

**TIME CRITICAL REMOVAL ACTION REPORT
FOR THE PLANT 6 CONTAMINATED PERCHED
WATER SEPTEMBER 1989**

09/30/89

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REPORT**

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R-002-202.2

TIME CRITICAL REMOVAL ACTION REPORT
FOR THE PLANT 6 CONTAMINATED PERCHED WATER

SEPTEMBER 1989

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FOREWORD

This time critical removal action report addresses the occurrence of relatively high concentrations of uranium found in subsurface water underlying Plant 6 at the U.S. Department of Energy (DOE) Feed Materials Production Center (FMPC). In July 1988, uranium-contaminated water was discovered beneath the floor of Plant 6. This water could migrate to the underlying aquifer, which lies approximately 35-50 feet below the plant floor.

This report is required to document the removal action following the proposed rules of the U.S. Environmental Protection Agency (USEPA), outlined in 40 CFR Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Removal actions at the FMPC are subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.

The objectives of this report are to identify the operation as a time-critical removal action, to document actions taken to date, and to assess environmental impacts associated with the removal action. This removal action is consistent with the overall objectives of the Remedial Investigation/Feasibility Study (RI/FS) currently being conducted for the FMPC.

NOMENCLATURE

The following is a list of the acronyms and abbreviations used in this document.

ACRONYMS

ALARA	As Low As Reasonably Achievable
ARAR	Applicable or Relevant and Appropriate Requirement
ASI	Advanced Sciences, Incorporated
BMP	Best Management Practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
DCG	Derived Concentration Guide
DFO	Director's Findings and Orders
DOE	U.S. Department of Energy
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
FFCA	Federal Facility Compliance Agreement
FMPC	Feed Materials Production Center
NAAQS	National Ambient Air Quality Standards
NCP	National Oil and Hazardous Substances Pollution 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
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Act
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
TBC	To Be Considered
TSCA	Toxic Substance Control Act
U	Uranium
USEPA	U.S. Environmental Protection Agency
WTF	Wastewater Treatment Facility

UNITS OF MEASURE ABBREVIATIONS

g	gram(s)
gal	gallon(s)
gpm	gallon(s) per minute
l	liter(s)
lb	pound(s)
mg	milligram(s)

1.0 SITE CHARACTERIZATION

1.1 Site Description

The FMPC is a DOE-owned manufacturing facility for the production of uranium metal used in the U.S. Defense Program. The FMPC site is located on 1050 acres in a rural area approximately 20 miles northwest of downtown Cincinnati, Ohio (Figure 1-1). The villages of Fernald, New Baltimore, Ross, and Shandon, and the city of Hamilton, are all located within a few miles of the plant. The Great Miami River, a tributary to the Ohio River, is about 3/4-mile east of the site. Paddy's Run flows through the western edge of the site and empties into the Great Miami River southwest of the village of Fernald. With the exception of about 200 acres located in southern Butler County, Ohio, most of the site, including all of the production and waste management activities, is located within Hamilton County, Ohio. The production facilities, including Plant 6, occupy approximately 136 acres on an elevated plain at about 580 feet above sea level, roughly in the center of the site (Figure 1-2). The predominant aquifer under the site regionally flows southerly towards the Great Miami River. However, due to the effects of large pumping wells of the Southwest Ohio Water Company east of the plant, groundwater in the aquifer beneath the Production Area flows to the east.

1.2 Site Background

At the FMPC production facilities, a wide variety of chemical and metallurgical process steps are used to convert uranium compounds into metal forms called derbies. Derbies and recycle metals are vacuum remelted to produce high purity uranium metal ingots that are machined for fabrication of uranium billets and target element cores. An intermediate process of nitric acid pickling of uranium feed materials for casting operations is performed in Plant 6 (Figure 1-3). The pickling process is ongoing and has been for a number of years. In July 1988, during the construction of the nitric acid fume scrubber facility in Plant 6, perched water containing relatively high concentrations (see Table 1-1) of uranium was discovered beneath the floor, near the nitric acid scrap pickling facility.

The uranium concentrations found in the Plant 6 perched water were deemed to be an unacceptable risk to environmental receptors. Unacceptable public health impacts could result from the uranium concentrations found in the perched water beneath Plant 6 if the plume reached the underlying aquifer and migrated offsite. For these reasons, a removal action was deemed appropriate to reduce risk levels to potential receptors. Removal of the Plant 6 contaminated perched water via the Clarifier Pit (discussed in Section 1.3) was initiated as a time-critical action in August 1988.

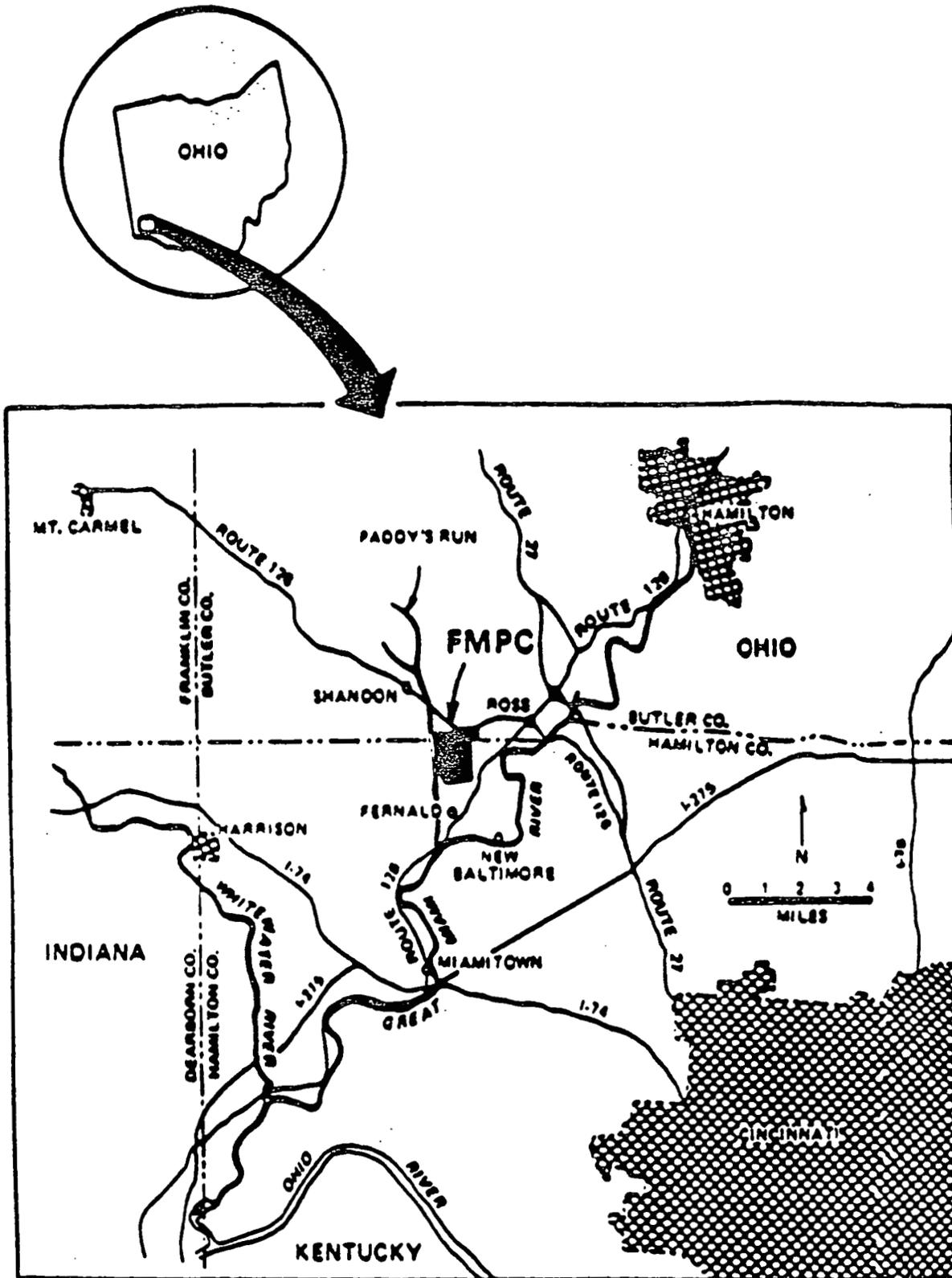


Figure I-1 Location of the FMPC Site

FMPC SITE

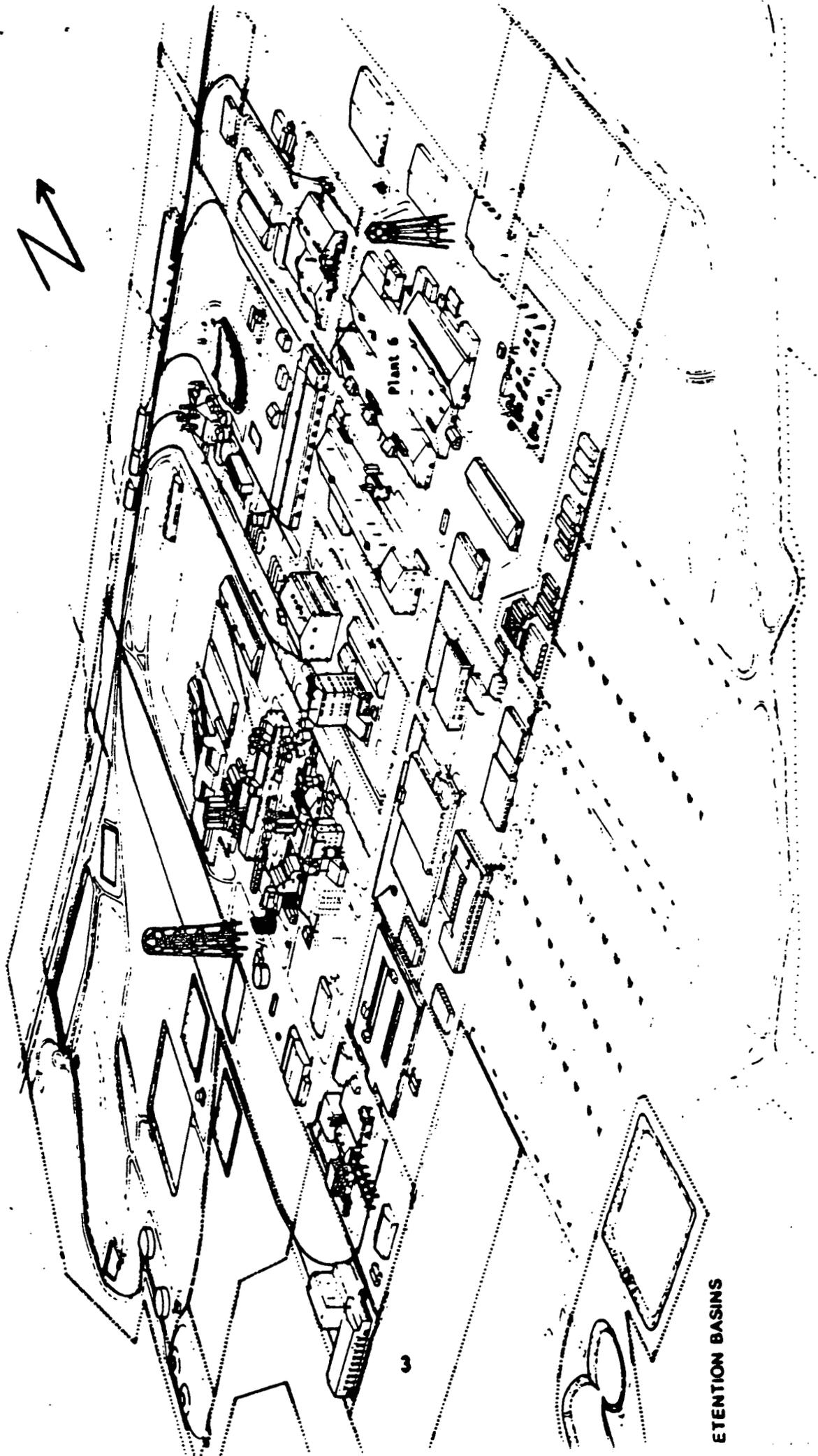


Figure 1-2 Production Facilities at the FMPC Site

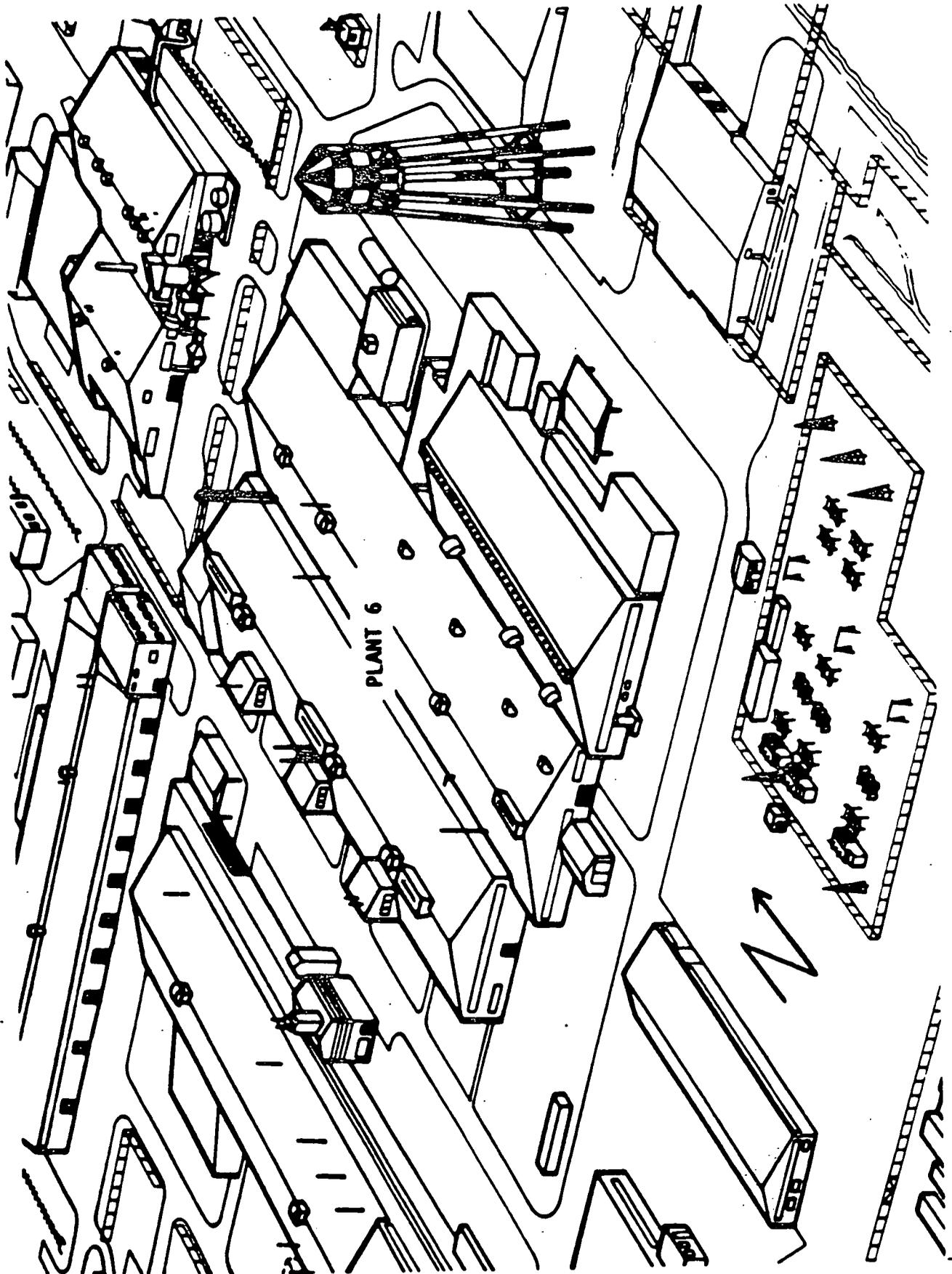


Figure 1-3 Plant 6 at the FMPC Site

1.3 Definition of Problem

Construction of the nitric acid fume scrubber facility led to the discovery of contaminated perched water beneath the floor of Plant 6 in August 1988. The wall of an abandoned clarifier pit, located adjacent to the nitric acid scrap pickling facility, was penetrated and 20,000 gallons of water flowed into the clarifier pit over a period of several days. Sampling of this water indicated a uranium concentration of 2,060 mg/l (2.06 g/l as shown in Table 1.1). Because of the high uranium concentrations found in this water, this removal action was initiated pursuant to CERCLA Section 104 as a time-critical response.

Perched water has continued to pass through this penetration and collect on the floor of the clarifier pit. Approximately once a week the quantity of accumulated water is measured, sampled, and pumped out of the clarifier pit. The results of sampling are shown in Table 1-1. The results indicate that relatively constant flow and uranium concentrations have been observed. The water is transferred to the Plant 6 Wastewater Treatment Facility (WTF) for uranium removal and subsequently to the Bionitrification (BDN) Facility for nitrate treatment (see Section 3.5).

As a part of the Remedial Investigation (RI) Work Plan Addendum being conducted for the sitewide RI/FS, special subsurface testing programs were developed for areas suspected of containing above background concentrations of uranium contamination. These "suspect areas" occur both inside and outside plant processing areas. Fourteen boring sites were identified in Plant 6 to evaluate suspect areas. Of the 14 borings completed, only three encountered perched water.

Initial water samples have been taken from the three wet boring holes. The analyses of these samples has indicated a high level of uranium is present. The concentrations of uranium in the borings ranged from 1,740 to 138,000 ug/l (1.74 to 138 mg/l). It was decided that a time-critical removal action be undertaken to pump water from these borings. The removal action will be ongoing until final remediation and protectiveness of the environment can be established through the Record of Decision (ROD) for Operable Unit 3. The water would be transferred to the Plant 6 WTF as is the water presently collected in the clarifier pit. The waste solids and liquids separated during treatment will be handled in accordance with existing FMPC procedures which include processing filtered solids as a low level radioactive waste and drumming and handling decanted liquids as a suspected RCRA waste until confirmed otherwise.

1.4 Site Conditions That Justify a Removal Action

The factors to be considered in determining the appropriateness of a removal action, as listed in proposed revisions of 40 CFR, Section 300.415 (b)(2) of the NCP, are as follows:

- o Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

- o Actual or potential contamination of drinking water supplies or sensitive ecosystems.
- o Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.
- o High levels of hazardous substances or pollutants or contaminants in soils, largely at or near the surface, that may migrate into the groundwater.
- o Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.
- o Threat of fire or explosion.
- o The availability of other appropriate Federal or State response mechanisms to respond to the release.
- o Other situations or factors that may pose threats to public health or welfare or the environment.

From the above list of the NCP removal action factors, the ones that apply to the Plant 6 contaminated perched water situation are as follows:

- o Actual or potential contamination of drinking water supplies or sensitive ecosystems.
- o High levels of hazardous substances or pollutants or contaminants in soils, largely at or near the surface, that may migrate into the groundwater.

The contaminated water underlying Plant 6 appears to be limited to perched zones contained within the upper 20 feet of an approximate 35-50 foot thick layer of low-permeability till. The potential exists, however, for migration of the perched water to the underlying Great Miami Aquifer. The Great Miami Aquifer, the major aquifer in the region, is a permeable glacial outwash which occupies an ancient river bed called the New Haven Trough. This aquifer yields large quantities of water for domestic, municipal, and industrial uses throughout the region. This aquifer has been designated as a Sole Source Aquifer under the provisions of the Clean Water Act as it is used as a primary source of potable water.

The potential risks associated with the removal action are addressed in Chapter 3. The following potential risk factors are considered in the risk evaluation: release mechanisms, environmental fate, population exposure, potential risks, potential receptors, and contaminants of concern.

TABLE 1-1
WATER ANALYSIS FROM PLANT 6 CLARIFIER

<u>Date of Sample</u>	<u>Approximate Amount of Water Pumped</u>		<u>Uranium*</u>		<u>pH</u>	<u>NO3</u>		
	<u>gal.</u>	<u>avg. gal/day</u>	<u>g/l</u>	<u>lbs</u>		<u>mg/l</u>	<u>kg</u>	
08-01-88	=	20,000	-	2.06	343.3	6.7	7965	603.0
08-23-88	=	1,500	68	1.95	24.4	6.8	8000	45.4
08-29-88	=	200	33	1.85	3.1	7.1	8000	6.1
09-02-88	=	100	25	1.92	1.6	7.0	8240	3.1
09-09-88	=	200	28	2.11	3.5	7.0	8360	6.3
09-23-88	=	300	21	0.63	1.6	6.6	9580	10.9
10-03-88	=	300	33	0.57	1.4	6.5	3720	4.2
11-23-88	=	1,200	24	1.44	14.4	7.6	5700	25.9
12-02-88	=	300	33	1.67	4.2	7.3	5960	6.8
12-06-88	=	150	38	1.77	2.2	7.0	6286	3.6
12-09-88	=	100	33	1.64	1.4	7.3	5946	2.3
12-30-88	=	900	43	1.73	13.0	7.3	5960	20.3
01-06-89	=	300	43	1.64	4.1	7.1	5540	6.3
01-13-89	=	300	43	1.72	4.3	7.1	6200	7.0
01-23-89	=	300	30	1.76	4.4	6.9	6105	6.9
01-27-89	=	150	38	1.67	2.1	6.9	5810	3.3
02-03-89	=	250	36	1.62	3.4	7.1	6802	6.4
02-10-89	=	250	36	1.60	3.3	7.3	6000	5.7
02-17-89	=	250	36	1.58	3.3	7.3	5140	4.9
02-24-89	=	200	29	1.63	2.7	7.5	6000	4.5
03-03-89	=	250	36	1.61	3.4	7.1	5730	5.4
03-10-89	=	250	36	1.75	3.6	7.2	6350	6.0
03-17-89	=	300	43	1.57	3.9	7.3	4750	5.4
03-23-89	=	200	33	1.73	2.9	6.9	5790	4.4
03-29-89	=	350	58	1.52	4.4	7.0	5750	7.6
04-07-89	=	300	33	1.63	4.1	7.2	5230	5.9
04-14-89	=	250	36	1.61	3.4	7.2	5310	5.0
04-21-89	=	300	43	1.52	3.8	7.0	5000	5.7
04-28-89	=	300	43	1.51	3.8	7.3	2840	3.2
05-05-89	=	300	43	1.54	3.9	6.9	5110	5.8
05-12-89	=	300	43	0.69	1.7	7.2	5170	5.9
05-26-89	=	700	50	1.50	8.8	7.2	4580	12.1
06-02-89	=	300	43	1.49	3.7	6.8	5080	5.8
06-09-89	=	300	43	1.43	3.6	6.8	4920	5.6
06-16-89	=	250	36	1.37	2.9	6.9	4460	4.2
Totals		31,900		499.6			870.9	

N/A Not Available

* Uranium is total uranium which includes all isotopes.

1.4.1 Release Mechanisms

The potential for migration of radionuclides in groundwater is related to the physical and chemical characteristics of the contaminants, the properties of the local environment, and the nature of the subsurface water movement. Possible release mechanisms associated with the Plant 6 contaminated perched water are as follows:

- o Leaks or spills that contaminate subsurface water.
- o Migration of the contaminated water through the porous subsurface medium.
- o Contact of the contaminated subsurface water with the soil, with subsequent leaching of the contaminants from the subsurface soil to the groundwater.

1.4.2 Environmental Fate

The potential fate of contaminants released into the environment must be evaluated in order to determine the exposure of potential receptors. For example, if proper operating procedures were not followed, direct exposure to humans could result from contact with the contaminated water during cleanup activities. Future exposure could involve the transport of the contaminants through various media to potentially affected receptors. This type of exposure could occur as a result of the Plant 6 problem in the absence of a response action.

At Plant 6, the environmental fate of contaminants may be affected by the following potential transport pathways:

- o Contaminated perched water migration vertically to the aquifer.
- o Aquifer discharge to surface water.
- o Contaminated water transfer to the surface (e.g., via pumping).

1.4.3 Population Exposure

The assessment of population exposure consists of: (1) developing scenarios of human activities that give rise to exposure, (2) assessing the transport of contaminants from the source through environmental media to potential receptors, and (3) assessing the biological uptake of these contaminants by all potential receptors. Potential population exposure pathways associated with the contaminated water beneath Plant 6 include the following:

- o Ingestion of contaminated groundwater.

- o Inhalation of contaminated vapors or particles.
- o Direct contact with contaminated water.

1.4.4 Potential Receptors

Potential receptors of radioactive contaminants that may migrate from the Plant 6 contaminated perched water include the following:

- o Persons who live in the area, drink local groundwater, or consume locally grown plant or animal food products.
- o Employees involved with the pumping and treating of the Plant 6 contaminated perched water. This is minimized by following standard health and safety procedures.

1.4.5 Contaminants of Concern

Based on the results of sampling the Plant 6 contaminated perched water, the primary contaminant of concern are uranium and nitrates. Uranium is defined as a hazardous substance under CERCLA. Nitrates are a contaminant limited for discharge in wastewaters under the FMPC National Pollutant Discharge Elimination System (NPDES) permit.

2.0 REMOVAL ACTION OBJECTIVES

The objectives of the proposed removal action at Plant 6 are to eliminate, reduce, or mitigate the potential for migration of radioactive contaminants from the perched water below Plant 6 to the underlying Great Miami Aquifer and to minimize threats to the public and the environment resulting from these contaminants.

2.1 Statutory Limits

Authority for responding to releases or threats of releases from a hazardous waste site is addressed in Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Executive Order 12580 delegates to DOE the response authority for DOE sites. Under CERCLA Section 104(b), DOE is authorized to undertake such investigations, surveys, testing, and/or other data gathering deemed necessary to identify the existence, extent and nature of the contaminants involved at the FMPC site, including the extent of danger to public health or welfare or the environment. In addition, DOE is authorized to undertake planning, engineering, and other studies or investigations appropriate to directing response actions to prevent, limit, or mitigate the risks to public health, welfare, and the environment.

2.2 Scope and Purpose

The scope of the proposed removal action can be broadly defined as control and management of radioactively contaminated perched water beneath Plant 6. The primary purpose of the proposed action is to remove the contaminated perched water from below Plant 6, thereby minimizing the potential for associated adverse impacts to the public and the environment. The contaminated water will require treatment for removal of contaminants prior to being released to the Great Miami River.

The objectives of the proposed removal action are as follows:

- o Eliminate or reduce potential public and environmental hazards associated with the contaminated perched water.
- o Minimize potential health hazards to on-site personnel performing the removal action.

These objectives can be achieved by removing the contaminated perched water, and treating the water to remove radioactive contaminants and to meet NPDES limits before discharging it to the Great Miami River.

2.3 Schedule

The primary scheduling objective is to install pumping and provide treatment of the existing contaminated perched water as soon as possible and continue this action until the subsequent remedial actions within the Production Area proposed by the RI/FS are determined and implemented.

The proposed removal action at the FMPC Plant 6 location is scheduled to be initiated in October 1989. The timely removal and treatment of the contaminated perched water at Plant 6 is consistent with the comprehensive remedial actions being developed as part of the RI/FS.

2.4 Compliance with Relevant Requirements

The proposed removal action of the FMPC Plant 6 contaminated perched water would be carried out in accordance with all applicable or relevant and appropriate requirements (ARARs), based on EPA interim guidance regarding compliance to the extent practicable, with ARARs. EPA guidance defines applicability by stating that the proposed action or site circumstances satisfy all of the jurisdictional prerequisites of the requirement. Relevant and appropriate requirements are defined as requirements that address problems or situations sufficiently similar to those encountered at the FMPC site and that their use is well suited to the particular situation.

The ARARs are divided into three categories:

- o Contaminant-specific.
- o Location-specific.
- o Action-specific.

Contaminant-specific ARARs address certain chemical species or a class of contaminants (e.g., uranium or radionuclides) and relate to the level of contamination allowed for a specific pollutant in the soil, water, or air. Location-specific ARARs are based on the specific setting and nature of the site (e.g., proximity to a major aquifer that is the main source of water supply for a region). Action-specific ARARs relate to minimum technical requirements associated with the specific response actions (i.e., removal actions) that are proposed at FMPC. Thus, a determination of the potential ARARs for proposed actions at a site is based on factors specific to that site and the individual action.

The preliminary identification of potential ARARs for the proposed removal action for the FMPC Plant 6 contaminated perched water is based on the nature of the contamination (radioactivity and toxicity of the uranium-contaminated water), the location of the contaminated perched water (proximity to major water supply aquifer), and the general scope of the applicable alternatives.

Table 2-1 includes a list of laws and orders that are potentially relevant to the proposed action at the FMPC Plant 6. The requirements are subdivided by groups: Federal Laws, Orders, and Agreements; Executive Orders; DOE Orders; and Ohio State Environmental Laws, Orders, and Agreements. This list is not meant to be all inclusive, but only to highlight the major environmental laws, orders, and agreements that may pertain to this proposed removal action. Further description of these potential requirements for the

proposed action are discussed in Section 5.1, following the selection of the final alternatives.

TABLE 2-1

LAWS AND ORDERS POTENTIALLY RELEVANT TO RESPONSE ACTIONS AT THE FMPC SITE

Federal Laws, Orders, and Agreements

- Clean Water Act, as amended (also referred to as the Federal Water Pollution Control Act of 1972, as amended).
- National Environmental Policy Act, as amended.
- Occupational Safety and Health Act.
- Resource Conservation and Recovery Act of 1976, as amended.

Executive Orders

- Executive Order 11514, Protection and Enhancement of Environmental Quality.
- Executive Order 11807, Occupational Safety and Health Programs for Federal Employees.
- Executive Order 12088, Federal Compliance with Pollution Control Standards.
- Executive Order 12580, Superfund Implementation.

Department of Energy Orders

- Order 5400.xx (draft) Radiation Protection of the Public and the Environment.
- Order 5400.xy (draft) Radiological Effluent Monitoring and Environmental Surveillance
- Order 5440.1C Implementation of the National Environmental Policy Act.
- Order 5480.1B Environment, Safety, and Health Program for Department of Energy Operations.
- Order 5480.14 Comprehensive Environmental Response, Compensation, and Liability Act Program.
- Order 5480.4 Environmental Protection, Safety, and Health Protection Standards.
- Order 5482.1B Environmental Protection, Safety, and Health Protection Appraisal System.
- Order 5483.1A Occupational Safety and Health Program for Government-Owned Contractor-Operated Facilities.
- Order 5484.1 Environmental Protection, Safety, and Health Protection Information Reporting Requirements.
- Order 5000.3 Unusual Occurrence Reporting System.
- Order 5820.2 Radioactive Waste Management.

Ohio State Environmental Laws, Orders, and Agreements

- Ohio Administrative Code (3745-1-05A and 3745-1-05B)
- Ohio Environmental Protection Agency Consent Decree, signed December 2, 1988.
- Ohio Environmental Protection Agency Director's Findings and Orders, signed June 26, 1987.

3.0 EVALUATION OF THE REMOVAL ACTION

Pumping the contaminated perched water and treatment in the Plant 6 WTF will provide an acceptable near-term solution to the contaminated perched water. The pumping and treatment of the contaminated perched water will reduce its toxicity, mobility, and/or volume. Pumping can be accomplished in a fairly short period, so it is considered timely. The constructability of the pumping system is straightforward, and the performance of the system is reliable because the components are off-the-shelf items. The Plant 6 WTF is successfully operating and processing similar wastewater on a routine basis. Pumping will be in full compliance with ARARs.

3.1 Requirements Potentially Relevant to the Proposed Action

The purpose of the removal action is to minimize the potential for adverse impacts to the public and the environment. The final remedial action for Plant 6 perched water will be addressed as part of the RI/FS.

The removal action identified is assessed on the basis of three interrelated categories of requirements: contaminant-specific, location-specific, and action-specific requirements. These requirements are discussed below according to their grouping as federal laws, federal orders and agreements, and state requirements.

3.1.1 Federal Laws

To the extent practicable, federal laws that may have primary significance to the removal action are summarized briefly below.

3.1.1.1 Clean Water Act, as Amended

Until 1977, the USEPA regulated FMPC wastewater discharges under the Federal Water Pollution Control Act. Congress amended this act in 1977, and it is now called the Clean Water Act (CWA). The CWA specifically subjects Federal Facilities to the substantive and procedural National Pollutant Discharge Elimination System (NPDES) permitting requirements of delegated states, of which Ohio is one.

3.1.1.2 Resource Conservation And Recovery Act of 1976, as Amended

The Resource Conservation and Recovery Act (RCRA) of 1976 governs the generation, transportation, treatment, and disposal of hazardous wastes and the hazardous components of mixed waste and regulates facilities disposing of all solid wastes. Source, by-product, and special nuclear material are excluded by provision of the Atomic Energy Act. Hazardous waste requirements defined under RCRA pertinent to the FMPC removal action include the following: 1) standards for generators of hazardous waste, 2) standards for owners and operators of hazardous waste treatment, storage, and disposal facilities.

3.1.1.3 National Environmental Policy Act of 1969, as Amended

The National Environmental Policy Act (NEPA) of 1969 requires consideration of environmental impacts at every stage of the process for making decisions and implementing actions that may affect the quality of the environment. Over the years, NEPA has become the basic policy-setting Federal law relating to protection of the environment and has provided the initiative for passage of other Federal and state environmental statutes. Although many of these other environmental statutes have unique requirements, there is a need to coordinate NEPA compliance with review requirements of the other environmental statutes in order to avoid delays that can be caused by proceeding separately under each statute. Because of its multi-purpose scope, the NEPA process is an excellent means for accomplishing the required coordination. The Council on Environmental Quality (CEQ) recognized this and included, in its regulations implementing NEPA, provisions requiring the coordination of NEPA and other environmental reviews (40 CFR 1500.2). The proposed action is subject to and would comply with all NEPA requirements including Categorical Exclusions.

3.1.1.4 Occupational Safety and Health Act

The Occupational Safety and Health Act (OSHA) establishes worker protection requirements in occupational situations, such as the storage and handling of contaminated materials.

3.1.2 Federal Orders and Agreements

In addition to the federal laws cited above, the following federal orders and agreements may also be applicable to the proposed project.

Draft DOE Order 5400.xx establishes standards and requirements for operations of the DOE and its contractors with respect to protection of the public and the environment against undue risk from radiation.

DOE Order 5400.xy establishes standards and requirements for ALARA at DOE facilities. "As low as reasonably achievable" (ALARA) is a phrase used in draft DOE Order 5400.xy to describe an approach to radiation protection to control or manage exposures (both individual and collective to the workforce and the general public) as low as social, technical, economic, practical, and public policy considerations will permit. As used in DOE Order 5400.xy, ALARA is not a dose limit, but rather it is a process that has as its objective the attainment of dose levels as far below the applicable limits of DOE Order 5400.xx as is practicable.

DOE Order 5480.1B sets forth the responsibility and authority for enforcing environmental protection programs for DOE facilities. This order further establishes ambient air concentration standards for radionuclides, while the Nuclear Regulatory Commission (NRC) standards for ambient air are set forth in 10 CFR 20.

DOE Order 5480.14 provides guidance on the management of inactive low-level radioactive and hazardous waste disposal facilities and also provides for the identification, characterization, and final remedial actions at the facilities.

The authority and regulatory basis for the Industrial Hygiene Program is contained in DOE Orders 5480.1B, 5480.4, and 5480.10. DOE Order 5480.10 contains specific industrial hygiene programs required of all government-owned contractor-operated facilities administered by the DOE. These orders incorporate regulations such as Occupational Safety and Health Act (OSHA) standards and those of the American Conference of Governmental Industrial Hygienists.

The overall Safety Analysis and Review Program is governed by DOE Orders 5480.5 and 5481.1B. DOE Order 5480.5 requires a facilities protection program consisting of several factors that include an independent safety analysis review process that has a formal documented system to identify and control risks, and an independent review and approval of safety analyses.

3.1.3 State Requirements

On June 26, 1987, the Ohio EPA issued the Director's Findings and Orders (DFO). The DFO contained 18 orders which focused on FMPC activities that relate to the Clean Water Act. The FMPC completed all activities required by the DFO either on or ahead of schedule. DOE provided a DFO bimonthly progress report to the OEPA.

On December 2, 1988, the DOE and the OEPA signed a Consent Decree which focuses on hazardous waste requirements and the control of wastewater and runoff. As a result, the DFO were incorporated into the Consent Decree. Progress is tracked and reported on a bimonthly basis.

Best Management Practices (BMPs) are defined by the USEPA to be "actions or procedures to prevent or minimize the potential for the release of toxic pollutants." BMP plans are authorized under the Clean Water Act of 1977 and are implemented under National Pollution Discharge Elimination System (NPDES) regulations to help control discharges of such materials associated with or ancillary to industrial manufacturing processes or treatment systems. The general types of discharges to be addressed by BMP plans are spills and leaks, drainage from material storage areas, plant site runoff, and sludge and waste disposal discharges. Because effluent guidelines are not always available, particularly for toxic or hazardous materials, BMP plans are designed to be one form of supplemental controls to effluent limitations for minimizing harmful discharges and protecting water quality, human health, and the environment.

Ohio has primacy under the CWA for the FMPC. The OEPA considers all waters originating in Ohio to be eligible for nondegradation and NPDES permitting; therefore, the FMPC obtained a permit for the outfall ditch to Paddy's Run and for the outfall to the Great Miami River at Manhole 175. The NPDES permit for the FMPC expired at midnight February 1, 1985. The FMPC

currently operates under an Administrative Extension of the expired permit with modifications as specified in the Consent Decree. A renewal application was submitted to the OEPA on August 1, 1988. This application is under review by OEPA. Until this application is approved, the FMPC will continue to operate under the former NPDES permit conditions as modified by the Consent Decree.

3.2 Effectiveness of the Removal Action

The effectiveness of the removal action is dependent upon ensuring protection of and minimizing impacts to the public and the environment. The removal action will reduce near-term impacts by removing and treating the contaminated perched water at Plant 6 and contribute to the efficient performance of the long-term remedy. These actions would reduce the potential for uncontrolled releases of contaminants from the Plant 6 contaminated perched water to the underlying aquifer. This would be effective in terms of health and safety because the pumping system will be safely constructed and operated, and the wastewater treatment facility is already being operated safely by adherence to standard operating practices.

3.3 Health Risk Analysis

Impacts to workers could occur during pumping and treatment of the Plant 6 contaminated perched water. All activities associated with the removal action will be conducted in conformance with DOE regulations governing safety, health, and environmental protection. Therefore, the potential for occupational exposure to contaminants by direct contact, ingestion, or inhalation is expected to be minimal. Workers will receive training relevant to the new procedures for pumping the Plant 6 contaminated perched water prior to initiation of the action.

3.4 Environmental Risk Analysis

The implementation of the removal action will improve the current condition by removing a contaminant that could migrate to the regional aquifer.

Analysis of this project for NESHAP compliance concludes that it will not result in an increase in radionuclide emissions at the FMPC. Therefore, compliance with FMPC Site NESHAP regulations will not be affected.

This project involves the emplacement of pumps and the construction of piping from the pumps to the Plant 6 WTF. Most waste generation for implementation of this removal action was produced from the boring cuttings during the Remedial Investigation and well installation effort. Waste from the proposed removal action effort resulting from piping and conduit installation and anchoring the pump system to the floor of Plant 6 will be minimal. The waste generated will be quantified in the FMPC Bimonthly Waste Generation Report. Cumulative impact assessment for FMPC waste generation is addressed in the FMPC Renovation and Site Evaluation Environmental Impact Statement.

3.5 Implementability

Implementability is defined by its timeliness, technical feasibility, and responsiveness to institutional considerations. The removal action can be implemented within a few weeks. The construction of a piping system is technically feasible. Pumping and treating perched water from the Plant 6 clarifier pit has been ongoing since discovery of perched water in August 1988. Since that time, treatment has taken place in the Plant 6 water treatment facility (WTF). By continuing this practice in the proposed action, no significant change in normal operations are expected. The levels of uranium in the perched water are similar to the levels normally found in wastewater treated in Plant 6. Likewise, the level of nitrates in the perched water is consistent with the levels found in the normal wastewater discharged from Plant 6.

The Plant 6 WTF processes include: (1) oil/water phase separation, (2) precipitation of the radionuclide (uranium) with a base (sodium hydroxide), (3) coagulation of the precipitant with a high density polymer (4) filtration of the slurried material to separate the precipitated radionuclides (uranium) from the supernatant. The Plant 6 WTF has the capacity and capability to process the contaminated perched water as described. The filtrate produced by the Plant 6 WTF using the above process typically contains less than 5 mg/l uranium. Following treatment at the Plant 6 WTF, the effluent is sent to the General Sump facility, and then to the Bionitrification Surge Lagoon and Treatment System which is expected to lower the average uranium concentration to approximately 1.0 to 3.0 mg/l, as has been achieved during the past several years of operation. The BDN Treatment System will remove nitrates to a level consistent with the NPDES permit limits.

The capacity of the existing Plant 6 WTF is 84,000 gal/week when operated three shifts per day. Since limited production has existed during the last year (FY-1989), the Plant 6 WTF is presently operating at less than one shift per day. This reduced operating mode is expected to continue in the near future. The flow from the perched water, inclusive of clarifier pit flow, is expected to be less than one batch per week (4,000 gal.). This additional amount of flow represents less than 5% of the capacity of the existing Plant 6 WTF and, therefore, will not be a problem. The contribution of perched water effluent to the BDN treatment system represents less than a 1% increase in flow. The contribution to flow and uranium mass discharged to the Great Miami River represents much less than a 1% increase. Therefore, treatment will not overburden the existing treatment system and is considered applicable to the proposed action.

3.6 Conclusions

This report was prepared to identify the time-critical removal action which addresses the occurrence of relatively high concentrations of uranium in perched water beneath the floor of Plant 6 at the FMPC. Implementation of this removal action will greatly reduce this potential source of soluble uranium that could migrate to the underlying aquifer.

4.0 REFERENCES

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