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SUBMISSION OF THE DRAFT REMEDIAL DESIGN WORK PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 2

08/04/95

DOE-1320-95
DOE-FN EPAS
~~175~~ 117
WORK PLAN

Department of Energy
Fernald Environmental Management Project
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AUG 04 1995
DOE-1320-95

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Dear Mr. Saric and Mr. Schneider:

SUBMISSION OF THE DRAFT REMEDIAL DESIGN WORK PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 2

The purpose of this letter is to submit the enclosed Draft Remedial Design Work Plan for Remedial Actions at Operable Unit 2 for your review and comment. Submittal of this document is required by August 7, 1995, which is within sixty (60) days of the signing of the Operable Unit 2 Record of Decision.

This Draft Remedial Design Work Plan presents the remedial design process for Operable Unit 2. This draft document incorporates discussions from the July 31, 1995, meeting between the U.S. Environmental Protection Agency (U.S. EPA), Ohio Environmental Protection Agency (OEPA), Department of Energy, Fernald Area Office (DOE-FN), and the Fernald Environmental Restoration Management Corporation (FERMCO). At this meeting, an integrated approach for Fernald site remedial activities was discussed. Inherent in this approach is the commitment that the placement of waste materials in the on-site disposal facility will not be delayed.

A schedule for the submittal of design packages for each phase of remedial design is also proposed in the Work Plan. Please note that a discussion on the proposed design criteria packages has been presented in Section 3.0. This section has been included to promote early discussion of the disposal facility technical design requirements between U.S. EPA, OEPA and DOE-FN.

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If you have any questions regarding the enclosed document, please contact Rod Warner at 513-648-3156.

Sincerely,

Johnny Reising

for Jack R. Craig
Fernald Remedial Action
Project Manager

Enclosure: As Stated

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REMEDIAL DESIGN WORK PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 2

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

AUGUST 1995

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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1.0 INTRODUCTION

This Remedial Design Work Plan defines the activities required to develop the final construction plans, drawings, specifications, and procurement documents for the implementation of the Operable Unit 2 selected remedy. This remedy is described in the *Final Record of Decision for Remedial Actions at Operable Unit 2* of the Fernald Environmental Management Project (FEMP), signed by the U.S. Environmental Protection Agency (EPA) on June 8, 1995 (DOE 1995).

The selected remedy presented in the Final Operable Unit 2 Record of Decision includes excavation of all material with contaminants of concern (COCs) above the established cleanup levels; material processing for size reduction and moisture control, if required; on-site disposal in an engineered disposal facility with a composite cap and liner system; and off-site disposal of a small fraction of the excavated material that exceeds the waste acceptance criteria for the on-site disposal facility.

In an effort to integrate Fernald site remedial activities, certain components of the Operable Unit 2 selected remedy will be covered by the separate site-wide plans, and thus have not been included in the scope of this Remedial Design Work Plan. These site-wide plans will include components such as: soil cleanup certification sampling, final subunit grading and restoration, groundwater and stormwater monitoring, off-site transportation, and treatment activities. However, the groundwater and stormwater plans for the on-site disposal facility are included in the scope of this Remedial Design Work Plan. The site-wide integration of certain remedial components will not impact the schedule for initial placement of waste material in the on-site disposal facility.

The U.S. Department of Energy (DOE) intends to construct only one disposal facility at the FEMP. On-site disposal of waste material is also the preferred remedial alternative of Operable Unit 5 and the leading remedial alternative for Operable Unit 3. Operable Unit 2 is responsible for designing the on-site disposal facility that will accommodate all FEMP waste proposed for on-site disposal.

This Work Plan is the primary document to be used in defining the implementation of the Operable Unit 2 remedial design activities and has been prepared in accordance with Section XI of the 1991 Amended Consent Agreement between DOE and EPA. The Amended Consent Agreement was entered into under Sections 120 and 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. This Work Plan has also been prepared,

where feasible, utilizing EPA guidance provided in "Superfund Remedial Design and Remedial Action Guidance" (EPA 1986) and "Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties" (EPA 1990).

The Remedial Design Work Plan includes a description of the selected remedy, a discussion of how technical design requirements will be identified, environmental compliance requirements, and general design strategy. This Work Plan addresses the design deliverables and schedules associated with implementation of the Operable Unit 2 remedial design in the following four phases:

- Phase 1 is the design of a primary waste haul road from the South Field and Inactive and Active Flyash Pile areas to the on-site disposal facility;
- Phase 2 is the design of test pads to verify the permeability of the cap and liner systems;
- Phase 3 is the design of an engineered on-site disposal facility; and
- Phase 4 is the design of the excavation activities for the waste unit areas.

The specific components of these phases are discussed in greater detail in Section 6.0. The Amended Consent Agreement requires that this Remedial Design Work Plan provide a schedule for the implementation of activities required to complete the remedial design. The schedule is also presented in Section 6.0 of this Work Plan and includes document submittal dates for the four phases discussed above and submittal dates for the Operable Unit 2 Remedial Action Work Plans.

This Remedial Design Work Plan is comprised of seven sections and one appendix. The sections and a description of the contents are as follows:

Section 1.0 Introduction

Section 2.0 Description of Selected Remedy — This section includes a description of the selected remedy and the major components required to complete implementation.

Section 3.0 Design Criteria Package — This section briefly discusses the Design Criteria Packages to be submitted to EPA independent of this Work Plan.

Section 4.0 Regulatory Compliance — This section identifies the substantive requirements of applicable or relevant and appropriate requirements (ARARs) pertaining to on-site activities and explains in concept how the remedial action will comply with ARARs and attain performance standards.

Section 5.0 Tests and Studies in Support of Design — This section provides a discussion of field studies supporting the remedial design.

Section 6.0 Remedial Design Strategy — This section proposes remedial design schedules and plans for completion of design activities.

Section 7.0 Program Management — This section discusses the initial assignment of responsibility and authority of all organizations and key personnel involved in the implementation of the selected remedy. This section also discusses the avenues of public participation during the remedial design process.

Appendix A ARARs and To Be Considered (TBC) Criteria

2.0 DESCRIPTION OF SELECTED REMEDY

2.1 DESCRIPTION OF OPERABLE UNIT 2

Operable Unit 2, Other Waste Units, consists of five site areas and their associated berms, liners, and soils.

- The Solid Waste Landfill was reportedly used for the disposal of cafeteria waste, rubbish, and other types of waste from the nonprocess areas and on-site construction/demolition activities.

- The North and South Lime Sludge Ponds contain waste from the FEMP water treatment plant operations, coal pile storm water runoff, and boiler plant blowdown. The South Lime Sludge Pond is inactive and overgrown with grasses and shrubs, while the North Lime Sludge Pond is currently in use. The FEMP will be connected to a public water supply in Fall 1995 which will eliminate the use of the water treatment operations and therefore the use of the North Lime Sludge Pond.

- The Inactive Flyash Pile was used for the disposal of ash from the boiler plant and other nonprocess wastes and building rubble such as concrete, gravel, asphalt, masonry, and steel rebar.

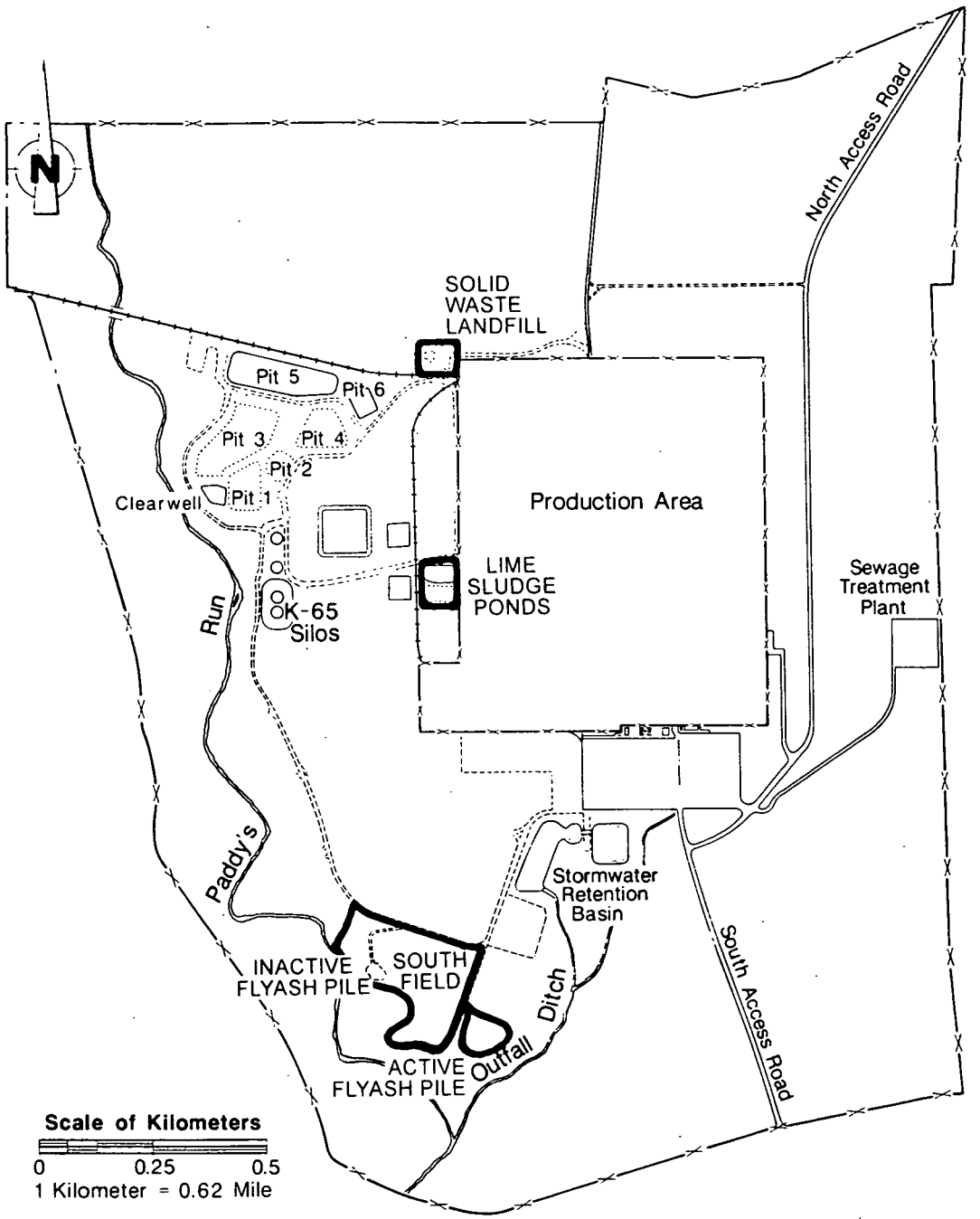
- The South Field was reportedly used as a burial site for FEMP nonprocess wastes such as flyash, on-site construction/demolition rubble, and soils that may have contained low levels of radioactivity. A slope at the southwest border of the South Field was used as the backstop for the FEMP security firing range for 35 years. Lead ammunition used during target practice is embedded in this slope.

- The Active Flyash Pile was the disposal area for flyash and bottom ash from the FEMP boiler plant.

The operational histories of the Lime Sludge Ponds and Active Flyash Pile are well understood, but the operational histories of the Solid Waste Landfill, Inactive Flyash Pile, and South Field are vague and not well documented. The location of each of the five Operable Unit 2 subunits is illustrated on Figure 2-1.

2.2 DESCRIPTION OF SELECTED REMEDY

The selected remedy presented in the Operable Unit 2 Record of Decision was designed to address the overall remediation of Operable Unit 2. The following are the major components of the selected remedy that are described below in more detail:



LEGEND

- Location of Operable Unit 2 Subunits
- Covered Pit
- Fence
- Railroad Spur
- Roadway

Figure 2-1: FEMP Site Map

GRAPHICS #2617

- construction of the on-site disposal facility
- excavation of material and certification sampling
- transportation and disposal of waste materials
- restoration
- long-term monitoring and maintenance

2.2.1 Construction of the On-Site Disposal Facility

The on-site disposal facility will be constructed with a composite liner of soil and geosynthetics. Excavated material meeting the on-site disposal facility waste acceptance criteria will be placed on the liner system. The composite cap of soil and geosynthetics will be constructed above the waste and tied-in with the liner system. Construction will also include associated site work and installation of monitoring wells. Figure 2-2 depicts a cross-section of the proposed cap and liner system. The design of the disposal facility will be finalized during the remedial design based on additional investigations and the design process. The on-site disposal facility will be located within the limits of the potentially acceptable region shown on Figure 2-3. A more specific location for the disposal facility has been proposed in the Draft Predesign Investigation Report, which was submitted to EPA and OEPA on July 31, 1995.

2.2.2 Excavation of Material and Certification Sampling

The material at the Operable Unit 2 subunits will be excavated to the required depth established by the Remedial Investigation (RI) and Feasibility Study (FS) Reports to remove materials with concentrations of COCs above the cleanup levels. Excavation will be performed in such a way as to minimize possible dilution of waste. The concept of keeping public and worker exposure "as low as reasonably achievable" (ALARA) will be documented in the Remedial Action Work Plan and implemented during construction. Dust control measures will also be utilized to minimize air emissions during excavation. Debris from the excavated material will be segregated and processed for size reduction, if required, before disposal.

Throughout excavation, waste acceptance criteria attainment certification sampling will be conducted to verify on-site or off-site disposal of the excavated material. Cleanup attainment certification sampling will be performed in the subunit areas following excavation of material.

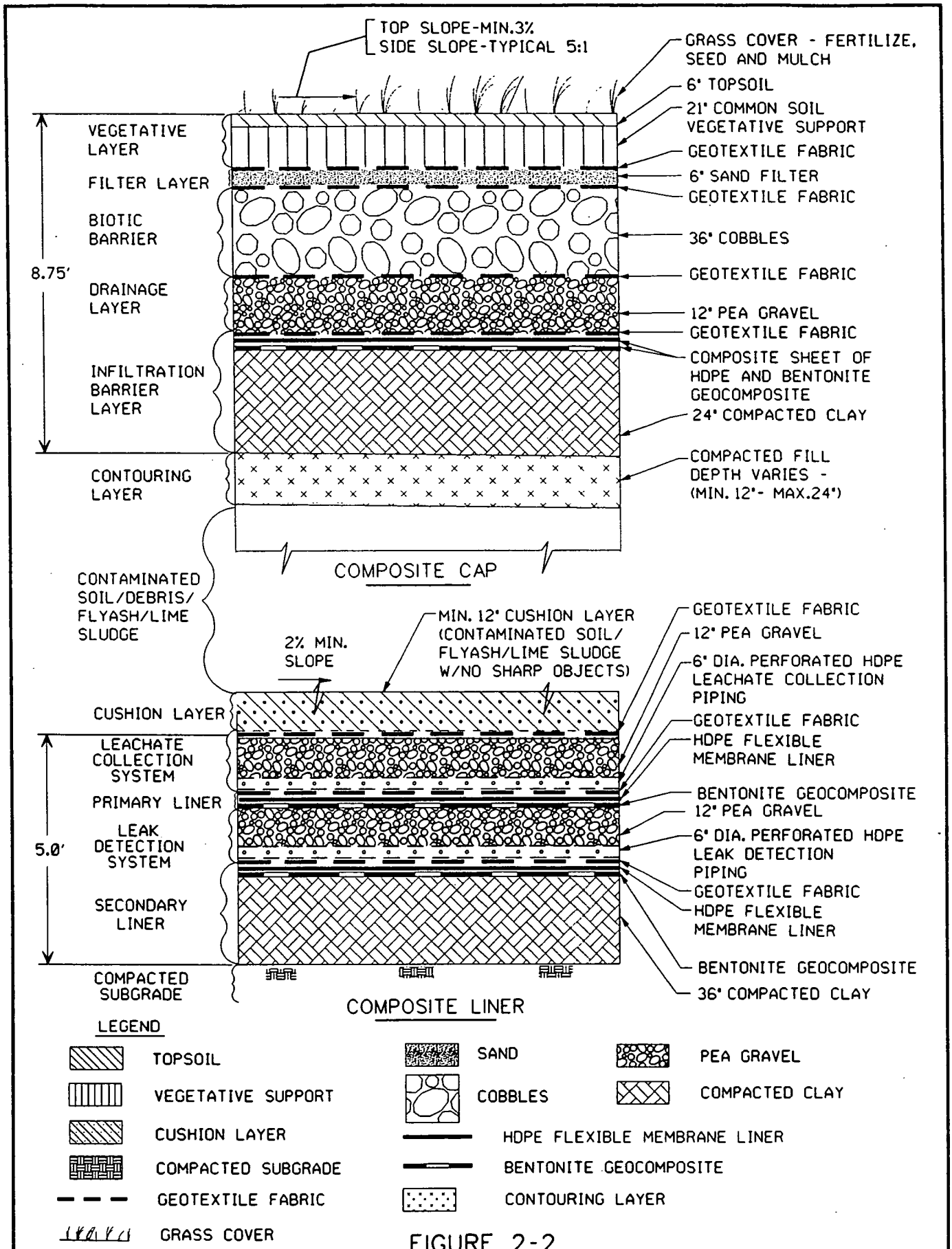
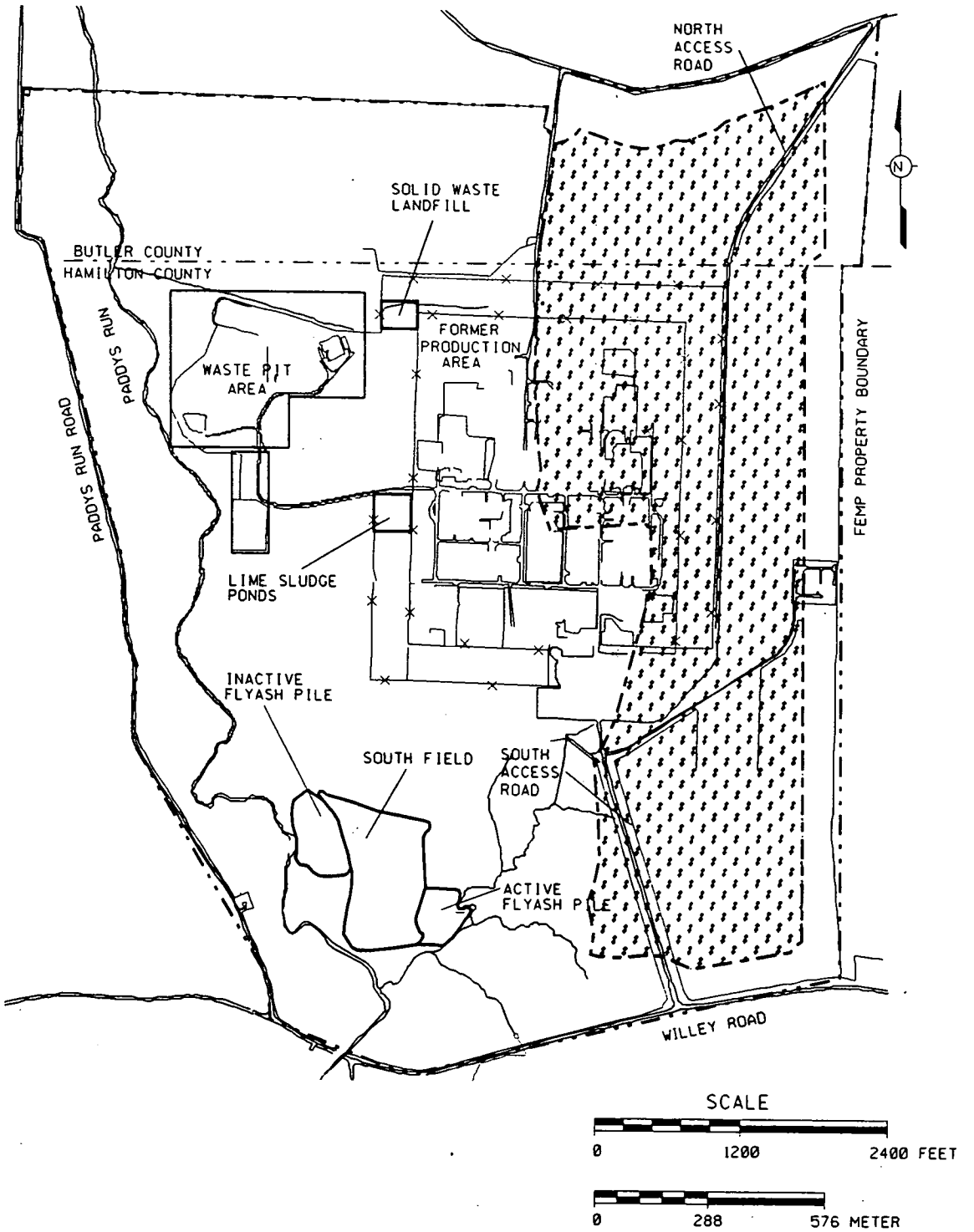


FIGURE 2-2
TYPICAL DETAIL
COMPOSITE CAP AND LINER
(NOT TO SCALE)



LEGEND

POTENTIALY ACCEPTABLE REGION

FEMP BOUNDARY

FIGURE 2-3
POTENTIALLY ACCEPTABLE REGION
FOR
ON-SITE DISPOSAL FACILITY

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2.2.3 Transportation and Disposal

A waste acceptance criteria of 346 picoCuries/gram (pCi/g) of uranium-238 or 1,030 parts per million (ppm) total uranium has been established for the Operable Unit 2 material to be disposed of in the on-site disposal facility. Operable Unit 2 material with concentrations above the cleanup levels and at or below the on-site waste acceptance criteria will be transported and disposed in the on-site disposal facility. It is estimated that out of a total of approximately 315,000 cubic yards, approximately 3,100 cubic yards of material will have concentrations of uranium-238 or total uranium above the disposal facility waste acceptance criteria. This material will be transported to an approved off-site disposal facility. An additional 300 cubic yards of lead-containing soil from the South Field Firing Range will be handled as mixed waste, treated as necessary, and disposed at an approved off-site disposal facility.

Additional waste acceptance criteria for Operable Units 3 and 5 COCs are in the process of being established and will be incorporated into the design once they are finalized.

2.2.4 Restoration and Long-Term Monitoring and Maintenance

Restoration of the Operable Unit 2 subunits will include grading of the subunits to blend with the surrounding topography, seeding, fencing, and the installation of monitoring wells. Institutional controls, such as access restrictions (fencing) of the on-site disposal facility and groundwater monitoring at the Operable Unit 2 subunits and on-site disposal facility, will be implemented following restoration. Groundwater monitoring at the disposal facility will be initiated prior to the placement of wastes to obtain background data. Groundwater monitoring and review of the results will continue for at least 30 years following closure of the on-site disposal facility. Continued Federal ownership of the FEMP is also a key component of the selected remedy. Maintenance of the subunit areas after restoration, and maintenance of the on-site disposal facility will be performed as necessary. Because this remedy will result in contaminants remaining on site in an engineered disposal facility, a review will be conducted by EPA no less often than every five years after the initiation of remedial action in accordance with CERCLA §121(c) to ensure that the remedy continues to provide adequate protection of human health and the environment. The five year reviews will continue, based on long-term monitoring results, until EPA determines that the reviews are no longer needed to ensure protectiveness of human health and the environment. Operation and maintenance plans will include general contingency provisions.

2.3 REMEDIAL ACTION LEVELS

The Operable Unit 2 remedial action levels (referred to as cleanup levels in the Operable Unit 2 Record of Decision) have been divided into primary and secondary levels, which are presented in Tables 2-1 and 2-2 respectively. Primary remedial action levels refer to those COCs that contribute over 90 percent of the risk from Operable Unit 2 and over 99 percent of the Operable Unit 2 volumes to be excavated under the selected remedial action. Secondary remedial action levels refer to those COCs that pose risks that are close to the 10^{-6} point of departure and contribute less than 10 percent to the overall risk from Operable Unit 2. This delineation has been made in order to optimize the cleanup certification sampling program which will be outlined in the Remedial Action Work Plan. Based on existing analytical results from the RI and the volume calculations from the FS, secondary cleanup levels will most likely be achieved by remediation to the primary levels, however, the achievement of remediation will be confirmed through cleanup attainment certification sampling.

Wastes not meeting the on-site disposal facility waste acceptance criteria must meet the waste acceptance criteria for the selected off-site disposal facility. An off-site disposal facility has not yet been chosen; however, Envirocare in Clive, Utah was used as a representative facility for purposes of cost estimates and planning. The waste acceptance criteria for radionuclides at the Envirocare facility are listed in Table 2-3. As Table 2-3 illustrates, based on samples taken during the RI, it is expected that all Operable Unit 2 waste with concentrations above the on-site waste acceptance criteria will meet the off-site waste acceptance criteria. In the unlikely event that any material exceeds the off-site disposal facility waste acceptance criteria, another acceptable off-site disposal facility with a higher waste acceptance criteria (e.g., Nevada Test Site) will be evaluated.

TABLE 2-1

OPERABLE UNIT 2 PRIMARY SOIL REMEDIAL ACTION LEVELS

Contaminant of Concern (COC)	Units	Background[a]	Remedial Action Level[b]	Basis for Remedial Action Level
ALL SUBUNITS				
Radium-226	pCi/g	1.42	1.8	10^{-6} ILCR[c]
Radium-228	pCi/g	1.25	2.0	10^{-6} ILCR
Thorium-228	pCi/g	1.43	1.8	10^{-6} ILCR
Thorium-232	pCi/g	1.36	1.5	10^{-6} ILCR
SOLID WASTE LANDFILL				
Uranium-234[g]	pCi/g	1.04	62.9	10^{-6} ILCR
Uranium-235/236[g]	pCi/g	0.15	63.1	10^{-6} ILCR
Uranium-238	pCi/g	1.22	12.9[d]	ARAR[e,f]
Uranium-Total	mg/kg	3.4	38.6	ARAR[f]
LIME SLUDGE POND				
Uranium-234[g]	pCi/g	1.04	196	10^{-6} ILCR
Uranium-235/236[g]	pCi/g	0.15	195	10^{-6} ILCR
Uranium-238	pCi/g	1.22	45.3[d]	ARAR[f]
Uranium-Total	mg/kg	3.4	136	ARAR[f]
INACTIVE FLYASH PILE (WASTE/SOIL OVER THE GREAT MIAMI AQUIFER)				
Arsenic	mg/kg	8.2	16.9	10^{-6} ILCR
Uranium-234[g]	pCi/g	1.04	8.68	10^{-6} ILCR
Uranium-235/236[g]	pCi/g	0.15	7.79	10^{-6} ILCR
Uranium-238[g]	pCi/g	1.12	6.12	10^{-6} ILCR
Uranium-Total[g]	mg/kg	3.4	24.8	ARAR[f]
INACTIVE FLYASH PILE (WASTE/SOIL LOCATED OVER >16 FEET NATURAL SOIL)				
Arsenic	mg/kg	8.2	16.9	10^{-6} ILCR
Uranium-234[g]	pCi/g	1.04	4.24	10^{-6} ILCR
Uranium-235/236[g]	pCi/g	0.15	3.35	10^{-6} ILCR
Uranium-238[g]	pCi/g	1.12	3.22	10^{-6} ILCR
Uranium-Total[g]	mg/kg	3.4	24.8	ARAR[f]
SOUTH FIELD (WASTE/SOIL LOCATED OVER THE GREAT MIAMI AQUIFER)				
Lead[h]	mg/kg	26.4	400	ARAR[i]
Thorium-230[g]	pCi/g	1.97	6.97	ARAR[j]
Uranium-234[g]	pCi/g	1.04	8.68	10^{-6} ILCR
Uranium 235/236[g]	pCi/g	0.15	7.79	10^{-6} ILCR
Uranium-238[g]	pCi/g	1.12	6.12	10^{-6} ILCR
Uranium-Total[g]	mg/kg	3.4	24.8	ARAR[f]

See footnotes at end of table.

TABLE 2-1
(Continued)

Contaminant of Concern (COC)	Units	Background[a]	Remedial Action Level[b]	Basis for Remedial Action Level
SOUTH FIELD (WASTE/SOIL LOCATED OVER >16 FEET NATURAL SOIL)				
Thorium-230[g]	pCi/g	1.97	6.97	ARAR[j]
Uranium-234[g]	pCi/g	1.04	4.24	10^{-6} ILCR
Uranium 235/236[g]	pCi/g	0.15	3.35	10^{-6} ILCR
Uranium-238[g]	pCi/g	1.12	3.22	10^{-6} ILCR
Uranium-Total[g]	mg/kg	3.4	24.8	ARAR[f]
ACTIVE FLYASH PILE				
Arsenic	mg/kg	8.2	16.9	10^{-6} ILCR
Uranium-234[g]	pCi/g	1.04	8.64	10^{-6} ILCR
Uranium-235/236[g]	pCi/g	0.15	7.75	10^{-6} ILCR
Uranium-238[g]	pCi/g	1.12	6.12	10^{-6} ILCR
Uranium-Total[g]	mg/kg	3.4	28	ARAR[f]

[a]Background value from Operable Unit 2 RI Report, Table 4-1A, surface concentrations.
[b]The cleanup level is the lowest value of the 10^{-6} ILCR, 0.2 Hazard Index, or ARAR standard.
[c]ILCR = incremental lifetime cancer risk. In the case of radionuclides, the remedial action level is the concentration responsible for the incremental risk plus the background concentration.
[d]This value determined by calculating the uranium-238 concentration in uranium-total.
[e]ARAR = applicable or relevant and appropriate requirement
[f]Based on the proposed MCL for uranium (56 Federal Register 33050).
[g]Remedial action level due to off-property resident farmer receptor
[h]The lead cleanup level applies to the Firing Range only, not the entire South Field area.
[i]Based on the EPA "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities" (OSWER Directive 9355.4-12).
[j]Based on DOE Order 5400.5, Chapter IV (4)(a)(2).

Source: Table 2-23, Operable Unit 2 FS Report.

TABLE 2-2

OPERABLE UNIT 2 SECONDARY SOIL REMEDIAL ACTION LEVELS

Contaminant of Concern (COC)	Units	Background[a]	Remedial Action Level[b]	Basis for Remedial Action Level
SOUTH FIELD (WASTE/SOIL LOCATED OVER THE GREAT MIAMI AQUIFER)				
Aroclor-1260[c]	mg/kg	0	25	10^{-6} ILCR[d]
Benzo(a)anthracene	mg/kg	0	0.455	ARAR[e,f]
Benzo(a)pyrene	mg/kg	0	0.777	ARAR[f]
Benzo(b)fluoranthene[c]	mg/kg	0	0.513	ARAR[f]
Benzo(k)fluoranthene	mg/kg	0	0.603	ARAR[f]
Dibenzo(a,h)anthracene[c]	mg/kg	0	0.157	ARAR[f]
Dieldrin	mg/kg	0	0.00957	ARAR[f]
Indeno(1,2,3-cd)pyrene[c]	mg/kg	0	0.496	ARAR[f]
Phenanthrene	mg/kg	0	0.19	ARAR[f]
Technetium-99	pCi/g	0	71	10^{-6} ILCR
Thorium-230[c]	pCi/g	1.97	6.97	ARAR[g]
SOUTH FIELD (WASTE/SOIL LOCATED OVER >16 FEET NATURAL SOIL)				
Aroclor-1260[c]	mg/kg	0	25	10^{-6} ILCR
Benzo(a)anthracene	mg/kg	0	0.455	ARAR[f]
Benzo(a)pyrene	mg/kg	0	0.777	ARAR[f]
Benzo(b)fluoranthene[c]	mg/kg	0	0.513	ARAR[f]
Benzo(k)fluoranthene	mg/kg	0	0.603	ARAR[f]
Dibenzo(a,h)anthracene[c]	mg/kg	0	0.157	ARAR[f]
Dieldrin	mg/kg	0	0.00957	ARAR[f]
Indeno(1,2,3-cd)pyrene[c]	mg/kg	0	0.496	ARAR[f]
Phenanthrene	mg/kg	0	0.19	ARAR[f]
Technetium-99	pCi/g	0	71	10^{-6} ILCR
Thorium-230[c]	pCi/g	1.97	6.97	ARAR[g]
ACTIVE FLYASH PILE				
Neptunium-237	pCi/g	0	4.99	10^{-6} ILCR

[a]Background value from Operable Unit 2 RI Report, Table 4-1A, surface concentrations.
[b]The remedial action level is the lowest value of the 10^{-6} ILCR, 0.2 Hazard Index, or ARAR standard.
[c]Remedial action level due to off-property resident farmer receptor.
[d]ILCR = incremental lifetime cancer risk. In the case of radionuclides, the remedial action level is the concentration responsible for the incremental risk plus the background concentration.
[e]ARAR = applicable or relevant and appropriate requirement
[f]Based on the Ohio Water Quality Standards (OAC 3745-1-07)
[g]Based on DOE Order 5400.5, Chapter IV (4)(a)(2).

Source: Table 2-23, Operable Unit 2 FS Report.

TABLE 2-3

ENVIROCARE ACCEPTANCE CRITERIA COMPARED TO MAXIMUM ACTIVITIES DETECTED

Contaminant of Concern	Acceptance Criteria for Envirocare[b] (pCi/g)	Maximum Detected Activity (pCi/g) by Operable Unit 2 Subunit[a]				
		Solid Waste Landfill	Lime Sludge Pond	Inactive Flyash Pile	South Field	Active Flyash Pile
Cesium-137	< 5.6E+02	5.22E-01	8.90E-01	6.41E-01	8.36E-01	9.19E-01
Neptunium-237	< 2.0E+03	3.11E+00	7.20E-01	3.73E+01	6.53E+00	4.50E-01
Plutonium-238	< 1.0E+04	9.02E-01	6.62E-01	1.85E+00	7.35E-01	1.29E+00
Radium-226	< 2.0E+03	1.13E+02	5.93E+00	4.23E+01	3.12E+01	6.22E+00
Radium-228	< 1.8E+03	6.65E+00	2.92E+00	3.13E+00	6.75E+02	5.32E+00
Thorium-228	--[c]	9.36E+00	2.91E+00	4.10E+00	5.95E+02	5.79E+00
Thorium-230	< 1.5E+04	7.20E+02	4.48E+01	1.21E+02	5.73E+01	6.74E+00
Thorium-232	< 6.8E+02	8.22E+00	2.75E+00	4.00E+00	6.00E+02	5.08E+00
Uranium-234	< 3.7E+04	5.53E+02	2.65E+01	1.38E+03	3.78E+02	1.73E+01
Uranium-235/236	< 7.7E+02[d]	2.89E+01	1.83E+00	6.88E+01	2.06E+01	4.12E+00
Uranium-238	< 2.8E+04	5.77E+02	8.40E+01	1.57E+03	3.97E+02	1.26E+01
Uranium-Total (mg/kg)	--[e]	1.77E+03	2.44E+02	3.58E+03	1.17E+03	5.18E+01

[a]Activity levels represent maximum detected value for surface soil, subsoil, or sediment for each subunit.
[b]Acceptance criteria for Envirocare is the maximum average value permitted for a shipment of waste.
[c]Thorium-228 is a daughter of thorium-232 (assumed at same concentration in equilibrium).
[d]Acceptance criteria provided is for uranium-235. Uranium-236 acceptance criteria is 3.6E+04 pCi/g.
[e]Acceptance criteria for uranium-natural is 1.8E+04 pCi/g and for uranium-depleted is 1.1E+05 pCi/g.

Source: Table E.2.1-2, Operable Unit 2 FS Report

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3.0 DESIGN CRITERIA PACKAGE

DOE will assemble engineering criteria, technical criteria, and scope information into a concise design criteria package (DCP) for each of the four Preliminary Design Review Packages for the remedial action. Each DCP will be submitted at the same time as its associated Preliminary Design Review Package.

Each DCP will provide the project description and the project design basis. The description will address the physical layout, structures, buildings, services, utilities, etc. that constitute the remedial action project. The design basis will describe how the project design will satisfy compliance with the ARARs, TBCs, and pertinent DOE Orders identified for the project. Within the design basis, the DCPs will identify the system functions, technical requirements, and design constraints and limitations.

The objective of the engineering design criteria is to identify and define the applicable general and discipline-specific design requirements that must be satisfied in performing the engineering design, and preparing construction drawings and specifications for the final remediation. The DCPs will list pertinent DOE Orders, ARARs and TBCs, Engineering Design Codes (national, state, and local) and Standards, and will also identify any exemptions to be requested from specific DOE Orders.

The engineering design criteria will include technical design requirements that, if modified after the submittal of the On-Site Disposal Facility Preliminary Design Review Package, may impact design and construction schedules. The significance of some of these technical design requirements is such that early consensus between DOE and EPA is required. The most important examples include the following proposed design criteria:

- Design Storm - 2,000 year storm event (mean annual hazard probability of 5×10^{-4}) in accordance with Performance Category 2 in DOE Standard 1020-94;
- Design Seismic Event - maximum horizontal ground surface acceleration of 0.13 gravities in accordance with Performance Category 2 in DOE Standard 1020-94;
- Design Life - the facility is to be effective for up to 1,000 years, to the extent reasonably achievable, and in any case, for at least 200 years as required under 40 CFR 192.02(a) with the design life of certain components being determined through a graded approach based on: (1) whether the component can be replaced/repaired via routine maintenance; (2) whether the failure of the component would jeopardize long-term protection of human health and the environment; and/or (3) how a reasonably achievable design life would be defined for a specific component.

4.0 REGULATORY COMPLIANCE

4.1 COMPLIANCE WITH ARARs

CERCLA §121(d)(2) directs that remedial actions must comply with federal and state environmental laws that are legally applicable or are relevant and appropriate under the circumstances of the release or potential release. The complete list of Operable Unit 2 ARARs is attached to this document as Appendix A. Because waste from other operable units may be disposed in the on-site disposal facility, Appendix A also includes ARARs from Operable Unit 5 that are pertinent to the design of the disposal facility. These additional ARARs have already been considered in the conceptual design of the cap and liner system (see Figure 2-2).

ARARs are defined as follows:

- Applicable requirements are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

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

- To Be Considered criteria is a category that includes non-promulgated criteria, advisories, and guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, pertinent TBCs will be considered along with the ARARs in determining the necessary level of cleanup or technology requirements.

EPA has identified three categories of ARARs:

- *Chemical-specific* ARARs are usually health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment [e.g., maximum contaminant levels (MCLs) that establish safe levels in drinking water].

- *Action-specific* ARARs are usually technology- or activity-based requirements or limitations on actions or conditions involving special substances.

- *Location-specific* ARARs restrict actions or contaminant concentrations in certain environmentally sensitive areas. Examples of areas regulated under various federal laws

include floodplains, wetlands, and locations where endangered species or historically significant cultural resources are present.

Sources of Operable Unit 2 ARARs are federal and state laws, regulations, and guidance and DOE Orders that address the site-specific circumstances in Operable Unit 2.

4.1.1 Chemical-Specific Requirements

All Operable Unit 2 remedial alternatives must meet the chemical-specific ARARs associated with potential releases to air, surface water, groundwater, and penetrating radiation. Air emission and radon protection standards will be met above the on-site disposal facility and each Operable Unit 2 subunit. Ohio Water Quality Standards will be met at both Paddys Run and the Great Miami River.

Groundwater will be protected to promulgated federal non-zero maximum contaminant level goals (MCLGs) and MCLs, and any more stringent state standards, for drinking water. The engineering and institutional controls associated with the selected remedy for Operable Unit 2 were established for the protection of human health, and will ensure that the groundwater MCLs and non-zero MCLGs will be met at the boundary of the on-site disposal facility and at each Operable Unit 2 subunit.

Radiation dose standards from DOE Orders 5400.5 and 5820.2A have been established so that no member of the public receives an effective dose equivalent greater than 100 millirem (mrem) in a year from radiation exposure as a consequence of all routine DOE activities or an effective dose equivalent of 25 mrem per year from concentrations of radioactive material released to the general environment in surface water, groundwater, soil, plants or animals. These standards will be met through the removal of all contaminated material above cleanup levels from Operable Unit 2. The material will either be safely disposed in the on-site disposal facility or, if it does not meet the on-site disposal facility waste acceptance criteria, it will be sent off-site for disposition at an approved facility.

4.1.2 Action-Specific Requirements

Because Operable Unit 2 includes both low-level radioactive waste/residual radioactive material and solid waste, design and construction of the on-site disposal facility will meet the more stringent requirements for the disposal of low-level radioactive waste/residual radioactive material. EPA states in 40 CFR §192.02(a) that the disposal facility must be designed to be effective for up to 1,000 years, to the extent reasonably achievable, and in any case, for at least 200 years. DOE Order 5820.2A

requires compliance with performance objectives for low-level radioactive waste disposal sites, including protection of public health and safety, protection of the public and the environment from releases of radioactivity, and protection of groundwater resources. DOE Order 5400.5 requires that the ALARA policy to minimize radiation exposure be adopted during design and construction.

The on-site disposal facility will also meet the less stringent Ohio Environmental Protection Agency (OEPA) technical requirements for the disposal of solid waste. These requirements include specifications for the design and construction of a liner and cap system for the on-site disposal facility.

Material from the South Field Firing Range is assumed to be mixed waste and will be treated as necessary and disposed at an off-site disposal facility that is approved to accept mixed waste. Firing Range material that is hazardous waste must comply with the storage, packaging, and transportation requirements of the Resource, Conservation, and Recovery Act (RCRA), including the manifest system, while it is being prepared and shipped from the FEMP. Packaging and transportation of the Firing Range wastes will also be required to meet DOE requirements for the transport of hazardous materials.

4.1.3 Location-Specific Requirements

The protection of endangered species, cultural resources, floodplains, and wetlands in the locations of remediation is required by federal and state regulations. Endangered and threatened species and habitat at the FEMP will be protected under the Operable Unit 2 selected remedy. Surveys for cultural resources have been performed in the area of the on-site disposal facility and all finds of archaeological significance will be preserved through avoidance of the area where possible or controlled removal of the resource. Additional cultural resource surveys will be implemented as the location of the on-site disposal facility is finalized and as areas for disturbance (e.g., roads, staging areas, etc.) are identified during remedial design. Part of the Inactive Flyash Pile and South Field are located in a 100- and 500-year floodplain area, but the remedial action will not adversely impact this floodplain. A small area of wetlands is located north of the Solid Waste Landfill. During remediation, contaminated sediments may be removed from the area, thus impacting the wetland. Wetlands in other areas of the site may also be impacted by construction and operation of the on-site disposal facility. This remedial action will be performed in accordance with the wetlands protection requirements of the Clean Water Act (Section 404 and applicable regulations). A DOE National

Environmental Policy Act (NEPA) assessment [10 CFR §1022] was prepared to evaluate and minimize potential impacts to floodplains and wetlands.

Because the on-site disposal facility will contain solid waste in addition to low-level radioactive waste/residual radioactive material, the siting criteria from the Ohio Solid Waste Disposal Regulations are pertinent ARARs. Ohio Administrative Code (OAC) 3745-27-07 establishes restrictions and prohibitions on where a solid waste disposal facility may be constructed, including prohibiting placement over a sole-source aquifer or over an unconsolidated aquifer capable of sustaining a yield of 100 gallons per minute for a 24-hour period (i.e., high yield.) The Great Miami Aquifer, which underlies the entire FEMP, is both a sole-source aquifer and a high-yield aquifer. Because of this, Operable Unit 2 has received a CERCLA ARAR waiver from EPA in accordance with CERCLA §121(d)(4)(D) to allow the on-site disposal facility to be constructed at the FEMP. The facility will be located in the area that exhibits the most suitable hydrogeologic conditions on site. This is currently defined as an area where, at a minimum, 12 feet or more of gray clay would exist between the bottom of the disposal facility and the aquifer. As discussed in Section 2.2.1, the most suitable location for the on-site disposal facility has been proposed in the Draft Predesign Investigation Report. This report also verified that the most suitable location would ensure protection of human health and the environment.

4.2 PERMITTING REQUIREMENTS

The selected remedy for Operable Unit 2 is exempt from administrative permitting requirements pursuant to CERCLA Section 121(e)(1), 40 CFR § 300.400(e) and Paragraph XIII.A of the Amended Consent Agreement. CERCLA Section 121(e)(1) specifically states that no Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on site, where such remedial action is selected and carried out in compliance with Section 121. The only exception for Operable Unit 2 is that National Pollutant Discharge Elimination System (NPDES) discharges to the Great Miami River will be off-site releases. In this case, the remedial action must comply with both the substantive and the administrative requirements of the NPDES permit. Paragraph XIII.B of the Amended Consent Agreement requires DOE to supply specific information regarding any permits that would have been required for the action in the absence of the CERCLA permitting exemption. Pursuant to Paragraph XIII.B of the Amended Consent Agreement, the following information is required:

- Identification of each permit that would have been required in absence of the CERCLA 121(e) permitting exemption;
- Identification of the standards, requirements, criteria, or limitations that would have had to have been met to obtain the permits; and
- Explanation of how the remedial action will meet the substantive requirements, criteria, or limitations identified above.

This information will be provided in the Pre-Final Design Review Package.

5.0 TESTS AND STUDIES IN SUPPORT OF DESIGN

Various tests and studies have been deemed necessary to support the remedial design of the Operable Unit 2 remediation efforts and the on-site disposal facility. These tests/studies are in various stages of completion. The results of these additional investigations will be factored into the design, and will be summarized in the detailed design packages. The tests/studies that have been, or will be, completed in support of design include the following and are discussed below:

- Predesign Investigation;
- Site-Wide Disposal Facility Field Investigation;
- Geotechnical Studies;
- Liner Compatibility Study; and
- Engineering Studies.

5.1 PREDESIGN INVESTIGATION

The purpose of the Predesign Investigation was to define the most suitable location for the on-site disposal facility within an identified best area at the FEMP. This most suitable area is located on the east side of the FEMP and was chosen because it has the greatest thickness of gray clay and interbedded coarse granular materials which provide a protective layer over the Great Miami Aquifer (see Figure 2-3).

The Predesign Investigation fieldwork was performed in a phased approach. The first phase included preliminary cone penetrometer testing (CPT) and water level measurements of existing wells. This information was used to obtain a preliminary understanding of the existing soil conditions and to optimize the sampling locations for the second phase. This included the installation and sampling of wells, borings, and lysimeters. Data obtained and analyzed in the Predesign Investigation was used to confirm the thickness of the gray clay, identify interbedded course granular materials, verify the protectiveness of human health and the environment, and obtain preliminary geotechnical information for the design of the disposal facility.

5.2 SITE-WIDE DISPOSAL FACILITY FIELD INVESTIGATION

The objective of the Site-Wide Disposal Facility Field Investigation is to obtain engineering and geotechnical data necessary for the detailed engineering design of the on-site disposal facility. This investigation will consist of soil borings, shallow soil sampling, CPTs, and slug testing. Soil borings will be completed within and adjacent to the proposed location for the disposal facility to facilitate additional engineering/geotechnical soil tests and gather additional soil profile information. Shallow soil sampling will be conducted to facilitate additional soil tests on both the topsoil and underlying till. CPTs will be performed within and adjacent to the proposed location for the disposal facility to provide continuous stratigraphy information and strength data for engineering evaluation and analysis. The data obtained through this investigation will support engineering analyses for the disposal facility design including settlement, earthquake stability, structural support, liquefaction potential, slope stability, and other design requirements. Additional hydrogeologic data, including slug testing, will also be obtained to determine if engineering controls will be required to minimize potential lateral flow pathways.

5.3 GEOTECHNICAL STUDIES

A Borrow Area Geotechnical Investigation will be conducted to identify local borrow sources and the properties of the material from these sources. If an on-site borrow source can be located, the material may be used in the construction of the cap and liner of the on-site disposal facility. This information will also be utilized in conjunction with the Site-Wide Disposal Facility Field Investigation to support the design of the on-site disposal facility cap and liner system.

An investigation of the waste units will also be conducted to characterize and define geotechnical properties of the Operable Unit 2 waste materials to assist in the evaluation of long-term settlement in the disposal facility and for possible use in the construction of the disposal facility. If the geotechnical properties of the waste material are suitable, it may be used as berm material and as a cushioning layer at the top of the liner system.

5.4 LINER COMPATIBILITY STUDY

A liner compatibility study will be performed on liner materials to determine the most suitable liner materials for use in the construction of the on-site disposal facility. This study will evaluate the physical properties of the materials and evaluate compatibility with leachates and other layers in the proposed cap and liner systems.

5.5 ENGINEERING STUDIES

Engineering studies will be performed on two potential technologies to evaluate their effectiveness and applicability to the Operable Unit 2 remediation. These studies will be performed on a geochemical barrier technology and on a volume reduction technology known as brickmaking. These studies will be completed in a phased approach to determine the effectiveness of the two technologies and the need to continue studying the two technologies. Further studies would be conducted only if it is determined in the engineering studies that the technologies are cost effective and reduce contaminant toxicity, mobility, or volume.

6.0 REMEDIAL DESIGN STRATEGY

Section 6.0 discusses the phases of remedial design and associated project documentation and deliverable schedules and the process and schedule for review and finalization of the identified deliverables.

6.1 PHASES OF REMEDIAL DESIGN

The basis for Operable Unit 2 remediation includes all of the elements of the selected remedy as presented in Section 2.2. The design approach to these elements will be reflected in the design deliverables which are included in one of the four phases of design. Phase 1 is the design of a primary waste haul road from the South Field and Inactive and Active Flyash Pile areas to the on-site disposal facility. Phase 2 is the design of test pads to verify the permeability of the cap and liner systems. Phase 3 is the design of the on-site disposal facility. Phase 4 is the design of the excavation for the waste unit areas.

6.1.1 Phase 1 — Design of Primary Waste Haul Road

A primary waste haul road from the waste unit areas to the on-site disposal facility will be constructed during remedial action. This activity will also entail relocating the FEMP North Access Road. The design of this activity will be based on the results of a study to coordinate remedial traffic activities.

Documentation and Schedule

The Primary Waste Haul Road Preliminary, Pre-Final, and Final Design Review Packages will be submitted for EPA review and approval (and OEPA review). A remedial action work plan will be submitted to EPA and OEPA with the Primary Waste Haul Road Pre-Final Design Review Package. The schedule associated with this documentation is included in Table 6-1.

6.1.2 Phase 2 — Design of Test Pads

Ohio Solid Waste Disposal Regulations specify the maximum permeability for certain layers of the cap and liner system [OAC 3745-27-08(C)]. Test pads will be designed based on the results of the Predesign Investigation, Site-Wide Disposal Facility Field Investigation, and the Borrow Area Geotechnical Investigation to verify that the permeabilities of the recompacted soil liner and the recompacted soil barrier layer in the cap system will meet the Ohio requirements.

TABLE 6-1

REMEDIAL DESIGN SCHEDULE

DELIVERABLES	SCHEDULED DATE
REMEDIAL DESIGN WORK PLAN	
Submit Draft Remedial Design Work Plan to EPA	08/07/95
REMEDIAL DESIGN	
Phase 1 - Design of the Primary Waste Haul Road	
Submit Primary Waste Haul Road Preliminary Design Review Package to EPA	01/29/96
Submit Primary Waste Haul Road Pre-Final Design Review Package to EPA	05/03/96
Issue Primary Waste Haul Road Final Design Review Package/CFC[1] to EPA	06/21/96
Phase 2 - Design of Test Pads	
Submit Draft Test Pad Work Plan to EPA	01/15/96
Submit Final Test Pad Work Plan to EPA	03/07/96
Phase 3 - Design of On-Site Disposal Facility	
Submit Disposal Facility Preliminary Design Review Package to EPA	12/22/95
Submit Disposal Facility Pre-Final Design Review Package to EPA	06/28/96
Issue Disposal Facility Final Design Review Package/CFC to EPA	10/14/96
Phase 4 - Excavation and Restoration of Waste Units	
Submit Waste Unit Preliminary Design Review Package to EPA	05/28/96
Submit Waste Unit Pre-Final Design Review Package to EPA	10/22/96
Issue Waste Unit Final Design Review Package/CFC to EPA	03/20/97
REMEDIAL ACTION WORK PLANS	
Submit Draft Disposal Facility Remedial Action Work Plan to EPA	04/12/96
Submit Draft Primary Waste Haul Road Remedial Action Work Plan to EPA	05/03/96
Submit Final Disposal Facility Remedial Action Work Plan to EPA	06/28/96
Submit Final Primary Waste Haul Road Remedial Action Work Plan to EPA	06/21/96
Submit Draft Waste Unit Remedial Action Work Plan to EPA	10/22/96
Submit Final Waste Unit Remedial Action Work Plan to EPA	03/20/97

[1] CFC = certified for construction

Documentation and Schedule

Due to the single focus of this phase, the design, specifications, and drawings will be included in a single work plan. The Draft and Final Test Pad Work Plan will be submitted to EPA for review and approval (and OEPA for review). The schedule associated with this documentation is included in Table 6-1.

6.1.3 Phase 3 — Design of On-Site Disposal Facility

The on-site disposal facility will be designed to accommodate 2.5 million cubic yards of remediation waste from the FEMP. The facility will include a multi-layer geocomposite cap and liner system with leak detection and leachate collection layers. For Operable Unit 2 remediation waste, a maximum on-site disposal facility waste acceptance criteria of 346 pCi/g uranium-238 or 1,030 ppm total uranium has been established to protect the Great Miami Aquifer, which underlies the FEMP. Similar waste acceptance criteria for other COCs are in the process of being established for remediation waste in Operable Units 3 and 5. Upon finalization, these additional waste acceptance criteria will be incorporated into the design. The cap and liner design, stormwater control, leachate management, waste acceptance criteria screening, and groundwater monitoring plan will be included in the on-site disposal facility remedial design package.

Documentation and Schedule

The on-site disposal facility Preliminary, Intermediate, Pre-Final, and Final Design Review Packages will be submitted to EPA for review and approval (and OEPA review). The schedule associated with this documentation is included in Table 6-1. The Intermediate Design Review Package is not an Amended Consent Agreement submittal and therefore is not included in Table 6-1.

6.1.4 Phase 4 — Excavation of Waste Units

The excavation activities for the waste units will be designed during this phase. The material with concentrations of COCs above the cleanup levels will be excavated from each of the five Operable Unit 2 waste units. The excavated material will be screened in the field and samples will be analyzed, as necessary, to determine the uranium concentration. This waste acceptance criteria attainment certification is to verify on-site or off-site disposal of the excavated material. If the material is at or below the on-site disposal facility waste acceptance criteria of 346 pCi/g of uranium-238 or 1,030 ppm total uranium, it will be transported for disposal in the on-site disposal facility. If the uranium concentration is above the on-site disposal facility waste acceptance criteria, the material

will be packaged and shipped to an approved off-site disposal facility. Material from the South Field Firing Range that contains lead is being considered a mixed waste. This waste will be treated and disposed at an approved off-site disposal facility. The specific treatment method for the lead-containing Firing Range material will be defined in the remedial design package.

Documentation and Schedule

The Waste Units Preliminary, Pre-Final, and Final Design Review Packages will be submitted for EPA review and approval (and OEPA review). The schedule associated with this documentation is included in Table 6-1.

6.2 REVIEW AND FINALIZATION OF DESIGN DELIVERABLES

DOE will formally address all EPA and OEPA comments on the Preliminary Design Review Packages through submittal of a comment response document within 30 days of receipt of the agencies' comments. DOE does not plan to submit revised Preliminary, Intermediate, or Pre-Final Design Review Packages, but rather will incorporate revisions to address comments into subsequent submittals.

6.3 COMMENCEMENT OF REMEDIAL ACTION

The design approach presented in this Remedial Design Work Plan, as reflected in the design deliverables and presented in the schedule, provides the mechanism for the Operable Unit 2 remediation to meet the requirement of Section 120(e)(2) for commencing substantial continuous physical on-site remedial action not later than 15 months after the signing of the Operable Unit 2 Record of Decision (i.e., by September 8, 1996). The schedule presented in Table 6-1 is based upon a 60 day review period for the Preliminary and Pre-Final Design Review Packages, and a 30 day review period for the Intermediate Design Review Package and certification for construction.

The Operable Unit 2 activity which fulfills the commitment to implement the remedy within 15 months is the issuance of the contract for the construction of the primary waste haul road from the waste unit areas to the location of the on-site disposal facility. This activity will be closely followed by construction of the primary waste haul road and construction of the test pads. Prior to completion of road construction, the construction of the disposal facility will begin.

Winter construction shut downs are anticipated once construction of the disposal facility and excavation of the waste units begins. This is necessary because optimum weather conditions are needed to construct the liner and cap systems of the on-site disposal facility and to place waste within the facility. These periodic shut downs do not constitute a lapse in the "substantial continuous physical on-site remedial action" that is required by CERCLA [Section 120(e)(2)]; they are a normal part of constructing and operating a disposal facility in this climate.

7.0 PROGRAM MANAGEMENT

This section identifies key management and technical personnel, defines specific project roles and responsibilities for managing and preparing the design for the selected remedy for Operable Unit 2, and discusses requirements for informing and involving the public.

7.1 STAFFING REQUIREMENTS

The Amended Consent Agreement places ultimate project management responsibility with the DOE and the EPA. In addition, the OEPA has been granted regulatory authority over certain RCRA activities. Each agency has engaged contractors to perform identified scopes of work related to their prime areas of responsibility for site remediation. For the development of remedial design, Figure 7-1 identifies the relationship among the regulators, DOE administrative and program management organizations, the public, and the Fernald Environmental Restoration Management Corporation (FERMCO) and its subcontractors. Figure 7-2 depicts the project communications which are in place for this project. Figure 7-3 depicts the project organizational chart.

The DOE Operable Unit 2 Team Leader will provide the overall programmatic direction for the Operable Unit 2 remedial activities. The FERMCO CERCLA/RCRA Unit 2 Project Director, will provide for the overall project management and technical guidance to the FERMCO team and the architect/engineer (A/E) design firm. One of the Project Director's roles is to ensure adherence of the A/E with the DCP and site-wide quality standards. The FERMCO organization consists of project organizations, support divisions, and service departments. The support divisions will provide a multidisciplinary team of full-time/part-time personnel to the project on a matrix basis. This may range from a simple point of contact (such as the procurement, safety, and quality control representatives) to a full department (such as Environmental, Engineering, or Construction).

Within the Operable Unit 2 organization, the Project Director is directly responsible for all remedial design activities. Public participation in the remedial design process will be coordinated through the Operable Unit 2 Project Director, DOE, and the Operable Unit 2 Public Affairs Specialists.

FIGURE 7-1
OPERABLE UNIT 2 REMEDIAL DESIGN
ADMINISTRATIVE RELATIONSHIPS

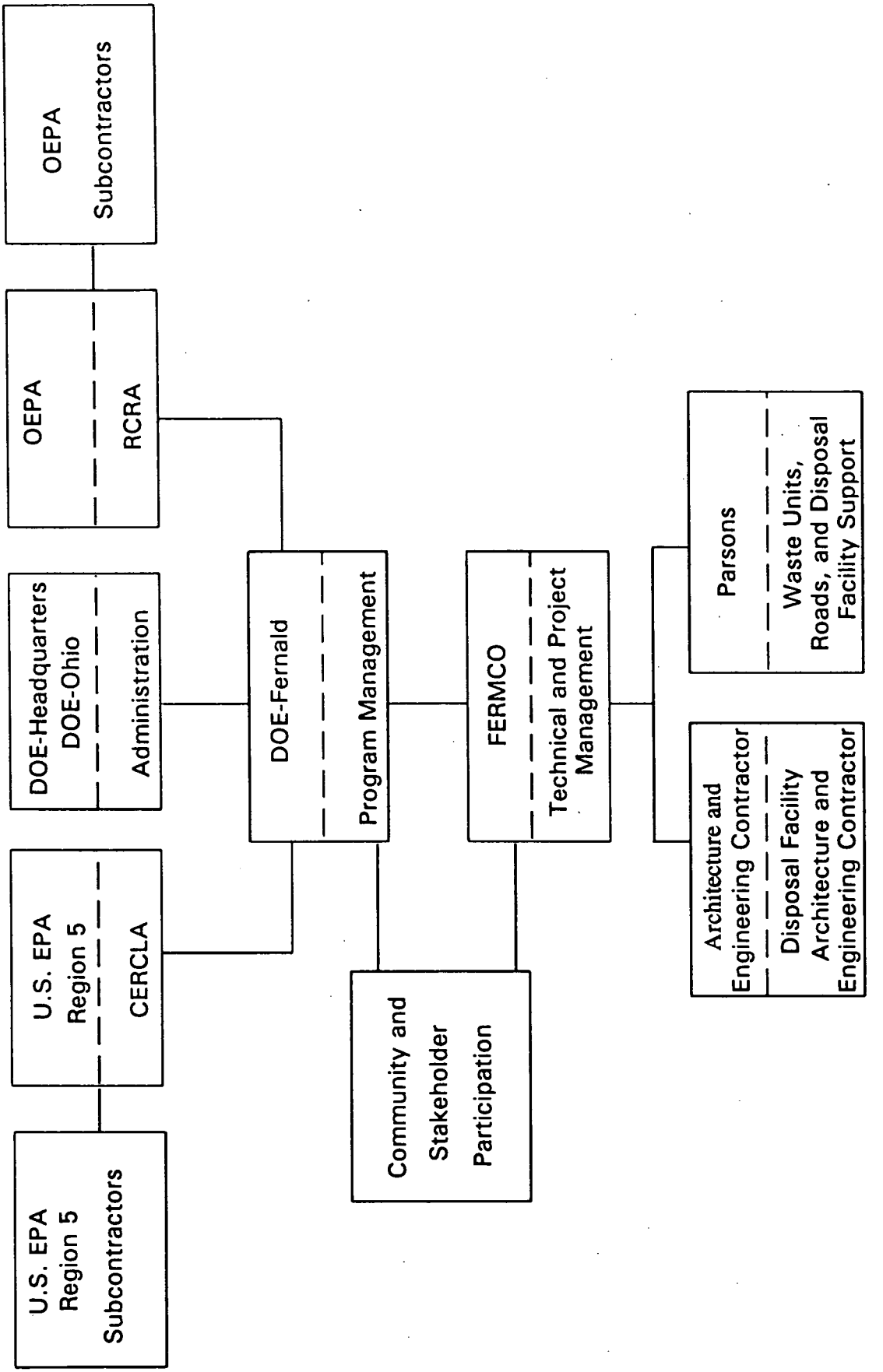

FIGURE 7-2
OPERABLE UNIT 2 REMEDIAL DESIGN PROJECT
COMMUNICATIONS FLOW CHART

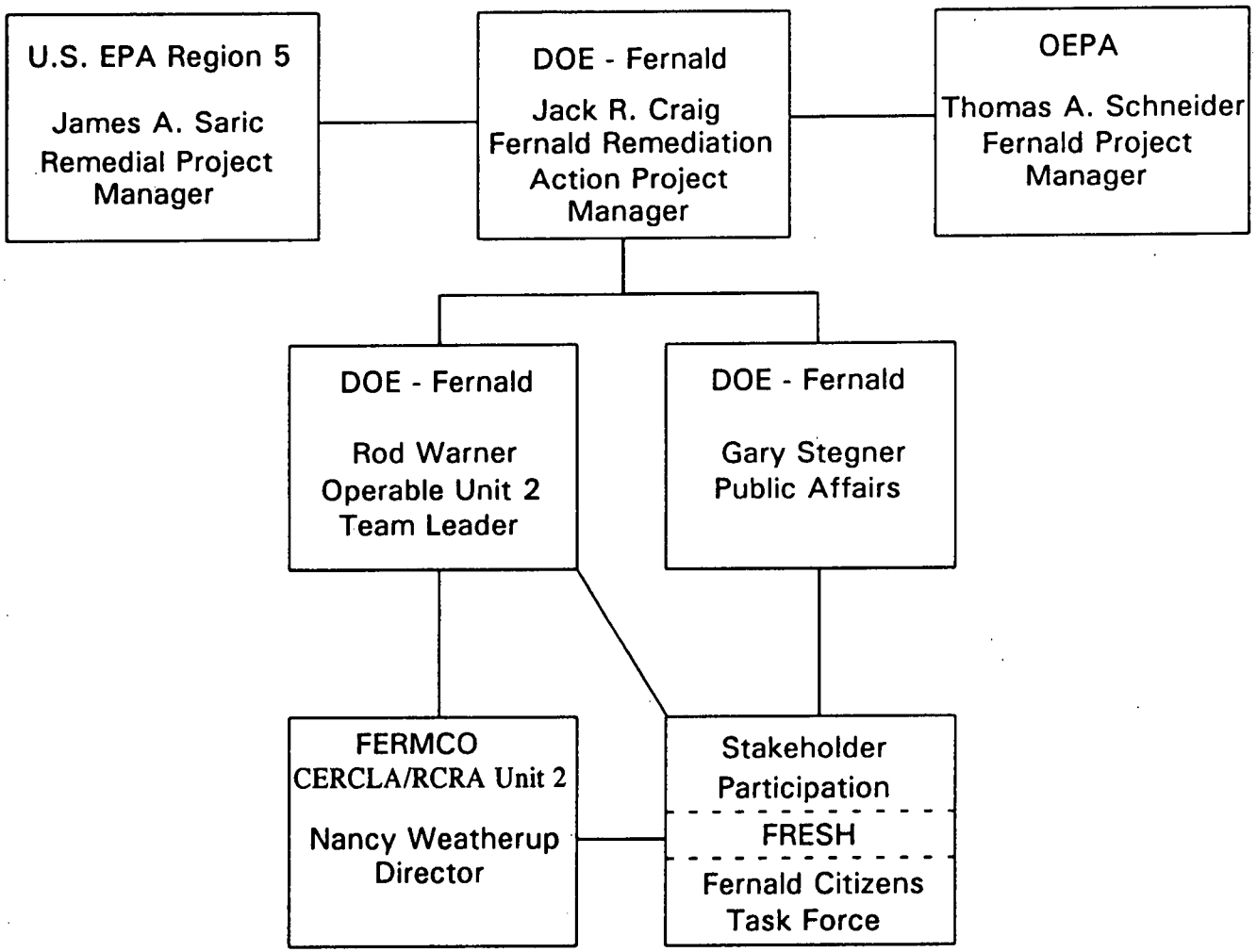

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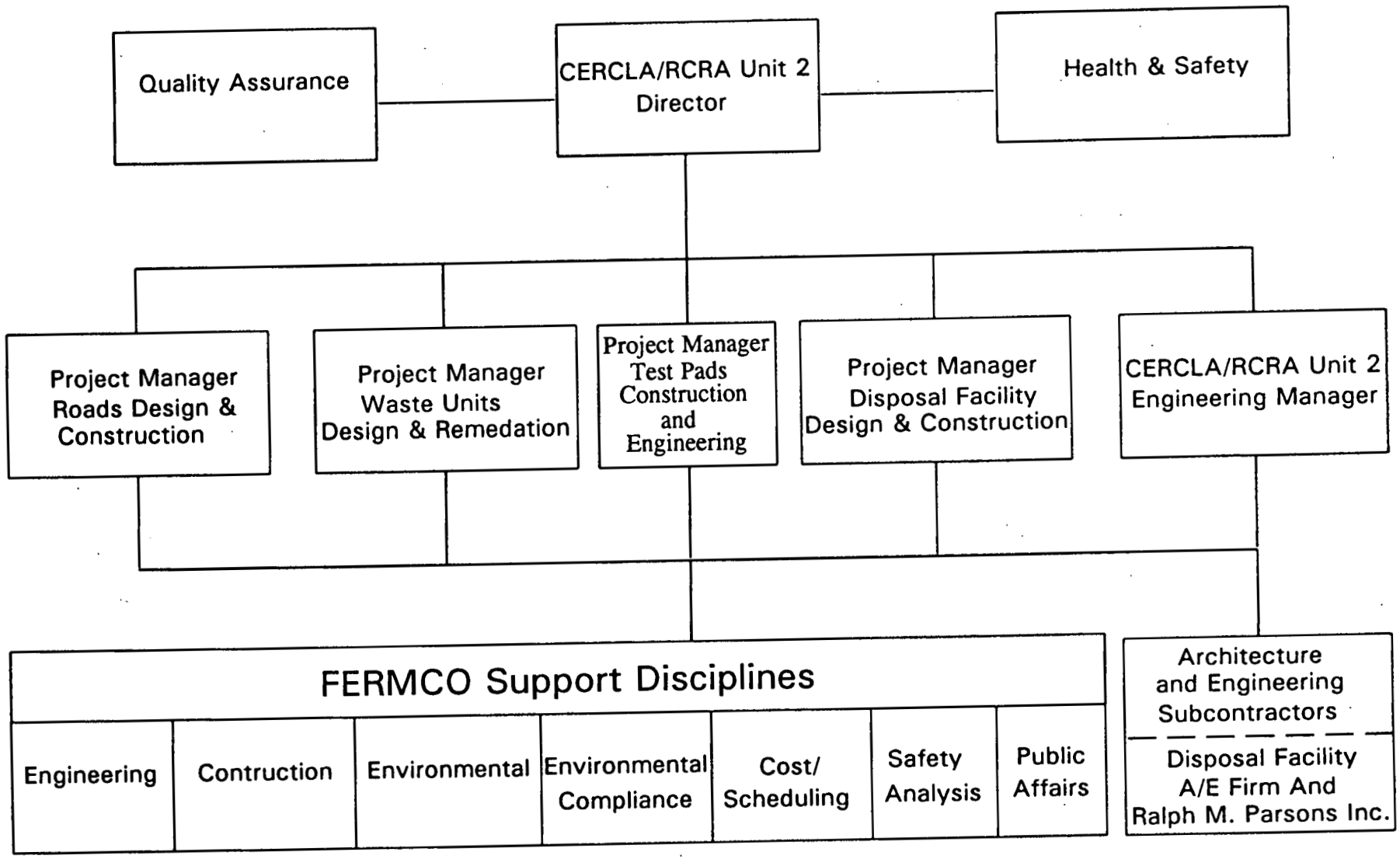
FIGURE 7-3
REMEDIAL DESIGN PROJECT FOR OPERABLE UNIT 2
PROJECT ORGANIZATION CHART



7.2 COMMUNITY RELATIONS

As a Superfund site, the FEMP must comply with certain requirements for informing and involving the public. The *Community Relations Plan (CRP) for the U.S. Department of Energy Fernald Environmental Management Project*, Revision 4, provides details about how management will involve the public in decisions related to the site during the remedial design, remedial action, and monitoring and maintenance phases. The CRP is designed to comply with the public participation requirements in CERCLA; it also reflects EPA guidance in *Community Relations in Superfund: A Handbook (January 1992)*. The CRP sets forth activities under the Amended Consent Agreement between DOE and EPA. The CRP also complies with the requirements of all applicable laws and regulations, including the NEPA and the Federal Facilities Compliance Act.

The CRP was revised in September/October 1994. OEPA approved the revised CRP in December 1994 and EPA approved the revised CRP in January 1995. Throughout the duration of remedial activities, the CRP may be revised to reflect changing community concerns, as well as changes in the law, regulations, or regulatory agreements.

Throughout the Operable Unit 2 remedial design, the public will be informed of the status of remedial design activity schedules, as well as any new findings or significant developments. Upon submittal of the draft and final Remedial Design Work Plan and Remedial Action Work Plan to EPA, key stakeholders, such as community leaders and members of the Fernald Citizens Task Force and Fernald Residents for Environment, Safety, and Health (F.R.E.S.H.), Inc., will be informally notified of the documents' availability at the Public Environmental Information Center.

As identified in the CRP, following completion of the final engineering design for the first construction package under remedial design, a fact sheet describing general engineering design for all components will be distributed to the general public. A public briefing will also be held to discuss the Operable Unit 2 actions to be undertaken. At a minimum, these opportunities will reflect regulatory requirements, as well as DOE's commitments for public involvement at the FEMP. The required public involvement activities during remedial design and remedial action are as follows:

- Upon completion of the final engineering design, prepare a fact sheet describing the remedial design [National Contingency Plan (NCP) 300.435].

- Provide a public briefing upon completion of the final engineering design and prior to the beginning of the remedial action [NCP 300.435].

When practicable, Operable Unit 2 management will offer public involvement opportunities -- surpassing regulatory requirements -- throughout the remedial design, remedial action, and monitoring and maintenance phases. The following are examples of some supplemental public involvement activities which may be conducted during the Operable Unit 2 remedial design:

- community workshops;
- media relations;
- public information and notification;
- written materials & videos;
- presentations to interested groups; and
- environmental education programs.

REFERENCES

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §9601 *et seq.*

Consent Agreement as Amended Under CERCLA Sections 120 and 106(a), 1991, U.S. Environmental Protection Agency and U.S. Department of Energy, Administrative Docket No. V-W-90-C-057.

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APPENDIX A

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TO BE CONSIDERED CRITERIA (TBCs)

LIST OF TABLES

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TABLE A-1
CHEMICAL-SPECIFIC REQUIREMENTS

Citation	Chemical	Requirement	Determination	Remarks
		GROUNDWATER PROTECTION STANDARDS		
EPA National Primary Drinking Water Regulations 40 CFR §141.15 and §141.16	MCLs for Radiological Contaminants	The following are maximum contaminant levels for radiological contaminants: Combined radium-226 and -228 . . . . . 5 pCi/L Gross alpha particle activity . . . . . 15 pCi/L (including radium-226 but excluding radon and uranium) Beta and photon radioactivity . . . . . 4 mrem/year from man-made radionuclides	Relevant and Appropriate	OEPA MCLs from OAC 3745-81-15 and -16 are the same as the Federal MCLs.
56 Federal Register 33050 (July 18, 1991)	Proposed MCLs for Radiological Contaminants	The following are the proposed maximum contaminant levels for radiological contaminants: Radium-226 . . . . . 20 pCi/L Radium-228 . . . . . 20 pCi/L Radon-222 . . . . . 300 pCi/L Uranium . . . . . 20 μg/L (30 pCi/L) Beta and photon emitters . . . . . 4 mrem ede/year (excluding radium-228) Adjusted gross alpha emitters . . . . . 15 pCi/L (excluding radium-226, uranium, and radon-222)	TBC	
EPA National Primary Drinking Water Regulations 40 CFR §141.61	MCLs for Organic Contaminants	The following are the maximum contaminant levels for organic contaminants: Benzo(a)pyrene . . . . . 0.0002 mg/L Polychlorinated biphenyls (PCBs) . . . . . 0.0005 mg/L	Relevant and Appropriate	Final MCLs are not presented for contaminants for which the non-zero MCLG is less than or equal to the MCL.
EPA National Primary Drinking Water Regulations 40 CFR §141.51	MCLGs for Inorganic Contaminants	The following are the non-zero maximum contaminant level goals for inorganic contaminants: Antimony . . . . . 0.006 mg/L Beryllium . . . . . 0.004 mg/L	Relevant and Appropriate	

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TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		GROUNDWATER PROTECTION STANDARDS (continued)		
50 Federal Register 46936 (November 13, 1985)	Proposed MCLGs for Inorganic Contaminants	The following are proposed, non-zero, maximum contaminant level goals for inorganic contaminants: Arsenic . . . . . 0.05 mg/L	TBC	
Ohio Drinking Water Regulations OAC 3745-81-11	MCLs for Inorganic Contaminants	The following are the maximum contaminant levels for inorganic contaminants: Arsenic . . . . . 0.05 mg/L	Relevant and Appropriate	Final MCLs are not presented for contaminants for which the non-zero MCLG is less than or equal to the MCL. This MCL is a stricter state standard.
EPA Groundwater Standards for Remedial Actions at Inactive Uranium Processing Sites 40 CFR §192.02(c)(3)(B)	Groundwater Protection Standards	The concentrations of the following constituents in groundwater must not exceed: Arsenic . . . . . 0.05 mg/L Combined radium-226 and radium-228 . . . . . 5 pCi/L Combined uranium-234 and uranium-238 . . . . . 30 pCi/L Gross alpha particle activity . . . . . 15 pCi/L (excluding radon and uranium)	Relevant and Appropriate	

TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		OHIO WATER QUALITY STANDARDS		
Ohio Water Quality Standards OAC 3745-1-21	Use Designation	Paddys Run and the Great Miami River are designated as: • warmwater aquatic life habitat • agricultural and industrial water supply • primary contact recreational use	Applicable	In addition to these overall designations: • Ross Rd. (River Mile (RM) 95.7) to Taylorsville Dam (RM 92.6) is a state resource water • RM 130 and RM 118 are public water supplies The FEMP effluent discharge pipe is located at RM 24.73, downstream of the state resource waters and public water supplies.
Ohio Water Quality Standards OAC 3745-1-07	Warmwater Habitat Water Quality Criteria	Parameter (μg/L) — outside mixing zone Max. / Avg. — inside mixing zone Max. Antimony (total) 650 190 1,300 Arsenic 360 190 720 Beryllium (total) 520 23 1,000 Dieldrin - 0.005 - Polychlorinated Biphenyls (PCBs) - 0.001 -	Applicable	Beryllium is based on a water hardness of 100 mg/L calcium carbonate ($CaCO_3$).
Ohio Water Quality Standards OAC 3745-1-07	Human Health and Agricultural Water Supply Criteria	Parameter (μg/L) — Human Health (outside mixing zone) — Agri-cultural Antimony (total) 780 - Arsenic - 100 Beryllium (total) 1.17 100 Dieldrin 0.00076 - Polychlorinated Biphenyls (PCBs) 0.00079 - Polynuclear Aromatic Hyrdrocarbons (PAHs) 0.31 -	Applicable	

TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		RADIATION DOSE LIMITS		
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(a)(2)	Protection of the General Population from Releases of Radioactivity	Concentrations of radioactive material which may be released to the general environment in surface water, ground water, soil, plants or animals must not result in an effective dose equivalent that exceeds 25 mrem per year to any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (1)(a)	Public Dose Limits	The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem. Dose evaluations should reflect realistic exposure conditions. Specific authorization may be received for a temporary increase of the dose limit up to 500 mrem in a year.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (1)	Public Dose Limits	The public dose limits include consideration of all exposure modes from all DOE activities (including remedial activities). Effective dose equivalent is the sum of the effective dose equivalent (weighted summation of doses to various organs of the body) from exposures to radiation sources external to the body during the year plus the committed effective dose equivalent from radionuclides taken into the body during the year. Medical sources, consumer products, residual fallout from past nuclear accidents and weapons tests and naturally occurring radiation sources are not included in this summation.	TBC	
National Emission Standards for Hazardous Air Pollutants 40 CFR §61.92, 61.93 Subpart H [Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (1)(b)]	National Emissions Standards for Emissions of Radionuclides Other than Radon from DOE Facilities	Emissions of radionuclides (except radon-220 and radon-222) to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.	Applicable	

TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
RADIATION DOSE LIMITS (continued)				
National Emission Standards for Hazardous Air Pollutants 40 CFR §61.92, 61.93 Subpart H [Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (1)(b)] (continued)	National Emissions Standards for Emissions of Radionuclides Other than Radon from DOE Facilities	To determine compliance with the standard, radionuclide emissions shall be determined and effective dose equivalent values to members of the public calculated using EPA approved sampling procedures, computer models CAP-88 or AIRDOS-PC, or other procedures for which EPA has granted prior approval.	Applicable	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (3)(a)(5)	Interim Dose Limit for Native Aquatic Animal Organisms	The absorbed dose to native aquatic animal organisms shall not exceed 1 rad per day from exposure to the radioactive material in liquid wastes discharged to natural waterways.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (4)(c)	External Gamma Radiation	External gamma radiation levels on open lands shall comply with the basic public dose limit of 100 mrem effective dose equivalent in a year and the ALARA process, considering appropriate-use scenarios for the area.	TBC	
EFFLUENT AND AIR EMISSION STANDARDS				
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (1)(d)	Drinking Water System Standards	It is DOE policy to provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE, either directly or through a DOE contractor, that is equivalent to that provided to the public by the public community drinking water standards of 40 CFR Part 141 (listed above). These systems shall not cause persons consuming the water to receive an effective dose equivalent greater than 4 mrem in a year. Combined Ra-226 and Ra-228 shall not exceed 5×10^{-9} μCi/mL and gross alpha activity (excluding radon and uranium) shall not exceed 1.5×10^{-8} μCi/mL.	TBC	

TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		EFFLUENT AND AIR EMISSION STANDARDS (continued)		
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (1)(d) (continued)	Drinking Water System Standards	The liquid effluents from DOE activities shall not cause private or public drinking water systems downstream of the facility discharge to exceed the drinking water radiological limits in 40 CFR Part 141 (listed above).	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter III	Derived Concentration Guides for Air and Water	The derived concentration guides (DCGs) are provided as reference values for conducting radiological environmental protection programs at operational DOE facilities and sites. DCG values are presented in Figures III-1 and III-3 of DOE Order 5400.5 for the following exposure modes: • ingestion of water • inhalation of air • immersion in a gaseous cloud The DCG values for internal exposure are based on a committed effective dose equivalent of 100 mrem for the radionuclide taken into the body by ingestion or inhalation during one year. The DCG values account for only three exposure pathways (ingested water <u>or</u> inhaled air <u>or</u> air immersion) and do not include other potentially significant pathways. When more complex environmental pathways are involved, a more complete pathway analysis is required for calculating public radiation doses resulting from the operation of DOE facilities.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (3)(a)	Discharges of Liquid Waste to Surface Waters	The best available technology is the prescribed level of treatment for liquid radioactive discharges to surface waters that would otherwise contain radioactive concentrations greater than the DCG values. Implementation of the best available technology process is not required for waste streams that contain radionuclide concentrations of not more than the DCG values at the point of discharge to a surface waterway.	TBC	

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TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		EFFLUENT AND AIR EMISSION STANDARDS (continued)		
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (3)(a) (continued)	Discharges of Liquid Waste to Surface Waters	The DCG for waste streams containing more than one type of radionuclide shall be the sum of the fractional DCG values.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (3)(a)(4)	Prevention of Radionuclide Buildup in Sediments	Liquid process waste streams containing radioactive material in the solid present in the waste stream must not exceed 5 pCi/g above background level of settleable solids for alpha-emitting radionuclides or 50 pCi/g above background of settleable solids for beta-gamma-emitting radionuclides.	TBC	
National Emission Standards for Hazardous Air Pollutants 40 CFR §61.192 Subpart Q	National Emission Standards for Radon Emissions from Department of Energy Facilities	No source at a Department of Energy facility shall emit more than 20 pCi/m^{2}s as an average for the entire source, into the air.	Applicable	
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.02 (b) Subpart A 40 CFR §192.32 (b)(1)(ii) Subpart D Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (6)(d)	Control of Radon Emissions	The following standards apply to the: • control of residual radioactive materials from inactive uranium processing sites. • management of uranium byproduct materials after closure of a disposal area. • long-term management of uranium, thorium, and their decay products. Controls shall be designed to provide reasonable assurance that releases of radon-222 from the above materials to the atmosphere will not: • exceed an average annual release rate of 20 pCi/m^{2}s	Relevant and Appropriate	

TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		EFFLUENT AND AIR EMISSION STANDARDS (continued)		
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.02 (b) Subpart A 40 CFR §192.32 (b)(1)(ii) Subpart D Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (6)(d) (continued)	Control of Radon Emissions	• increase the annual average concentration of radon-222 in air or above any location outside the disposal site by more than 0.5 pCi/L.	Relevant and Appropriate	
National Primary and Secondary Ambient Air Quality Standards 40 CFR §50	National Ambient Air Quality Standards	The following are the primary National Ambient Air Quality Standards (NAAQS): Criteria Pollutant / Primary Standard / Averaging Time Carbon Monoxide: 9 ppm, 8-hour; 35 ppm, 1-hour Lead: 1.5 $\mu g/m^3$, Quarterly average Nitrogen Dioxide: 0.053 ppm, Annual Particulate Matter: 50 $\mu g/m^3$, Annual; 150 $\mu g/m^3$, 24-hour Ozone: 0.12 ppm, 1-hour Sulfur oxides: 0.03 ppm, Annual; 0.14 ppm, 24-hour	Relevant and Appropriate	

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TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		EFFLUENT AND AIR EMISSION STANDARDS (continued)		
Review of New Sources of Air Toxic Emissions OEPA Proposed Policy January 1994	De Minimis Emission Levels for Carcinogens	The following are the Ohio de minimis emission levels for classes A, B1, and B2 carcinogens: Carcinogen — EPA Class — Emission Level Chromium VI — A — 0.1 ton/year All Others — A, B1, B2 — 1.0 ton/year	TBC	
		RADIONUCLIDE CONCENTRATIONS IN SOILS		
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.12(a) Subpart B 40 CFR §192.20 Subpart C	Cleanup of Soils Contaminated with Residual Radioactive Materials	Remedial actions shall be conducted so as to provide reasonable assurance that, as a result of residual radioactive materials, the concentration of radium-226 in land averaged over any area of 100 m^2 shall not exceed the background level by more than: • 5 pCi/g, averaged over the first 15 cm of soil below the surface • 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface Compliance with this requirement should be shown through measurements performed within the accuracy of currently available types of field and laboratory instruments in conjunction with reasonable survey and sampling procedures.	Relevant and Appropriate	
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.21 (f) and §192.22 (b) Subpart C	Supplemental Standards	Where radionuclides other than radium-226 and its decay product are present in sufficient quantity and concentration to constitute a significant radiation hazard from residual radioactive materials, remedial actions shall, in addition to satisfying the standards of 40 CFR §§ 192.02, Subpart A and 192.12, Subpart B (both listed above), reduce other residual radioactivity to levels that are as low as is reasonably achievable.	Relevant and Appropriate	

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TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		RADIONUCLIDE CONCENTRATIONS IN SOILS (continued)		
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.32 (b)(2) Subpart D	Management of Uranium Byproduct Material	The requirements for the management of uranium byproduct materials after closure of a disposal area (40 CFR §192.32 (b)(1)) shall not apply to any portion of a disposal site which contains a concentration of radium-226 in land, averaged over areas of $100m^2$, which, as a result of uranium byproduct material, does not exceed the background level by more than the limits specified in 40 CFR §192.12 (a).	Relevant and Appropriate	
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §§ 192.40-192.42 Subpart E	Management of Thorium Byproduct Material	The following are requirements for the management of thorium byproduct materials: • the provisions for the management of uranium byproduct material (40 CFR §192.32) shall apply to thorium byproduct material and: - provisions applicable to the element uranium shall also apply to the element thorium - provisions applicable to radon-222 shall also apply to radon-220 - provisions applicable to radium-226 shall also apply to radium-228 With the concurrence of EPA, alternative provisions may be substituted for any of the above requirements provided the alternative provisions will provide at least an equivalent level of protection for human health and environment.	Relevant and Appropriate	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (4)(a)	Guidelines for Residual Radioactive Material	Guidelines for residual concentrations of radionuclides other than thorium and radium shall be derived from the basic dose limits by means of an environmental pathway analysis using specific property data where available. Procedures for these derivations are given in DOE/CH-8901. Residual concentrations of radioactive material in soil are defined as those in excess of background concentrations averaged over an area of $100\ m^2$.	TBC	

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TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
		RADIONUCLIDE CONCENTRATIONS IN SOILS (continued)		
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (4)(a)(2),(3)	Generic Guidelines for Residual Concentrations	The generic guidelines for residual concentrations (in excess of background) of radium-226, radium-228, thorium-230, and thorium-232 are: • 5 pCi/g, averaged over the first 15 cm of soil below the surface; and • 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (4)(a)(2),(3) (continued)	Generic Guidelines for Residual Concentrations	These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If both thorium-230 and radium-226, or both thorium-232 and radium-228, are present and not in secular equilibrium, the appropriate guideline is applied as a limit for the radionuclide with the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that either the dose for the mixture will not exceed the basic dose limit or the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1. Explicit formulas for calculating residual concentrations guidelines for mixtures are given in DOE/CH-8901.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (4)(a)(1)	Hot Spots	If the average concentration in any surface or below surface area less than or equal to 25 m^2, exceeds the limit or guideline by a factor of $(100/A)^{0.5}$ [where A is the area (in square meters) of the region in which the concentrations are elevated], limits for "hot spots" shall also be developed and applied. Procedures for calculating these hot spots limits, which depend on the extent of the elevated local concentrations, are given in DOE/CH-8901. In addition, reasonable efforts shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit in the soil, irrespective of the average concentration in the soil.	TBC	

TABLE A-1
(Continued)

Citation	Chemical	Requirement	Determination	Remarks
RADIONUCLIDE CONCENTRATIONS IN SOILS (continued)				
EPA Guidance Methods for Evaluating the Attainment of Cleanup Standards, Vol. 1	Attainment of Soil Cleanup Standards	This document describes methods for testing whether soil chemical concentrations at a site are statistically below a cleanup standard or ARAR. If it can be reasonably concluded that the remaining soil or treated soil at a site has concentrations that are statistically less than relevant cleanup standards then the site can be judged protective of human health and the environment.	TBC	
LEAD STANDARDS				
Resource Conservation and Recovery Act 40 CFR §268.41	Requirements for Lead Disposal	The maximum concentration of lead in the extract of any sample of treated soil is 5 mg/L.	Relevant and Appropriate	
Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (OSWER Directive 9355.4-12)	Screening Level for Lead in Soil	EPA recommends using 400 ppm soil lead as a screening level for lead in soil for residential scenarios at CERCLA sites and at RCRA Corrective Action sites. Residential areas with soil lead below 400 ppm generally require no further action.	TBC	

TABLE A-2
SOLID WASTE ACTION-SPECIFIC REQUIREMENTS

Citation	Action	Requirement	Determination	Remarks
		DEFINITIONS		
Resource, Conservation, and Recovery Act 42 U.S.C. §6903 (27)	Definition	Solid waste means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities, but does not include source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-01 (B)(40)	Definition	Solid wastes means such unwanted residual solid or semisolid material as results from industrial, commercial, agricultural, and community operations, excluding earth or material from construction, mining, or demolition operations, or other waste materials of the type that would normally be included in demolition debris, nontoxic flyash, spent nontoxic foundry sand, and slag and other substances that are not harmful or inimical to public health, and includes, but is not limited to, garbage, tires, combustible and noncombustible material, street dirt, and debris. Solid waste does not include any material that is an infectious waste or a hazardous waste. For the purpose of this definition, "semisolid material" does not contain liquids which can be readily released under normal climatic conditions, as determined by method 9095 (paint filter liquids test) in SW-846: "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods".	Applicable	
Resource, Conservation, and Recovery Act 40 CFR §261.3(a)	Definition	A solid waste is a hazardous waste, if: • it is not excluded from regulation as a hazardous waste under 40 CFR §261.4(b). • it exhibits any of the characteristics of hazardous waste. • it is listed in 40 CFR §§ 261.30 - 261.35. • it is a mixture of solid and hazardous wastes.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		DEFINITIONS (continued)		
Ohio Infectious Waste Regulations OAC 3745-27-01 (B)(15) OAC 3745-27-30 (A),(E),(H) ORC 3734.021 (A)(1)(c),(d)	Definition	Infectious waste is defined by 9 categories of waste including human blood specimens and blood products, sharp wastes used in the treatment or inoculation of human beings, and any other waste materials generated in the diagnosis, treatment, or immunization of human beings. A generator who places all sharp infectious wastes and all unused hypodermic needles, syringes, and scalpel blades into a "SHARPS" container before they are transported and who generates less than 50 lbs. of infectious wastes each month and does not hold a certificate of registration as a generator of infectious wastes may transport and dispose of infectious wastes in the same manner as solid wastes. Treated infectious wastes can be transported and disposed in the same manner as noninfectious waste. Infectious waste that is also radioactive shall be managed in accordance with applicable Ohio Department of Health and U.S. Nuclear Regulatory Commission regulations.	Applicable	
Resource, Conservation, and Recovery Act 40 CFR §261.4(b)(4)	Definition	Flyash waste, bottom ash waste, slag waste, and fly gas emission control waste, generated primarily from the combustion of coal or other fossil fuels, are excluded from the definition of hazardous waste.	Applicable	
Ohio Petroleum Contaminated Soil Policy OEPA Policy PP 01 03 200	Definition	The basis of the "contained in" policy is that environmental media, such as soil or groundwater, are not considered to be waste material. Because they are not a solid waste, the mixture rule, as set forth in OAC 3745-51-03, does not apply when they become contaminated with a listed hazardous waste but only contains the waste. The result of this policy is that if the waste constituents can be removed, the soil is no longer considered to contain a hazardous waste. Therefore, since soil is not a waste material it does not have to be de-listed in order for it to be used for its intended purpose. However, as long as the soil contains the waste material, it must be managed as a hazardous waste.	TBC	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		DEFINITIONS (continued)		
Ohio Petroleum Contaminated Soil Policy OEPA Policy PP 01 03 200 (continued)	Definition	If we apply this concept to petroleum-contaminated soil, the soils containing a petroleum hydrocarbon would not need to be managed as a solid waste if the contaminants were removed.	TBC	
CERCLA Compliance with Other Laws Manual Section 2.7	Definition	Placement/disposal of waste does not occur under the following circumstances: • waste is consolidated within a unit (including an area of contamination that can be viewed as a single unit); • waste is capped in place, including grading prior to capping; • waste is treated in situ; and • waste is processed within the unit in order to improve its structural stability for closure or for movement of equipment over the area.	TBC	
Resource, Conservation, and Recovery Act 40 CFR §260.10	Definition	Remediation waste means all solid and hazardous waste, and all media (including groundwater, surface water, soils, and sediments) and debris, which contain listed hazardous wastes or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements under 40 CFR §264.101 and RCRA section 3008(h). For a given facility, remediation wastes may originate only from within the facility boundary, but may include waste managed in implementing RCRA sections 3004(v) or 3008 (h) for releases beyond the facility boundary.	Relevant and Appropriate	

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		DEFINITIONS (continued)		
Resource, Conservation, and Recovery Act 40 CFR §264.552 (a),(c)	Definition	For the purpose of implementing corrective action for solid waste management units, the Regional Administrator may designate an area at the facility as a corrective action management unit (CAMU). One or more CAMU's may be designated at a facility. • Placement of remediation wastes into or within a CAMU does not constitute land disposal of hazardous wastes. • Consolidation or placement of remediation wastes into or within a CAMU does not constitute creation of a unit subject to minimum technology requirements. • The CAMU shall facilitate the implementation of reliable, effective, protective, and cost-effective remedies. • Waste management activities associated with the CAMU shall not create unacceptable risks to humans or to the environment resulting from exposure to wastes. • The CAMU shall include uncontaminated areas of the facility only if including such areas for the purpose of managing remediation waste is more protective than management of such wastes at contaminated areas of the facility. • Areas within the CAMU, where wastes remain in place after closure of the CAMU, shall be managed and contained so as to minimize future releases, to the extent practicable. • The CAMU shall expedite the timing of remedial activity implementation, when appropriate and applicable. • The CAMU shall enable the use, when appropriate, of treatment technologies (including innovative technologies) to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU.	Relevant and Appropriate	Under all of the remedial alternatives, any hazardous waste from the firing range is being sent off-site for disposal. This CAMU rule would only be used if Operable Unit 5 plans to dispose hazardous waste in a centralized disposal cell; the cell would then have to be designed to meet RCRA standards and it would not be cost-effective to send the firing range material off-site for disposal. Because this is dependent on Operable Unit 5, the RCRA disposal requirements will be addressed in Operable Unit 5 ARARs.

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		DEFINITIONS (continued)		
Resource, Conservation, and Recovery Act 40 CFR §264.552 (a),(c) (continued)	Definition	• The CAMU shall, to the extent practicable, minimize the land area of the facility upon which wastes will remain in place after closure of the CAMU.	Relevant and Appropriate	
Resource, Conservation, and Recovery Act 40 CFR §264.553 (a),(b)	Definition	For temporary tanks and container storage areas used for treatment or storage of remediation wastes during remedial activities, the Regional Administrator may determine that a design, operating, or closure standard applicable to such units may be replaced by alternative requirements which are protective of human health and the environment. Any temporary unit to which alternative requirements are applied shall be: • located within the facility boundary; and • used solely for treatment or storage of remediation wastes.	Relevant and Appropriate	
		SOLID WASTE DISPOSAL		
Ohio Solid Waste Disposal Regulations OAC 3745-27-05 (A)	Solid Waste Disposal Methods	Solid waste shall be disposed of only by the following methods: • sanitary landfill • incineration • composting Methods not mentioned above and not prohibited by this chapter, OAC 3745-27, may be used provided that such methods are demonstrated to the satisfaction of the Director to be capable of disposing of solid waste without creating a nuisance or a health hazard, without causing water pollution, and without violating these regulations and any regulation adopted by the Director pursuant to Ohio Revised Code Chapter 3704 (Air Pollution Control).	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
US EPA Solid Waste Disposal Regulations 40 CFR §257.3-7	Open Burning Prohibited	The solid waste disposal facility or practice shall not engage in open burning of residential, commercial, institutional, or industrial solid waste. This requirement does not apply to land-clearing debris, diseased trees, debris from emergency clean-up operations, and ordnance.	Applicable	
US EPA Solid Waste Disposal Regulations 40 CFR §257.3-3	Surface Water	A solid waste disposal facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the NPDES under section 402 of the Clean Water Act, as amended. A solid waste disposal facility shall not cause a discharge of dredged material or fill material to waters of the United States that is in violation of the requirements under section 404 of the Clean Water Act, as amended. A solid waste disposal facility or practice shall not cause non-point source pollution of waters of the United States that violates applicable legal requirements implementing an area-wide or Statewide water quality management plan that has been approved by the Administrator under section 208 of the Clean Water Act, as amended.	Applicable	
US EPA Solid Waste Disposal Regulations 40 CFR §257.3-4	Groundwater Protection	A solid waste disposal facility or practice shall not contaminate an underground drinking water source beyond the solid waste boundary.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1),(2),(3),(4),(5),(6),(7),(9)	Landfill Construction	The following layers must be installed in the construction of a sanitary landfill (from bottom to top):	Applicable	This applies to new disposal of solid waste.
		Recompacted Soil Liner		
		The recompacted soil liner shall be: • constructed using loose lifts 8 inches thick with a maximum permeability of 1 x 10^{-7} cm/s. • constructed of a soil with a maximum clod size of 3 inches or half the lift thickness, whichever is less.		

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1),(2),(3),(4),(5),(6),(7),(9) (continued)	Landfill Construction	• constructed of soil with: - 100% of the particles having a maximum dimension not greater than 2 inches. - not more than 10% of the particles, by weight, having a dimension greater than 0.75 inches. - not less than 50% of the particles, by weight, passing through the 200-mesh sieve. - not less than 25% of the particles, by weight, having a maximum dimension not greater than 0.002 millimeters. • compacted to at least 95% of the maximum "Standard Proctor Density" using ASTM D-698 or at least 90% of the maximum "Modified Proctor Density" using ASTM D-1557. • compacted at a moisture content at or wet of optimum. Alternatives for the above requirements may be used if it is demonstrated to the satisfaction of the Director that the materials and techniques will result in each lift having a maximum permeability of 1×10^{-7} cm/s. Additionally, the recompacted soil liner shall: • not comprised of solid waste. • be constructed using the same number of passes and lift thickness, and the same or similar type and weight of compaction equipment established by testing (as defined in this table). • be placed on the bottom and exterior excavated sides of the landfill and have a minimum bottom slope of 2% and a maximum slope based on: - compaction equipment limitations;	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1), (2),(3),(4),(5),(6),(7),(9) (continued)	Landfill Construction	- slope stability; - maximum friction angle between any soil-geosynthetic interface and between any geosynthetic-geosynthetic interface; and - resistance of geosynthetics and geosynthetic seams to tensile forces. • constructed on a prepared surface that shall: - be free of debris, foreign material, and deleterious material; - be able to bear the weight of the landfill and its construction operations without causing or allowing a failure of the liner to occur through settling; and - not have any abrupt changes in grade that may result in damage to geosynthetics. • be at least 5 feet thick, although the Director may approve an alternate thickness, to be no less than 3 feet, based upon the result of calculations or on a design that is no less protective of human health and the environment. • be at least 3 feet thick with a geosynthetic clay liner that meets the specifications in paragraph (C)(3) of this rule although the Director may approve an alternate thickness to be no less than 1½ feet, based upon the results of calculations or on a design that is no less protective of human health and the environment. • have a factor of safety for hydrostatic uplift not less than 1.4. • be adequately protected from damage due to desiccation, freeze/thaw cycles, wet/dry cycles, and the intrusion of objects during construction and operation.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1),(2),(3),(4),(5),(6),(7),(9) (continued)	Landfill Construction		Applicable	
		Flexible Membrane Liner		
		The flexible membrane liner shall be: • placed on the recompacted soil liner. • sixty mil high density polyethylene (HDPE). • be protected from the drainage layer by a cushion layer, as required by the Director Other materials or thicknesses may be used if, at a minimum, the flexible membrane liner meets all the following: • negligibly permeable to fluid migration. • physically and chemically resistant to chemical attack by the solid waste, leachate, or other materials which may come in contact with the flexible membrane liner. • seamed to allow no more than negligible amounts of leakage with seaming material that is physically and chemically resistant to chemical attack by the solid waste, leachate, or other materials which may come in contact with the seams. • have properties for its installation and use which are acceptable to the Director. • protected from the drainage layer by a cushion layer, as required by the Director. • have a minimum thickness of 40 mils.		
		Geosynthetic Clay Liner		
		The geosynthetic clay liner used in lieu of part of the recompacted soil liner shall be:		

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1),(2),(3),(4),(5),(6),(7),(9) (continued)	Landfill Construction	• negligibly permeable to fluid migration. • be installed to allow no more than negligible amounts of leakage by a minimum overlap of 6 inches, or, for end of panel seams, a minimum over of 12 inches. Overlap shall be increased in accordance with manufacturers specifications or to account for shrinkage due to weather conditions. • have a bentonite mass per unit area of at least 1 pound per square foot. • be installed in accordance with the manufacturers specifications in regards to handling, overlap, and the use of granular or powdered bentonite to enhance bonding at the seams. • be constructed above the recompacted soil liner.	Applicable	
		Leachate Management System		
		The leachate management system shall: • be designed to prevent clogging and crushing of the system and to limit the level of leachate in areas other than lift stations to a maximum of 1 foot. • include a drainage layer placed on top of the flexible membrane liner composed of granular material that must: - have a minimum permeability of 1×10^{-3} cm/s; - have a minimum thickness of 1 foot; - have a negligible amount of fines; and - not contain carbonate material. An alternate material and/or thickness may be used if it is demonstrated to the satisfaction of the Director that the material meets the requirements.		

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1),(2),(3),(4),(5),(6),(7),(9) (continued)	Landfill Construction	• include leachate collection pipes to remove leachate from the bottom of the landfill. The pipes must: - be imbedded in the drainage layer; - have a minimum slope of 0.5%; - have lengths and configuration which shall not exceed the capabilities of clean-out devices; - be provided with access for clean-out devices which shall be protected from differential settling; - have joints sealed to prevent separation; and - be physically and chemically resistant to attack by the solid waste, leachate, or other materials that they may come in contact with. Sealing material and means of access for clean-out devices shall also be physically and chemically resistant to attack by the solid waste, leachate, or other materials that they may come in contact with. An alternate means for leachate removal may be used if it is demonstrated to the satisfaction of the Director that the means for leachate removal meets the requirements. • include a filter layer to prevent clogging of the leachate collection system. • include a protective layer to protect the recompacted soil liner, flexible membrane liner, geosynthetic clay liner (if applicable), and leachate collection system from the intrusion of objects during construction and operation.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1),(2),(3),(4),(5),(6),(7),(9) (continued)	Landfill Construction	• include lift stations which are to be protected from adverse effects from leachate and differential settling. If manholes are used as lift stations, they must be equipped with automatic high level alarms located no greater than 6 feet above the invert of the leachate inlet pipe. Lift station pipes should be of adequate capacity and shall automatically commence pumping before the leachate elevation activates the high level alarm.	Applicable	
		Leachate Collection and Storage		
		Any leachate conveyance and storage structures located outside the limits of solid waste placement shall be no less protective of the environment than the landfill facility, as determined by the Director, and: • The structures must be monitored, as required by the Director. • Storage tanks must be provided with spill containment • Leachate lines must be double-cased • Storage structures must have a minimum of 1 week of storage capacity using design assumptions simulating final closure. • If at any time leachate is evaluated to be hazardous in accordance with rule 3745-52-11 of the OAC, it shall be managed in accordance with Chapters 3745-50 to 3745-69 of the OAC, and the generator standards for storage shall apply in accordance with Chapter 3745-52 of the OAC.		

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1),(2),(3),(4),(5),(6),(7),(9) (continued)	Landfill Construction		Applicable	
		Surface Water Control		
		• Any permanent or temporary surface water control structures shall be designed to accommodate, by non-mechanical means, the peak flow from the 25-year/24-hour storm event. • Surface water control structures shall be designed to minimize silting and scouring. • If sedimentation ponds are used, they shall be designed and constructed according to OAC 3745-27-08 (C)(6)(b).		
		Benchmarks		
		• At least 3 permanent third order benchmarks on separate sides of the landfill facility shall be within easy access to the limits of solid waste placement and shall be constructed in accordance with OAC 3745-27-08(C)(7)(a)-(c).		
		Groundwater Control		
		• Any permanent groundwater control structures shall adequately control groundwater infiltration through the use of non-mechanical means such as impermeable barriers or permeable drainage structures. • No permanent groundwater control structures may be used to dewater an aquifer system, except if the recharge and discharge zone of the aquifer system are located entirely within the boundary of the landfill facility.		

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
EPA Criteria for Municipal Solid Waste Landfills 40 CFR §258.40	Landfill Design Criteria	The liner and leachate system shall be designed and constructed to maintain less than a 30-cm depth of leachate over the liner. The geomembrane must be at least 30-mil thick.	Relevant and Appropriate	
EPA Criteria for Municipal Solid Waste Landfills 40 CFR §258.26	Run-On/Run-Off Control Systems	The landfill shall have: • a run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 25-year storm. • a run-off control system from the active portion of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm.	Relevant and Appropriate	
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (D) and (E)	Landfill Construction	Prior to being used in the construction of the recompacted soil liner and drainage layer of the sanitary landfill or the landfill cap, the following characteristics of the earthen materials must be determined to show that the material is suitable for use in construction of the landfill.	Applicable	
		Soil Material Specifications		
		The following tests shall be performed on representative samples at least once for every 1,500 yd^3 of soil except the recompacted permeability test, which shall be performed at least once for every 10,000 yd^3 of soil. • recompacted permeability at construction specifications; • moisture content and density using an approved ASTM method; • grain size distribution using ASTM D-422 for sieve and hydrometer methods; and • Atterberg limits using ASTM D-4318.		

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (D) and (E) (continued)	Landfill Construction	Granular Drainage Material Specifications The following tests shall be performed at least once for every 3,000 yd^3 of material. • permeability; • grain size distribution using ASTM D-422 for the sieve method; and • chemical compatibility testing may be required by the Director. Geosynthetic Material Specifications Geosynthetics, other synthetic materials, and joint sealing compounds used in the construction of the flexible membrane liner, geosynthetic clay liner, and leachate management system for a sanitary landfill facility or a sanitary landfill cap system shall be shown to: • be physically and chemically resistant to attack by the solid waste, leachate, or other materials that they may come in contact with using USEPA Method 9090 or other documented data. • have properties acceptable for installation and use.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1)(m),(o) and (C)(2)(g)	Landfill Construction	The following activities must be performed to ensure that the components of the sanitary landfill facility meet the specifications of this rule.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1)(m),(o) and (C)(2)(g) (continued)	Landfill Construction	Test Pads The recompacted soil liner and the recompacted soil barrier layer in the cap system shall be modeled by the construction of test pads. The test pads shall: • be designed such that the proposed tests are appropriate and their results are valid. • be constructed to establish the construction details which are necessary to obtain sufficient compaction to satisfy the permeability requirement. The construction details include: - lift thickness; - water content necessary to achieve the desired compaction; and - type, weight, and number of passes of construction equipment. • be constructed prior to the construction of the sanitary landfill component which the test pad will model. • be constructed whenever there is a significant change in soil material properties. • have a minimum width three times the width of the compaction equipment, and a minimum length two times the length of compaction equipment, including power equipment and any attachments. • be comprised of at least four lifts.	Applicable	

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(1)(m),(o) and (C)(2)(g) (continued)	Landfill Construction	• be tested for field permeability, following the completion of test pad construction. For each lift a minimum of 3 tests for moisture content and density shall be performed. • be reconstructed as many times as necessary to meet the permeability requirement. Any amended construction details shall be noted. An alternative to test pads may be used if it is demonstrated to the satisfaction of the Director that the alternative meets the requirements.	Applicable	
		Moisture Content and Density Testing		
		Moisture content and density testing of the recompacted soil liner and recompacted soil barrier in the cap system shall be performed at a frequency of no less than 5 tests per acre per lift. Any penetrations shall be repaired using methods acceptable to the Director.		
		Flexible Membrane Liner Testing		
		• For the purpose of testing every seaming apparatus in use each day, peel and shear tests shall be performed on scrap pieces of flexible membrane liner at the beginning of the seaming period and every four hours thereafter. • Nondestructive testing shall be performed on 100% of the flexible membrane liner seams. • Destructive testing for peel and shear shall be performed at least once for every 500 feet of seam length. An alternate means may be used if it is demonstrated to the satisfaction of the Director that the alternate means meets the requirements.		

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (G)	Landfill Construction	All tests failing to meet the specifications outlined above must be investigated and the areas reconstructed to meet specifications.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (F)	Landfill Construction	The following testing procedures shall be included in a Quality Assurance/Quality Control Plan: • sampling and testing procedures to be used in the field and in the laboratory; • testing frequency; • parameters and sample locations; • procedures to be followed if a test fails; • the management structure and the experience and training of the testing personnel; and • contingency plan for anticipated construction difficulties. The following components shall be included in a Quality Assurance/Quality Control Plan: • in-situ foundation preparation; • recompacted soil and/or geosynthetic clay liner system; • flexible membrane liner; • leachate management system; • cap system; • permanent ground water control structures; and • explosive gas control/extraction systems.	Applicable	

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-19 (E)(19)	Sanitary Landfill Operation	To demonstrate that the solid wastes to be received at the landfill facility will not compromise the integrity of any material used to construct the landfill facility, the Director may require chemical compatibility testing to be performed.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-19 (E)(26)	Sanitary Landfill Operation	The integrity of the engineered components of the landfill facility shall be maintained and any damage to, or failure or, the components shall be repaired.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-19 (J)(1), (4)	Sanitary Landfill Operations	Surface water shall be diverted from areas where solid waste is being, or has been, deposited. The facility shall be designed, constructed, maintained, and provided with surface water control structures, as necessary, to control run-on and run-off of surface water to ensure minimal infiltration of water through the cover material and cap system, and minimal erosion of the cover material and cap system. If ponding or erosion occurs on areas of the landfill facility where solid waste is being, or has been, deposited, action will be taken to correct the conditions causing the ponding or erosion.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-19 (K)(1)	Sanitary Landfill Operations	If leachate is detected on the surface of the landfill facility, then the outbreak(s) shall be repaired and: • leachate shall be contained and properly managed at the sanitary landfill facility. • if necessary, leachate shall be collected and disposed in accordance with paragraph (K)(5) and (K)(6) of OAC 3745-27-19. • actions shall be taken to minimize, control, or eliminate the conditions which contribute to the production of leachate.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-19 (K)(2)	Sanitary Landfill Operations	At least one lift station back-up pump shall be kept at the sanitary waste landfill facility at all times.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-19 (K)(3)	Sanitary Landfill Operations	The collection pipe network of the leachate management system shall be inspected after placement of the initial lift of waste to ensure that crushing has not occurred and shall be inspected annually thereafter to ensure that clogging has not occurred.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-19 (K)(4)	Sanitary Landfill Operations	If authorized by the Director, leachate may be temporarily stored within the limits of solid waste placement until the leachate can be treated and disposed.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-10	Groundwater Monitoring Program	The groundwater monitoring system for detection monitoring, assessment monitoring, or corrective measures shall consist of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from both the uppermost aquifer system and any significant zones of saturation that exist above the uppermost aquifer system that: • represent the quality of the background groundwater that has not been affected by past or present operations; and • represent the quality of the groundwater passing directly downgradient of the limits of solid waste placement. The groundwater monitoring program shall include consistent sampling and analysis procedures and statistical methods that are protective of human health and the environment and that are designed to ensure monitoring results that provide an accurate presentation of groundwater quality at the background and downgradient well. If contamination from the landfill is discovered, corrective measures shall be taken.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-11 (H)	Final Closure of Landfill Facilities	At final closure of a landfill facility: • all land surfaces shall be graded to prevent ponding of water where solid waste has been placed. Drainage facilities shall be provided to direct surface water from the landfill facility. • a groundwater monitoring system shall be designed and installed in accordance with OAC 3745-27-10, if a system is not already in place.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-11 (O)	Final Closure of Landfill Facilities	Closure of the sanitary landfill facility must be completed in a manner that minimizes the need for further maintenance and minimizes post-closure formation and release of leachate and explosive gases to air, soil, groundwater, or surface water to the extent necessary to protect human health and the environment.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(15)	Construction of a Landfill Cap System	A composite cap system which shall minimize infiltration, must be constructed in all areas of solid waste placement: • The cap system shall have a slope of between 5% and 25% or some greater slope based on stability analyses. • The cap system shall have a maximum projected erosion rate of 5 tons/acre/year. • Any penetrations into the cap system shall be sealed so that the integrity of the soil barrier layer is maintained. The cap system shall, at a minimum, consist of the following (from bottom to top):	Applicable	
		Recompacted Soil Barrier Layer		
		The recompacted soil barrier layer of the cap shall be:		

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(15) (continued)	Construction of a Landfill Cap System	• a minimum of 18 inches thick and constructed in accordance with the specifications outlined above for construction of the recompacted soil liner for a landfill facility ((C)(1)(a) to (C)(1)(g) and (C)(1)(m) to (C)(1)(o) of OAC 3745-27-08) with the exception that the maximum permeability of the recompacted soil barrier shall be $1x10^{-6}$ cm/sec; OR • a geosynthetic clay liner of equal or less permeability as the recompacted soil barrier layer, with an engineered subgrade constructed in accordance with the following requirements: • The thickness of the subgrade shall be sufficient to achieve an evenly graded surface and shall be a minimum of 12 inches. • Be constructed of a soil with 100% of the particles have a maximum dimension not greater than 2 inches and with not more than 10% of the particles, by weight, having a dimension greater than 0.75 inches. • Be compacted to at least 95% of the maximum "Standard Proctor Density" using ASTM D-698 or at least 90% of the maximum "Modified Proctor Density" using ASTM D-1557. • After being smooth-rolled, the surface shall not have sharp edged or protruding particles. • The particle size and proctor density required shall be verified by tests performed on representative samples based on the variability and homogeneity of the material, but no less than a minimum of once for every 5,000 cubic yards of material used in the engineered subgrade.	Applicable	

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(15) (continued)	Construction of a Landfill Cap System	• Field density testing shall be performed at a frequency not less than 5 tests per acre. Any penetrations in the subgrade as a result of the testing must be repaired using bentonite or a bentonite-soil mixture.	Applicable	
		Flexible Membrane Liner		
		The flexible membrane liner for the cap system shall be constructed on top of the soil barrier layer or geosynthetic clay liner in accordance with the specifications listed above for a flexible membrane liner for a landfill facility [OAC 3745-27-08 (C)(2)].		
		Drainage Layer		
		The drainage layer shall be: • a minimum of 1 foot of granular material; OR • a drainage net that has equivalent performance capabilities as the granular material. • constructed on top of the flexible membrane liner in accordance with the specifications outlined above for the drainage layer included in the leachate management system of a sanitary landfill facility ((C)(4)(a) of 3745-27-08 of the OAC).		
		Frost Protection Layer		
		The frost protection layer shall be: • placed on top of the drainage layer. • a minimum of 30 inches thick.		

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-08 (C)(15) (continued)	Construction of a Landfill Cap System	If the drainage layer is constructed with granular material instead of a drainage net, the drainage layer may be used as part of the frost protection layer.	Applicable	
		Soil Vegetative Layer		
		The soil vegetative layer shall: • consist of soil and vegetation placed on top of the frost protection layer. • have soil of sufficient thickness and fertility to support its vegetation and to protect the recompacted soil barrier layer and flexible membrane liner from damage due to root penetration. • have healthy grasses or other vegetation that form a complete and dense vegetative cover. Soil from the frost protection layer may be used as a part of the vegetative layer. Comparable materials and/or thicknesses for the soil barrier layer, the granular drainage layer, and the soil vegetative layer may be used if approved by the Director.		
Ohio Solid Waste Disposal Regulations OAC 3745-27-11 (H)(5) (b)	Final Closure of Landfill Facilities	A notation must be recorded on the deed to the sanitary landfill facility property, or on some other instrument which is normally examined during title search, that will in perpetuity notify any potential purchaser of the property that the land has been used as a sanitary landfill facility. The notation shall include information describing acreage, exact location, depth, volume, and nature of the solid waste deposited in the sanitary landfill facility.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
		SOLID WASTE DISPOSAL (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-14 (A)(1), (2)	Sanitary Landfill Post-Closure Care	Following completion of final closure activities in accordance with rule 3745-27-11 of the OAC, post-closure care activities shall be conducted at the sanitary landfill facility for a minimum of 30 years. Post-closure care activities for all sanitary landfill facilities shall include, but are not limited to: • continuing operation and maintenance of the leachate management system, the surface water management system, any explosive gas extraction and/or control system, any explosive gas monitoring system, and the groundwater monitoring system • maintaining the integrity and effectiveness of the cap system, including making repairs to the cap system as necessary to correct the effects of settling, dead vegetation, subsidence, erosion, leachate outbreaks, or other events, and preventing run-on and run-off from eroding or otherwise damaging the cap system	Applicable	
EPA Criteria for Municipal Solid Waste Landfills 40 CFR §258.61	Post-Closure Care	The Director of Ohio EPA may allow the owner or operator to stop managing leachate if the owner or operator demonstrates that leachate no longer poses a threat to human health and the environment.	Relevant and Appropriate	
		HAZARDOUS WASTE MANAGEMENT AND DISPOSAL		
Resource, Conservation, and Recovery Act 40 CFR §265.301(a)	RCRA Landfill Design	Construction of a landfill must include 2 or more liners and a leachate collection and removal system above and between such liners.	Applicable	
Resource, Conservation, and Recovery Act 40 CFR §265.90	Groundwater Monitoring	The owner or operator of a surface impoundment, landfill, or land-treatment facility which is used to manage hazardous waste must implement a groundwater monitoring program capable of determining the facility's impact on the quality of groundwater in the uppermost aquifer underlying the facility.	Applicable	

TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
HAZARDOUS WASTE MANAGEMENT AND DISPOSAL (continued)				
Resource, Conservation, and Recovery Act 40 CFR §265.310	RCRA Landfill Design for Closure	At final closure of the landfill or upon closure of any cell, the owner or operator must cover the landfill or cell with a final cover designed and constructed to: • provide long-term minimization of liquids through the closed landfill; • function with minimum maintenance; • promote drainage and minimize erosion or abrasion of the cover; • accommodate settling and subsidence so that the cover's integrity is maintained; and • have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present. After final closure, the owner or operator must comply with all post-closure requirements, including maintenance and monitoring throughout the post-closure care period. The owner or operator must: • maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events; • continue to operate the leachate collection and removal system until leachate is no longer detected; • maintain and monitor the leak detection system; • maintain and monitor the groundwater monitoring system; • prevent run-on and run-off from eroding or otherwise damaging the final cover; and • protect and maintain surveyed benchmarks.	Applicable	

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TABLE A-2
(Continued)

Citation	Action	Requirement	Determination	Remarks
POLYCHLORINATED BIPHENYL (PCB) DISPOSAL				
PCB Manufacturing, Processing, Distribution, and Use Prohibitions 40 CFR §761.3	Excluded PCB Materials	PCB materials which appear at concentrations less than 50 ppm are excluded from the PCB disposal requirements in this regulation.	Relevant and Appropriate	Operable Unit 2 does not contain PCB materials which have a concentration greater than 50 ppm.
ASBESTOS MANAGEMENT AND DISPOSAL				
National Emission Standard for Asbestos 40 CFR §61.151 (a) Ohio Asbestos Handling Regulations OAC 3745-20-07 (A),(C)	Inactive Asbestos Waste Disposal Sites	Each owner or operator of an inactive asbestos waste disposal site shall do one of the following: • discharge no visible emissions from an inactive waste disposal site; • cover the asbestos-containing waste material with at least 6 inches of compacted nonasbestos-containing material and grow and maintain a cover of vegetation on the area adequate to prevent exposure of the asbestos-containing waste material; or • cover the asbestos-containing waste material with at least 2 feet of compacted nonasbestos-containing material, and maintain the cover to prevent exposure of the asbestos-containing waste material. The owner or operator may use an alternative control method that has received prior approval of the Administrator.	Federal Relevant and Appropriate, Ohio Applicable	The Federal requirement is relevant and appropriate because it specifically applies to a type of facility that is not found in Operable Unit 2. The Ohio requirement is generally applicable to any inactive asbestos waste disposal site.

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TABLE A-3
RADIOLOGICAL ACTION-SPECIFIC REQUIREMENTS

Citation	Action	Requirement	Determination	Remarks
		DEFINITIONS		
Atomic Energy Act 42 U.S.C. §2014 (e)(2), (ee) Nuclear Waste Policy Act 42 U.S.C. §10101 (12), (16),(23)	Definition	The term low-level waste means radioactive material that is not: • high-level radioactive waste, the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations. • spent nuclear fuel, fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing. • transuranic waste, material contaminated with elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations greater than 10 nanocuries per gram. • byproduct material, the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.	Applicable	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV	Definition	Residual radioactive material is defined as: • residual concentrations of radionuclides in soil (soil is defined as unconsolidated earth material, including rubble and debris that might be present in the earth material); • concentrations of airborne radon decay products; • external gamma radiation; • surface contamination; and • radionuclide concentrations in air or water resulting from, or associated with, any of the above.	TBC	

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
		DEFINITIONS (continued)		
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(i)(6) Attachment 2 (1)	Definition	Radioactive material that is below regulatory concern is a definable amount of low-level waste that can be deregulated with minimal risk to the public. Waste containing amounts of radionuclides below regulatory concern, as defined by Federal regulations, may be disposed without regard to radioactivity content.	TBC	
		DOE ALARA POLICY		
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter I (4) and Chapter II (2)	As Low As Reasonably Achievable (ALARA) Process	The order adopts the ALARA process in planning and carrying out all DOE activities. ALARA requires judgement with respect to what is reasonably achievable. Factors that relate to societal, technological, economic, and other public policy considerations shall be evaluated to the extent practicable. Factors to be considered, at a minimum, shall include: • maximum dose to members of the public; • collective dose to the population; • alternative processes, such as alternative treatment of discharge streams, operating methods, or controls; • doses for each process alternative; • cost for each of the technological alternatives; • examination of the changes in cost among alternatives; and • changes in societal impact associated with process alternatives (e.g., differential doses from various pathways).	TBC	

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
DOE ALARA POLICY (continued)				
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter I (4) and Chapter II (2) (continued)	As Low As Reasonably Achievable (ALARA) Process	Except for meeting requirements of NEPA, qualitative analyses are acceptable, in most instances, for ALARA judgements, especially when the potential doses are well below the dose limit. The bases for these judgements should be documented. More detailed analyses should be considered if the decision might result in doses that approach the limit.	TBC	
GENERAL RADIOACTIVE MATERIALS DISPOSAL REQUIREMENTS				
Radiation Protection of the Public and the Environment DOE Order 5400. 5 Chapter II (3)(b)	Discharges of Liquid Waste to Aquifers and Phaseout of Soil Columns	New or increased discharges of radionuclides in liquid waste to active soil columns and virgin soil columns is prohibited.	TBC	
MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE				
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(a)	Performance Objectives of Low-Level Radioactive Waste Management	DOE low-level radioactive waste shall be managed to accomplish the following performance objectives: • protection of public health and safety; • protection of the public and the environment from releases of radioactivity (see chemical-specific requirements for radioactive dose limitations); and • protection of groundwater resources, consistent with Federal, State, and local requirements.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(c)	Low-Level Radioactive Waste Generation	Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal. Waste reduction efforts shall include consideration of process modification, process optimization, materials substitution, and decontamination.	TBC	

TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE (continued)				
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(c) (continued)	Low-Level Radioactive Waste Generation	All DOE low-level waste generators shall establish auditable programs to assure that the amount of low-level waste generated and/or shipped for disposal is minimized. Each DOE low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal. Each DOE low-level waste generator preparing a design for a new process or process change shall incorporate principles into the design that will minimize the generation of low-level waste.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(d)	Waste Characterization	Low-level waste shall be characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal. This characterization shall ensure that, upon generation after processing, the actual physical and chemical characteristics and major radionuclide content are recorded and known during all stages of the waste management process. Waste characterization data shall be recorded on a waste manifest and shall include: • the physical and chemical characteristics of the waste; • volume of the waste (total of waste and any solidification or absorbent media); • weight of the waste (total of waste and any solidification or absorbent media); • major radionuclides and their concentrations; and • packaging date, package weight, and external volume.	TBC	These requirements will apply when low-level radioactive waste is transported off-site for disposal.

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE (continued)				
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(f)	Waste Treatment	Waste shall be treated by appropriate methods so that the disposal site can meet the performance objectives stated above. Waste treatment techniques such as incineration, shredding, and compaction to reduce volume and provide more stable waste forms shall be implemented as necessary to meet performance requirements. Use of waste treatment techniques to increase the life of the disposal facility and improve long-term facility performance, by improved site stability and reduction of infiltrating water, is required to the extent it is cost effective. The development of large scale waste treatment facilities shall be supported by the appropriate National Environmental Policy Act documentation. Operation of waste treatment facilities shall be supported by adequate documentation.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(g)	Waste Shipment	The volume of waste and number of shipments of low-level wastes shall be minimized and the shipments will be conducted based on plans developed by field organizations. Generators shall provide an annual forecast in the third quarter of the fiscal year to the field organizations managing the off-site disposal facility to which the waste is to be shipped. Generators must receive advance approval from the receiving facility and shall certify prior to shipment that waste meets the receiving facility waste acceptance criteria. The certification program shall be auditable and able to withstand independent review.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(i)(1)-(6)	Waste Disposal	Low-level waste shall be disposed of by methods appropriate to achieve the performance objectives stated in paragraph 3a (listed above), consistent with the radiation dose limits in paragraph 3b (see chemical-specific requirements).	TBC	

TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE (continued)				
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(i)(1)-(6) (continued)	Waste Disposal	Engineered modifications (stabilization, packaging, burial depth, barriers) for specific waste types and for specific waste compositions for each disposal site shall be developed to achieve the performance objectives. Site specific waste classification limits may be developed if operationally useful in determining how specific wastes should be stabilized and packaged for disposal. Disposition of waste designated as greater than class C, as defined in 10 CFR §61.55, must be handled as a special case. Disposal systems for such waste must be justified by a specific performance assessment through the NEPA process and with the concurrence of DOE headquarters. The following are additional disposal requirements intended either to improve stability of the disposal site or to facilitate handling and provide protection of the health and safety of personnel at the disposal site: • Waste must not be packaged for disposal in cardboard or fiberboard boxes, unless such boxes meet DOT requirements and contain stabilized waste with a minimum of void space. For all types of containers, void spaces within the waste and between the waste and its packaging shall be reduced as much as practical. • Liquid wastes, or wastes containing free liquid, must be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonable achievable, but, in no case, shall the liquid exceed 1 percent of the volume of the waste when the waste is in a disposal container, or 0.5 percent of the volume of the waste processed to a stable form. • Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.	TBC	

TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE (continued)				
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(i)(1)-(6) (continued)	Waste Disposal	• Waste must not contain, or be capable of generating quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged as identified in the next requirement. • Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. • Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(i)(8)	Disposal Facility and Disposal Site Design	Design criteria shall be established prior to selection of new disposal facilities, new disposal sites, or both. These design criteria shall be based on analyses of physiographic, environmental, and hydrogeological data to assure that the policy and requirements of this Order can be met. The criteria shall be also based on assessments of projected waste volumes, waste characteristics, and facility and disposal site performance. Disposal units will be designed consistent with disposal site hydrology, geology, and waste characteristics and in accordance with NEPA.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(i)(9)	Disposal Facility Operations	Operating procedures for low-level waste disposal facilities shall be developed so that they: • protect the environment, health and safety of the public, and facility personnel; • ensure the security of the facility; • minimize the need for long-term control; and • meet the requirements of the closure/post-closure plan. Permanent identification markers for disposal excavations and monitoring wells shall be emplaced.	TBC	

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE (continued)				
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(i)(9) (continued)	Disposal Facility Operations	Operating procedures shall include training for disposal facility operating personnel, emergency response plans, and a system of reporting unusual occurrences to DOE. Waste placement into disposal units should minimize voids between containers. Operations are to be conducted so that active waste disposal operations will not have an adverse effect on filled disposal units.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(j)	Disposal Site Closure/Post Closure	Site-specific comprehensive closure plans shall be developed for new and existing operating low-level waste disposal sites. The plan shall address closure of disposal sites within a 5-year period after each is filled and shall conform to the requirements of the NEPA process. Performance objectives for existing disposal sites shall be developed on a case-by-case basis as part of the NEPA process. During closure and post closure, residual radioactivity levels for surface soils shall comply with existing DOE decommissioning guidelines. Corrective measures shall be applied to new disposal sites or individual disposal units if conditions occur or are forecasted that could jeopardize attainment of the performance objectives of this Order. Inactive disposal facilities, disposal sites, and disposal units shall be managed in conformance with RCRA, CERCLA, and the Superfund Amendments and Reauthorization Act (SARA). Closure plans for new and existing operating low-level waste disposal facilities shall be reviewed and approved by the appropriate field organization.	TBC	

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
MANAGEMENT OF LOW-LEVEL RADIOACTIVE WASTE (continued)				
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(j) (continued)	Disposal Site Closure/Post Closure	Termination of monitoring and maintenance activity at closed facilities or sites shall be based on an analysis of site performance at the end of the institutional control period.	TBC	
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(k)	Environmental Monitoring	Each low-level waste treatment, storage, and disposal facility shall be monitored by an environmental monitoring program that, at a minimum, meets the following requirements: • The program shall be designed to measure: - operational effluent releases; - migration of radionuclides; - disposal unit subsidence; and - change in disposal facility and disposal site parameters which may affect long-term site performance. • Based on the characteristics of the facility being monitored, the program may include, but not necessarily be limited to, monitoring surface soil, air, surface water, and, in the subsurface, soil and water, both in the saturated and the unsaturated zones. • The monitoring program shall be capable of detecting changing trends in performance sufficiently in advance to allow application of any necessary corrective action prior to exceeding performance objectives. The monitoring program shall be able to ascertain whether or not effluents from each treatment, storage, or disposal facility or disposal site meet the requirements of applicable EH Orders.	TBC	

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
		LOW-LEVEL RADIOACTIVE WASTE CONFINEMENT		
General Design Criteria DOE Order 6430.1A 1324-5.3	Low-Level Solid Waste Confinement	Low-level solid waste that is disposed to the ground shall be confined by a site-specific system of barriers that may include, but not necessarily be limited to, waste form, waste packaging, and the geologic setting. When site permeability characteristics do not provide the required confinement capabilities, the confinement system shall be augmented by the following: • constructing low permeability walls around the low-level waste; • lining the walls and bottom of the excavated area with low permeability material; and • other suitable methods for reducing permeability. Means shall be provided to minimize contact of emplaced low-level waste with water. Active water control measures shall not be required following permanent closure. Typical requirements for water control are as follows: • placing a layer of highly permeable material beneath the low-level waste to channel any percolating water to a sump; • mounding the soil surface to facilitate surface water runoff; • use of a suitable low-permeability cover material (e.g., clay) over the disposal area to prevent contact of the waste by infiltrating rainwater. This cover material shall be protected by a layer of overburden (e.g., sand, gravel, top soil). • a site diversion system for surface water runoff during operation of the facility; • temporary protective covers (e.g., tarpaulin) before the completion of the natural in-place soil barrier over the low-level waste;	TBC	

TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
LOW-LEVEL RADIOACTIVE WASTE CONFINEMENT (continued)				
General Design Criteria DOE Order 6430.1A 1324-5.3 (continued)	Low-Level Solid Waste Confinement	• revegetation of the overburden layer; and • other suitable and reliable means for minimizing water contact with low-level waste.	TBC	
General Design Criteria DOE Order 6430.1A 1324-6	Radioactive Solid Waste Confinement Systems	The following requirements outline the confinement system for radioactive solid waste: • Primary confinement consists of process systems equipment and its associated ventilation and off-gas system, storage containers, or other waste and site-specific engineered barriers. • Secondary confinement consists of process cell barriers and the ventilation systems associated with the cells or building, or a large storage building or structure. In some cases, a drum, cask, or other waste and site-specific engineered barrier shall provide secondary confinement. • The natural geologic setting composes the tertiary confinement system. In addition, the tertiary confinement system shall meet the following performance objectives: • Following permanent closure, on-going site maintenance shall not be needed. • In the absence of unplanned natural processes or human contact with a low-level waste disposal facility, calculated contaminant levels in groundwater at the site boundary shall not exceed the maximum contaminant levels (MCLs) established pursuant to the Safe Drinking Water Act (see chemical-specific requirements).	TBC	

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
LOW-LEVEL RADIOACTIVE WASTE CONFINEMENT (continued)				
General Design Criteria DOE Order 6430.1A 1324-6 (continued)	Radioactive Solid Waste Confinement Systems	• In the event of human-induced activities following permanent closure, or reasonably foreseeable but unplanned natural processes, the guidelines of DOE Order 6430.1A, Section 1300-1.4.2, Accidental Releases, shall not be violated. Institutional controls may be relied on for a limited time following closure. For the purposes of calculation, these controls shall not be relied on for more than 100 years following permanent closure.	TBC	
CONTROL OF URANIUM AND THORIUM BYPRODUCT MATERIAL				
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.02 (a) Subpart A	Control of Residual Radioactive Materials	Controls of residual radioactive materials from inactive uranium processing sites shall be designed to be effective for up to 1,000 years, to the extent reasonably achievable, and in any case, for at least 200 years.	Relevant and Appropriate	
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.20 Subpart C	Implementation	Reasonable assurance to show compliance with 40 CFR §192.02 (Subpart A) standards should be done through the use of analytical models and site-specific analyses.	Relevant and Appropriate	
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §192.32 (b)(1)(i) Subpart D	Management of Uranium Byproduct Material	Disposal areas for the management of uranium byproduct materials after closure shall each comply with the closure performance standard in 40 CFR §264.111 with respect to nonradiological hazards and shall be designed to provide reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonable, and, in any case, for at least 200 years	Relevant and Appropriate	

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TABLE A-3
(Continued)

Citation	Action	Requirement	Determination	Remarks
CONTROL OF URANIUM AND THORIUM BYPRODUCT MATERIAL (continued)				
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings 40 CFR §§ 192.40-192.42 Subpart E	Management of Thorium Byproduct Material	The provisions for the management of uranium byproduct material (40 CFR §192.32) shall apply to thorium byproduct material and provisions applicable to the element uranium shall also apply to the element thorium	Relevant and Appropriate	
MANAGEMENT OF RESIDUAL RADIOACTIVE MATERIAL				
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (5)	Release of Property	Real property (land and structures), personal property, materials, and equipment shall be released if the concentration of radioactivity is within the limits of residual radioactive contamination.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (6)	Control of Residual Radioactive Material Above the Guidelines	Residual radioactive material with concentrations above the generic guidelines (see chemical-specific requirements) shall be managed in accordance with Chapter II, Requirements for Radiation Protection of the Public and the Environment, and operational and control requirements.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (6)(d)	Long-Term Management of Residual Radioactive Material	To properly manage uranium, thorium, and their decay products, access to a property and use of on-site materials contaminated by residual radioactive material should be controlled through appropriate administrative and physical controls such as those described in 40 CFR 192. These controls should be designed to be effective to the extent reasonable for at least 200 years.	TBC	
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter IV (7)	Supplemental Limits and Exceptions for Residual Radioactive Material	If special specific property circumstances indicate that the concentration guidelines or authorized limits are not appropriate, supplemental limits or an exception may be requested to those guidelines or limits.	TBC	

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TABLE A-4
OTHER ACTION-SPECIFIC REQUIREMENTS

Citation	Action	Requirement	Determination	Remarks
		AIR POLLUTION CONTROL		
Ohio General Provisions on Air Pollution Control OAC 3745-15-07 ORC 3704.01-.05	Prevention of Air Pollution Nuisance	Measures shall be taken to adopt and maintain a program for the prevention, control, and abatement of air pollution in order to protect and enhance the quality of the state's air resource so as to promote the public health, welfare, and economic vitality of the people of the state. The emission or escape into open air from any source whatsoever of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, and combinations of the above in such a manner or in such amounts as to endanger the health, safety, or welfare of the public or to cause unreasonable injury or damage to property shall be declared to be a public nuisance. It is unlawful for any person to cause, permit, or maintain any such public nuisance.	Applicable	
Ohio Permit to Install New Sources of Pollution OAC 3745-31-05 (A)(3)	Best Available Technology (BAT)	The installation or modification and operation of an air contaminant source must employ the best available technology.	Relevant and Appropriate	
Ohio Ambient Air Quality Standards OAC 3745-17-02 OAC 3745-17-05	Particulate Ambient Air Quality Standards	The level of the primary and secondary 24-hour ambient air quality standards for total suspended particulates is 150 $\mu g/m^3$, 24-hour average concentration. The level of the primary and secondary annual standards for total suspended particulates in 50 $\mu g/m^3$, annual arithmetic mean. The significant and avoidable deterioration of air quality in any part of the area where presently existing air quality is equal to or better than the particulate ambient air quality standards shall be prohibited.	Applicable	
Ohio Particulate Matter Standards OAC 3745-17-07	Control of Visible Particulate Emissions from Stationary Sources	Visible particulate emissions from any stack shall not exceed 20 percent opacity, as a six-minute average. Transient exceedance limits are included in this regulation.	Applicable	

TABLE A-4
OTHER ACTION-SPECIFIC REQUIREMENTS

Citation	Action	Requirement	Determination	Remarks
		AIR POLLUTION CONTROL (continued)		
Ohio Emissions of Particulate Matter OAC 3745-17-07(B)(4),(5),(6)	Control of Visible Particulate Emissions	There shall be no visible particulate emissions from any paved roadway or parking area except for a period of time not to exceed six minutes during any sixty-minute observation period. There shall be no visible particulate emissions from any unpaved roadway, parking area, or material storage piles except for a period of time not to exceed thirteen minutes during any sixty-minute observation period.	Applicable	
Ohio Emissions of Particulate Matter OAC 3745-17-08	Restriction of Emission of Fugitive Dust	No person shall cause or permit any fugitive dust source to be operated; or any materials to be handled, transported or stored; or a building or its appurtenances or a road to be used constructed, altered, repaired or demolished without taking or installing reasonably available control measures to prevent fugitive dust from becoming airborne. Such reasonably available control measure shall include, but not be limited to, one or more of the following which are appropriate to minimize or eliminate visible particulate emissions of fugitive dust: • the use of water or other suitable dust suppression chemicals for the control of fugitive dust from the demolition of existing buildings or structures, construction operations, the grading or roads or the clearing of land; or • the periodic application of asphalt, oil, water, or other suitable dust suppression chemicals on dirt or gravel roads and parking lots, and any other surfaces which cause emissions of fugitive dust.	Relevant and Appropriate	This requirement is applicable only to certain cities in Butler and Hamilton Counties.
Ohio Particulate Matter Standards OAC 3745-17-11	Restrictions on Particulate Emissions	The following are restrictions for particulates from any operation, process, or activity which releases or may release particulate emissions into the ambient air. These limits are based on the weight of material being processed.	Applicable	

TABLE A-4
(Continued)

Citation	Action	Requirement	Determination	Remarks
AIR POLLUTION CONTROL (continued)				
Ohio Particulate Matter Standards OAC 3745-17-11 (continued)	Restrictions on Particulate Emissions	Process Weight at Maximum Capacity lb/hr. / Allowable Rate of Particulate Emission lb/hr. 100 / 0.551 200 / 0.877 400 / 1.40 600 / 1.83 800 / 2.22 1000 / 2.58	Applicable	
Standard of Performance for Nonmetallic Mineral Processing Plants 40 CFR §60.672 (a),(d),(e)	Restrictions on Particulate Emissions From Crushers	No owner or operator shall cause to be discharged into the atmosphere from a crusher any emissions which: • contain particulate matter in excess of 0.05 grams per dry cubic meter at standard conditions (g/dscm); and • exhibit greater than 7 percent opacity Truck dumping of nonmetallic minerals into any crusher is exempt from these requirements.	Relevant and Appropriate	
WATER POLLUTION CONTROL				
National Pollutant Discharge Elimination System 40 CFR §122.26 (a)(1)(ii) 40 CFR §122.26 (b)(14)(v),(x)	Storm Water Discharge Associated with Industrial Activity	A discharge composed entirely of storm water associated with industrial activity is required to obtain a NPDES permit. These categories of facilities are considered to be engaging in "industrial activity": • landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under subtitle D of RCRA; and	Applicable	Engineering controls will be implemented to monitor and control stormwater runoff during removal, treatment, and disposal of Operable Unit 2 material.

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TABLE A-4
(Continued)

Citation	Action	Requirement	Determination	Remarks
		WATER POLLUTION CONTROL (continued)		
National Pollutant Discharge Elimination System 40 CFR §122.26 (a)(1)(ii) 40 CFR §122.26 (b)(14)(v),(x) (continued)	Storm Water Discharge Associated with Industrial Activity	• construction activity including clearing, grading, and excavation activities that disturbs 5 acres or more of total land area.	Applicable	
Clean Water Act §404 (33 U.S.C. §1344) Guidelines for Specifications of Disposal Sites for Dredged or Fill Material 40 CFR §230.10	Discharge of Dredged or Fill Material	No discharge of dredged or fill material shall be permitted: • if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as, the alternative does not have other significant adverse environmental consequences. • unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem. No discharge of dredged or fill material shall be permitted if it: • causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable state water quality standard. • violates any applicable toxic effluent standard or prohibition under section 307 of the Clean Water Act. • jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification or a habitat which is determined to be a critical habitat under the Endangered Species Act of 1973, as amended.	Applicable	

000102

TABLE A-4
(Continued)

Citation	Action	Requirement	Determination	Remarks
WATER POLLUTION CONTROL (continued)				
Clean Water Act Nationwide Permit Program 33 U.S.C. §1341(a)(1),(d) 33 CFR §330.1 (c)	Nationwide Permits - Terms and Conditions	An activity is authorized under an NWP only if that activity and the permittee satisfy all of the following NWPs terms and conditions. Potentially applicable NWPs include: • Nationwide Permit #26 - Headwaters and Isolated Waters Discharges - The discharge does not cause the loss of more than 10 acres of waters of the United States. - The permittee notifies the district engineer if the discharge would cause the loss of waters of the United States greater than one acre. - For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. - The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project. • Nationwide Permit #38 - Cleanup of Hazardous and Toxic Waste - This permit authorizes specific activities required to effect the containments, stabilization or removal of hazardous or toxic waste materials that are performed ordered, or sponsored by a government agency with established legal or regulatory authority provided the permittee notifies the district engineer. - For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands.	Applicable	In a January 17, 1992 letter to the U.S. Army Corps of Engineers, OEPA conditionally certified that projects authorized by these Nationwide Permits will comply with the applicable provisions of the Federal Water Pollution Control Act.

TABLE A-4
(Continued)

Citation	Action	Requirement	Determination	Remarks
		WATER POLLUTION CONTROL (continued)		
Clean Water Act Nationwide Permit Program 33 U.S.C. §1341(a)(1),(d) 33 CFR §330.1 (c) (continued)	Nationwide Permits - Terms and Conditions	- This nationwide permit does not authorize the establishment of new disposal sites or the expansion of existing sites used for the disposal of hazardous or toxic waste.	Applicable	
Clean Water Act Nationwide Permit Program 33 CFR §330.4 (c)(1) Ohio Section 401 Water Quality Certifications OAC 3745-32	Nationwide Permits - Terms and Conditions	State 401 water quality certification pursuant to section 401 of the Clean Water Act, or waiver thereof, is required prior to the issuance or reissuance of individual or nationwide permits authorizing activities which may result in a discharge into waters of the United States	Applicable	
Clean Water Act General Regulatory Policies 33 CFR §323.3	Permits for Discharges of Dredged or Fill Material	Permits will be required for the discharge of dredged or fill material into waters of the United States including wetlands. Certain discharges specified in 33 CFR Part 330 are permitted by that regulation (nationwide permits). If a discharge of dredged or fill material is not permitted by 33 CFR Part 330 (Nationwide Permits), an individual section 404 permit will be required for the discharge of dredged or fill material into waters of the United States. Discharges of dredged or fill material into waters of the United States done by or on behalf of any Federal agency, other than the Corps of Engineers, are subject to the authorization procedures of these regulations.	Applicable	
Ohio Water Pollution Control Regulations ORC 6111.04	Acts of Pollution Prohibited	No person shall cause pollution or place or cause to be placed any sewage, industrial waste, or other wastes in a location where they cause pollution of any waters of the state.	Applicable	

000104

TABLE A-4
(Continued)

Citation	Action	Requirement	Determination	Remarks
WATER POLLUTION CONTROL (continued)				
Ohio Water Pollution Control Regulations ORC 6111.04 (continued)	Acts of Pollution Prohibited	No person to whom a permit has been issued shall place or discharge, or cause to be placed or discharged, in any waters of the state any sewage, industrial waste, or other wastes in excess of the permissive discharges specified under such existing permit without first receiving a permit from the Director to do so.	Applicable	
NOISE POLLUTION CONTROL				
Noise Control Act 42 U.S.C. §4901, *et seq.* Noise Pollution and Abatement Act 42 U.S.C. §7641	Noise Pollution Control	The public must be protected from noises that jeopardize health and welfare.	Applicable	

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TABLE A-5
LOCATION-SPECIFIC REQUIREMENTS

Citation	Location	Requirement	Determination	Remarks
THREATENED AND ENDANGERED SPECIES PROTECTION				
Procedures for Implementing the National Environmental Policy Act 40 CFR §6.302(h) Endangered and Threatened Wildlife and Plants 50 CFR §17.21,§17.94 Interagency Cooperation-Endangered Species Act 50 CFR §402.01	Endangered Species and Critical Habitat	All Federal agencies must insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the constituent elements essential to the conservation of a listed species within a defined critical habitat.	Applicable	In 1994, surveys were conducted for potential threatened or endangered plant species; no individuals were found. In 1993 and 1994, surveys have verified the presence of the state-threatened Sloan's crayfish [*Orconectes sloanii*] in Paddys Run. Suitable habitat for the Indiana bat [*Myotis sodalis*], a federally-listed endangered species, also exists on the Fernald property.
Interagency Cooperation-Endangered Species Act 50 CFR §402.12 (a),(b)	Biological Assessment	A biological assessment shall evaluate the potential effects of the action on listed and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action and is used in determining whether formal consultation or a conference is necessary. These procedures are required for Federal actions that are "major construction activities".	Applicable	No critical habitat is present on the Fernald property.
Ohio Endangered Species Regulations ORC 1531.25	Endangered Animal Species	No person shall take or possess any native species of wild animal, or any eggs or offspring thereof, that is threatened with state-wide extinction.	Applicable	See first remark.
Ohio Endangered Species Regulations ORC 1518.02 OAC 1501:18-1	Endangered Plant Species	No person shall root up, injure, destroy, remove, or carry away on or from public highways, public property, or waters of the state, or on or from the property of another, without the written permission of the owner, lessee, or other person entitled to possession, any endangered or threatened plant listed in OAC 1501:18-1.	Applicable	See first remark.

000107

TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
THREATENED AND ENDANGERED SPECIES PROTECTION (continued)				
Classification of Solid Waste Disposal Facilities and Practices 40 CFR §257.3-2	Any	Solid waste disposal facilities or practices shall not cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife. Solid waste disposal facilities or practices shall not result in the destruction or adverse modification of the critical habitat of endangered or threatened species as identified in 50 CFR Part 17.	Applicable	See first remark.
HISTORIC AND CULTURAL RESOURCE PROTECTION				
Antiquities Act of 1906 16 U.S.C. §431	Antiquity Preservation	No person may appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity situated or controlled by the Government of the United States.	Applicable	An assessment of the Operable Unit 2 waste units was performed in March 1993 and it was determined that the areas had already been sufficiently disturbed so that there would be no requirement to consult the State Historic Preservation Officer (SHPO). Archaeological investigations will be conducted for the disposal facility study area. Any other proposed areas of disturbance for Operable Unit 2 remedial actions will be surveyed and the SHPO consulted as necessary.
Archaeological Resources Protection Act 16 U.S.C. §47099 Procedures for Implementing the National Environmental Policy Act 40 CFR §6.301(c) Protection of Archaeological Resources 43 CFR §7.4(a)	Archaeological Resource Recovery and Preservation	Whenever any Federal agency finds, or is notified, in writing, by an appropriate historical or archaeological authority, that its activities in connection with any Federal construction project or federally licensed project, activity, or program may cause irreparable loss or destruction of significant scientific prehistorical, historical, or archaeological data, such agency shall notify the Secretary of the Interior, in writing, and shall provide the Secretary with appropriate information concerning the project, program, or activity.	Applicable	See above remark.

000108

TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
HISTORIC AND CULTURAL RESOURCE PROTECTION (continued)				
Archaeological Resources Protection Act 16 U.S.C. §47099 Procedures for Implementing the National Environmental Policy Act 40 CFR §6.301(c) Protection of Archaeological Resources 43 CFR §7.4(a) (continued)	Archaeological Resource Recovery and Preservation	No person may excavate, remove, damage, or otherwise alter or deface or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands unless such activity is pursuant to a permit. If an EPA activity may cause irreparable loss or destruction of significant scientific, prehistoric, historic, or archaeological data, the responsible official or the secretary of the Interior is authorized to undertake data recovery and preservation activities.	Applicable	See above remark.
National Historic Preservation Act 16 U.S.C. §470 36 CFR 800 Procedures for Implementing the National Environmental Policy Act 40 CFR §6.301 (a),(b)	Historic Preservation	A Federal agency must take into account how each of its undertakings could affect historic properties. The purpose of this Act is not only to protect those properties listed in or eligible for the National Register of Historic Places, but also those properties that have not been listed or formally determined eligible for the listings. The heads of all Federal agencies shall assume responsibility for the preservation of historic properties which are owned or controlled by such agency. Prior to any Federal undertaking which may directly and adversely affect any National Historic Landmark, the head of the responsible agency shall, to the extent possible, minimize the harm to such landmark.	Applicable	See above remark.
Native American Graves Protection and Repatriation Act 25 U.S.C. §3001	Protection of American Indian Grave Sites	Provides for the return of human remains and cultural objects from Native American graves to affiliated tribes.	Applicable	

000109

TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
HISTORIC AND CULTURAL RESOURCE PROTECTION (continued)				
American Indian Religious Freedom Act 42 U.S.C. §1996	Protection of American Indian Religious Freedom	Provides for tribal access by native peoples to grave sites and sites of cultural, symbolic, or religious significance.	Applicable	
FLOODPLAINS/WETLANDS PROTECTION				
Procedure for Implementing the National Environmental Policy Act 40 CFR §6.302(a) [Executive Order 11990]	Protection of Wetlands	Federal agencies conducting certain activities must avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands when a practicable alternative exists.	Applicable	An updated site-wide delineation of Fernald wetlands, performed in accordance with the U.S. Army Corps of Engineers Wetland Delineation Manual, was completed in March 1993. Although there are wetlands located near the Lime Sludge Ponds, the Solid Waste Landfill is the only subunit with wetlands located inside the battery limits. These wetlands may be affected during the Operable Unit 2 remedial action. Wetlands in other areas of the site may also be impacted by construction and operation of the on-site disposal facility. A Wetland/Floodplain Assessment was conducted.
Procedures for Implementing the National Environmental Policy Act 40 CFR §6.302(b) [Executive Order 11988]	Floodplain Management	Federal agencies must evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain.	Applicable	An updated floodplain determination was performed for Paddys Run in October 1993 using the Army Corps of Engineers' standard HEC2 water surface profile analysis program. The 100-year flood elevations reach the western slope of the Inactive Flyash Pile and the toe of the South Field slope. Indirect, short-term floodplain impacts will occur during remediation. A Wetland/Floodplain Assessment was conducted.

TABLE A-5
(Continued)

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

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TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
		FLOODPLAINS/WETLANDS PROTECTION (continued)		
DOE Compliance with Floodplain/Wetlands Environmental Review Requirements 10 CFR §1022.5(b),(h)	Floodplain/Wetlands	This part shall apply to all proposed floodplain/ wetlands actions, including those sponsored jointly with other agencies, where practicable alternatives to the proposed actions are still available. The policies and procedures of this part which are applicable to floodplain actions shall apply to all proposed actions which occur in a wetlands located in a floodplain.	Applicable	
DOE Compliance with Floodplain/Wetlands Environmental Review Requirements 10 CFR §1022.11(a),(b), (c)	Floodplain/Wetlands	Concurrent with its review of a proposed action to determine appropriate NEPA requirements, DOE shall determine applicability of the floodplain management and wetlands protection requirements of this part. In making a floodplain determination, DOE shall utilize the Flood Insurance Rate Maps (FIRMs) or the Flood Hazard Boundary Maps (FHBMs) prepared by the Federal Insurance Administration of the Department of Housing and Urban Development to determine if a proposed action is located in the base or critical action floodplain, as appropriate. For a proposed action in an area of predominantly Federal or State land holdings where FIRM or FHBM maps are not available, information shall be sought from the land administering agency (e.g., Bureau of Land Management, Soil Conservation Service, etc.) or from agencies with floodplain analysis expertise.	Applicable	
DOE Compliance with Floodplain/Wetlands Environmental Review Requirements 10 CFR §1022.12(a)	Floodplain/Wetlands	If DOE determines, pursuant to 10 CFR §§ 1022.5 and 1022.11, that this part is applicable to the proposed action, DOE shall prepare a floodplain/wetlands assessment, according to the requirements in this section (10 CFR §1022.12).	Applicable	

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TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
FLOODPLAINS/WETLANDS (continued)				
DOE Compliance with Floodplain/Wetlands Environmental Review Requirements 10 CFR §1022.15(a)	Floodplain/Wetlands	If DOE finds that no practicable alternative to locating in the floodplain/wetlands is available, consistent with the policy set forth in Executive Order 11988, DOE shall, prior to taking action, design, or modify its action in order to minimize potential harm to or within the floodplain/wetlands.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-20 (C)(2)	Floodplain	The limits of solid waste placement and the leachate management system cannot be located in a regulatory floodplain, unless deemed acceptable by the Director.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(4)(d)	Stream, Lake, or Wetland	The limits of waste placement cannot be located within 200 feet of a stream, lake, or wetland, unless deemed acceptable by the Director.	Applicable	
GROUNDWATER PROTECTION				
Safe Drinking Water Act 42 U.S.C. §1424(e)	Sole Source Aquifer	All Federal financially assisted projects constructed in the area of a sole source aquifer and its principal recharge zone will be subject to EPA's review to insure that these projects are designed and constructed so that they do not create a significant hazard to public health.	Applicable	A notice in 53 FR 15876 (May 4, 1988) designated the Buried Valley Aquifer System of the Great Miami/ Little Miami River Basins of southwestern Ohio as a sole or principal source of drinking water. The Fernald site is located above this aquifer.
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(3)(a)	Any	A sanitary landfill facility may not be located within the surface and subsurface areas surrounding a public water supply well through which contaminants may move toward and may reach the public water supply well within a period of 5 years.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(2)(c)	Any	A sanitary landfill facility cannot be located above an aquifer declared by the federal government under the Safe Drinking Water Act to be a sole source aquifer.	Applicable	

TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
		GROUNDWATER PROTECTION (continued)		
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(2)(d)	Any	A sanitary landfill facility cannot be located above an unconsolidated aquifer capable of sustaining a yield of 100 gallons per minute for a 24-hour period to an existing or future water supply well located within 1,000 feet of the limits of solid waste placement, unless deemed acceptable by the Director.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(3)(c)	Water Supply Well or Developed Spring	The limits of sold waste placement cannot be located within 1,000 feet of an existing water supply well or developed spring unless it is deemed acceptable by the Director or it is: • controlled by the applicant, is needed as a source of nonpotable water, no other reasonable alternate water source is available, and the well is constructed to prevent contamination of the groundwater, OR • located at least 500 feet hydrogeologically up-gradient from the limits of solid waste placement, OR • separated from the limits of solid waste placement by a hydrogeologic barrier, OR • constructed and used solely for monitoring groundwater quality	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(2)(e)	Any	The isolation distance between the uppermost aquifer system and the bottom of the recompacted soil liner of a sanitary landfill system cannot be less than 15 feet of in situ or added geologic material deemed acceptable by the Director.	Applicable	
OEPA Guidance on Solid Waste Siting Criteria: Material Acceptable to the Director GD202.104	Any	For geologic material to be deemed acceptable to the Director as added fill under OAC Rule 3745-27-07 (B)(15), it must be able to meet the following criteria: • the geologic material must be impermeable enough so it will not store, transmit or yield a significant amount of water to a well or spring	TBC	

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TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
		GROUNDWATER PROTECTION (continued)		
OEPA Guidance on Solid Waste Siting Criteria: Material Acceptable to the Director GD202.104 (continued)	Any	• the geologic material must be able to impede both physically and chemically, the flow of leachate constituents through it In order to meet both criteria listed above, the added geologic material should: • be classified as CL, SC, GC, CL-ML, or CH under the Unified Soil Classification System (USCS) • be composed of particles of which at least 25% by dry weight will pass through a No. 200 (75 μm) sieve • be composed of no more than 25% by dry weight particles which will not pass through a No. 4 sieve • no particle should be greater than 8 inches in diameter • have a final permeability of no more than 1×10^{-8} cm/sec • be recompacted in a manner that when the landfill is constructed on it, no damage to the landfill liner will occur due to settling of the added material	TBC	
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(4)(b)	Any	The limits of waste placement cannot be located within 300 feet of the sanitary landfill facility's property line, unless deemed acceptable by the Director.	Applicable	
Ohio Solid Waste Disposal Regulations OAC 3745-27-07 (H)(4)(c)	Any	The limits of solid waste placement cannot be located within 1,000 feet of an existing domicile whose owner has not consented in writing to the location of the sanitary landfill facility.	Applicable	

TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
		GROUNDWATER PROTECTION (continued)		
Ohio Solid and Hazardous Waste Rules ORC 3734.02(A)	Protection of Human Health and the Environment	The director of environmental protection shall adopt and may modify, suspend, or repeal rules for all solid waste facilities in order to ensure that the facilities will be located, maintained, and operated, and will undergo closure and post-closure care, in a sanitary manner so as not to create a nuisance, cause or contribute to water pollution, create a health hazard, or violate 40 CFR § 257.3-2 or 257.3-8.	Applicable	
		RADIOLOGICAL SITING CRITERIA		
Radioactive Waste Management DOE Order 5820.2A Chapter III (7)	Disposal Site Selection	Disposal site selection criteria (based on planned waste confinement technology) shall be developed for establishing new low-level waste disposal sites. Disposal site selection shall be based on an evaluation of the prospective site in conjunction with planned waste confinement technology, and in accordance with the National Environmental Policy Act process. Site selection shall also be based on the following criteria: • The disposal site shall have hydrogeologic characteristics which, in conjunction with the planned waste confinement technology, will protect the groundwater resource. • The potential for natural hazards such as floods, erosion, tornadoes, earthquakes, and volcanoes shall be considered in site selection. • Site selection criteria shall address the impact on current and projected populations, land use resources development plans and nearby public facilities, accessibility to transportation routes and utilities, and the location of waste generation.	TBC	

TABLE A-5
(Continued)

Citation	Location	Requirement	Determination	Remarks
		RADIOLOGICAL SITING CRITERIA (continued)		
Joint NRC-EPA Guidance on Siting of Mixed Low-Level Radioactive and Hazardous Waste Units (March 13, 1987)	Any	Areas with highly vulnerable hydrogeology deserve special attention in the siting of a mixed low-level waste disposal facility. Hydrogeology is considered vulnerable when groundwater travel time along any 100-foot flow path from the edge of the engineered containment structure in less than approximately 100 years. Disposal sites located in areas of vulnerable hydrogeology may require extensive, site-specific investigations which could lead to and provide bases for restrictions or modifications to design or operating practices. However, a finding that a site is located in an area of vulnerable hydrogeology alone, based on the EPA criteria, is not considered sufficient to prohibit siting under RCRA.	TBC	

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