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MLM-MU-91-72-0001

**VOLATILE ORGANIC COMPOUND
REMEDIAL ACTION PROJECT
ENVIRONMENTAL ASSESSMENT**

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EG&G MOUND APPLIED TECHNOLOGIES

P.O. BOX 3000

MIAMISBURG, OHIO 45343-3000

513-865-4020

operated for the UNITED STATES DEPARTMENT OF ENERGY

Contract No. DE-AC04-88-DP43495

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**VOLATILE ORGANIC COMPOUND
REMEDIAL ACTION PROJECT**

**MOUND PLANT
Miamisburg, Ohio**

ENVIRONMENTAL ASSESSMENT

December 1991

**Prepared by
EG&G Mound Applied Technologies, Inc.
P. O. Box 3000
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ABBREVIATIONS AND ACRONYMS

ACP	asbestos cement pipe
AL	Albuquerque Operations Office (now Albuquerque Field Office)
BAT	best available technology
Btu	British thermal unit
BVA	Buried Valley Aquifer
CAA	Clean Air Act
CEARP	Comprehensive Environmental Assessment and Response Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO ₂	carbon dioxide
CWA	Clean Water Act
DCG	Derived Concentration Guide
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
°F	degrees Fahrenheit
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	foot/feet
GAC	granulated activated carbon
gpm	gallons per minute
HMTA	Hazardous Materials Transportation Act
HSWA	Hazardous and Solid Waste Amendments
in.	inch(es)
L	liter
lb	pound
LP&EC	Loss Prevention and Environmental Control (System)
LSA	low specific activity
MAGLC	maximum acceptable ground level concentration
MCD	Miami Conservancy District
MCL	maximum contaminant level
μCi	microcurie
μg/L	micrograms per liter (parts per billion)
mi	mile(s)
mph	miles per hour
mL	milliliter
MSL	mean sea level
nCi	nanocurie
NEPA	National Environmental Policy Act

ABBREVIATIONS AND ACRONYMS (continued)

NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Act
%	percent
PCB	polychlorinated biphenyl
pH	logarithm of the reciprocal of hydrogen ion concentration in gram-atoms per liter (measure of the acidity or basicity of an aqueous solution)
PMF	Probable Maximum Flood
PRV	pressure reducing (control) valve
PTA	packed tower aeration (air stripping)
Pu	plutonium
RAPCA	Regional Air Pollution Control Authority
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
scfm	standard cubic feet per minute
SDWA	Safe Drinking Water Act
SEN	Secretary of Energy Notice
SM-PP	Special Metallurgical-Plutonium Processing
TDH	total dynamic head
TSCA	Toxic Substances Control Act
U.S.	United States
VOC	volatile organic compound
VOC/RAP	VOC Remedial Action Project
yd	yard

1.0 INTRODUCTION

1.1 OVERVIEW

This Environmental Assessment (EA) reviews a proposed project that is planned to reduce the levels of volatile organic compound (VOC) contaminants present in the Mound domestic water supply. The potable and industrial process water supply for Mound is presently obtained from a shallow aquifer via on-site production wells. The present levels of VOCs in the water supply drawn from the on-site wells are below the maximum contaminant levels (MCLs) permissible for drinking water under Safe Drinking Water Act (SDWA; 40 CFR 141); however, Mound has determined that remedial measures should be taken to further reduce the VOC levels. The proposed project action is the reduction of the VOC levels in the water supply using packed tower aeration (PTA).

This document is intended to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969 and associated Council on Environmental Quality regulations (40 CFR parts 1500 through 1508) as implemented through U.S. Department of Energy (DOE) Order 5440.1D⁽¹⁾ and supporting DOE NEPA Guidelines (52 FR 47662), as amended (54 FR 12474; 55 FR 37174), and as modified by the Secretary of Energy Notice (SEN) 15-90⁽²⁾ and associated guidance⁽³⁾.

As required, this EA provides sufficient information on the probable environmental impacts of the proposed action and alternatives to support a DOE decision either to prepare an Environmental Impact Statement (EIS) or issue a Finding of No Significant Impact (FONSI).

1.2 MOUND PLANT

The Mound Plant is a Federal facility operated by EG&G Mound Applied Technologies, Inc., for DOE. The Mound site, which occupies 306 acres in Miamisburg, Ohio, is approximately 10 mi south-southwest of Dayton, Ohio (Figures 1-1 and 1-2).

In 1943, Mound originated as a technical organization that was operated by the Monsanto Chemical Company for the Manhattan Engineering District. Construction of a permanent physical facility in Miamisburg began in 1947, and operations for the production of nuclear components for weapons and nonweapons use began in 1949. Mound's current mission includes 1) the research, development, engineering, production, and surveillance of components for the DOE weapons programs; 2) the separation, purification, and sale of stable isotopes; and 3) the conduct of DOE programs in nuclear safeguards and waste management, heat-source testing, and fusion fuel systems.

Figure 1-1. Southwestern Ohio and location of Mound.

Figure 1-2. Area immediately adjacent to Mound.

The major VOCs present in the Mound supply wells are chloroform, trichloroethylene, and 1,2-dichloroethylene. Groundwater is monitored at the supply wells and within the Mound domestic water distribution system for these and other applicable organic contaminants listed under the SDWA. The VOC contamination present in the portion of the regional aquifer from which Mound obtains its domestic water supply is primarily a result of past on-site waste disposal operations at Mound⁽⁴⁾.

2.0 PURPOSE AND NEED FOR PROPOSED ACTION

2.1 NEED FOR PROPOSED ACTION

On-site waste disposal operations were conducted at Mound from the initial site operations in 1948 until the mid 1970s. Wastes buried on-site included general refuse, construction materials, solvents and sludges from solvent recovery processes, paints, photoprocessing solutions, and plating bath solutions. No radioactive materials were disposed of on-site. Combustible wastes were partially destroyed by burning at the time of disposal. During the construction of the overflow pond in 1978 (Figure 2-1), residual wastes from the waste disposal operations were encountered. The residual wastes were compacted and enclosed in a sealed, clay-lined landfill with provisions for leachate monitoring in accordance with existing chemical landfill technology. In June 1981, Mound notified the U.S. Environmental Protection Agency (EPA) of the waste disposal site as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

In 1984, the DOE Albuquerque Operations Office (DOE/AL), established their CERCLA program to investigate contamination at all DOE/AL sites. Under Phase I of the Comprehensive Environmental Assessment and Response Program (CEARP), Mound conducted environmental reconnaissance activities which identified the following:

- The existence of VOC contamination in the Buried Valley Aquifer (BVA) at Mound (identified in early 1986),
- The potential existence of residual hazardous substances not enclosed in the clay-lined landfill,
- The potential existence of residual hazardous substances under part of the overflow pond, and
- The potential for groundwater contamination due to both leakage from the landfill enclosure and movement of hazardous substances not enclosed in the landfill.

Figure 2-1. Site plan of Mound, detailing Well Nos. 1, 2, and 3, location of the proposed action, and other relevant site features.

The CEARP Phase I report stated that, as planned future action, the affected area would be surveyed to determine the extent oils and hazardous substances exist outside the landfill; and that the potential for groundwater contamination from unconfined oils and hazardous substances was under evaluation⁽⁴⁾. The Mound assessment program for VOC groundwater contamination was initiated December 1989 and is scheduled to be completed March 1993⁽⁵⁾.

Samples drawn at the Mound supply wells have indicated the presence of low levels of VOCs, with Well No. 1 having the highest level of VOC contamination. While the present VOC concentrations in the Mound domestic water supply are below the MCLs established by the SDWA, Mound management has determined that interim remedial actions are warranted to ensure that the safe drinking water standards are not exceeded while ultimate corrective actions are being developed.

2.2 PURPOSE OF THE PROPOSED ACTION

The proposed action is intended to reduce the level of VOC contaminants present in the Mound domestic water supply. This will be accomplished through PTA, also referred to as air stripping. The reduction of VOCs present in the Mound domestic water supply through this proposed interim action will produce a positive environmental impact by reducing the potential exposure of Mound personnel to contaminants which may cause adverse health effects.

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 PROPOSED ACTION

The proposed action for the VOC Remedial Action Project (VOC/RAP) is the removal of VOCs from the Mound domestic water supply. The method selected for removal of VOCs is PTA. PTA is an effective method to accomplish the desired reduction of VOCs in the domestic water supply and is a proven technology, identified as "best available technology" (BAT) by the EPA [40 CFR 141.61(b)], and is currently utilized by municipalities and other facilities in the area for this application.

In its current configuration, the Mound domestic water supply is drawn from the BVA via three on-site wells (designated as Well Nos. 1, 2, and 3), each equipped with a multistage turbine pump. The discharge from the well pumps flows into two parallel domestic water supply lines, each of which flows to the Mound Powerhouse and to the Water Treatment Plant (Building 24) where the raw water is softened and chlorinated and from whence it is transferred to the distribution systems serving the Main Hill and the Special Metallurgical-Plutonium Processing (SM-PP) Hill. The normal supply of potable and industrial process water requirements for Mound is

presently supplied from the on-site system described above. Under the proposed action, a VOC Removal Facility will be designed to receive and treat raw water pumped from Well Nos. 1 and 2 and to return the treated raw water to the domestic water system. The major components of the VOC Removal Facility and activities associated with the VOC/RAP are described below.

3.1.1 Project Site

The VOC Removal Facility, consisting of an air stripper system, clearwell with booster pumps, chemical addition system for scale control, recarbonation system (optional), and auxiliary equipment, will be located immediately north of Well No. 1 with the Mound security fence on the west side and a paved roadway bordering the facility on the east side (Figure 3-1). A 10-ft access road will be located around the perimeter of the VOC Removal Facility. Because of safety and security requirements, the proposed VOC Removal Facility design includes a 20-ft buffer between all above-ground facilities and the security fence.

The existing paved road within the project area will be replaced with a new road consisting of heavy-duty asphalt pavement and, in the immediate vicinity of the VOC Removal Facility, approximately 80 ft of the road will be relocated approximately 20 ft east of its present location in order to provide the area necessary for construction. In addition, existing overhead and underground electrical and communication circuits will be relocated to allow room for the facility.

The elevation of the project area will be raised as much as 3.5 ft above the existing grade in order to provide for adequate drainage during an emergency clearwell overflow situation. Approximately 500 yd³ of fill materials will be required for the road relocation, access road, and construction of equipment pads, of which an estimated 350 yd³ will be made available from materials excavated for the clearwell.

To allow access to all areas of the project site and to the supply wells during construction and demolition activities, a temporary road will be constructed to the east of the project site. This road will be removed upon completion of construction activities.

3.1.2 VOC Removal Facility

During the normal operating mode, raw water pumped from Well Nos. 1 and 2 will be treated in the VOC Removal Facility. The facility will be designed to permit bypass operation in the event of power failure, maintenance outage, or other event which would render the facility inoperable. During the bypass mode, raw water pumped from Well Nos. 2 and 3 will be supplied directly to the Powerhouse and Building 24 (Figure 3-2). This is the present mode

Figure 3-1. VOC Remedial Action Project site plan.

Figure 3-2. Flow schematic of the VOC Remedial Action Project.

- (1) During normal operation:
 - Well Pump Nos. 1 and 2 operate to supply raw water to Air Stripper Column. Combined flow of these pumps is 1500 gpm at 90 ft TDH.
 - Valves XVB and XVC are closed and valve XVA is open. Valve XVA is modulated to maintain downstream pressure at set point.
 - Booster pumps (2 operating, 1 standby) supply raw water from clearwell to Building 24 and Powerhouse. Combined flow of 2 booster pumps is 1500 gpm at 350 ft TDH.
 - Operation of Well Pump Nos. 1 and 2 and booster pumps is controlled by clearwell level.
- (2) During bypass mode operation:
 - Well Pumps No. 2 and 3 operate to supply raw water directly to Building 24 and Powerhouse. Combined flow of these pumps is 1500 gpm at 350 ft TDH.
 - Valves XVB and XVC are open and valve XVA is closed.
- (3) Well Pump No. 2 is equipped with variable speed drive. During normal operation, pump operates at reduced speed to provide 600 gpm at 125 ft TDH; PRV further reduces discharge pressure to 90 ft. During bypass mode, pump operates at full speed; PRV is in open position.
- (4) Optional equipment to be installed only if recarbonation is required for scale control.

of supply and, because the VOC concentrations in the water from Well Nos. 2 and 3 are well within SDWA standards (Section 4.4.1.3), operation in the bypass mode is not considered to be a health threat. Thus, redundant equipment and emergency power are not deemed necessary in the design of the VOC Removal Facility.

3.1.2.1 Air Stripper System

The air stripper system will consist of a packed column (tower), liquid distribution system with internals, and a blower. In the PTA process, air is used as the gas to strip the VOC contaminants (solute) from the raw water (liquid solvent). The raw water containing VOCs will be introduced at the top of the column where the liquid distribution system will provide even disbursement of the water over the packing. Water will flow via gravity over the packing where it will contact fresh, filtered air that will be forced upward through the packing by an external blower. This countercurrent flow of air and water promotes diffusional mass transfer of the VOCs from the water to the air by providing a concentration difference as the motive force. The effluent air, vented from the stripper column to the atmosphere through a mist eliminator, will carry with it VOCs and carbon dioxide (CO₂) stripped from the raw water. The effluent raw water, containing less than 1 µg/L total VOC contaminants, will flow by gravity to the clearwell located directly below the air stripper system. The air stripper system will be designed to process 1500 gpm of raw water. The countercurrent air flow needed to achieve the desired degree of VOC removal at the 1500-gpm processing rate is 8550 scfm.

3.1.2.2 Clearwell and Booster Pumps

The clearwell will be a reinforced concrete tank (basin), constructed below grade, which will serve both as a holding basin for the treated raw water and as the base for the air stripper system equipment. The clearwell will have approximate inside dimensions of 24 ft by 16 ft by 18 ft (deep) and, at a normal operating level of 12 ft, will contain approximately 34,000 gal of treated raw water. In order to prevent freezing, the normal water level in the clearwell (12 ft) will be approximately 3 ft below grade. At the design VOC Removal Facility flow rate of 1500 gpm, the clearwell capacity will provide a detention time of approximately 22 minutes.

Three vertical turbine booster pumps will be installed in the clearwell to pump the water from the clearwell to the Powerhouse and Building 24 via the existing domestic water supply lines. Each booster pump will have a rated capacity of 800 gpm at 350 ft TDH. Normally two booster pumps will operate continuously to provide a combined flow of 1500 gpm at 350 ft TDH; the third will be an installed spare.

3.1.2.3 Scale Control Equipment

Removing the VOCs from the raw water by air stripping also removes CO_2 , thereby making the water more alkaline (raising the pH). Recent studies have indicated that scaling would probably occur in a distribution system using the treated raw water⁽⁶⁾. Polyphosphate injection was selected as the means to inhibit the formation of calcium carbonate scale. Polyphosphate will be injected into the inlet raw water if scaling of the air stripper packing and/or within the domestic water distribution system is experienced during operation⁽⁶⁾.

If, in the event polyphosphate injection does not adequately control scaling within the domestic water distribution system, a recarbonation system will be installed to replace the CO_2 stripped from the water, thereby keeping the calcium carbonate in solution. The recarbonation system would adjust the pH of the treated raw water in the clearwell to maintain a non-scaling pH by transferring vaporized CO_2 through a sparging system located within clearwell. The design CO_2 sparging rate is 500 lb/day; however, the required CO_2 injection rate would be controlled by a pH monitor.

The recarbonation system would consist of a liquid CO_2 storage tank with a complete refrigeration subsystem, a pressurized vaporizer subsystem, a pH controller, and a CO_2 injection control valve. The CO_2 storage tank would be sized to hold a one-month supply of CO_2 (approximately 15 tons of CO_2). All of the recarbonation system equipment, except for the CO_2 storage tank, would be located on a concrete equipment pad immediately north of the clearwell. The CO_2 storage tank would be located on separate foundations adjacent to the equipment pad.

3.1.2.4 Chemical Storage Building

The chemical storage building will be a small prefabricated, moveable metal building, approximately 9 ft by 9 ft, located on the concrete equipment pad immediately north of the clearwell. The building will be specifically designed and constructed for chemical storage and handling and will be provided with a spill containment sump equal to 30 percent of the building capacity. The building will house an air compressor for supply of control air to pneumatically operated control valves and two chemical feed systems, one each for the injection of polyphosphate and sodium hypochlorite into the raw water flowing to the air stripper column. Polyphosphate will be injected into the inlet raw water to inhibit the formation of calcium carbonate scale as described above. Hypochlorite will be injected into the inlet raw water when cleaning and disinfection of the clearwell is required. Only minor amounts of these chemicals will be used and stored in the building.

3.1.2.5 System Control

Operation of the VOC Removal Facility will be monitored and controlled from the Air Stripper Control Panel to be located in the Powerhouse. Manual selection of facility operating mode ("normal" or "bypass"), as well as control of the booster pumps, will be provided at the control panel. Additionally, the raw water inlet pressure and flow, clearwell level, and the status of the air blower and each deep well pump will be indicated and monitored at the panel. A local panel will be located at the VOC Removal Facility to provide for remote-manual control.

During normal operation, Well Pump Nos. 1 and 2 and the booster pumps will be controlled by clearwell level.

The facility control system will automatically default to the bypass mode upon electrical failure, control air supply failure, or control valve failure (control valve misalignment). The pressure reducing control valve (PRV) at the discharge of Well Pump No. 2 will be interlocked with the supply and bypass control valves (Figure 3-2, valves XVA, XVB, and XVC) so that when these valves assume their respective bypass positions, the PRV will go from its control position to fully open. During facility bypass mode operation, Well Pump No. 1 will automatically switch from operation to standby and Well Pump No. 3 will switch from standby to operation.

3.1.3 Existing Equipment Modifications

3.1.3.1 Well Pump Capacity and Control

The present domestic water supply system consists of three wells, each with its own existing vertical turbine pump.

Well Pump No. 1 will be derated from its existing capacity of 500 gpm at 400 ft TDH to 650 gpm at 90 ft TDH. Well Pump No. 1 will be utilized only during normal mode operation to supply raw water to the VOC Removal Facility and will be switched to standby during bypass mode operation.

Well Pump No. 2 presently provides 800 gpm at 350 ft TDH and has emergency power backup. However, during normal operation, only 90 ft TDH will be required to serve the VOC Removal Facility. The discharge pressure of Well Pump No. 2 will be controlled by a PRV and a variable frequency motor drive unit to slow the pump speed. The reduced pump speed will provide 600 gpm at 125 ft TDH and the PRV will provide further reduction of the pump discharge pressure to 90 ft TDH during normal mode operation. During bypass mode operation, the pump motor speed will be increased to its normal speed to provide 800 gpm at 350 ft TDH and the PRV will be in its fully open position. During normal operation, the combined flow of Well Pump Nos. 1 and 2 will be 1500 gpm at 90 ft TDH.

Well Pump No. 3 presently provides 800 gpm at 350 ft TDH and has emergency power backup. This pump will not be modified under the proposed action. Well Pump No. 3 will be utilized only during bypass mode operation to supply raw water directly to the Powerhouse and Building 24 and will be in standby status during normal mode operation. During bypass mode operation, the combined flow of Well Pump Nos. 2 and 3 will be 1500 gpm at 350 ft TDH.

3.1.3.2 Domestic Water Piping

To provide for the VOC Removal Facility intertie with the existing domestic water system, approximately 20 ft of each existing 8-in. domestic water supply line in the area east of the clearwell will be excavated and removed. A new section of pipe, with branch connections to convey the raw water to and from the VOC Removal Facility and an automatic control valve (closed during normal operation), will be installed in each domestic water supply line. The automatic valves (XVB and XVC) will be located in a valve pit constructed east of the relocated road (Figure 3-1). Post indicator valves to provide manual isolation of the VOC Removal Facility from each domestic water supply line will be located below grade in the vicinity of the valve pit.

3.2 ALTERNATIVE ACTIONS

The following alternative actions to the proposed VOC/RAP are available: (1) no-action, (2) delayed-action, (3) pumping from interceptor well, and (4) carbon absorption.

3.2.1 No-Action Alternative

This alternative would consist of not implementing the VOC/RAP as described under the proposed action (Section 3.1). The "no-action" alternative would, as a minimum, result in the VOC contamination of the Mound domestic water supply continuing at current levels. The impact of not implementing the proposed interim remedial action under the VOC/RAP would be to continue to expose Mound personnel to low levels of contaminants which may cause adverse health effects. Additionally, there would be no assurance that safe drinking water standards can be maintained because no means would exist to mitigate any marked increase in the groundwater VOC contamination, if such an event were to occur before the ultimate corrective actions are implemented.

3.2.2 Delayed-Action Alternative

This alternative would consist of deferring the implementation of the proposed action. Deferring the VOC/RAP would delay the potential benefits that would be derived from its implementation. The "delayed-action" alternative would have the same effect as the "no-action" alternative until the proposed action is implemented.

3.2.3 Pumping from Interceptor Well

This alternative would consist of utilizing Well No. 1 to partially remove contaminants from the BVA before they reach Well Nos. 2 and 3. Water withdrawn at Well No. 1 would be discharged to the river through the storm drain system. Under this alternative, removal of contaminants from the BVA would be limited by the capacity of Well No. 1, and contaminants outside the influence of Well No. 1 would be unaffected. Although this alternative could achieve a partial reduction in the VOC contamination reaching Wells No. 2 and 3, the actual degree of reduction achievable would be difficult to quantify and could vary due to hydrogeologic influences in the BVA. Additionally, there would be no assurance that safe drinking water standards could be maintained if any marked increase in the groundwater VOC contamination were to occur before the ultimate corrective actions are implemented.

3.2.4 Carbon Absorption

In addition to PTA, the proposed method of VOC contaminant reduction, absorption on granulated activated carbon (GAC) is also identified as BAT for the reduction of VOC contaminants in water systems [40 CFR 141.61(b); 56 FR 3526]. Absorption on GAC beds was considered as an alternative to the proposed action, but was determined to be less desirable because of the high operation and maintenance costs associated with the GAC beds and the waste disposal problems associated with the exhausted GAC media.

4.0 AFFECTED ENVIRONMENT

This section contains a brief summary of the natural and man-made environment surrounding the Mound site. Most of the information in this section originated in the Final Environmental Impact Statement (FEIS) for Mound⁽⁷⁾ and the Mound CEARP Phase I report⁽⁴⁾.

4.1 REGIONAL AND LOCAL SETTING

4.1.1 Site Location

Mound is located on a 306-acre site in southern Montgomery County in southwestern Ohio, partially within the Miamisburg city limits and 0.49 mi due east of the Great Miami River. The site is 10 mi south-southwest of Dayton, Ohio, and 31 mi north-northeast of Cincinnati, Ohio (Figures 1-1 and 1-2).

4.1.2 Site Description

Mound lies on high bedrock bluffs overlooking Miamisburg, the Great Miami River, and the river plain to the west. The site incorporates two high hills divided by a minor northeast-to-southwest-trending valley that feeds into the Great Miami River. Most of the buildings comprising the plant occupy the northwest hill crest (Main Hill). A smaller group of buildings lies in the valley and on the valley slopes. Other buildings occupy the southeastern SM-PP Hill.

4.1.3 Land Use

The region surrounding Miamisburg is predominantly agricultural, used for growing corn and soybeans. Miamisburg itself is largely residential, with only limited commercial and industrial development. Most development is concentrated on the floodplain of the Great Miami River. The adjacent upland areas are used primarily for agriculture, are occupied by residences, or are unused open space. Montgomery County is extensively urbanized to the northeast of Mound. Mound abuts residential areas on the north and east.

No large lakes are found within a 5-mi radius of the site. Several fishing ponds lie 3.5 mi north-northeast of the facility in inactive gravel pits. The City of Miamisburg maintains a small recreational pond in a park west of the site. The major water body in the vicinity of the site is the Great Miami River, approximately 150 to 200 ft wide. No commercial barge traffic or fishing takes place, but some pleasure boating and sport fishing occur.

4.1.4 Nearby Off-site Facilities and Population Concentrations

Significant off-site facilities and population concentrations are located near Mound. To the west, just beyond the site boundary, is a Conrail right-of-way. Beyond the railroad is a residential area, with the Great Miami River further west. To the north, east, and southeast of the site boundary are residential areas. The Dayton Power and Light Company Hutchings Power Station lies 1.5 mi to the south on the opposite bank of the Great Miami River.

4.1.5 Demography and Infrastructure

Mound is located within the Dayton metropolitan area. The current (1990) population of Miamisburg is 17,770. The Miami Valley Regional Planning Commission estimates the total population within a 5-mi radius of Mound to be 76,061 (based on 1988 figures). Pipelines, significant industrial facilities, and major transportation routes lie within 5 mi of Mound. Gas pipelines lie within 2 mi on the northeast and northwest. Dual Conrail tracks 200 ft west of the site form the major rail link between Cincinnati

and Dayton. Interstate 75, 3 mi east of the site, is a major north-south thoroughfare. No military bases, missile sites, government installations, or military firing ranges are located within 5 mi of Mound.

4.2 AIR

4.2.1 Climate and Meteorology

With a continental climate, the Miamisburg area experiences only moderate seasonal temperature variations. Summers are warm and humid, with temperatures ranging from 62°F to 85°F and rarely exceeding 100°F. Autumn is predominantly cool and dry. Winters are moderately cold, with an average of only two days of subzero weather, frequent periods of cloudiness, and a temperature range of 22°F to 37°F. Spring is the wettest season. Severe weather, generally associated with thunderstorms, can occur in any season, and can result in damaging winds and flash flooding.

Precipitation is common in all seasons, with an average rainfall equivalent of 40 in., including an average of 27 in. of snow per year.

The surface wind is predominantly from the southwest with annual average wind speeds ranging from 7 to 10 mph. The "fastest mile" wind speed on record in the Dayton area is 78 mph.

Tornados occur in the region but only infrequently, and most only touch down along short and narrow paths. The probability of a tornado hitting the site in any given year is approximately 1 in 30,000.

Ohio is subject to damaging hailstorms, with two or three occurring each year. The most likely month for damaging hail is April. In addition to hailstorms, ice storms that occur each season rarely cause damage. Once every four or five years a moderate or heavy ice storm occurs, damaging utility lines and trees, as well as interfering with traffic.

4.2.2 Air Emissions

According to the Regional Air Pollution Control Authority (RAPCA), Mound operations are in compliance with state and Federal air pollution regulations. RAPCA administers these regulations for the Ohio Environmental Protection Agency (OEPA) in a six-county region.

Discussions of Mound's atmospheric non-radioactive and radioactive emissions for 1990 are presented below⁽⁸⁾.

4.2.2.1 Nonradioactive Air Emissions

The primary source of nonradioactive airborne emissions at Mound is the steam power plant which burns natural gas or fuel oil. Other sources of airborne emissions include a paint spray booth, explosive waste burning, and fire fighting exercises. Emissions from these sources during 1990 and applicable emission standards are summarized in Table 4-1. These data demonstrate that nonradioactive airborne emissions at Mound are within applicable standards and have minimal impact on ambient air quality.

Table 4-1. Nonradioactive airborne emissions - 1990

Emission Source	Pollutant	Emission	Emission Standard ^a	% of Standard
Powerhouse	Particulates	0.005 lb/10 ⁶ Btu Input	0.02 lb/10 ⁶ Btu	25.0
Powerhouse	Sulfur Oxides	0.001 lb/10 ⁶ Btu Input	1.6 lb/10 ⁶ Btu	0.06
Paint Shop	Organics	2.2 lb/day	40.0 lb/day	5.5
Explosives Burning	Particulates	2.5 lb	NA ^b	NA ^b
Firefighter Training	Particulates	27 lb	NA ^b	NA ^b

^a Ohio EPA Air Pollution Regulations 3745-17-10, 3745-18-06, and 3745-21-07

^b NA - Not applicable

4.2.2.2 Radioactive Air Emissions

The primary airborne radionuclides emitted from Mound are plutonium-238 (Pu-238) and tritium. During 1990, the average airborne concentrations of Pu-238 and tritium were within the DOE Derived Concentration Guides (DCG) for these radionuclides⁽⁹⁾.

Fifteen off-site stations collect air samples. Particulate air samples are taken for Pu-238, while tritium oxide samples are collected using a bubbler-type sampler. The average incremental off-site Pu-238 air concentration during 1990 for all locations was 3.9×10^{-18} $\mu\text{Ci/mL}$, which is 0.013% of the DOE DCG. The average incremental concentration of tritium oxide measured during 1990 for all off-site locations was 5.9×10^{-12} $\mu\text{Ci/mL}$, which is 0.006% of the DOE DCG.

In addition to the off-site sampling program, five on-site air-sampling stations operate. The average incremental Pu-238 concentration measured during 1990 for all on-site locations was 12.7×10^{-18} $\mu\text{Ci/mL}$, which is 0.042% of the DOE DCG. The average incremental on-site tritium concentration measured during 1990 for all on-site locations was 22×10^{-12} $\mu\text{Ci/mL}$, which is 0.02% of the DOE DCG.

4.3 GEOLOGIC SETTING

4.3.1 Geology

The region around Miamisburg is geologically stable. The underlying Ordovician bedrock lies essentially flat and consists of limestones, calcareous shales, dolomite, and thin sandstones. These strata overlie a Precambrian granite basement which begins at approximately 2,600 ft below sea level. The surface of the bedrock has been shaped by direct glacial erosion and covered by a thin (less than 20 ft thick) veneer of Pleistocene glacial till. Associated gravel outwash deposits of variable thickness and extent fill the surrounding valleys and underlie the nearby river plains.

The higher elevations at the Mound site are underlain by Ordovician marine limestones and calcareous shales and mantled by thin (1 to 10 ft thick) glacial till composed of silt, clay, and gravel. The bordering and topographically lower valley is filled with thicker till and outwash deposits filling a glacially excavated buried valley. These gravel, sand, clay, and silt deposits thicken towards the Great Miami River and form an important aquifer discussed below.

No evidence of solution-cavity development, recent faulting, or any other geologically unstable situation has been observed in any outcrop or boring in the Miamisburg area.

No large earthquakes have occurred in the Miamisburg area during historic times. Although earth tremors have occurred in the past, geologic studies suggest that they were not strong enough to affect local surface or subsurface materials.

4.3.2 Soils

Most structures at Mound are either built directly on bedrock or lie on thin (1.5 ft thick), dense, highly compacted glacial till. All soils at Mound are either cohesive or extremely dense. Liquefaction is extremely unlikely.

Radioactive soil contamination has been identified at 20 areas on the original Mound site, of which a large portion have only surface contamination⁽⁴⁾.

During the CEARP Phase I assessment, 15 areas within the original Mound site were categorized as potential CERCLA sites which, because of past operations and/or waste disposal activities, could have been contaminated with oils or hazardous substances. The CEARP Phase I assessment concluded that most of these sites required no further action because the assessment findings were either negative or the completed/on-going remedial actions were adequate. Three areas, however, were identified as requiring further action, those being the inactive landfill (Section 2.1) and two smaller areas to the north and northeast in the vicinity of the landfill. Planned future actions involving these areas include further studies to determine the extent to which hazardous substances are present and the potential for groundwater contamination⁽⁴⁾.

4.3.3 Mineral Resources

No mineral resources are known to exist within the Mound site. The nearest major oil and gas producing area is the Lima-Indiana Field of central Ohio. Some production of oil occurs in Darke County, which is 25 mi northwest of the site. Exploration wells drilled near Mound have been unproductive.

4.4 HYDROLOGY AND WATER RESOURCES

4.4.1 Hydrology

4.4.1.1 Regional Surface Water

Mound lies within the Great Miami River drainage basin, which covers a significant portion of southwestern Ohio and small segments of southeastern Indiana. The drainage area above Miamisburg, which is 1 mi upstream from Mound, is 2,711 mi². The level of the Great Miami River adjacent to Mound is controlled at 680 ft above mean sea level (MSL) by the Hutchings Power Station dam, about 1.5 mi downstream from Mound. The 100-year flood level adjacent to Mound is 698.67 ft MSL.

Water samples from the Great Miami River and other off-site surface water locations near Mound, such as ponds, are collected and analyzed for Pu-238 and tritium. During 1990, the average incremental concentration of Pu-238 for all locations in the Great Miami River was 0.6×10^{-12} $\mu\text{Ci/mL}$ (0.002% of the DOE DCG), and for all other surface water locations, 0.1×10^{-12} $\mu\text{Ci/mL}$ (0.0003% of the DOE DCG). During 1990, the average incremental concentration of tritium for all locations in the Great Miami River was 0.02×10^{-6} $\mu\text{Ci/mL}$ (0.001% of the DOE DCG), and for all other surface water locations, 0.22×10^{-6} $\mu\text{Ci/mL}$ (0.011% of the DOE DCG)⁽⁸⁾.

Water from the Great Miami River is not used as a public water supply by any municipality below Mound.

4.4.1.2 On-site Surface Water

On-site surface water consists of two man-made ponds and an intermittent stream. The stream flows down the valley between the Main Hill and the SM-PP Hill. The stream watershed is predominantly within Mound's borders. This drainage basin is relatively small and the slopes are relatively steep, resulting in rapid runoff. The alluvium beneath the channel is relatively permeable and allows flow in the channel to infiltrate the underlying aquifer. The site drains to the Great Miami River, and the effluents from the sanitary sewage treatment plant, storm water runoff, single-pass cooling water, cooling tower blowdown, and other sources are discharged to the river in accordance with the Mound National Pollutant Elimination Discharge System (NPDES) permit.

4.4.1.3 Groundwater

The Mound plant contains two sources of groundwater: bedrock aquifers covered by a thin, low-permeability layer of till and the layer of unconsolidated silts, sands, and gravels known as the BVA. The bedrock aquifers underlie the major portion of the plant but are largely protected from plant operations due to the layer of till. The bedrock aquifers are only capable of low yields and have a small storage capacity. The BVA underlies the western edge of the plant and serves as the major aquifer for water supplies in the vicinity. The wells that supply Mound draw from this aquifer. A map showing hydrogeologic environments for a radius of 2.5 mi from the site is presented in Figure 4-1. The direction of groundwater flow in the BVA is generally from north to south, following the downstream course of the Great Miami River. Under untapped conditions in the Mound area (no groundwater withdrawal from the BVA), the normal direction of groundwater flow is from the BVA towards the Great Miami River (i.e., from east to west). Aquifer recharge occurs from precipitation infiltrating directly through the glacial outwash moving as underflow into the aquifer along the contact between the glacial till and bedrock along the valley walls. However, the high rate of withdrawal from the Mound supply wells causes a cone of depression that locally reverses this trend, which results in recharge from the river. This cone of depression tends to capture any contaminated groundwater from the Mound site; thus, preventing contamination of off-site groundwater.

Samples from seeps along the flank of the Main Hill have been tested for VOCs, semivolatiles, pesticides, polychlorinated biphenyls (PCBs), and metals. Some VOCs were present in low concentrations. Tritium is also present in many of the seeps at activities below the effluent discharge standard of 3000 nCi/L but above the current primary drinking water standard of 20 nCi/L. However, all but on-site seep and all off-site seeps sampled are below the proposed drinking water standard of 60 nCi/L (40 CFR 141.16; 56 FR 33050).

Figure 4-1. Hydrogeologic environments in the vicinity of Mound.

Monitoring wells in most areas overlying the BVA show only manganese and nitrate concentrations above primary or secondary drinking water standards. Manganese is natural constituent of groundwater in the area, and the source of the nitrate has not been determined. Monitoring wells located in the vicinity of the overflow pond and the inactive landfill, as well as the three on-site supply wells (Figure 2-1), show minor levels of VOC contaminants, most of which are in concentrations well below the MCLs established by the SDWA. Off-site monitoring wells show lower levels of VOC contamination and, in many cases, no VOC contamination is detectable. Table 4-2 presents data characterizing the Mound domestic water supply developed from the on-going Mound assessment program for VOC groundwater contamination.

Drinking water from community systems and private wells in the surrounding area are sampled and analyzed for Pu-238 and tritium. During 1990, the average concentration of tritium in Miamisburg city water and in the community drinking water systems within five mi downstream (south) of Mound was 0.21 nCi/L (1.05% of the current SDWA standard), while the average concentration in all other community drinking water systems sampled was below the environmental level. During 1990, the average concentration of tritium in all private wells was 2.3 nCi/L (11.5% of the current SDWA standard), and the average concentration in Mound's on-site wells was 2.6 nCi/L (13% of the current SDWA standard). During 1990, four private wells and Miamisburg city water were sampled and analyzed for Pu-238. The average incremental concentration of Pu-238 for these locations was below the environmental level, while the average incremental concentration of Pu-238 in Mound's on-site wells was 4.4×10^{-12} $\mu\text{Ci/mL}$ (0.28% of the standard for Pu-238 in drinking water of 4% of the DOE DCG)⁽⁸⁾.

4.4.2 Water Use

Groundwater in the vicinity of Mound is used for municipal, domestic, and industrial purposes. Six municipal water supplies lie within a 5-mi radius of the plant, including Miamisburg, West Carrollton, Franklin, Germantown, the Springboro Water District, and the Montgomery County Sanitary District. The nearest municipal user downstream of Mound, the Springboro Water District, is approximately 4 mi to the south, outside the probable range of influence by Mound.

Two areas of domestic well use near Mound are hydraulically connected to the site area and may be susceptible to possible contamination. One area, on the east bank of the Great Miami River, is west of the Conrail Line and south of the east-west line bisecting Mound. The other area, on the west bank of the Great Miami River, is assumed to be less susceptible to possible contamination because of the partial hydraulic barrier of the intervening river.

Table 4-2. Mound domestic water supply VOC concentrations^a

Sample Point ^{a,c}	Contaminant, µg/L (MCL) ^b						
	Trans-1,2-Dichloro-ethylene (100)	Tri-chloro-ethylene (5)	Chloroform (100)	Tri-halo-methanes (100)	Tetra-chloro-ethylene (5)	Vinyl chloride (2)	Carbon tetra-chloride (5)
MW-1 ^f	High	26.00	9.80	17.00	1.20	ND	2.00
	Low	1.10	1.50	ND ^h	ND	ND	ND
	Avg	12.65	4.57	2.07	0.13	--	0.17
MW-2	High	7.40	5.60	2.40	2.40	2.20	ND
	Low	ND	ND	ND	ND	ND	ND
	Avg	4.02	2.99	0.38	0.06	0.71	--
MW-3	High	5.00	4.80	0.50	4.90	1.60	ND
	Low	ND	ND	ND	ND	ND	ND
	Avg	1.63	1.64	0.02	0.17	0.22	--
OS-CAFE ^g	High	4.90	5.30	1.20	16.10	2.40	ND
	Low	ND	ND	ND	ND	ND	ND
	Avg	2.05	2.32	0.13	4.34	0.53	--
SM-CAFE ^g	High	5.00	5.60	5.00	31.00	2.00	ND
	Low	0.70	0.40	ND	ND	ND	ND
	Avg	2.25	2.49	1.43	9.47	0.58	--

^aSample period is from 10/89 through 10/91 unless otherwise noted. Readings reported on monthly basis. Highest and lowest readings and average of all readings over sample period indicated for each VOC contaminant.

^bMaximum Contaminant Level per SDWA (40 CFR 141; 56 FR 3526; 56 FR 3578).

^cSample points are as follows:

MW-1 - Mound (supply) Well No. 1
 MW-2 - Mound (supply) Well No. 2
 MW-3 - Mound (supply) Well No. 3
 OS-CAFE - Main Cafeteria (OSE Building)
 SM-CAFE - SM Cafeteria (Building 44-5)

^dChloroform reported at MW-1, MW-2, and MW-3 is present in groundwater as a result of VOC contamination; not chlorination.

^eIncludes chloroform. Trihalomethanes present in distribution system are primarily the result of chlorination.

^fMW-1 is currently not utilized as source of domestic water supply.

^gFinished water sample (softened and chlorinated) drawn from distribution system at point of use (40 CFR 141.2). Sampling at this point established 6/90.

^hND - Contaminant not detected.

The only industrial user of groundwater in the immediate vicinity of Mound is the Hutchings Power Station. This station is 1.5 mi south of the plant on the west bank of the Great Miami River. The distance, the presence of the river, and the lack of reported migration of contaminants suggest that this supply is unaffected by activities at Mound.

Mound obtains its domestic water supply from three on-site wells. The current VOC groundwater contamination assessment program has indicated the presence of VOCs in the water from these wells, with Well No. 1 marginally exceeding the SDWA standards for some VOC contaminants (Section 4.4.1.3). Continued maintenance of the domestic water supply within SDWA standards is a major concern at Mound and is the subject of the proposed action.

4.5 BIOLOGICAL RESOURCES

4.5.1 Flora

Much of the land near Mound is either residential or under cultivation. Native flora is found in and around the wooded areas on-site. Small trees and shrubs are common on hilly areas. The flatter areas contain much scrub growth and grasses.

4.5.2 Fauna

In addition to highly visible farm animals, various birds, mammals, and other wildlife either inhabit or migrate through the Miami River Valley and its environs. Small wild animals, including groundhogs, rabbits, raccoons, skunks, mice, rats, and squirrels, are occasionally found on the Mound site. There are some deer on recently acquired portions of the site.

4.5.3 Threatened and Endangered Species

During the course of investigation for the FEIS⁽⁷⁾, a thorough review of threatened and endangered species was made and no such species or habitats suitable for such species were located on the Mound site at that time. More recently, Mound has been determined to fall within the range of the Indiana bat (*Myotis sodalis*), a Federally-listed endangered species⁽¹⁰⁾. The bat roosts in trees with exfoliating bark (e.g., shagbark hickory) and the possible presence of such trees, especially on the undeveloped areas of the site, make Mound a potential habitat for this endangered species.

4.6 FLOODPLAIN AND WETLANDS

No wetland areas have been identified on the Mound site. A small portion of the Mound site, located in the southwestern corner of the undeveloped area (Figure 2-1), lies within the 100-year floodplain of the Great Miami River⁽⁸⁾.

4.7 HISTORICAL AND CULTURAL RESOURCES

Mound lies 380 ft west of the Miamisburg Mound, a pre-Columbian, Native American earthwork. During the course of investigations for the FEIS⁽⁷⁾, the Curator of Anthropology for the Dayton Museum of Natural History inspected the Mound site and found no sites of specific historical interest. A second field survey, including the recently acquired portions of the Mound site, was undertaken in 1987⁽¹¹⁾ during which no sites of specific historical interest were located. The Ohio Historical Society, Ohio Historic Preservation Office, has confirmed their agreement with the conclusions developed from the 1987 field survey and examination of the Mound site⁽¹²⁾. During 1990, an archaeological survey, conducted in the area of the Miami-Erie Canal adjacent to the Mound site and in a small undeveloped portion of the Mound site, encountered nothing of cultural or historical significance⁽¹³⁾.

5.0 ENVIRONMENTAL IMPACTS

All construction and demolition activities associated with the proposed action will be controlled, as required, to conform with the Mound Loss Prevention and Environmental Control (LP&EC) System⁽¹⁴⁾ requirements which govern Mound Environmental, Safety, and Health (ES&H) programs. LP&EC System requirements include design and construction reviews by various LP&EC functions, including fire protection, health physics, industrial hygiene, safety, and waste management. All activities will be accomplished under the policies and procedures currently in effect at the Mound site in compliance with applicable Federal, state, and local codes and regulations.

5.1 TOPOGRAPHY AND PHYSIOGRAPHY

Except for the installation of the Air Stripper Control Panel within the Powerhouse and the routing of instrumentation cable from the VOC Removal Facility to the control panel, all major activities associated with the proposed action will occur in the vicinity of Well No. 1 (Figure 3-1). Some temporary disturbances will be necessary during the construction and demolition activities and the final grade within the project area will be raised slightly; however, no significant, permanent impacts on the topography or physiography of Mound or vicinity are expected.

5.2 AIR QUALITY IMPACTS

No radioactive air emissions will result from the proposed action. The nonradioactive air emissions resulting from the construction and demolition activities will be limited to some airborne particulate matter (dust) generated during demolition, earthwork, excavation, and other related activities. Standard site practices will be utilized as needed to mitigate this impact.

Permitting for the installation and operation of the VOC Removal Facility will be administered through RAPCA (Section 4.2.2). The levels of air emissions which will be released from the VOC Removal Facility are, however, well below the values which the OEPA recognizes as significant⁽¹⁵⁾. Continuous operation of the VOC Removal Facility at maximum design conditions (VOC concentration, 10 µg/L; water flow rate, 1500 gpm; and air flow rate, 8550 scfm) would result in approximately 66 lbs/yr (0.18 lb/day) of VOCs being exhausted into the air, a relatively small increase over the present Mound airborne emissions (Table 4-1). Under the above conditions, the estimated maximum emission concentration at the air stripper column exhaust would be 0.24 µg/L. By comparison, Table 5-1 presents the air emission threshold values and the maximum acceptable ground level concentration (MAGLC) values established by OEPA for the major VOC contaminants present in the Mound domestic water supply.

Table 5-1. Threshold and MAGLC values for VOC air pollutants^a

Contaminant	Threshold Value ^b	MAGLC Value ^c
Chloroform	2000 lbs/yr	0.70 µg/L
Trichloroethylene	2000 lbs/yr	3.80 µg/L
1,2-Dichloroethylene	Not a carcinogen	11.30 µg/L

^aReview of New Sources of Air Toxic Emissions, Ohio EPA, Division of Air Pollution Control.

^bFor carcinogenic air pollutant, health impact risk assessment study is required if emission exceeds threshold value.

^cMaximum in acceptable ground-level concentration is also the maximum allowable emission concentration at source.

5.3 SOILS AND MINERAL RESOURCE IMPACTS

There are no known mineral resources and no significant soil resources located within the Mound site. Because the proposed action will take place entirely within the existing site, no adverse impacts to soil or mineral resources will result.

5.4 WASTE DISPOSAL IMPACTS

No radioactive waste is anticipated as a result of the proposed action. Based on Mound surveys, there is no reason to expect that contaminated materials will be encountered during the construction and demolition activities. If contaminated materials are encountered, Mound will monitor levels and, if needed, perform the actual removal. Any contaminated material requiring removal will be packaged in U.S. Department of Transportation (DOT)-approved containers for transport to a DOE-approved burial site as low specific activity (LSA) waste.

The only hazardous material anticipated as a result of the proposed action is friable asbestos produced during the demolition of existing asbestos cement pipe (ACP). Approximately 20 ft of 8-in. ACP will be removed from the existing domestic water piping to provide for the interface between the VOC Removal Facility and the existing domestic water system. In its present configuration, the ACP is a nonfriable material, not posing any environmental or health concerns; however, cutting the ACP for removal will produce friable asbestos particles and appropriate actions will be required to protect the environment and human health. The removal, subsequent packaging, and ultimate disposal of the ACP will be performed in accordance with existing Mound policies and procedures and with all applicable Federal (EPA, OSHA, and DOT), state, and local regulations. Disposal of the asbestos-containing waste (estimated volume: 10 ft³) will be in an approved waste disposal landfill.

The solid wastes to be generated during construction and demolition activities are estimated to consist of 6500 ft³ of demolition material and 500 ft³ of normal construction debris. The demolition material and construction debris will, after monitoring by Mound Health Physics, be removed from the site and transferred to a licensed commercial landfill.

In addition, all materials encountered during excavation and other earthwork activities which are not suitable for reuse under the proposed action, i.e., earthwork debris, will be transferred to the on-site spoils area (Figure 2-1).

The incremental increase in solid waste resulting from the VOC/RAP will not adversely affect the capacity of Mound's solid waste processing capabilities.

5.5 WATER RESOURCE IMPACTS

5.5.1 Surface Water

Surface runoff from the project site will be discharged to a nearby drainage ditch which will convey the water south of the project site. Under most conditions surface runoff will infiltrate the BVA before reaching the existing drainage system. In order to minimize the amount of suspended solids carried from the project site in surface runoff, consideration will be given to current and forecasted weather conditions before commencing or continuing with any construction or demolition involving earthwork, excavation, or related activities. Additionally, standard site construction practices (e.g., silt fences and straw bales) will be utilized to further mitigate this potential impact. During operation of the VOC Removal Facility, surface runoff and the emergency overflow from the clearwell will be discharged to the nearby drainage ditch as described above. No adverse impacts to surface water are anticipated as a result of the proposed action.

5.5.2 Groundwater

Only minor amounts of hazardous substances and oils will be present on the project site. Standard site practices will be utilized to prevent and mitigate spills of substances which could result in soil and potential groundwater contamination. The quality and quantity of surface water on the project site expected to infiltrate the BVA will not contaminate or otherwise alter the characteristics of the groundwater. The present withdrawal of groundwater from the BVA at the Mound supply wells, which will continue under the proposed action, does not exceed the capacity of the normal recharge to the portion of the BVA underlying Mound. No adverse impacts to groundwater are anticipated as a result of the proposed action.

5.6 HUMAN HEALTH IMPACTS

5.6.1 Public Health Impacts

Implementation of the VOC/RAP will not adversely impact public health. The only activity during the construction phase of the proposed action which will involve the handling of hazardous material is the removal of ACP (Section 5.4). The removal of this asbestos-containing material will be performed in strict accordance with regulatory requirements specifically designed to prevent the release of this hazardous material to the environment. The incremental increase in Mound's organic air emissions resulting from the operation of the VOC Removal Facility (Section 5.2) will be small, estimated to be a 8.2% increase over the actual 1990 Mound airborne emissions of organics, and 0.45% of the permitted emission standard for Mound (Section 4.2). No risk to public health will result from any credible accident associated with the VOC/RAP.

5.6.2 Worker Health Impacts

One expected impact resulting from the VOC/RAP will be the reduced potential exposure of Mound personnel to VOC contaminants in the domestic water supply. The only potential exposure of workers to hazardous material during the construction phase of the proposed action will be associated with the removal of ACP for which provisions will be made to adequately protect the workers (Section 5.4). The estimated maximum airborne concentration of VOCs to which workers could be exposed during operation of the VOC Removal Facility is well below the threshold values established by the OEPA (Section 5.2). Although serious injury to workers could result from credible accidents (e.g., accidents resulting from unanticipated equipment failure, operator error, natural phenomena, etc.), no adverse impact to worker health is anticipated as a result of implementing the VOC/RAP.

5.7 BIOLOGICAL RESOURCES

5.7.1 Wildlife

While the Mound site does harbor many species of wildlife, the proposed action will take place within a previously developed area of the site. Although some minor, temporary displacement of a few animals might occur, no significant, lasting impact to wildlife is anticipated as a result of the proposed action.

5.7.2 Threatened and Endangered Species

Mound is a potential habitat for the Indiana bat, a Federally-listed endangered species. The bat roosts in trees with exfoliating bark, and during the period that this potential habitat may be used as maternity roosting areas (May through August), measures will be taken to ensure that such trees are not cut or otherwise disturbed. Aside from the Indiana bat, no other species present on Federal or State of Ohio lists of endangered and threatened species are known to exist on the site, and the habitats present on the largely disturbed site are not generally supportive of the species on these lists. No removal of trees is anticipated during the proposed action. Furthermore, the proposed action will take place within a previously developed area of the site and will not disturb any of the few remaining wild areas on the site. Therefore, no impacts are expected.

5.8 FLOODPLAIN AND WETLANDS

Because the proposed action will take place on the site, outside the floodplain of the Great Miami River and any potential wetland areas, no adverse impacts to the floodplain or wetlands will result from the proposed action.

5.9 HISTORICAL AND CULTURAL IMPACTS

Because no sites of historical or cultural significance exist anywhere on the Mound property, no adverse impacts to historical or cultural resources will result from the proposed action.

5.10 SOCIOECONOMIC IMPACTS

Mound is one of the main employers in Miamisburg. The proposed action will provide employment for those workers engaged in its implementation, as well as those employed by the supporting services.

There will be a minor, temporary increase in truck traffic between Mound and the major highways serving Miamisburg. The total number of truck deliveries to and shipments from the site

anticipated in connection with the proposed action is extremely low when compared to the substantial amount of heavy traffic already present in Miamisburg.

The only significant socioeconomic impacts anticipated from the project are positive.

5.11 OPERATIONAL AND ACCIDENT RISKS

Risk is defined as the product of the hazard level associated with an event and the probability of that the event will occur expressed in events per year. The risk associated with the proposed VOC/RAP is extremely low. The entire intent of the proposed action is to further reduce already acceptable levels of VOC contaminants in the Mound domestic water supply.

5.11.1 Impacts from Potential Accidents

Design basis accidents involving the VOC Removal Facility equipment will not result in any dangerous release of hazardous materials to the environment. Carbon dioxide will be the only physically hazardous material which might be utilized in the operation of the VOC Removal Facility. As discussed in Section 3.1.2.3, a maximum of 15 tons of CO₂ could be present on-site. If the storage tank were to be damaged, the liquid CO₂ stored in the tank would volatilize, thereby releasing approximately 245,000 ft³ of CO₂ to the atmosphere. There would be a negligible impact upon the environment if this were to occur.

Another potential risk associated with the proposed action is that of the clearwell which could pose a drowning hazard. The clearwell will be a totally enclosed reinforced concrete tank; access will be limited to authorized personnel through a locked hatch.

Because only small quantities of flammable materials will be present on the project site during construction and demolition activities and no flammable materials will be utilized in the operation of the VOC Removal Facility, fire is not a major concern. During the operation of the facility, the sources of ignition will be primarily limited to motors and associated electrical equipment.

No materials utilized by the VOC Removal Facility or stored in the vicinity are capable of explosion; hence, explosion is not a credible event.

5.11.2 Potential Impact from Natural Hazards

The VOC Removal Facility will be an open-air facility and will not be designed to withstand the effects of extreme natural phenomena events. The damage that the facility might sustain resulting from the low-probability events discussed below would

render it inoperable. However, because the loss of the facility in itself will not pose any environmental hazard, there would be no resulting risk to the environment or human health. In the absence of such risk, the probability of occurrence of extreme natural phenomena events is not relevant and therefore has been omitted from the discussion that follows. In addition, when compared to the potential collateral damage that extreme natural phenomena events might cause within the region, any impact to the environment or human health resulting from the loss of the VOC Removal Facility would be negligible.

5.11.2.1 High Wind/Tornado

The most likely consequence of a direct-hit or near-miss tornado would be the toppling of the air stripper column and the resultant damage to other equipment from the falling column and airborne debris. Personnel in the vicinity of the facility could be struck and injured by the falling equipment and airborne debris.

5.11.2.2 Earthquake

The following accidents could be caused by a severe earthquake: toppling of the air stripper column; damage to a clearwell wall; and damage to the CO₂ storage tank. The effects of the air stripper column toppling and the CO₂ storage tank damage have been discussed in Sections 5.10.2.1 and 5.10.1, respectively. If a clearwell wall were to be damaged, the water in the clearwell could leak into the adjacent soils and infiltrate the BVA. There would be no adverse effect upon the environment if this were to occur.

5.11.2.3 Flood

The site of the proposed action will be at 705.5 ft MSL, approximately 25 ft above the normal level of the Great Miami River adjacent to the site, and well above the highest water level anticipated during any reasonable flooding. The Miami Conservancy District (MCD) has projected the flood stage at Miamisburg during the 2000-year flood to be 699.5 ft MSL. The Probable Maximum Flood (PMF) developed by the MCD would result in a flood stage at Miamisburg of 710 ft. The PMF is based on all possible contributing factors reaching their most critical values simultaneously. Although the MCD has not developed a frequency for the PMF event, it is considered to be very remote (less than once per 10,000 years). Another low-probability event, complete failure of the Huffman Dam upstream of Mound, could result in a maximum wave runup of 727 ft. If the PMF or dam failure were to occur, the VOC Removal Facility, as well as the existing Mound supply well pumps, would be heavily damaged.

5.11.2.4 Other Natural Hazards

Other natural hazards that could affect the VOC Removal Facility are lightning, hailstorms, and ice storms.

5.11.3 Operational Risks

The proposed action is intended to reduce the risk associated with personnel ingestion of low levels of potentially carcinogenic materials. In the event of the occurrence of a system outage, the VOC Removal Facility would be bypassed and the water would be supplied from Well Nos. 2 and 3 directly to the Powerhouse and Building 24. This configuration is the current mode of supplying domestic water to Mound.

There are no radioactive materials associated with the proposed action and only limited quantities of hazardous materials are present or processed.

The only petroleum products used during the proposed action will be small quantities of fuel required for trucks and other machinery during construction and demolition activities and lubricating oil required for pumps and other machinery during the operation and maintenance of the VOC Removal Facility. Small amounts of chemicals (polyphosphate and sodium hypochlorite) will be stored in and distributed from the Chemical Storage Building, and liquid CO₂, if present, will be stored in bulk. The amounts of these materials present will pose no appreciable environmental or personnel hazard.

5.11.4 Risk Comparison

The risks associated with the proposed action are not unique to this action and are negligible. In fact, going forward with the proposed action will reduce the already low risk of cancer due to ingestion of low level VOC contamination in the drinking water to even lower levels. As previously discussed, the possible impacts from a worst case accident are small.

5.12 CUMULATIVE IMPACTS

The implementation of the proposed action will not adversely impact human health or the environment. Because the impacts resulting from the proposed action, as described above, are negligible, no significant cumulative adverse impacts would be expected from the proposed action in combination with other existing or planned operations at Mound.

As an interim remedial action, the VOC/RAP will reduce the level of VOCs present in the Mound domestic water supply; thus reducing the exposure of Mound personnel to contaminants which may cause adverse health effects. The proposed action will also ensure

that SDWA standards are maintained for VOC contaminants until such time as the final corrective actions are developed and implemented. The process selected for the VOC/RAP will result an approximate 8% increase in the current level of organic air emissions from Mound. The incremental increase in air emissions that would result from the proposed action is less than 0.5% of Mound's permitted emission standard for organics and is well below any level of significance.

6.0 PERTINENT LAWS AND REGULATIONS

This EA and the process associated with it derive from the National Environmental Policy Act (NEPA) of 1969 and associated Council on Environmental Quality regulations (40 CFR parts 1500 through 1508) as implemented through DOE Order 5440.1D⁽¹⁾.

The following Federal acts, as well as corresponding State of Ohio, regional, and local laws and regulations, which are applicable to Mound and its operations, will apply to the proposed action:

- The emission of air pollutants is regulated by the Clean Air Act (CAA) of 1967 as amended;
- The discharge of wastewater is regulated by Federal Water Pollution Control Act of 1972 [retitled as the Clean Water Act (CWA) in 1977] as amended;
- Nonradioactive hazardous wastes are regulated by the Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984 and subsequent amendments;
- The release or potential release of hazardous substances is regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended, the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986;
- Transportation of hazardous materials is regulated by the Hazardous Materials Transportation Act (HMTA) of 1975 as amended;
- The manufacture and release of chemicals are regulated by the Toxic Substances Control Act (TSCA) of 1976 as amended;
- The protection of drinking water resources and standards for drinking water are regulated by the Safe Drinking Water Act (SDWA) of 1974 as amended;

- Worker safety and exposure are regulated by the Occupational Safety and Health Act (OSHA) of 1970 as amended; and
- The protection of endangered and threatened plant and animal resources is provided through the Endangered Species Act (ESA) of 1973 as amended.
- The identification, evaluation, registration, protection, and preservation of prehistoric and historic resources are regulated by the National Historic Preservation Act (NHPA) of 1966 as amended.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

No resources will be lost as a result of implementing the VOC/RAP.

Uncontaminated waste generated during the construction and demolition activities under the proposed action, except for earthwork debris, will be transferred to licensed commercial landfills. Any hazardous wastes generated during the proposed action which is to be disposed of through burial will be placed in land considered irretrievable and dedicated to that purpose.

The proposed action will require the utilization of natural resources in the form of such items as vehicle fuel, electric power, construction materials, chemicals, and process equipment; however, the quantities involved are considered to be insignificant. No other irreversible or irretrievable commitments exist.

8.0 OVERALL EVALUATION OF PROPOSED ACTION AND ALTERNATIVES

The construction and demolition activities associated with the VOC/RAP would result in minor and normal temporary conditions, the impacts of which would be negligible to human health and the environment. The proposed action will render the already acceptable VOC contaminant levels in the Mound domestic water supply even lower.

Three alternatives to the proposed action exist:

- 1) No-Action. If no action is taken, VOC contamination levels in the Mound domestic water supply will remain at their current levels and no means will exist to mitigate any increase in VOC contaminant levels.
- 2) Delayed-Action. Delayed action would have the same effects as the "no-action" alternative until the proposed action is implemented.

- 3) Pumping from Interceptor Well. Utilizing Well No. 1 as an interceptor well would reduce the VOC contaminants reaching Well Nos. 2 and 3; however, the degree of removal achievable is uncertain and may be inconsistent, and there would be no assurance that safe drinking water standards could be maintained through this alternative.
- 4) Carbon Absorption. Carbon absorption would provide removal of VOC contaminants from the domestic water supply; however, this competing technology was not selected because of high operational cost, maintenance cost, and waste disposal problems.

The proposed action and alternatives all present negligible risks. Operational accidents or natural phenomena events during the course of the proposed action would cause the system to revert to its present mode of operation at worst. Of the proposed alternatives, only the carbon absorption alternative will reliably reduce VOC contamination levels in the Mound domestic water supply. The proposed action was selected as the better alternative based on the lower environmental impact and greater cost effectiveness.

9.0 AGENCIES AND PERSONS CONSULTED

In addition to the Mound personnel who contributed to the preparation of this document, the following individuals, representing the indicated agencies, were consulted:

- Thomas R. Hissong - Curator of Education, Dayton Museum of Natural History;
- Judith Kitchen - Head, Technical and Review Services Department, Ohio Historic Preservation Office, Ohio Historical Society;
- Kent E. Kroonemeyer - Supervisor, Reynoldsburg Field Office, DOI Fish and Wildlife Service; and
- Kurt A. Rinehart - Flood Control Engineer, Miami Conservancy District.

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