US DOE PORTSMOUTH

QIV DECISION DOCUMENT

SEPTEMBER 2000

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List of Acronyms

ARARs:	Applicable or Relevant and Appropriate Requirements
Bedford:	Bedford shale
BERA:	Baseline Ecological Risk Assessment
BRA:	Baseline Risk Assessment
CERCLA :	Comprehensive Environmental Response, Compensation and Liability Act (Superfund Law)
Ci/hr:	Curies per hour
cm^2/sec:	Square centimeters per second
CMS:	Corrective Measures Study
CAS:	Cleanup Alternatives Study
COC:	Chemicals of Concern
COPC:	Chemicals of Potential Concern
Cuyahoga:	Cuyahoga shale
D&D:	Decontamination and Decommissioning
DDAGW	Division of Drinking and Ground Water
DHWM	Division of Hazardous Waste Management
DOCC:	Description of Current Conditions
ED:	Exposure Duration
ELCR:	Excess Lifetime Cancer Risk Level
fissile:	Refers to a shale that easily splits or cleaves
ft^2:	Square foot
ft^3:	Cubic foot
ft/d:	Feet per Day
ft^2/d:	Square feet per day
ft^3/d:	Cubic feet per day
Gallia:	Gallia sand and gravel
gal/month:	Gallons per month
gal/yr:	gallons per year
GC:	Gas chromatograph
gpd:	Gallons per day
gpm:	Gallons per minute
IGWMP	Integrated Ground Water Monitoring Plan
in/yr:	Inches per year

IRM:	Interim Remedial Measure
kg/yr:	Kilograms per year
lbs:	Pounds
LBC:	Little Beaver Creek
LMES:	Lockheed Martin Energy Systems
LMUS:	Lockheed Martin Utility Services
m^3/day:	Cubic meters per day
mg/l:	Milligrams per liter
mg/kg:	Milligrams per kilogram
mg/m^3:	Milligrams per cubic meter
mgd:	Million gallons per day
Minford:	Minford silt and clay
NCP:	National Oil and Hazardous Substances Pollution Contingency Plan
ND:	Not detected
NDD:	North Drainage Ditch
NEDD:	North East Drainage Ditch
NEPA:	National Environmental Policy Act
NPDES:	National Pollution Discharge Elimination System
OAC:	Ohio Administrative Code (Rules/Regulations developed as directed by law)
Ohio EPA:	Ohio Environmental Protection Agency
PAHs:	Polycyclic (or polynuclear) aromatic hydrocarbons
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene
***p*Ci/l:**	Picocuries per liter
PERA:	Preliminary Ecological Risk Assessment
PORTS:	Portsmouth Gaseous Diffusion Plant
ppb:	Parts per billion
ppm:	Parts per million
Preferred Plan:	The plan developed by Ohio EPA and US EPA that identifies the preferred alternative for cleanup at a SWMU
PRG	Preliminary Remedial Goal
QI	Quadrant I (QII = Quad II, etc.)
RAGS	Risk Assessment Guidance for Superfund
RCRA:	Resource Conservation and Recovery Act

RFI:	RCRA Facility Investigation
RME:	Reasonable Maximum Exposure
Sunbury:	Sunbury shale
SVOCs:	Semivolatile Organic Compounds
SWMUs:	Solid Waste Management Unit
Tc-99:	Technetium-99
TCE:	Trichloroethylene - A volatile organic compound commonly used in industrial degreasing operations.
TSCA	Toxic Substance Control Act
***u*g/hr:**	Micrograms per hour
***u*g/kg:**	Micrograms per kilogram
***u*g/l:**	Micrograms per liter
***ug/m*^{3}:**	Micrograms per cubic meter
US DOE:	United States Department of Energy
US EPA:	United States Environmental Protection Agency
VOCs:	Volatile Organic Compounds
VC	Vinyl Chloride
yd^3	Cubic Yards

DECLARATION STATEMENT

SITE NAME AND LOCATION

US Department of Energy

Portsmouth Gaseous Diffusion Plant (PORTS)

Quadrant IV

Piketon, Ohio

STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the proposed remedial actions for the Portsmouth Gaseous Diffusion Plant (PORTS), Quadrant IV, on the US Department of Energy (US DOE) Reservation in Piketon, Ohio. These actions were chosen in accordance with the Resource Conservation and Recovery Act (RCRA) of 1976, the Comprehensive Environmental Response, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the Hazardous and Solid Waste amendments (HWSA) of 1984. These Decisions are based on the administrative record for this response action. The US DOE site is being cleaned up under a Consent Decree between US DOE and the State of Ohio, and an Administrative Order by Consent (AOC) signed by US DOE and the United States Environmental Protection Agency (US EPA). Both legal agreements were signed in 1989.

Documentation for the selection of these remedial actions are contained in the administrative record which is maintained at both the US DOE Environmental Information Center in Piketon, Ohio and at the Ohio EPA Southeast District Office in Logan, Ohio. The specific documents include but are not limited to the Quadrant IV Final RFI Report, the Baseline Ecological Risk Assessment (BERA), the Air RFI, the Background Sampling Investigation of Soil and

Groundwater and the Ohio EPA Preferred Plan (Preferred Plan), the PAH Position Paper, the PCB Position Paper and other documents contained in the administrative record file for this response action.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from Quadrant IV, if not addressed by implementing the response actions selected in this Preferred Plan, may present a current or future risk to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDIES

Quadrant IV contains twenty four solid waste management units **(SWMUs)** which were investigated as part of the RFI (Please refer to Figure 2.1 or Figure 2.1 in the CAS/CMS Report . For the purposes of this Decision Document, the SWMUs were placed into two categories; **1) (SWMUs Requiring No Further Corrective Action)** are those SWMUs which have been determined to fall within the risk goals as outlined in RCRA and CERCLA ; and **2) (SWMUs "Deferred" to Decontamination and Decommissioning (D&D))** are those SWMUs which will be addressed under the 1989 Ohio Consent Decree when those SWMUs are no longer used as they were originally intended or when the gaseous diffusion plant is no longer in operation, or earlier if deemed appropriate. Most of these SWMUs pose minimal risk, are still in operation, and are part of the operational plant infrastructure. Although the approved CAS/CMS Report discusses a "referral" option, Ohio EPA has determined that the term "deferral" is more appropriate for SWMUs which fall into that category. The units addressed in this section remain under the auspices of Section VII of the Ohio Consent Decree. Deferring these units to D&D requires US DOE to re-evaluate and remediate these SWMUs at a later date as warranted, rather than potentially eliminating these SWMUs from further consideration.

SWMUs Requiring No Further Corrective Action

These SWMUs do not pose an unacceptable risk to human health and the environment as

described in the Baseline Risk Assessment (BRA) in the approved RFI. These SWMUs are described in detail in the approved RFI Report for Quadrant IV. The SWMUs listed below were determined to meet the risk guidelines for No Further Corrective Action:

- X-114A Firing Range
- X-334 Transformer Storage and Cleaning Building
- X-344A Uranium Hexaflouride Sampling Facility and X-344A Settling Tank
- X-344D HF Neutralization Pit*
- X-744W Surplus and Salvage Warehouse
- X-745E Northwest International Process Gas Yard
- X-745F North Process Gas Stock Pile Yard
- X-752 Hazardous Waste Storage Facility
- Old Northwest Firing Range (Ruby Hollow)
- Rail Road Spur Yard Storage Area

* The D&D of this SWMU will be completed per the Ohio EPA approved workplan.
Note - D&D will take place before December 2000.

Remedial Actions have been completed at these SWMUs and monitoring is ongoing per the approved IGWMP and O&M Plans. Please refer to pages 23-25 of this text.

- X-611A North, Middle, and South Lime Sludge Lagoons
- X-735 Sanitary Landfill and X-735A Landfill Utility Building*
- X-734 Old Sanitary Landfill, X-734A Construction Spoils Landfill, and X-734B Constructions Spoils Land Fill

SWMUs Deferred to Decontamination and Decommissioning (D&D)

There were four criteria that were used to identify SWMUs as appropriate for deferral to the D&D process in the approved CAS/CMS Report. The four criteria are as follows:

(1) HI values for media-specific total non-cancer risks under the industrial worker scenarios are generally less than 1: and

(2) The industrial worker scenario ELCR values were within the risk range of 1×10^{-4} to 1×10^{-6}: or

(3) Evaluation of the contaminants present indicate that they are generally immobile.

(4) The SWMUs identified are within current production areas and operational facilities. Remedial activities may interrupt facility operations and such areas may likely become re-contaminated due to on going production of enriched uranium.

Releases of contaminants to the environment from ongoing production areas may be occurring. Should a release occur which could impact current workers or ecological receptors, proper action will be taken to prevent exposure. It was not considered necessary for the SWMUs in this section to meet all of the four criteria listed above to be deferred to D&D at the site.

The SWMUs listed below have been deferred to D&D:

- X-230J6 Northeast Holding Pond, Monitoring Facility, and Secondary Oil Collection Basin
- X-333 Process Building
- X-342A Feed Vaporization and Fluorine Generation Building, X-342B Fluorine Storage Building, and X-342C Waste HF Neutralization Pit
- X-344C HF Storage Facility
- X-533A Switchyard, X-533B Switch House, X-533C Test and Repair Building, X-533D Oil House and Associated French Drains, X-533E Valve House, X-533F Valve House, and X-533H Gas Reclaiming Cart Garage
- X-630-1 Recirculating Water Pump House, X-630-2 A&B Cooling Towers, and X-630-3 Acid Handling Station
- X-745B Enrichment Process Gas Yard

PART 2: DECISION SUMMARY

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DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

The PORTS facility was constructed between 1952 and 1956 and is owned by US DOE. The active portion of the PORTS plant occupies approximately 1,000 acres of a 3,714-acre US DOE reservation in south central Ohio, approximately 80 miles south of Columbus, 20 miles north of Portsmouth, and 1 mile east of U.S. Route 23, near Piketon (Please refer to Figure 1). The immediate region surrounding the site consists of Pike County, Scioto County, Jackson County, and Ross County. Approximately 24,250 people reside in Pike County (Energy Systems 1997), and scattered rural development is typical. Piketon is the nearest town, approximately 5 miles north of the facility on U.S. Route 23. Piketon had an estimated population of 1,717 in 1990. The county's largest community, Waverly, has approximately 4,500 residents and is situated 12 miles north of the facility.

Land within a 5-mile radius of PORTS is primarily undeveloped, including cropland, woodlots, pasture, and forest. This distribution includes approximately 25,000 acres of farmland and 25,000 acres of forest. There is approximately 500 acres of urban land within the same radius (Energy Systems, 1993).

The PORTS facility occupies an upland area of southern Ohio with an average land surface elevation of 670 feet above mean sea level. The terrain surrounding the plant site consists of marginal farmland and wooded hills, generally with less than 100 feet of relief. The plant is located within a mile-wide former river valley.

The geology of the PORTS plant site consists of unconsolidated material overlying bedrock formations. The unconsolidated material is known as the Teays formation. The Teays formation is composed of two members, the Minford silt and clay (Minford), and the Gallia sand and gravel

(Gallia). The bedrock formation underlying the Teays formation are, in descending order, the Sunbury shale, the Berea sandstone, and the Bedford shale.

For purposes of the RCRA Facility Investigation (RFI), the PORTS facility has been separated into quadrants (Please refer to Figure 2). Each quadrant roughly corresponds to the uppermost groundwater flow paths beneath the site. The PORTS groundwater system includes two water-bearing units, the Berea Sandstone bedrock and the unconsolidated Gallia, and two aquitards, the Sunbury Shale (Sunbury) and the unconsolidated Minford. Although the Minford silt does not transmit groundwater as readily as Gallia, the basal silt portion of the Minford is generally grouped with the Gallia as part of the uppermost water-bearing unit at the PORTS site.

Creeks and holding ponds are the most important surface water features at the PORTS plant site. The PORTS site is drained by Little Beaver Creek, Big Run Creek, the West Drainage Ditch, and the unnamed southwest drainage ditch. Sources of water for the surface water flow system include precipitation run-off, groundwater discharge and effluent from plant processes. All surface water from the plant site eventually drains into the Scioto River which flows north to south approximately 1 mile west of the plant. The Scioto River is approximately 120 ft. lower in elevation than the PORTS site.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The principal process at the PORTS facility is the separation of uranium isotopes via gaseous diffusion. The PORTS facility has been operating since 1954 enriching uranium for use in commercial reactors and for use by the U.S. Navy in power reactors. Production of enriched uranium for use by the Navy was ceased in 1991. The production facilities are owned by US DOE and are leased by the United States Enrichment Corporation which was formed in 1993 as a government-owned corporation by the Energy Policy Act of 1992. The company became private in July 1998. Other portions of the site are leased to the Ohio National Guard and the Defense Logistics Agency. US DOE remains the owner of the property.

Support operations for the production of enriched uranium include the feed and withdrawal of material from the primary process, water treatment for sanitary and cooling purposes, decontamination of equipment removed from the primary process, or maintenance, or replacement, and recovery of uranium from various waste materials. The construction, operation and maintenance of this facility requires the use of a wide range of commercially available chemicals. Continuous operation of this facility since 1954 has resulted in the generation of inorganic, organic and low level radioactive waste materials.

In 1989, US DOE and the State of Ohio entered into a Consent Decree that outlined the requirements for handling hazardous waste generated at the PORTS facility and for conducting investigation and corrective measures studies at the site. US EPA and US DOE entered into a similar agreement, the AOC, in September 1989. This agreement was negotiated between US EPA Region V and US DOE. The AOC requires that the PORTS facility conduct a RCRA Facility Investigation (RFI) and a Corrective Measures Study (CMS), select remedies, and implement them according to a Corrective Measures Implementation (CMI) plan. A schedule is attached to each agreement outlining a submittal schedule to Ohio EPA and US EPA for documents pertaining to the investigation and corrective measures studies. A recent schedule for completion of remedial activities was approved by Ohio EPA on December 11, 1998.

The AOC and Consent Decree require corrective action based on the requirements of RCRA. In addition, the AOC states that CERCLA requirements must be incorporated into the corrective action process. In areas where the AOC and Consent Decree are not specific, regulations and guidance under RCRA statutes are used. In specific instances where RCRA provides no guidance, the provisions of CERCLA are used, as appropriate.

Ohio EPA and US EPA signed a three-party order in August 1997 which granted Ohio EPA the authority for oversight of the day-to-day activities at Portsmouth. Under this agreement, US EPA must concur with all remedy selections.

3.0 HISTORY OF QUADRANT IV REMEDIAL INVESTIGATION

For purposes of the **RCRA** Facility Investigation (**RFI**), the PORTS facility has been separated into quadrants. Each quadrant roughly corresponds to a distinct groundwater flow cell within

the primary water-bearing unit beneath the site and has been investigated separately. Quadrant IV occupies the northern portion of the PORTS reservation. (See Figure 1.2 in Appendix II or refer to Figure 1.2 in the CAS/CMS report.) The Quadrant IV RFI was conducted in two phases. Phase I of the investigation was conducted from February to August, 1991. Phase II of the investigation was conducted from October to December, 1993. The final version of the RFI report was submitted on January 2, 1997. The Quadrant IV RFI received final approval from Ohio EPA on September 5, 1997. The Quadrant IV CAS/CMS Report was approved on October 19, 1998. The amended Quadrant IV Final CAS/CMS Report was approved on January 22, 1999.

4.0 RISK ASSESSMENT

The assessment of potential or current risks from wastes present at the site is based on guidance provided by the **US EPA**, in particular the "**Risk Assessment Guidance for Superfund (RAGS)**, (US EPA, 1989a) and Guidelines for Exposure Assessment (US EPA, 1992a). These guidance documents are founded on well-established chemical risk assessment principles developed for the regulation of environmental contaminants.

The risk assessment for contaminated sites on the **DOE-PORTS** site consisted of a Human Health Risk Assessment and an Ecological Risk Assessment. The Ecological Risk Assessment was conducted separately. The initial risk assessment conducted for the site assumes that no future cleanup action is taken and is referred to as the Baseline Risk Assessment. The Baseline Risk Assessment consists of numerous steps as follows:

4.1 Identification of Chemicals of Potential Concern

After data collected during the RFI was evaluated, chemicals detected during lab analysis were retained as **Chemicals of Potential Concern (COPC)**. Some data not appropriate for certain exposure pathways was excluded. For example, deep soil data greater than 10 feet would not

be expected to be available for possible ingestion by children or adults and is only a threat to ground water contamination. Therefore, this data was not included in the assessment of soil ingestion risks.

4.2 Exposure Assessment

This step involves the evaluation of potential human exposures to site chemicals. There are basically four separate tasks necessary in the Exposure Assessment. These steps are: **(a) The Characterization of the Exposure Setting; (b) Identification of Exposure Pathways; (c) Estimation of Environmental Concentrations; and (d) Estimation of Human Intake.**

4.2.1 Characterization of the Exposure Setting

This step involves modeling or simulating those exposure scenarios considered possible on the site both for current use and future use. The following scenarios were included in the baseline risk assessment:

4.2.1.1 Current Use Scenarios

- **on-site worker**
- **off-site resident**
- **off-site recreational population**
- **on site resident***

*(This scenario was no longer considered viable after the completion of the RFI Report. Stakeholders and regulators determined it is more likely that the area within the security fence will probably remain industrial and the other areas within the reservation will be used for commercial or recreation use. Areas at the reservation boundary will still be evaluated as residential)

The on-site worker scenario describes potential exposures to outdoor media at **PORTS** for a worker engaged in normal day-to-day activities throughout the quadrant. The future worker scenario describes potential exposures to outdoor media at PORTS and includes the ingestion of groundwater. The recreational population scenario was developed to assess potential exposures to surface water bodies on the PORTS reservation and to fish and game eaten by local recreational anglers and hunters. In estimating exposure for both current off-site resident and recreational populations, any significant direct access to media within the Quadrant being evaluated was considered unlikely. Exposures were assumed to result from contaminants that could potentially migrate off-site.

As stated above, future use scenarios were developed consistent with the reasonable maximum exposure. The area within the security fence is expected to remain industrial in the future. Areas outside the security fence within the reservation were evaluated for a future recreational/commercial use. For the future use conditions, the following scenarios were developed:

4.2.1.2 Future Use Scenarios

- **On-site commercial use** *(evaluated after approval of the RFI and BRA)*
- **On-site recreational population**
- **On-site industrial worker**
- **Off-site resident**
- **Off-site recreational population.**

In addition to the on-site worker who is involved in normal day-to-day activities, another exposure scenario modeled under both current and future land use conditions is the excavation worker. This worker is assumed to be in contact with contaminated media during periodic, intrusive activities such as construction or landscaping. The future worker scenario described potential exposures to outdoor media at PORTS and includes the ingestion of groundwater.

4.2.2 Identification of Human Exposure Pathways

The above exposure scenarios were developed to model or simulate possible exposure situations found at the site. It is also necessary to determine the most likely **exposure pathways** as well. An example of an exposure pathway is the ingestion of contaminated groundwater by on-site workers in the future. The following exposure pathways were evaluated for both the current and future worker as well as the recreational visitor:

- **Exposure to Groundwater via ingestion of drinking water, and dermal contact and inhalation of volatiles while showering; (for future on-site worker only)**

- **Exposure to soil via incidental ingestion and dermal contact, and via external gamma radiation from radionuclides present in soil;**

- **Exposure to sediment via incidental ingestion and dermal contact;**

- **Exposure to surface water via incidental ingestion and dermal contact;**

- **Exposure to air via inhalation of vapors and particulates;**

- **Exposure via ingestion of local game contaminated by grazing on land affected by plant operations;**

- **Exposure via ingestion of fish.**

4.2.3 Estimation of Environmental Concentrations

In this step, concentrations of chemicals and radionuclides in various environmental media from which exposure may occur are estimated via sampling results and mathematical modeling.

4.2.4 Estimation of Human Intake

This step involves calculating the amount of a substance received by an individual through exposure to chemicals and radionuclides in the various environmental media. Chemical intakes (referred to as **chronic daily intakes or CDIs**) are typically expressed in terms of the amount of material in contact with the body for a certain time period, and are calculated as a function of chemical concentration in the soil or water, how often the exposure occurs and how long (exposure frequency), body weight, and the portion of a lifetime that exposure occurs. The generic equation for calculating the **CDI** is as follows:

$$\mathbf{CDI} = \frac{\mathbf{CxCRxEFxED}}{\mathbf{BwxAT}}$$

CDI	=	Chronic daily intake, mg/kg/day
C	=	Chemical concentration in soil or water, e.g. mg/kg soil
CR	=	Contact Rate, e.g., kg/soil/day
EF	=	Exposure frequency, days/year
ED	=	Exposure Duration, years
BW	=	Body Weight, kg
AT	=	Averaging Time; portion of lifetime over which exposure is averaged (days).

Variations of this equation are used when calculating air inhalation and radiological exposures.

4.3 Toxicological Assessment

The toxicological assessment involves the identification of adverse health effects associated with exposure to a chemical or radionuclide and the relationship between the extent of exposure and the likelihood and/or severity of adverse effects. The US EPA has conducted such assessments on many frequently occurring environmental chemicals and radionuclides and has developed toxicity values based on these assessments for use in risk assessments. Further information regarding the toxicological assessment can be found in the RFI Reports.

4.4 Risk Characterization

This step involves calculating estimates of carcinogenic (cancer causing) and non-carcinogenic risks from chemicals of concern for different exposure pathways.

Cancer risk is defined as the probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen in addition to the probability of cancer risks from all other causes. As a benchmark in developing clean-up goals at contaminated sites, an acceptable range of **excess cancer risk (ECR)** from one in one million ($1x10^{-6}$) to one in ten thousand ($1 x 10^{-4}$) has been established. The point of departure or program goal for risk remaining after a site is cleaned up is $1x10^{-6}$ (i.e. a one in one million excess lifetime cancer risk, above and beyond risks from other unrelated causes) and is the risk goal for the U. S. DOE-PORTS site.

The "**Hazard Quotient**" **(HQ)** is used to determine the severity of non-cancerous hazards posed at a site. The HQ is determined by dividing the **Chronic Daily Intake (CDI)** by the **Reference dose (RfD).** The reference dose is the amount of material that is determined to cause a toxic effect. If the **HQ** is less than or equal to 1, then the estimated exposure to a substance represented by the **CDI**, is judged to be below the threshold that could result in a toxic effect. An **HQ** greater than 1, indicates that a toxic effect may result. To assess the cumulative effect

of similar noncancerous substances, the **HQ** for all of the substances being assessed at a site are added, with the result being the **Hazard Index (HI)**.

4.5 Conclusions

The risks estimated for substances evaluated at a SWMU and in the quadrant, are compared to target risk levels (preliminary remedial goals-PRGs) and general conclusions are made regarding the potential risks associated with these substances. If the risks are shown to be unacceptable, remedial alternatives are developed to prevent potential exposure to human and ecological receptors.

5.0 GEOLOGY/HYDROGEOLOGY

GEOLOGY

The geology (or characterization of site soils and bedrock) at the PORTS facility has been characterized through the drilling of over 1200 borings throughout the site. The uppermost geologic layer (called the unconsolidated material) consists of the Minford silt and clay and the Gallia sand and gravel. Where undisturbed, the Minford consists of an upper clay layer that grades into a silt layer. Generally the upper clay comprises two-thirds of the Minford and consists of strong stiff clay. The silt portion of the Minford is more permeable, yet still contains a relatively high percentage of finer clay material. The Gallia is compromised of poorly sorted sand and gravel with silt and clay. Below the Gallia sand and gravel is the Sunbury shale and then the Berea sandstone. The Sunbury shale generally thins from east to west across the PORTS facility and is generally absent on the western side of the PORTS site. For a more detailed description of the PORTS geology, please refer to Section 2.0 of the Quadrant IV RFI Report. (See Figure 1.6 in Appendix II)

HYDROGEOLOGY

The groundwater flow system at the PORTS facility includes two aquifers (the bedrock Berea sandstone and the unconsolidated Gallia) and two aquitards (the Sunbury shale and the unconsolidated Minford). The basal silt portion of the Minford is generally grouped with the Gallia to form the uppermost primary aquifer at the facility. The hydraulic properties of these units have been well defined over a period of years during the RFI. Groundwater flow at the site has also been well defined as a result of the RFI. Groundwater flow maps for the Gallia and Berea can be found in the approved RFI Report in Appendix A.

6.0 DISCUSSION OF SWMUS IN QUADRANT IV

Discussed below are the history and risk analysis of SWMUs in Quadrant IV as they were presented in the RFI and CAS/CMS Reports as well as summaries of current risk management documents which were used to determine the clean-up objectives for this quadrant.

6.1 Groundwater Summary

Groundwater and surface water monitoring at the Portsmouth Gaseous Diffusion Plant was initiated in the 1980's. Since that time, numerous investigative studies and routine monitoring programs have provided much geologic and hydrogeologic information. Groundwater monitoring has been conducted in response to regulatory requirements of the Ohio Administrative Code, closure documents, an Administrative Order on Consent between US DOE and Ohio EPA, as well as US DOE orders.

Elevated levels of arsenic, beryllium and other metals were detected in the groundwater during the RFI. Groundwater samples collected for the RFI were taken using a bailer which allowed for highly turbid samples. These samples were not filtered to remove sediments prior to laboratory

analysis. Risk was determined based on the results of these highly turbid samples. US DOE completed additional sampling of groundwater using low-flow pumps from wells located in areas of the plant that have historically had high metals results in groundwater. Based on these results, the metals in groundwater previously detected at these areas appear to be the result of turbidity due to previous sampling techniques. Numerous samples indicated that the metals detected in the groundwater using the low flow technique were below MCLs and in some cases were below the analytical method detection limit. Therefore, the risk calculated for exposure to metals in groundwater in the baseline risk assessment as part of the RFI may be over estimated.

The integrated ground water monitoring plan (IGWMP) is designed to minimize the potential for conflicts in requirements and to maximize resources for collecting the data needed for sound decision making. Keeping the intent of the regulatory directives and objectives of various monitoring programs in mind, the IGWMP is designed to establish all groundwater monitoring requirements for the Portsmouth site. The requirements established for the continued groundwater monitoring for selected remedial alternatives will be incorporated into the IGWMP and will be revised as determined to be necessary by Ohio EPA. Areas which continue to indicate elevated levels of inorganics using the low-flow pumps will continue to be monitored through the IGWMP. If necessary a remedy will be installed to remediate inorganics in areas of concern.

6.2 Summary of the PAH Position Paper

PAHs are a common contaminant at PORTS which are introduced into the environment by both natural and anthropogenic combustion processes. PAHs are semi-volatile organic compounds that consist of two or more fused aromatic rings and include chemicals such as anthracene, benzo(a)pyrene (B(a)P), flouranthene, and naphthalene. PAHs are formed when hydrocarbons undergo incomplete combustion in which hydrogen is consumed in preference to carbon. The purpose of the PAH position paper was to evaluate and demonstrate that the contamination from polynuclear aromatic hydrocarbons (PAH) was similar in concentration to areas out side of the facility and was not related to the site processes but was due to the infra-structure of the site (i.e. asphalt roofs, roadways, automobile exhaust, etc.). Risk goals were developed based on

the most current information available on PAHs. An evaluation regarding the concentration of PAH contamination was made to areas which are not regulated (i.e. along road ways and community parks) as well as residential. The report concluded that many of the elevated detections of PAHs at the site during the RFI appear to be the result of sources such as tar covered gravel lots, asphalt roads and parking lots, vehicle exhaust and possibly air emissions and run-off from the coal fired steam plant. It is not recommended that those areas with levels of PAH contamination similar to that of non-regulated or residential areas be remediated at this time. Such an effort would not be cost effective since these areas would likely become recontaminated. Areas such as drainage ditches, streams and creeks, will be deferred to D&D. The risk from PAHs will be evaluated at that time and the proper remedial action will be taken. The PAH position paper was approved by Ohio EPA on May 8, 1997.

6.3 Summary of the PCB Position Paper

The purpose of the Polychlorinated biphenyl (PCB) position paper was to evaluate the levels and extent of PCB contamination at the site and develop a risk goal which was protective of human health and the environment. PCBs have been used as cooling fluids in electrical transformers and capacitors; for heat transfer and hydraulic fluids; as dye carriers in carbonless copy paper, in paints, adhesives, and caulking compounds, and as sealants and road coverings to control dust. The RFI and BERA sampling activities indicated that at least one PCB compound was detected at 98 of the 1007 locations where soil was sampled. PCB detections in soil appear to be distributed widely across the plant site. Of the 148 sediment samples taken and analyzed for PCBs during the RFI and the BERA, 28 had at least one of the PCB compounds detected.

The PCB remedial goal for this site was based on the most probable future use. The future use at this site within the Perimeter Road has been determined to be industrial. In order to be consistent with this risk goal the clean -up goal for the site within the Perimeter Road is 25 ppm. The 25 ppm goal for the site is consistent for an industrial site as cited in TSCA and CERCLA guidance as well as in the Federal Register, Proposed Rule: December 1996. PCB

contamination in soil at the Peter Kiewit Landfill is the only location where PCBs exceed 25 ppm. This soil has been addressed as part of the remedial activity at the land fill. The PCB position paper was approved on September 11, 1997.

7.0 SWMUs Requiring No Further Corrective Action

7.1 X-114A Firing Range

The X-114A Firing Range is an 80,000 square feet outdoor area that was used for target practice by security personnel from 1979 to 1989. The projectile impact area was a sloped bank at the southeastern end of the unit.

Risk Analysis

Environmental media sampled at this SWMU during the RFI were surface water, surface soil (0 to 2 ft), and shallow soil (2 to 10 ft).

Surface Water. During the RFI, lead and other metals were detected in seep surface water associated with this SWMU. The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for all future land use scenarios. The BRA also identified a total ELCR of $1x10^{-5}$ for current and future on-site workers. This ELCR was driven by exposure to beryllium in surface water. A total ELCR of $2x10^{-5}$, also due to the presence of beryllium in surface water, was identified for the future recreational population. It is believed that the beryllium in the surface water was naturally occurring.

Soil. Lead was detected at elevated concentrations in soil associated with this SWMU. The evaluation of risks associated with exposure to lead in soil at this unit is based on the Integrated Exposure Uptake Biokinetics (IEUBK) model, which predicts blood lead concentrations in children. On the basis of the soil lead concentrations found at this unit, monitoring indicates blood levels do not exceed the levels generally considered acceptable, i.e., a blood level of 10 ug/dL or less in 95% of exposed children.

7.2 X-334 Transformer Storage and Cleaning Building

The X-334 building encloses approximately 2,500 square feet and houses a transformer storage and cleaning area. The cleaning area is surrounded by dikes and is equipped with recovery sumps that pump the used cleaning agent, kerosene, to a storage tank before final disposition. PCB mixed oils have been stored in tanks located in the PCB transfer area of X-334.

Risk Analysis

Environmental media sampled at this SWMU during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), and groundwater.

Soil and Groundwater. During Phase I of the Quadrant IV RFI, no VOCs, PCBs, or pesticides were detected in the soil associated with this SWMU. Uranium was detected in the soil associated with this unit. No radiological parameters were detected in the groundwater associated with this SWMU. PAHs were detected at concentrations consistent with or lower than PAH levels detected in soils throughout the site.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for all future land use scenarios. The BRA also identified a total ELCR of less than $1x10^{-6}$ for all future land use scenarios in the RFI.

7.3 X-344A Uranium Hexaflouride Sampling Facility and X-344A Settling Tank

The X-334 Uranium Hexafluoride Sampling Facility encloses an area of approximately 91,900 ft^2 and serves as the shipping and receiving facility for uranium hexafluoride cylinders and as the operations facility for transfer of uranium hexafluoride from 14-ton DOE cylinders to 2.5-ton customer cylinders. The X-344A settling tank is located adjacent to the north side of the facility and was designed to receive runoff from drains inside the building.

Environmental media surrounding the X-344A facility were investigated during Quadrant IV RFI as part of the X-745B Enrichment Process Gas Yard and X-745F North Process Gas Stockpile Yard. These SWMUs are discussed in Sections 6.2.7 and 6.2.8, respectively. Subsequent to the RFI, the tank and adjoining soils were removed as part of a risk-based closure. The closure activities were certified complete on November 25, 1996.

Risk Analysis

Environmental media sampled at this SWMU (near settling tank only) during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Soil. During the Phase II investigation, VOCs were detected at concentrations below laboratory detection limits in the soil associated with this SWMU. Radiological parameters were also detected at low levels in the soil associated with this SWMU. No SVOCs, PCBs, technetium, or pesticides were detected in the soil associated with this SWMU.

Groundwater. During the Phase II RFI, no VOCs, SVOCs, PCBs, radiological parameters, or pesticides were detected in the groundwater associated with this SWMU.

The Quadrant IV RFI BRA did not analyze the risk associated with this unit, and the contamination was deemed likely to be confined to the immediate vicinity of the tank because of the very low concentrations detected and the proximity of the sample locations to the settling tank. As noted above, the X-344A Settling Tank underwent a successful closure according to the approved closure plan, and other media surrounding the X-344A facility have been evaluated as part of the X-745B and X-745F SWMUs. Therefore, this SWMU does not require further corrective action.

7.4 X-344D HF Neutralization Pit

The X-344D HF Neutralization Pit is an open-top concrete basin approximately 100 ft long by 4 ft deep and has a trapezoidal cross-section that is 4 ft wide at the bottom and 29 ft wide at the

top. The pit is divided into four sections separated by concrete weirs and has a total volume of approximately 6,000 gal. No documented spills have occurred at this site.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface water, sediment, surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Surface Water and Pit Sediment. During the Phase I RFI, no VOCs, SVOCs, PCBs, radiological parameters, or pesticides were detected in the surface water associated with this SWMU. VOCs and SVOCs were detected at concentrations above laboratory detection limits in the pit sediment. PAHs were detected at concentrations below and above laboratory detection limits in the pit sediment. Radiological parameters, including technetium, were also detected in the pit sediment. No PCBs or pesticides were detected in the pit sediment associated with this SWMU.

Soil and Groundwater. During the Phase I RFI, VOCs were detected at concentrations above laboratory detection limits and PAHs were detected at concentrations below and above laboratory detection limits in the soil associated with this SWMU. Radiological parameters were also detected in the soil associated with this unit. No PCBs or pesticides were detected in the soil associated with this unit.

During the Phase II RFI, SVOCs were detected at one location in the soil associated with this SWMU. Radiological and inorganic parameters were also detected. No VOCs, PAHs, PCBs, or pesticides were detected in the soil associated with this unit during the Phase II investigation.

During the Phase I and Phase II RFI, VOCs were detected in the groundwater associated with this SWMU. The radiological parameters gross alpha and gross beta were detected during the Phase I investigation only. Inorganic parameters were also detected in groundwater associated with this unit.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for the current on-site and excavation worker scenarios. A total noncancer HI of 4 was also identified for the future on-site worker scenario because of the presence of arsenic and vanadium in the groundwater at this SWMU.

Additional sampling of groundwater was collected using low-flow pumps from wells located in areas of the plant that have historically had high metals results in groundwater. Based on these results, the elevated levels of metals in groundwater previously detected appear to be the result of turbidity due to previous sampling techniques. Therefore, the risk at this unit to future on-site workers due to ingestion of groundwater may be over estimated. Continued groundwater monitoring will take place through the approved Integrated Groundwater Monitoring Plan.

The BRA also identified a total ELCR of $5x10^{-4}$ for the future on-site worker scenario. This risk is driven by exposure to arsenic and beryllium in the groundwater associated with this SWMU. Please refer to comment above regarding turbidity issues in wells. A total ELCR of less than $1x10^{-6}$ was identified for the current on-site and excavation worker scenarios. This pit will be removed per the Ohio EPA approved workplan in September 2000. Therefore, the risk as noted above from sediments and soils will be greatly reduced.

7.5 X-611A North, Middle, and South Lime Sludge Lagoons

Following the RFI sampling activities, this unit was accelerated through the CAS/CMS process and addressed in a separate document, the *X-611A Draft Cleanup Alternatives Study/Corrective Measures Study* (DOE 1995). CMI plans were approved by Ohio EPA on July 2, 1996. Remedial construction activities were completed in the fall of 1996. The selected remedial alternative for this SWMU was the construction of a prairie wetland habitat over the lagoon area of approximately 18 acres. The selected remedy prevents human and ecological receptors from coming into contact with the sludge in the lagoons. Therefore, no further additional

corrective action is required for this SWMU. US DOE continues to monitor groundwater and inspect and maintain this unit per the Ohio EPA approved CMI.

7.6 The X-734 Area (X-734 Old Sanitary Landfill, X-734A Construction Spoils Landfill, X-734B Construction Spoils Landfill)

The X-734 Old Sanitary Landfill has a total of approximately 3.8 acres. Detailed records of materials disposed in the landfill were not kept. However, waste known to be disposed of at X-734 include: trash and garbage, construction spoils, and waste containing unspecified levels of heavy metals. While not substantiated, plant personnel have indicated that organic solvents may have been disposed of in the unit. The X-734A Construction Spoils Landfill has a total area of approximately 3.5 acres and is adjacent to the southern boundary of X-734. In March 1985 empty drums were being disposed in the spoil area; the practice was subsequently discontinued. Waste disposed of at X-734A included construction spoils, trees, railroad ties, broken concrete, stumps, roots, brush, and other wastes from clearing and grubbing operations. A surface water seep area is located in the upper portion of the slope on the eastern side of the landfill.

The X-734B Construction Spoils Landfill is located south of the X-734A and has a surface area of approximately 4.6 acres. A road and buffer zone separate the northern boundary of X-734B from X-734A. X-734B reportedly received the same type of waste as X-734A, construction spoils, trees, railroad ties, broken concrete, stumps, roots, brush and other wastes from clearing and grubbing operations. The southwest boundary of this unit overlaps a portion of the X-744W leach field area. (See Figures 6.2 and 6.3 in Appendix II)

Risk Analysis

Environmental media sampled at this unit during the RFI were surface water, sediment, surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Seep Surface Water and Sediment. The Quadrant IV RFI BRA identified a total noncancer HI of 2 for the current on-site worker and on-site recreational population scenarios. These risks

are driven by exposure to arsenic in the seep sediment associated with this SWMU. The BRA also identified a total ELCR of $4x10^{-4}$ for the current on-site worker scenario because of the presence of arsenic and PAHs in seep leachate associated with this SWMU. Leachate is detected in the eastern side of the X-734/X-734A landfill. The leachate is flowing towards Little Beaver Creek. A total ELCR of $8x10^{-4}$ identified for the on-site recreational population scenario is driven by exposure to arsenic, beryllium, and PAHs in the seep sediment and arsenic in the surface water.

Soil and Groundwater. The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for the current on-site worker. The BRA identified a total noncancer HI of 7 for the future on-site worker scenario. This risk is driven by exposure to arsenic in the groundwater associated with this SWMU. The BRA also identified a total noncancer HI of 1 for the excavation worker scenario. This risk is driven by exposure to inorganic constituents in the soil associated with this SWMU.

The BRA also identified a total ELCR of $1x10^{-4}$ for the current on-site worker scenario because of the presence of arsenic, beryllium, and PAHs in the soil associated with this SWMU. A total ELCR of $1x10^{-3}$ was identified for the future on-site worker scenario. This risk is driven by exposure to arsenic, beryllium, and PAHs in the soil and arsenic and beryllium in the groundwater associated with this SWMU. A total ELCR of $8x10^{-6}$ was identified for the excavation worker scenario. This risk is driven by exposure to arsenic and PAHs in the soil. Due to the unacceptable risks identified in the RFI BRA, remedial alternatives were developed for this unit. The X-734 Landfill area was capped in accordance with the Ohio EPA Decision Document issued in September 1999. A Multimedia cap was installed on the X-734/X-734A area . A Soil Cap was installed on the X-734B area along with phytoremediation down gradient from the landfill. Phytoremediation (hybrid poplar trees) was installed in this area to remediate any groundwater that could potentially migrate beneath the landfill. This area will be monitored per the approved CMI plan and groundwater will be monitored in accordance with the IGWMP.

7.7 X-735 Sanitary Landfill and X-735A Landfill Utility Building

The X-735 Sanitary Landfill has a total area of approximately 7.9 acres and was approved by the Ohio EPA and the Pike County Department of Health for the disposal of nonradioactive, nonhazardous, and non-PCB solid wastes. Included within this facility are the following documented materials: industrial and office waste, cafeteria waste, empty metal and plastic containers, sewage treatment plant grit screenings, metallic sludges from the coal pile runoff treatment facility, asbestos, fixed chemical and semi-solid sludges, flyash, medical wastes, and materials from construction and demolition operations. The X-735 Sanitary Landfill was closed in accordance with Ohio Solid Waste regulations in September 1998.

The X-735A Landfill Utility Building encloses 5,200 square feet. It contains a heavy equipment storage and repair area, office space and shelter for employees, restrooms, a lunchroom, and shower facilities.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Soil and Groundwater. During Phase I of the RFI, no VOCs, SVOCs, PCBs, or pesticides were detected in the soil or groundwater samples collected for this unit. Radiological parameters were detected at low levels in the soil and groundwater associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of 2 for the future on-site worker scenario. This risk is due to the presence of several inorganic constituents in the groundwater associated with this SWMU. A total ELCR of $3x10^{-4}$ was identified for future on-site workers as a result of exposure to arsenic and beryllium in the groundwater associated with this SWMU. To address this problem and reflect the most probable levels of arsenic and other inorganic constituents present in groundwater at this unit, additional sampling and monitoring will be conducted using a low flow pump. The evaluation of groundwater at this unit will continue via

the IGWMP. If at any time it appears that contaminants are above acceptable levels, appropriate action will be taken. Neither a total noncancer HI nor an ELCR were derived for the current on-site or excavation workers because of the low levels of constituents detected.

Since *the northern and southern* portions of X-735 Landfill have been closed in accordance with the requirements of the Ohio EPA hazardous and solid waste programs further evaluation of this SWMU is unnecessary. The groundwater at this unit will be monitored according to the Ohio EPA solid waste regulatory program per the requirements of the IGWMP and the Director's Order on Consent for Integration (1999). The caps for both the northern and the southern portion of the landfill will continue to be monitored by the Ohio EPA hazardous and solid waste programs.

7.8 X-744W Surplus and Salvage Warehouse

The X-744W Surplus and Salvage Warehouse encompasses 50,000 square feet. This building contains various surplus plant-site equipment that is periodically auctioned. The X-744W warehouse is served by a septic tank, drainage field, and associated sewer lines. The tank and drain field are located northeast of the warehouse.

Risk Analysis

Environmental media sampled at this unit during the RFI were shallow soil (2 to 10 ft), deep soil, and groundwater.

Soil and Groundwater. No VOCs were detected in the soil at this SWMU. During the Phase I RFI, PCBs were detected in one soil sample and PAHs were detected in the soil at concentrations both above and below laboratory detection limits. However, no PCBs or PAHs were detected during the Phase II RFI. The PAH concentrations detected during Phase I at this SWMU are consistent with or lower than PAH levels detected in soils throughout the site.

No VOCs, PCBs, or pesticides were detected in the groundwater samples collected for this unit during the RFI. The SVOC 1,4-dioxane was detected at concentrations below its laboratory detection limit in the groundwater during the Phase I investigation.

Because of the absence of surface soil data, neither a total HI nor an ELCR was calculated for this SWMU for the current on-site worker. The Quadrant IV RFI BRA identified a total noncancer HI of 1 and an ELCR of $2x10^{-4}$ for the future on-site worker because of the presence of inorganic constituents, particularly arsenic, in the groundwater and Aroclor-1260 and PAHs in the soil associated with this SWMU. A total noncancer HI of less than 1 and an ELCR of $2x10^{-6}$ were also identified for the excavation worker scenario because of the presence of Aroclor-1260 and PAHs in the soil associated with this SWMU. Two PAHs exceeded selected PRGs in one sample; however, the area where this sample was taken (X-744W leach field) will be remediated with the X-734B Land fill. PCBs slightly exceed the selected PRG in one groundwater sample (0.63 ug/l vs. 0.5 ug/l MCL) taken during the Phase I RFI. However, PCBs were not detected during the Phase II RFI investigation. The levels of arsenic and other metals in the groundwater may be elevated due to sampling technique. Low flow pumps have been installed on many wells on the site and the levels of inorganics including arsenic and the resulting risk are shown to be greatly reduced. The evaluation of groundwater will continue via the IGWMP and if levels of contaminants of concern exceed PRGs, this unit may be re-evaluated to determine if remediation is warranted.

7.9 X-745E Northwest International Process Gas Yard

The X-745E Northwest International Process Gas Yard is a gravel pad covering approximately 94,367 square feet and is used to store full uranium hexafluoride cylinders that will be shipped overseas. The X-745E yard is located northwest of the X-630 Cooling Towers. No releases from the X-745E unit have been documented.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Soil and Groundwater. No SVOCs, PCBs or pesticides were detected in the soil or groundwater at this SWMU. One VOC, acetone, was detected at one location in one soil sample at a concentration slightly above its laboratory detection limit. One VOC, chloroform, was detected at one location in one groundwater sample at a concentration below its laboratory detection limit. Radiological parameters were also detected in both the soil and groundwater associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for current and future on-site worker and excavation worker scenarios. A total ELCR was not calculated for these scenarios because none of the constituents detected at concentrations above tentative background levels are considered carcinogenic by US EPA.

7.10 X-745F North Process Gas Stockpile Yard

The X-745F North Process Gas Stockpile Yard is a 130,662 square feet concrete pad used for the storage of uranium hexafluoride cylinders. The X-745F unit is located between the X-344A and the X-344C/D units. No releases from the X-745F unit have been documented.

Risk Analysis

The environmental media sampled at this unit during the RFI are soil and groundwater.

Soil. During Phase I RFI sampling, VOCs were detected at concentrations above laboratory detection limits in a single soil sample collected at X344C-SB02. SVOCs (PAHs) were detected at concentrations above laboratory detection limits in the vicinity of X-745F. VOCs, SVOCs, and Aroclor-1260 were detected in soil samples collected during the Phase II RFI sampling.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for current on-site workers and excavation worker. A total ELCR of $7x10^{-6}$ was identified in the RFI for current on-site workers. This ELCR is driven by exposure to benzo(a) pyrene and other PAHs in soil (Please refer to the approved PAH Paper) and to external radiation associated with uranium levels in soil.

A total ELCR of $2x10^{-4}$ was identified in the RFI for future on-site workers. Risks in excess of $1x10^{-6}$ are presented by exposure to benzo(a)pyrene and other PAHs in soil and by external radiation exposure associated with uranium levels in soil. Any unacceptable future risk to on-site workers will be addressed by US DOE. A total ELCR of $5x10^{-7}$ was identified for excavation workers in the RFI.

Groundwater. During the Phase I RFI, VOCs and SVOCs were detected in groundwater samples. No VOCs or SVOCs were detected during Phase II resampling.

The Quadrant IV RFI BRA identified a total noncancer HI of 1 for future on-site workers. This HI is largely attributable to exposure to several inorganic constituents in groundwater from the Gallia. A total ELCR of $2x10^{-4}$ was identified in the RFI for future on-site workers. This ELCR is driven by exposure to arsenic in groundwater from the Gallia water-bearing unit. Low flow pumps have been installed on many wells at the site and the levels of arsenic and other metals are shown to be greatly reduced. Thus, the risk data generated in the RFI may be artificially elevated. The evaluation groundwater will continue to be monitored via the IGWMP.

7.11 X-752 Hazardous Waste Storage Facility

The X-752 Hazardous Waste Storage Facility encompasses approximately 15,425 square feet and contained the following documented wastes: radioactive and hazardous mixed waste sludge, trichloroethene wastes (solids and liquids), paint wastes, flammable solvents, cyanide wastes,

mercury residues, watery sludges containing both metals and uranium (2,500 ppm), 10 lbs of malathion, 50 lbs of 2,4-D ester, and "lab packs" containing expired laboratory chemicals.

All nonradioactive hazardous wastes that were housed in the X-752 Hazardous Waste Storage Area were stored in U.S. DOT-approved containers. Liquid hazardous wastes and solid wastes with free liquids were stored within an area surrounded by a containment dike. The laboratory packs once stored at X-752 were placed in drums with sufficient inert absorbent to absorb the liquids in the event of breakage. After packaging, the drums were stored outside the contained area. Sludges with free liquids were stored within the diked area.

On February 3, 1988, leaks from several 55-gal drums containing a mixture of sulfuric acid and sodium dichromate breached the east side of the building and was contained within 25 yd of a dry drainage ditch. An estimated 100 gal of acid were released and contaminated approximately 1,600 square feet of soil outside the building to a depth of 6 to 8 in. Soils were subsequently excavated from the known spill area.

Risk Analysis

Soil and Groundwater. During the RFI, inorganic parameters were detected in groundwater associated with this SWMU. No SVOCs, PCBs, or pesticides were detected in the soil or groundwater associated with this SWMU. One VOC, acetone, was detected at one location in one soil sample at a concentration slightly above its laboratory detection limit. PAHs were detected in two soil samples at concentrations below their laboratory detection limits. The PAH concentrations detected during Phase I at this SWMU are consistent with or lower than PAH levels throughout the site. Radiological parameters were also detected in the soil and groundwater associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for current on-site worker and excavation worker scenarios. A total noncancer HI of 7 was calculated for the future on-site worker scenario. This risk is due to exposure to arsenic in groundwater. A total ELCR of less than $1x10^{-6}$ was calculated for the current on-site and excavation worker

scenarios. A total ELCR of $1x10^{-3}$ was calculated for the future on-site worker. This risk is due to the presence of arsenic and beryllium in the groundwater associated with this SWMU. The elevated levels of inorganic constituents detected in the groundwater may be due to sampling procedure. US DOE has changed their sampling procedure to better identify the true nature of inorganic material in the groundwater. Additional sampling of groundwater was conducted using low-flow pumps from wells located in areas of the plant that have historically had high metal results in groundwater. Based on these results, arsenic and other metals in groundwater previously detected at this unit appear to be the result of turbidity due to previous sampling techniques. The upgraded sampling techniques indicate previous metals data may be artificially high. Therefore, the risk calculated during the RFI may be overestimated. Groundwater monitoring will continue on site and the data will be evaluated in the IGWMP. Should levels of contaminants of potential concern exceed PRGs, this SWMU will be re-evaluated to determine is remediation of the groundwater is warranted.

7.12 Old Northwest Firing Range (Ruby Hollow)

The Old Northwest Firing Range (OFR) was once used by plant-site security personnel for target practice and training activities. On December 17, 1982, police riflemen shot and punctured 11 small cans of unknown content that had been removed from storage barrels in the X-744G Bulk Storage Building (Quadrant II). The contents appeared to be paint or a similar substance. The area was cleaned up after this incident.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), and deep soil.

Soil. During the RFI, no VOCs, PCBs, or pesticides were detected in the soil associated with this SWMU. PAHs were detected in three soil samples at concentrations below their laboratory detection limits. The PAH concentrations detected during Phase I at this SWMU are consistent with or lower than PAH levels detected in soils throughout the site. Inorganics were detected in

765 the soil samples collected. Radiological parameters were also detected at low levels in the soil
766 associated with this SWMU.

767 The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for the current and
768 future on-site worker and excavation worker scenarios. A total ELCR was not calculated for
769 these scenarios because none of the constituents were detected at levels above tentative
770 background levels are considered carcinogenic by the US EPA.

771 ### 7.13 Railroad Spur Yard Storage Area

772 The Railroad Spur Yard Storage Area is located in the northwest corner of the plant and was
773 used as a temporary storage and unloading area for freight cars. The Railroad Spur Yard
774 Storage Area occupies an area of approximately 39,800 square yards and consists of two north-
775 south parallel tracks that terminate northeast of the Don Marquis Substation (Quadrant III). A
776 1982 aerial photograph of the area shows an unknown number of 55-gal drums at the south end
777 of the storage area. The contents of the drums are unknown.

778 **Risk Analysis**
779 Environmental media sampled at this unit during the RFI includes soil and groundwater.

780 **Soil.** Chloroform, PAHs, and technetium were detected in one or more soil samples during the
781 Phase I investigation. The Quadrant IV RFI BRA identified a total noncancer HI of less than 1
782 for current on-site workers and excavation workers. Total ELCRs of $6x10^{-5}$ and $5x10^{-4}$ were
783 identified for current on-site workers and future on-site workers, respectively. Any current or
784 future unacceptable risks identified for current on-site workers will be addressed by US DOE.
785 These ELCRs are driven by exposure to arsenic and beryllium in the soil. A total ELCR of
786 $5x10^{-6}$ was identified for excavation workers in the RFI. This ELCR is driven by exposure to
787 arsenic in soil by means of incidental ingestion and to soil vapors of chloroform.

Groundwater. No VOCs, SVOCs, PCBs, or pesticides were detected in groundwater samples collected at this unit. The Quadrant IV RFI BRA identified a total noncancer HI of 3 for the future on-site workers. This HI is driven by exposure to arsenic in groundwater from the Gallia water-bearing unit. A total ELCR of $5x10^{-4}$ was identified for future on-site workers in the RFI. This ELCR is driven by exposure to arsenic in the groundwater from the Gallia water-bearing unit. Additional sampling of groundwater was collected using low-flow pumps from wells located in areas of the plant that have historically had high metals results in groundwater. Based on these results, the elevated levels of metals in groundwater previously detected appear to be the result of turbidity due to previous sampling techniques. The current data has been evaluated and the risk at this unit to future on-site workers due to ingestion of groundwater in the RFI appears to be over estimated.

8.0 SWMUs DEFERRED TO GASEOUS DIFFUSION PLANT D&D PROGRAM

The CAS/CMS Report identified the SWMUs listed below as "referred" to the upcoming D&D program at Portsmouth. However, the Ohio EPA considers a deferral option to be consistent with the requirements of the Ohio Consent Decree and the US EPA Administrative Order.

8.1 X-230J6 Northeast Holding Pond, Monitoring Facility, and Secondary Oil Collection Basin

The X-230J6 Northeast Holding Pond is approximately 5,300 square feet in area and was constructed to control sedimentation resulting from stormwater runoff from Storm Sewer L. The discharge from Storm Sewer L enters the western branch of the North East Drainage Ditch (NEDD) upstream from X-230J6. An oil-skimming boom directs floating debris or oily water entering through the storm sewers and surface waters to a secondary oil collection basin adjacent to the pond. The amount of recoverable waste oil is insignificant under normal discharge conditions. The X-230J6 pond discharges to the eastern branch of the North East Drainage Ditch (NEDD), which flows into Little Beaver Creek (LBC). X-230J6 is regulated as NPDES Outfall 011.

814 **Risk Analysis**

815 Environmental media sampled at this unit during the RFI were surface water, sediment, surface
816 soil (0 to 2 ft), shallow soil (2 to 10 ft), and groundwater.

817 **Surface Water and Sediment.** During the RFI, VOCs were detected at two locations at
818 concentrations below and slightly above laboratory detection limits in the surface water
819 associated with this SWMU. PAHs were detected at one location at concentrations below
820 laboratory detection limits and SVOCs were also detected in the surface water at this SWMU.
821 No PCBs, pesticides, or radiological constituents were encountered at this SWMU.

822 VOCs were detected at three locations in the sediment at this SWMU. PAHs were detected at
823 concentrations below and above laboratory detection limits. SVOCs and PCBs were also
824 detected in the sediment at this SWMU. Radiological parameters, including technetium, were
825 detected at low levels in the sediment associated with this SWMU. No pesticides were
826 encountered at this SWMU.

827 The BRA identified a total noncancer HI of 2 for all applicable future land-use scenarios, for
828 current and future on-site workers and future on-site recreational populations. The BRA also
829 identified a total ELCR of $6x10^{-4}$ for current and future on-site worker scenarios in the RFI and
830 a total ELCR of $2x10^{-3}$ for the recreational population scenario. These risks are driven by
831 exposure to PAHs in the sediment associated with this SWMU. Current workers do not come
832 in contact with the sediments at this unit. Should contact with the sediments become necessary
833 proper protective clothing will be required. Future evaluation of the sediments will occur when
834 the facility is no longer in operation. The sediments will be investigated during D&D prior to
835 releasing this unit for any future use.

836 **Soil.** During the RFI, no VOCs, PCBs, or pesticides were detected in the soil associated with
837 this SWMU. SVOCs, specifically PAHs, have been detected in soil at concentrations below
838 laboratory detection limits in soil. Radiological parameters were detected at low levels in the
839 soil associated with this SWMU.

Groundwater. During the RFI investigation, no VOCs, SVOCs, PCBs, or pesticides were detected in the groundwater associated with this SWMU. Inorganic parameters were detected in groundwater associated with this SWMU, and radiological parameters were detected at one location in the groundwater.

The BRA identified a total noncancer HI of 20 for the future on-site worker scenario. The BRA also identified a total ELCR of $2x10^{-3}$ for future on-site worker scenario. These risks are driven by exposure to metals in the Gallia water-bearing unit associated with this SWMU. US DOE has changed their sampling procedure to better identify the true nature of inorganic material in the groundwater. Additional sampling of groundwater was conducted using low-flow pumps from wells located in areas of the plant that have historically had high metals results in groundwater. Based on these results, arsenic and other metals in groundwater previously detected at this unit appear to be the result of turbidity due to previous sampling techniques. The upgraded sampling techniques indicate previous metals data may be artificially high. Therefore the risk calculated during the RFI may be overestimated. Groundwater will continued to be monitored via the IGWMP. Should levels of contaminants of potential concern exceed PRGs, this SWMU will be re-evaluated to determine is remediation of the groundwater is warranted.

8.2 X-333 Process Building

The X-333 Process Building is 1,456 ft long, 970 ft wide, and 82 ft high. Within the X-333 building are 640 diffusion cascade stages that are used in the initial phase of the uranium enrichment process. Heated uranium hexafluoride, introduced into the diffusion network as a pressurized gas, flows along the inside of the porous barrier. Approximately 50% of the gas diffuses through the barrier and is fed to the next higher stage; the remaining undiffused portion is recycled to the next lower stage. The diffused stream is slightly enriched with respect to uranium-235 and the stream that has not been diffused is similarly depleted. By cycling the process gas through many stages, it can become enriched in uranium-235.

The X-333 Process Building houses 80 on-line transformers and 26 reserve transformers. Each transformer contains 1,370 gal. of 60% PCB oil. Eight unit-lubricating systems within the X-333 building also have oil containing PCBs. X-333 is an active process building that is expected to remain in operation until D&D.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater. (Note: Building interior was not sampled as part of the RFI.)

Soil and Groundwater. During the RFI, VOCs (mostly below laboratory detection limits) were detected in the soil associated with this unit. SVOCs, including PAHs were detected in the soil at concentrations above laboratory detection limits. PCBs were detected in one soil sample at this unit. Radiological and inorganic parameters were also detected in the soil associated with this SWMU.

During the RFI, VOCs were detected in the groundwater associated with this unit. SVOCs (including PAHs) were also detected in the groundwater below laboratory detection limits. No PCBs or pesticides were detected in the groundwater associated with this unit. Radiological and inorganic parameters were also detected in the groundwater associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for the current on-site worker scenario. The BRA identified a total noncancer HI of 10 for the future on-site worker and an HI of 2 for the excavation worker scenarios. These risks are driven by exposure to several inorganic constituents in the soil and groundwater.

The BRA also identified a total ELCR of $1x10^{-3}$ for current on-site workers in the RFI investigation because of exposure to PCBs, PAHs, and arsenic in the soil. The levels of PAHs in the soil do not exceed the levels of non-regulated (i.e. roadways) areas and do not require remediation at this time per the approved PAH position paper. The PAH Position Paper was

approved by Ohio EPA on 5/8/97. In areas of known contamination current workers are advised of the potential hazards and appropriate actions are taken. A total ELCR of $3x10^{-3}$ was identified for the future on-site worker scenario because of arsenic in the groundwater and PAHs in the soil associated with this SWMU. A total ELCR of $6x10^{-5}$ was also identified for the excavation worker scenario because of PAHs in the soil associated with this SWMU.

8.3 X-342A Feed Vaporization and Fluorine Generation Building, X-342B Fluorine Storage Building, and X-342C Waste HF Neutralization Pit

The X-342A Feed Vaporization and Fluorine Generation Building encompasses approximately 13,800 square feet. At this unit, fluorine is generated by the electrolysis of an electrolyte composed of hydrogen fluoride in solution with, or absorbed in, molten potassium hydrogen fluoride. The hydrogen fluoride ionizes when in solution, and a direct current passing through the electrolyte liberates fluorine gas at the anode and hydrogen gas at the cathode. Hydrogen fluoride is constantly bubbled through the molten electrolyte to replace the hydrogen fluoride that is ionized to hydrogen and fluorine.

During the fluorine generation process, fluorine containing some entrained hydrogen fluoride is routed through distribution headers to NaF traps for the removal of hydrogen fluoride. After the trap the fluorine purity is approximately 95%. Fluorine is then pumped to one of three 1,000 cubic feet storage tanks in the X-342B Fluorine Storage Building. The traps are regenerated periodically to remove the trapped hydrogen fluoride.

The X-342C Waste HF Neutralization Pit is 107.5 ft long and 5 ft deep, with a trapezoidal cross section that is 19 ft wide at the top and 4 ft wide at the bottom. The total volume is approximately 75,000 gal. The purpose of the facility is to neutralize waste hydrogen fluoride solutions (hydrofluoric acid) from the X-342 fluorine generation operations by allowing the X-342 effluent to react with the limestone that fills the pit. This facility is expected to remain in operation until D&D.

Risk Analysis

Environmental media sampled at this unit during the RFI are surface water, shallow soil (2 to 19 ft), deep soil, and groundwater.

Surface Water and Pit Sediment. During the Phase I RFI, radiological parameters, specifically gross alpha and gross beta, were detected at low levels in the surface water from within the X-342C Waste HF Neutralization Pit. PAHs were detected at concentrations below and above laboratory detection limits in the pit sediment. Radiological parameters, including technetium, were also detected in the pit sediment associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for all applicable current and future land use scenarios. The BRA also identified a total ELCR of $5x10^{-6}$ for the current and future on-site worker scenarios. This risk is driven by exposure to arsenic and benzo(a)pyrene in the sediment.

Soil and Groundwater. PAHs were detected at concentrations below laboratory detection limits in the soil associated with this SWMU. Radiological parameters were also detected in the soil associated with this SWMU. No VOCs, PCBs, or pesticides were detected in the soil associated with this unit.

PAHs were detected below laboratory detection limits in the groundwater associated with this SWMU. Inorganic parameters were also detected in groundwater associated with this SWMU. No VOCs, PCBs, radiological parameters, or pesticides were detected in the groundwater associated with this SWMU.

No shallow soil samples (0 to 2 ft) surrounding the X-342 facility were collected as part of the X-745B Enrichment Process Gas Yard and X-745F North Process Gas Stockpile Yard assessments. Therefore no assessment for the current on-site worker scenario was performed for this unit. For all other current and future land use scenarios, the Quadrant IV RFI BRA identified a total noncancer HI of less than 1.

941 The BRA also identified a total ELCR of $9x10^{-5}$ for the future on-site worker scenario. This is
942 driven by exposure to arsenic in the groundwater. A total ELCR of less than $1x10^{-6}$ was
943 identified for the excavation worker scenario.

944 ## 8.4 X-344C HF Storage Facility

945 The X-344C HF Storage Facility covers approximately 1,700 square feet and houses three
946 10,000-gal storage tanks with a capacity of 70,000 to 80,000 lbs of hydrogen fluoride. The
947 tanks are equipped with a rupture disc system for protection against over pressurization and a
948 vent system for purging in preparation for maintenance. Liquid hydrogen fluoride is transferred
949 by pressure differentials to the hydrogen fluoride vaporizer in the X-342A Feed Vaporization
950 and Fluorine Generation Building. The vaporizer is heated to maintain hydrogen fluoride vapor
951 pressure at the desired level for distribution to four flourine generators. X-344C is diked and
952 equipped with a floor drain that discharges to the X-344D Neutralization Pit.

953 **Risk Analysis**
954 Environmental media sampled at this unit during the RFI were surface water, sediment, surface
955 soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

956 **Surface Water and Pit Sediment.** During the Phase I RFI, no VOCs, SVOCs, PCBs,
957 radiological parameters, or pesticides were detected in the surface water associated with this
958 SWMU. VOCs and SVOCs were detected at concentrations above laboratory detection limits
959 in the pit sediment. PAHs were detected at concentrations below and above laboratory
960 detection limits in the pit sediment. Radiological parameters, including technetium, were also
961 detected in the pit sediment. No PCBs or pesticides were detected in the pit sediment associated
962 with this SWMU.

963 **Soil and Groundwater.** During the Phase I RFI, VOCs were detected at concentrations above
964 laboratory detection limits and PAHs were detected at concentrations below and above
965 laboratory detection limits in the soil associated with this SWMU. Radiological parameters

966 were also detected in the soil associated with this unit. No PCBs or pesticides were detected in
967 the soil associated with this unit.

968 During the Phase II RFI, SVOCs were detected at one location in the soil associated with this
969 SWMU. Radiological and inorganic parameters were also detected. No VOCs, PAHs, PCBs,
970 or pesticides were detected in the soil associated with this unit during the Phase II investigation.

971 During the Phase I and Phase II RFI, VOCs were detected in the groundwater associated with
972 this SWMU. The radiological parameters gross alpha and gross beta were detected during the
973 Phase I investigation only. Inorganic parameters were also detected in groundwater associated
974 with this unit.

975 The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for the current on-site
976 and excavation worker scenarios. A total noncancer HI of 4 was also identified for the future
977 on-site worker scenario because of the presence of arsenic and vanadium in the groundwater at
978 this SWMU.

979 Additional sampling of groundwater was collected using low-flow pumps from wells located in
980 areas of the plant that have historically had high metals results in groundwater. Based on these
981 results, the elevated levels of metals in groundwater previously detected appear to be the result of
982 turbidity due to previous sampling techniques. Therefore, the risk at this unit to future on-site
983 workers due to ingestion of groundwater may be over estimated.

984 ### 8.5 X-533A Switchyard, X-533B Switch House, X-533C Test and Repair Building, X-
985 533D Oil House and Associated French Drains, X-533E Valve House, X-533F Valve
986 House, and X-533H Gas Reclaiming Cart Garage

987 The X-533A Switchyard has an area of approximately 772,174 square feet and contains
electrical transformers and circuit breakers, some of which contain PCB-contaminated oil. The
989 bed of the switchyard contains 1 to 3 ft of 2- to 3-in. diameter limestone cobbles underlain by a

grounding grid and high-voltage cables. Beneath the grid is clay soil with French drains oriented north-south. The eastern half of the switchyard drains into Storm Sewer L, which flows into the X-230J6 Northeast Holding Pond before discharging into the NEDD. The western half of the switchyard drains into Storm Sewer K, which flows into the X-230L North Holding Pond before discharging into the NDD.

Several other support facilities are associated with the X-533A unit. The X-533B Switch House encloses approximately 148,800 square feet and supplies power to the X-533 Process Building and area auxiliaries at a nominal voltage of 13.8 kV. The X-533C Test and Repair Building encloses 1,200 ft^2 and houses an electrical maintenance shop. The X-533D Oil House encloses approximately 500 ft^2. Within this facility, oil from transformers and circuit-breakers is drained, stored, filtered, and recycled. The X-533H Gas Reclaiming Cart Garage encloses approximately 1,500 ft^2 and contains sulfur hexafluoride (SF_6) cylinders and circuit-breaker service carts. The carts replenish circuit-breakers with SF_6 and are themselves recharged at the garage. Sulfur hexafluoride is used as an insulator in circuit breakers in the place of Askarel or mineral oil. These units are expected to remain in operation until D&D. Due to the nature of the operation of the switch yard a full investigation of the soils within the switch yard was not possible. The high voltage and utilities in this area pose a risk to workers who may contact them. Only when the switch yard is no longer operational can the soils be investigated safely.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Soil and Groundwater. During the Phase I RFI, VOCs were detected at concentrations below and above laboratory detection limits in the soil associated with this unit. SVOCs, including PAHs at concentrations below laboratory detection limits, were also detected in the soil. The PCB Aroclor-1260 was detected at one location and radiological and inorganic parameters were also detected in the soil associated with this SWMU.

During the Phase I RFI, VOCs were detected at concentrations both below and above laboratory detection limits in the groundwater associated with this unit. SVOCs, including PAHs, were detected at concentrations below laboratory detection limits in the groundwater. Inorganic and radiological parameters, specifically gross alpha and gross beta, were also detected in the groundwater associated with this SWMU. No PCBs or pesticides were detected in the groundwater at this unit.

During the Phase II RFI, no VOCs, SVOCs, PCBs, radiological parameters, or pesticides were detected in the groundwater associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for the current on-site worker scenario. A total noncancer HI of 3 was identified for the future on-site worker scenario because of the presence of arsenic in the groundwater associated with this SWMU.

The BRA also identified a total ELCR of $4x10^{-5}$ for the current on-site worker scenario. This risk is driven by the presence of arsenic and Aroclor-1260 in the soil associated with this unit. A total ELCR of $2x10^{-4}$ was identified for the future on-site worker scenario. This risk is driven by exposure to arsenic in the groundwater and arsenic, beryllium, and Aroclor-1260 in the soil associated with this SWMU. A total ELCR of $5x10^{-6}$ was also identified for the excavation worker scenario. This risk is driven by the presence of arsenic in the soil associated with this SWMU.

8.6 X-630-1 Recirculating Water Pump House, X-630-2 A&B Cooling Towers, and X-630-3 Acid Handling Station

The Quadrant IV recirculating water system includes a recirculating water pump house, two cooling towers with basins, and associated piping. The X-630-1 building encompasses 10,200 square feet and contains pumps that recirculate the cooling water from the X-330 Process Building (Quadrant III) to the X-630-2A and 2B Cooling Towers. The X-630-2A and 2B Cooling Towers dissipate heat from the recirculating water system by evaporation. Heated

water entering the cooling tower is exposed to cool atmospheric air that exits the top of the tower under a forced draft. The cooled water collects in a basin at the base of the tower. Drift, consisting of small water droplets, is released with the heated air from the top of the towers. The amount of drift depends upon weather conditions. The loss of water from the recirculating water system concentrates dissolved solids, which are removed from the system in the form of blowdown. The phosphate-based blowdown is currently discharged to the Scioto River through an underground line. The discharge is permitted by Ohio EPA and must meet the requirements of the National Pollution Discharge Elimination System (NPDES) permit.

The X-630-3 Acid Handling Station is located near the X-630 Pump House and consists of two aboveground, 10,000-gal bulk storage tanks used for the transfer of sulfuric acid through aboveground pipelines to X-630. Piping for filling the bulk tanks from railcar or tank truck and for transferring acid from large tanks to portable tanks for use at other facilities is also present. Sulfuric acid is used for treatment of the recirculating water system at each of the three recirculating water system pump houses. These units are expected to remain in operation until D&D.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Soil and Groundwater. During the Phase I RFI, VOCs were detected in the soil associated with this unit. One SVOC was detected at concentrations slightly above its laboratory detection limit and PAHs were detected at concentrations below and above laboratory detection limits in the soil. Radiological and inorganic parameters and the PCB Aroclor-1254 were also detected in the soil associated with this SWMU.

During the Phase II investigation, VOCs were detected at one location in the soil associated with this unit. No SVOCs, PCBs, radiological parameters, or pesticides were detected in the soil.

During the Phase I RFI, VOCs were detected at concentrations above laboratory detection limits in the groundwater associated with this SWMU. Radiological parameters, specifically gross alpha and gross beta, were also detected in the groundwater associated with this SWMU. Inorganics were also detected in the groundwater. No SVOCs, PCBs, or pesticides were detected in the groundwater at this SWMU.

During the Phase II RFI, VOCs were detected at one location below laboratory detection limits in the groundwater associated with this SWMU. Inorganics were also detected in the groundwater. No SVOCs, PCBs, radiological parameters, or pesticides were detected in the groundwater associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for the current on-site worker scenario. A total noncancer HI of 5 was identified for the future on-site worker scenario because of the presence of several inorganic compounds in the groundwater associated with this SWMU. Additional sampling of groundwater was collected using low-flow pumps from wells located in areas of the plant that have historically had high metals results in groundwater. Based on these results, the elevated levels of metals in groundwater previously detected appear to be the result of turbidity due to previous sampling techniques. Therefore, the risk at this unit to future on-site workers due to ingestion of groundwater may be over estimated. A total noncancer HI of 4 was identified for the excavation worker scenario because of the presence of arsenic in the soil associated with this unit. Proper personal protection will be worn as required in the US DOE health and safety plans prior should excavation of soils at this unit become necessary.

The BRA also identified a total ELCR of $2x10^{-5}$ for the current on-site worker scenario because of the presence of Aroclor-1254 and PAHs in the soil associated with this unit. A total ELCR of $7x10^{-4}$ was identified for the future on-site worker scenario. This risk is driven by exposure to arsenic and beryllium in the groundwater and arsenic in the soil associated with this SWMU. US DOE has changed their sampling procedure to better identify the true nature of inorganic material in the groundwater. Additional sampling of groundwater was conducted using low-

flow pumps from wells located in areas of the plant that have historically had high metals results in groundwater. Based on these results, arsenic and other metals in groundwater previously detected at this unit appear to be the result of turbidity due to previous sampling techniques. The upgraded sampling techniques indicate previous metals data may be artificially high. Therefore the risk calculated during the RFI may be overestimated. A total ELCR of $2x10^{-5}$ was also identified for the excavation worker scenario because of the presence of arsenic and chromium in the soil associated with this SWMU. Current US DOE health and safety procedures require personal protection in the event of an excavation in areas of known contamination is necessary due to utility repair.

8.7 X-745B Enrichment Process Gas Yard

The X-745B Enrichment Process Gas Yard is a 183,894 square feet concrete pad that holds 2.5 and 14-ton uranium hexafluoride cylinders. The X-745B unit is adjacent to the south side of the X-344A Uranium Hexafluoride Sampling Facility.

Risk Analysis

Environmental media sampled at this unit during the RFI are soil and groundwater.

Soil. During Phase I RFI sampling, the only VOC detected in soils was TCE at 22 ug/kg at RCW-SB301. Because of the distance of the sample from the unit and the proximity of the X-330 Process Building, this occurrence probably does not constitute a release from X-745B. PAHs were detected in four soil samples ranging from below laboratory detection limits to 5,500 ug/kg. PAH concentrations detected at this unit are consistent with or lower than PAH levels detected in soil samples throughout the site. Aroclor-1254 was detected at X745B-HA05 at a concentration of 110 ug/kg. Technetium was detected in three hand-augured samples at activities ranging from below its laboratory detection limit to 3.4 pCi/g. No VOCs or technetium were detected in soils during the Phase II investigation. Although SVOCs and PCBs were detected at concentrations above laboratory detection limits, and total uranium

concentrations appeared to be elevated in samples collected, concentrations were generally higher in shallower sample intervals and generally decreased with depth.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for all applicable current and future land-use scenarios. A total ELCR of $4x10^{-5}$ was identified in the RFI for current on-site workers. This ELCR is driven by exposure to Aroclor-1254, Aroclor-1260, and PAHs in soil and by external radiation exposure associated with uranium levels in soil. A total ELCR of $7x10^{-5}$ was identified in the RFI for future on-site workers. This ELCR is driven by exposure to Aroclor-1254, Aroclor-1260, and PAHs in soil and by external radiation exposure associated with uranium levels in soil. A total ELCR of $9x10^{-6}$ was identified for excavation workers in the RFI. This ELCR is driven by inhalation of soil particulates containing chromium and uranium isotopes. Due to the number of cylinders in the yard it would be impossible to move them at this time to remediate soils. During D&D the cylinders may be removed allowing the soils to be addressed.

Groundwater. No VOCs, SVOCs, PCBs, pesticides, or radiological parameters were detected in groundwater samples from the X-745B unit during Phase I or Phase II RFI.

8.8 X-747H Northwest Surplus and Scrap Yard

The X-747H Northwest Surplus and Scrap Yard encompasses an area of approximately 6.8 acres and is used for the storage of process scrap metal. The storage lot is surrounded by a fence. Before the scrap metal is moved to X-747H, it is decontaminated at the X-705/X-700 Decontamination Facilities. The remaining radioactivity is fixed (nonremovable) surface radioactivity that is below an alpha decay level of 30,000 disintegrations per minute/100 cm^2.

Risk Analysis

Environmental media sampled at this unit during the RFI are soil and groundwater.

Soil. During the Phase I RFI, PAHs were detected at concentrations above laboratory detection limits in one surface-soil sample. Technetium was detected in one soil sample. Uranium was detected in all Phase I soil samples. To more fully characterize the soils and to define the extent of contamination, additional samples were collected from the soils surrounding these two locations during Phase I of the RFI investigation. Inorganic parameters were detected in soils associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for all applicable current and future land-use scenarios. A total ELCR of $1x10^{-3}$ was identified in the RFI for both current and future on-site workers. The ELCRs are driven by exposure to PAHs and beryllium in soil. Access to this unit is controlled. The unit is fenced off from the general worker population. In order for on site personnel to work within the unit, a work permit from US DOE is required. US DOE's current health and safety protocols to require personal protection in areas of known contamination prior to any work being conducted. A total ELCR of $5x10^{-5}$ was identified in the RFI for excavation workers. This ELCR is driven by exposure to PAHs in soil.

Groundwater. No VOCs, SVOCs, PCBs, or pesticides were detected in groundwater samples collected at this unit. Gross alpha and gross beta were detected in groundwater samples collected at this unit. Gross alpha and gross beta were detected at X752-01G at activities of 198 pCi/L and 331 pCi/L, respectively. No other radiological parameters were detected in groundwater samples collected at X-747H. Inorganic parameters were also detected in groundwater associated with this SWMU.

A total ELCR of $1x10^{-3}$ was identified in the RFI for future on-site workers. This ELCR is driven by exposure to arsenic in groundwater from the Gallia water-bearing unit. Additional sampling of groundwater was collected using low-flow pumps from wells located in areas of the plant that have historically had high metals, gross alpha and gross beta results in groundwater. Based on these results, the elevated levels of metals in groundwater previously detected appear to

be the result of turbidity due to previous sampling techniques. Therefore, the risk at this unit to future on-site workers due to ingestion of groundwater may be over estimated. Groundwater will continue to be monitored through the Integrated Groundwater Monitoring Plan.

8.9 Chemical and Petroleum Containment Basins (East of X-533A) and Emergency Containment Tanks

The Chemical and Petroleum Containment Basins (CPCB) east of X-533A were designed to collect spills during rail car unloading or storage operations. The facility consists of five collection basins located beneath the railroad tracks. These collection basins are approximately 10 ft by 18.5 ft by 4 in. deep. The collection basins drain to three underground containment tanks, which have a capacity of 4,800 gal each.

Risk Analysis

Environmental media sampled at this unit during the RFI include soil and wastewater.

Soil. During Phase I RFI sampling, VOCs were detected in soil below laboratory detection limits east of the underground tanks. During Phase II RFI sampling, VOCs, PAHs, and one pesticide were detected in soils associated with this unit.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for all applicable current and future land-use scenarios. Total ELCRs of $4x10^{-6}$ were identified in the RFI for both current and future on-site workers. These ELCRs are driven by exposure to benzo(a)pyrene and other PAHs in soil. A total ELCR of $7x10^{-7}$ was identified for excavation workers in the RFI.

Wastewater. No VOCs were detected in wastewater samples collected. 1,4-Dioxane was detected at a concentration of 0.6J ug/L (The laboratory was unable to validate this contaminant detection due to the extremely low value. It was below the method detection limit). No other

SVOCs and no PCBs, pesticides, or radiological parameters were detected in wastewater samples.

8.10 North Drainage Ditch, X-230L North Holding Pond, and Unnamed Construction Fill Area

The North Drainage Ditch (NDD) consists of six small drainage ditches including the western drainage (two ditches), the central drainage (three ditches), and the eastern drainage (one ditch). Storm Sewers C, K, and M discharge into the central and western drainage. The western drainage and the central drainage flow into the X-230L North Holding Pond. Effluent from the holding pond is monitored according to the requirements of the NPDES Permit before it flows into Little Beaver Creek.

The X-230L North Holding Pond, which covers 14,400 square feet and has a capacity of 390,000 gal at normal level, was constructed in 1974. The main function of X-230L is to retain accidental spills until the materials can be removed and disposed of properly. The pond discharges into Little Beaver Creek (LBC) through the NDD. The X-230L North Holding Pond collects storm runoff from the following units: the X-533 Switchyard; the west side of the X-333 Process Building; the northern end of Pike Avenue; the X-342 and X-344 buildings; Scioto Avenue; X-630-2A and a portion of the X-630-2B cooling towers; X-745-B, E, and F; the western side of the X-747H Surplus and Scrap Yard; Storm Sewers C, K, and M; and the NDD.

The Unnamed Construction Fill Area is a relatively flat, grassy area located southeast of the X-230L North Holding Pond. During preliminary field reconnaissance, deep cracks were discovered in the soil and a hummocky surface topography was noted, which may indicate the presence of unstable construction fill. A review of aerial photographs of the PORTS facility indicated that the area was a construction site in the early 1980s.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface water, sediment, surface soil (0 to 2 ft), shallow soil (2 to 10 ft), deep soil, and groundwater.

Surface Water and Sediment. During the Phase I RFI, VOCs were detected in the surface water associated with these units at concentrations below laboratory detection limits at the NDD and at concentrations below and slightly above laboratory detection limits at the X-230L Holding Pond. SVOCs were also detected at concentrations below and slightly above laboratory detection limits in the surface water at this unit. No PCBs, pesticides, or radiological parameters were detected in the surface water.

During the Phase I RFI, VOCs were detected at two locations in the sediment associated with this SWMU. PAHs have been detected at concentrations below and above laboratory detection limits in sediment. Radiological parameters, including technetium, were also detected at low levels in the sediment associated with this SWMU.

The Quadrant IV RFI BRA identified a total noncancer HI of 8 for the current on-site worker and a total noncancer HI of 10 for the future recreational visitor, respectively. These risks are driven by exposure to manganese in the sediment associated with this unit. The BRA also identified a total ELCR of $1x10^{-4}$ for the current on-site worker scenario and a total ELCR of $3x10^{-4}$ for the future recreational population scenario. These risks are driven by exposure to PAHs, arsenic, and beryllium in sediment associated with this SWMU. Current workers at the facility do not come in contact with the sediments at this unit. A report detailing the current risk at the North Drainage Ditch has been submitted to Ohio EPA. The report indicated that the current risks posed by the surface water and sediments at the North Drainage Ditch fall within 1×10^{-4} to 1×10^{-6} ELCR risk range. The report was approved by Ohio EPA on January 19, 1998. As an operational unit, it would be difficult to fully remediate the NDD unit until process discharges cease at D&D. Prior to any future use of this unit, a determination will be made to remediate the unit to address potential exposure to contaminated sediments.

Soil and Groundwater. During the RFI VOCs were detected at concentrations below laboratory detection limits in the soil associated with this SWMU. PAHs have been detected at concentrations both below and above laboratory detection limits. Radiological parameters were also detected in the soil at very low levels. No PCBs or pesticides were detected in the soil associated with this SWMU.

During the Phase I RFI, no VOCs, SVOCs, PCBs, or pesticides were detected in the groundwater associated with this unit. Radiological parameters (gross alpha and gross beta) were detected at low levels. During the Phase II RFI, VOCs were detected at low levels in the groundwater associated with this unit. No SVOCs, PCBs, or pesticides were detected.

The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for current on-site and excavation worker scenarios. A total noncancer HI of 3 was identified for the future on-site worker scenario because of the exposure to arsenic in the groundwater associated with this unit. The BRA also identified a total ELCR of less than $1x10^{-6}$ for current on-site workers in the RFI investigation. A total ELCR of $6x10^{-4}$ was also identified for the future on-site worker scenario because of arsenic and beryllium in the groundwater and PAHs and beryllium in the soil associated with this SWMU. US DOE has changed their sampling procedure to better identify the true nature of inorganic material in the groundwater. Additional sampling of groundwater was collected using low-flow pumps from wells located in areas of the plant that have historically had high metals results in groundwater. The upgraded sampling techniques indicate previous metals data may be artificially high. Therefore the risk calculated during the RFI may be overestimated.

8.11 Northeast Drainage Ditch

Discharge from Storm Sewer L enters the NEDD at its origin, which is adjacent to Perimeter Road and southwest of X-230J6. The NEDD then discharges into X-230J6. The outfall from X-230J6 flows into the northeast portion of the NEDD, which then discharges into the LBC.

Risk Analysis

Environmental media sampled at this unit during the RFI were surface water, sediment, surface soil (0 to 2 ft), and shallow soil (2 to 10 ft).

Surface water and sediment. During the Phase I RFI, SVOCs, including PAHs, were detected at concentrations below laboratory detection limits in the surface water at this SWMU. Inorganics were also detected in the surface water associated with this SWMU. No VOCs, PCBs, pesticides, or radiological constituents were encountered in the surface water associated with this SWMU.

During the Phase I RFI one VOC (acetone) was detected at concentrations slightly above its laboratory detection limit in the sediment associated with this SWMU. SVOCs, including PAHs, were also detected at concentrations below and above laboratory detection limits in the sediment. Radiological parameters, including technetium, and inorganics were also detected in the sediment associated with this SWMU. No PCBs or pesticides were encountered in the sediment associated with this SWMU.

The Quadrant IV BRA identified a total noncancer HI of 7 for the current on-site worker and a total noncancer HI of 9 for the future on-site recreational population scenarios. These risks are driven by exposure to chromium in the sediments associated with this SWMU. The BRA also identified a total ELCR of $8x10^{-4}$ for the current on-site worker scenario in the RFI investigation. A total ELCR of $2x10^{-3}$ was also identified for the future recreational population scenario. This ditch is not utilized for recreational purposes at this time. These risks are driven by exposure to arsenic and PAHs in the sediment associated with this SWMU. Current workers at the facility do not come in contact with the sediments at this unit. A risk report prepared by US DOE indicates the risk posed by this unit falls within 1×10^{-4} to 1×10^{-6} ELCR based on current sampling. It would be difficult to fully remediate the NEDD unit until process discharges cease at D&D. Prior to any future use of this unit, a determination will be made to remediate the facility to address potential exposure to contaminated sediments.

Soil. During the Phase II RFI, no SVOCs were detected in the soil associated with this SWMU. Radiological parameters were detected in the soil associated with this SWMU.

During the Quadrant IV BRA, a total noncancer HI was not calculated for the current on-site worker scenario because no shallow soil samples were collected from this unit. A total noncancer HI of less than 1 was identified for the future on-site worker scenario. The BRA identified a total noncancer risk of 3 for the excavation worker scenario. This risk is driven by exposure to arsenic in the soil associated with this SWMU.

During the Quadrant IV BRA, a total ELCR was not calculated for the current on-site worker because no shallow soil samples were collected from this unit. The BRA identified a total ELCR of $7x10^{-5}$ for the current on-site worker scenario in the RFI investigation. This risk is driven by the exposure to arsenic in the soil. The BRA also identified a total ELCR of $1x10^{-5}$ for the current on-site worker scenario in the RFI investigation. This risk is driven by exposure to arsenic and chromium in the soil associated with this SWMU.

8.12 Transformer Cleaning/Storage Pad

The transformer Cleaning/Storage Pad covers approximately 9,769 square feet. Before 1985 transformers from the X-530A and X-533A Switchyards were cleaned with trichloroethene and repaired on the pad. Transformers that could not be repaired remained on the pad until they could be shipped by rail to the manufacturer. The PCB-based oil was drained from the transformers at the switchyards. Since 1985, transformers have been cleaned with kerosene, repaired, and stored in the X-334 Transformer Storage and Cleaning Building. The Transformer Cleaning/Storage Pad is currently used as a temporary storage facility for transformers arriving or leaving by rail.

Risk Analysis

Environmental media sampled at this unit during the RFI are soil and groundwater.

Soil. VOCs, PAHs, Aroclor-1260, and total uranium were detected in soils associated with this unit during the RFI. The Quadrant IV RFI BRA identified a total noncancer HI of less than 1 for current on-site workers. A total noncancer HI of 3 was identified for future on-site workers. This HI is largely attributable to exposure to vanadium in soil.

A total noncancer HI of 8 was identified for excavation workers this HI is driven by exposure to arsenic and vanadium in soil by means of incidental ingestion and dermal contact. A total ELCR of $2x10^{-6}$ was identified for current on-site workers in the RFI. This ELCR is driven by exposure to Aroclor-1260 in soil. A total ELCR of $1x10^{-4}$ was identified for future on-site workers in the RFI. This ELCR is driven by exposure to arsenic in soil. The soils at this unit will be investigated at the time of D&D to determine if further remedial action is warranted based on the reasonably anticipated future use. Should US DOE find it necessary for any reason to excavate soils in this area workers will be required to take proper precautions and will follow the US DOE health and safety plan.

Groundwater. No VOCs, SVOCs, PCBs, or pesticides were detected in groundwater during either Phase I or Phase II of the RFI.

9.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Ohio EPA relies on the public to ensure that each remedial alternative selected at PORTS meets the need of the local community, in addition to being an effective solution to the problem. The Quadrant IV Preferred Plan was released to the public in May 1999. This document is available to the public in the administrative record, maintained at the Environmental Information Center, P.O. Box 693, Piketon, Ohio and at the Ohio EPA Southeast District Office, 2195 Front Street, Logan, Ohio. Notice of the availability of the Preferred Plan was published in the Pike County News and Waverly Watchman on May 30, 1999.

Ohio EPA formally presented the Preferred Plan for Quadrant IV at a public availability session on June 3, 1999. At this meeting representatives from Ohio EPA discussed the RFI,

CAS/CMS, and the Preferred Plan, and answered questions and received comments related to Quadrant IV and the remedial alternatives under consideration. Responses to significant comments, criticisms, or new data received during the comment period and public meeting are included in the "Responsiveness Summary," which is attached to this document as Appendix III.

This decision document presents the selected remedial actions for Quadrant IV of the US DOE Portsmouth Facility. These actions are chosen in accordance with the Resource Conservation and Recovery Act (RCRA) of 1976, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization ACT (SARA) of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the Hazardous and Solid Waste Amendments (HWSA) of 1984, and applicable and appropriate State regulations. This decision is based on the administrative record for this response action.

All Documents leading up to the Decision Document have been available for public review and comment prior to selection of the chosen remedies. Documents issued before the Decision Document include, but are not limited to the Quadrant III Final RFI Report (DOE 1996), The Baseline Ecological Risk Assessment (DOE 1994), The Air RFI (DOE 1997), the Background Sampling Investigation (DOE 1996), the Quadrant III CAS/CMS Report (DOE 1998), the Preferred Plan for Quadrant IV (Ohio EPA 1999).

10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting the remedial alternative, the Ohio EPA will consider the following eight criteria.

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection, and describes how risks are eliminated, reduced or controlled through treatment, engineering controls, and/or institutional controls.

2. **Compliance with all State, Federal and local laws and regulations** addresses whether or not a remedy will meet all of the applicable State, Federal, and Local environmental statutes.

3. **Long-term effectiveness and permanence** refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once clean-up goals have been met.

4. **Reduction of toxicity, mobility, or volume** through treatment is the anticipated performance of the treatment technologies to yield a permanent solution. This includes the ability of the selected alternative to reduce the toxic characteristics of the chemicals of concern or remove the quantities of those chemicals to an acceptable risk concentration or regulatory limit and/or decrease the ability of the contaminants to migrate through the environment.

5. **Short-term effectiveness** involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until clean-up goals are achieved.

6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of goods and services needed to implement the chosen solution.

7. **Cost** includes capital and operation and maintenance costs.

8. **Community acceptance** is addressed as the Responsiveness Summary in Appendix II.

Selection of a remedy: Remedies selected shall reflect the scope and the purpose of the actions being undertaken and how the action relates to long term comprehensive response at the site. The criteria noted above are categorized into three groups. (A) Threshold Criteria- Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative must meet. (B) Primary balancing criteria- the five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost. (C) Modifying Criteria-Community acceptance is considered modifying criteria. Ohio EPA evaluated each alternative using the above eight criteria. The following discussion summarizes the compliance of the alternatives with these criteria.

1. Overall Protection of Human Health and the Environment

The No Further Corrective Action Alternative is protective of human health and the environment for those thirteen SWMUs noted. The SWMUs that have been deferred to D&D do not pose risk warranting remedial action at this time. In some cases, exposure controls will be in place for workers until D&D. Remediation at this time would not be prudent because these units are still in use and may become re-contaminated.

2. Compliance with all State, Federal and Local Laws and Regulations

Selected remedial actions on the U. S. DOE site must comply with applicable Federal, State, and Local laws and regulations. Examples of these include, but are not limited to, the Clean Air Act, Toxic Substances Control Act, the Safe Drinking Water Act, the Clean Water Act, the Resource Conservation and Recovery Act, Ohio Revised Code (ORC) 6111, ORC 3734, and

Ohio Administrative Code 3745. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that remedial actions meet legally applicable or relevant and appropriate requirements (**ARARs**) of other environmental laws. "Applicable requirements" means those cleanup standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that

specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site. "Relevant and appropriate" requirements are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal or State law that, while not legally "applicable" to a hazardous substance, pollutant, remedial action or circumstance at a site, their use and application is well suited to the situation at a site. An example of a situation where a law would be relevant and appropriate is the treatment of waste not lawfully deemed "hazardous" but identical to chemicals currently deemed hazardous under the Resource Conservation and Recovery Act (RCRA).

ARARs are divided into three different categories:

- **Chemical-Specific ARARs**
- **Action-Specific ARARs**
- **Location-Specific ARARs**

Chemical-Specific ARARs are health or risk-based numerical values which establish the acceptable amount or concentration of a chemical that may be found in the environment. An example of chemical-specific requirements are maximum contaminant levels (MCL's) established for certain chemicals under the Safe Drinking Water Act.

Action-Specific ARARs are usually technology or activity based requirements or limitations on actions taken with respect to generated wastes. An example of an action-specific requirement would be the requirement for treatment of hazardous waste to approved standards before it is land disposed.

Location-Specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in a specific location. An example of

location-specific requirements are laws forbidding the placement of an incinerator near a hospital or school or the placement of waste in a wetland area.

The No Further Corrective Action Alternative complies with all identified ARARs for the thirteen units noted. ARARs will be developed for those SWMUs referred to D&D at the time a remedial action is selected.

3. Long-term Effectiveness and Permanence

Long-term Effectiveness and Permanence is not applicable to those SWMUs deferred to D&D. Those SWMUs which have been deferred to D&D will be evaluated for remedial alternatives at the time of the plant closure. Since clean-up objectives are met for those SWMUs which fall into the No Further Corrective Action Alternative, long-term effectiveness and permanence is expected to be satisfied.

4. Reduction of Toxicity, Mobility and Volume.

This criteria is not applicable to those SWMUs in Quadrant IV in the No Further Corrective Action Alternative which were determined to meet the risk guidelines. This criteria will apply to those units deferred to D&D.

5. Short-term Effectiveness

This criteria is applicable to those SWMUs in the No Further Corrective Action Alternative which were determined to meet the risk guidelines. These thirteen SWMUs meet all risk criteria and guidelines and therefore are protective in the short term. This criteria will apply to those units referred to D&D at the time that the facility is no longer in operation.

6. Implementability

Both the No Further Corrective Action and deferral to D&D remedial solutions are easily implemented.

7. Cost

There are no costs associated with the No further Corrective Action Alternative because there is no need for any further remedial action. For those SWMUs in which remedial actions have been completed, there will be costs associated with ongoing monitoring to ensure that the remedies selected are performing as expected. The cost for future remediation for those units deferred to D&D will be evaluated at the time the Portsmouth facility enters D&D.

8. Community Acceptance:

Ohio EPA and US EPA will evaluate community acceptance during the public comment period. All comments pertinent to the preferred alternatives outlined below will be addressed in the responsiveness summary in the decision document prepared by Ohio EPA for this quadrant.

11.0 OHIO EPA'S SELECTED ALTERNATIVES FOR QUADRANT IV

Ohio EPA has selected a no further corrective action and a deferral option for Quadrant IV. Although the approved CAS/CMS Report discusses a "referral" option, Ohio EPA has determined that the term "deferral" is more appropriate for SWMUs which fall into that category. The units addressed in this section remain under the auspices of Section VII of the Ohio Consent Decree. Deferring these units to D&D requires US DOE to re-evaluate and remediate these SWMUs at a later time as warranted, rather than potentially eliminating these SWMUs from further consideration. Further more, "referring" these units to D&D implies that US DOE PORTS has a D&D process in place. "Deferral" more accurately reflects that these units will be addressed in the future when those SWMUs are no longer used as they were originally intended or when the gaseous diffusion plant is no longer in operation.

For those SWMUs which fall into the risk goals as outlined by CERCLA and RCRA, a No Further Corrective Action Alternative is selected. The thirteen SWMUs which fall into this category are:

- X-114A Firing Range
- X-334 Transformer Storage and Cleaning Building

- X-344A Uranium Hexaflouride Sampling Facility and X-344A Settling Tank
- X-344D HF Neutralization Pit*
- X-744W Surplus and Salvage Warehouse
- X-745E Northwest International Process Gas Yard
- X-745F North Process Gas Stock Pile Yard
- X-752 Hazardous Waste Storage Facility
- Old Northwest Firing Range (Ruby Hollow)
- Rail Road Spur Yard Storage Area

* This tank will be removed prior to December 2000 per the Ohio EPA approved workplan.

Remedial Actions have been completed at these SWMUs and monitoring is ongoing per the approved IGWMP and O&M Plans. Please refer to pages 23-25 of this text.

- X-611A North, Middle, and South Lime Sludge Lagoons
- X-735 Sanitary Landfill and X-735A Landfill Utility Building
- X-734 Old Sanitary Landfill, X-734A Construction Spoils Landfill, and X-734B Constructions Spoils Land Fill

In addition to the No Further Action Alternative, there were fourteen SWMUs which have been deferred to decontamination and decommissioning (D&D). There were four criteria used to make that decision.

(1) HI values for media-specific total non-cancer risks under the industrial worker scenarios are generally less than 1.

(2) The industrial worker scenario ELCR values were within the risk range of 1×10^{-4} to 1×10^{-6}.

(3) Evaluation of the contaminants present indicate that they are generally immobile.

(4) The SWMUs identified are within current production areas and operational

facilities. Remedial activities may interrupt facility operations and such areas may likely become re-contaminated due to on going production of enriched uranium.

In some instances it was noted that there may be unacceptable risk (> 10-4 ELCR or HI > 1) to current on site workers based on the data present in the BRA in the RFI Report for soil, sediments and surface water for some SWMUs currently deferred to D&D. US DOE has implemented administrative controls to insure workers do not excavate soils or come into contact with sediments and surface water without proper environmental and health and safety controls. Such controls include wearing of the proper protective clothing prior to working in potential areas of concern, and notification of DOE personnel prior to excavation of soils. US DOE has installed fencing in some areas to control entry of on site workers. Ohio EPA will continue monitor such areas to ensure that workers are not exposed to potential contaminants in soils, sediments and surface water.

The SWMUs listed below have been deferred to D&D:

- X-230J6 Northeast Holding Pond, Monitoring Facility, and Secondary Oil Collection Basin
- X-333 Process Building
- X-342A Feed Vaporization and Fluorine Generation Building, X-342B Fluorine Storage Building, and X-342C Waste HF Neutralization Pit
- X-344C HF Storage Facility
- X-533A Switchyard, X-533B Switch House, X-533C Test and Repair Building, X-533D Oil House and Associated French Drains, X-533E Valve House, X-533F Valve House, and X-533H Gas Reclaiming Cart Garage
- X-630-1 Recirculating Water Pump House, X-630-2 A&B Cooling Towers, and X-630-3 Acid Handling Station
- X-745B Enrichment Process Gas Yard
- X-747H Northwest Surplus and Scrap Yard

- Chemical and Petroleum Containment Basins (East of X-533A) and Emergency Containment Tanks
- North Drainage Ditch, X-230L North Holding Pond, and Unnamed Construction Fill Area
- Northeast Drainage Ditch
- Transformer Cleaning/Storage Pad

This Decision Document took into account all the eight criteria listed above.

APPENDIX I

ARAR LIST

QUADRANT IV DECISION DOCUMENT

1.0 INTRODUCTION

This appendix provides a discussion pertinent to federal and state applicable or relevant and appropriate requirements (ARARs) which may be considered for corrective measures proposed for the X-734 Old Sanitary Landfill, X-734A Construction Spoils Landfill, and X-734B Old Construction Spoils Landfill located in Quadrant IV at the Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio.

In the absence of federal- or state-promulgated regulations, certain criteria, advisories, guidance values, and proposed standards, although not legally binding, may serve to supplement an ARAR provision by providing useful guidance for setting protective cleanup levels. These are not potential ARARs but are **"to be considered" (TBC)** guidance.

2.0 REGULATORY HISTORY OF PORTS

A Cleanup Alternative Study/Corrective Measures Study (CAS/CMS) being conducted for PORTS is intended to develop alternatives for remediating hazardous and radioactive contamination present in PORTS groundwater and soil as a result of plant operations. PORTS, which is owned by the United States Department of Energy (U.S. DOE), currently enriches uranium for electrical power generation and until 1991 provided highly enriched uranium to the U.S. Navy.

The environmental restoration program at PORTS is the subject of two enforcement actions. The State of Ohio issued a Consent Decree August 31, 1989, requiring a CAS. An Administrative Order by Consent (AOC) between the U.S. Environmental Protection Agency (U.S. EPA) and DOE under the authority of Section 3008(h) of Resource Conservation and Recovery Act (RCRA) and Sections 104 and 106(a) of the CERCLA Act of 1980 was issued effective September 27, 1989, and amended May 11, 1994. The U.S. EPA AOC includes requirements for a CMS for solid waste management units (SWMUs) that parallel requirements of the state of Ohio Consent Decree. Tasks in the AOC are patterned after the proposed RCRA corrective action process to be promulgated in Title 40 *Code of Federal Regulations* (CFR) Part 264 Subpart S. The AOC also suggests that CERCLA requirements be integrated into the corrective action process as ARARs or regulatory drivers to address releases of hazardous substances that are not hazardous waste. The intent of implementing CERCLA guidance at PORTS is to supplement policies and decisions not specifically included under RCRA.

CERCLA on-site remedial response actions must comply only with the substantive requirements of a regulation and not the administrative requirements to obtain federal, state, or local permits [CERCLA §121(e)]. To ensure that CERCLA response actions proceed as rapidly as possible, the U.S.

EPA has reaffirmed this position in the final National Contingency Plan (NCP) (55 Federal Register (FR) 8756). **Substantive requirements** pertain directly to the actions or conditions at a site. **Administrative requirements** facilitate the implementation of those substantive requirements. Although these administrative requirements are not ARARs under the CERCLA process, compliance with all administrative requirements (not summarized in this appendix) is necessary until PORTS is listed on the National Priorities List (NPL). Section 121 of CERCLA specifies that remedial actions for cleanup of hazardous substances must comply with ARARs or standards under federal and state environmental laws.

3.0 DEFINITION OF TERMS

The terms defined in the following sections of the appendix are those essential to understanding the information in the appendix.

Applicable requirements are "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site" (40 CFR 300.5).

Relevant and appropriate requirements are "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting law that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site" (40 CFR 300.5).

3.1 Chemical, Location, and Action-Specific ARARs

ARARs will govern remediation activities, generation and management of waste streams, and final disposition of waste streams. To-be-considered guidance will be integrated with ARARs as non-promulgated standards. The following paragraphs provide brief explanations of chemical-, location-, and action-specific ARARs.

3.2 Chemical-Specific ARARs

Chemical-specific requirements set health or risk-based concentration limits or discharge limitations in various environmental media for specific hazardous substances, pollutants, or contaminants (53 FR

51394). Although limited in number, chemical-specific standards have been established under several statutes, including RCRA, Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), and Clean Air Act (CAA). These requirements generally set protective cleanup levels for the chemicals of concern in the designated media or else indicate a safe level of discharge that may be incorporated when considering a specific remedial activity.

3.3 Location-Specific ARARs

Location-specific requirements set restrictions upon the concentration of hazardous substances or the conduct of activities solely because these substances or activities are in special locations (53 FR 51394). Location characteristics that trigger ARARs include the presence of sensitive resources such as wetlands, flood plains, cultural resources, historic sites, and endangered or threatened species.

3.4 Action-Specific ARARs

Performance, design, or other action-specific requirements set controls or restrictions on particular types of activities related to the management of hazardous waste (53 FR 51394). Selection of a particular remedial action at a site will invoke the appropriate action-specific ARARs. These ARARs may specify particular performance standards or technologies as well as specific environmental cleanup levels for discharged or residual chemicals remaining after treatment or following remedial activities.

4.0 ARARs STATUS

ARARs will govern the remediation activities, generation and management of waste streams, and final disposition of waste streams. To ensure protection of human health and the environment, and to ensure proper management of waste, the Ohio EPA and DOE are establishing a list of Federal and State of Ohio promulgated standards, requirements, and cleanup criteria that will be met during the implementation of the remedial activities. The Federal and State of Ohio promulgated standards, requirements, and cleanup criteria presented in Table B.1 include requirements from the Ohio Administrative Code (OAC), Ohio Revised Code (ORC), U.S. EPA Guidance, DOE Orders and Title 40 *Code of Federal Regulations* (CFR). To-be-considered (TBC) guidance will be integrated with ARARs as non-promulgated standards.

This list of ARARs is preliminary in nature and provides a broad spectrum of ARARs for consideration in the Preferred Plan. After the selected remedial action alternative for Quadrant IV is chosen, a final list of ARARs will be negotiated and incorporated into the CMI. The preliminary list of ARARs and TBC guidance is presented in Table B.1.

[Note: a list of acronyms is included at the end of Table B.1.]

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Historic Preservation (Location)	DOE must take into account the effect of an undertaking on Historic Properties and accord the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are defined as any prehistoric or historic district, building, site, structure, or object included or eligible for inclusion in, the National Register of Historic Places.	This requirement will include the terms associated with artifacts, records, and persons released to and located within such properties. Historic properties that are to be substantially altered or demolished must be recorded for future use and reference - **applicable.**	National Historic Preservation Act 16 U.S.C. 470C (Federal) Consideration of Historic Properties 36 CFR Part 800
Archeological resource recovery and preservation (Action/Location)	Upon discovery that a project may cause irreparable loss, destruction, significant scientific finding, prehistoric finding, or loss of historical or archeological data, DOE must notify the Department of Interior in writing and provide appropriate information concerning the project. DOE must, with possible assistance from State Historical Preservation Officer (SHPO), undertake recovery, protection and preservation of the data. Prior to any Federal undertaking which may directly and adversely affect any National Historic Landmark, the Director of Ohio EPA of the responsible agency shall, to the extent possible, minimize the harm to such landmark.	No person shall excavate, remove, damage, or otherwise alter or deface or attempt to excavate, remove, damage, or otherwise alter or deface any archeological resource located on public lands unless such activity is pursuant to a permit. If an EPA activity may cause irreparable loss or destruction of significant scientific, prehistoric, historic, or archeological data, the responsible official or the Secretary of the Interior is authorized to undertake data recovery and preservation activities - **applicable.** [NOTE: The National Environmental Policy Act requires that federal projects be evaluated to consider adverse effects on archeological and historical sites.]	Archeological and Historic Preservation Act 16 U.S.C. 469, 470 Procedures for Implementing the National Environmental Policy Act (NEPA) 40 CFR 6.301(a),(h)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Protection of wetlands (Location)	Federal agencies conducting certain activities must avoid, to the extent possible, the adverse effects and impacts associated with destruction or loss of wetlands and to avoid support of new construction in wetlands when a practicable alternative exist.	Consideration will be given by DOE to protect wetlands associated with the area near the sites undergoing remediation in Quadrant IV - **applicable.**	Procedure for Implementing NEPA 40 CFR 6.302(a) Executive Order 11990
Flood plain management (Location)	Federal agencies must evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, adverse effects with the direct or indirect development of a floodplain.	DOE must consider floodplain areas located within or effected by the Quadrant IV remedial action - **applicable.**.	Procedures for Implementing NEPA 40 CFR 6.302(b) Executive Order 11988
Floodplain (Location)	The limits of solid waste placement and the leachate management system cannot be located in a regulatory floodplain, unless deemed necessary by the Director of Ohio EPA.	Measures will be taken to ensure that the regulatory requirements identified as applicable or relevant and appropriate under this regulation will be adhered to - **applicable.**	OAC 3745-27-20(c)(2)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Floodplain/wetlands (Location)	DOE shall exercise leadership and take action to: (1) avoid to the extent possible long- and short-term adverse impacts associated with the destruction of wetlands and the occupancy and modification of floodplain and wetlands, and avoid direct and indirect support of floodplain and wetlands development wherever there is a practicable alternative. (2) incorporate floodplain management goals and wetlands protection considerations into its planning, regulatory, and decision-making processes and shall to the extent practicable: (a) reduce the hazard and risk of flood loss. (b) minimize the impact of floods on human safety, health and welfare. (c) restore and preserve natural and beneficial values served by the floodplain. (d) minimize the destruction, loss or degradation of wetlands. (e) preserve and enhance the natural and beneficial values of wetlands.	DOE will undertake a careful evaluation of the potential effects of any DOE action taken in a floodplain and any new construction undertaken by DOE in wetlands not located in a floodplain. DOE will identify, evaluate, and as appropriate, implement alternative actions which may avoid or mitigate adverse floodplain/wetlands impacts. DOE will provide opportunity for early review of any plans or proposals for actions in floodplain and new construction in wetlands. DOE must consider wetlands and areas located within or effected by the Quadrant IV remedial action - applicable.	DOE Compliance with Floodplain/Wetlands Environmental Review Requirements 10 CFR 1022.3(a),(b)(1),(2),(3),(5),(6),z, (d),(e), 1022.5(b),(h), and 1022.11(a),(b),(c)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Best Management Practices Program (BMP) (Action)	BMP programs shall be developed in accordance with good engineering practices and: (1) be documented in a narrative form, including necessary plot plans, drawings, and maps, (2) establish specific objectives for the control of toxic and hazardous pollutants, and (3) establish specific best management practices to meet the specific objectives for control of toxic and hazardous pollutants to the waters of the United States.	The substantive portions of this regulation may apply to the remedial action(s) undertaken - **applicable.**	40 CFR 125.104 Subpart K
Noise control (Action)	The public must be protected from noises that jeopardize health and welfare.	Because vehicles and equipment would be involved in certain aspects of the remedial action, all substantive requirements of the act are applicable - **applicable.**	Noise Control Act, as amended 42 U.S.C. 4901 et. seq. Noise Pollution and Abate Act 42 U.S.C. 7641
Solid waste closure regulations (RCRA Subtitle D Municipal) (Action)	RCRA Subtitle D regulations cover the location, operation, and closure of municipal solid waste landfills. Subpart F of 40 CFR 258 covers closure and post-closure.	The substantive portions of 40 CFR 258 Subpart F are identified due to capping requirements - **relevant and appropriate.**	RCRA Subtitle D Municipal Solid Waste Closure Regulations 40 CFR 258 Subpart F
RCRA corrective actions (Action)	The following promulgated requirements are Federal statutory requirements for RCRA corrective actions.	The remedial action(s) are being conducted pursuant to RCRA and CERCLA requirements - **applicable.**	RCRA Corrective Actions - Sections 3004(u), 3005(c)(3), 3008(h), and 7003

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Radiation protection of public and environment (Chemical)	DOE Orders relating to radiation dose limit, as low as reasonably achievable policy, control of residual radioactive material, management and control of radioactive material, management and control of radioactive materials in liquid discharges, radiation protection of public and the environment, and derived concentration guides for radionuclides contain criteria and guidelines to be considered for management of radioactive material.	Management of any materials during remedial action(s) that are contaminated with radioactive compounds should consider the criteria and guidelines established in this DOE Order - **TBC.**	DOE Order 5400.5
Management of low-level radioactive waste (Chemical)	DOE Order 5820.2A states "low-level radioactive waste may be disposed by methods appropriate to achieve the performance objectives of the disposal facility." Low-level radioactive waste must be disposed of on-site, if possible.	Management of any materials that may be considered low-level radioactive waste should consider the criteria and guidelines established in this DOE Order. If on-site disposal capacity for LLW is insufficient, off-site disposal must be at another DOE facility. An exemption is required for disposal of LLW off-site - **TBC.**	DOE Order 5820.2A (III)
RCRA corrective actions (proposed regulations) (Action)	RCRA corrective actions are the proposed regulations identified for implementation.	The proposed Subpart S regulations pertaining to RCRA corrective actions are to be considered during remedial actions - **TBC.**	40 CFR 264 Subpart S

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Mixed LLW (Chemical)	To ensure that inappropriate shipments of mixed waste are not occurring, the DOE Office of Environment Restoration and Waste Management issued a Performance Objective for Certification of Nonradioactive Hazardous Waste. In accordance with DOE Order 5820.2A, mixed waste is to be disposed of on the site where it was generated, if possible.	The basic premise of the performance objective is that no mixed waste is to be shipped off-site to a facility not specifically licensed for the radioactive component of the waste - **TBC.** The waste must be shipped to an off-site treatment/disposal facility holding both a RCRA permit and a NRC permit - **TBC.**	DOE Order 5820.20A
RCRA corrective action (Action)	Guidance from EPA on conducting RCRA corrective actions.	The RCRA Corrective Action Plan guidance is to be considered for the remedial action - **TBC.**	RCRA Corrective Action Plan OSWER Directive No. 9902.3-2A
Chemicals in drinking water (Solid Waste Disposal Facility) (Chemical)	A solid waste disposal facility shall not contaminate an underground drinking water source beyond the solid waste boundary (outermost perimeter of the waste). The concentration of chemicals shall not exceed background levels or listed maximum contaminant levels (MCLs), whichever is higher.	These requirements would be relevant and appropriate because the SWMUs contains several of the constituents and/or chemicals listed in the regulation - **relevant and appropriate.**	40 CFR 257.4
Classification of solid waste disposal facilities and practices (Chemical)	Solid waste disposal facilities or practices shall not cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife.	The practices shall not result in the destruction or adverse modification of critical habitat of endangered or threatened species identified in 50 CFR Part 17 - **applicable.**	40 CFR 257.3-2

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Endangered and threatened species and plants (Location)	All Federal agencies must ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the constituent elements essential to conservation of a listed species within a defined critical habitat.	Additional requirements could apply if it is determined that the remedial action could adversely affect these species or their habitat - **applicable.**	Endangered Species Act 16 U.S.C. 1531, et. Seq. Endangered and Threatened Wildlife and Plants 50 CFR 17.21, 17.31, 17.61, 17.71 and 17.94 Interagency Cooperation-Endangered Species Act 50 CFR 402.01
Required technical information for sanitary landfills (Action)	Specifies the minimum technical information required of solid waste permit to install. Included are hydrogeologic investigation report, leachate production and migration information, surface water discharge information, design calculations and plan drawings.	This ARAR will present substantive requirements of a solid waste permit to install. Pertains to any new solid waste disposal facility created on-site and expansions of existing solid waste landfills. Pertains to existing areas of contamination that are capped per solid waste regulations. The regulations establish the minimum information required during the remedial design stage - **applicable.**	OAC 3745-27-06(B)(C)
Construction specifications for sanitary landfills (Action)	Specifies the minimum requirements for the soil/clay layers.	Pertains to any new solid waste disposal facility located on-site and any expansions to existing solid waste landfills. Requirements applicable to areas of contamination that are capped per solid waste regulations - **applicable.**	OAC 3745-27-08(C), (D thru H)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Sanitary landfill - groundwater monitoring (Action)	Groundwater monitoring program must be established for all sanitary landfill facilities. The system must consist of a sufficient number of wells that are located so that samples indicate both upgradient (background) and downgradient water samples. The samples must be designed per the minimum requirements specified in this rule. The sampling and analysis procedures used must comply with this rule.	Applies in order to ensure that proper operation and maintenance is maintained at the unit. Wells have been installed both upgradient and downgradient. Sampling and analysis procedures required by this rule shall be incorporated into site procedures - **relevant and appropriate.**	OAC 3745-27-10(B)(C)(D)
Final closure of sanitary landfill facilities (Action)	Final closure standards will require the closure of a landfill in a manner which minimizes the need for post-closure maintenance and minimizes post-closure release of leachate or explosive gases to air, soil, groundwater or surface water. The requirement specifies acceptable cap design, soil, barrier layer, granular drainage layer, soil and vegetative layer. Will also provide for use of comparable materials to those specified with approval of Director of Ohio EPA.	Although these requirements apply to new solid waste landfills being created on-site, any expansion of existing solid waste landfills on-site and any existing areas of contamination that are capped in place per the solid waste rules - **relevant and appropriate.**	OAC 3745-27-11(B)(G)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Sanitary landfill-explosive gas monitoring (Action/Chemical)	Establishes requirements for an explosive gas monitoring plan which is required for solid waste landfills. Specifies the minimum information required in such a plan, including detailed engineering plans, specifications, information on gas generation potential, sampling and monitoring procedures, etc. Mandates when repairs must be made to an explosive gas monitoring system.	Pertains to any site which has had or will have putrescible solid waste placed on-site and which has a residence or other occupied structure located within 1000 feet of the emplaced solid waste - **relevant and appropriate.**	OAC 3745-27-12 (A)(B)(D)(E)(M)(N)
		Parameters and schedule for explosive gas monitoring must be identified for any disposal site where explosive gas monitoring may be a threat - **relevant and appropriate.**	OAC 3745-27-12(I)(J)
Disturbance where hazardous or solid waste facility was operated (Action)	Requires that a detailed plan be provided to describe how any proposed filling, grading, excavation, building, drilling, or mining on land where a hazardous water facility or solid waste facility was operated will be accomplished. This information must demonstrate that proposed activities will not create a nuisance or adversely affect the public health or the environment. Special terms to conduct such activities may be imposed by the Director of Ohio EPA to protect the public and the environment.	Pertains to any site at which hazardous or solid waste has been managed, either intentionally or otherwise. Does not apply to areas that have had one-time leaks or spills - **relevant and appropriate.**	OAC 3745-27-13(C)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Post-closure care of sanitary landfill facilities (Action)	Specifies the required post-closure care for solid waste facilities. Includes continuing operation of any leachate or surface water management systems, maintenance of the cap systems, and groundwater monitoring.	Although these requirements apply to new solid waste landfills being created on-site, any expansion of existing solid waste landfills on-site and any existing areas of contamination that are capped in place per the solid waste rules are covered under these requirements. The requirement applies to ensure proper operation and maintenance is maintained at the unit - **relevant and appropriate.**	OAC 3745-27-14(A) 40 CFR 267.23
Sanitary landfill operations - leachate management, final cover, and surface water management. (Action)	Includes requirements for the final cap system for areas at final elevations.	Although these requirements apply to new solid waste landfills being created on-site, any expansion of existing solid waste landfills on-site and any existing areas of contamination that are capped in place per the solid waste rules - **relevant and appropriate.**	OAC 3745-27-19(H)
	Surface water must be diverted from areas where solid waste is being, or has been, deposited. Also requires run-on and run-off to be controlled to minimize infiltration through the cover material and to minimize erosion of the cap system.	Pertains to new solid waste disposal facilities to be created on-site and existing landfills that will be expanded during remediation. Applies to existing areas of contamination that will be capped in-place per solid waste rules - **relevant and appropriate.**	OAC 3745-27-19(J)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Sanitary landfill operations - leachate management, final cover, and surface water management. (Action) (Continued)	Requires repair of leachate outbreaks; collection and treatment of leachate on the surface of the landfill; and action to minimize control or eliminate conditions causing leachate outbreaks.	Applies in order to ensure that proper operation and maintenance is maintained at the unit - **relevant and appropriate.**	OAC 3745-27-19(K)
Water/air permit criteria for decision by the director (Action)	A permit to install (PTI) or plans must demonstrate best available technology (BAT) and shall not interfere with or prevent that attainment or maintenance of applicable air quality standards.	Pertains to any site that will discharge to on-site surface water or will emit contaminants into the air. Surface water may be discharged to waters of the state before and after construction in accordance with the CWA requirements - **applicable.**	OAC 3745-31-05
Water quality criteria for decision by the Director of Ohio EPA (Action)	Specifies substantive requirement and criteria for Section 401 water quality criteria for dredging, filling, obstructing or altering waters of the state.	Pertains to any site that has or will affect waters of the state. The potential exist for discharge to waters of the state before or after construction in accordance with the CWA requirements. There is also a possibility that the remedial alternative chosen may require state waterways to be altered - **applicable.**	OAC 3745-32-05
Monitoring frequency for radioactivity (Chemical)	Presents monitoring requirements for radioactivity.	Pertains to any site which has contaminated groundwater or surface water that is either being used, or has the potential for use, as a drinking water source - **applicable.**	OAC 3745-81-26(A)(B)(C)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Maintenance and operation of groundwater wells (Action)	Establishes specific maintenance and modification requirements for casing, pump and wells in general.	Applies to the installation of groundwater monitoring well(s) to prevent the contamination of the well. Water well standards are incorporated into PORTS SOPs - **relevant and appropriate.**	OAC 3745-9-09(A thru C) OAC 3745-9-09(D(1) OAC 3745-9-09(E thru G)
Abandonment of test holes and wells (Action)	Following completion of use, wells and test holes shall be completely filled with grout or similar material or shall be maintained in compliance of all regulations.	Applies to the installation of groundwater monitoring well(s) to prevent the contamination of the well. Water well standards are incorporated into PORTS SOPs - **applicable.**	OAC 3745-9-10(A)(B)(C)
Endangered plant species (Location)	Prohibits removal or destruction of endangered plant species. No person shall root up, injure, destroy, remove from public highways, public property, or waters of the state, or on or from the property of another, without the written permission of the owner, lessee, or other person entitled to possession, any endangered or threatened plant listed in OAC 1501-18-1.	Applies to remediation sites where chemicals may harm endangered species. Clearly establishes that receptor plant species must be considered in risk assessments. This act may require consideration for displacement of large volumes of surface soils. Appropriate action will be taken in the event that an endangered or threatened species is discovered - **applicable.**	OAC 1501-18-1(03)(A) ORC 1518.02
Endangered animal species (Location)	No person shall take or possess any native species of wild animal, or any eggs or offspring thereof, that is threatened with site-wide extinction.	Applies to remediation sites where chemicals may harm endangered species. May apply at sites where remediation could disturb existing habitats - **applicable.**	OAC 1501-31-23(01) OAC 1501-31-23(A thru B) ORC 1531.25

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Standard for active asbestos waste site (Action/Chemical)	Establishes operating standards for an active asbestos waste disposal site.	Pertains to sites where asbestos has come to be located and must be consolidated on-site. The remedial action undertaken will implement control measures to prevent disturbance and release to the atmosphere of any asbestos containing material - **applicable.**	OAC 3745-20-06(A)(B)
Standard for inactive asbestos waste site (Action/Chemical)	Establishes operating standards for an inactive asbestos waste disposal site.	Pertains to sites where asbestos has been located. This requirement will also consider inadequate cover or areas where asbestos will be consolidated. The remedial action undertaken will implement control measures to prevent disturbance and release to the atmosphere of any asbestos containing material - **applicable.**	OAC 3745-20-07(A)(B)(C)
Institutional controls (Action)	Controls recommended include restrictions on land use, deed restrictions, well drilling prohibitions, well use advisories, and deed notices.	Long-term management of contamination left in place - **applicable.**	40 CFR 300.430(e)(3)
	Controls include but are not limited to periodic monitoring, appropriate shielding, physical barriers (i.e., fences, warning signs) to prevent access, inspection and repair of coverings, temporary dikes, drainage courses, and appropriate radiological safety measures to ensure protection during activities at the site.	Interim management of residual radioactive material above guidelines, including but not limited to that material left in accessible locations - **TBC.**	DOE Order 5400.5(IV)(6)(c)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Groundwater protection: (applicability Action)	The groundwater program, including monitoring requirements and associated activities will be consistent with the PORTS groundwater protection program, remedial action objectives (RAOs), selected remedial alternative(s).	The selected remedial alternative will be designed to achieve regulatory compliance with the established groundwater protection standard(s) - **applicable.**	OAC 3745-54-90
Operational - groundwater protection (Action)	Requires the establishment of detection, compliance, and corrective action monitoring program to ensure protection of groundwater by assessing the performance of the TSD facility during operation.	The groundwater monitoring program is required to be performed during the post-closure period for land disposal facilities where hazardous waste remain after closure. The post-closure monitoring needs to be conducted for a period of 30 years unless the regulatory agency approves an earlier termination date or requires that monitoring period be extended - **applicable.**	40 CFR 264, (all applicable requirements of Subpart F - OAC 3745-54-91 thru 3745-54-99)
Groundwater corrective action program (Action/Chemical)	Presents the requirements of a groundwater corrective action program that prevents hazardous constituents from exceeding their respective concentration limits at compliance point either by removal or treatment of the constituents.	Remedial action is currently being conducted or being developed to address the contaminants and/or constituents in groundwater at PORTS which exceed their concentration limits - **relevant and appropriate.**	OAC 3745-55-01
Acts of pollution prohibited (Action)	Pollution of waters of the state will be prohibited. Establishes regulations requiring compliance with national effluent standards which may have a point source discharge.	Pertains to any site which has contaminated on-site groundwater or surface water or will have a discharge to on-site surface water or groundwater - **applicable.**	OAC 6111.04 OAC 6111.04.2

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
The "Five Freedoms" for surface water (Chemical)	All surface water of the state shall be free from: (1) objectional suspended solids (2) floating debris, oil, and scum (3) materials that create a nuisance (4) toxic, harmful, or lethal substances (5) nutrients that create nuisance growth.	Pertains to both discharges to surface water and any on-site surface waters affected by site conditions during and/or after remedial action(s) - **applicable.**	OAC 3745-1-04(A)(B)(C)(D)(E)
Antidegradation policy for surface water (Chemical)	Prevents degradation of surface water quality below designated use or existing water quality. Existing instream uses shall be maintained and protected. The most stringent controls for treatment shall be required by the Director of Ohio EPA to be employed for all new and existing point source discharges. Prevents any degradation of "State Resource Waters".	Requires that best available technology (BAT) be used to treat surface water discharges. This requirement may be applied to set standards when existing water quality is better than the designated use - **relevant and appropriate.**	OAC 3745-1-05(A)(B)(C)
Mixing zone for surface water (Chemical)	Presents the criteria for establishing non-thermal mixing zones for point source discharges, and presents the criteria for establishing thermal mixing zones.	This requirement would pertain to an alternative which could result in a point source discharge to waters of the state or when establishing an alternative discharge point - **applicable.**	OAC 3745-1-06(A)(B)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Water quality standards and criteria (Action)	Specifies analytical methods and collection procedures for surface water discharges.	Surface water may be discharged into waters of the state during remedial actions. The required analytical and collection techniques are to be incorporated into the site standard operating procedures (SOPs) - **applicable.**	OAC 3745-1-03 40 CFR Part 136
	May be applicable to pollutants which do not have specific numerical or narrative criteria identified in Tables 7-1 thru 7-15 of this rule.	Surface water may be discharged into waters of the state during remedial action. Pertains to both discharges to surface waters as a result of the remedial action and any surface waters affected by site conditions - **applicable.**	OAC 3745-1-07(C)
Water use designation for Scioto River (Action/Location)	Establishes water use designations for stream segments within the Scioto River Basin.	Pertinent if stream or stream segment is on-site and is either affected by site conditions or if selected remedial alternative includes direct discharge. Waste load allocations may have to be established and/or modified - **applicable.**	OAC 3745-1-09

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Stormwater discharge associated with industrial activity (Action)	A discharge composed entirely of stormwater associated with industrial activities is required to obtain a NPDES permit. These categories of facilities are considered engaging in "industrial activity": (1) landfills, land application sites, and open dumps that receive or have received any industrial waste (waste that is received from any of the facilities described under this section) including those that are subject to regulation under Subtitle D of RCRA. (2) also includes construction activities including clearing, grading, and excavation activities that disturbs five acres or more of total area.	Sediment and erosion controls and BMP must be used to control run-off from installation and construction activities. Control of stormwater discharge associated with construction activities at industrial sites that result in a disturbance of greater than five acres of total land area - **applicable**. For those sites with less than five acres affected - **relevant and appropriate**.	40 CFR 122.26(a)(1)(ii) 40 CFR 122.26(b)(14)(v)(x)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Water pollution control (Action)	No discharge to waters of the state that will exceed discharge limits presented in the NPDES Permit shall occur. All discharges to waters of the state resulting from treatment systems such as a pump-and-treat system will meet the substantive requirements for discharge permits.	Prohibits failure to comply with requirements of sections 6111.01 to 6111.08 or any rules, permit or order issued under those sections - **applicable.**	ORC 6111.07(A)(C)
"Digging" where hazardous or solid waste facility was located (Action/Location)	Filling, grading, excavating, building, drilling or mining on land where a hazardous or solid waste facility was operated is prohibited without prior authorization from the Director of Ohio EPA.	Pertains to any site at which hazardous or solid waste has come to be located. Certain alternatives include potential excavation activities which may uncover solid and/or hazardous waste. Should remedial activities require the management of such waste, an exemption to permitting and other requirements may be warranted - **applicable.**	ORC 3734.02(H)
Explosive gas monitoring (Action/Location)	Several SWMUs may require explosive gas monitoring plans prior to any construction activities. The Director of Ohio EPA may order an owner or operator of a facility to implement an explosive gas monitoring and reporting plan should one not already be established.	Pertains to sanitary landfills except for those that dispose of non-putrescible waste - **relevant and appropriate.**	ORC 3734.04.1

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Protection of human health and the environment (Action)	The Director of the Ohio EPA shall adopt and may modify, suspend, or repeal rules for solid waste facilities in order to ensure that the facilities will be located, maintained, and operated, and will undergo closure and post-closure care, in a sanitary manner so as not to create a nuisance, cause or contribute to water pollution, or create a health hazard, or violate 40 CFR 237.3-2 or 257.3-8.	A waiver for this requirement may be required - **relevant and appropriate.**	ORC 3734.02(A)
Additional permit information: hazardous waste TSD in miscellaneous units (Action)	Establishes substantive hazardous waste permit requirements necessary for Ohio EPA to determine adequacy of miscellaneous units used to treat or store hazardous waste. Includes information such as waste characteristics, detailed design plans and reports, control of run-on and run-off, closure information, etc. See OAC 3745-57-90 to 3745-57-93 for additional requirements for miscellaneous units.	Pertains to sites where hazardous waste may be stored, treated or disposed in miscellaneous units. This requirement will apply to ensure that proper operation and maintenance is maintained at the unit - **relevant and appropriate.** [NOTE: This requirement will be fulfilled through the CMS/CMI process including and not limited to the remedial design phase.]	OAC 3745-50-44(C)(9)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Waste determination and hazardous waste analysis (Action/Chemical)	Any person who generates a solid waste must determine if that waste is hazardous by using procedures identified in 40 CFR 262.11. An overview of the hazardous waste determination procedures is presented in 40 CFR 260 Appendix I.	The specific project will assess the selected alternative for hazardous waste by reviewing the RFI database, reviewing process/historical records, and performing sampling and analysis (as required). A task-specific sampling and analysis plan will be developed to guide the required waste characterization activities - **applicable.**	OAC 3745-52-11 OAC 3745-54-13
Hazardous waste container management Action)	Containers of RCRA hazardous waste will be: (1) maintained in good condition, (2) compatible with other waste streams to be stored, (3) closed during storage, and (4) managed to prevent spills or rupture.	During the remedial action, containers of various types of waste streams could be generated. Containers will be inspected and records of the inspections will be kept. Containers will be stored per applicable containment requirements - **relevant and appropriate.**	OAC 3745-55-71, 73 to 78
Residues of hazardous waste in empty containers (Action)	Exempts residues from empty containers when these residues have resulted from remedial action alternatives requiring storage of containers on-site.	Pertains to any alternative that incorporates storage of hazardous waste on-site in containers - **relevant and appropriate.**	OAC 3745-51-07
Compatibility of hazardous waste with containers (Action)	Containers holding hazardous waste must not react with the container material or liner material.	Pertains to any site at which hazardous waste will be stored in containers. The requirement is being considered relevant and appropriate because hazardous waste pending analysis may be stored at the remediation site - **relevant and appropriate.**	OAC 3745-55-72

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Hazardous waste accumulation time (Action)	A generator may accumulate hazardous waste on-site for 90 days or less without a permit or without having interim status.	During the remedial action, various waste streams could be generated, segregated, and temporarily staged pending analysis. The containers will be managed accordingly until disposal. The applicable requirements will be adhered to - **relevant and appropriate.**	OAC 3745-52-34
General closure performance standard: hazardous waste facilities (Action)	Requires that all hazardous waste facilities be closed in a manner that minimizes the need for further maintenance, controls, minimizes, eliminates or prevents post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off or hazardous waste decomposition products to the ground or surface water or the atmosphere.	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-3745-55-11(A)(B)(C)
Disposal/decontamination of equipment, structures and soils (Action)	Requires that all contaminated equipment, structures and soils be properly disposed of or decontaminated.	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
Landfill closure and post-closure requirements (Action)	Specifies closure and post-closure requirements for hazardous waste landfills, including and not limited to final cover and maintenance.	Pertains to existing land-based areas of contamination - **applicable.**	OAC 3745-57-10
Hazardous waste restricted from land disposal (Action)	Provides specific requirements pursuant to hazardous wastes that are restricted from land disposal.	Pertains to any alternative that incorporates disposal of a hazardous waste on-site - **applicable.**	OAC 3745-59-01(C)(E)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Dilution prohibited as treatment (Action)	Prohibits dilution of restricted waste or residuals resulting from treatment of restricted waste (as a substitute for adequate treatment) in order to land disposed a restricted waste.	Pertains to any alternative that incorporates disposal of a hazardous waste on-site - **relevant and appropriate.**	OAC 3745-59-03(A)(B)
Hazardous waste analysis (Action)	Generators shall test the waste or test extract of the waste according to the frequency and test methods described in the rule to determine if the waste is restricted from land disposal.	Pertains to any alternative that incorporates disposal of a hazardous waste on-site - **relevant and appropriate.**	OAC 3745-59-07(A)(B)(C)
Restricted waste that exhibit a characteristic (Action/Chemical)	Prohibits land disposal of characteristic waste unless the waste complies with treatment standards of listed waste. If the waste is both listed and characteristic, the treatment standard for the listed waste will operate in lieu of the standard for the characteristic waste.	Pertains to any alternative that incorporates disposal of a hazardous waste on-site - **relevant and appropriate.**	OAC 3745-59-09
Prohibition on storage of restricted waste (Action)	Prohibits on-site storage of hazardous waste restricted from storage beyond a specified time frame stated in the rule.	Pertains to any site in which storage of hazardous waste will occur on-site to facilitate proper recovery, treatment or disposal. The PORTS site has been granted an extension to store restricted waste beyond the regulatory suggested time frame - **TBC.**	OAC 3745-59-50(A)(B)(C)(D)(E)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Waste specific prohibitions (Chemical)	Prohibits land disposal of the following waste: (1) liquid waste with pH < or = 2 (2) liquid waste containing PCBs with concentrations > or = 50 ppm (3) liquid waste with halogen organic loading of > or = 100 mg/l and < 10,000 mg/l	Pertains to any site in which on-site land disposal of PCB or HOC contaminated waste may be disposed as part of an alternative. However, there will be no first-third waste disposed of at the PORTS site during and/or after any remedial action - **TBC.**	OAC 3745-59-32(A)(D)(E)(F)
California listed waste prohibited (Chemical)	Prohibits on-site land disposal of first-, second-, third-third waste unless requirements of paragraph D, E, F, and G are met.	Pertains to any site in which on-site land disposal of first-, second-, third-third hazardous waste may be disposed as part of an alternative. However, there will be no first third waste disposed of at the PORTS site during and/or after any remedial action - **TBC.**	OAC 3745-59-33 (A)(B)(C)(D)(E)(F)(G) OAC 3745-59-34 (A-H) OAC 3745-59-35 (A-I)
Corrective action for waste management units (Action)	Requires an applicant for a hazardous waste permit to institute corrective action for all releases of hazardous waste or constituents from any waste management unit regardless of the time at which the waste was placed in the unit.	Pertains to all sites with land-based hazardous waste units (surface impoundments, waste piles, land treatment units, landfills). This includes existing land-based areas of contamination - **applicable.** [NOTE: Corrective action will also be implemented during the Corrective Measure Implementation (CMI) process.]	OAC 3745-55-011(A)(C)(D)

Table B.1 Preliminary ARARs for Quadrant IV (Continued)

Action	Requirement	Prerequisites	Citation
Environmental performance standards: land-based units (Action)	Specifies location, design, construction, operation, maintenance and closure requirements for landfills, waste piles, surface impoundments, and underground injection wells.	Pertains to all sites with land-based hazardous waste units (surface impoundments, waste piles, land treatment units, landfills). This includes existing land-based areas of contamination - **relevant and appropriate.**	OAC 3745-57-01(A)(D) 40 CFR 267.10
Transportation for off-site disposal (Action)	EPA requires that all off-site shipments of CERCLA waste be to a properly permitted treatment, storage, and disposal facility.	In addition, all off-site shipments must comply with the administrative as well as substantive requirements of legally applicable regulations - **TBC.**	40 CFR 300.400
Hazardous waste shipping requirements: manifest, packaging, labeling, and placarding (Action)	A generator who transports, or offers for transportation, hazardous waste for offsite treatment, storage or disposal shall prepare and meet all hazardous waste manifesting requirements.	Prior to any offsite transportation of hazardous waste materials, all manifesting, packaging, labeling, marking, and placarding requirements shall be met - **applicable.** [**NOTE:** If on-site transportation of hazardous waste, then - **relevant and appropriate.**]	OAC 3745-52-20, 22, 23, 30, 31, 32 and 33

Table B.1 Preliminary ARARs for Quadrant IV (continued)

Action	Requirement	Prerequisites	Citation
Containment of RCRA waste left in place (Action)	When a cap is being paced over waste (e.g., closing of a landfill), design and construct a cover to: (1) minimize migration of liquids through the capped area, over the long term; (2) function with minimum maintenance; (3) promote drainage and minimize erosion or abrasion of the cover; and (4) accommodate settling and subsidence so that the cover's integrity is maintained.	Applicable to RCRA hazardous waste placed at site after November 19, 1980; relevant and appropriate to waste left in place before 1980 - **applicable.**	40 CFR 264.310(a) OAC 3745-68-10
Post-closure care (Action)	Restrict post-closure use of property as necessary to prevent damage to the cover.	**Relevant and appropriate** to final closure of a SWMU with some hazardous materials or residues left in place.	OAC 3745-55-17 OAC 3745-68-10
	Ensure that post-closure care includes: (1) maintenance of the integrity and effectiveness of the final cover; (2) maintenance and monitoring of the groundwater system and compliance with all applicable parts of Subpart F, "Releases from Solid Waste Management Units;" and (3) prevention of the damage to the cover from run-on and run-off cover.	**Applicable** to closure of RCRA - permitted hazardous waste facilities. **Relevant and appropriate** to final closure of a SWMU with some hazardous materials or residues left in place. [NOTE: See also 40 CFR 264.228(b), 40 CFR 264.310(b)]	

Table B.1 Preliminary ARARs for Quadrant IV (continued)

Action	Requirement	Prerequisites	Citation
Air emissions from hazardous waste facilities (Action/Chemical)	No hazardous waste facility shall emit any particulate matter, dust, fumes, smoke, vapor or odorous substance that interfere with the comfortable enjoyment of life or property.	Pertains to any site at which hazardous waste will be managed such that air emissions may occur. Consider sites that will undergo movement of earth or incineration - **applicable.**	ORC 3734.02(I)
Particulate ambient air quality standards (Chemical)	Establishes the specific standards for total suspended particulates. The primary standard for National Ambient Air Quality Standards (NAAQS) for particulate matter is 50 ug/m^3 annual (averaging time) and 150 ug/m^3 per 24 hours (averaging time).	Fugitive dust will be generated during loading, unloading, transportation and grading of cover material - **applicable.**	OAC 3745-17-02(A)(B)(C) 40 CFR Section 50

Table B.1 Preliminary ARARs for Quadrant IV (continued)

Action	Requirement	Prerequisites	Citation
Air pollution nuisances prohibited (Action)	Defines air pollution nuisance as emission or escape into the air from any source(s) of smokes, ashes, dust dirt, grime, acids, fumes, gases, vapors, odors, and combinations of the above that endanger health, safety or welfare of the public or cause personal injury or property damage. Such nuisances are prohibited.	Fugitive dust may be generated during loading or unloading, transportation and grading of cover material. There are minimal activities anticipated that will result in an air pollution nuisance - **applicable.**	OAC 3745-15-07(A)
Air discharges (fugitive dust) (Chemical/Location)	The significant deterioration of air quality is prohibited.	Wind dispersal of any debris or stockpiled soil resulting from activities associated with an alternative will be controlled - **applicable.**	OAC 3745-17-05
Emission Restrictions (Action)	For any fugitive dust source that may cause such a public nuisance, fugitive dust control measures must be implemented.	These controls include use of water or other suitable dust suppressants and the covering at all times of open-bodied vehicles when transporting materials likely to become airborne. Canvas or other suitable coverings must be used. Small sources of fugitive emissions are exempt from air-permitting requirements if the emissions of air contaminants can demonstrably be held to less than 10 lb per day - **applicable.**	OAC 3745-17-08(B)

Table B.1 Preliminary ARARs for Quadrant IV (continued)

Action	Requirement	Prerequisites	Citation
Emission Restrictions (Action) (Continued)		All emissions of dust shall be controlled. Considered for all sites which may undergo grading, loading operations, demolition, clearing and construction - relevant and appropriate.	OAC 3745-17-08A(1) thru A(2) OAC 3745-17-08(D)
Emission of radionuclides to atmosphere (NESHAP) (Chemical)	Subpart H of 40 CFR 61 addresses atmospheric radionuclide emissions from DOE facilities and may be applicable to airborne emissions during remedial activities. EPA has issued a final NESHAP for amounts that would not cause any member of the public to receive an effective dose equivalent of 10 mrem/year or more.	Title 40 CFR 61.93(b)(4)(I) requires radiological emission measurements at all release points that could discharge radionuclides into the air in quantities that could cause an effective dose equivalent in excess of 1% of the standard 0.1 mrem/year. All radionuclides that contribute greater than 10% of the standard 1 mrem/year for a release point shall be measured - applicable.	40 CFR 61
Control of emissions of organic materials from stationary sources (Action)	All air discharges resulting from equipment or other stationary sources that may emit VOCs to the atmosphere will meet substantive requirements as permitted.	No persons shall cause or allow emissions of an air contaminant to the atmosphere without a permit - applicable.	OAC 3745-21-07 ORC 3704.05
Worker health and safety (Action)	Response actions under the NCP will comply with the provisions for response action worker safety and health in 29 CFR 1910.120.	All governmental agencies and private employers are directly responsible for the health and safety of their own employees - relevant and appropriate.	40 CFR 300.150

Table B.1 Preliminary ARARs for Quadrant IV (continued)

Action	Requirement	Prerequisites	Citation
Occupational-worker protection (TBC)	The safety and health standards for general construction presented in 29 CFR 1926 will be followed. The OSHA standards are incorporated into DOE Order 483.1A. The specific requirement will be identified in the task-specific health and safety plan.	The proposed remedial action alternative will be implemented in accordance with applicable OSHA general construction standards. The OSHA standards will apply on their own merit as required through DOE Order 5483.1A - **TBC.**	29 CFR 1910.120
Occupational worker protection health and safety documentation (TBC)	Employers shall maintain and implement a written safety and health program for their employees involved in hazardous waste operations. All occupational safety and health requirements of 29 CFR 1910 and 1926 are to be followed. In case of a conflict or overlap, the most protective provision will apply.	The proposed remedial action alternative will be implemented in accordance with the provisions of DOE and Portsmouth Gaseous Diffusion Plant Comprehensive Occupational Safety and Health Program. As specified in 29 CFR 1910.120(b)(4), a task-specific health and safety plan will be developed - **TBC.**	29 CFR 1910.120(b)(4)
Radiation protection of the public (TBC)	Exposures of members of the public to radiation sources as a consequence of all routine DOE activities will not cause, in a year, an effective dose equivalent greater than 100 mrem from all exposure pathways.	Precautions will be taken through the use of appropriate controls to minimize exposure to the public - **TBC.**	DOE Order 5400.5, Chapter II, Section 1.A

Table B.1 Preliminary ARARs for Quadrant IV (continued)

Action	Requirement	Prerequisites	Citation
Radiation protection of the public (continued) (TBC)	Specific authorizations may be received for a temporary increase of the dose limit up to 500 mrem in a year. The derived concentration guides (DCGs) are provided as reference values for conducting radiological environmental protection programs at operational DOE facilities and sites. DCG values are presented in DOE Order 5400.5 for the following exposures modes: (1) ingestion of water (2) inhalation of air (3) immersion in a gaseous cloud	The DCG values for internal exposure are based on a committed effective dose equivalent of 100 mrem for the radionuclide taken into the body by ingestion or inhalation during one year - TBC.	DOE Order 5400.5 Chapter III
Facility design requirements (Action)	The final cap system design shall be certified by a Professional Engineer. The applicable drawings, calculations, etc. shall meet the necessary requirements of this rule. The criteria identified for Final Cap System Design Plans shall meet construction and performance specifications for soil compaction, particle size, plasticity properties per ASTM D 2487, and ASTM D 422. The soil will not consist of solid waste or additional construction and demolition debris.	The X-734 Landfill Final Cap System will meet lift and slope requirements and standards needed to ensure growth of dense vegetation. These factors will also prevent ponding and improper draining which will minimize erosion. The substantive portions of these requirements will apply to all phases of the remedial action taken. DOE will provide opportunity for Ohio EPA review of any plans generated pursuant to this cap and other phases of this remedial action - applicable.	OAC 3745-400-07(G)(2)

Table B.1 List of Acronyms

ARARs	Applicable or relevant and appropriate requirements
BAT	Best Available Technology
CAA	Clean Air Act
CAS/CMS	Cleanup Alternatives Study/Corrective Measures Study
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation
CWA	Clean Water Act
DCG	Derived Concentration Guide
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FR	Federal Register
HOC	Halogen Organic Compounds
LDR	Land Disposal Restrictions
LLW	Low-level radioactive waste
MCL	Maximum Contaminant Level
NAAQS	National Ambient Air Quality Standards
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
O&M	Operations & Maintenance
OAC	Ohio Administrative Code
ORC	Ohio Revised Code
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PORTS	Portsmouth Gaseous Diffusion Plant
ppm	parts per million
PTI	Permit to Install
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SHPO	State Historical Preservation Officer
SOPs	Standard Operating Procedures
SWMU	Solid Waste Management Unit
TBC	To be considered
TSCA	Toxic Substances Control Act
TSD	Treatment Storage and Disposal
USC	United States Congress

APPENDIX II

FIGURES

QUADRANT IV DECISION DOCUMENT

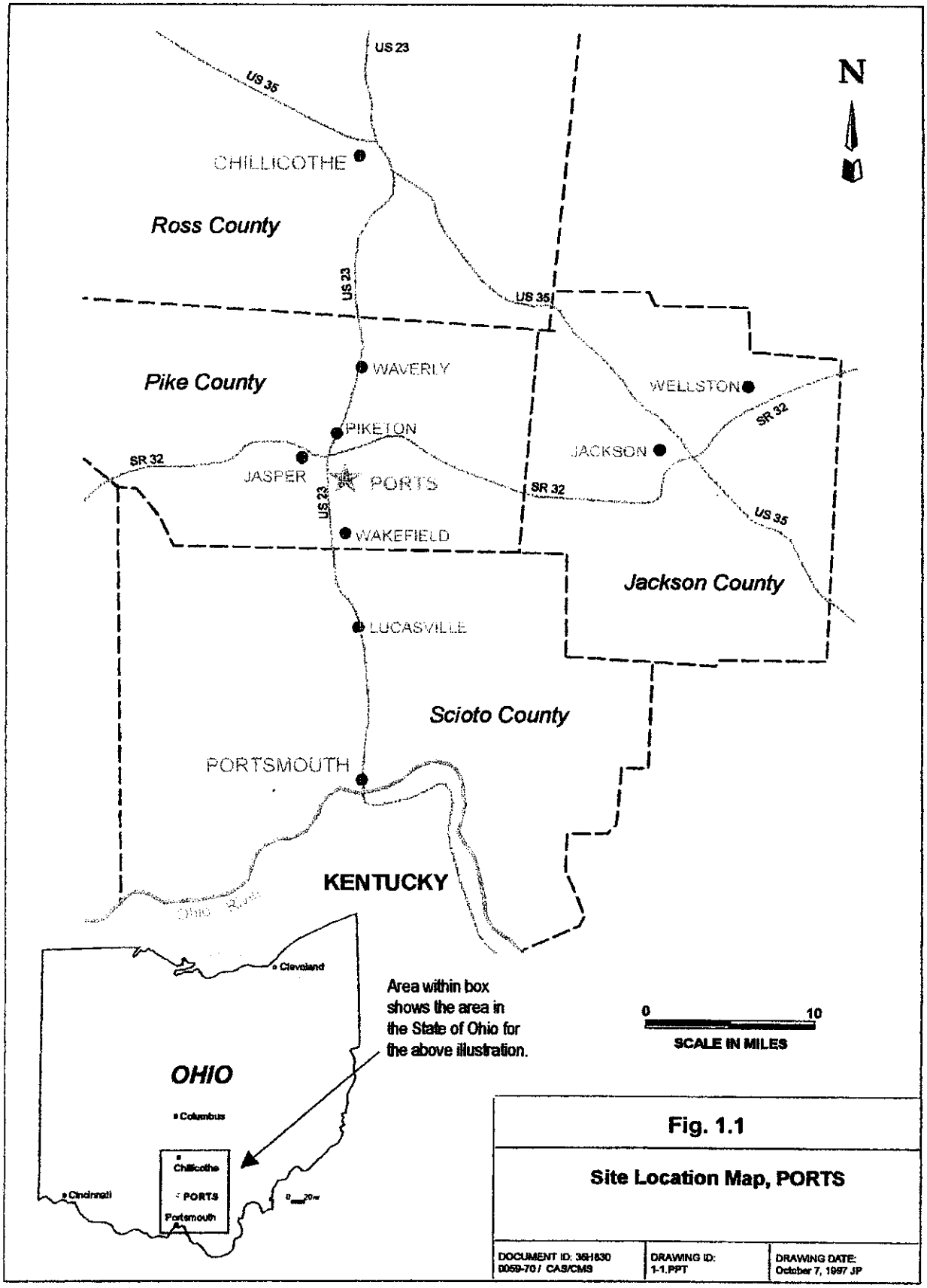
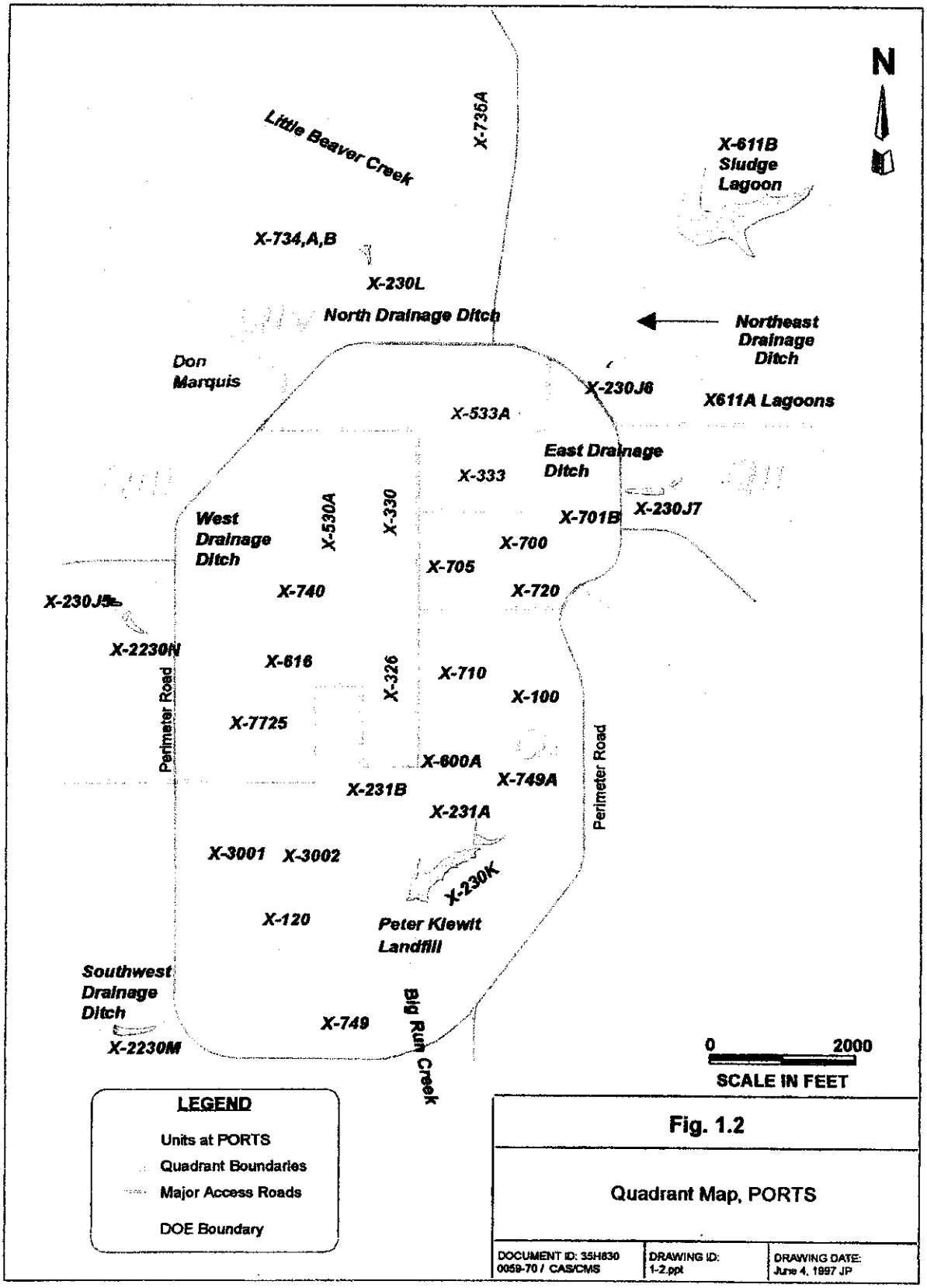


Fig. 1.1

Site Location Map, PORTS

DOCUMENT ID: 36H830 0059-70 / CAS/CMS	DRAWING ID: 1-1.PPT	DRAWING DATE: October 7, 1997 JP


N
Little Beaver Creek
X-735A
X-611B
Sludge
Lagoon
X-734,A,B
X-230L
North Drainage Ditch
Northeast
Drainage
Ditch
Don
Marquis
X-230J6
X611A Lagoons
X-533A
East Drainage
Ditch
X-333
X-530A
X-330
West
Drainage
Ditch
X-701B
X-230J7
X-700
X-705
X-740
X-720
X-230J5
X-2230N
X-616
X-326
X-710
X-100
Perimeter Road
X-7725
X-600A
X-749A
X-231B
X-231A
Perimeter Road
X-3001
X-3002
X-230K
X-120
Peter Kiewit
Landfill
Southwest
Drainage
Ditch
X-749
Big Run Creek
X-2230M
0
2000
SCALE IN FEET
LEGEND
Units at PORTS
Quadrant Boundaries
Major Access Roads
DOE Boundary
Fig. 1.2
Quadrant Map, PORTS
DOCUMENT ID: 35H830
0059-70 / CAS/CMS
DRAWING ID:
1-2.ppt
DRAWING DATE:
June 4, 1997 JP

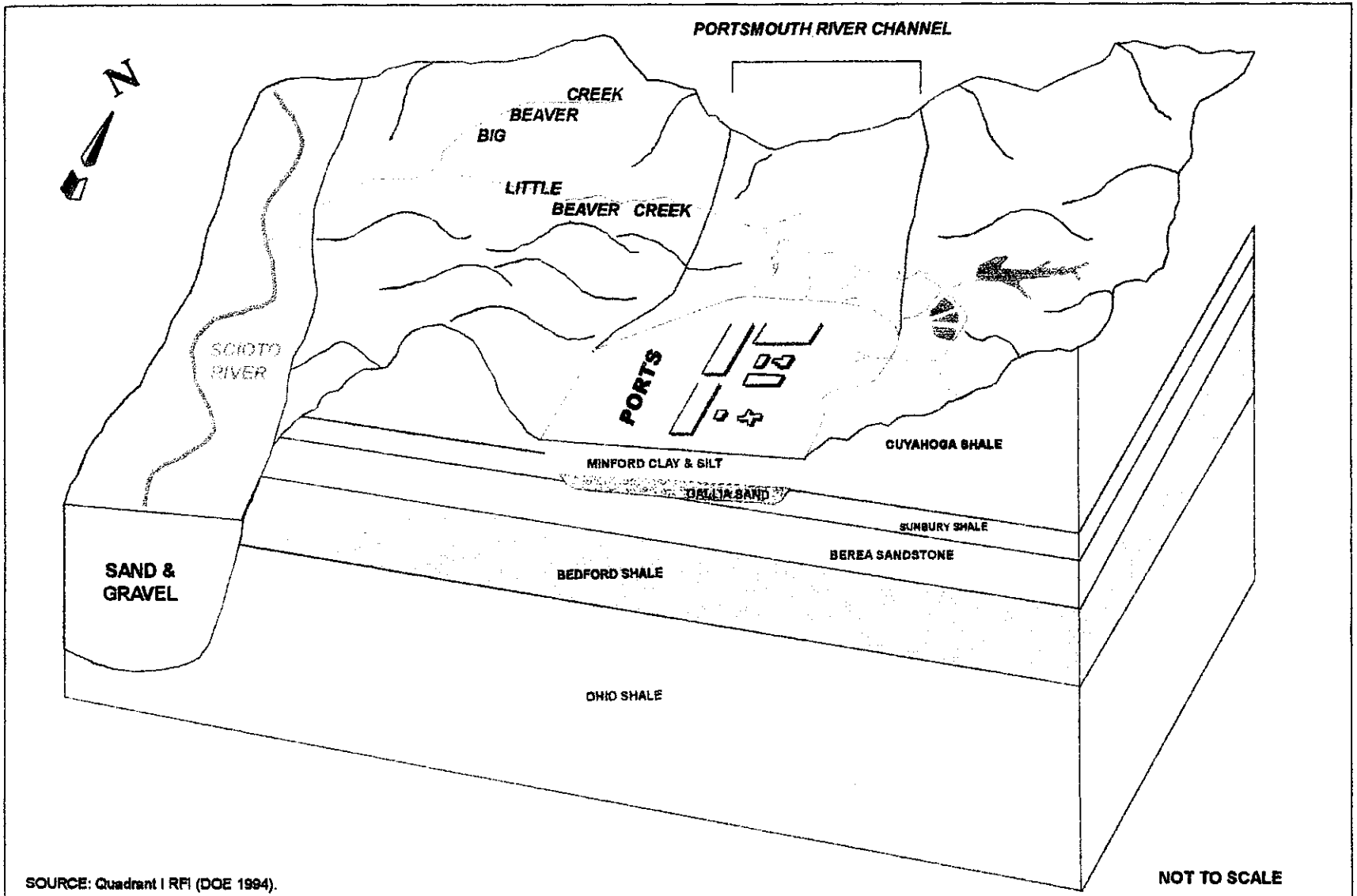
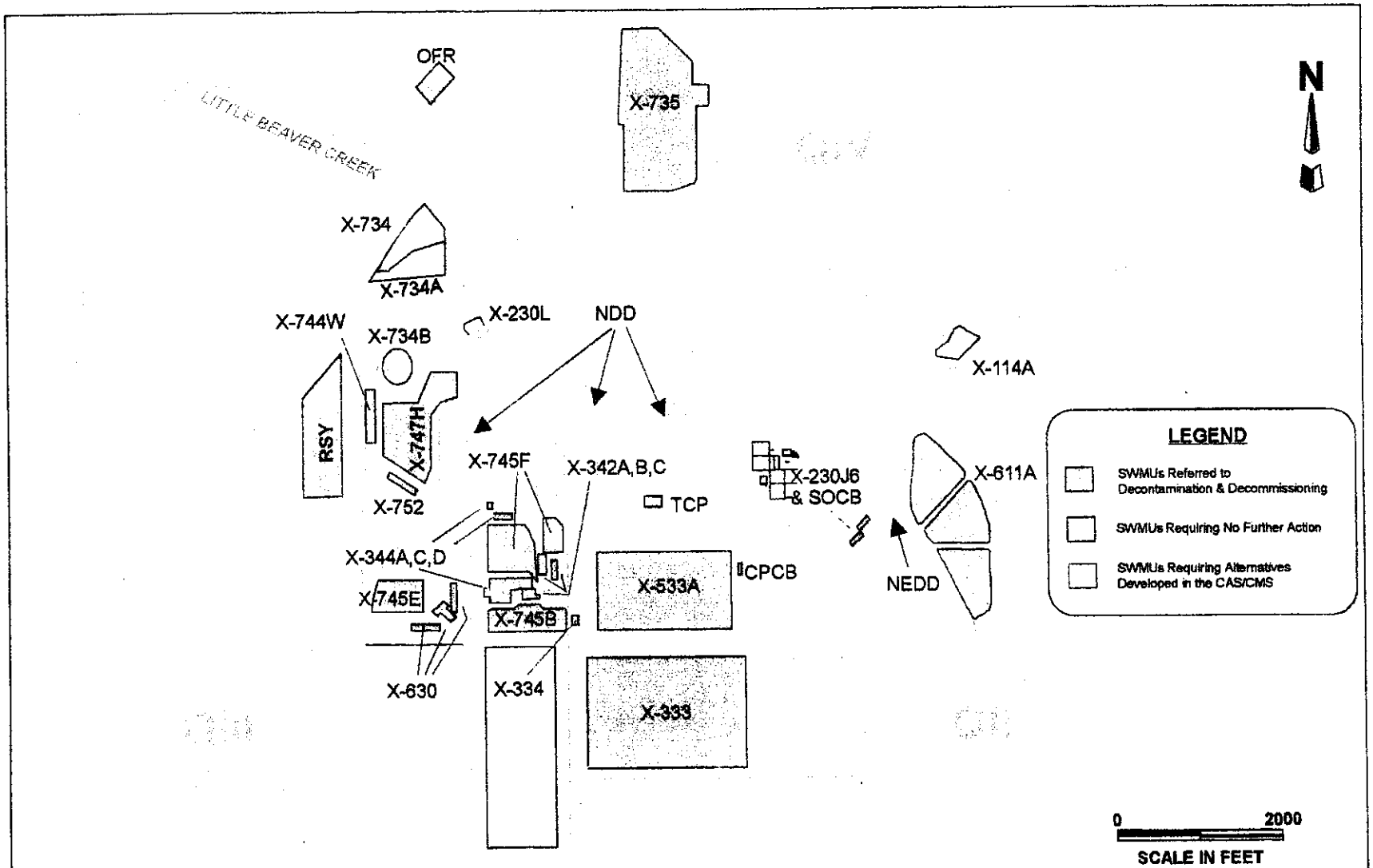


Fig. 1.6	Schematic Block Diagram Showing Geology at PORTS	DOCUMENT ID: 35H830 0083-30 / CAS/CMS	DRAWING ID: 1-6.PPT	DRAWING DATE: June 10, 1997 JP



SOURCE: Quadrant IV RFI (DOE 1994).

Fig. 2.1	Disposition of SWMUs for Quadrant IV	DOCUMENT ID: 35H830 0063-30 / CAS/CMS	DRAWING ID: 2.1.PPT	DRAWING DATE: December 18, 1997

APPENDIX III

RESPONSIVENESS SUMMARY

QUADRANT IV DECISION DOCUMENT

There were no significant comments regarding the remedies selected in this document.

Ctl. # 4209

PORTSMOUTH DOCUMENT RELEASE FORM

DOCUMENT DESCRIPTION (TO BE COMPLETED BY REQUESTER)

DOCUMENT NUMBER None DRAFT ☐ FINAL ☐ DOCUMENT DATE 09/00

DOCUMENT TITLE/IDENTIFIER US DOE Portsmouth QIV Decision Document

AUTHOR(S) (NAME AND AFFILIATION) Ohio Environmental Protection Agency

PURPOSE OF RELEASE For a Public Request at the Environmental Information Center

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REQUESTER Janie Croswait, Administrative Record Librarian Date 08/16/02

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REMARKS _____

CLASSIFICATION AND TECHNICAL INFORMATION OFFICE A H Thomas 8/16/02
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SEND TO OSTI? ☐ YES ☑ NO

REMARKS _____