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**PLANT 6 CONTAMINATED PERCHED WATER
MODIFIED REMOVAL ACTION WORK PLAN
JUNE 1990**

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WMCO/DOE

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WORK PLAN

PLANT 6
CONTAMINATED PERCHED WATER

MODIFIED REMOVAL ACTION
WORK PLAN

JUNE 1990

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I. INTRODUCTION

This document provides a modified work plan describing the required changes in the removal action taken to address the occurrence of relatively high concentrations of uranium found in perched water underlying Plant 6 at the Feed Materials Production Center (FMPC). The modification is required to address the presence of hazardous substance list/volatile organic compounds (HSL/VOCs) in the water being pumped. The existing pumping action was stopped on April 23, 1990, when the HSL/VOCs were detected. The modified work plan was prepared to restart pumping to comply with the commitment for Removal Action No. 1 as stated in the Consent Agreement Under CERCLA Section 120 and 106(a) (hereafter called the "Consent Agreement") and is consistent with the requirements of 29 CFR 1910.120. The modified scope of work herein delineates the plan which will be used to locate the source of influent water, and pumping and treatment of the extracted water.

II. DESCRIPTION

1.0 Summary of the Potential Threat

The Production and Additional Suspect Areas Work Plan of the Feed Materials Production Center (FMPC) Remedial Investigation and Feasibility Study (RI/FS) includes a comprehensive plan to sample and characterize the soil, and the extent of perched water in the upper 20 feet of the soil under the FMPC production area. This depth is intentionally confined to the space sufficiently above the aquifer that exists under the FMPC so that penetration through the cover soil does not occur. In addition to systematic borings at 250 foot intervals across the entire production site, one phase of the RI/FS involves "focused" borings to explore suspect areas of contamination under the individual plants.

As part of the Production and Additional Suspect Areas Work Plan, several borings were installed in and around Plant 6 (see Figure 1). Fourteen focused boring sites were identified in Plant 6 to evaluate suspect areas. Three of the 14 borings encountered perched water. The analyses of the water samples taken from the three piezometers indicated that a high level of uranium was present. The concentrations of uranium in the borings ranged from 1.74 to 138 mg/l. It was decided that a time-critical removal action be undertaken to pump water from these borings. The pumping action began on November 6, 1989. The pumped water has been transferred to existing FMPC Wastewater Treatment Facilities (WTFs) for uranium removal and nitrate treatment. The waste solids and liquids separated during treatment were handled in accordance with existing FMPC procedures which include processing filtered solids as a low level radioactive waste. The action was halted on April 23, 1990, due to the detection of HSL/VOCs in the water being pumped.

2.0 Related Actions

Construction of a 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 in 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).

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 indicate a relatively constant flow is occurring. The water is transferred to existing FMPC WTFs for uranium removal and nitrate treatment.

3.0 Roles of Participants

- A. The DOE has been the lead agency for this removal action and will coordinate and execute continuation of this removal action.
- B. USEPA and OEPA shall review, comment on the modified work plan, follow progress through TIE meetings and the Consent Agreement progress reports.
- C. Westinghouse Materials Company of Ohio (WMCO), the Maintenance and Operations Contractor at the FMPC, will coordinate, manage, implement, monitor and prepare all reports associated with the removal actions in a manner consistent with DOE and regulatory guidance.

4.0 Modified Removal Action

This Removal Action will address the presence of HSL/VOCs in Plant 6 perched water so that the existing piezometer and clarifier pit perched water pumping systems located in Plant 6 can be restarted. Any HSL/VOC treatment will occur prior to transferring the water to existing FMPC WTFs for treatment of uranium and nitrates. This action will be undertaken to continue the effort to control the potential for vertical migration of contamination into the Great Miami Aquifer by reducing the hydrostatic head of the perched water.

III. **METHOD OF ACCOMPLISHMENT**

Activities will be undertaken to provide planning, design, and management for the modified removal action.

1.0 Project Planning

Included in this activity will be the preparation of detailed task listings and delineation of responsibilities to support the schedule given in Attachment 1. Training has recently been completed to ensure that the personnel involved in the scope of work have been trained in accordance with the Occupational Safety and Health Administration (OSHA) standards found in 29 CFR 1910.120.

2.0 Design Pumping Systems Discharge Piping Modifications

The objective of this activity is to design a modification to the existing pumping systems discharge piping to isolate the extracted perched water contaminated with HSL/VOCs from the other wastewater flows in Plant 6. The existing pumping systems discharge piping will be designed to be combined into a new dedicated header system if it is determined that HSL/VOC treatment is required. The header system will be designed to discharge into an existing holding tank at the Plant 6 WTF from where it would be treated for HSL/VOCs if required.

3.0 HSL/VOC Investigation

Three options for removing HSL/VOCs from Plant 6 pumping systems discharge water are under investigation. Option 1 involves heating the water to 180°F in the first unit of the existing Plant 6 WTF. The water would be held at this temperature for a sufficient time to vaporize the organics. Preliminary simulation tests for this removal method have been performed at the WMCO laboratory. The water samples resulting from the tests are presently being analyzed for HSL/VOCs by an offsite laboratory. The water sample analysis will determine if Option 1 is viable. Option 3 requires the pumping systems discharge water to be circulated through activated carbon filters for removal of organic compounds. Option 4 involves utilization of an air stripping column to remove the organics from the contaminated water. Options 3 and 4 would require construction of new treatment units at the FMPC. Option 2 is an investigation into the feasibility of providing no treatment of the HSL/VOCs. A mass balance of the HSL/VOC level in FMPC wastewater discharge to the Great Miami River will be undertaken to determine the need for HSL/VOC treatment. If this option is acceptable, a report of this option will be prepared and issued to EPA for approval.

In the event that Option 1 is successful, the standard operating procedures (SOPs) for the Plant 6 WTF will be modified to incorporate the necessary heating time operating changes. However, if the testing is not successful, a detailed design for either option 3 or 4 will be prepared based on the results of the ongoing treatment investigation.

4.0 Management of Project

FMPC site personnel will manage the project using FMPC-2201 Topical Manual, Project Management Procedures.

IV. FIELD ACTIONS

Actions will be taken to investigate the source of perched water and, if required, to provide for HSL/VOC removal prior to transferring the water to existing FMPC WTFs for treatment of uranium and nitrates.

1.0 Perched Water Recharge Investigation

The objective of this activity is to determine the source of perched water found in the clarifier pit and three borings located inside Plant 6. Possible sources include leakage from roof drain lines which discharge to the storm sewer. This will include actions such as hydrostatic testing, dye testing and visual observations.

2.0 Install Pumping Systems Discharge Piping Modifications

The objective of this activity is to install a new common header system for combining existing pumping systems discharge piping.

3.0 Provide HSL/VOC Treatment (If Required)

The objective of this activity is to install a treatment system (Option 3 or 4) to remove volatile organics from extracted water. Treatment will take place if it is determined that operation of the existing Plant 6 treatment system (Option 1) can not be modified to achieve HSL/VOC removal or in the event that no treatment (Option 2) is unacceptable.

4.0 Pump Contaminated Water

The objective of this activity is to restart pumping of the contaminated water. This effort will be undertaken to control the potential for vertical migration of the contamination by reducing the hydrostatic head of the perched water. The uranium contaminated water will be pumped from the clarifier pit and borings into a holding tank at Plant 6 from where it will be processed through the HSL/VOC treatment system to remove the organics.

V. SAMPLING AND ANALYSIS PLAN

Process control water samples from each of the three pumping units and the clarifier pit will be obtained by site personnel according to the FMPC Standard Operating Procedure (SOP) and sent to the FMPC Laboratory for analysis of total uranium, total thorium, nitrates and pH. The analytical procedures will be in accordance with the Analytical Laboratories Quality Assurance Plan L.C.N.-QAP, October 1987. Samples from the pumping

operations will be obtained weekly for the first three months and monthly thereafter.

Split samples of the water from each of the pumping units and a sample from the combined discharge of the pumping units, or from the discharge of the HSL/VOC treatment unit, if required, will be obtained by the site Environmental Monitoring group monthly during the first quarter of the pumping operation and quarterly thereafter. The split sampling will be performed consistent with the procedures and protocol specified in the RI/FS Work Plan. The split samples will be sent to an independent laboratory. The pumping units sample results will be correlated with the analysis performed by the FMPC laboratory. The sample of the wastewater discharged from the combined discharged flow, or from the HSL/VOC treatment unit, if required, will be analyzed for HSL/VOCs and total radionuclides. The results from the certified lab will become part of the Administrative Record File. The FMPC laboratory data will be used for process control information only.

VI. HEALTH & SAFETY PLAN

The work to be performed will be consistent with the Health and Safety Plan prepared for this removal action. A copy of this plan is provided as Attachment 2 of this Work Plan. The plan identifies, evaluates, and controls all safety and health hazards. In addition, it provides for emergency response for hazardous operations. The plan is consistent with 29 CFR 1910.120 and the FMPC Site Safety and Health Plan.

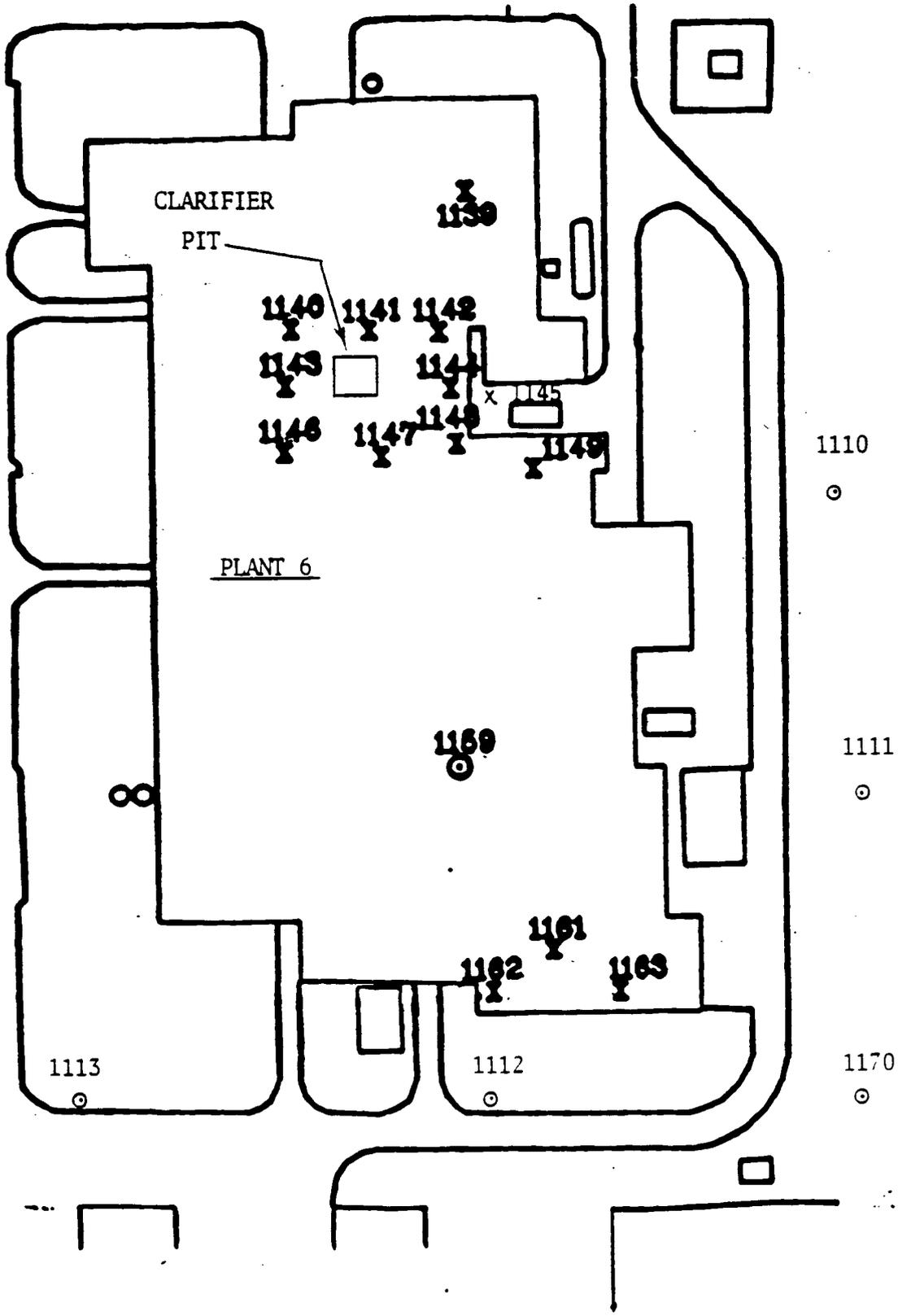
Additional safety documentation will be prepared as necessary according to FMPC-2116 Topical Manual "Implementing FMPC Policies and Procedures for System Safety Analysis." FMPC-2116 has been prepared to implement DOE Order 5481.1B - Safety Analysis and Review System and DOE/OR-901 - Guidance for Preparation of Safety Analysis Reports.

VII. QUALITY ASSURANCE PLAN

The overall quality assurance program at the FMPC is described in the site Quality Assurance Plan, FMPC 2139. The Quality Assurance Plan is based on the criteria specified in ASME NQA-1, Federal EPA Guideline QAMS-005/80 and DOE Orders 5700.6 and 5400.1. Specific quality assurance requirements will be incorporated into written and approved procedures and during personnel training. The Quality Department will conduct periodic surveillances to verify compliance.

VIII. ASSUMPTIONS

1. No new regulatory assessments or permits are required.
2. Removal actions that are time critical are completed in an expeditious manner with the NEPA document being satisfied with a Memorandum to File.



PLANT 6 BORING SITES
FIGURE 1

Plant 6 Contaminated Groundwater Pumping

FMPC

SCHEDULE

Description	Time Zero
Work Plan · Prepare/Submit · USEPA Approval	22
Perched Water Recharge Investigation	154
HSL/VOC Investigation · Treatment Options · Obtain & Analyze Samples · USEPA Approval Action	22 66 22
Piping/Treatment System Design, Procurement, Installation, and Start-up (Treatment If required)	154
Pump Perched Water · Option 1 (Plant 6 WTF) · Option 2 (No Treatment) · Option 3 & 4 (Other Treatment Techniques)	Sec Note 1 143 110 176

Note 1 = Pumping will continue until implementation of the Record of Decision (ROD) is completed for Operable Unit No. 3 or until concentration of hazardous substance in water becomes insignificant as compared to background.
 Note 2 = Durations are working days.

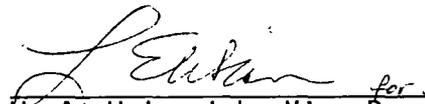
ATTACHMENT 2

PLANT 6 - CONTAMINATED PERCHED WATER
MODIFIED REMOVAL ACTION
HEALTH AND SAFETY PLAN

FEED MATERIALS PRODUCTION CENTER

June 1990

APPROVAL:


W. A. Weinreich, Vice President
Restoration
Westinghouse Materials Company of Ohio

CONCURRENCE:

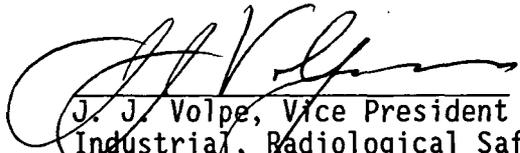

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1.0 TASKS TO BE PERFORMED

The work to be performed involves modifying the removal action which was undertaken to address the occurrence of relatively high concentrations of uranium found in the subsurface water underlying Plant 6 at the Feed Materials Production Center (FMPC). The modifications are required to address the presence of volatile organic compounds (VOCs) in the water that was being pumped. The modified work includes a support effort (project planning, investigating options to treat the pumped water for VOC removal, and the design of the system) and the actual work effort (source detection, installation of header piping, installation of the treatment system, if necessary, and the actual pumping and treatment). The Health and Safety Plan is for the actual work effort, not for the support effort.

The work to be performed will be at Plant 6 and its water treatment system. The work will be performed by FMPC personnel. All work will be performed under the direction of the Plant 6 supervisor. Support will be provided by Water Treatment, Maintenance, Industrial Radiation Safety and Training (IRS&T), and Site Restoration personnel. The work will be consistent with the procedures identified in Section 13.

The source detection will:

<u>no</u>	Disturb Surface Soil	<u>yes</u>	Sample Surface Water
<u>no</u>	Disturb Subsurface Soil	<u>no</u>	Sample Lagoons
<u>no</u>	Use Heavy Equipment	<u>no</u>	Use Boat
<u>yes</u>	Enter Confined Space	<u>yes</u>	Involve Radioactivity
<u>yes</u>	Disturb Containerized Matter	<u>no</u>	Involve Trenches

The installation of the header piping, if necessary, will:

<u>yes</u>	Disturb Surface Soil	<u>no</u>	Sample Surface Water
<u>yes</u>	Disturb Subsurface Soil	<u>no</u>	Sample Lagoons
<u>yes</u>	Use Heavy Equipment	<u>no</u>	Use Boat
<u>yes</u>	Enter Confined Space	<u>yes</u>	Involve Radioactivity
<u>no</u>	Disturb Containerized Matter	<u>yes</u>	Involve Trenches

The installation of the VOCs treatment system, if necessary, will:

<u>yes</u>	Disturb Surface Soil	<u>no</u>	Sample Surface Water
<u>yes</u>	Disturb Subsurface Soil	<u>no</u>	Sample Lagoons
<u>yes</u>	Use Heavy Equipment	<u>no</u>	Use Boat
<u>yes</u>	Enter Confined Space	<u>yes</u>	Involve Radioactivity
<u>no</u>	Disturb Containerized Matter	<u>yes</u>	Involve Trenches

The operation of the system for pumping the contaminated water will:

<u>no</u>	Disturb Surface Soil	<u>yes</u>	Sample Surface Water
<u>no</u>	Disturb Subsurface Soil	<u>no</u>	Sample Lagoons
<u>no</u>	Use Heavy Equipment	<u>no</u>	Use Boat
<u>no</u>	Enter Confined Space	<u>yes</u>	Involve Radioactivity
<u>no</u>	Disturb Containerized Matter	<u>no</u>	Involve Trenches

2.0 SITE HISTORY

The task will be performed at Plant 6 which is located within the FMPC property lines area. At present, the Plant 6 is routinely occupied. The Plant 6 was previously used an intermediate operation in the production of uranium billets and target element cores. The operation involved a nitric acid pickling of uranium feed materials for casting operations.

The Plant 6 is currently being used for general housekeeping, storage of drums containing uranium, and maintenance, as well as for the existing removal action associated with the uranium contaminated surface and subsurface water near Plant 6. The removal action involves the perched water that collects 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. Small quantities of water will also be pumped from three borings (1148, 1149, and 1161) inside Plant 6. The water is transferred to existing FMPC wastewater treatment facilities for uranium removal and nitrate treatment. This modification to the removal action will incorporate VOCs treatment.

Three options for removing VOCs from Plant 6 pumping systems discharge water are under investigation. The first option involves heating the water to 180°F in the first unit of the existing Plant 6 water treatment facility. The water would be held at this temperature for a sufficient time to vaporize the organics. Preliminary simulation tests for this removal method have been performed at the FMPC laboratory. The water samples resulting from the tests are presently being analyzed for VOCs by an offsite laboratory. The second option requires the pumping systems discharge water be circulated through charcoal filters for removal of organic compounds. The third option involves utilization of an air stripping column to remove the organics from the contaminated water. Methods 2 and 3 would require construction of new treatment facilities at the FMPC.

3.0 TASK SPECIFIC HAZARD ASSESSMENT

A walk-through survey of the tank area (see Figure 1) in Plant 6 indicated the potential hazards identified below. Prior to the initiation of the activities, a reassessment of the conditions will be conducted to ensure that conditions have not changed through the issuance of work permits. All newly identified hazards will be addressed with the Industrial, Radiological, Safety and Training (IRS&T) representative(s) to determine the degree of hazard and if any changes to the safety plan are needed.

3.1 Physical Hazards

No physical hazards have been identified. If a treatment option is selected, a reassessment of potential physical hazards will be performed.

3.2 Radiation Hazards

The potential radiation hazard are from uranium (depleted to 2% enriched in U-235), thoron (Rn-220), and short lived decay products.

3.3 Chemical Hazards

<u>Contaminant</u>	<u>Primary Hazard</u>	<u>Limit</u>	<u>Action Level</u>
Nitrogen Dioxide ⁽¹⁾	Inhalation	1 ppm (Note 3)	0.5 ppm
Asbestos ⁽²⁾	Inhalation	0.2 f/cc (Note 4)	0.1 f/cc
Nitric Acid	Contact Skin/Eyes	2 ppm (Note 4) 4 ppm (Note 3)	
Uranium	Inhalation/Ingestion		Note 5
Acetone	Inhalation	750 ppm	375 ppm
1,1-Dichloroethylene	Inhalation	5 ppm (Note 3)	2.5 ppm
1,1-Dichloroethylene	Inhalation	200 ppm	100 ppm
2-Butanone	Inhalation	200 ppm	100 ppm
1,1,1-Trichloroethane	Inhalation	350 ppm	175 ppm
Trichloroethylene	Inhalation	50 ppm	25 ppm
Trichlorofluoro-methane	Inhalation	1000 ppm	500 ppm
Trimethyl-silanol	Ingestion	Note 6	

Additional information on these chemicals is available on the Material Data Sheets which will be contained in a separate manual addressing this removal action. This manual will be on file in the Plant 6 supervisor's office.

Notes

- (1) NO₂ may be produced if residual nitric acid is present in lines or sump.
- (2) No asbestos hazard present unless insulated lines or transite is damaged or disturbed (Special permit is required for asbestos work and monitoring will be performed.)
- (3) Based on a 15 minute short term exposure limit.
- (4) Based on 8 hour time weighted average.
- (5) The action level for uranium is 5×10^{-12} uCi/ml which is based on the DOE derived air concentration limit of 2×10^{-11} uCi/ml
- (6) No promulgated or recommended limits are available.

4.0 MONITORING

4.1 Goals

During the contaminant source detection task, air monitoring will be performed as determined to be necessary at the time of issuance of the work permit(s) to ensure that exposure levels do not exceed established exposure limits.

4.2 Monitoring Equipment and Frequency of Monitoring

4.2.1 Airborne Radioactivity

During the contaminant source detection and installation of the treatment system tasks, air samples will be taken in the general area of the work inside Plant 6 daily while work is in progress. Local or breathing zone samples will be taken in the vicinity of possible leaks of fluid systems as they are air-pressurized for hydrostatic testing.

4.2.2 Radioactive Surface Contamination

During the contaminant source detection and installation of the treatment system tasks, weekly surveys for removable radioactive surface contamination will be performed in Plant 6. Contamination surveys will be performed on potentially contaminated fluid systems, as they are opened, to ensure that adequate protective clothing is being worn and to verify radiological postings.

4.2.3 Radiation Surveys

Area radiation surveys will be taken monthly in Plant 6.

4.2.4 Chemical Hazard

Direct reading monitoring devices will be used to determine the concentration of NO_2 and/or other gases and vapors at the time of issuance of the work permit and thereafter as determined to be necessary by the Industrial Hygiene representative.

A HNu will be used periodically to test for organic vapors as determined to be necessary by the Industrial Hygiene representative. In addition, charcoal tube air samples will be taken to characterize levels of organics. The Breathing Zone action levels are listed in Section 4.3.

4.2.5 Thermoluminescent Dosimetry (TLD)

TLDs will be worn by all workers.

4.3 Action Levels

<u>Measurement</u>	<u>Level</u>	<u>Action</u>
Removable contamination on open surfaces	20,000 dpm/100 cm ² (average)	Note 1
Airborne radioactivity -long lived -thoron	5 x 10 ⁻¹² uCi/ml 0.25 working level	Note 1, Note 3 Note 1, Note 3
H _{Nu} Meter (Breathing Zone)	Detection to 10 ppm (Note 2)	Note 1
	10-25 ppm	Supplied Air Respirator (SAR)
	>25 ppm	Withdraw
Nitrogen Dioxide (Breathing Zone)	0.5 ppm	Withdraw
Nitric Acid (Note 4)	1 ppm (in air)	SAR
	4 ppm (in air)	Withdraw

Notes

- 1 Full-face air purifying respirators with combination HEPA filter and organic vapor, acid gas, fume cartridges.
- 2 1 ppm above background.
- 3 The action level is 25% of the Derived Air Concentration (DAC) averaged over a calendar quarter. Daily averages of one DAC (four times amount listed) is the action limit for short-term exposure.
- 4 If contact with skin likely, skin protection shall be used.

5.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

All employees in the task exclusion area will wear the following personal protective equipment while performing the required tasks.

5.1 Contaminant Source Detection

<u>ITEM</u>	<u>NEED</u>	<u>APPLICABILITY</u>
Air purifying respirator	No (Yes)	Required if action levels are exceeded or as specified by IRS&T representative
Cartridges: HEPA Combination Radiological/OV/AG	No (Yes)	Required if action levels are exceeded or as specified by IRS&T representative
Hard Hat	No	
Hearing Protection	No (Yes)	As needed for grinding or similar operations.
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids (e.g., sump & drains)
Leather-Palm Gloves	No (Yes)	As needed for handling drums, equipment, etc. for general protection
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids (e.g., sump & drains)
Plain Tyvek	Yes	
PE Tyvek	Yes	
Process Coveralls	Yes	
Safety Glasses	Yes	Minimum Requirement
Safety Goggles and Face Shield	Yes	During hydrostatic testing, as needed to prevent contact with splash or particulates (e.g., cleaning/grinding on chemically contaminated drain lines)
Safety Shoes	Yes	Minimum Requirement

5.2 Installation of Header Piping

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air purifying respirator	No (Yes)	Required if action levels are exceeded or as specified by the IRS&T representative.
Cartridges: HEPA Combination Radionuclide/organic vapor/acid gas	No (Yes)	Required if action levels are exceeded or as specified by the IRS&T representative.
Hard Hat	Yes	As needed for overhead work
Hearing Protection	Yes	During concrete breaking/cutting
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids (e.g., sumps, drains, pumping)
Leather-Palm Gloves	No (Yes)	As needed for handling drums, equipment, etc. for general protection
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids (e.g., sumps, drains, pumping)
Plain Tyvek	Yes	
PE Tyvek	Yes	
Process Coveralls	Yes	
Safety Glasses	Yes	Minimum Requirement
Safety Goggles and Face Shield	Yes	During pump testing and as needed
Safety Shoes	Yes	Minimum Requirement

5.3 Installation of Treatment System (Options 3 & 4)

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air purifying respirator	No (Yes)	Required if action levels are exceeded or as specified by the IRS&T representative.
Cartridges: HEPA Combination Radionuclide/organic vapor/acid gas	No (Yes)	Required if action levels are exceeded or as specified by the IRS&T representative.
Hard Hat	Yes	As needed for overhead work
Hearing Protection	Yes	During concrete breaking/cutting
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids (e.g., sumps, drains, pumping)
Leather-Palm Gloves	No (Yes)	As needed for handling drums, equipment, etc. for general protection
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids (e.g., sumps, drains, pumping)
Plain Tyvek	Yes	
PE Tyvek	Yes	
Process Coveralls	Yes	
Safety Glasses	Yes	Minimum Requirement
Safety Goggles and Face Shield	Yes	During pump testing and as needed
Safety Shoes	Yes	Minimum Requirement

5.4 Operation of the Pumping System

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air purifying respirator	No (Yes)	Required if action levels are exceeded or as specified by the IRS&T representative.
Cartridges: HEPA Combination Radionuclide/organic vapor/acid gas	No (Yes)	Required if action levels are exceeded or as specified by the IRS&T representative.
Hard Hat	Yes	As needed for overhead work
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids (e.g., sumps, drains, pumping)
Leather-Palm Gloves	No (Yes)	As needed for handling drums, equipment, etc. for general protection
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids (e.g., sumps, drains, pumping)
Plain Tyvek	No	
PE Tyvek	No	
Process Coveralls	Yes	
Safety Glasses	Yes	Minimum Requirement
Safety Goggles and Face Shield	Yes	During initial testing and as needed
Safety Shoes	Yes	Minimum Requirement

6.0 SITE CONTROL

6.1. Access

The work associated with this removal action will be within the FMPC controlled area. No special controlled access is anticipated.

6.1.1 Radiological Postings

Radiological areas will be posted in accordance with DOE Order 5480.11. The following is a brief summary of posting requirements based on uranium:

Regulated Area	> 1000 dpm/100 cm ² removable > 5000 dpm/100 cm ² fixed and removable
Contaminated Area	> 10,000 dpm/100 cm ² removable > 50,000 dpm/100 cm ² fixed and removable
Airborne Radioactivity Area	> 2 x 10 ⁻¹² uCi/ml
Respirator Area	> 5 x 10 ⁻¹² uCi/ml

In addition, special postings may be added for access to areas: "RWP Required for Entry" or "Contact HP for Entry."

6.2 Bioassay Samples

Site personnel involved in this project are required to participate in a routine periodic urine assay program. Any suspected exposure to hazardous substances shall be reported and require additional sampling. Personnel are also required to wear a TLD at all times for radiological purposes.

6.3 Medical Monitoring

In accordance with 29 CFR 1910.120 OSHA requirements, all site personnel are required to participate in a medical monitoring program which includes:

- o A baseline medical examination
- o Annual medical examination
- o Medical examinations may be required after exposures
- o Respirator clearance for respirator users

Prior to the start of work, personnel involved in this project shall be identified by name and badge number. Each individual shall be subject to a medical surveillance approval by the Director, Medical Services. The approval statement shall certify that each individual is medically qualified to perform the work and is physically fit to wear PPE.

6.4 Training Requirements

All site personnel assigned to the tasks will, as a minimum, meet the following training requirements:

- o Review of this health & safety plan for this work including site specified hazards and procedures. (The safety meeting(s) will be documented.)
- o Reviewed MSDS for all identified chemicals. (See sect. 3.3)
- o Site radiation safety training
- o Site respiratory training and fit test or equivalent approved by site Industrial Hygiene
- o Site nuclear criticality training
- o 40-hour OSHA training
- o 8-hour annual refresher training, if necessary
- o 8-hour supervisory training (for supervisors)
- o 24-hour supervised field experience
- o FMPC site orientation video

The completion of this training shall be documented by the site training organization.

6.5 Safety Meetings

A safety meeting, which must be documented, shall be conducted prior to start of each day's work during the perched water source detection, the installation of the pipe header, and the installation of the pumping system tasks. The meeting will cover the following applicable subjects:

- work operations
- personnel protective equipment
- all monitoring data
- hazard communications
- monitoring tests and results
- decontamination
- task organization
- physical stress
- emergency procedures
- communications
- general safety
- housekeeping

7.0 EXPOSURE SYMPTOMS

Exposure to low levels of radioactivity does not produce acute exposure symptoms. Such exposures may cause delayed effects such as cancer. Since biological effects from radiation exposures are cumulative, exposures are to be kept as low as achievable. No treatment is anticipated for the predicted contaminants and concentrations. See Section 11 for contingency plans.

Exposure symptoms for inhalation of nitrogen dioxide (NO₂) and for skin/eye contact with nitric acid are described on the MSDS which are on file.

8.0 SITE ENTRY PROCEDURES

During the perched water source detection and installation of pumping system tasks, the following procedures apply:

- o Perform daily safety meeting to familiarize team with site specific hazards.
- o Discuss alternate communications signals (if applicable).
- o Perform respirator check out and fit test prior to use.
- o Use buddy system. Teams of at least two individuals will be used for all activities for this removal action.

Prior to the initiation of these work tasks, the following permits are required:

- Radiation Work Permit
- Chemical/Hazardous Material Permit
- Work Permit

All personnel working on this removal action shall be trained and certified to perform their assigned task as defined by 29 CFR 1910.120.

9.0 DECONTAMINATION

Equipment for decontamination of radiological or chemical hazards shall be kept available in the area surrounding the exclusion zone if such is determined necessary by supervisor or by either Radiation Safety or Industrial Hygiene prior to the initiation of the activity. As a minimum, the location of the nearest water for decontamination and eye washing shall be identified and its operability verified prior to start of work.

Under routine operation no decontamination procedures will be necessary. In the event of a spill, the decontamination procedures, as well as the cleanup, will be under the direction of the AEDO.

Employees having excessive levels (over 100 cpm above background) of radioactive contamination will be decontaminated according to SOP-SP-P-35-017, "Procedure for Personnel Decontamination". In the event exposure to asbestos or nitrogen dioxide inhalation, the affected employees will be sent to Medical Services for evaluation.

Employees coming in contact with nitric acid or organics will remove the affected clothing as soon as possible, and soak the affected area for 10 minutes using the nearest safety shower or eye wash. The employee will then report to medical services for surveillance.

10.0 WASTES

Wastes include, but are not limited to:

- o Disposable PPE
- o "Spent" activated carbon, if used in treatment
- o Excess materials such as soil or concrete

All potentially contaminated waste materials resulting from site activities will be collected and placed in drums or other containers. Disposable protective clothing will be placed in plastic bags and disposed of as compactible, potentially contaminated waste.

Drums or containers shall meet DOE 49 CFR Parts 171-178, EPA, 40 CFR Parts 264-265 and 300, and OSHA requirements. Hazard warning label shall be immediately applied to all drums as specified by WMCO management/supervisors and Solid Waste Compliance.

11.0 CONTINGENCY PLANS

The plans shall be consistent with FMPC-2046, "FMPC Emergency Plan".

11.1 Incidents or Injuries Involving Possible Intake of Radiological or Chemical Substances by Employees

See statement on submission of urine samples for radiation exposures in Standard Operating Procedure (SOP) No. 11-C-245.

Incidents or injuries involving potential intake of other hazardous substances shall be reported to supervisor and the site Medical Section by the involved employee and an Incident Investigation Report completed by the involved employee.

11.2 Pre-Emergency Planning

During the training and pre-work safety meetings, all employees involved in this task shall be trained and reminded of the provisions of the plant emergency procedure, alarm signals and communications, evacuation routes and emergency reporting.

11.3 Lines of Authority

The supervisor in charge, Plant 6 supervisor, has the primary responsibility for the prevention of emergency conditions. In the event that an emergency does occur, the individual involved or observing the condition shall immediately notify a supervisor, the communication center or the Assistant Emergency Duty Officer (AEDO). The AEDO is responsible for ensuring that corrective actions have been implemented, the appropriate personnel notified, and reports completed as required.

11.4 Evacuation

In the event of an emergency which necessitates an evacuation of the Exclusion Area, the 3-3, 3-3 shall be sounded over the plant alarm system; a voice message will follow over the Emergency Message System instructing employees to go to their designated Rally Point (see Figure 2). Personnel shall immediately proceed to the Rally Point and participate in the accountability process. Personnel will follow instructions given by the Rally Point Coordinator. When an all-clear condition has been achieved, personnel will be released from the Rally Point.

11.5 Emergency Equipment

The following safety equipment, locations to be identified at safety meetings, is available for employee usage:

- | | |
|--|---|
| <input type="checkbox"/> fire extinguisher | <input type="checkbox"/> manual fire alarm |
| <input type="checkbox"/> eye wash | <input type="checkbox"/> two-way radio |
| <input type="checkbox"/> safety shower | <input type="checkbox"/> emergency SCBA units |
| <input type="checkbox"/> telephone | <input type="checkbox"/> respirators |
| <input type="checkbox"/> spill drums | <input type="checkbox"/> clean-up materials |
| <input type="checkbox"/> absorbent | <input type="checkbox"/> local evacuation alarm |
| <input type="checkbox"/> other - List | |

No spill containment equipment is required beyond the existing floor sump system. If a spill were to occur, the material will go to an existing floor sump and will be transferred for later processing.

11.6 Emergency Notification

All emergencies, including spills and leaks, shall be reported immediately. Emergencies can be reported by telephone dialing 6511; by contacting the communications center via two-way radio; or by pulling a manual fire alarm.

11.7 Fire, Explosion, or Medical Emergency

In the event of a fire, explosion or medical emergency, the communication center shall be notified immediately by manual fire alarm, two-way radio, or by calling 6511. The communication center operator will activate the emergency response team and dispatch them to your location. If a fire is in the incipient stage and perceived controllable without endangering oneself, personnel may use available fire extinguishers. If not in the incipient stage, personnel in the immediate area should evacuate to a safe position and await instructions.

11.8 Additional Information

11.8.1 Hospitals

The FMPC Medical Facility (Building 53) is the primary choice for on-site injuries. The FMPC ambulance will transport the injured to the nearest hospital if necessary. FMPC maintains an emergency response capability which includes an ambulance and Emergency Medical Technicians.

11.8.2 Emergency Telephone Numbers

Ambulance: 6511
Hospital: 6511
Fire: 6511

<u>Name</u>	<u>Work</u>	<u>Radio</u>
EMERGENCY RESPONSE	6511	Control
Industrial Hygiene	6207	357
Radiation Safety	6889	355
Fire and Safety	6235	303
Leo Singleton	8908	709
Walt Mengel (Safety and Health Officer)	6231	
Assistant Emergency Duty Officer (AEDO)	6431 or 6295	202

12.0 CONFINED SPACE ENTRY

A Confined Space Entry permit will be required for the perched water source detection task and for pump startup if entry into the clarifier pit is required. A Confined Space Entry Permit will be obtained and its requirements followed.

13.0 OPERATING PROCEDURES

The following is a list of some of the operating procedures that are applicable to this removal action:

FMPC-503	FMPC Spill Incident Reporting and Cleanup
FMPC-516	Control of Permits for Accomplishing Hazardous Work
FMPC-704	Minor Event Reporting System
FMPC-719	FMPC Lock and Tag Procedure
FMPC-720	Control of Construction Waste
FMPC-2046	FMPC Emergency Plan
FMPC-2084	FMPC Radiation Control Manual
FMPC-2112	FMPC Nuclear Criticality Safety Guide
SOP-20-C-904	General Nuclear Safety Requirements
SOP-6-C-301	Plant 6 Wastewater Treatment
SOP-6-C-909	Plant 6 Emergencies
SOP-6-C-910	Inspecting Plant 6 Floor Control Areas, Trenches, and Sumps Daily and Quarterly
IRS&T-SP-P-35-017	Procedures for Personnel Decontamination

14.0 APPROVAL AND COMPLIANCE STATEMENT

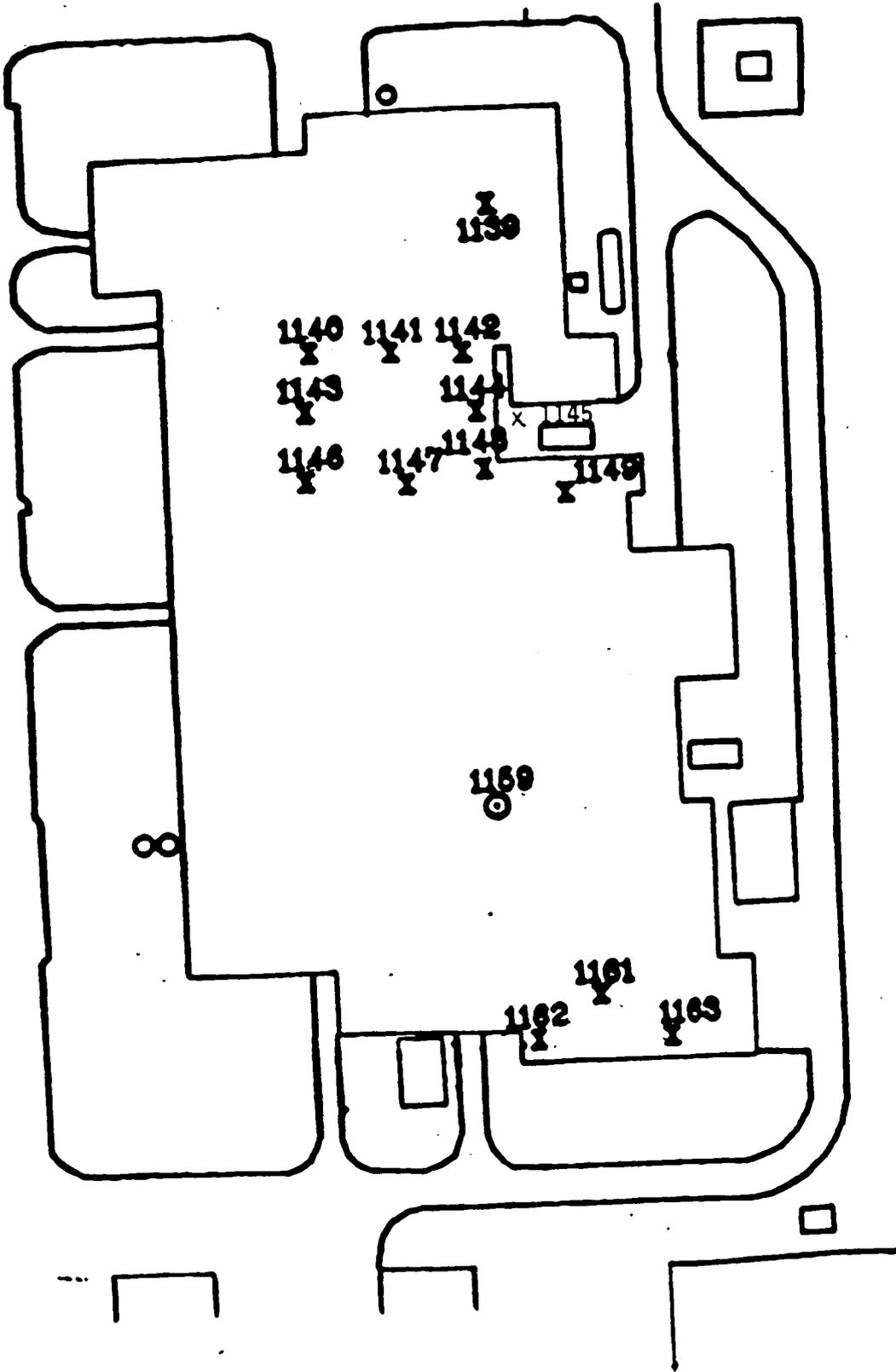
This Removal Action Site Specific Health and Safety Plan is intended for the FMPC and specifically for the following activities related to the Plant 6 modified removal action:

- Contaminant Source Detection
- Installation of Header Piping
- Installation of Treatment System
- Pumping of the Contaminated Water

The personnel performing these tasks must read and understand this Health and Safety plan and agree to follow its provisions¹. Written documentation with signatures of those personnel performing these tasks must be maintained.

¹ Compliance with the provisions of this Health and Safety Plan may be audited through announced or unannounced site visits. Assurances should be provided that this safety plan is implemented. Reasons for field actions/changes, when necessary, shall be documented. Site visits may be performed by the DOE or other site personnel.

PLANT SIX BORING SITES



FMPC RALLY POINTS

