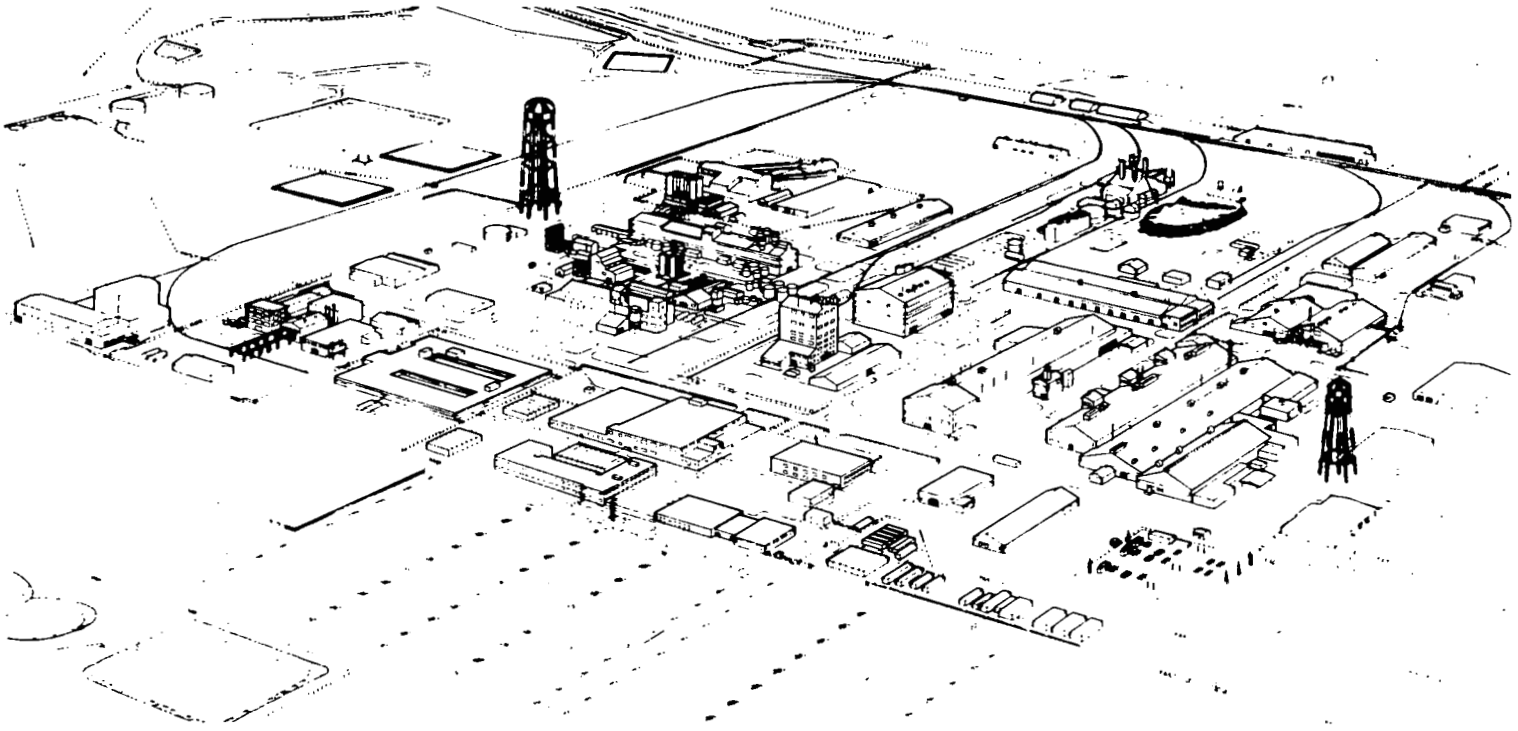
264

RCRA PART B PERMIT APPLICATION SECTION I: CLOSURE AND POST-CLOSURE REQUIREMENTS VOLUME 10 OF 11
SEPTEMBER 22, 1990

09/22/90

DOE-FMPC/USEPA
250
APPLICATION

RCRA PART B PERMIT APPLICATION



SEPTEMBER 22, 1989

SECTION I: CLOSURE AND POST-CLOSURE REQUIREMENTS

(Volume 10 of 11)

FEED MATERIALS PRODUCTION CENTER
U.S. DEPARTMENT OF ENERGY
CINCINNATI, OHIO 45239-8705

U.S. EPA IDENTIFICATION NO. 0H6890008976
OHIO EPA PERMIT NO. 05-31-0681

RCRA PART B
PERMIT APPLICATION

SECTION I - CLOSURE AND POST-CLOSURE REQUIREMENTS

SEPTEMBER 22, 1989

FEED MATERIALS PRODUCTION CENTER
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TABLE OF CONTENTS

FACILITY CLOSURE PLAN FOR THE FEED MATERIALS PRODUCTION CENTER SITE

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. BOX 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

FACILITY CLOSURE PLAN

This is a facility closure plan for all the Feed Materials Production Center (FMPC) hazardous waste management units. At the request of the Environmental Protection Agency, individual closure plans have been written for each of the HWMUs which contain detailed information specific to the unit along with maps showing the location of each unit. Each of these closure plans for the individual units addresses the requirements of OAC 3745-55-12 (40 CFR 264.112). The purpose of this section is to provide facility closure information for the FMPC.

FACILITY DESCRIPTION

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste.

PARTIAL CLOSURE

The FMPC has seventeen treatment, storage, and disposal (TSD) units. Eight detailed closure plans have already been submitted and are pending agency approval. The remaining nine units are active and closure plans are submitted with this Part B Permit Application.

The inactive unit closure plans not included in the Part B Permit Application are:

Waste Pit 4
Trane Thermal Incinerator
2/3 Storage Pad
Storage Pad North of Plant 6
Plant 1 Storage Pad
Tank T5
Tank T6
Barium Chloride Treatment Unit

The closure plans included in the Part B Permit Application are:

Pilot Plant Warehouse - Building 68
Plant 6 Warehouse - Building 79
Plant 8 Warehouse - Building 80
Plant 9 Warehouse - Building 81
KC-2 Warehouse - Bay 5
KC-2 Warehouse - Bay 6
KC-2 Warehouse - Bay 7
Proposed Building 83X Storage Warehouse
Proposed RCRA Warehouse

Partial closure of the FMPC will occur as each one of the following individual units is certified closed.

REQUIREMENTS OF CLOSURE

The closure plan identifies the steps to perform partial and/or final closure of the facility at any point during the active life. The closure plan shall include the following:

1) A description of how each hazardous waste management unit at the facility will be closed in accordance with OAC 3745-55-11. This description is detailed in each unit closure plan.

2) A description of how final closure of the facility will be conducted in accordance with OAC 3745-55-11. The description shall identify the maximum extent of the operations which will be unclosed during the active life of the facility. No units have yet undergone final closure; all units will be unclosed until closure of each unit is complete.

3) An estimate of the maximum inventory of hazardous wastes ever on-site over the active life of the facility and a detailed description of the methods to be used during partial closures and final closures including, but not limited to, methods for removing, transporting, treating, storing or disposing of all hazardous wastes, and identification of the type(s) of the off-site hazardous waste management units to be used, if applicable.

The maximum inventory of wastes is the total of those quantities listed below. Detailed descriptions of closure activities are given in the unit closure plans. All drum quantities below refer to 55-gallon drums:

Waste Pit 4 - 23,000 lbs.
Trane Thermal Incinerator - Not Applicable
2/3 Storage Pad - 825 drums
Storage Pad North of Plant 6 - 40 drums
Plant 1 Storage Pad - 183 drums
Tank T5 - 10,000 gallons
Tank T6 - 10,000 gallons
Barium Chloride Treatment Unit - Not Applicable
Pilot Plant Warehouse - Building 68 - 180 drums
Plant 6 - Building 79 - 3648 drums

Plant 8 - Building 80 Storage Warehouse - 1992 drums
Plant 9 - Building 81 Storage Warehouse - 1704 drums
KC-2 Warehouse
Bay 5 - 456 drums
Bay 6 - 464 drums
Bay 7 - 240 drums
Proposed Building 83X Storage Warehouse - 16,300 drums
Proposed RCRA Warehouse - 2640 drums

4) A detailed description of the steps needed to remove or decontaminate all hazardous waste residues and contaminated containment system components, equipment, structures, and soils during partial and final closure, including but not limited to, procedures for cleaning equipment and removing contaminated soils, methods for sampling and testing surrounding soils, and criteria for determining the extent of decontamination required to satisfy the closure performance standard.

This description is in the detailed closure plan.

5) A detailed description of other activities necessary during the closure period to ensure that all partial closures and final closure satisfy the closure performance standards, including, but not limited to, groundwater monitoring, leachate collection, and run-on and run-off control.

This description is in the detailed closure plans.

6) A schedule for closure of each hazardous waste management unit and for final closure of the facility. The schedule shall include, at a minimum, the total time required to close each hazardous waste management unit and the time required for intervening closure activities which will allow tracking of the progress of partial and final closure (for example, in the case of a landfill unit, an

estimate of the time required to treat or dispose of all hazardous waste inventory and of the time required to place a final cover must be included).

This schedule is provided in the detailed closure plan.

7) For facilities that use trust funds to establish financial assurance under OAC 3745-55-43 or 3745-55-45 and that are expected to close prior to the expiration of the permit, an estimate of the expected year of final closure.

The FMPC does not use trust funds because it is a federal facility owned by the U.S. Department of Energy, and is thereby excluded from financial requirements under OAC 3745-55-40(C).

FINAL CLOSURE

When the last TSD unit is closed, Final Closure of the FMPC as a facility will be complete.

POST-CLOSURE CARE

A post-closure plan is also included in this section for Waste Pit 4, which is undergoing closure as a landfill.

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
KC-2 WAREHOUSE - BAY 5

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. Box 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

264

CONTENTS (Continued)

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The KC-2 Warehouse - Bay 5, which measures 70 feet x 36 feet, was operated at the FMPC to store hazardous solid and liquid waste materials generated from cleaning and operational processes on-site. These materials are RCRA hazardous by characteristic and listing.

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.112 through 264.115, the unit must be closed following the guidelines of a written and approved Closure Plan. The Closure Plan is being submitted to the Ohio EPA to establish the guidelines that will be followed once EPA approval has been granted.

SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. the FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomformably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous since the hydrogeologic properties of interest occur on a much larger scale than these local variations. On the scale appropriate

for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been previously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- A groundwater divide exists, which trends from southeast to northwest across the south-central portion of the facility.

- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.

- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study RI/FS to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective actions programs have been implemented at the facility.

I-1 CLOSURE PLAN

This Closure Plan is submitted for the KC-2 Warehouse - Bay 5 as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the Closure Plan and all revisions to the plan will be kept at the facility until final closure has been certified in accordance with OAC 3745-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55-12(A) and 40 CFR 264.112(a), the most recent copy of the closure plan will be provided to the Ohio EPA upon request. Also, the plan will be available for Ohio EPA review if requested during site inspections. Should an amendment to the KC-2 Warehouse Bay 5 storage area Closure Plan be required for any of the reasons listed below, a written request for amendment will be provided to the and Ohio EPA will include a copy of the amended closure plan. The following situations would require an amendment to the plan:

- o A change in the expected date of closure.
- o An unexpected event encountered during closure activities.
- o A proposed change in operating plans or facility design that affect closure.

If a proposed change in design or operating plans will affect the Closure Plan, an amendment to the plan will be submitted 60 days prior to the change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days after the event. If an unexpected event affecting the Closure Plan occurs during the closure period, an amendment will be submitted within 30 days of the event. If the closure plan is amended after the permit has been issued, the amended Closure Plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the KC-2 Warehouse - Bay 5 storage area will be completed in accordance with performance standards as stated in OAC 3745-55-11, OAC 3745-55-78, 40 CFR 264.111 and 40 CFR 264.178. These standards include the following:

- Minimizing the need for further maintenance by decontaminating the concrete warehouse floor and removing any contaminated soil from beneath the floor. Any concrete flooring that cannot be decontaminated to below allowable limits will be removed and placed into an approved FMPC RCRA storage unit. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10(B) and 40 CFR 264.110.

- Controlling, minimizing, or eliminating (to the extent necessary to protect human health and the environment) the escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials and residues contained within the storage unit and placing the storage containers into approved RCRA storage units at the FMPC or by transfer to a permitted off-site disposal or treatment facility.

1-1b Partial Closure and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC facility. At the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum number of drums that can be stored in the KC-2 Warehouse Bay 5 is 456 (55-gallon) drums. A monthly inventory is made of the storage unit. The waste drums mainly consist of dry cleaning sludges (tetrachloroethylene), used oils (containing 1,1,1-trichloroethane, lead), and paint thinner (methylene chloride).

Weekly inspections are made to verify the integrity of the drums, floors, and roof, proper storage of the drums, and the presence of fire and safety equipment. Any drums noted to be leaking during this weekly inspection are re-drummed.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

The KC-2 Warehouse - Bay 5 consists of a concrete pad that underlies the waste and will be decontaminated before closure.

The storage consists of a concrete floor which is 35 feet wide and 69 feet long inside a 6 inches by 6 inches wide dike. An 8 foot wide ramp allows access for fork trucks into the diked area.

A site map is provided identifying the location of the KC-2 Warehouse (Attachment 1). A diagram of the storage unit is also provided (Attachment 2).

Based on the storage configuration, a potential for hazardous waste contamination exists in the floor sections of the storage bay due to spills or leaking drums. In addition, there is a possibility for soil contamination in the area under the concrete due to floor cracks.

Detailed sampling procedures for the soil underneath the KC-2 Warehouse Bay 5 are addressed in the sampling plan attached in Appendix A to this closure plan. Sampling will be conducted of the concrete floor and the soil underneath using SW-846 methods and following OAC 3745-55-11.

To prepare for decontamination, the storage bay will be cleared of all drummed materials. The waste drums will be inspected for integrity and transferred into the FMPC approved RCRA storage units.

The floor section of the storage bay has shown visible evidence of waste residue from leaking drums. This residue will be cleaned from the floor surface by wiping and rinsing to the maximum extent possible. All materials used in the cleaning of the floor section will be collected and placed into storage containers which will be placed into approved FMPC RCRA storage units. All cleaning materials will be stored in storage units until analysis and appropriate disposal can be completed in accordance with hazardous waste disposal regulations. Then a clean water rinseate will be run over the cleaned floor section and collected. This rinseate will be analyzed using the EP Toxicity method outlined in SW-846 to determine D004 through D011 metal contaminant concentrations and analyzed using the GC method outlined in SW-846 to determine organic concentrations. If concentrations above regulatory thresholds in OAC 3745-51-24 for D004 through D011 contaminants are detected, or organic contaminants above 1 ppm are detected, after cleaning, the floor section will be rewashed and analyzed until decontamination to below these concentrations is complete. If after three attempts, complete

decontamination cannot be accomplished, the contaminated floor section or sections will be removed and placed into appropriate containers and transferred to FMPC RCRA storage units.

After the rinseate test is completed on the floor section, sampling will be performed to determine if hazardous constituents are present in the soils under the concrete floor. If the data from this study indicates hazardous wastes are present, further sampling will be conducted to determine the source and extent of the RCRA contamination. Once the source is identified, decontamination efforts or excavation will be performed and the soils will be handled as hazardous waste.

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal or placement of these wastes in an approved facility, decontamination of the storage area, and sampling and analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section is not applicable to this closure plan. No tanks are associated with the KC-2 Warehouse - Bay 5.

I-1d(3) Closure of Waste Piles

This section is not applicable to this closure plan. No waste piles are associated with the KC-2 Warehouse - Bay 5.

I-1d(4) Closure of Surface Impoundments

This section is not applicable to this closure plan. No surface impoundments are associated with the KC-2 Warehouse - Bay 5.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this closure plan. No incinerators are associated with the KC-2 Warehouse - Bay 5.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this closure plan. No land treatment facilities are associated with the KC-2 Warehouse - Bay 5.

I-1e Closure of Disposal Units

This section and its subsections are not applicable to this closure plan. No waste piles, landfills, or surface impoundments will exist as a result of closing the KC-2 Warehouse - Bay 5.

I-1f Schedule for Closure

The Ohio EPA will be notified 45 days prior to commencement of closure activities, in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d). The schedule for closure is provided in Attachment 3 of this closure plan.

I-1g Extension for Closure Time

Attachment 3 shows the anticipated closure schedule for this unit. If additional time will be required to close the unit, the FMPC will request from the Ohio EPA an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered engineer shall submit certification of closure within 60 days after unit closure is complete. The certification will meet the requirements of OAC 3745-55-15 and 40 CFR 264.115.

In addition, the Ohio EPA's facility inspector shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinsewater sampling. The Professional Engineer will also be present during such critical activities as cleaning and final sampling.

I-2 POST-CLOSURE PLAN

This section and its subsections are not applicable to this closure plan. As noted in OAC 3745-55-10(B) and 40 CFR 264.110(b), post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units, landfills, or tanks. Closure of the KC-2 Warehouse - Bay 5 does not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required only when post-closure care is involved. Post-closure care is required only for hazardous waste

disposal facilities, waste piles, and surface impoundments, as noted in OAC 3745-55-10(B) and 40 CFR 264.110(b). Since post-closure care is not required when closing a storage unit, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for closure costs.

I-6 POST-CLOSURE COST ESTIMATE

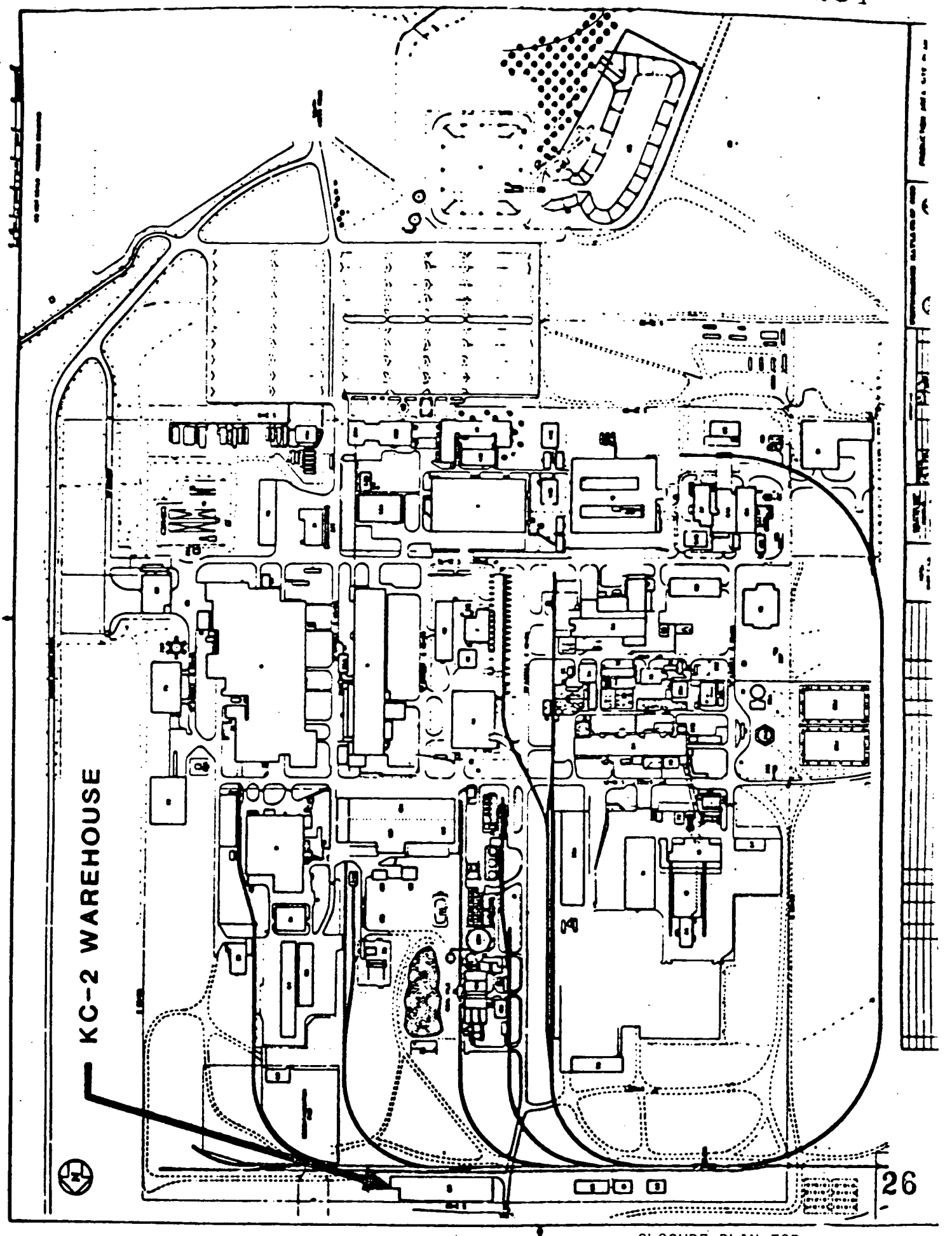
This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a post-closure cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-8 LIABILITY REQUIREMENTS

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of accident.

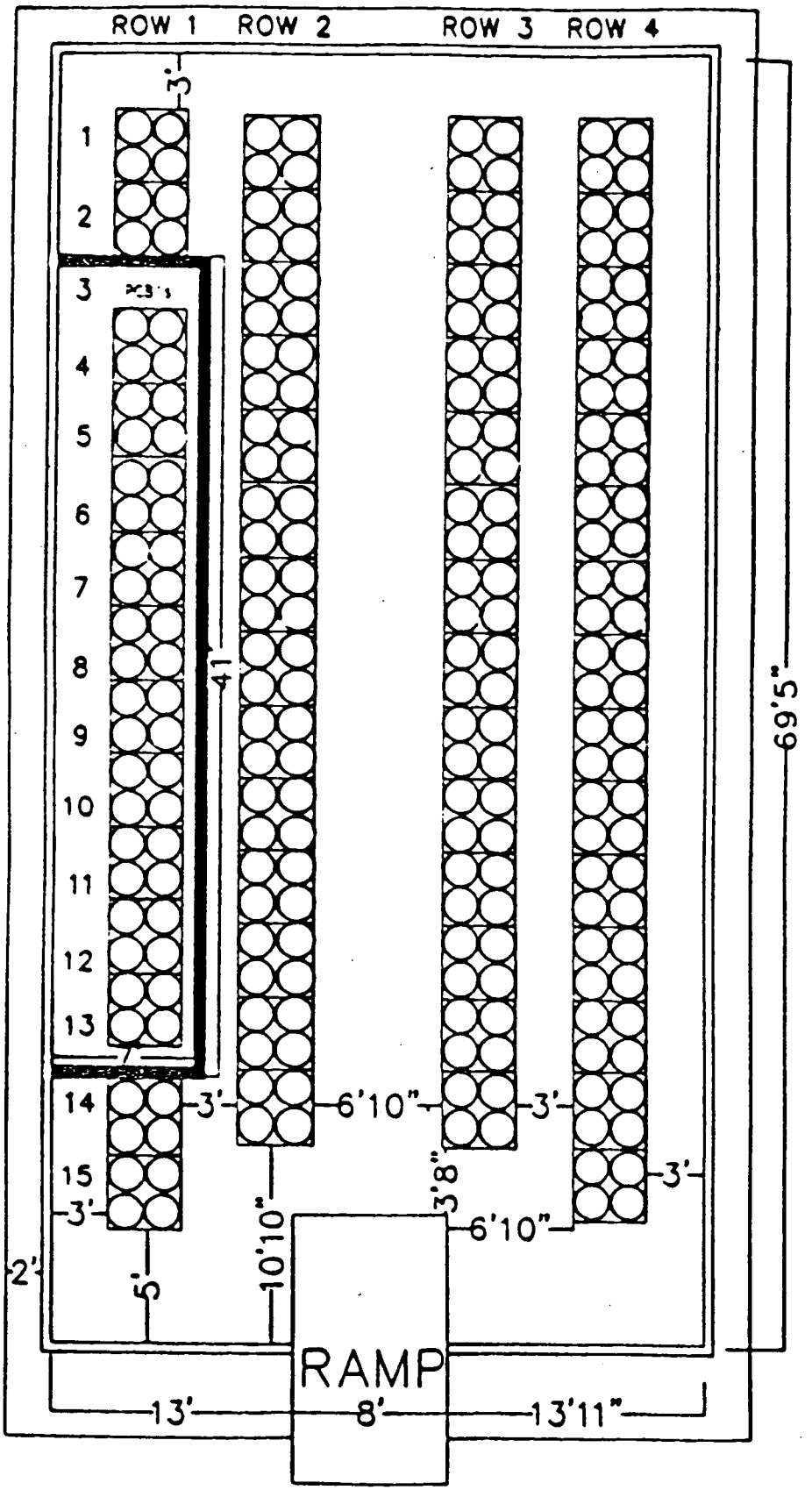

KC-2 WAREHOUSE
26

Layout

KC 2 BAY 5

Pallets - 57 Drums,- 228

Total Drum Capacity—456



ATTACHMENT 3

SCHEDULE FOR CLOSURE OF THE KC-2 WAREHOUSE - BAY 5

Action	Cumulative Days to Complete
Initiate Closure	0
Remove and Store Waste Residues	30
Complete Decontamination Efforts*	150
Complete Closure	180

* The time required for decontamination of floor sections and excavation of soil will depend on the extent of above acceptable levels of RCRA contaminants found on equipment and in the soil.

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
KC-2 WAREHOUSE - BAY 6

U.S. DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
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CINCINNATI, OHIO 45239-8705

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SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. the FMPC site lies on top of one of these terrace remnants.

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Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

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As currently understood, the ground water flow direction is as follows:

- A groundwater divide exists, which trends from southeast to northwest across the south-central portion of the facility.

- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.

- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

I-1 CLOSURE PLAN

This closure plan is submitted for the KC-2 Warehouse - Bay 6 as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the closure plan and all revisions to be the plan will be kept at the facility until final closure has been certified in accordance with and OAC 3745-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55-12(A) and 40 CFR 264.112(a), the most recent copy of the closure plan will be provided to the Ohio EPA upon request. Also, the plan will be available for Ohio EPA review if requested during site inspections. Should an amendment to the KC-2 Warehouse Bay 6 Storage Area Closure Plan be required for any of the reasons listed below, a written request for amendment will be provided to the Ohio EPA will include a copy of the amended Closure Plan. The following situations would require an amendment to the plan:

- o A change in the expected date of closure.
- o An unexpected event encountered during closure activities.
- o A proposed change in operating plans or facility design that affects closure.

If a proposed change in design or operating plans will affect the Closure Plan, an amendment to the Plan will be submitted 60 days prior to the change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days after the event. If an unexpected event affecting the Closure Plan occurs during the closure period, an amendment will be submitted within 30 days of the event.

If the Closure Plan is amended after the permit has been issued, the amended Closure Plan will include a request for permit modifications.

During closure of the KC-2 Warehouse - Bay 6 storage area, FMPC Health and Safety procedures will be followed that comply with the Occupational Safety and Health Administrations (OSHA) requirements for protection of personnel.

I-1a Closure Performance Standard

Closure of the KC-2 Warehouse - Bay 6 storage area will be completed in accordance with performance standards as stated in OAC 3745-55-11, OAC 3745-55-78, 40 CFR 264.111 and 40 CFR 264.178. These standards include the following:

- o Minimizing the need for further maintenance by decontaminating the concrete warehouse floor and removing any contaminated soil from beneath the floor. Any concrete flooring that cannot be decontaminated to below allowable limits will be removed and placed into an approved FMPC RCRA storage unit. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10(B) and 40 CFR 264.110.

- o Controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, the escape of

hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials and residues contained within the storage unit and placing the storage containers into approved RCRA storage units at the FMPC or by transfer to a permitted off-site disposal or treatment facility.

1-1b Partial Closure and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC facility. At the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12 (D) and 40 CFR 264.112 (d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum number of drums that can be stored in the KC-2 Warehouse Bay 6 is 232 (55-gallon) drums. A monthly inventory is made of the storage unit. The waste drums mainly consist of dry cleaning sludges (tetrachloroethylene), used oils (containing 1,1,1-trichloroethane, lead), paint thinner (methylene chloride), hydrogen fluoride, heat treat salts (barium chloride), and Tributyl Phosphate/kerosene.

Weekly inspections are made to verify the integrity of the drums, floors, and roof, proper storage of the drums, and the presence of fire and safety equipment. Any drums noted to be leaking during this weekly inspection are re-drummed.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

The KC-2 Warehouse - Bay 6 consists of a concrete pad that underlies the waste and will be decontaminated before closure.

The storage consists of a concrete floor which is 34 feet 11 inches wide and 69.5 foot long inside a 6 inches by 6 inches wide dike. An 8 foot wide ramp allows access for fork trucks into the diked area.

A site map is provided identifying the location of the KC-2 Warehouse (Attachment 1). A diagram of the storage unit is also provided (Attachment 2).

Based on the storage configuration, a potential for hazardous waste contamination exists in the floor sections of the storage bay due to spills or leaking drums. In addition, there is a possibility for soil contamination in the area under the concrete due to floor cracks.

To prepare for decontamination, the storage bay will be cleared of all drummed materials. The waste drums will be inspected for integrity and transferred into the FMPC approved RCRA storage units.

The floor section of the storage bay has shown visible evidence of waste residue from leaking drums. This residue will be cleaned from the floor surface by wiping and rinsing to the maximum extent possible. All materials used in the cleaning of the floor section will be collected and placed into storage containers which will be

placed into approved FMPC RCRA storage units. All cleaning materials will be stored in storage units until analysis and appropriate disposal can be completed in accordance with hazardous waste disposal regulations. Then a clean water rinseate will be run over the cleaned floor section and collected. This rinseate will be analyzed using the EP Toxicity method outlined in SW-846 to determine D004 through D011 metal contaminant concentrations and analyzed using the GC method outlined in SW-846 to determine organic concentrations. If concentrations above regulatory thresholds in OAC 3745-51-24 for D004 through D011 contaminants and organic contaminants above 1 ppm exist after cleaning, the floor section will be rewashed and analyzed until decontamination to below these concentrations is complete. If after three attempts, complete decontamination cannot be accomplished, the contaminated floor section or sections will be removed and placed into appropriate containers and transferred to FMPC RCRA storage units.

After the rinseate test is completed on the floor section, sampling will be performed to determine if hazardous constituents are present in the soils under the concrete floor. If the data from this study indicates hazardous wastes are present, further sampling will be conducted to determine the source and extent of the RCRA contamination. Once the source is identified, decontamination efforts or excavation will be performed and the soils will be handled as hazardous waste.

Detailed sampling procedures of the soil underneath the warehouse are addressed in the sampling provided in Appendix A to this closure plan.

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal or placement of these wastes in an approved facility,

decontamination of the storage area, and sampling and analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section is not applicable to this closure plan. No tanks are associated with the KC-2 Warehouse - Bay 6.

I-1d(3) Closure of Waste Piles

This section is not applicable to this closure plan. No waste piles are associated with the KC-2 Warehouse - Bay 6.

I-1d(4) Closure of Surface Impoundments

This section is not applicable to this closure plan. No surface impoundments are associated with the KC-2 Warehouse - Bay 6.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this closure plan. No incinerators are associated with the KC-2 Warehouse - Bay 6.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this closure plan. No land treatment facilities are associated with the KC-2 Warehouse - Bay 6.

I-1e Closure of Disposal Units

This section and its subsections are not applicable to this closure plan. No waste piles, landfills, or surface impoundments will exist as a result of closing the KC-2 Warehouse - Bay 6.

I-1f Schedule for Closure

The Ohio EPA will be notified 45 days prior to commencement of closure activities, in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d). The schedule for closure of the KC-2 Warehouse - Bay 6 is provided in Attachment 3 of this Closure Plan.

I-1g Extension for Closure Time

Attachment 3 shows the anticipated closure schedule for this unit. If additional time will be required to close the unit, the FMPC will request from the Ohio EPA an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered engineer shall submit certification of closure within 60 days after unit closure is complete.. The certification will meet the requirements of OAC 3745-55-15.

In addition, the Ohio EPA's facility inspector shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinsewater sampling. The Professional Engineer will also be present during such critical activities as cleaning and final sampling.

I-2 POST-CLOSURE PLAN

This section and its subsections are not applicable to this closure plan. As noted in OAC 3745-55-10(B) and 40 CFR 264.110 (b), post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units, landfills or tanks. Closure of the KC-2 Warehouse - Bay 6 does not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required when closure involves post-closure care. Post-closure care is required only for hazardous waste disposal facilities, waste piles, and surface impoundments, as noted in OAC 3745-55-10(B) and 40 CFR 264.110(b). Since post-closure care is not required when closing a storage unit, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for closure costs.

I-6 POST-CLOSURE COST ESTIMATE

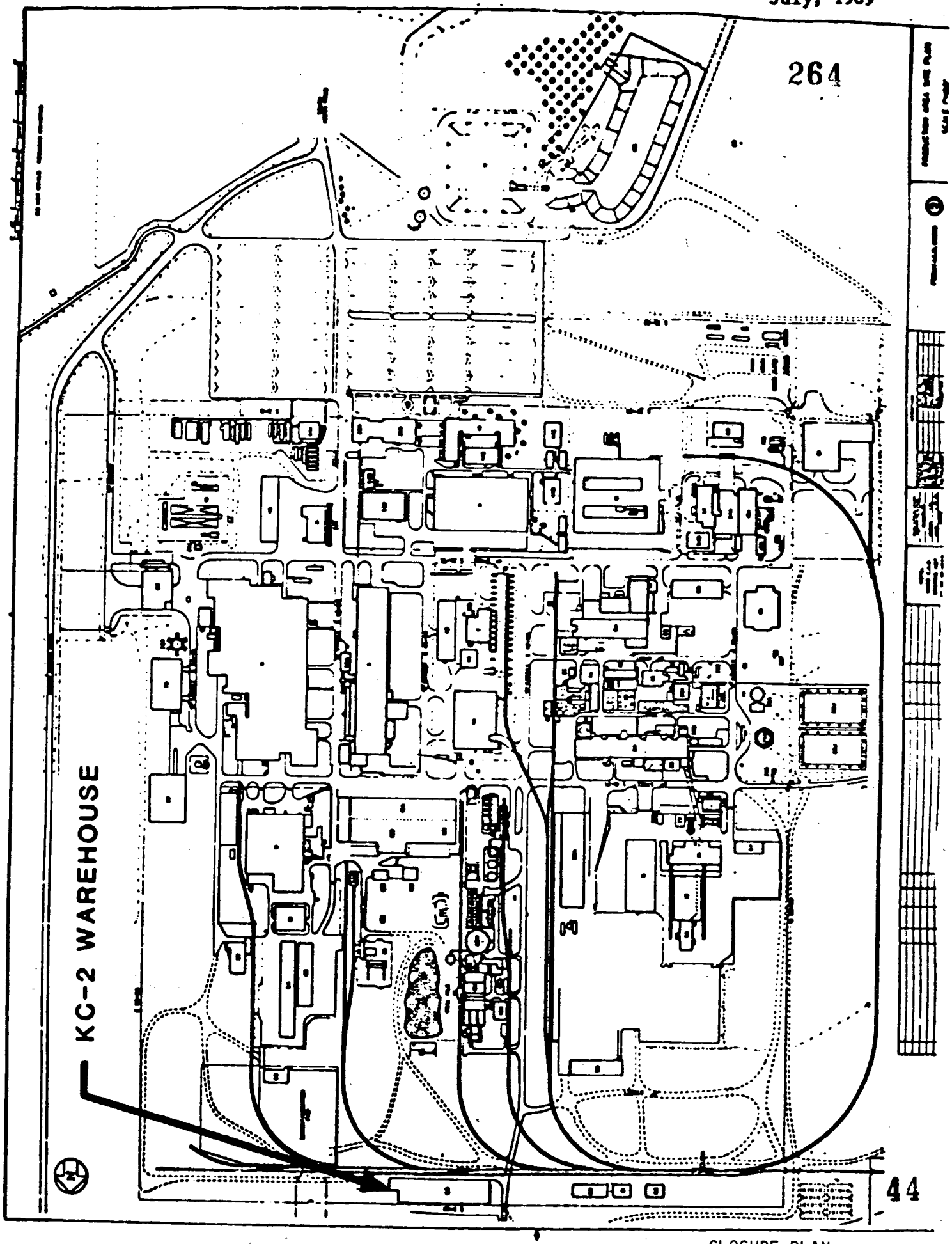
This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a post-closure cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-8 LIABILITY REQUIREMENTS

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of accident.

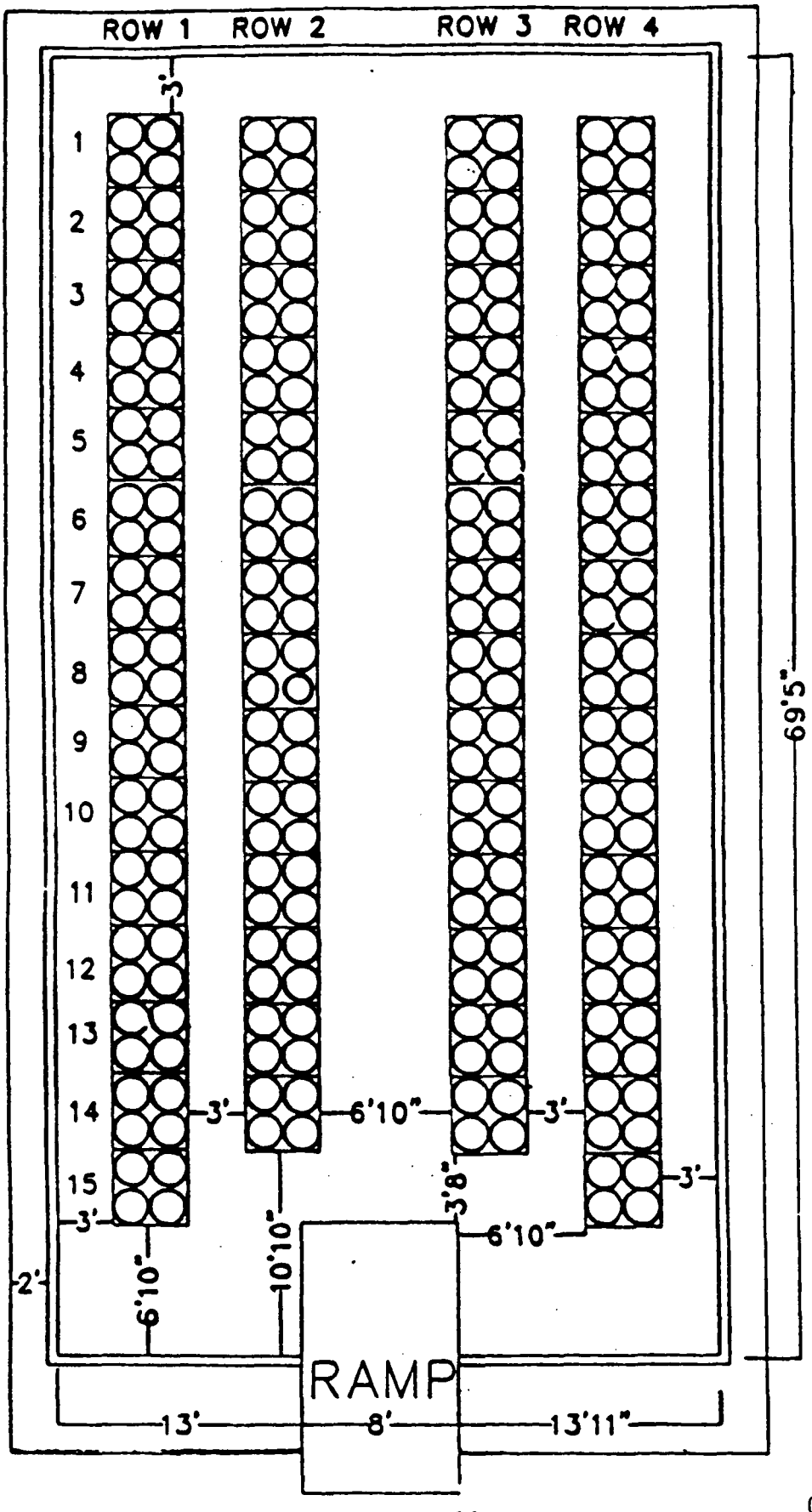

264
KC-2 WAREHOUSE
44

ATTACHMENT 2

KC 2, BAY 6

264

Pallets - 58 Drums - 232
Total Drum Capacity - 232



45

ATTACHMENT 3

SCHEDULE FOR CLOSURE OF THE KC-2 Warehouse - Bay 6

Action	Cumulative Days to Complete
Initiate Closure	0
Remove and Store Waste Residues	30
Complete Decontamination Efforts*	150
Complete Closure	180

* The time required for decontamination of floor sections and excavation of soil will depend on the extent of above acceptable levels of RCRA contaminants found on equipment and in the soil.

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
KC-2 WAREHOUSE - BAY 7

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. Box 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste.

The KC-2 Warehouse - Bay 7, which measures 20 feet x 70 feet, was operated at the FMPC to store hazardous solid and liquid waste materials generated from cleaning and operational processes on-site. These materials are RCRA hazardous by characteristic and listing.

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.112 through 264.115, the unit must be closed following the guidelines of a written and approved closure plan. The closure plan is being submitted to the Ohio EPA to establish the guidelines that will be followed once EPA approval has been granted.

SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. the FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomformably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous because the hydrogeologic properties of interest occur on a much larger scale than these local variations. On the scale appropriate

for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been previously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- A groundwater divide exists which trends from southeast to northwest across the south-central portion of the facility.

- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.

- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

I-1 CLOSURE PLAN

This Closure Plan is submitted for the KC-2 Warehouse - Bay 7 as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the Closure Plan and all revisions to the plan will be kept at the facility until final closure has been certified in accordance with OAC 3745-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55-12(A) and 40 CFR 264.112(a), the most recent copy of the closure plan will be provided to the Ohio EPA upon request. Also, the plan will be available for Ohio EPA review if requested during site inspections. Should an amendment to the KC-2 Warehouse Bay 7 storage area Closure Plan be required for any of the reasons listed below, a written request for amendment will be provided to the Ohio EPA will include a copy of the amended closure plan. The following situations would require an amendment to the plan:

- o A change in the expected date of closure.
- o An unexpected event encountered during closure activities.
- o A proposed change in operating plans or facility design that affects closure.

If a proposed change in design or operating plans will affect the Closure Plan, an amendment to the plan will be submitted 60 days prior to the change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days

after the event. If an unexpected event affecting the Closure Plan occurs during the closure period, an amendment will be submitted within 30 days of the event. If the closure plan is amended after the permit has been issued, the amended Closure Plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the KC-2 Warehouse - Bay 7 storage area will be completed in accordance with performance standards as stated in OAC 3745-55-11, OAC 3745-55-78, 40 CFR 264.111 and 40 CFR 264.178. These standards include the following:

- Minimizing the need for further maintenance by decontaminating the concrete warehouse floor and removing any contaminated soil from beneath the floor. Any concrete flooring that cannot be decontaminated to below allowable limits will be removed and placed into an approved FMPC RCRA storage unit. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10(B) and 40 CFR 264.110.

- Controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, the escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials and residues contained within the storage unit and placing the storage containers into approved RCRA storage units at the FMPC or by transfer to a permitted off-site disposal or treatment facility.

1-1b Partial Closure and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC facility. At the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum number of drums that can be stored in the KC-2 Warehouse Bay 7 is 120 (55-gallon) drums. A monthly inventory is made of the storage unit. The waste drums mainly consist of dry cleaning sludges (tetrachloroethylene), used oils (containing 1,1,1-trichloroethane, lead), paint thinner (methylene chloride), tributyl phosphate/ kerosenes, and miscellaneous hazardous suspect materials.

Weekly inspections are made to verify the integrity of the drums, floors, and roof, proper storage of the drums, and the presence of fire and safety equipment. Any drums noted to be leaking during this weekly inspection are re-drummed.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

The KC-2 Warehouse - Bay 7 consists of a concrete pad that underlies the waste and will be decontaminated before closure.

The storage consists of a concrete floor which is 21 feet 3 inches wide and 69 feet 4 inches long inside a 6 inches by 6 inches wide dike. An 8 foot wide ramp allows access for fork trucks into the diked area.

A site map is provided identifying the location of the KC-2 Warehouse (Attachment 1). A diagram of the storage unit is also provided (Attachment 2).

Based on the storage configuration, a potential for hazardous waste contamination exists in the floor sections of the storage bay due to spills or leaking drums. In addition, there is a possibility for soil contamination in the area under the concrete due to floor cracks.

Detailed sampling procedures for the soil underneath the KC-2 Warehouse Bay 7 is provided in Appendix A to this closure plan. Sampling will be conducted of the concrete floor and the soil underneath using SW-846 methods and following OAC 3745-55-11.

To prepare for decontamination, the storage bay will be cleared of all drummed materials. The waste drums will be inspected for integrity and transferred into the FMPC approved RCRA storage units.

The floor section of the storage bay has shown visible evidence of waste residue from leaking drums. This residue will be cleaned from the floor surface by wiping and rinsing to the maximum extent possible. All materials used in the cleaning of the floor section will be collected and placed into storage containers which will be placed into approved FMPC RCRA storage units. All cleaning materials will be stored in storage units until analysis and appropriate disposal can be completed in accordance with hazardous waste disposal regulations. Then a clean water rinseate will be run over the cleaned floor section and collected. This rinseate will be analyzed

using the EP Toxicity method outlined in SW-846 to determine D004 through D011 metal contaminant concentrations and analyzed using the GC method outlined in SW-846 to determine organic concentrations. If concentrations above regulatory thresholds for D004 through D011 contaminants and organic contaminants above 1 ppm exist after cleaning, the floor section will be rewashed and analyzed until decontamination to below these concentrations is complete. If after three attempts, complete decontamination cannot be accomplished, the contaminated floor section or sections will be removed and placed into appropriate containers and transferred to FMPC RCRA storage units.

After the rinseate test is completed on the floor section, sampling will be performed to determine if hazardous constituents are present in the soils under the concrete floor. If the data from this study indicates hazardous wastes are present, further sampling will be conducted to determine the source and extent of the RCRA contamination. Once the source is identified, decontamination efforts or excavation will be performed and the soils will be handled as hazardous waste.

I-1d(1) Closure of Containers

Closure will consist of removal the containers of waste, disposal or replacement of these wastes in an approved facility, decontamination of the storage area, and sampling analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section is not applicable to this closure plan. No tanks are associated with the KC-2 Warehouse - Bay 7.

I-1d(3) Closure of Waste Piles

This section is not applicable to this closure plan. No waste piles are associated with the KC-2 Warehouse - Bay 7.

I-1d(4) Closure of Surface Impoundments

This section is not applicable to this closure plan. No surface impoundments are associated with the KC-2 Warehouse - Bay 7.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this closure plan. No incinerators are associated with the KC-2 Warehouse - Bay 7.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this closure plan. No land treatment facilities are associated with the KC-2 Warehouse - Bay 7.

I-1e Closure of Disposal Units

This section and its subsections are not applicable to this closure plan. No waste piles, landfills, or surface impoundments will exist as a result of closing the KC-2 Warehouse - Bay 7.

I-1f Schedule for Closure

The Ohio EPA will be notified 45 days prior to commencement of closure activities. The schedule for closure of the KC-2 Warehouse - Bay 7 is provided in Attachment 3 of this closure plan.

I-1g Extension for Closure Time

Attachment 3 shows the anticipated closure schedule for this unit. If additional time will be required to close the unit, the FMPC will request from Ohio EPA an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered engineer shall submit certification of closure within 60 days after unit closure is complete. The certification will meet the requirements of OAC 3745-55-15.

In addition, the Ohio EPA's facility inspector shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinsewater sampling. The Professional Engineer will also be present during such critical activities as cleaning and final sampling.

I-2 POST-CLOSURE PLAN

This section and its subsections are not applicable to this closure plan. As noted in OAC 3745-55-10(B) and 40 CFR 264.110(b), post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units, landfills or tanks. Closure of the KC-2 Warehouse - Bay 7 does not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required under which involves post-closure care. Post-closure care is required only for hazardous waste

disposal facilities, waste piles, and surface impoundments, as noted in OAC 3745-55-10(B) and 40 CFR 264.110(b). Since post-closure care is not required when closing a storage unit, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for closure costs.

I-6 POST-CLOSURE COST ESTIMATE

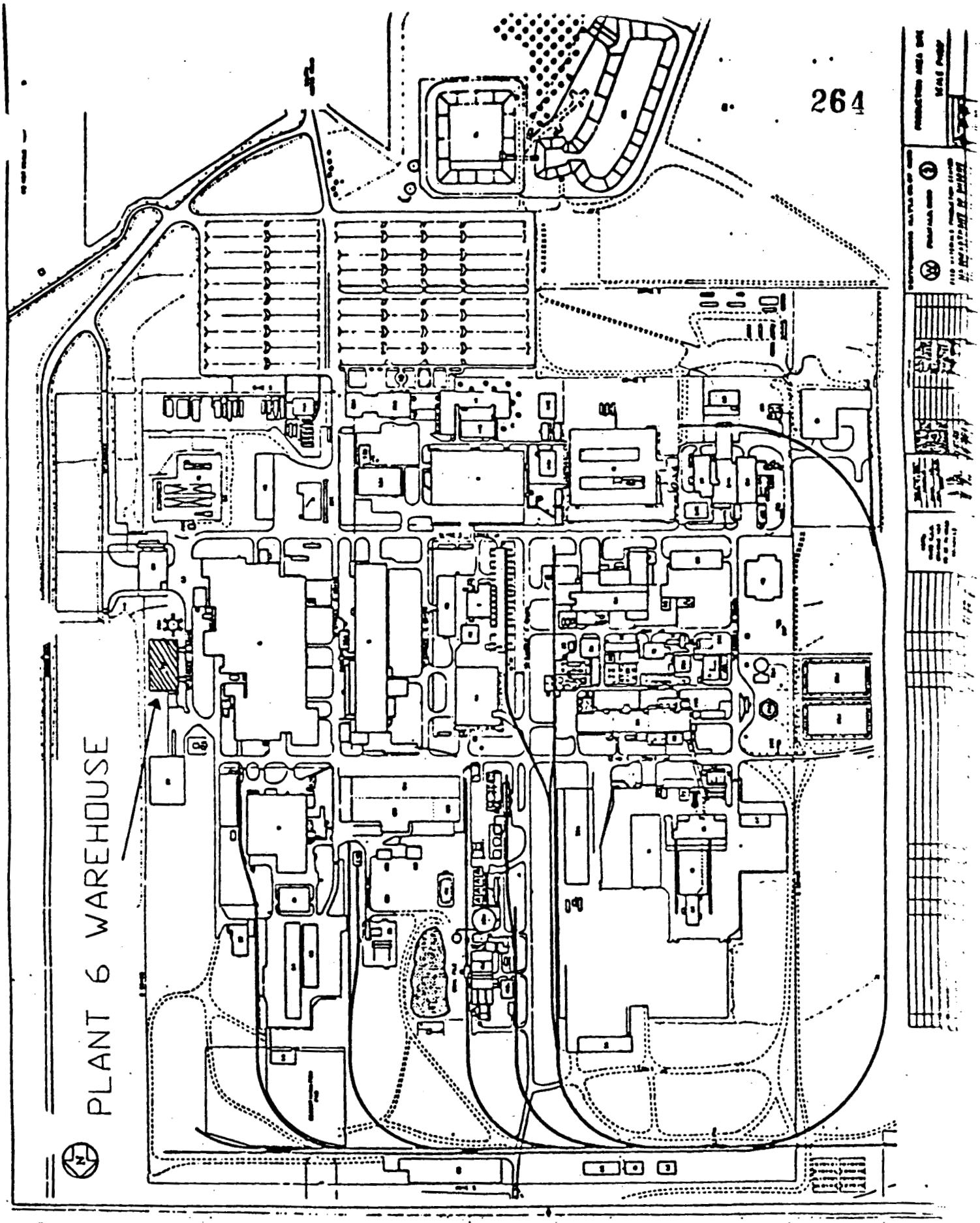
This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a post-closure cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-8 LIABILITY REQUIREMENTS

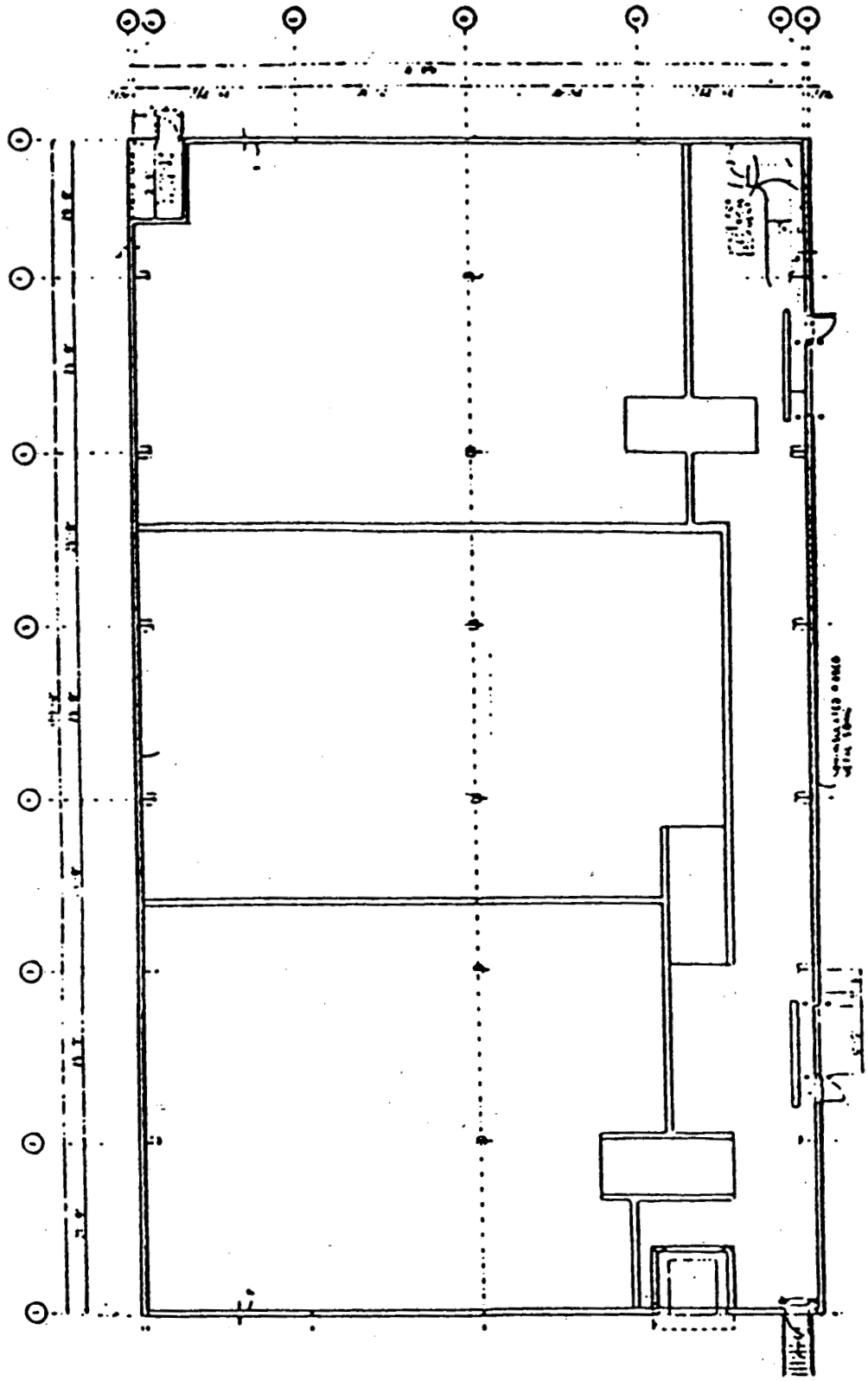
This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of accident.



ATTACHMENT 1

62

CLOSURE PLAN
KC-2 WAREHOUSE - BAY /



PLANT 6 WAREHOUSE
FLOOR PLAN
LAYOUT OF DIKES AND RAMPS

EXECUTIVE RESOURCE ASSOCIATES
DATE: JULY, 1989 | TASK:048 | REV: 01
DRAWN BY: K. J. DUNBAR | SCALE: NONE
FOR: WESTINGHOUSE MATERIALS COMPANY OF OHIO

ATTACHMENT 2

ATTACHMENT 3

SCHEDULE FOR CLOSURE OF THE KC-2 Warehouse - Bay 7

Action	Cumulative Days to Complete
Initiate Closure	0
Remove and Store Waste Residues	30
Complete Decontamination Efforts*	150
Complete Closure	180

* The time required for decontamination of floor sections and excavation of soil will depend on the extent of above acceptable levels of RCRA contaminants found on equipment and in the soil.

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
PLANT 6 WAREHOUSE

U.S. DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
P.O. Box 398705
CINCINNATI, OHIO 45239-8705

CONTENTS

CONTENTS (Continued)

INTRODUCTION

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated o-under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste.

The Plant 6 Warehouse.Building 79 is located 135 feet east of E Street and 350 feet north of First Street directly across from Plant 6. The location is shown on the site map in Attachment 1; the layout is shown in Attachment 2. The warehouse has approximately 17,000 square feet (100 feet x 170 feet) of floor space.

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.110 through 264.115, the unit must be closed following the guidelines of a written and approved Closure Plan. This Closure Plan is being submitted to the Ohio EPA to establish the guidelines that will be followed once EPA approval has been granted.

SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Frosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. the FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomformably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous because the hydrogeologic properties of interest occur on

a much larger scale than these local variations. On the scale appropriate for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been prev:ously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- Agroundwater divide exists which trends from southeast to northwest across the south-central portion of the facility.

- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.

- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

1-1 CLOSURE PLAN

This closure plan is submitted for the Plant 6 Warehouse-Building 79 as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written closure plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the closure plan and all revisions to be the plan will be kept at the facility until final closure has been certified in accordance with OAC 3745-55-15 and 40-CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55.12(A) and 40 CFR 264.112(a), the most recent copy of the closure plan will be orovided to Ohio EPA upon request. Also, the plan will be available for this EPA review if requested during site inspections. Should an amendment to the Plant 6 Warehouse-Building 79 closure plan be required for any of the reasons listed below, a written amendment will be provided to the Ohio EPA and will include a copy of the amended closure plan. The following situations would require an amendment to the plan:

- A change in the expected date of closure.
- An unexpected event encountered during closure activities.
- Changes in the operating plan or facility design that affect the closure plan.

If a proposed change in design or operating plans will affect the closure plan, an amendment to the plan will be submitted 60 days prior to the change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days after the event. If an unexpected event occurs during the closure period, an amendment will be submitted within 30 days of the event. If the Closure Plan is amended after the permit has been issued, the amended closure plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the Plant 6 Warehouse-Building 79 storage area will be completed in accordance with performance standards as stated in OAC 3745-55-11, OAC 3745-55-78 and 40 CFR 264.111 and 264.178. These standards include the following:

- Minimizing the need for further maintenance by decontaminating the storage area, specifically the material underlying the containers. Any portion of the storage area that cannot be cleaned to below allowable limits will be removed and placed into an approved FMPC RCRA storage units. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10 and 40 CFR 264.110.

- Controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated run-off or hazardous waste decomposition products to the ground or surface waters or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials to storage containers, and placing the storage containers into approved RCRA storage units at the FMPC.

1-1b Partial Closure and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC Facility. At the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum inventory of hazardous wastes in the Plant 6 Warehouse-Building 79 any given time during the operating life of FMPC could conceivably be as many as 3648 55-gallon drums/containers. This is the largest amount of waste that can be stored in this storage unit. Waste stored in this unit have been tetrachloroethylene, corrosive liquids, combustible liquids, and solid hazardous wastes.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

Closure of the Plant 6 Warehouse-Building 79 waste container storage unit at the FMPC will be completed in accordance with the following guidelines.

At the time of closure, all containerized wastes will be removed and transferred to an alternate FMPC approved storage unit. Once all

drums have been removed, the unit will be inspected to ensure the integrity of the containment dike. Any evidence of spills or leaks will be investigated to determine if decontamination and/or disposal of waste debris will be necessary. All equipment associated with the Plant 6 Warehouse-Building 79 will be decontaminated, if necessary, to below acceptable limits. The walls, floors, warehouse interior loading ramps and miscellaneous equipment in the warehouse will be cleaned by high pressure water spray. The generated wash waters will be collected, drummed and then transferred to an alternate FMPC approved storage unit.

The entire container storage unit will be segregated into designated areas and each area will be flushed with a clean water rinseate, which will be collected and placed into appropriate containers. A sample or samples will be drawn from the rinseate for each area and will be analyzed following the guidelines of SW-846 for hazardous constituents. Acceptable levels will be established to be 1 ppm of total organic constituents, and the EP Toxcity characteristic limits given in OAC 3745-51-24. If the analysis proves to contain acceptable levels of hazardous constituents, the rinseate and the portion of the container storage unit from which it was drawn shall be considered clean.The area will be returned to service non-hazardous waste purposes or abandoned. The clean rinseate will be disposed of as non-hazardous waste.

If the rinseate contains hazardous constituents above acceptable levels, further decontamination efforts in the form of solvent washing, steam cleaning or scraping will be employed to remove the contamination. The storage area will be analyzed again with the collection of a rinseate and rechecked for contamination. The process ofdecontaminating and analyzing of rinseate will be repeated a maximum of three times. Any portion of the container storage unit that cannot be decontaminated to below acceptable limits after three

attempts, will be removed and placed into appropriate storage containers. Off-site treatment of disposal alternatives will be pursued for final disposal of this material.

The entire container storage area will be decontaminated with a series of high pressure water spray efforts. All waste water and residues from this operation will be collected in the sumps and pumped into storage containers until the appropriate analyses following SW-846 guidelines are performed. If the analyses indicate the wash solution wastes to be hazardous, they will be transported to a permitted off-site facility for disposal or to an alternate FMPC storage unit. If laboratory results indicate no evidence of contamination, the wash solution wastes will be discharged to the on-site sewer treatment system. Pumps and equipment will be removed and decontaminated as necessary.

Any wastes generated as a result of clean-up and decontamination operations that are determined to be hazardous will be transported to a permitted off-site facility for disposal or to an alternate FMPC storage unit. Once the unit has been deemed clear of any contamination, it will be reused or abandoned.

A sampling plan addressing the specifics of sampling, and the parameters to be analyzed for in the rinseates, concrete pad sections, soil beneath the warehouse pad will be submitted to the Ohio EPA prior to initiation of closure activities on the Plant 6 Warehouse-Building 79.

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal or placement of these wastes in an approved facility, decontamination of the storage area, and sampling and analysis

of the soils below the storage area. Analytical methods will be those determined by SW-46.

I-1d(2) Closure of Tanks

This section is not applicable to this closure plan. No tanks are associated with the Plant 6 Warehouse-Building 79.

I-1d(3) Closure of Waste Piles

This section is not applicable to this closure plan. No waste piles are associated with the Plant 6 Warehouse-Building 79.

1-1d(4) Closure of Surface Impoundments

This section is not applicable to this closure plan. No surface impoundments are associated with the Plant 6 Warehouse-Building 79.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this closure plan. No incinerators are associated with the Plant 6 Warehouse-Building 79.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this closure plan. No land treatment facilities are associated with the Plant 6 Warehouse-Building 79.

I-1e Closure of Land Disposal Units

This section and its subsections do not apply to this closure plan. No disposal units are associated with the Plant 6 Warehouse-Building 79. If contamination exists following closure, amendments will be made to the plan, to provide for post-closure care or remediation, whichever is more appropriate.

I-1f Schedule for Closure

The Ohio EPA will be notified at least 45 days before the date closure begins, in accordance with OAC 3745-55-12(D) nad 40 CFR 264.112(d). All critical and major activities of the final closure will be supervised and certified by an independent professional engineer registered registered in Ohio. If requested by Ohio EPA, FMPC will contact the facility inspector at least five days in advance of certain critical activities so that the inspector may be present to observe these activities.

It is anticipated that removal of all RCRA hazardous waste can be accomplished within 90 days after receipt of the final known volume of waste at the storage unit.

1-1g Extension for Closure Time

Attachment 3 shows the anticipated closure schedule for this unit. If additional time will be required to close the unit, the FMPC will request from the Ohio EPA an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered Professional Engineer shall submit certification of closure within 60 days of completion of closure. The certification will meet the requirements of OAC 3745-55-15 and 40 CFR 264.115.

1-2 POST-CLOSURE PLAN

This section and its subsections are not applicable to this closure plan. As noted in OAC 3745-55-10(B) and 40 CFR 264.110(b)# post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units or landfills. Closure of the Plant 6 Warehouse-Building 79 does not involve any of these types of units.

1-3 NOTICE IN DEED

A notation in the property deed is required when post-closure care is involved. Post-closure care is required only for hazardous waste disposal facilities, waste piles, and surface impoundments. Since post-closure care is not required when closing container storage units, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is a federally-owned facility. According to OAC 3745-55-40(C) the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for closure.

I-6 POST-CLOSURE COST ESTIMATE

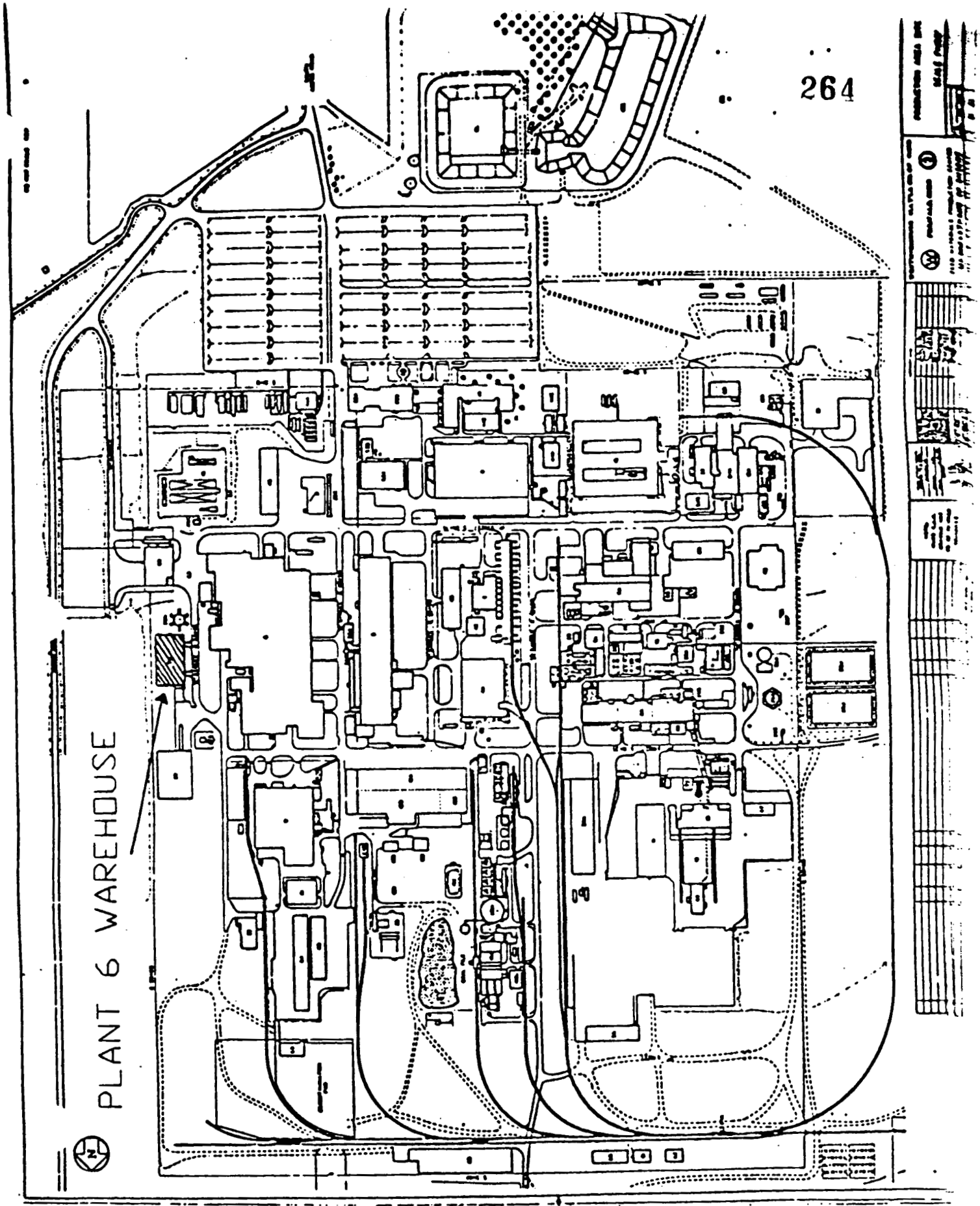
This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a post-closure care cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

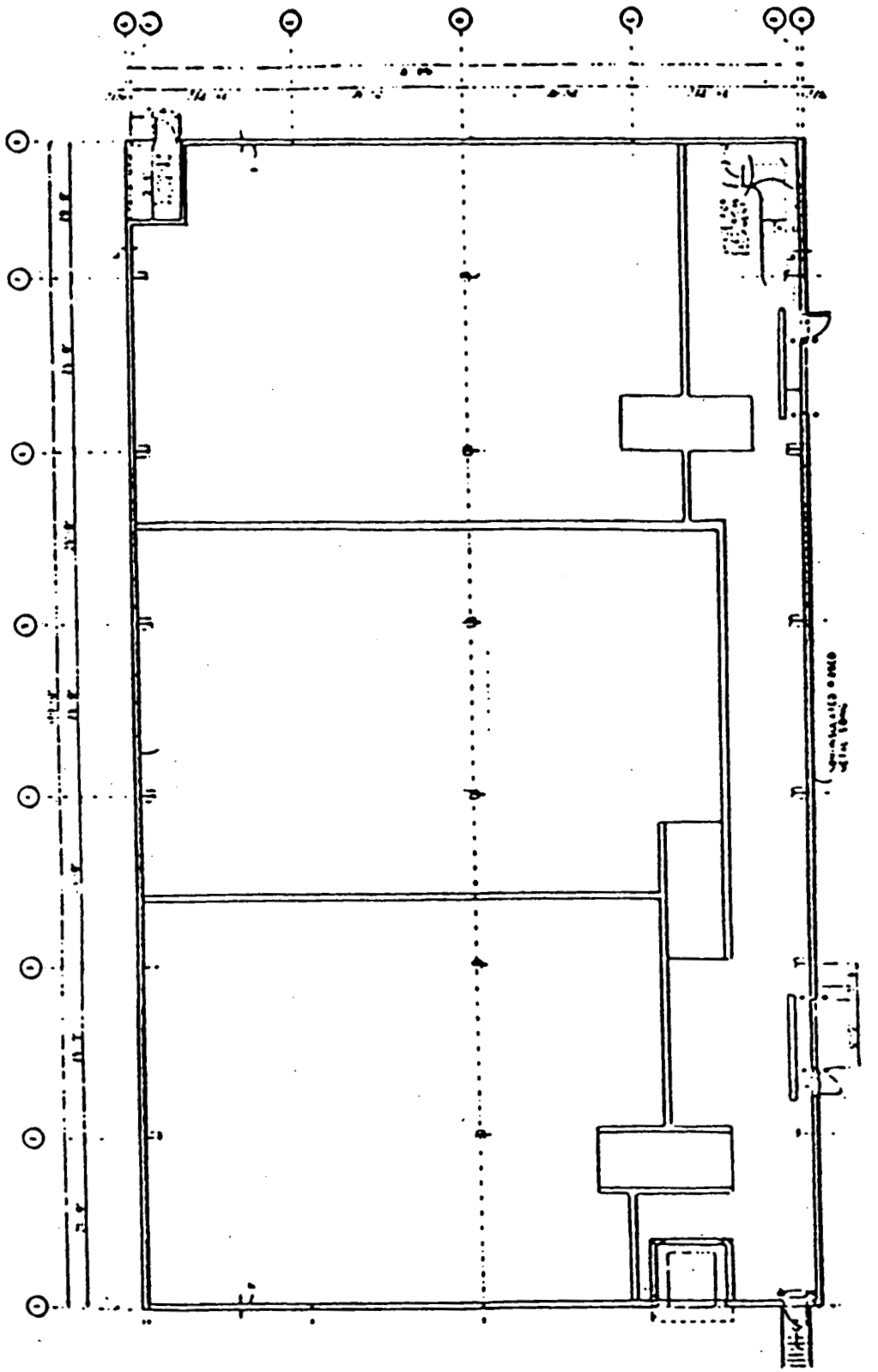
I-8 LIABILITY REQUIREMENTS

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of an accident.



ATTACHMENT 1

CLOSURE PLAN
KC-2 WAREHOUSE - BAY



PLANT 6 WAREHOUSE
FLOOR PLAN
LAYOUT OF DIKES AND RAMPS

EXECUTIVE RESOURCE ASSOCIATES
DATE: JULY, 1989 | TASK:048 | REV: 01
DRAWN BY: K. J. DUNBAR | SCALE: NONE
FOR: WESTINGHOUSE MATERIALS COMPANY OF OHIO

ATTACHMENT 2

ATTACHMENT 3

SCHEDULE FOR CLOSURE OF THE KC-2 Warehouse - Bay 7

Action	Cumulative Days to Complete
Initiate Closure	0
Remove and Store Waste Residues	30
Complete Decontamination Efforts*	150
Complete Closure	180

* The time required for decontamination of floor sections and excavation of soil will depend on the extent of above acceptable levels of RCRA contaminants found on equipment and in the soil.

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
PLANT 8 WAREHOUSE

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. BOX 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste.

The Plant 8 Warehouse - Building 80 will be used to store containers of hazardous waste. At this time there have been no RCRA identified hazardous wastes stored in the warehouse. Future plans call for a maximum of 1,992 drums of various materials, both liquid and solid, to be stored in the Plant 8 Warehouse - Building 80.

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.112 through 264.15, the unit must be closed following the guidelines of a written and approved Closure Plan. The Closure Plan is being submitted to the Ohio EPA to establish the guidelines that will be followed once EPAs approval has been granted.

SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. The FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomfortably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous because the hydrogeologic properties of interest occur on

a much larger scale than these local variations. On the scale appropriate for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been previously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- A groundwater divide exists, which trends from southeast to northwest across the south-central portion of the facility.

- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.

- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

I-1 CLOSURE PLAN

This Closure Plan is submitted for the Plant 8 Warehouse - Building 80 as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the closure plan and all revisions to be the plan will be kept at the facility until final closure has been certified in accordance with and OAC 3745-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55-12(A) and 40 CFR 264.112(a), the most recent copy of the closure plan will be provided to the Ohio EPA upon request. Also, the plan will be available for Ohio EPA review if requested during site inspections. Should an amendment to the Plant 8 Warehouse Closure Plan be required for any of the reasons listed below, a written request for amendment will be provided to the Ohio EPA and will include a copy of the amended Closure Plan. The following situations would require an amendment to the plan:

- o A change in the expected date of closure.
- o An unexpected event encountered during closure activities.
- o A change in operating plans or facility design that affects the closure.

If a proposed change in design or operating plans will affect the closure plan, an amendment to the plan will be submitted 60 days prior to the

change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days after the event. If an unexpected event affecting the closure plan occurs during the closure period, an amendment will be submitted within 30 days of the event. If the closure plan is amended after the permit is issued, the amended closure plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the Plant 8 Warehouse - Building 80 storage area will be completed in accordance with performance standards as stated in OAC 3745-55-11, OAC 3745-55-78, 40 CFR 264.111 and 40 CFR 264.178. These standards include the following:

- Minimizing the need for further maintenance by decontaminating the concrete warehouse floor and removing any contaminated soil from beneath the floor. Any concrete flooring that cannot be decontaminated to below allowable limits will be removed and placed into an approved FMPC RCRA storage unit. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10(B) and 40 CFR 264.110.

- Controlling, minimizing, or eliminating (to the extent necessary to protect human health and the environment) the escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials and residues contained within the storage unit and placing the storage containers into approved RCRA storage units at the FMPC or by transfer to a permitted off-site disposal or treatment facility.

I-1b Partial and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC facility. At the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

At this time there have been no hazardous waste materials stored in the Plant 8 Warehouse. The maximum storage of hazardous waste materials that can be stored in the Plant 8 Warehouse is 1,992 55-gallon containers.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

The Plant 8 Warehouse - Building 80 consists of one unheated building 60 feet x 170 feet with a concrete floor. The building will be used for storage of containerized hazardous wastes in curbed areas. Attachments 2 and 3 show the location and structural design of the warehouse.

Based on this operation, a potential for hazardous waste contamination exists on and under the concrete floor caused by a

spill or leak in a drum stored there. During closure activities, if any floor sections show visible evidence of a spill or leak this residue will be cleaned from the floor surface by wiping and rinsing to the maximum extent possible. All materials used in the cleaning of the floor section will be collected and placed into storage containers which will be placed into approved FMPC RCRA storage units. All cleaning materials will be stored in approved RCRA storage units until analysis and appropriate disposal can be completed in accordance with hazardous waste disposal regulations.

A clean water rinseate will be run over the cleaned floor section and collected. This rinseate will be analyzed using the EP Toxicity method outlined in SW-846 to determine D004 through D011 contaminant concentrations and analyzed using the methods outlined in SW-846 to determine organic concentrations. Detailed methods of sampling will be submitted in a sampling plan prior to the start of closure activities. The sampling plan will specify the types of organic constituents that will be sampled based on the types of material that will have been stored in the warehouse. If concentrations above regulatory thresholds listed in OAC 3745-51-24 for D004 through D011 RCRA metals and organic contaminants above 1 ppm exist after cleaning, the floor section will be rewashed and analyzed until decontamination to below these concentrations is complete. Once decontamination is complete, the floor section will be left in place for future, nonhazardous waste storage. If after three attempts, complete decontamination cannot be accomplished, the contaminated floor section or sections will be removed and placed into appropriate containers and transferred to FMPC RCRA storage units.

All other floor sections of the warehouse will first be investigated by collecting a clean water rinseate and analyzing the rinseate using the EP Toxicity method for metals and appropriate SW-

846 test methods for organics. This investigation will occur before any cleaning is attempted. If unacceptable levels of D004 through D011 RCRA metals are detected in the EP Toxicity analysis of the rinseate, or unacceptable levels of organics (above 1 ppm) are detected in the analysis, decontamination will be performed until the floor is cleaned to below these levels. Once decontamination is complete, the floor section will be left in place for future, nonhazardous waste storage. If after three attempts, complete decontamination cannot be accomplished, the contaminated floor section or sections will be removed and placed into appropriate containers and transferred to FMPC RCRA storage units.

Any concrete floor area that cannot be decontaminated to below acceptable limits will be removed, placed into a suitable container, and transferred into approved FMPC RCRA storage. Permanent disposal options will be investigated based on the type of contamination involved.

All wash water or collected rinseates will be collected into appropriate containers and placed into an FMPC RCRA storage unit until analytical results can be obtained. If the analysis demonstrates that the waste is nonhazardous, the waste will be disposed of in the FMPC wastewater treatment system. If the analysis demonstrates that the waste is hazardous, the waste will remain in storage until the appropriate disposal method can be identified.

The FMPC will only analyze for RCRA regulated wastes during closure of the Plant 8 Warehouse. Only the constituents suspected of being present on the concrete will be evaluated during analysis.

A sampling plan addressing the specifics of sampling, and the parameters to be analyzed for in the rinseates, and concrete pad

sections will be submitted to the Ohio EPA prior to initiation of closure activities on the Plant 8 Warehouse.

The integrity of the concrete floor will be inspected during closure. The sampling of soil underlying the concrete floor will not be conducted unless the integrity of the concrete floor is in question.

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal or placement of these wastes in an approved facility, decontamination of the storage area, and sampling and analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section is not applicable to this Closure Plan. No tanks are associated with the Plant 8 Warehouse - Building 80.

I-1d(3) Closure of Waste Piles

This section is not applicable to this Closure Plan. No waste piles are associated with the Plant 8 Warehouse - Building 80.

I-1d(4) Closure of Surface Impoundments

This section is not applicable to this Closure Plan. No surface impoundments are associated with the Plant 8 Warehouse - Building 80.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this closure plan. No incinerators are associated with the Plant 8 Warehouse - Building 80.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this closure plan. No land treatment facilities are associated with the Plant 8 Warehouse - Building 80.

I-1e Closure of Disposal Units

This section is not applicable to this closure plan. No waste piles, landfills, or surface impoundments will exist as a result of closing the Plant 8 Warehouse - Building 80.

I-1f Schedule for Closure

The OHio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

The Schedule of Closure is provided in Attachment 1 to this closure plan. At this time, it is anticipated that removal of all RCRA hazardous waste can be accomplished within 90 days after receipt of the final known volume of waste at the storage unit. Attachment 1 provides approximate milestones for closures; the time required for decontamination of equipment and removal of soils will depend on the extent of contamination found on the equipment and in the soils.

If requested by Ohio EPA, FMPC will contact the facility inspector at least five days in advance of certain critical activities so that the inspector may be present to observe these activities.

I-1g Extension for Closure Time

Attachment 1 shows the anticipated closure schedule for the Plant 8 Warehouse - Building 80 storage area. If additional time will be required to close the unit, the FMPC will request from Ohio EPA an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered engineer shall submit certification of closure within 60 days after unit closure is complete. The Certification will meet the requirements of OAC 3745-55-15.

In addition, the Ohio EPA's facility inspector shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinsewater sampling.

I-2 POST CLOSURE PLAN

This section is not applicable to this closure plan. As noted in OAC 3745-55-10(B), post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units, or landfills, Closure of the Plant 8 Warehouse - Building 80 does not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required under OAC 3745-55-19(B) when post-closure care is required. Post-closure care is required only for hazardous waste disposal facilities, waste piles, and surface impoundments, as noted in OAC 3745-55-10(B). Since post-closure care is not required when closing a storage unit, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40 C, the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40 C, the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism.

I-6 POST-CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40 C, the Federal Government is exempt from Financial Requirements, which includes submittal of a post-closure cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40 C, the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-8 LIABILITY REQUIREMENTS

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40 C, the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of accident.

ATTACHMENT 1

SCHEDULE FOR CLOSURE OF THE

PLANT 8 WAREHOUSE - BUILDING 80

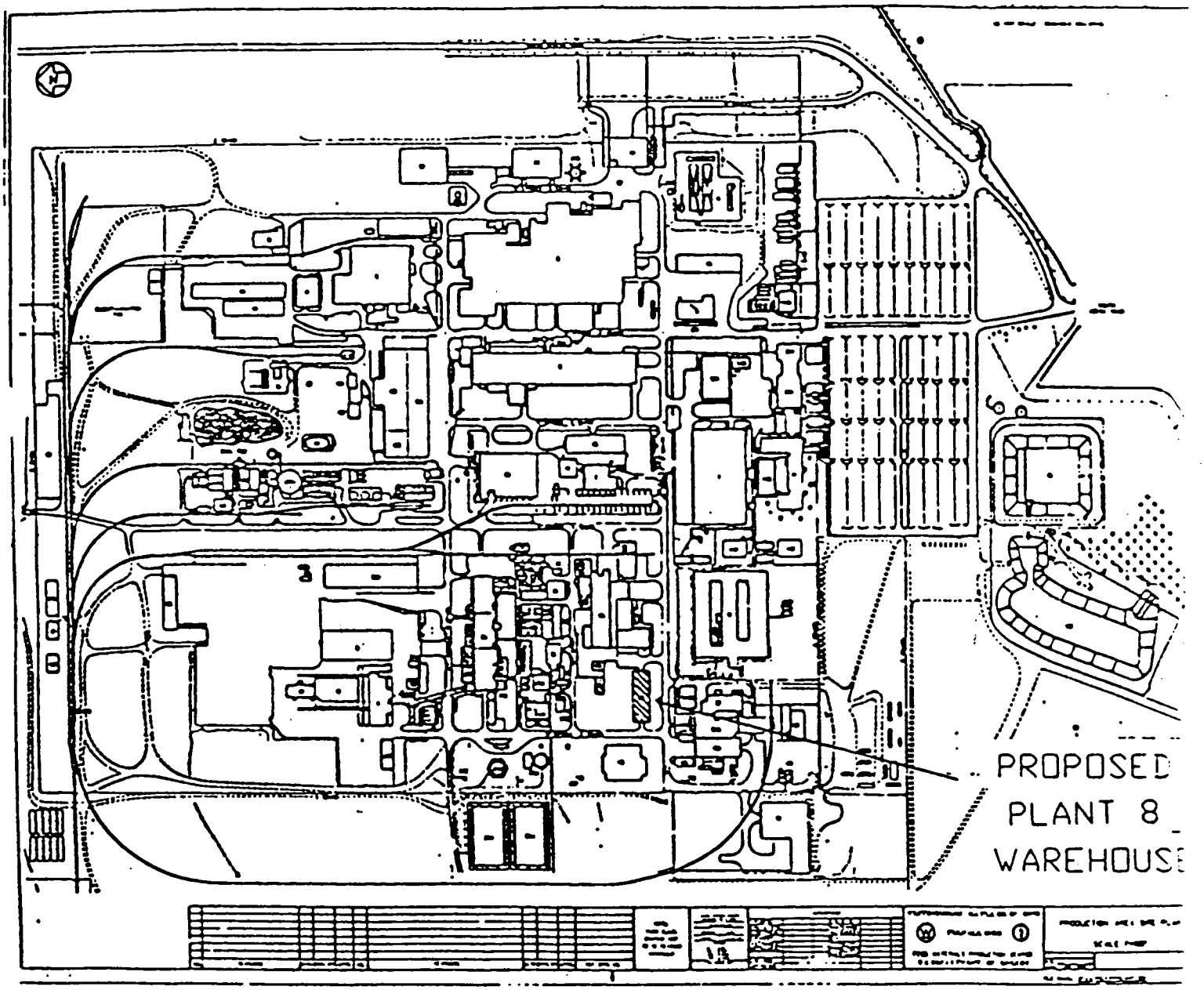
Action	Cumulative Days to Complete
Initiate Closure of Warehouse Storage Warehouse Storage	0
Remove and Store Waste Residues at an FMPC RCRA Storage Location	10
Decontaminate Storage Area	30
Wipe Sample Equipment	40
Analyze Rinseate and Sampling Materials	60
Decontaminate Storage Pad as Required After Initial Rinseate Sampling	80
Sample Soils Underlying the Storage Pad	100
Storage Pad Removal as Required by Sample Results	120
Complete Closure	180

The time required for decontamination of equipment will depend on the extent of above acceptable levels of RCRA contaminants found on equipment.

ATTACHMNT 2

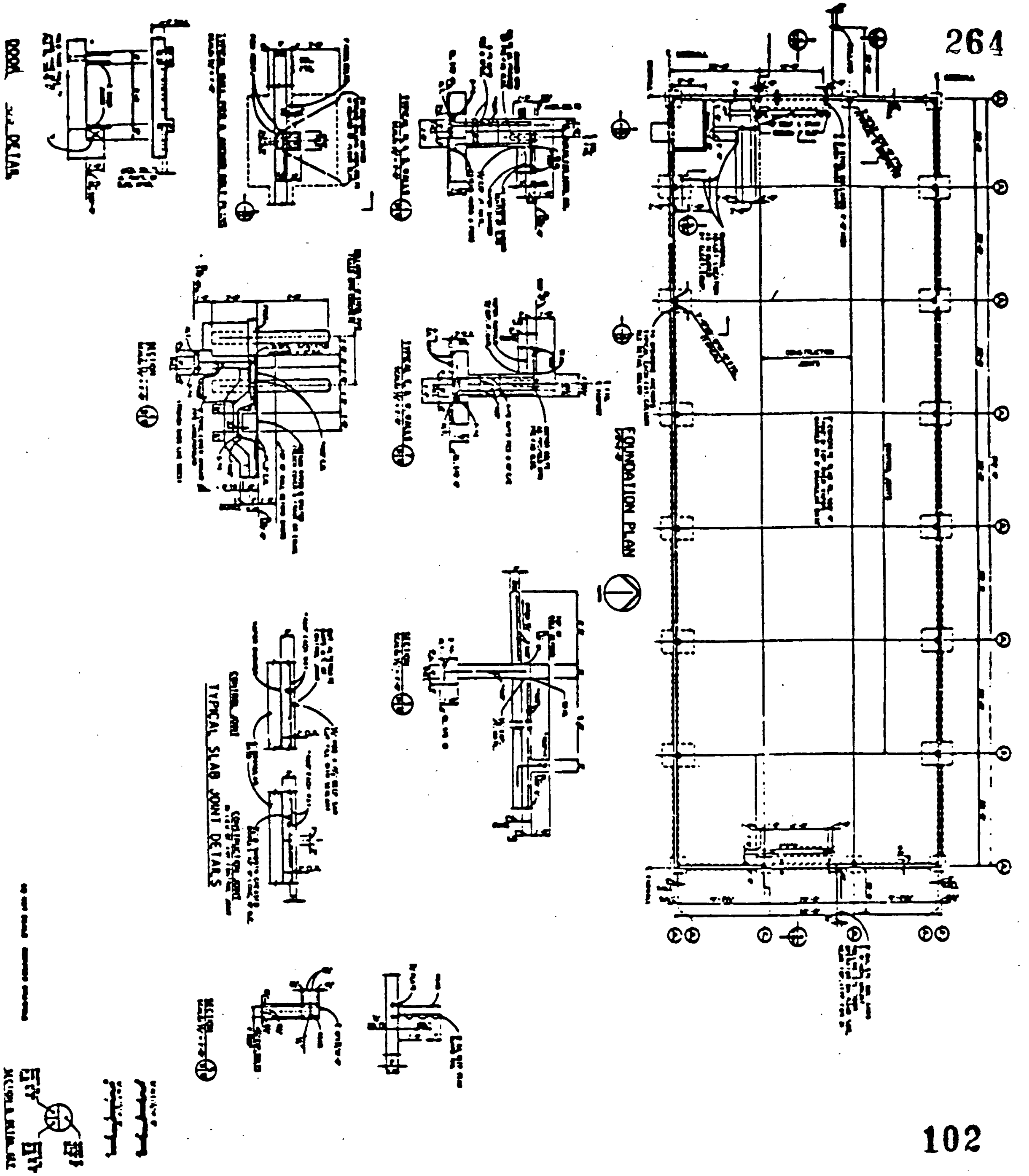
SITE LOCATION

PLANT 8 WAREHOUSE - BUILDING 80



101

CLOSURE PLAN FOR
PLANT 8 WAREHOUSE -
BUILDING 80



ATTACHMENT 3

STRUCTURAL DRAWING,
PLANT 8 WAREHOUSE - BUILDING 80

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
PLANT 9 WAREHOUSE

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. BOX 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

CONTENTS (Continued)

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste.

The warehouse has approximately 8,000 square feet (80 feet x 100 feet) of floor space. The warehouse will be capable of safely storing approximately 1704 drums when triple stacked utilizing three-foot aisle spacing (see Attachment 2).

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.110 through 264.115, the unit must be closed following the guidelines of a written and approved closure plan. This closure plan is being submitted to the Ohio EPA to establish the guidelines that will be followed during closure of the unit.

SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. the FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomformably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous because the hydrogeologic properties of interest occur on

a much larger scale than these local variations. On the scale appropriate for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been previously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- A groundwater divide exists which trends from southeast to northwest across the south-central portion of the facility.
- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.
- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

I-1 CLOSURE PLAN

This closure plan is submitted for the proposed Plant 9 Warehouse-Building 81 as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the closure plan and all revisions to the plan will be kept at the facility until finalclosure has been certified in accordance with OAC 3745-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B permit application. To meet the requirements of OAC 3745-55-12(A) and 40 CFR 264.112(a), the most recent copy of the closure plan will be provided to the Ohio EPA upon request. Also, the plan will be available for Ohio EPA review if requested during site inspections. Should an amendment to the Plant 9 Warehouse - Building 81 closure plan be required for any of the reasons listed below, a written request for amendment will be provided to the Ohio EPA and will include a copy of the amended closure plan. The following situations would require an amendment to the plan:

- o A change in the expected date of closure.
- o An unexpected event encountered during closure activities.
- o A change in the operating plan or facility design that affects the closure plan.

If a proposed change in design or operating plans will affect the closure plan, an amendment to the plan will be submitted 60 days prior to the

change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days after the event. If an unexpected event affecting the closure plan occurs during the closure period, an amendment will be submitted within 30 days of the event. If the Closure Plan is amended, the amended closure plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the Plant 9 Warehouse - Building 81 will be completed in accordance with performance standards as stated in OAC 3745-55-11 and OAC 3745-55-78, and in 40 CFR 264.111 and 264.178. These standards include the following:

- Minimizing the need for further maintenance by decontaminating the equipment and the storage pad. Any equipment that cannot be cleaned to below allowable limits will be removed and placed into an approved FMPC RCRA storage unit(s). Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10(B) and 40 CFR 264.110.

- Controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, the escape of hazardous waste, hazardous waste constituents, leachate, contaminated run-off or hazardous waste decomposition products to the ground or surface waters or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials, residues, contaminated equipment and structures contained within the warehouse. All contaminated wastes will be packaged into storage containers and placed into approved RCRA storage units at the FMPC or sent to a permitted off-site disposal or treatment facility.

I-1b Partial Closure and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC facility. After the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities, in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum inventory of hazardous wastes in the Plant 9 Warehouse - Building 81 at any time during the operating life of FMPC could conceivably be as many as 1704 drums/containers. Worst case conditions were assumed in the development of this closure plan.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

Closure of the Plant 9 Warehouse - Building 81 waste container storage unit at the FMPC will be completed in accordance with the following guidelines.

All containers of hazardous waste will be removed from the container storage unit to be closed. The containers will be placed into the remaining approved RCRA storage units at the FMPC until appropriate

disposal can be accomplished or transferred to a permitted off-site treatment or disposal facility. 264

Once all drums have been removed, the facility will be inspected to ensure the integrity of the containment dike. Any evidence of spills or leaks will be investigated to determine if decontamination and/or disposal of waste debris will be necessary.

The container storage unit will first be examined visually to determine if any obvious signs of contamination are present. The areas with visible contamination will be flushed with a solvent or clean water rinseate. The rinseate will be placed into appropriate containers and transferred to one of the remaining approved RCRA storage units. The rinseate will be analyzed following the guidelines of SW-846 to determine the level of hazardous constituents. Appropriate disposal, whether as a hazardous waste or non-hazardous waste, will be accomplished based on the results of the analysis.

The entire container storage unit will be segregated into designated areas and each area will be flushed with a clean water rinseate which will be collected and placed into appropriate containers. A sample or samples will be drawn from the rinseate for each area and will be analyzed following the guidelines of SW-846 for hazardous constituents. If the analysis proves that the sample contains levels of hazardous constituents below the EP taxicity regulatory thresholds in OAC 3745-51-24 and below one part per million (ppm) for any RCRA related solvent, the rinseate and the portion of the container storage unit from which it was drawn shall be considered clean. The area will be returned to service for non-hazardous waste purposes or abandoned and the clean rinseate will be disposed of as non-hazardous waste.

If the rinseate contains hazardous constituents above acceptable levels, further decontamination efforts in the form of solvent washing, steam cleaning or scraping will be employed to remove the contamination. The storage area will be analyzed again with the collection of a rinseate and rechecked for contamination. The process of decontaminating and analyzing of rinseate will be repeated a maximum of three times. Any portion of the container storage unit which cannot be decontaminated to below acceptable limits after three attempts, will be removed and placed into appropriate storage containers. Off-site treatment of disposal alternatives will be pursued for final disposal of this material.

The entire container storage area will be decontaminated with a series of appropriate wash solutions. All waste water and residues from this operation will be collected in the sumps and pumped into storage containers until the appropriate analyses following SW-846 guidelines are performed. If the analyses indicate the wash solution wastes to be hazardous, they will be transported to a permitted off-site TSD facility for disposal or an approved FMPC storage unit. If laboratory results indicate no evidence of contamination, the wash solution wastes will be discharged to the on-site waste water treatment system. Pumps and equipment will be removed and decontaminated as necessary.

Any wastes generated as a result of clean-up and decontamination operations including soil and contaminated equipment which are determined to be hazardous will be transported to a permitted TSD facility for disposal or to an alternate FMPC storage unit. Once the facility has been deemed clear of any contamination, it will be reused or abandoned.

After closure of the last approved FMPC container storage unit, any hazardous waste generated will remain on-site no longer than 90

days. Off-site treatment or disposal alternatives will be identified before closure of the final container storage unit begins.

A sampling plan addressing the specifics of sampling, and the parameters to be analyzed for in the rinseates, concrete pad sections, and soil beneath the pad will be submitted to the Ohio EPA prior to initiation of closure activities on the Plant 9 Warehouse - Building 81.

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal or placement of these wastes in an approved facility, decontamination of the storage area, and sampling and analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section is not applicable to this closure plan. No tanks will be associated with the Plant 9 Warehouse - Building 81.

I-1d(3) Closure of Waste Piles

This section is not applicable to this closure plan. No waste piles will be associated with the Plant 9 Warehouse - Building 81.

I-1d(4) Closure of Surface Impoundments

This section is not applicable to this closure plan. No surface impoundments will be associated with the Plant 9 Warehouse - Building 81.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this closure plan. No incinerators will be associated with the Plant 9 Warehouse - Building 81.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this closure plan. No land treatment facilities will be associated with the Plant 9 Warehouse -Building 81.

I-1e Closure of Land Disposal Units

This section and its subsections do not apply to this closure plan. No waste piles, landfills or surface impoundments will exist as a result of closing the Plant 9 Warehouse - Building 81.

I-1f Schedule for Closure

The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112. Removal of all hazardous waste from the unit will be accomplished within 90 days after receipt of the known final volume of hazardous wastes. See Attachment 3 for a closure schedule.

I-1g Extension for Closure Time

Attachment 3 shows the anticipated closure schedule for this unit. If additional time will be required to close the unit, the FMPC will request from the Ohio EPA an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered engineer shall submit certification of closure within 60 days of completion of closure. This certification will meet the requirements of OAC 3745-55-15.

In addition, the Ohio EPA's facility inspector shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinsewater sampling. The Professional Engineer will also be present during such activities as cleaning and final sampling.

I-2 POST-CLOSURE PLAN

This section and its subsections do not apply to this closure plan. As noted in OAC 3745-55-10(B) and 40 CFR 264.110(b), post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units, landfills, or tanks. Closure of the Plant 9 Warehouse - Building 81 does not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required when post-closure care is required. Post-closure care is required only for hazardous waste disposal

facilities, waste piles, and surface impoundments as noted in OAC 3745-264
55-10(B) and 40 CFR 264.110(b). Since post-closure care is not required when closing a container storage area, a notation will not be made in the FMPC property deed regarding closure of this unit.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for closure.

I-6 POST-CLOSURE COST ESTIMATE

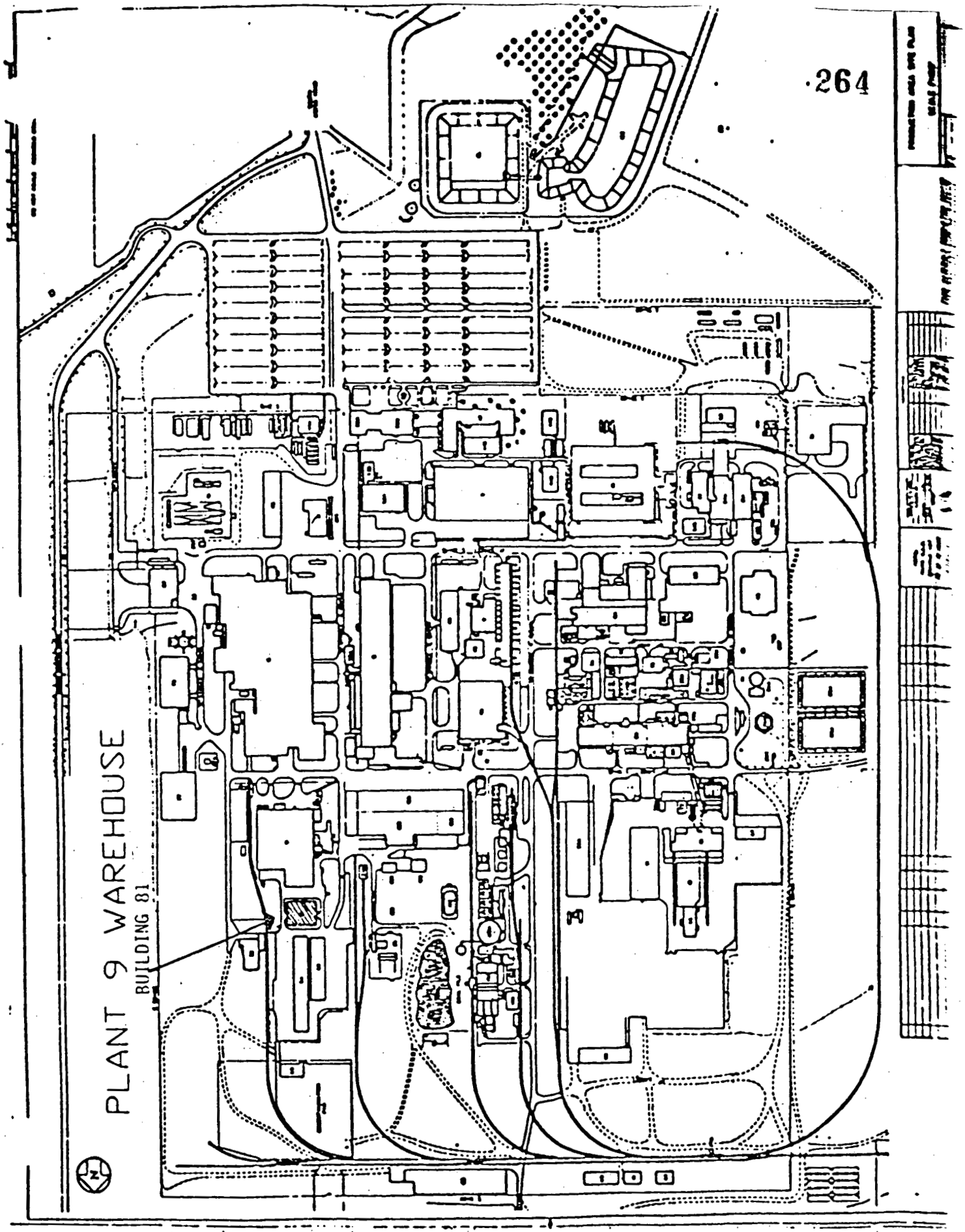
This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a post-closure care cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-8 LIABILITY REQUIREMENTS

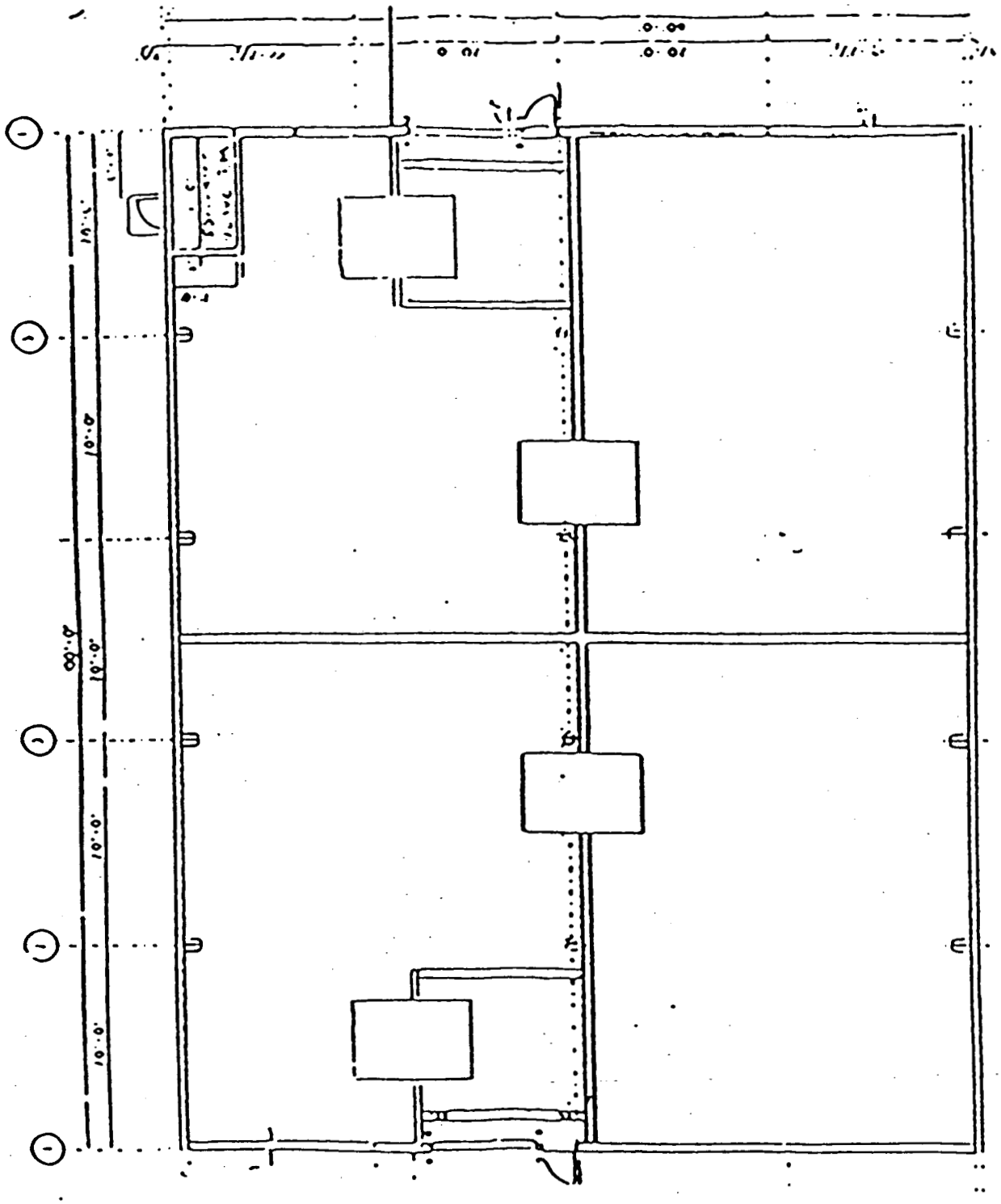
This section and its subsections do not apply to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of an accident.



ATTACHMENT 1

119

CLOSURE PLAN
PLANT 9 WAREHOUSE
BUILDING 81



ATTACHMENT 2

CLOSURE PLAN
PLANT 9 WAREHOUSE
BUILDING 81

ATTACHMENT 3

SCHEDULE FOR CLOSURE OF THE PLANT 9 WAREHOUSE - BUILDING 81

Action	Cumulative Days to Complete
Initiate Closure	0
Remove inventory, load and transfer	10
Decontaminate building	40*
Building surface sampling	50*
Analyze samples and results	70
Decontaminate equipment	80*
Complete closure	110
or	
Repeat building decontamination, surface sampling and sample analysis prior to decontamination of equipment	150
Complete closure	180

* The time required for decontamination of equipment and excavation of soil will depend on the extent of above acceptable levels of RCRA contaminants found on equipment and in the soil.

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
PILOT PLANT WAREHOUSE

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. Box 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facitlity for supplying uranim metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste. Storage Area consists of a 7 feet by 62 feet curbed area within the warehouse where drummed barium chloride wastes are stored. The warehouse is located at the southwest corner of the production area.

Barium chloride wastes are generated by Reactive Metals Inc. (RMI), a DOE contractor in Ashtabula, Ohio, and shipped to FMPC in 55-gallon drums for storage prior to disposal.

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.110 through 264.115, the unit must be closed following the guidelines of a written and approved Closure Plan. This Closure Plan is being submitted to the Ohio EPA to establish the guidelines that will be followed once EPA approval has been granted.

SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand

topographically higher than surrounding bottom lands. The FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomformably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally.

The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous because the hydrogeologic properties of interest occur on a much larger scale than these local variations. On the scale appropriate for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been previously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- A groundwater divide exists which trends from southeast to northwest across the south-central portion of the facility

- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River

- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of

the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

I-1 CLOSURE PLAN

This Closure Plan is submitted for the Pilot Plant Warehouse - Building 68 as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the Closure Plan, and all revisions to the plan will be kept at the facility until final closure has been certified in accordance with OAC 3745-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55-12(a) and 40 CFR 264.112(A), the most recent copy of the Closure Plan will be provided to the Ohio EPA upon request. Also, the plan will be available for Ohio EPA review if requested during site inspections. Should an amendment to the Pilot Plant Warehouse Storage Area Closure Plan be required for any of the reasons listed below, a written request for amendment will be provided to the Ohio EPA and will include a copy of the amended Closure Plan. The following situations would require an amendment to the plan:

- A change in the expected date of closure.
- An unexpected event encountered during closure activities.
- A change in operating plans or facility design that affects the closure.

If a proposed change in design or operating plans will affect the closure plan, an amendment to the plan will be submitted 60 days prior to the change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days after the event. If an unexpected event affecting the closure plan occurs during the closure period, an amendment will be submitted within 30 days of the event.

If the Closure Plan is amended after the permit has been issued, the amended closure plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the Pilot Plant Warehouse - Building 68 storage area will be completed in accordance with performance standards as stated in OAC 3745-55-11, OAC 3745-55-78, and 40 CFR 264.111 and 264.178. These standards include the following:

- Minimizing the need for further maintenance by decontaminating the storage area specifically the material underlying the containers. Any portion of the storage area which cannot be cleaned to below allowable limits will be removed and placed into approved FMPC RCRA storage units. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10 and 40 CFR 264.110.

- Controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, the escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials to

storage containers, and placing the storage containers into approved RCRA storage units at the FMPC.

I-1b Partial Closure and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC facility. At the time of closure no additional storage of hazardous wastes will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities, in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum waste inventory that can be stored at the Pilot Plant Warehouse - Building 68 is 180 55-gallon containers of waste. This the largest amount of waste that can be stored in this storage unit. Waste stored at this unit in the past has been barium chloride waste (EPA waste code-D005), a RCRA solid waste, designated as RCRA due to its barium content. The storage of FMPC K-65 residues which contain concentrations of lead can also occur at this storage unit. Sampling as part of closure at this unit will address the type of waste stored at the unit.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

The Pilot Plant Warehouse - Building 68 storage area consists of one area 7 feet x 62 feet located within the warehouse, which is located at the southwest corner of the production area. It consists of a curbed area within the warehouse. The purpose of this storage area is to provide for storage of the hazardous waste generated and received at the FMPC. A facility location map and diagram of the storage area are provided in Attachment 2 of this plan.

Based on these operations, a potential for contamination exists within the storage area from normal drum leaks, spills, or transportation-related incidents. In addition, the possibility exists for soil contamination below the storage area in the soil underlying the structure at the point where cracks or joints in the concrete exist.

Initial closure actions include the removal of all wastes and materials stored within the storage unit. Disposal will be provided at a permitted facility off-site. Prior to shipping, it may be necessary to temporarily store the containers at a FMPC RCRA storage unit. Either temporary storage at another FMPC RCRA facility or disposal off-site will be necessary in order to fully decontaminate and close this facility in accordance with this Closure Plan.

After removal has been accomplished, the next task will be to decontaminate the storage unit using a high-pressure spray detergent wash and rinse with vacuum attachment. The unit will be cleaned and rinsed; both washwater and rinseate will be collected and containerized. Complete cleaning of the entire area must be accomplished to assure adequate closure. The containers of water will each be sampled followed the guidelines of an approved sampling plan.

Samples must be analyzed for the RCRA metals as listed in the RCRA characteristics (OAC 3745-51-24). If the washwater and rinseate have been determined to be below allowable levels they will be disposed of as non-hazardous, otherwise they must be disposed of as hazardous. Wipe samples will be collected of the storage unit with the number of samples and area to be covered determined as outlined in SW-846. These will be collected using distilled water and either a laboratory filter or wipe. All sampling materials must be held pending the results of the analyses. If the results indicate a level below the RCRA characteristics level, then another wash will not be required; however, if levels are above the allowable limits, then additional decontamination will be required. This will be repeated up to three times or until levels are satisfactory.

If floor sections cannot be decontaminated after three attempts then they will be removed, containerized and transferred to an FMPC RCRA storage unit to be managed as a RCRA hazardous waste.

A sampling plan for the soils underlying the the Pilot Plant Warehouse - Building 68 is provided in Appendix A to this Closure Plan.

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal or placement of these wastes in an approved facility, decontamination of the storage area, and sampling and analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section does not apply to this Closure Plan. No tanks are associated with the Pilot Plant Warehouse - Building 68 Storage Area.

I-1d(3) Closure of Waste Piles

This section does not apply to this Closure Plan. No waste piles are associated with the Pilot Plant Warehouse - Building 68 Storage Area.

I-1d(4) Closure of Surface Impoundments

This section does not apply to this Closure Plan. No surface impoundments are associated with the Pilot Plant Warehouse - Building 68 Storage Area.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this Closure Plan. No incinerators are associated with the Pilot Plant Warehouse - Building 68 Storage Area.

I-1d(6) Closure of Land Treatment Facilities

This section does not apply to this Closure Plan. No land treatment facilities are associated with the Pilot Plant Warehouse - Building 68 Storage Area.

I-1e Closure of Land Disposal Units

This section and its subsections do not apply to this Closure Plan. No disposal units are associated with the Pilot Plant Warehouse - Building 68 Storage Area. If contamination exists following removal, amendments will be made to the plan to provide for post-closure care or remediation, whichever is more appropriate.

I-1f Schedule for Closure

The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d). The Schedule for Closure is provided in Attachment 1 to this Closure Plan. Attachment 1 provides approximate milestones for closure; the time required for decontamination of equipment and removal of soils will depend on the extent of contamination found on the equipment and in the soils.

If requested by Ohio EPA, FMPC will contact the facility inspector at least five days in advance of certain critical activities so that the inspector may be present to observe these activities.

I-1g Extension for Closure Time

Attachment 1 shows the anticipated closure schedule for this unit. If additional time will be required to close the unit, the FMPC will request from the Ohio EPA an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered Professional Engineer shall submit certification of closure within 60 days after unit closure is

complete. The certification will meet the requirements of OAC 3745-55-15.

In addition, the Ohio EPA's facility inspector shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinse water sampling. The Professional Engineer will also be present during such critical activities as cleaning and final sampling.

I-2 POST-CLOSURE PLAN

This section and its subsection are not applicable to this Closure Plan. As noted in OAC 3745-55-10(B) and 40 CFR 264.110(b), post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units, landfills, or tanks. Closure of the Pilot Plant Warehouse Storage Area does not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required when post-closure care is involved. Post-closure care is required only for hazardous waste disposal facilities, waste piles, and surface impoundments. Since post-closure care is not required when closing containers or storage areas, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this Closure Plan. The FMPC is a federally owned facility. The Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this Closure Plan. The FMPC is a federally owned facility. The Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism.

I-6 POST-CLOSURE COST ESTIMATE

This section is not applicable to this Closure Plan. The FMPC is a federally owned facility. The federal government is exempt from Financial Requirements, which includes submittal of a post-closure cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable to this Closure Plan. The FMPC is a federally owned facility. The Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-8 LIABILITY REQUIREMENTS

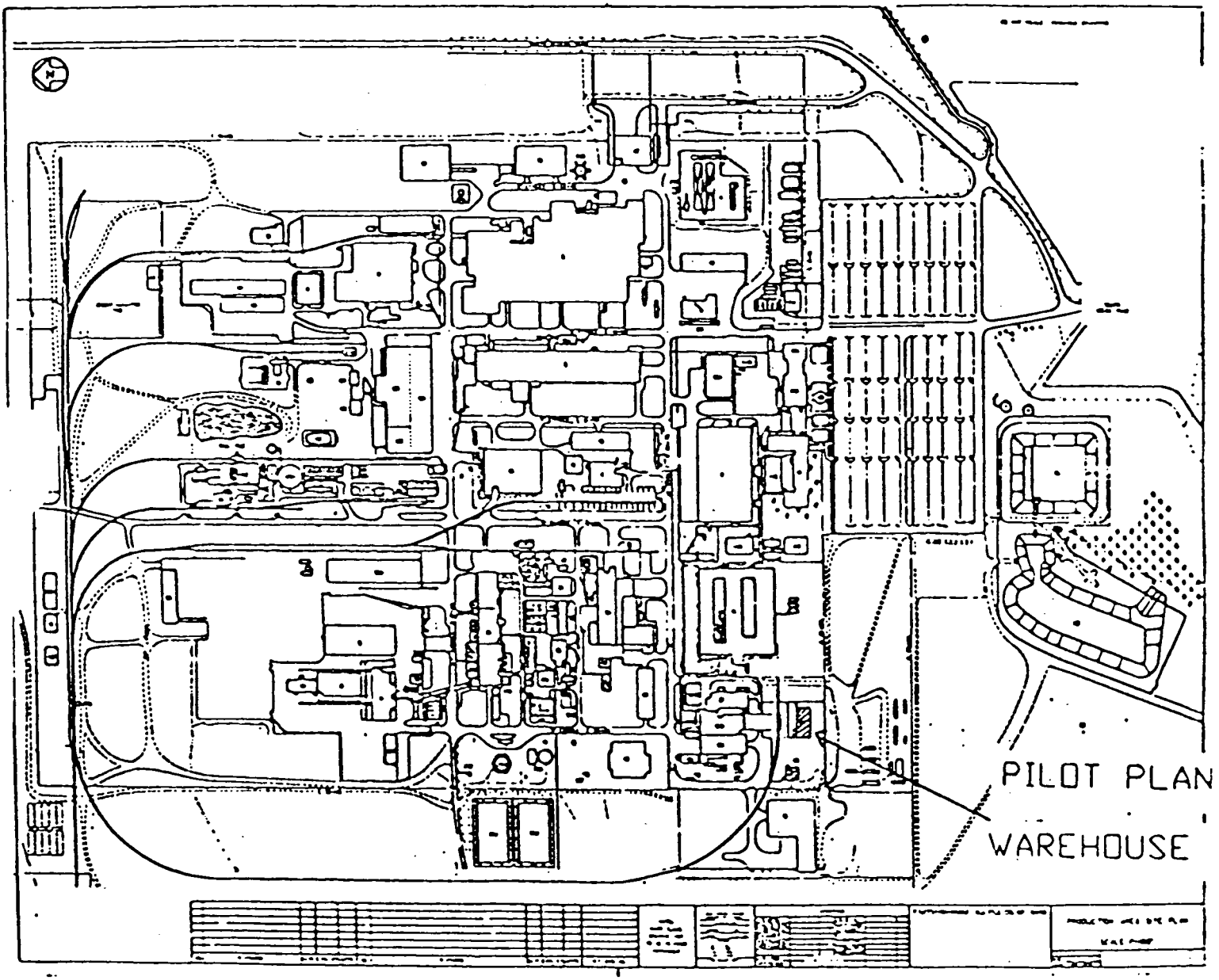
This section and its subsections are not applicable to this Closure Plan. The FMPC is a federally owned facility. The Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of an accident.

SCHEDULE FOR CLOSURE OF THE PILOT PLANT WAREHOUSE STORAGE AREA

Action	Cumulative Days To Complete
° Initiate Closure	0
° Remove and Store Accumulated Waste	20
° Decontaminate Containment Structure	30
° Sample and Analyze Washwater and Rinseate as Required	50
° Wipe Sample and Analyze Containment Structure as Required	70
° Conduct Additional Decontamination as Needed Pending Results of the Sampling	100
° Conduct Sampling and Analysis of the Underlying Soils	120
° Remove Containment Structure and/or Soils as Required Pending the Results of the Sampling	150
° Complete Closure	180

ATTACHMENT 2

SITE LOCATION
PILOT PLANT WAREHOUSE



CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
PROPOSED RCRA WAREHOUSE

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. Box 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

CONTENTS (Continued)

INTRODUCTION

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste.

The new RCRA warehouse is proposed to be built approximately 150 feet south of the KC-2 warehouse in an open area parallel to the railroad tracks (See Attachment 1). The warehouse will have approximately 9,600 square feet (80 feet x 120 feet) of floor space. The warehouse will be capable of storing approximately 2640 drums when triple stacked utilizing three foot aisle spacing (see Attachment 2).

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.110 through 264.115, the unit must be closed following the guidelines of a written and approved Closure Plan. This Closure Plan is being submitted to the Ohio EPA to establish the guidelines that will be followed during unit closure.

SITE HYDROGEOLOGY

The FMPC is located within a 2- to 3-mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. The FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomformably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous because the hydrogeologic properties of interest occur on a much larger scale than these local variations. On the scale appropriate

for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been previously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- A groundwater divide exists which trends from southeast to northwest across the south-central portion of the facility.
- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.
- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

I-1 CLOSURE PLAN

This closure plan is submitted for the Proposed RCRA Warehouse as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the closure plan and all revisions to the plan will be kept at the facility until final closure has been certified in accordance with OAC 3744-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55-12(A) and 40 CFR 264.112(a), the most recent copy of the Closure Plan will be provided to the Ohio EPA upon request. Also, the plan will be available for EPA review if requested during site inspections. Should an amendment to the proposed RCRA Warehouse Closure Plan be required for any of the reasons listed below, a written request for amendment will be provided to the Ohio EPA and will include a copy of the amended Closure Plan. The following situations would require an amendment to the plan:

- o A change in the expected date of closure.
- o An unexpected event encountered during closure activities.
- o A change in the operating plan or facility design which affect the closure.

If a proposed change in design or operating plans will affect the closure plan, an amendment to the plan will be submitted 60 days prior to the change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 days

after the event. If an unexpected event affecting the closure plan occurs during the closure period, an amendment will be submitted within 30 days of the event. The amended closure plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the proposed RCRA warehouse will be completed in accordance with performance standards as stated in OAC 3745-55-11, OAC 3745-55-78, 40 CFR 264.11, and 40 CFR 264.178. These standards include the following:

- Controlling, minimizing, or eliminating (to the extent necessary to protect human health and the environment) the escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or hazardous waste decomposition products to the ground or surface waters or to atmosphere. This will be achieved by removing all remaining hazardous waste materials and residues contained within the storage unit and placing the storage containers into approved RCRA storage units at the FMPC or by transfer to a permitted off-site disposal or treatment facility.

- Minimizing the need for further maintenance by decontaminating the concrete warehouse floor and removing any contaminated soil from beneath the floor. Any concrete flooring that cannot be decontaminated to below allowable limits will be removed and placed into an approved FMPC RCRA storage unit. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10(B) and 40 CFR 264.110.

I-1b Partial Closure and Final Closure Activities

This Closure Plan addresses the closure of one of the FMPC's hazardous waste storage units, which constitutes partial closure of the FMPC facility. At the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC 3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum inventory of hazardous wastes in the proposed RCRA warehouse at any given time during the operating life of FMPC could conceivably be as many as 2640 55-gallon containers. Worst case conditions were assumed in the development of this Closure Plan.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

Closure of the RCRA warehouse waste container storage unit at the FMPC will be completed in accordance with the following guidelines.

All containers of hazardous waste will be removed from the RCRA Warehouse at the time of closure. The containers will be placed into the remaining approved RCRA storage units at the FMPC until appropriate disposal can be accomplished or transferred to a permitted off-site treatment or disposal facility.

Once all drums have been removed, the facility will be inspected to ensure the integrity of the containment dike. Any evidence of spills or leaks will be investigated to determine if decontamination and/or disposal of waste debris will be necessary.

The container storage unit will first be examined visually to determine if any obvious signs of contamination are present. The areas with visible contamination will be flushed with a solvent or clean water rinseate. The rinseate will be placed into appropriate containers and transferred to one of the remaining approved RCRA storage units. The rinseate will be analyzed following the guidelines of SW-846 to determine the level of hazardous constituents. Appropriate disposal, whether as a hazardous waste or non-hazardous waste, will be accomplished based on the results of the analysis.

The entire container storage unit will be segregated into designated areas and each area will be flushed with a clean water rinseate which will be collected and placed into appropriate containers. A sample or samples will be drawn from the rinseate for each area and will be analyzed following the guidelines of SW-846 for hazardous constituents. If the analysis proves to contain levels of hazardous constituents below those specified for metals as listed in OAC 3745-51-24 and below one part per million (ppm) for any RCRA related solvent, the rinseate and the portion of the container storage unit from which it was drawn shall be considered clean. The area will be returned to service for non-hazardous waste purposes or abandoned and the clean rinseate will be disposed of as non-hazardous waste.

If the rinseate contains hazardous constituents above acceptable levels, further decontamination efforts in the form of solvent washing, steam cleaning or scraping will be employed to remove the contamination. The storage area will be analyzed again with the collection of a rinseate and rechecked for contamination. The

process of decontaminating and analyzing of rinseate will be repeated a maximum of three times. Any portion of the container storage unit which cannot be decontaminated to below acceptable limits after three attempts, will be removed and placed into appropriate storage containers. Off-site treatment of disposal alternatives will be pursued for final disposal of this material.

The entire container storage area will be decontaminated with a series of appropriate wash solutions. All waste water and residues from this operation will be collected in the sumps and pumped into storage containers until the appropriate analyses following SW-846 guidelines are performed. If the analyses indicate the wash solution wastes to be hazardous, they will be transported to a licensed off-site TSD facility for disposal or an alternate FMPC storage unit. If laboratory results indicate no evidence of contamination, the wash solution wastes will be discharged to the on-site sewer treatment system. Pumps and equipment will be removed and decontaminated as necessary.

Any wastes generated as a result of clean-up and decontamination operations including solid and contaminated equipment which are determined to be hazardous will be transported to a licensed TSD facility for disposal or to an alternate FMPC storage unit. Once the facility has been deemed clear of any contamination, it will be reused or abandoned.

A sampling plan addressing the specifics of sampling, and the parameters to be analyzed for in the rinseates, concrete pad sections, and soil beneath the pad will be submitted to the Ohio EPA prior to initiation of closure activities on the Proposed RCRA Warehouse.

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal, or placement of these wastes in a approved facility, decontamination of the storage area, and sampling and analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section is not applicable to this Closure Plan. No tanks will be associated with the Proposed RCRA Warehouse.

I-1d(3) Closure of Waste Piles

This section is not applicable to this Closure Plan. No waste piles will be associated with the Proposed RCRA Warehouse.

I-1d(4) Closure of Surface Impoundments

This section is not applicable to this Closure Plan. No surface impoundments will be associated with the Proposed RCRA Warehouse.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this Closure Plan. No incinerators will be associated with the Proposed RCRA Warehouse.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this Closure Plan. No land treatment facilities will be associated with the RCRA Warehouse.

I-1e Closure of Land Disposal Units

This section and its subsections are not applicable to this Closure Plan. No waste piles, landfills or surface impoundments will exist as a result of closing the RCRA warehouse.

I-1f Schedule for Closure

The Ohio EPA will be notified 45 days prior to commencement of closure activities. The schedule for closure of the Proposed RCRA Warehouse is provided in Attachment 3 of this Closure Plan.

In addition, the Ohio EPA's facility inspector shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinsewater sampling. The Professional Engineer will also be present during such critical activities as cleaning and final sampling.

I-1g Extension for Closure Time

Attachment 3 shows the anticipated closure schedule for this proposed unit. If additional time will be required to close the unit, the FMPC will request an extension of closure time from the Ohio EPA in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered engineer shall submit certification of closure within 60 days after unit closure is complete. The certification will meet include the requirements of OAC 3745-55-13 and 40 CFR 264.115.

I-2 POST-CLOSURE PLAN

This section and its subsections are not applicable to this Closure Plan. As noted in OAC 3745-55-10(B) and 40 CFR 264.110(b), post-closure care and a Post-Closure Plan are required only when closing hazardous waste surface impoundments, land treatment units, landfills, or tanks. Closure of the RCRA warehouse will not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required under OAC 3745-55-19(B)(1) when post-closure care is required. Post-closure care is required only for hazardous waste disposal facilities, waste piles and surface impoundments as noted in OAC 3745-55-40(B) and 40 CFR 264.110(b). Since post-closure care is not required when closing a storage unit, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this Closure Plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this Closure Plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for closure costs.

I-6 POST-CLOSURE COST ESTIMATE

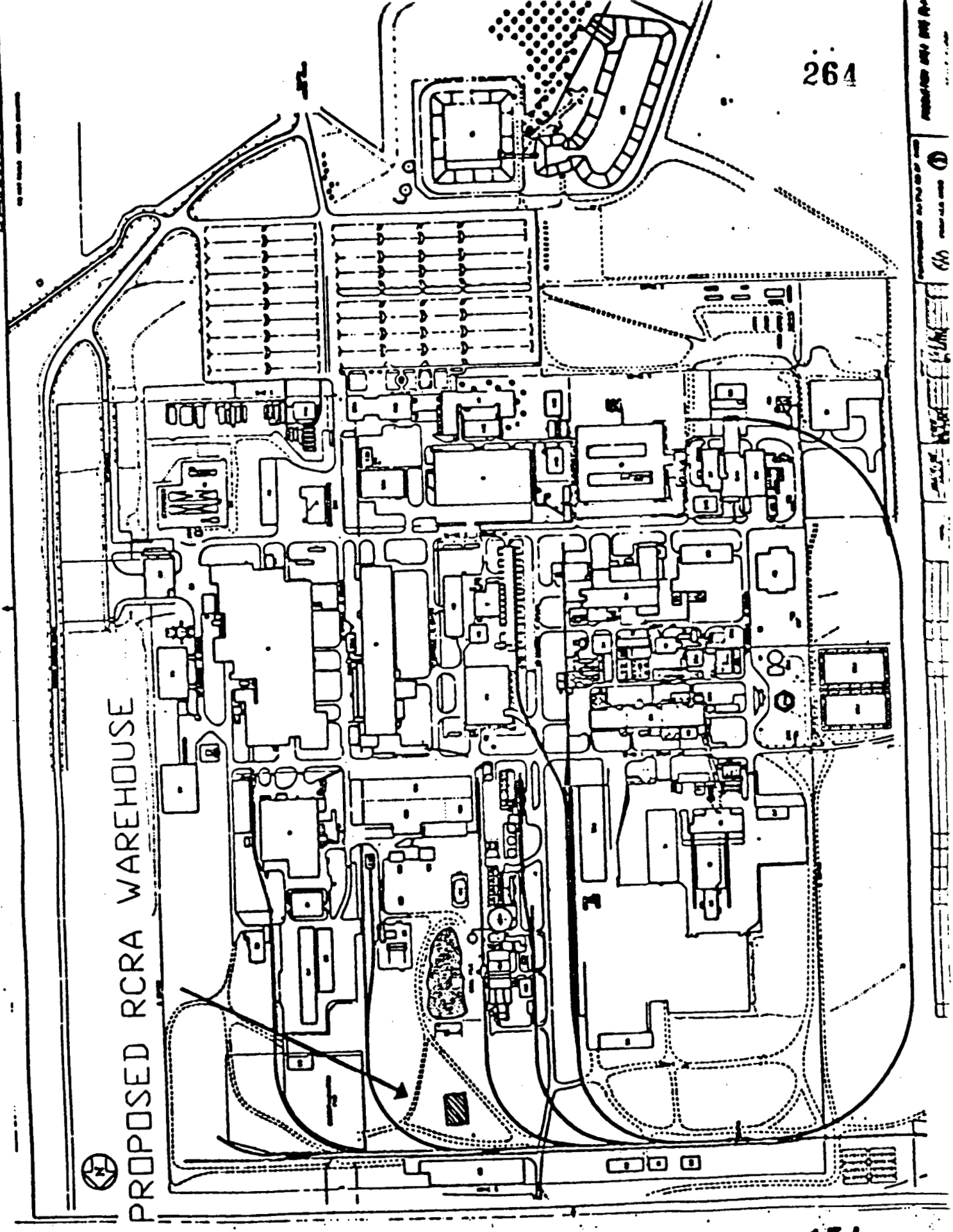
This section and its subsections are not applicable to this Closure Plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable to this Closure Plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

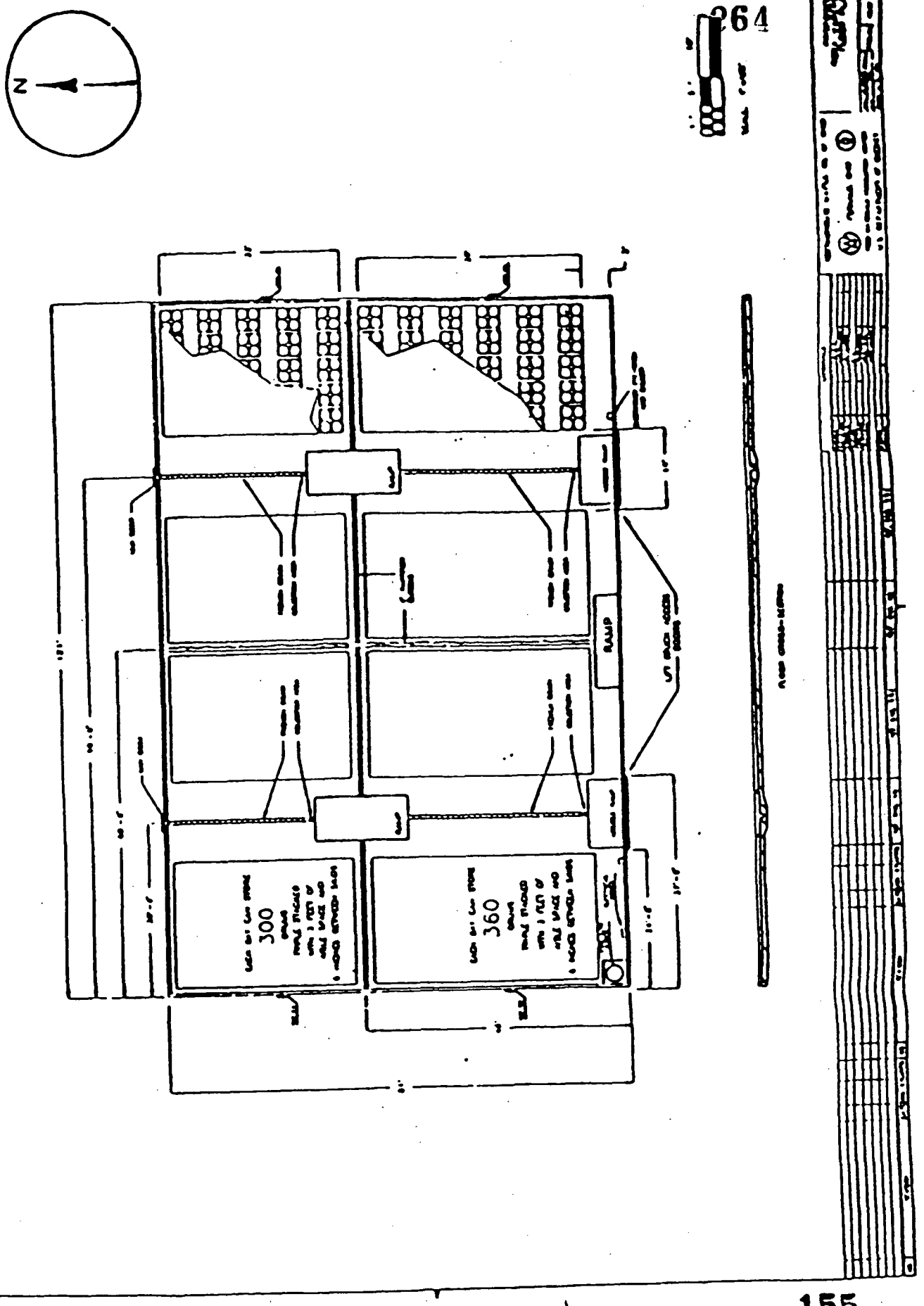
I-8 LIABILITY REQUIREMENTS

This section and its subsections are not applicable to this Closure Plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of an accident.



ATTACHMENT 1

CLOSURE PLAN
PROPOSED RCRA WAREHOUSE



ATTACHMENT 2

155

CLOSURE PLAN
PROPOSED RCRA WAREHOUSE

ATTACHMENT 3

SCHEDULE FOR CLOSURE OF PROPOSED RCRA WAREHOUSE

Action	Cumulative Days to Complete
Initiate Closure	0
Remove inventory, load and transfer	10
Decontaminate building	40*
Building surface sampling	50*
Analyze samples and results	70
Decontaminate equipment	80*
Complete closure	110
or	
Repeat building decontamination, surface sampling and sample analysis prior to decontamination of equipment	150
Complete closure	180

* The time required for decontamination of equipment and excavation of soil will depend on the extent of above acceptable levels of RCRA contaminants found on equipment and in the soil.

CLOSURE PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
PROPOSED BUILDING 83X STORAGE WAREHOUSE

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. BOX 398705

CINCINNATI, OHIO 45239-8705

CONTENTS

CONTENTS (Continued)

INTRODUCTION

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Closure Plan to hazardous waste mean radioactive mixed waste.

The Proposed Building 83X Warehouse is located west of building 67/Plant 1 on the west side of the production fence line and east of the railroad track. It will extend from the K-65 service road north to the drainage gully (see Attachment 1).

A materials handling/identification facility adjacent to the main storage area will serve as a permanent material handling and identification area.

The material handling facility will be approximately 45 feet by 45 feet (2,000 square feet) and made of concrete blocks with wire strip joint reinforcement (see Attachment 3).

Adjacent to the material handling facility will be a shielded storage facility. This facility will store mixed hazardous and radioactive materials that require special shielding (radioactive material that produces exposure fields greater than 70 mRem/hour). This building will be approximately 50 feet by 160 feet (8,000 square feet) with poured reinforced concrete walls (see Attachment 2).

In accordance with OAC 3745-55-10 through OAC 3745-55-15 and 40 CFR 264.110 through 264.115, the unit must be closed following the

guidelines of a written and approved Closure Plan. This Closure Plan is being submitted to the Ohio EPA to establish the guidelines that will be followed during unit closure.

SITE HYDROGEOLOGY

The FMPC is located within a 2 to 3 mile wide valley, entitled the New Haven Trough, formed as a result of Pleistocene glaciation and, subsequently, filled with glacial outwash materials and till. Erosion by the Great Miami River and its tributaries then removed significant portions of the glacial till and left terrace remnants, which stand topographically higher than surrounding bottom lands. the FMPC site lies on top of one of these terrace remnants.

Bedrock underlying the FMPC is comprised of flat lying olive gray shale within the New Haven Trough and is generally between 60 to more than 200 feet below the land surface in the vicinity of the FMPC. Elevation of the bedrock surface varies from 327 feet south of the Production Area to 400 feet just north of the FMPC (GeoTrans, 1985).

Uncomformably overlying the shale bedrock is a sequence of sand and gravel glacial outwash material up to 200 feet thick. Underneath parts of the FMPC these gravels are separated by 10 to 20 feet thick greenish-black silty clay ("blue-clay") at a depth of about 100 to 125 feet below the surface (Spieker, 1968; GeoTrans, 1985). This clay layer, which appears to be discontinuous, is located in the vicinity of the FMPC Waste Storage Area and production wells.

Near the surface of the FMPC, overlying the outwash materials is a dense, silty clay, glacial till that varies in composition vertically and laterally. The silty clay till contains lenses of poorly sorted fine-to medium-grained sand and gravel, silty sand and silt with layers of silty clay to the west and south of the FMPC. The till varies in

thickness from 20 to 50 feet having a base at an elevation of 540 feet (above MSL) (Dames & Moore, 1985; GeoTrans, 1985; Spieker, 1968).

To the west and south of the site, the silty clay till laterally grades into a sequence of silty sand and silt with some layers of silty clay. The silty clay till remains continuous to the north and east of the site and directly overlies the bedrock in these areas. In the lower reach of Paddy's Run and the Storm Sewer Outfall Ditch, the silty clay till has been eroded away and the underlying sand and gravel are exposed.

The buried channel aquifer includes numerous interbedded clay or fine-grained lenses. These lenses result in very large variations of aquifer properties on a localized scale. The aquifer may be regarded, however, as homogeneous because the hydrogeologic properties of interest occur on a much larger scale than these local variations. On the scale appropriate for characterizing groundwater movement in the vicinity of the FMPC, aquifer properties have been previously established by aquifer pumping tests (Spieker, 1968a; Spieker and Norris, 1962; Dove, 1961).

Transmissivity values within the aquifer have been reported in the range of 300,000 to 500,000 gallons per day per foot (Spieker, 1968a). Based on an average saturated thickness of 150 feet, the range of horizontal hydraulic conductivity is approximately 270 to 450 feet per day.

From an aquifer test, Spieker and Norris (1962) estimated the transmissivity of the lower sand and gravel aquifer below the FMPC to be about 140,000 gallons per day per foot. Using a thickness of 70 feet, the estimated horizontal hydraulic conductivity of the lower sand and gravel aquifer is approximately 270 feet per day.

As currently understood, the ground water flow direction is as follows:

- o A groundwater divide exists which trends from southeast to northwest across the south-central portion of the facility.

- Water in the buried channel aquifer near the waste pits will travel east towards the Great Miami River.

- Water south of the waste pits will travel south and southeasterly towards the Great Miami River.

Efforts continue under the Remedial Investigation/Feasibility Study (RI/FS) to refine the current understanding of the relative location of the groundwater divide and its impact on local groundwater flow and quality.

Corrective Actions

At the time of preparation of this Closure Plan, no corrective action programs have been implemented at the facility.

I-1 CLOSURE PLAN

This closure plan is submitted for the proposed Building 83X Warehouse as part of the FMPC Facility Closure Plan. RCRA regulations require hazardous waste management facilities to have a written Closure Plan that identifies the steps necessary to perform partial and/or final closure of the facility at any point during its active life. Copies of the closure plan and all revisions to the plan will be kept at the facility until final closure has been certified in accordance with and OAC 3745-55-15 and 40 CFR 264.115.

The FMPC Facility Closure Plan is included in of the RCRA Part B Permit Application. To meet the requirements of OAC 3745-55-12(A) and 40 CFR 264.112(a), the most recent copy of the closure plan will be provided to the Ohio EPA upon request. Also, the plan will be available to the Ohio EPA for inspection if requested during site inspections. Should an amendment to the Proposed Building 83X Warehouse closure plan be required for any of the reasons listed below, a written request for

amendment will be provided to the Ohio EPA and will include a copy of the amended closure plan. The following situations would require an amendment to the plan: 264

- o A change in the expected date of closure.
- o An unexpected event encountered during closure activities.
- o A change in the operating plans or facility design which affect the closure plan.

If a proposed change in design or operating plans will affect the closure plan, an amendment to the plan will be submitted 60 days prior to the change. If an unexpected change affecting closure occurs during the operating life of the unit, an amendment will be submitted within 60 after the event. If an unexpected event affecting the closure plan occurs during the closure period, an amendment will be submitted within 30 days of the event. The amended closure plan will include a request for permit modification.

I-1a Closure Performance Standard

Closure of the Proposed Building 83X Warehouse storage area will be completed in accordance with performance standards as stated in OAC 3745-55-11 and OAC 3745-55-78, and in 40 CFR 264.111 and 264.178. These standards include the following:

- o Minimizing the need for further maintenance by decontaminating the storage area, specifically the material underlying the containers. Any portion of the storage area that cannot be cleaned to below allowable limits will be removed and placed into approved FMPC RCRA storage units. Post-closure maintenance under RCRA will not be required since this unit is excluded from post-closure care under OAC 3745-55-10 and 40 CFR 264.110.

- Controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, the escape of hazardous waste, hazardous waste constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters, or to the atmosphere. This will be achieved by removing all remaining hazardous waste materials to storage containers, and placing the storage containers into approved RCRA storage units at the FMPC.

I-1b Partial Closure and Final Closure Activities

This closure plan addresses the closure of one of the FMPC's hazardous waste storage units which constitutes partial closure of the FMPC facility. At the time of closure no additional storage of hazardous waste will occur at the unit.

This plan identifies all steps necessary to completely close this unit. No additional hazardous waste storage will occur once closure is completed. The Ohio EPA will be notified 45 days prior to commencement of closure activities in accordance with OAC-3745-55-12(D) and 40 CFR 264.112(d).

Final closure of the FMPC as a facility is not the intent of this plan; this plan addresses closure of only one FMPC storage unit.

I-1c Maximum Waste Inventory

The maximum inventory of hazardous wastes in the Proposed Building 83X Warehouse at any given time during the operating life of FMPC could conceivably be as much as 16,300 55-gallon drums. The mixed radioactive waste will be stored in 55-gallon drums, each foamed inside an overpack. The overpack will be 72 inches in length by 46 1/2 inches width and 47 1/2 inches height with 2-3 inch high

runners on bottom. Worst case conditions were assumed in the development of this closure plan.

I-1d Inventory Removal, Disposal, or Decontamination of Equipment

Closure of the Proposed Building 83X Warehouse waste container storage unit at the FMPC will be completed in accordance with the following guidelines.

All containers of hazardous waste will be removed from the Building 83X Warehouse at the time of closure. The containers will be placed into the remaining approved RCRA storage units at the FMPC until appropriate disposal can be accomplished or transferred to a permitted off-site treatment or disposal facility.

Once all drums have been removed, the facility will be inspected to ensure the integrity of the containment dike. Any evidence of spills or leaks will be investigated to determine if decontamination and/or disposal of waste debris will be necessary.

The container storage unit will first be examined visually to determine if any obvious signs of contamination are present. The areas with visible contamination will be flushed with a solvent or clean water rinseate. The rinseate will be placed into appropriate containers and transferred to one of the remaining approved RCRA storage units. The rinseate will be analyzed following the guidelines of SW-846 to determine the level of hazardous constituents. Appropriate disposal, whether as a hazardous waste or non-hazardous waste, will be accomplished based on the results of the analysis.

The entire container storage unit will be segregated into designated areas and each area will be flushed with a clean water rinseate which will be collected and placed into appropriate containers. A sample or samples will be drawn from the rinseate for each area and will be analyzed following the guidelines of SW-846 for hazardous constituents. If the analysis proves to contain levels of hazardous constituents metals above the EP toxicity regulatory thresholds in OAC 3745-51-24, the rinseate and the portion of the container storage unit from which it was drawn shall be considered clean. The area will be returned to service for non-hazardous waste purposes or abandoned and the clean rinseate will be disposed of as non-hazardous waste.

If the rinseate contains hazardous constituents above acceptable levels, further decontamination efforts in the form of solvent washing, steam cleaning or scraping will be employed to remove the contamination. The storage area will be analyzed again with the collection of a rinseate and rechecked for contamination. The process of decontaminating and analyzing of rinseate will be repeated a maximum of three times. Any portion of the container storage unit which cannot be decontaminated to below acceptable limits after three attempts, will be removed and placed into appropriate storage containers. Off-site treatment of disposal alternatives will be pursued for final disposal of this material.

The entire container storage area will be decontaminated with a series of appropriate wash solutions. All waste water and residues from this operation will be collected in the sumps and pumped into storage containers until the appropriate analyses following SW-846 guidelines are performed. If the analyses indicate the wash solution wastes to be hazardous, they will be transported to a permitted off-site facility for disposal or an alternate FMPC storage unit. If laboratory results indicate no evidence of contamination, the wash solution wastes will be

discharged to the on-site waste water treatment system. Pumps and equipment will be removed and decontaminated as necessary.

Any wastes generated as a result of clean-up and decontamination operations which are determined to be hazardous will be transported to a permitted off-site facility for disposal or to an alternate FMPC storage unit. Once the facility has been deemed clear of any contamination, it will be reused or abandoned.

A sampling plan addressing the specifics of sampling, and the parameters to be analyzed for in the rinseates, concrete pad sections, and soil beneath the pad will be submitted to the Ohio EPA prior to initiation of closure activities on the Proposed Building 83X Warehouse.

Soils surrounding the facility are not expected to be contaminated. However, the possibility of contamination during decontamination operations or as a result of a spill does exist. Area soil samples will be taken and analyzed as per methods included in SW-846.

If there is any evidence of spills or leaks, samples will be taken and analyzed to determine the extent of contamination in the subsoils and if necessary, in groundwater. Any contaminated soil will be excavated, removed and disposed of in an approved RCRA Storage unit(s) at the FMPC or licensed off- site treatment or disposal facility.

If necessary, soils located around the perimeter of the Proposed Building 83X Warehouse shall be sampled and analyzed following procedures set forth in the SW-846. A sampling plan showing the number of samples to be collected and their precise location shall be submitted 180 days prior to actual closure activities. Soil sampling shall continue until the full extent of contamination is

determined. The sampling plan will include the results of soil studies performed in the area of the Proposed Building 83X Warehouse storage unit during the RI/FS. The sampling plan will be the basis for defining clean levels for soil as specified in OAC 3745-55-11. The following information will be included in the sampling plan.

1) Parameters to be analyzed
2) Locations of samples
3) Background samples
4) Sampling methods and equipment
5) Analytical methods
6) Evidence of a quality assurance/quality control plan for laboratory analyses
7) Clear statement of the "clean" level for soil

The parameters to be analyzed in the soil may include any element or compound that is a hazardous waste or hazardous waste constituent (as specified in OAC 3745-51). Parameters will not only be based upon knowledge of the wastes managed at the Proposed Building 83X Warehouse but will also include other potential elements or compounds used at the facility which generated the waste.

The locations of soil samples will be selected to adequately determine the horizontal and vertical extent of all contaminant specified in the parameters. To determine the horizontal extent either a grid system or directed system will be used. The interval for sampling soil at various depths will depend upon the following factors:

- o soil type and permeability
- o suspected magnitude of surface contamination
- o physical state of the waste and its mobility

- o height of liquid head at the ground surface
- o length of time waste present at warehouse
- o relative toxicity of waste

Background samples of the area will be taken to compare statistically the natural condition to the potentially contaminated area (OAC 3745-55-11). Much of this data will be a result of the RI/FS. The background samples will be taken in areas minimally affected by industrial or other pollution. The samples will be taken from soil depths and soil horizon materials similar to those of the potentially contaminated area.

Sampling methods and equipment, as well as laboratory analytical methods, will follow. Method for field sampling, including soil sampling, not included in SW-846 will be approved by Ohio EPA before being used in this closure.

In addition to the SW-846 methods for laboratory analyses, each laboratory analyzing samples will show that it has a quality assurance/quality control plan for each parameter of interest. QA/QC procedures will be similar to the Ohio EPA/Ohio Department of Health's "RCRA Laboratory Quality Assurance Project Plan" (1983).

I-1d(1) Closure of Containers

Closure will consist of removal of the containers of waste, disposal or placement of these wastes in an approved facility, decontamination of the storage area, and sampling and analysis of the soils below the storage area. Analytical methods will be those determined by SW-846.

I-1d(2) Closure of Tanks

This section is not applicable to this closure plan. No tanks will be associated with the Proposed Building 83X Warehouse.

I-1d(3) Closure of Waste Piles

This section is not applicable to this closure plan. No waste piles will be associated with the Proposed Building 83X Warehouse.

I-1d(4) Closure of Surface Impoundments

This section is not applicable to this closure plan. No surface impoundments will be associated with the Proposed Building 83X Warehouse.

I-1d(5) Closure of Incinerators

This section and its subsections do not apply to this closure plan. No incinerators will be associated with the Proposed Building 83X Warehouse.

I-1d(6) Closure of Land Treatment Facilities

This section is not applicable to this closure plan. No land treatment facilities will be associated with the Proposed Building 83X Warehouse.

I-1e Closure of Land Disposal Units

This section is not applicable to this closure plan. No waste piles, landfills or surface impoundments will exist as a result of closing the Proposed Building 83X Warehouse.

I-1f Schedule for Closure

The expected date of closure is 30 days after the date on which the unit receives the known final volume of hazardous waste or one year after the date on which the unit received the most recent volume of waste if there is a possibility the unit will receive additional waste. See Attachment 4 for the closure schedule.

I-1g Extension for Closure Time

Attachment 4 shows the anticipated closure schedule for this unit. If additional time will be required to close the unit, the FMPC will request from the Ohio EPA, an extension of closure time in accordance with OAC 3745-55-13 and 40 CFR 264.113.

I-1h Certification of Closure

The FMPC and an independent registered engineer shall submit certification of closure within 60 days after unit closure is complete. The certification statement will meet the requirements of OAC 3745-55-15.

In addition, the Ohio EPA's facility shall be contacted at least five business days in advance of certain critical closure activities. These activities shall be designated as soil sampling or removal and rinsewater sampling. The Professional Engineer will also be present during such critical activities as cleaning and final sampling.

I-2 POST-CLOSURE PLAN

This section and it subsections are not applicable to this closure plan. As noted in OAC 3745-55-10(B), and 40 CFR 264.110(b), post-closure care and a post-closure plan are required only when closing hazardous waste surface impoundments, land treatment units, landfills, or tanks. Closure of the Proposed Building 83X Warehouse does not involve any of these types of units.

I-3 NOTICE IN DEED

A notation in the property deed is required when closure involves post-closure care. Post-closure care is required only for hazardous waste disposal facilities, waste piles and surface impoundments as noted in OAC 3745-55-10(B) and 40 CFR 264.110(b). Since post-closure care is not required when closing a storage unit, a notation will not be made in the FMPC property deed.

I-4 CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40 (C), the Federal Government is exempt from Financial Requirements, which includes submittal of a cost estimate for closure.

I-5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for closure costs.

I-6 POST-CLOSURE COST ESTIMATE

This section is not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40 (C), the Federal Government is exempt from Financial Requirements, which includes submittal of post-closure cost estimate.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submittal of a financial assurance mechanism for post-closure care.

I-8 LIABILITY REQUIREMENTS

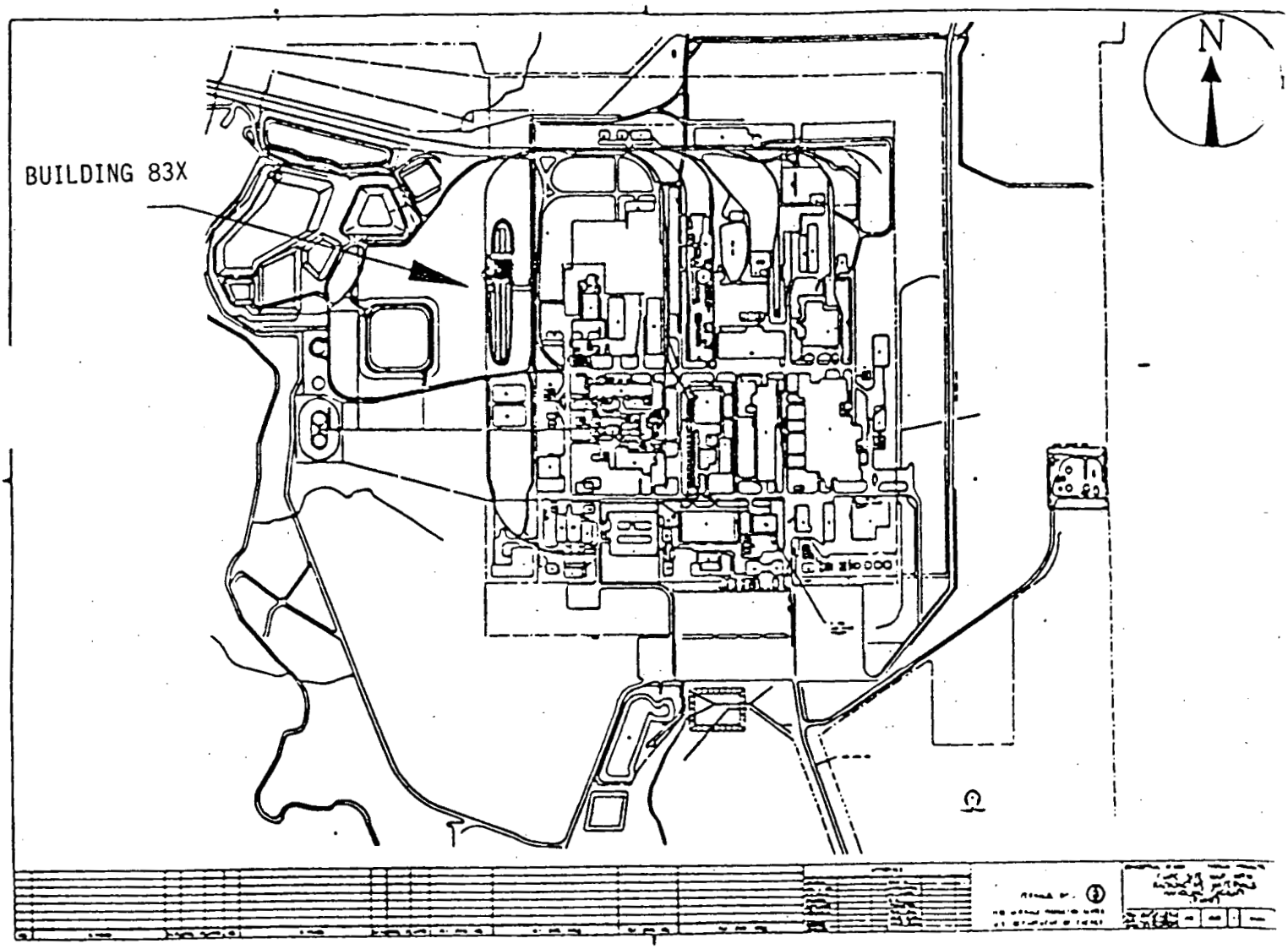
This section and its subsections are not applicable to this closure plan. The FMPC is a federally owned facility. According to OAC 3745-55-40(C), the Federal Government is exempt from Financial Requirements, which includes submitting proof of liability in the event of an accident.

ATTACHMENT 1

264

SITE LOCATION
THE PROPOSED BUILDING 83X STORAGE WAREHOUSE

PROPOSED BUILDING 83X STORAGE WAREHOUSE

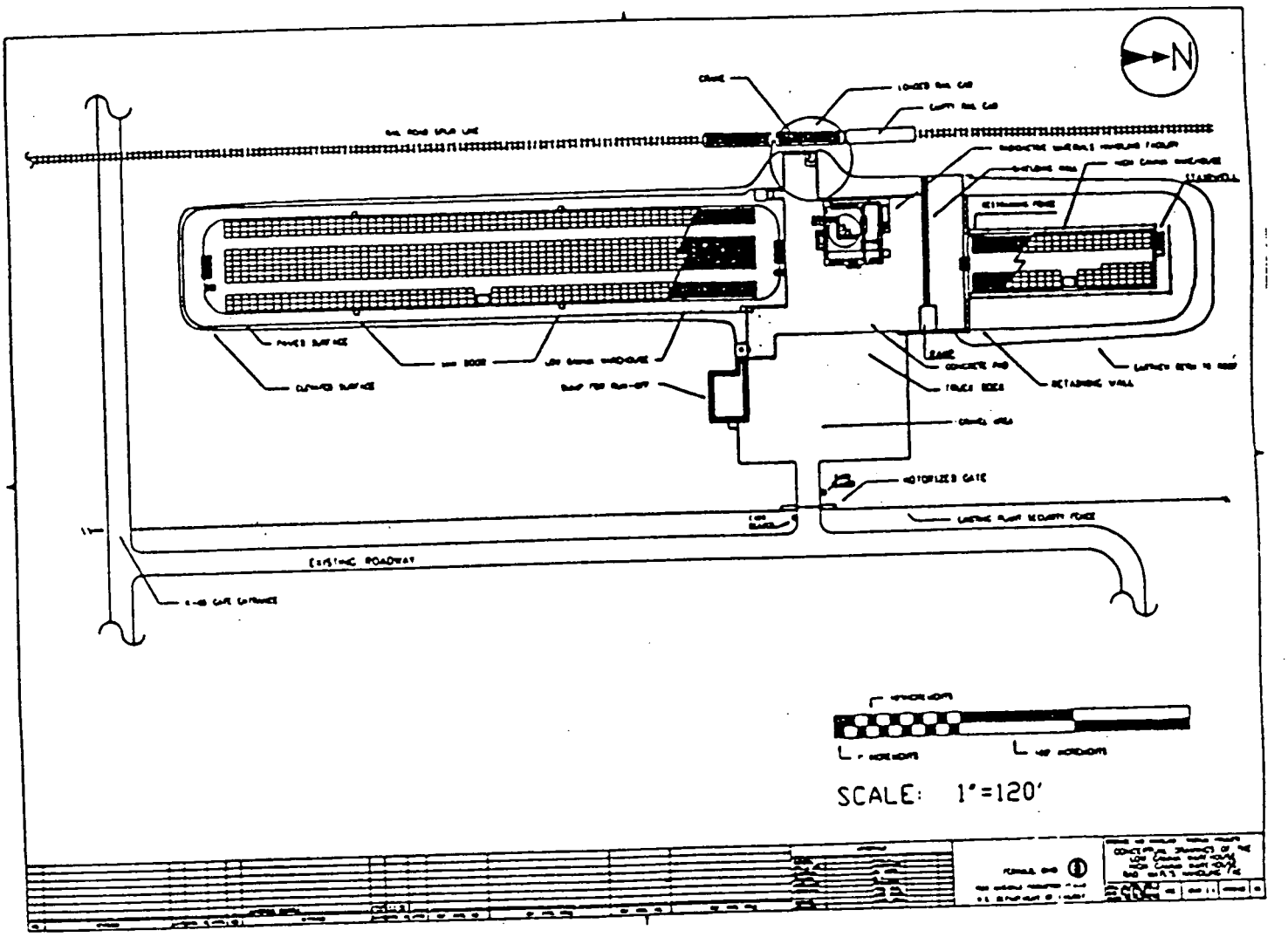


175

CLOSURE PLAN
PROPOSED BLDG. 83X WHSE

ATTACHMENT 2

FLOOR PLAN
THE PROPOSED BUILDING 83X STORAGE WAREHOUSE

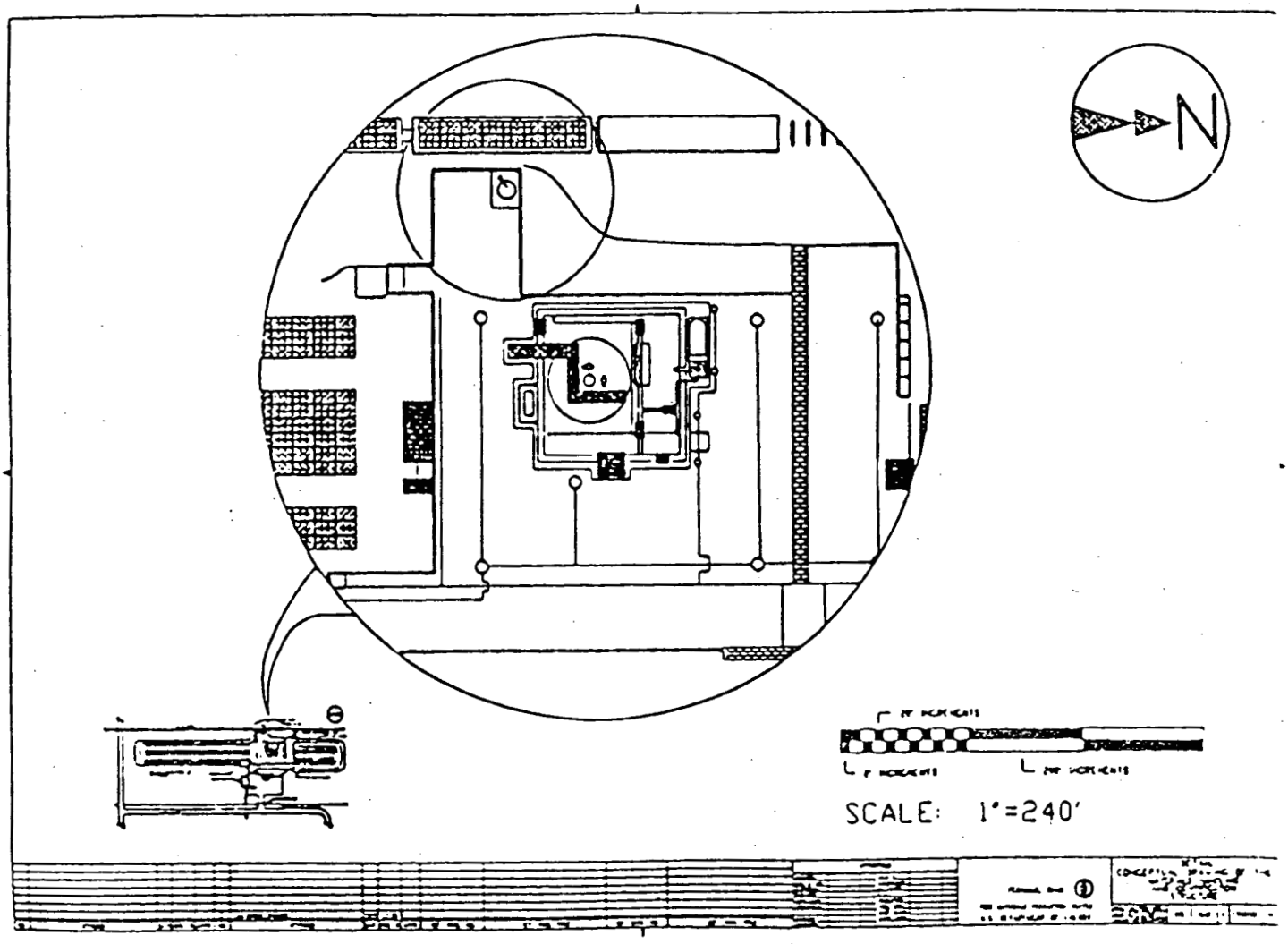


CLOSURE PLAN
PROPOSED BLDG. 83X WHSE.

ATTACHMENT 3

FLOOR PLAN MATERIAL HANDLING FACILITY
THE PROPOSED BUILDING 83X STORAGE WAREHOUSE

MATERIAL HANDLING FACILITY



ATTACHMENT 4

SCHEDULE FOR CLOSURE OF THE PROPOSED BUILDING 83X WAREHOUSE

Action	Cumulative Days to Complete
Submit Sampling and Analysis Plan to the Ohio EPA	-90
Approval of Closure by the Ohio EPA and Initiate Closure of Warehouse Storage	0
Remove and Store Waste Residues at an FMPC RCRA Storage Location	10
Decontaminate Storage Area	30
Notify Ohio EPA Facility Inspector	35
Wipe Sample Equipment	40
Analyze Rinseate and Sampling Materials	60
Decontaminate Storage Pad as Required After Initial Rinseate Sampling	80
Notify Ohio EPA Facility Inspector	95

SCHEDULE FOR CLOSURE OF THE PROPOSED BUILDING 83X WAREHOUSE (CONT)

Sample Soils Underlying the Storage Pad	100
Notify Ohio EPA Facility Inspector	115
Storage Pad Removal as Required by Sample Results	120
Complete Closure	180

The time required for decontamination of equipment and excavation of soil will depend on the extent of above acceptable levels of RCRA contaminants found on equipment and in the soil.

POST CLOSURE PLAN FOR
FEED MATERIALS PRODUCTION CENTER
WASTE PIT 4

U.S. DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
P.O. Box 398705
CINCINNATI, OHIO 45239-8705

CONTENTS

CONTENTS (Continued)

INTRODUCTION

The FMPC is owned and operated by the United States Department of Energy (DOE). The facility is a large-scale integrated production facility for supplying uranium metal for the DOE defense programs. Because the FMPC operations involve uranium, most of the hazardous waste at the facility is considered radioactive mixed waste, i.e., hazardous waste mixed with radioactive material. Only the hazardous waste component of the radioactive mixed waste is regulated under RCRA. Unless otherwise delineated, all references in this Post-Closure Plan to hazardous waste mean radioactive mixed waste.

Waste Pit 4 is one of several RCRA hazardous waste treatment, storage, and disposal units identified in the FMPC RCRA Part A application. Waste Pit 4 is identified as a hazardous waste landfill, and is the only hazardous waste landfill at the FMPC. Twenty-three thousand five hundred pounds of a hazardous waste containing toxic levels of barium were placed into the landfill during the period from 1981 through 1983 as part of an estimated total one hundred forty-three million pounds of solid waste. All of the solid waste material was placed into the landfill during operations from 1960 through early 1985.

A Closure Plan for the landfill was submitted to the Environmental Protection Agency in September 1987. The Closure Plan states that closure will be accomplished in two phases. The first phase, termed interim closure, involves placing a cover over the landfill consisting of two feet of compacted clay overlain with a synthetic liner. The first phase of closure was started in September 1988 and completed in May 1989. The second phase, final closure, will be determined after the Record of Decision (ROD) for the FMPC has been established.

The entire remediation of the FMPC waste pit area will be completed under a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) action. After the ROD is complete, design and construction will

take place in the waste pit area to implement the ROD. The extensive amount of work that will be performed after the ROD for the waste pit area will require a revision to the Post-Closure Plan for Waste Pit 4. This Post-Closure Plan will address the specifics of the type of inspection, maintenance, and monitoring that will occur up to the point of ROD. The revision of the Post-Closure Plan will be completed after design on the Operable Unit for the waste pit area is complete.

Under Ohio law, federally owned facilities are exempt from RCRA post-closure financial requirements; therefore, this plan does not address financial assurances.

POST-CLOSURE PLAN

This Post-Closure Plan is for the FMPC Waste Pit 4, a RCRA hazardous waste disposal unit identified as a landfill. The plan will include sections on inspection, monitoring, and maintenance as required for landfills. The plan will address inspection, monitoring, and maintenance of the landfill prior to the ROD for the waste pit area.

Inspection Plan

At the request of the Ohio Environmental Protection Agency, an inspection and testing plan has been developed for the interim closure cover. Construction of this interim cover was completed in June 1989 and the inspections of the cover were initiated on June 14, 1989.

The type of final closure for Waste Pit 4 will be determined as part of the FMPC Record of Decision. If final closure of Waste Pit 4 involves removal of the entire pit contents, then inspection of a cover will not be necessary. If final closure involves covering the pit with additional drainage and soil layers, as specified in the final closure plan, then inspection of the cover will be performed as outlined here.

A visual inspection of the cover will be performed on a weekly basis by personnel walking around the cover. Once every four weeks an inspection will be performed by personnel walking over the cover. By inspecting the cover on a weekly basis, it is reasonable to assume that problems requiring repairs will be noted before any extensive damage is done. An inspection log will be completed by personnel making the inspection, and a file of all inspection logs will be maintained by the Environmental Compliance Department at the FMPC. A copy of this inspection log is contained in Attachment 1 to this Post-Closure Plan. Each item on the inspection log must be marked as either satisfactory or unsatisfactory. If marked unsatisfactory, an explanation must be provided as to why the item is unsatisfactory and the location of the problem must be noted.

Inspections will begin within one week of completing the cover under final closure activities for Waste Pit 4.

Security control devices

The FMPC maintains a full time security force for the purpose of preventing unauthorized personnel from the entering the entire FMPC production area and waste storage area. Waste Pit 4 is located within the FMPC waste storage area. The waste storage area is also surrounded by two security fences to prevent unauthorized personnel from entering the area. These fences and security force will be maintained as long there is a hazard to personnel within the FMPC.

Erosion damage

Inspection of the pit cover will be performed on a weekly basis and will consist of a walk over inspection of the pit to determine if unacceptable amounts of drainage have occurred. An erosion gully that exposes Flexible Membrane Liner (FML) below the existing grade level will require repair and must be noted in the inspection log.

Cover settlement, subsidence and displacement

During the weekly inspection of the pit surface, a notation will be made of areas that require repair due to settling, subsidence or displacement if that area is ponding water that falls on the cover.

Vegetative cover condition

Inspection of the cover will include examining areas where the vegetative cover is not adequate to prevent erosion. If an area has insufficient cover, and erosion has begun on that area of the cover, the personnel performing the inspection will note this problem on the inspection log.

Integrity of run-on and run-off control measures

There is a drainage ditch surrounding the area of Waste Pit 4. This drainage prevents any water from running-on the pit surface other that rainfall. This ditch also provides the drainage for all run-off from the pit. This ditch will be inspected as part of the weekly inspection to verify that erosion or collapse of the ditch walls has not occurred. If the drainage ditch is no longer capable of controlling run-on, or allowing run-off to flow from around the pit, a notation will be made on the inspection log.

Cover drainage system functioning

The only cover drainage system is addressed in the previous paragraph regarding integrity of run-on and run-off control measures.

Leachate collection/detection and removal system

Waste Pit 4 was constructed in 1960 before requirements for hazardous waste landfills were established. The only structure built into the bottom of the pit was a twelve inch thick layer of clay material. There is no leachate collection or detection system built into the landfill. There will be no inspection of any leachate collection or detection system.

Gas venting system

A vent has been installed at the apex of the interim cover that is in place on Waste Pit 4. During final closure activities, should they involve further covering of the landfill, the vent will be extended so that it protrudes through the additional covering. During the weekly inspection, the vent will be inspected to ensure that it is in place and that it is not allowing water to infiltrate into the landfill.

Well condition

There are four well clusters located around Waste Pit 4 (a total of 10 wells). During the weekly inspections, the wellheads will be examined to ensure that the covers and locks are in place. The wellheads will also be examined for general damage that may be caused by a passing vehicle. This will include dented, bent, or broken wellheads. Should any of these conditions be observed on the wellhead, a notation will be made on the inspection log.

Benchmark integrity

There are no benchmarks located within the Waste Pit 4 area. The inspection of benchmarks will not be performed as part of the post-closure inspection process.

Groundwater monitoring

All groundwater monitoring requirements are addressed in Section E of the RCRA Part B Permit Application. For a discussion of the compliance monitoring activities associated with post-closure care of the waste pit area, refer to Section E.

Leachate collection/detection and removal

Waste Pit 4 was constructed prior to the development of requirements for liners and leachate collection systems below hazardous waste landfills. There is no leachate collection/detection or removal system in place at Waste Pit 4. It is not possible to collect the leachate from below Waste Pit 4 as the pit exists in its present state, and no discussion of the operation will be discussed in this Post-Closure Plan.

Maintenance Plan

The Record of Decision for Waste Pit 4 will determine whether additional cover materials will be placed over the existing interim closure cover on Pit 4, or excavation of the pit materials will be performed, for final closure. Should additional cover materials be placed on the pit, maintenance on the cover will be performed as outlined in this section of the Post-Closure Plan.

Maintenance will be performed based on any deficiencies noted during the weekly inspection. These deficiencies will be typical of an undesirable situation such as standing water on the cover, erosion, or damage to security control devices. If an inspection is completed and deficiencies are recorded, the FMPC Environmental Compliance Department will be responsible for initiating the action to complete repairs.

Repair of security control devices

The only security control devices that are in place around Waste Pit 4 that might require repair are the two security fences that surround the entire FMPC waste storage area. When damage occurs to this fence, repairs are made to prevent the inadvertent intrusion of personnel.

Erosion damage repair

The cover placed over Waste Pit 4 is currently inspected on a weekly basis. This inspection will continue on a weekly basis until work begins on the alternative for final remediation as determined by the Record of Decision.

This weekly inspection includes examining the area surrounding the pit cover for erosion. Since the surface of the interim cover in place on Waste Pit 4 is a Flexible Membrane Liner (Hypalon), no erosion will occur on the actual cover portion of the pit. However, due to the large amount of run-off from the Flexible Membrane Liner, erosion can occur in the area surrounding the pit cover. The inspection plan for the pit calls for erosion that exposes the FML below grade to be noted on the inspection log for repair.

Should the Record of Decision result in further covering of Waste Pit 4, it is likely that the surface of the final cover will be soil and not a synthetic liner. If this is the case, the inspection plan will be modified so that any erosion that forms a gully six inches in depth in relation to the surrounding topography will require a notation in the inspection log and repair work to correct the erosion.

Correction of settlement, subsidence and displacement

Additional covering of Waste Pit 4 is one of the options that may be selected in the Record of Decision for the FMPC. If further covering of the pit is performed and settlement, subsidence or displacement is noted, the area will be repaired by filling the area with soil to the point that water no longer stands.

Mowing, fertilization and other vegetative cover maintenance

Should covering of Waste Pit 4 be the alternative selected in the Record of Decision, the surface of the cover will be comprised of soil. The soil will be seeded and a vegetative cover will be established.

Maintenance of this vegetative cover will take the form of mowing to allow for the visual weekly inspection, and seeding of areas where vegetative growth has not occurred.

Repair of run-on and run-off control structures

The only type of run-on and run-off control structures in place at Waste Pit 4 are constructed of earthen berms and two sections of reinforced concrete pipe. The earthen berms form a perimeter drainage ditch around the existing interim cover. The two sections of reinforced concrete pipe provide drainage from the perimeter ditch beneath two roads.

Currently, inspection of the earthen berms that form the perimeter drainage ditch occurs on a weekly basis. This inspection includes the observance of any damage to the earthen berms that would prevent proper run-on and run-off control from the landfill. Upon completion of placing the additional cover materials, should further covering of the pit be the option selected in the Record of

Decision, inspections of the cover will include checking the run-on and run-off controls to determine if repairs are required. Noting erosion to the point of causing water to drain improperly from the pit surface will be the intent of the inspection.

Leachate collection/detection system maintenance

Waste Pit 4 was constructed prior to the establishment of guidelines for construction of hazardous waste landfills. No leachate collection system exists for Waste Pit 4. Therefore, maintenance of this type of a system will not be required.

Well replacement

Maintenance of wells will be performed if problems are experienced during the pumping of the wells for groundwater monitoring purposes. Corrective action will also be taken to replace or repair wells should damage to the wellhead occur. During inspections of the pit cover, a notation will be made if damage to a wellhead is observed.

Contact and Notification Requirements

Until final closure of Waste Pit 4, a copy of the approved Post-Closure Plan shall be furnished to the Ohio EPA upon request, in accordance with OAC 3745-55-18(C). After final closure of the unit has been certified, the facility contact listed below will keep the approved plan.

Facility contact during post-closure care

During the post-closure care period, the office to contact regarding the waste pit post-closure care will be:

Site Manager
Feed Materials Production Center
P.O. Box 398705
Cincinnati, OH 45239-8705

Telephone: (513) 738-6200

Amendments to Post-Closure Plan

As discussed in the Introduction to this plan, the Record of Decision (ROD) for the CERCLA activities in the waste pit area will affect this Post-Closure Plan. After the ROD is issued, this plan will be amended to include the work that will be performed under CERCLA. The revision will be completed after design on the Operable Unit for the waste pit area is finalized.

In addition, the Post-Closure Plan will be amended whenever changes in activities or conditions at the facility affect the approved plan. A written request for a permit modification will be submitted with a copy of the amended Post-Closure Plan. The request shall be submitted 60 days prior to a proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred that affects post-closure.

Notification to local authorities

Upon final closure of the waste pit area, the local land use authority and the Director of the Ohio EPA will be provided with an annotated copy of the survey plat of the facility, in accordance with OAC 3745-55-16 and 40 CFR 264.116.

Within 60 days after certification of final closure, the local land use authority and the Ohio EPA will be provided with a record of the type, location, and quantity of hazardous wastes disposed of within the waste pit, in accordance with the best knowledge and records existing at the facility.

Within 60 days after closure is certified, a notation will be placed on the deed to the facility property to notify any potential purchaser of the property that the land has been used to manage hazardous wastes, and that future land use is restricted under federal regulations. The deed will also note that the survey plat and record of the type, location, and quantity of hazardous wastes disposed of have been filed with the local land use authority and with the Director, Ohio EPA. A copy of the annotated deed, and a signed certification that the required notifications have been made, will be sent to the Ohio EPA.

Completion of post-closure care

The length of the post-closure care period will be established in the revised Post-Closure Plan, to be prepared after completion of the Record of Decision for the CERCLA cleanup activities in the waste pit area. The post-closure care period will extend for 30 years following completion of final closure unless a different length of time is established in accordance with OAC 3745-55-17(A)(2). At the end of the approved post-closure care period, when required post-closure maintenance activities have been completed, a certification will be submitted by registered mail to the Director, Ohio EPA. This certification will state that post-closure care was performed in accordance with the approved plan, and will be signed by an independent registered Professional Engineer.

SAMPLING PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
KC-2 WAREHOUSE - BAY 5

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. BOX 398705

CINCINNATI, OHIO 45239-8705

APPENDIX A

SOIL SAMPLING PLAN FOR THE KC-2 WAREHOUSE BAY 5

1.0 INTRODUCTION

Closure of RCRA storage units requires that the units be decontaminated and sampled to ensure that no hazardous waste contamination exists at the units. If no contamination is found, the units can be closed "clean" allowing the units to have unrestricted future use.

This sampling plan provides a thorough and concise description of FMPC's procedures to determine the appropriate number of samples, the location of sampling points, sampling methodology, and sample analysis.

1.1 Background

1.1.1 Description

The KC-2 Warehouse - Bay 5 is a RCRA unit and is located within the FMPC facility as shown in Attachments 1 and 2 of the Closure Plan. The warehouse is underlaid by a concrete pad. Procedures for decontamination and testing of the concrete pad have already been described in the unit's Closure Plan.

Because the pad may contain cracks and because leaks from drums stored at the site have been known to occur at the unit, sampling the soil below the concrete is warranted.

The goal of this sampling plan will be to provide an assessment of the soils underlying and immediately adjacent to the concrete pad. If the results of the soil sampling indicate that the underlying or adjacent soils are contaminated, additional sampling may be needed to determine the full extent of such contamination. If additional

sampling is required, the closure plan will be amended to include a detailed sampling plan for the additional sampling and soil removal, if warranted.

1.1.2 Closure Standard

FMPC proposes that the site be considered clean and that no further action be required under the following conditions:

- The concentrations of the eight RCRA metals (total metals) in the soil do not exceed the upper limit of the mean plus two standard deviations of the soils collected at the FMPC as part of the background soil sampling effort.

- Analyzed organic compounds do not exceed the analytical detection limits for the analytical method proposed in this sampling plan and outlined in SW-846.

If either of these two conditions are not met, the reported values will be statistically compared to the duplicate soil samples (OAC 3745-55-11) taken for the unit and reported to Ohio E.P.A. with recommendations for further action.

1.2 Identification of Potential Contaminants and Laboratory Analysis

1.2.1 Waste Stored At The Unit

As discussed in the Closure Plan, the KC-2 Warehouse - Bay 5 RCRA unit has stored tetrachloroethylene, 1,1,1-trichloroethane, lead, and methylene chloride in the past.

1.2.2 Parameters

Because of the variety of wastes that were stored at this unit, it is proposed that the following two tests be completed.

- Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

- Organic scan using Method 8240 as described in SW-846 to identify targeted organic compounds.

Table 1 lists test procedures and appropriate holding times for soils analysis. Table 2 is a listing of the organic compounds and analytical detection limits that will be reported using Method 8240.

Method 8240 will detect the organic compounds which have been stored at the unit. In addition, this method will detect a majority of the degradation products of these compounds.

1.3 Appropriate Number of Samples

1.3.1 Statistical Methods Described in SW-846

The statistical method described in SW-846 to determine the proper number of samples for closure of RCRA units requires that an initial set of samples be analyzed. The results of this initial round of sampling is used to calculated the sample mean and variance so the appropriate number of samples can be determined for a particular site.

This method of determining the appropriate number of samples favors large RCRA units. Because the area of the RCRA unit is only

approximately 2,500 square feet, the statistical method described in SW-846 for determining the required number of samples for the unit may be inappropriate.

Therefore, FMPC proposes to forego the initial round of sampling and determine the appropriate number of soil samples by taking approximately one sample for every 400 square feet of unit area or a total of 7 samples from the unit itself, excluding perimeter and background soil samples. Once the analytical results have been received, the appropriate number of samples can then be calculated using the following formula:

$$n = \frac{t^2_{.05}\, S^2}{\Delta^2}$$

where: $t_{.05}$ = Tabulated "t" value
S = Variance of sample
Δ = RT - x
RT = Regulatory threshold
x = Mean measurements of initial round of samples

If the appropriate number of samples is less than seven, no further sampling will be done.

1.3.2 Background Sampling

FMPC proposes to collect a total of eight soil samples at the facility for use as the unit's background samples for statistical comparison of background levels for RCRA metals at this and other RCRA units.

These soil samples will be collected from eight different relatively undisturbed locations at the facility. Each soil sample will consist of a composite soil sample from 0 to 3 feet at each of the eight

locations. Decontamination of sampling equipment, soil sampling techniques, and laboratory analysis will follow the guidelines specified in this sampling plan.

Once completed, the eight background soil samples will be used for statistical comparison purposes at all RCRA units at the FMPC to determine if the unit can be considered clean, as described in Section 1.1.2 of this sampling plan.

1.3.3 Number of Perimeter Samples

One perimeter soil sample will be taken downslope of the unit, within 5 feet of the edge of the RCRA unit.

1.3.4 Number of Duplicate Samples

Duplicate soil samples will be taken for the units as confirmation of the laboratory's QA/QC. One duplicate soil sample will be taken for every five soil samples collected within the RCRA unit.

To reduce laboratory bias, the duplicate soil sample will be labeled and numbered in such a way that will not indicate that the sample is a duplicate or the location of the duplicate sample on the sampling grid. This information will be noted in the field book for later use.

1.4 Sampling Grid Design

1.4.1 Unit Dimensions

The KC-2 Warehouse - Bay 5 RCRA unit is approximately 2,500 square feet (35 feet by 69 feet).

As part of the goal of this sampling effort, soil immediately adjacent to the unit will also be tested. An area 5 feet around the perimeter of the unit will be included as part of the unit's dimensions when calculating the grid interval for the unit.

1.4.2 Ohio EPA's Acceptable Grid Interval

In the Ohio EPA, Division of Solid and Hazardous Waste Management's Closure Plan Review Guidance dated February 8, 1988, Ohio EPA states that the following equation may be used to determine the appropriate sampling grid interval:

$$GI = ((A \cdot \pi) / GL)^{0.5}$$

where: GI = Grid Interval
A = Grid Area (includes the 5 foot perimeter)
GL = Length of the Grid Area

The grid interval for this RCRA unit, as calculated using the above formula, is 12 feet.

1.4.3 Grid Orientation and Base Point

Prior to any sampling, the Plant Engineer will determine a suitable Base Point for the RCRA unit from which all measurements for the grid system will be taken. The Base Point for the unit can be any permanent landmark or surveyor's monument, near the unit and documented as to its surveyed position within the facility. This information will be well documented in the field book for possible duplication at a later time.

Once the Base Point is established, the grid axes will be determined. Based on magnetic north, a primary North-South axis and a primary East-West axis will be established for the unit, intersecting the

approximate center of the unit. Primary axes will be well marked and labeled on the concrete using a non-hazardous paint or other suitable marking system. The primary grid axes will be used to determine all other grid point locations by measuring from these axes.

1.5 Decontamination Procedures For Sampling Equipment

1.5.1 General Information

Prior to any sampling activities, all equipment used during the sampling effort will be properly decontaminated, reducing the possibility of cross contamination between other RCRA units. After sampling has been completed at each sampling location, all sampling equipment will also be properly decontaminated, reducing the chance of cross contamination and contact contamination by the sampling equipment outside the RCRA unit.

Prior to beginning the decontamination procedures, all personnel involved with sampling will inspect their clothing. Clean or new disposable coveralls will be used when clothing has visible soil/mud stains. Clean latex gloves will be worn during the entire decontamination process and during the handling of any equipment. During the final rinsing of the equipment, a new pair of latex gloves will be worn to reduce the potential for cross contamination between the dirty wash area and the clean rinse area.

1.5.2 Decontamination Procedures

Proper decontamination will consist of a staged procedure. The dirty wash stage will consist of scrubbing the equipment with a dedicated brush in clean potable water to remove all visible mud and soil. The equipment will then be scrubbed with a second dedicated brush using a soap solution made up of deionized water and laboratory-grade soap.

Each piece of equipment will then be rinsed with deionized water to remove any visible soap solution.

After decontamination in the dirty wash area, the equipment will be processed through the clean rinse area. The clean rinse stage will consist of spraying the equipment with a dilute solution of nitric acid (10% nitric acid and deionized water) on all exposed and accessible areas of the equipment. After 1 to 3 minutes of contact, the equipment will be rinsed, using deionized water. The equipment will then be rinsed with hexane, followed by a triple rinse with deionized water.

If the equipment is not immediately needed, it will be protected from dust and weather by wrapping the equipment in new plastic polyethylene sheeting.

1.5.3 Collection and Handling of Decontamination Rinseate

All liquids and solids produced as a result of decontaminating sampling equipment will be collected at each unit, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6 Concrete Coring

1.6.1 Technique

To be able to sample the native soils below the reinforced concrete pads, FMPC proposes to use a jack hammer to core through the concrete. Jack hammering has many advantages at this site: the process does not require water (as do many concrete coring machines); it is able to core through thick concrete pads; and it can cut through reinforcement bars.

Prior to the concrete coring operations, the FMPC Plant Engineer will be contacted to determine if there are any known underground utilities, pipes, wires or other similar structures which, if breached, would cause a safety problem. These underground structures will be well marked at the unit.

A core hole will be advanced through the concrete, cutting through reinforcement bars and other obstructions in the concrete. Hammering will continue until the top of the base gravel (the gravel below the concrete but above the native soil) is reached.

Once the base gravel is reached, all concrete chips will be removed from the hole by hand (clean latex gloves will be worn). All of the concrete chips and other material produced as a result of this coring operation will be collected at the site, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6.2 Alternative Method

When jack hammering is not feasible (i.e. inside confined buildings, near sensitive electronic equipment, etc.), concrete coring will be accomplished using a standard dry concrete coring machine.

1.6.3 Core Hole Plugging

Once the soil sample is collected from the hole, the core and soil bore will be filled with portland cement grout to a level slightly higher than the surrounding concrete, reducing ponding and promoting runoff.

1.7 Soil Sampling Procedures

1.7.1 Sample Locations

FMPC will use a combination of directed and random sampling point locations. The directed sampling point location for the adjacent soil sample will be taken at a downslope location within 5 feet of the RCRA unit. The RCRA unit samples will be located within the RCRA unit at random locations. A random number table will be used to determine the intersecting grid points.

1.7.2 Sample Collection Methodology

Ohio EPA will be notified at least five business days in advance of soil sampling activities.

As discussed in Section 1.5 of this sampling plan, all equipment used to collect the soil samples, including concrete coring equipment, will be decontaminated prior to beginning the sampling effort. All equipment will be properly decontaminated after the sampling effort to reduce the chance of contamination through contact with the equipment outside the RCRA unit.

Details about the concrete coring operation have already been discussed in Section 1.6 of this sampling plan. Once the concrete coring operation has reached the top of the base gravel lying beneath the concrete pad, coring will stop. The concrete chips and other debris will be cleaned out of the core hole by hand.

A 3-inch diameter bucket auger will be advanced through the base gravel and the native soil by hand. Augering will begin near the top of the base gravel and continue through to the native soil. If the base gravel is too large to allow for augering, the gravel may be

removed by hand, using clean latex gloves. Once the top of the native soil is reached, augering will continue using the bucket auger. FMPC will attempt to auger into the native soil a total of 2 feet.

As the hand auger is brought to the surface, the resulting soil sample will be placed into a properly decontaminated stainless steel compositing pan. Clean latex gloves will be worn to assist in the removal of the soil sample from the hand auger and whenever contact with the sample or sampling equipment is imminent.

The minimum volume of native soil that will be collected will be equal to 2 times the volume of base gravel collected. Sampling of the native soil will continue until enough soil is collected from the location to meet this minimum volume requirements as well as the volume requirement for laboratory analysis (two 4-ounce, wide-mouth glass jars with teflon liners).

Once the appropriate volume of soil is collected, sampling will be terminated. Compositing the soil sample will consist of mixing the collected soil and base gravel with decontaminated stainless steel utensils until the soil sample is thoroughly mixed.

The composite soil will then be placed into two 4-ounce, wide-mouth glass jars with teflon liners supplied by the laboratory, filled to the top (no headspace), sealed, labeled, logged onto the chain of custody form, and stored at 4° C in a thermal chest or refrigerator until delivered to the laboratory. Delivery to the laboratory will be via overnight courier or equivalent method. Holding times for the samples are shown in Table 1.

Any remaining soil sample not placed in containers for laboratory analysis will be placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

Prior to, during, and after the sampling effort, notes will be made in a field book. A description of the weather, sampling conditions, sampling crew, names of other observers, time sampling began, and the sample location will be noted prior to sampling. During the sampling effort, notations in the field book will include: special conditions; changes to procedures; sample description, including color, moisture and texture; and sample depth. Once sampling is completed, the sample number, time, and date will be noted.

1.8 Laboratory Analysis

Because of the radiation potential of the samples, the selection of the laboratory which will perform the analyses has not been identified at this time. Laboratory selection will be based on the laboratory's ability to handle potentially radiation contaminated samples and will be a CLP (Contract Lab Program) Laboratory certified for RCRA analyses by U.S. EPA. The laboratory's QA/QC plan will be reviewed and approved by the Plant Engineer prior to analysis.

Because of the variety of wastes that were stored at this unit, it is proposed that the following test procedures be completed.

- Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

- Organic scan using Method 8240 as described in SW-846 to identify targeted organic compounds.

Analytical methods are identified in Table 1.

In addition to the RCRA analyses of the soil samples, total Uranium and Uranium 235 will be tested. Because Uranium is regulated under the Atomic Energy Act of 1954 and is not a RCRA regulated waste, further discussion of the testing procedures is not appropriate. Reporting the results of Uranium testing in the soils is not a requirement for closure under RCRA.

1.9 Health and Safety Plan

Standard FMPC health and safety practices will be used during this sampling program.

1.10 QAPP

Standard FMPC Quality Assurance (QA) and Quality Control (QC) programs will be used during this sampling program.

Table 1

Procedures for Proposed RCRA Analysis of Soils

RCRA Metals

Parameter	Detection Method	Holding Time
Arsenic	6010	6 months
Barium	6010	6 months
Cadmium	6010	6 months
Total Chromium	6010	6 months
Hexavalent Chromium	7196	24 hrs.
Lead	6010	6 months
Mercury	7470	28 days
Selenium	6010	6 months
Silver	6010	6 months
Organic Scan	8240	14 days

Table 2

Listing of Organic Compounds
and Analytical Detection Limits
Using SW-846, Method 8240

Compound	Detection Limits (ug/kg dry weight)
Chloromethane	10
Bromomethane	10
Vinyl Chloride	10
Chloroethane	10
Methylene Chloride	5
Acetone	100
Carbon Disulfide	5
1,1-Dichloroethene	5
1,1-Dichloroethane	5
trans-1,2-Dichloroethene	5
Chloroform	5
1,2-Dichloroethane	5
2-Butanone	100
1,1,1-Trichloroethane	5
Carbon Tetrachloride	5
Vinyl Acetate	50
Bromodichloromethane	5
1,1,2,2-Tetrachloroethane	5
1,2-Dichloropropane	5
trans-1,3-Dichloropropene	5
Trichloroethene	5
Dibromochloromethane	5
Benzene	5
cis-1,3-Dichloropropene	5
2-Chloroethyl Vinyl Ether	10
Bromoform	5
2-Hexanone	50
4-Methyl-2-pentanone	50
Tetrachloroethene	5
Toluene	5
Chlorobenzene	5
Ethyl Benzene	5
Styrene	5
Total Xylenes	5
n-Butyl alcohol	5
Cresols (and cresylic acid)	5
Cyclohexanone	5
1,2-Dichlorobenzene	5
Ethyl acetate	5

Table 2 (Continued)

Listing of Organic Compounds
and Analytical Detection Limits
Using SW-846, Method 8240

Compound	Detection Limits (ug/kg dry weight)
Ethyl ether	5
Isobutyl alcohol	5
Methanol	5
Nitrobenzene	5
Pyridine	5
1,1,2-Trichloro - 1,2,2-Trifluoroethane	5
Trichlorofluoromethane	5

SAMPLING PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
KC-2 WAREHOUSE - BAY 6

U.S. DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

P.O. Box 398705

CINCINNATI, OHIO 45239-8705

APPENDIX A
SOIL SAMPLING PLAN FOR THE KC-2 WAREHOUSE
BAY 6

1.0 INTRODUCTION

Closure of RCRA storage units requires that the units be decontaminated and sampled to ensure that no hazardous waste contamination exists at the units. If no contamination is found, the units can be closed "clean" allowing the units to have unrestricted future use.

This sampling plan provides a thorough and concise description of FMPC's procedures to determine the appropriate number of samples, the location of sampling points, sampling methodology, and sample analysis.

1.1 Background

1.1.1 Description

The KC-2 Warehouse - Bay 6 is a RCRA unit and is located within the FMPC facility as shown in Attachments 1 and 2 of the Closure Plan. The warehouse is underlain by a concrete pad. Procedures for decontamination and testing of the concrete pad have already been described in the unit's Closure Plan.

Because the pad may contain cracks and because leaks from drums stored at the site have been known to occur at the unit, sampling the soil below the concrete is warranted.

The goal of this sampling plan will be to provide an assessment of the soils underlying and immediately adjacent to the concrete pad. If the results of the soil sampling indicate that the underlying or adjacent soils are contaminated, additional sampling may be needed

to determine the full extent of such contamination. If additional sampling is required, the closure plan will be amended to include a detailed sampling plan for the additional sampling and soil removal, if warranted.

1.1.2 Closure Standard

FMPC proposes that the site be considered clean and thus no further action under the following conditions:

- The concentrations of the eight RCRA metals (total metals) in the soil do not exceed the upper limits of the range or the mean plus 2 standard deviations of the soils collected at the FMPC as part of the background soil sampling effort.

- Analyzed organic compounds do not exceed the analytical detection limits for the analytical method proposed in this sampling plan and outlined in SW-846.

If either of these two conditions are not met, the reported values will be statistically compared to the duplicate and background soil samples (OAC 3745-55-11) taken for the unit and reported to Ohio EPA with recommendations for further action.

1.2 Identification of Potential Contaminants and Laboratory Analysis

1.2.1 Waste Stored At The Unit

As discussed in the Closure Plan, the KC-2 Warehouse - Bay 6 RCRA unit has stored tetrachloroethylene, 1,1,1-trichloroethane, lead, hydrogen fluoride, barium chloride, tributyl phosphate/kerosene, and methylene chloride in the past.

1.2.2 Parameters

Because of the variety of wastes that were stored at this unit, it is proposed that the following two tests be completed.

- Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

- Organic scan using Method 8240 as described in SW-846 to identify targeted organic compounds.

Table 1 lists test procedures and appropriate holding times for soils analysis. Table 2 is a listing of the organic compounds and analytical detection limits that will be reported using Method 8240.

Method 8240 will detect the organic compounds which have been stored at the unit. In addition, this method will detect a majority of the degradation products of these compounds.

1.3 Appropriate Number of Samples

1.3.1 Statistical Methods Described in SW-846

The statistical method described in SW-846 to determine the proper number of samples for closure of RCRA units requires that an initial set of samples be analyzed or that parameter statistics be estimated. The results of this initial round of sampling is used to calculate the sample mean and variance so the appropriate number of samples can be determined for a particular site.

This method of determining the appropriate number of samples favors large RCRA units. Because the area of the RCRA unit is only

approximately 2,500 square feet, the statistical method described in SW-846 for determining the required number of samples for the unit will be inappropriate.

Therefore, FMPC proposes to forego the initial round of sampling and determine the appropriate number of soil samples by taking approximately one sample for every 400 square feet of unit area or a total of 7 samples from the unit itself, excluding perimeter and background samples. Once the analytical results have been received, the appropriate number of samples can then be calculated using the following formula:

$$n = \frac{t^2_{.05}\, S^2}{\Delta^2}$$

where: $t_{.05}$ = Tabulated "t" value
S = Variance of sample
Δ = RT - x
RT = Regulatory threshold
x = Mean measurements of initial round of samples

If the appropriate number of samples is less than seven, no further sampling will be done.

1.3.2 Background Sampling

FMPC proposes to collect a total of eight soil samples at the facility for use as the unit's background samples for statistical comparison of background levels for RCRA metals at this and other RCRA units.

These soil samples will be collected from eight different relatively undisturbed locations at the facility. Each soil sample will consist of a composite soil sample from 0 to 3 feet at each of the eight

locations. Decontamination of sampling equipment, soil sampling techniques, and laboratory analysis will follow the guidelines specified in this sampling plan.

Once completed, the eight background soil samples will be used for statistical comparison purposes at all RCRA units at the FMPC to determine if the unit can be considered clean, as described in Section 1.1.2 of this sampling plan.

1.3.3 Number of Perimeter Samples

One perimeter soil sample will be taken downslope of the unit, within 5 feet of the edge of the RCRA unit.

1.3.4 Number of Duplicate Samples

Duplicate soil samples will be taken for the units as confirmation of the laboratory's QA/QC. One duplicate soil sample will be taken for every 5 soil samples collected within the RCRA unit.

To reduce laboratory bias, the duplicate soil sample will be labeled and numbered in such a way that will not indicate that the sample is a duplicate or the location of the duplicate sample on the sampling grid. This information will be noted in the field book for later use.

1.4 Sampling Grid Design

1.4.1 Unit Dimensions

The KC-2 Warehouse - Bay 6 RCRA unit is approximately 2,500 square feet (35 feet by 69 feet).

As part of the goal of this sampling effort, soil immediately adjacent to the unit will also be tested. An area 5 feet around the perimeter of the unit will be included as part of the unit's dimensions when calculating the grid interval for the unit.

1.4.2 Ohio EPA's Acceptable Grid Interval

In the Ohio EPA, Division of Solid and Hazardous Waste Management's Closure Plan Review Guidance dated February 8, 1988, Ohio EPA states that the following equation may be used to determine the appropriate sampling grid interval:

$$GI = ((A \cdot \pi) / GL)^{0.5}$$

where: GI = Grid Interval
A = Grid Area (includes the 5 foot perimeter)
GL = Length of the Grid Area

The grid interval for this RCRA unit, as calculated using the above formula, is 12 feet.

1.4.3 Grid Orientation and Base Point

Prior to any sampling, the Plant Engineer will determine a suitable Base Point for the RCRA unit from which all measurements for the grid system will be taken. The Base Point for the unit can be any permanent landmark or surveyor's monument, near the unit and documented as to its surveyed position within the facility. This information will be well documented in the field book for possible duplication at a later time.

Once the Base Point is established, the grid axes will be determined. Based on magnetic north, a primary North-South axis and a primary

East-West axis will be established for the unit, intersecting the approximate center of the unit. Primary axes will be well marked and labeled on the concrete using a non-hazardous paint or other suitable marking system. The primary grid axes will be used to determine all other grid point locations by measuring from these axes.

1.5 Decontamination Procedures For Sampling Equipment

1.5.1 General Information

Prior to any sampling activities, all equipment used during the sampling effort will be properly decontaminated, reducing the possibility of cross contamination between other RCRA units. After sampling has been completed at each sampling location, all sampling equipment will also be properly decontaminated, reducing the chance of cross contamination and contact contamination by the sampling equipment outside the RCRA unit.

Prior to beginning the decontamination procedures, all personnel involved with sampling will inspect their clothing. Clean or new disposable coveralls will be used when clothing has visible soil/mud stains. Clean latex gloves will be worn during the entire decontamination process and during the handling of any equipment. During the final rinsing of the equipment, a new pair of latex gloves will be used to reduce the potential for cross contamination between the dirty wash area and the clean rinse area.

1.5.2 Decontamination Procedures

Proper decontamination will consist of a staged procedure. The dirty wash stage will consist of scrubbing the equipment with a dedicated brush in clean potable water to remove all visible mud and soil. The equipment will then be scrubbed with a second dedicated brush using

a soap solution made up of deionized water and laboratory-grade soap. Each piece of equipment will then be rinsed with deionized water to remove any visible soap solution.

After decontamination in the dirty wash area, the equipment will be processed through the clean rinse area. The clean rinse stage will consist of spraying the equipment with a dilute solution of nitric acid (10% nitric acid and deionized water) on all exposed and accessible areas of the equipment. After 1 to 3 minutes of contact, the equipment will be rinsed, using deionized water. The equipment will then be rinsed with hexane, followed by a triple rinse with deionized water.

If the equipment is not immediately needed, it will be protected from dust and weather by wrapping the equipment in new plastic polyethylene sheeting.

1.5.3 Collection and Handling of Decontamination Rinseate

All liquids and solids produced as a result of decontaminating sampling equipment will be collected at each unit, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6 Concrete Coring

1.6.1 Technique

To be able to sample the native soils below the reinforced concrete pads, FMPC proposes to use a jack hammer to core through the concrete. Jack hammering has many advantages at this site: the process does not require water (as do many concrete coring machines);

it is able to core through thick concrete pads; and it can cut through reinforcement bars.

Prior to the concrete coring operations, the FMPC Plant Engineer will be contacted to determine if there are any known underground utilities, pipes, wires or other similar structures which, if breached, would cause a safety problem. These underground structures will be well marked at the unit.

A core hole will be advanced through the concrete, cutting through reinforcement bars and other obstructions in the concrete. Hammering will continue until the top of the base gravel (the gravel below the concrete but above the native soil) is reached.

Once the base gravel is reached, all concrete chips will be removed from the hole by hand (clean latex gloves will be worn). All of the concrete chips and other material produced as a result of this coring operation will be collected at the site, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6.2 Alternative Method

When jack hammering is not feasible (i.e. inside confined buildings, near sensitive electronic equipment, etc.), concrete coring will be accomplished using a standard dry concrete coring machine.

1.6.3 Core Hole Plugging

Once the soil sample is collected from the hole, the core and soil bore will be filled with portland cement grout to a level slightly higher than the surrounding concrete, reducing ponding and promoting runoff.

1.7 Soil Sampling Procedures

1.7.1 Sample Locations

FMPC will use a combination of directed and random sampling point locations. The directed sampling point location for the adjacent soil sample will be taken at a downslope location within 5 feet of the RCRA unit. The RCRA unit samples will be located within the RCRA unit at random locations. A random number table will be used to determine the intersecting grid points.

1.7.2 Sample Collection Methodology

Ohio EPA will be notified at least five business days in advance of soil sampling activities.

As discussed in Section 1.5 of this sampling plan, all equipment used to collect the soil samples, including concrete coring equipment core/bit, will be decontaminated prior to beginning the sampling effort. All equipment will be properly decontaminated after the sampling effort to reduce the chance of contamination through contact with the equipment outside the RCRA unit.

Details about the concrete coring operation have already been discussed in Section 1.6 of this sampling plan. Once the concrete coring operation has reached the top of the base gravel lying beneath the concrete pad, coring will stop. The concrete chips and other debris will be cleaned out of the core hole by hand.

A 3-inch diameter bucket auger will be advanced through the base gravel and the native soil by hand. Augering will begin near the top of the base gravel and continue through to the native soil. If the base gravel is too large to allow for augering, the gravel may be

removed by hand, using clean latex gloves. Once the top of the native soil is reached, augering will continue using the bucket auger. FMPC will attempt to auger into the native soil a total of 2 feet.

As the hand auger is brought to the surface, the resulting soil sample will be placed into a properly decontaminated stainless steel compositing pan. Clean latex gloves will be worn to assist in the removal of the soil sample from the hand auger and whenever contact with the sample or sampling equipment is imminent.

The minimum volume of native soil that will be collected will be equal to 2 times the volume of base gravel collected. Sampling of the native soil will continue until enough soil is collected from the location to meet this minimum volume requirements as well as the volume requirement for laboratory analysis (two 4-ounce wide-mouth glass jars with teflon liners).

Once the appropriate volume of soil is collected, sampling will be terminated. Compositing the soil sample will consist of mixing the collected soil and base gravel with decontaminated stainless steel utensils until the soil sample is thoroughly mixed.

The composite soil will then be placed into two 4-ounce wide-mouth glass jars with teflon liners supplied by the laboratory, filled to the top (no headspace), sealed, labeled, logged onto the chain of custody form, and stored at 4° C in a thermal chest or refrigerator until delivered to the laboratory. Delivery to the laboratory will be via overnight courier or equivalent method. Holding times for the samples are shown in Table 1.

Any remaining soil sample not placed in containers for laboratory analysis will be placed in a properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

Prior to, during, and after the sampling effort, notes will be made in a field book. A description of the weather, sampling conditions, sampling crew, names of other observers, time sampling began, and the sample location will be noted prior to sampling. During the sampling effort, notations in the field book will include special conditions; changes to procedures; sample description, including color, moisture and texture; and sample depth. Once sampling is completed, the sample number, time, and date will be noted.

1.8 Laboratory Analysis

Because of the radiation potential of the samples, the selection of the laboratory which will perform the analyses has not been identified at this time. Laboratory selection will be based on the laboratory's ability to handle potentially radiation contaminated samples and will be CLP (Contract Lab Program) certified for RCRA analyses. The laboratory's QA/QC plan will be reviewed and approved by the Plant Engineer prior to analysis.

Because of the variety of wastes that were stored at this unit, it is proposed that the following two test procedures be completed.

- Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

- Organic scan using Method 8240 as described in SW-846 to identify targeted organic compounds.

Analytical methods are identified in Table 1.

In addition to the RCRA analyses of the soil samples, total Uranium and Uranium 235 will be tested. Because Uranium is regulated under the Atomic Energy Act of 1954 and is not a RCRA regulated waste, further discussion of the testing procedures is not appropriate. Reporting the results of Uranium testing in the soils is not a requirement for closure under RCRA.

1.9 Health and Safety Plan

Standard FMPC health and safety practices will be used during this sampling program.

1.10 QAPP

Standard FMPC Quality Assurance (QA) and Quality Control (QC) programs will be used during this sampling program.

Table 1

Procedures for Proposed RCRA Analysis of Soils

RCRA Metals

Parameter	Detection Method	Holding Time
Arsenic	6010	6 months
Barium	6010	6 months
Cadmium	6010	6 months
Total Chromium	6010	6 months
Hexavalent Chromium	7196	24 hrs.
Lead	6010	6 months
Mercury	7470	28 days
Selenium	6010	6 months
Silver	6010	6 months
Organic Scan	8240	14 days

Table 2

Listing of Organic Compounds
and Analytical Detection Limits
Using SW-846, Method 8240

Compound	Detection Limits (ug/kg dry weight)
Chloromethane	10
Bromomethane	10
Vinyl Chloride	10
Chloroethane	10
Methylene Chloride	5
Acetone	100
Carbon Disulfide	5
1,1-Dichloroethene	5
1,1-Dichloroethane	5
trans-1,2-Dichloroethene	5
Chloroform	5
1,2-Dichloroethane	5
2-Butanone	100
1,1,1-Trichloroethane	5
Carbon Tetrachloride	5
Vinyl Acetate	50
Bromodichloromethane	5
1,1,2,2-Tetrachloroethane	5
1,2-Dichloropropane	5
trans-1,3-Dichloropropene	5
Trichloroethene	5
Dibromochloromethane	5
Benzene	5
cis-1,3-Dichloropropene	5
2-Chloroethyl Vinyl Ether	10
Bromoform	5
2-Hexanone	50
4-Methyl-2-pentanone	50
Tetrachloroethene	5
Toluene	5
Chlorobenzene	5
Ethyl Benzene	5
Styrene	5
Total Xylenes	5
n-Butyl alcohol	5
Cresols (and cresylic acid)	5
Cyclohexanone	5
1,2-Dichlorobenzene	5
Ethyl acetate	5

Table 2 (Continued)

Listing of Organic Compounds
and Analytical Detection Limits
Using SW-846, Method 8240

Compound	Detection Limits (ug/kg dry weight)
Ethyl ether	5
Isobutyl alcohol	5
Methanol	5
Nitrobenzene	5
Pyridine	5
1,1,2-Trichloro - 1,2,2-Trifluoroethane	5
Trichlorofluoromethane	5

SAMPLING PLAN FOR THE
FEED MATERIALS PRODUCTION CENTER
KC-2 WAREHOUSE - BAY 7

U.S. DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
P.O. BOX 398705
CINCINNATI, OHIO 45239-8705

APPENDIX A
SOIL SAMPLING PLAN FOR THE KC-2 WAREHOUSE
BAY 7

1.0 INTRODUCTION

Closure of RCRA storage units requires that the units be decontaminated and sampled to ensure that no hazardous waste contamination exists at the units. If no contamination is found, the units can be closed "clean" allowing the units to have unrestricted future use.

This sampling plan provides a thorough and concise description of FMPC's procedures to determine the appropriate number of samples, the location of sampling points, sampling methodology, and sample analysis.

1.1 Background

1.1.1 Description

The KC-2 Warehouse - Bay 7 is a RCRA unit and is located within the FMPC facility as shown in Attachments 1 and 2 of the Closure Plan. The warehouse is underlaid by a concrete pad. Procedures for decontamination and testing of the concrete pad have already been described in the unit's Closure Plan.

Because the pad may contain cracks and because leaks from drums stored at the site have been known to occur at the unit, sampling the soil below the concrete is warranted.

The goal of this sampling plan will be to provide an assessment of the soils underlying and immediately adjacent to the concrete pad. If the results of the soil sampling indicate that the underlying or

adjacent soils are contaminated, additional sampling may be needed to determine the full extent of such contamination. If additional sampling is required, the closure plan will be amended to include a detailed sampling plan for the additional sampling and soil removal, if warranted.

1.1.2 Closure Standard

FMPC proposes that the site be considered clean and that no further action be required under the following conditions:

- The concentrations of the eight RCRA metals (total metals) in the soil do not exceed the upper limits of the range or the mean and plus two standard deviations of the soils collected at the FMPC as part of the background soil sampling effort.

- Analyzed organic compounds do not exceed the analytical detection limits for the analytical method proposed in this sampling plan and outlined in SW-846.

If either of these two conditions are not met, the reported values will be statistically compared to the duplicate and background soil samples (OAC 3745-55-11) taken for the unit and reported to Ohio EPA with recommendations for further action.

1.2 Identification of Potential Contaminants and Laboratory Analysis

1.2.1 Waste Stored At The Unit

As discussed in the Closure Plan, the KC-2 Warehouse - Bay 7 RCRA unit has stored tetrachloroethylene, 1,1,1-trichloroethane, lead, tributyl phosphate/kerosene and methylene chloride in the past.

1.2.2 Parameters

Because of the variety of wastes that were stored at this unit, it is proposed that the following two tests be completed.

- Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

- Organic scan using Method 8240 as described in SW-846 to identify targeted organic compounds.

Table 1 lists test procedures and appropriate holding times for soil analysis. Table 2 is a listing of the organic compounds and analytical detection limits that will be reported using Method 8240.

Method 8240 will detect the organic compounds which have been stored at the unit. In addition, this method will detect a majority of the degradation products of these compounds.

1.3 Appropriate Number of Samples

1.3.1 Statistical Methods Described in SW-846

The statistical method described in SW-846 to determine the proper number of samples for closure of RCRA units requires that an initial set of samples be analyzed. The results of this initial round of sampling is used to calculate the sample mean and variance so the appropriate number of samples can be calculated for a particular site.

This method of determining the appropriate number of samples favors large RCRA units. Because the area of the RCRA unit is only

approximately 1,500 square feet, the statistical method described in SW-846 for determining the required number of samples for the unit may be inappropriate.

Therefore, FMPC proposes to forego the initial round of sampling and determine the appropriate number of soil samples by taking approximately one sample for every 400 square feet of unit area or a total of 4 samples, excluding perimeter and background soil samples. Once the analytical results have been received, the appropriate number of samples can then be calculated using the following formula:

$$n = \frac{t^2_{.05}\, S^2}{\Delta^2}$$

where: $t_{.05}$ = Tabulated "t" value
S = Variance of sample
Δ = RT - x
RT = Regulatory threshold
x = Mean measurements of initial round of samples

If the appropriate number of samples is less than four, no further sampling will be done.

1.3.2 Background Sampling

FMPC proposes to collect a total of eight soil samples at the facility for use as the unit's background samples for statistical comparison of background levels for RCRA metals at this and other RCRA units.

These soil samples will be collected from eight different relatively undisturbed locations at the facility. Each soil sample will consist of a composite soil sample from 0 to 3 feet at each of the eight

locations. Decontamination of sampling equipment, soil sampling techniques, and laboratory analysis will follow the guidelines specified in this sampling plan.

Once completed, the eight background soil samples will be used for statistical comparison purposes at all RCRA units at the FMPC to determine if the unit can be considered clean, as described in Section 1.1.2 of this sampling plan.

1.3.3 Number of Perimeter Samples

One perimeter soil sample will be taken downslope of the unit, within 5 feet of the edge of the RCRA unit.

1.3.4 Number of Duplicate Samples

Duplicate soil samples will be taken for the units as confirmation of the laboratory's QA/QC. One duplicate soil sample will be taken for every five soil samples collected within the RCRA unit.

To reduce laboratory bias, the duplicate soil sample will be labeled and numbered in such a way that will not indicate that the sample is a duplicate or the location of the duplicate sample on the sampling grid. This information will be noted in the field book for later use.

1.4 Sampling Grid Design

1.4.1 Unit Dimensions

The KC-2 Warehouse - Bay 7 RCRA unit is approximately 1,500 square feet (21 feet by 69 feet).

As part of the goal of this sampling effort, soil immediately adjacent to the unit will also be tested. An area 5 feet around the perimeter of the unit will be included as part of the unit's dimensions when calculating the grid interval for the unit.

1.4.2 Ohio EPA's Acceptable Grid Interval

In the Ohio EPA, Division of Solid and Hazardous Waste Management's Closure Plan Review Guidance dated February 8, 1988, Ohio EPA states that the following equation may be used to determine the appropriate sampling grid interval:

$$GI = ((A \cdot \pi) / GL)^{0.5}$$

where: GI = Grid Interval
A = Grid Area (includes the 5 foot perimeter)
GL = Length of the Grid Area

The grid interval for this RCRA unit, as calculated using the above formula, is 10 feet.

1.4.3 Grid Orientation and Base Point

Prior to any sampling, the Plant Engineer will determine a suitable Base Point for the RCRA unit from which all measurements for the grid system will be taken. The Base Point for the unit can be any permanent landmark or surveyor's monument, near the unit and documented as to its surveyed position within the facility. This information will be well documented in the field book for possible duplication at a later time.

Once the Base Point is established, the grid axes will be determined. Based on magnetic north, a primary North-South axis and a primary

East-West axis will be established for the unit, intersecting the approximate center of the unit. Primary axes will be well marked and labeled on the concrete using a non-hazardous paint or other suitable marking system. The primary grid axes will be used to determine all other grid point locations by measuring from these axes.

1.5 Decontamination Procedures For Sampling Equipment

1.5.1 General Information

Prior to any sampling activities, all equipment used during the sampling effort will be properly decontaminated, reducing the possibility of cross contamination between other RCRA units. After sampling has been completed at each sampling location, all sampling equipment will also be properly decontaminated, reducing the chance of cross contamination and contact contamination by the sampling equipment outside the RCRA unit.

Prior to beginning the decontamination procedures, all personnel involved with sampling will inspect their clothing. Clean or new disposable coveralls will be used when clothing has visible soil/mud stains. Clean latex gloves will be worn during the entire decontamination process and during the handling of any equipment. During the final rinsing of the equipment, a new pair of latex gloves will be used to reduce the potential for cross contamination between the dirty wash area and the clean rinse area.

1.5.2 Decontamination Procedures

Proper decontamination will consist of a staged procedure. The dirty wash stage will consist of scrubbing the equipment with a dedicated brush in clean potable water to remove all visible mud and soil. The equipment will then be scrubbed with a second dedicated brush using

a soap solution made up of deionized water and laboratory-grade soap. Each piece of equipment will then be rinsed with deionized water to remove any visible soap solution.

After decontamination in the dirty wash area, the equipment will be processed through the clean rinse area. The clean rinse stage will consist of spraying the equipment with a dilute solution of nitric acid (10% nitric acid and deionized water) on all exposed and accessible areas of the equipment. After 1 to 3 minutes of contact, the equipment will be rinsed, using deionized water. The equipment will then be rinsed with hexane, followed by a triple rinse with deionized water.

If the equipment is not immediately needed, it will be protected from dust and weather by wrapping the equipment in new plastic polyethylene sheeting.

1.5.3 Collection and Handling of Decontamination Rinseate

All liquids and solids produced as a result of decontaminating sampling equipment will be collected at each unit, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6 Concrete Coring

1.6.1 Technique

To be able to sample the native soils below the reinforced concrete pads, FMPC proposes to use a jack hammer to core through the concrete. Jack hammering has many advantages at this site: the process does not require water (as do many concrete coring machines);

it is able to core through thick concrete pads; and it can cut through reinforcement bars.

Prior to the concrete coring operations, the FMPC Plant Engineer will be contacted to determine if there are any known underground utilities, pipes, wires or other similar structures which, if breached, would cause a safety problem. These underground structures will be well marked at the unit.

A core hole will be advanced through the concrete, cutting through reinforcement bars and other obstructions in the concrete. Hammering will continue until the top of the base gravel (the gravel below the concrete but above the native soil) is reached.

Once the base gravel is reached, all concrete chips will be removed from the hole by hand (clean latex gloves will be worn). All of the concrete chips and other material produced as a result of this coring operation will be collected at the site, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6.2 Alternative Method

When jack hammering is not feasible (i.e. inside confined buildings, near sensitive electronic equipment, etc.), concrete coring will be accomplished using a standard dry concrete coring machine.

1.6.3 Core Hole Plugging

Once the soil sample is collected from the hole, the core and soil bore will be filled with portland cement grout to a level slightly higher than the surrounding concrete, reducing ponding and promoting runoff.

1.7 Soil Sampling Procedures

1.7.1 Sample Locations

FMPC will use a combination of directed and random sampling point locations. The directed sampling point location for the adjacent soil sample will be taken at a downslope location within 5 feet of the RCRA unit. The RCRA unit samples will be located within the RCRA unit at random locations. A random number table will be used to determine the intersecting grid points.

1.7.2 Sample Collection Methodology

Ohio EPA will be notified at least five business days in advance of soil sampling activities.

As discussed in Section 1.5 of this sampling plan, all equipment used to collect the soil samples, including concrete coring equipment core/bit, will be decontaminated prior to beginning the sampling effort. All equipment will be properly decontaminated after the sampling effort to reduce the chance of contamination through contact with the equipment outside the RCRA unit.

Details about the concrete coring operation have already been discussed in Section 1.6 of this sampling plan. Once the concrete coring operation has reached the top of the base gravel lying beneath the concrete pad, coring will stop. The concrete chips and other debris will be cleaned out of the core hole by hand.

A 3-inch diameter bucket auger will be advanced through the base gravel and the native soil by hand. Augering will begin near the top of the base gravel and continue through to the native soil. If the base gravel is too large to allow for augering, the gravel may be

removed by hand, using clean latex gloves. Once the top of the native soil is reached, augering will continue using the bucket auger. FMPC will attempt to auger into the native soil a total of 2 feet.

As the hand auger is brought to the surface, the resulting soil sample will be placed into a properly decontaminated stainless steel compositing pan. Clean latex gloves will be worn to assist in the removal of the soil sample from the hand auger and whenever contact with the sample or sampling equipment is imminent.

The minimum volume of native soil that will be collected will be equal to 2 times the volume of base gravel collected. Sampling of the native soil will continue until enough soil is collected from the location to meet this minimum volume requirements as well as the volume requirement for laboratory analysis (two 4 ounce, wide-mouth glass jars with teflon liners).

Once the appropriate volume of soil is collected, sampling will be terminated. Compositing the soil sample will consist of mixing the collected soil and base gravel with decontaminated stainless steel utensils until the soil sample is thoroughly mixed.

The composite soil will then be placed into two 4 ounce wide-mouth, glass jars with teflon liners, supplied by the laboratory, filled to the top (no headspace), sealed, labeled, logged onto the chain of custody form, and stored at 4° C in a thermal chest or refrigerator until delivered to the laboratory. Delivery to the laboratory will be via overnight courier or equivalent method. Holding times for the samples are shown in Table 1.

Any remaining soil sample not placed in containers for laboratory analysis will be placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

Prior to, during, and after the sampling effort, notes will be made in a field book. A description of the weather, sampling conditions, sampling crew, names of other observers, time sampling began, and the sample location will be noted prior to sampling. During the sampling effort, notations in the field book will include: special conditions; changes to procedures; sample description, including color, moisture and texture; and sample depth. Once sampling is completed, the sample number, time, and date will be noted.

1.8 Laboratory Analysis

Because of the radiation potential of the samples, the selection of the laboratory which will perform the analyses has not been identified at this time. Laboratory selection will be based on the laboratory's ability to handle potentially radiation contaminated samples and will be CLP (Contract Lab Program) certified for RCRA analyses. The laboratory's QA/QC plan will be reviewed and approved by the Plant Engineer prior to analysis.

Because of the variety of wastes that were stored at this unit, it is proposed that the following two test procedures be completed.

- Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

- Organic scan using Method 8240 as described in SW-846 to identify targeted organic compounds.

Analytical methods are identified in Table 1.

In addition to the RCRA analyses of the soil samples, total Uranium and Uranium 235 will be tested. Because Uranium is regulated under the Atomic Energy Act of 1954 and is not a RCRA regulated waste, further discussion of the testing procedures is not appropriate. Reporting the results of Uranium testing in the soils is not a requirement for closure under RCRA.

1.9 Health and Safety Plan

Standard FMPC health and safety practices will be used during this sampling program.

1.10 QAPP

Standard FMPC Quality Assurance (QA) and Quality Control (QC) programs will be used during this sampling program.

Table 1

Procedures for Proposed RCRA Analysis of Soils

RCRA Metals

Parameter	Detection Method	Holding Time
Arsenic	6010	6 months
Barium	6010	6 months
Cadmium	6010	6 months
Total Chromium	6010	6 months
Hexavalent Chromium	7196	24 hrs.
Lead	6010	6 months
Mercury	7470	28 days
Selenium	6010	6 months
Silver	6010	6 months
Organic Scan	8240	14 days

Table 2

Listing of Organic Compounds and Analytical Detection Limits Using SW-846, Method 8240

Compound	Detection Limits (ug/kg dry weight)
Chloromethane	10
Bromomethane	10
Vinyl Chloride	10
Chloroethane	10
Methylene Chloride	5
Acetone	100
Carbon Disulfide	5
1,1-Dichloroethene	5
1,1-Dichloroethane	5
trans-1,2-Dichloroethene	5
Chloroform	5
1,2-Dichloroethane	5
2-Butanone	100
1,1,1-Trichloroethane	5
Carbon Tetrachloride	5
Vinyl Acetate	50
Bromodichloromethane	5
1,1,2,2-Tetrachloroethane	5
1,2-Dichloropropane	5
trans-1,3-Dichloropropene	5
Trichloroethene	5
Dibromochloromethane	5

Table 2 (Continued)

Listing of Organic Compounds
and Analytical Detection Limits
Using SW-846, Method 8240

Compound	Detection Limits (ug/kg dry weight)
Benzene	5
cis-1,3-Dichloropropene	5
2-Chloroethyl Vinyl Ether	10
Bromoform	5
2-Hexanone	50
4-Methyl-2-pentanone	50
Tetrachloroethene	5
Toluene	5
Chlorobenzene	5
Ethyl Benzene	5
Styrene	5
Total Xylenes	5
n-Butyl alcohol	5
Cresols (and cresylic acid)	5
Cyclohexanone	5
1,2-Dichlorobenzene	5
Ethyl acetate	5
Ethyl ether	5
Isobutyl alcohol	5
Methanol	5
Nitrobenzene	5
Pyridine	5
1,1,2-Trichloro - 1,2,2-Trifluoroethane	5
Trichlorofluoromethane	5

SAMPLING PLAN FOR THE FEED MATERIALS PRODUCTION CENTER PILOT PLANT WAREHOUSE

U.S. DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
P.O. Box 398705
CINCINNATI, OHIO 45239-8705

APPENDIX A
SOIL SAMPLING PLAN FOR THE
PILOT PLANT WAREHOUSE - BUILDING 68

1.0 INTRODUCTION

Closure of RCRA storage units requires that the units be decontaminated and sampled to ensure that no hazardous waste contamination exists at the units. If no contamination is found, the units can be closed "clean" allowing the units to have unrestricted future use.

This sampling plan provides a thorough and concise description of FMPC's procedures to determine the appropriate number of samples, the location of sampling points, sampling methodology, and sample analysis.

1.1 Background

1.1.1 Description

The Pilot Plant Warehouse - Building 68 is a RCRA unit and is located within the FMPC facility as shown in Attachment 2 of the Pilot Plant Warehouse - Building 68 Closure Plan. The warehouse is underlaid by a concrete pad. Procedures for decontamination and testing of the concrete pad have already been described in the unit's Closure Plan.

Because the pad may contain cracks and because leaks from drums stored at the site have been known to occur at the unit, sampling the soil below the concrete is warranted.

The goal of this sampling plan will be to provide an assessment of the soils underlying and immediately adjacent to the concrete pad. If the results of the soil sampling indicate that the underlying or

adjacent soils are contaminated, additional sampling may be needed to determine the full extent of such contamination. If additional sampling is required, the closure plan will be amended to include a detailed sampling plan for the additional sampling and soil removal, if warranted.

1.1.2 Closure Standard

FMPC proposes that the site be considered clean and that no further action be required under the following conditions:

The concentrations of the eight RCRA metals (total metals) in the soil do not exceed the upper limits of the range or the mean plus 2 standard deviations of the soils collected at the FMPC as part of the background sampling event.

If this condition is not met, the reported values will be statistically compared to the duplicate and background soil samples (OAC 3745-55-11) taken for the unit and reported to Ohio EPA with recommendations for further action.

1.2 Identification of Potential Contaminants and Laboratory Analysis

1.2.1 Waste Stored At The Unit

As discussed in the Closure Plan, the Pilot Plant Warehouse RCRA unit has stored barium chloride.

1.2.2 Parameters

Because of the of wastes that were stored at this unit, it is proposed that the following analytical test be completed.

Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

1.3 Appropriate Number of Samples

1.3.1 Statistical Methods Described in SW-846

The statistical method described in SW-846 to determine the proper number of samples for closure of RCRA units requires that an initial set of samples be analyzed or that parameter statistics be estimated. The results of this initial round of sampling is used to calculate the sample mean and variance so the appropriate number of samples can be determined for a particular site.

This method of determining the appropriate number of samples favors large RCRA units. Because the area of the RCRA unit is only 430 square feet, the statistical method described in SW-846 for determining the required number of samples for the unit may be inappropriate.

Therefore, FMPC proposes to forego the initial round of sampling and determine the appropriate number of soil samples by taking one sample for every 100 square feet of unit area or a total of four samples from the unit itself, excluding perimeter and background sampling.

Once the analytical results have been received, the appropriate number of samples can then be calculated using the following formula:

$$n = \frac{t^2_{.05}\, s^2}{\Delta^2}$$

where: $t_{.ot}$ = Tabulated "t" value
s = Variance of sample
Δ = RT - x
RT = Regulatory threshold
x = Mean measurements of initial round of samples

If the appropriate number of samples is less than four, no further sampling will take place.

1.3.2 Background Sampling

FMPC proposes to collect a total of eight soil samples at the facility for use as the unit's background samples for statistical comparison of background levels for RCRA metals at this and other RCRA units.

These soil samples will be collected from eight different relatively undisturbed locations at the facility. Each soil sample will consist of a composite soil sample from 0 to 3 feet at each of the eight locations. Decontamination of sampling equipment, soil sampling techniques, and laboratory analysis will follow the guidelines specified in this sampling plan.

Once completed, the eight background soil samples will be used for statistical comparison purposes at all RCRA units at the FMPC to determine if the unit can be considered clean, as described in Section 1.1.2 of this sampling plan.

1.3.3 Number of Perimeter Samples

One perimeter soil sample will be taken downslope of the unit, within 5 feet of the edge of the RCRA unit.

1.3.4 Number of Duplicate Samples

Duplicate soil samples will be taken for the units as confirmation of the laboratory's QA/QC. One duplicate soil sample will be taken for every five soil samples collected within the RCRA unit.

To reduce laboratory bias, the duplicate soil sample will be labeled and numbered in such a way that will not indicate that the sample is a duplicate or the location of the duplicate sample on the sampling grid. This information will be noted in the field book for later use.

1.4 Sampling Grid Design

1.4.1 Unit Dimensions

The Pilot Plant Warehouse RCRA unit is approximately 450 square feet (7 feet by 62 feet).

As part of the goal of this sampling effort, soil immediately adjacent to the unit will also be tested. An area 5 feet around the perimeter of the unit will be included as part of the unit's dimensions when calculating the grid interval for the unit.

1.4.2 Ohio EPA's Acceptable Grid Interval

In the Ohio EPA, Division of Solid and Hazardous Waste Management's Closure Plan Review Guidance dated February 8, 1988, Ohio E.P.A states that the following equation may be used to determine the appropriate sampling grid interval:

$$GI = ((A \cdot \pi) / GL)^{0.5}$$

where: GI = Grid Interval
A = Grid Area (includes the 5 foot perimeter)
GL = Length of the Grid Area

The grid interval for this RCRA unit, as calculated using the above formula, is 7 feet.

1.4.3 Grid Orientation and Base Point

Prior to any sampling, the Plant Engineer will determine a suitable Base Point for the RCRA unit from which all measurements for the grid system will be taken. The Base Point for the unit can be any permanent landmark or surveyor's monument, near the unit and documented as to its surveyed position within the facility. This information will be well documented in the field book for possible duplication at a later time.

Once the Base Point is established, the grid axes will be determined. Based on magnetic north, a primary North-South axis and a primary East-West axis will be established for the unit, intersecting the approximate center of the unit. Primary axes will be well marked and labeled on the concrete using a non-hazardous paint or other suitable marking system. The primary grid axes will be used to determine all other grid point locations by measuring from these axes.

1.5 Decontamination Procedures For Sampling Equipment

1.5.1 General Information

Prior to any sampling activities, all equipment used during the sampling effort will be properly decontaminated, reducing the possibility of cross contamination between other RCRA units. After sampling has been completed at each sampling location, all sampling equipment will also be properly decontaminated, reducing the chance of cross contamination and contact contamination by the sampling equipment outside the RCRA unit.

Prior to beginning the decontamination procedures, all personnel involved with sampling will inspect their clothing. Clean or new disposable coveralls will be used when clothing has visible soil/mud stains. Clean latex gloves will be worn during the entire decontamination process and during the handling of any equipment. During the final rinsing of the equipment, a new pair of latex gloves will be used to reduce the potential for cross contamination between the dirty wash area and the clean rinse area.

1.5.2 Decontamination Procedures

Proper decontamination will consist of a dirty wash procedure and a clean rinse procedure. The dirty wash procedure will consist of scrubbing the equipment with a dedicated brush in clean potable water to remove all visible mud and soil. The equipment will then be scrubbed with a second dedicated brush using a soap solution made up of deionized water and laboratory-grade soap. Each piece of equipment will then be rinsed with deionized water to remove any visible soap solution.

After decontamination in the dirty wash area, the equipment will be processed through the clean rinse area. The clean rinse procedure will consist of spraying the equipment with a dilute solution of nitric acid (10% nitric acid and deionized water) on all exposed and accessible areas of the equipment. After 1 to 3 minutes of contact, the equipment will be rinsed using deionized water. The equipment will then be rinsed with hexane, followed by a triple rinse with deionized water.

If the equipment is not immediately needed, it will be protected from dust and weather by wrapping the equipment in new plastic polyethylene sheeting.

1.5.3 Collection and Handling of Decontamination Rinseate

All liquids and solids produced as a result of decontaminating sampling equipment will be collected at each unit, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6 Concrete Coring

1.6.1 Technique

To be able to sample the native soils below the reinforced concrete pads, FMPC proposes to use a jack hammer to core through the concrete. Jack hammering has many advantages at this site: the process does not require water (as do many concrete coring machines); it is able to core through thick concrete pads; and it can cut through reinforcement bars.

Prior to the concrete coring operations, the FMPC Plant Engineer will be contacted to determine if there are any known underground utilities, pipes, wires or other similar structures which, if breached, would cause a safety problem. These underground structures will be well marked at the unit.

A core hole will be advanced through the concrete, cutting through reinforcement bars and other obstructions in the concrete. Hammering will continue until the top of the base gravel (the gravel below the concrete but above the native soil) is reached.

Once the base gravel is reached, all concrete chips will be removed from the hole by hand (clean latex gloves will be worn). All of the concrete chips and other material produced as a result of this coring operation will be collected at the site, placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

1.6.2 Alternative Method

When jack hammering is not feasible (i.e., inside confined buildings, near sensitive electronic equipment, etc.) concrete coring will be accomplished using a standard dry concrete coring machine.

1.6.3 Core Hole Plugging

Once the soil sample is collected from the hole, the core and soil bore will be filled with portland cement grout to a level slightly higher than the surrounding concrete, reducing ponding and promoting runoff.

1.7 Soil Sampling Procedures

1.7.1 Sample Locations

FMPC will use a combination of directed and random sampling point locations. The directed sampling point location for the adjacent soil sample will be taken at a downslope location within 5 feet of the RCRA unit. The RCRA unit samples will be located within the RCRA unit at random locations. A random number table will be used to determine the intersecting grid points.

1.7.2 Sample Collection Methodology

Ohio EPA will be notified at least five business days in advance of soil sampling activities.

As discussed in Section 1.5 of this sampling plan, all equipment used to collect the soil samples, including concrete coring equipment core/bit, will be decontaminated prior to beginning the sampling

effort. All equipment will be properly decontaminated after the sampling effort to reduce the chance of contamination through contact with the equipment outside the RCRA unit.

Details about the concrete coring operation have already been discussed in Section 1.6 of this sampling plan. Once the concrete coring operation has reached the top of the base gravel lying beneath the concrete pad, coring will stop. The concrete chips and other debris will be cleaned out of the core hole by hand.

A 3 inch diameter bucket auger will be advanced through the base gravel and the native soil by hand. Augering will begin near the top of the base gravel and continue through to the native soil. If the base gravel is too large to allow for augering, the gravel may be removed by hand (clean latex gloves will be worn). Once the top of the native soil is reached, augering will continue using the bucket auger. FMPC will attempt to auger into the native soil a total of 2 feet.

As the hand auger is brought to the surface, the resulting soil sample will be placed into a properly decontaminated stainless steel compositing pan. Clean latex gloves will be worn when removing the soil sample from the hand auger and whenever contact with the sample or sampling equipment is imminent.

The minimum volume of native soil that will be collected will be equal to 2 times the volume of base gravel collected. Sampling of the native soil will continue until enough soil is collected from the location to meet this minimum volume requirements as well as the volume requirement for laboratory analysis (two 4 ounce, wide- mouth, glass jars with teflon liners).

Once the appropriate volume of soil is collected, sampling will be terminated. Compositing the soil sample will consist of mixing the collected soil and base gravel with decontaminated stainless steel utensils until the soil sample is thoroughly mixed.

The composite soil will then be placed into two 4 ounce, wide- mouth, glass jars with teflon liners supplied by the laboratory, filled to the top (no headspace), sealed, labeled, logged onto the chain of custody form, and stored at 4° C in a thermal chest or refrigerator until delivered to the laboratory. Delivery to the laboratory will be via overnight courier or equivalent method. Holding times for samples are shown in Table 1.

Any remaining soil sample not placed in containers for laboratory analysis will be placed in properly labeled 55-gallon drums, and stored in an approved RCRA storage unit at FMPC.

Prior to, during, and after the sampling effort, notes will be made in a field book. A description of the weather, sampling conditions, sampling crew, names of other observers, time sampling began, and the sample location will be noted prior to sampling. During the sampling effort, notations in the field book will include: special conditions; changes to procedures; sample description, including color, moisture and texture; and sample depth. Once sampling is completed, the sample number, time, and date will be noted.

1.8 Laboratory Analysis

Because of the radiation potential of the samples, the selection of the laboratory which will perform the analyses has not been identified at this time. Laboratory selection will be based on the laboratory's ability to

handle potentially radiation contaminated samples and will be CLP (Contract Lab Program) certified for RCRA analyses. The laboratory's QA/QC plan will be reviewed and approved by the Plant Engineer prior to analysis.

Because only barium chloride wastes were stored at this unit, it is proposed that the following test procedure be completed.

- Eight RCRA metals (total Arsenic, Barium, Cadmium, total and hexavalent Chromium, Lead, Mercury, Selenium, and Silver) following the procedures outlined in SW-846.

Analytical methods are identified Table 1.

In addition to the RCRA analyses of the soil samples, total Uranium and Uranium-235 will be tested. Because Uranium is regulated under the Atomic Energy Act of 1954 and is not a RCRA regulated waste, further discussion of the testing procedures is not appropriate. Reporting the results of Uranium testing in the soils is not a requirement for closure under RCRA.

1.9 Health and Safety Plan

Standard FMPC health and safety practices will be used during this sampling program.

1.10 QAPP

Standard FMPC Quality Assurance (QA) and Quality Control (QC) programs will be used during this sampling program.

Table 1

Procedures for Proposed RCRA Analysis of Soils

RCRA Metals

Parameter	Detection Method	Holding Time
Arsenic	6010	6 months
Barium	6010	6 months
Cadmium	6010	6 months
Total Chromium	6010	6 months
Hexavalent Chromium	7196	24 hrs.
Lead	6010	6 months
Mercury	7470	28 days
Selenium	6010	6 months
Silver	6010	6 months
Organic Scan	8240	14 days