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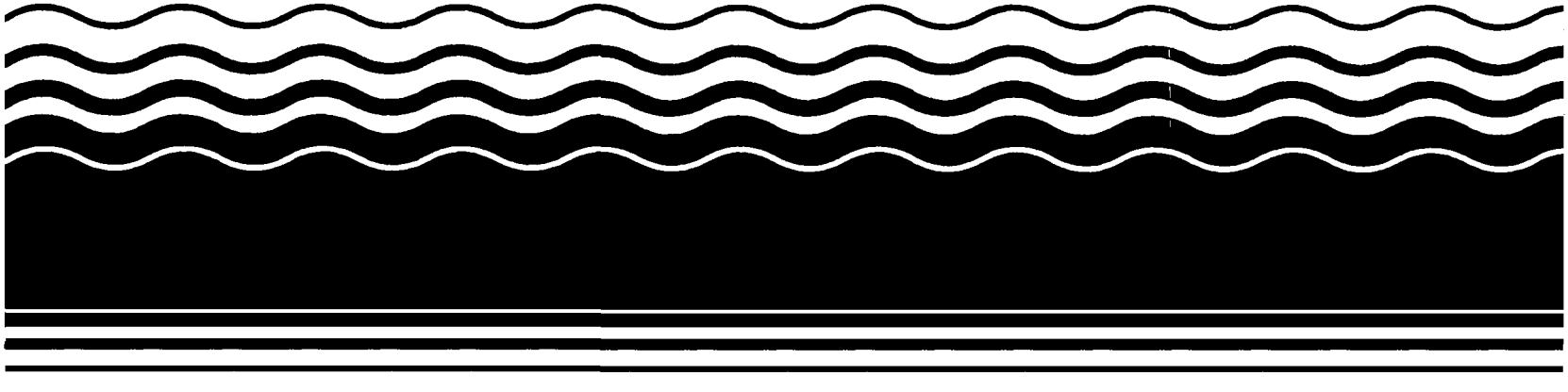
February 1996

EPA Superfund Record of Decision:

Feed Materials Production Center, (USDOE), Operable Unit 1, Fernald, OH 3/1/1995



FINAL
RECORD OF DECISION
FOR REMEDIAL ACTIONS AT
OPERABLE UNIT 1

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

JANUARY 1995

U.S. DEPARTMENT OF ENERGY
FERNALD FIELD OFFICE

DECLARATION

DECLARATION STATEMENT

SITE NAME AND LOCATION

Fernald Environmental Management Project (FEMP) Site -- Operable Unit 1,
Hamilton and Butler Counties, Ohio

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for Operable Unit 1 of the FEMP site in Hamilton and Butler Counties, Ohio. Operable Unit 1 consists of Waste Pits 1 through 6, the Burn Pit, the Clearwell, and associated environmental media (excluding groundwater).

This remedial action was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (hereinafter jointly referred to as CERCLA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300.

In making this decision, the Department of Energy (DOE) integrated the National Environmental Policy Act (NEPA) values into the CERCLA remedial process. Through DOE's integration, the Feasibility Study and the Proposed Plan also comprised DOE's Environmental Assessment. However, it is not the intent of DOE to make a statement about the legal applicability of NEPA to CERCLA actions.

The decision is based on the information available in the administrative record for this site.

The State of Ohio concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from Operable Unit 1, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

Operable Unit 1 is the second of five operable units at the site for which remedies will be selected in individual Records of Decision. The purpose of this remedy is to address the above-named waste pits of the FEMP site, known as Operable Unit 1. Operable Unit 2 will focus on remediation of other waste units, including the flyash piles, lime sludge ponds, solid waste landfill, and South Field disposal areas. Operable Unit 3 includes the former production area and associated facilities. Operable Unit 4 includes remediation of the concrete storage silos and their contents in the site waste storage area. Operable Unit 5 focuses on environmental media, including groundwater and soil not remediated in Operable Units 1 through 4. If needed, a sixth operable unit will address any residual issues that remain after remediation of Operable Units 1 through 5.

The Operable Unit 1 remedy is: removal, treatment, and off-site disposal at a permitted commercial disposal facility.

The Operable Unit 1 remedy consists of the following key components:

- Construction of waste processing and loading facilities and equipment.
- Removal of water from open waste pits for treatment at the site's wastewater treatment facility.
- Removal of waste pit contents, caps and liners, and excavation of surrounding contaminated soil.
- Confirmation sampling of waste pit excavations to verify achievement of remediation levels.
- Pretreatment (sorting/crushing/shredding) of waste.
- Treatment of the waste by thermal drying as required to meet the waste acceptance criteria of the disposal facility.
- Waste sampling and analysis prior to shipment to ensure that the waste acceptance criteria of the disposal facility are met.

- Off-site shipment of waste for disposal at a permitted commercial waste disposal facility. It is estimated that over 600,000 cubic yards of waste material will be excavated and disposed as low-level radioactive waste.

- As a contingency, shipment of any waste that fails (due to radiological concentrations) to meet the waste acceptance criteria of the permitted commercial waste disposal facility (up to 10 percent of the total waste volume) for disposal at the Nevada Test Site.

- Decommissioning and removal of the drying treatment unit and associated facilities, as well as miscellaneous structures and facilities within the operable unit. Oversized material that is amenable to the selected alternative for Operable Unit 3 would be segregated from Operable Unit 1 waste, decontaminated, and forwarded to Operable Unit 3 to be managed as construction rubble.

- Disposition of remaining Operable Unit 1 residual contaminated soils, as amenable, consistent with selected remedies for contaminated process area soils as documented in the Operable Unit 5 Record of Decision. Any materials not consistent with the Operable Unit 5 remedy will be disposed as waste pit materials (i.e., shipped off-site).

- Placement of backfill into excavations and construction of cover system.

This remedy addresses the principal threats posed by Operable Unit 1 by removing waste materials and contaminated soils to health-based levels, and treating waste materials and soils to facilitate waste handling. These actions reduce the potential for contaminant migration and will ensure disposal facility waste acceptance criteria are met. The waste will then be disposed at a permitted off-site disposal facility in accordance with applicable requirements. By implementing this remedy, the waste material will not be available for direct human or ecological contact or for migration into the underlying Great Miami Aquifer.

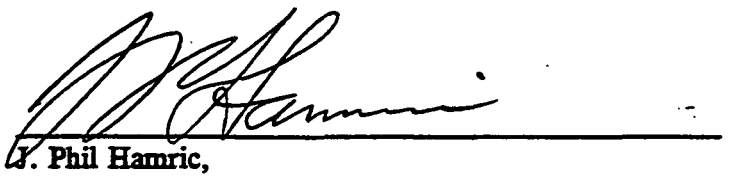
The health-based cleanup levels established in this Record of Decision are protective of human health and the environment assuming continued Federal ownership of the site. However, the remediation levels will be reviewed by the Operable Unit 5 Feasibility Study and Record of Decision, based upon available Operable Unit 5 Feasibility Study conclusions, recommendations concerning future land use from the Fernald Citizens Task Force, and further public comment. If found to be necessary, the Operable Unit 5 Record of Decision will modify the Operable Unit 1 remediation levels downward to

further ensure protectiveness of human health and the environment. The Operable Unit 5 Record of Decision will be finalized prior to waste pit excavation at Operable Unit 1.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces contaminant toxicity, mobility, or volume as a principal element.

In accordance with CERCLA 121(c) and Section XXX of the Amended Consent Agreement between the U.S. Environmental Protection Agency (EPA) and the Department of Energy, EPA will review this remedial action, from a site-wide perspective, no less often than each five years after the implementation of final remedial actions to assure that human health and the environment are being protected by the remedial actions.



1/24/95

J. Phil Hamric,
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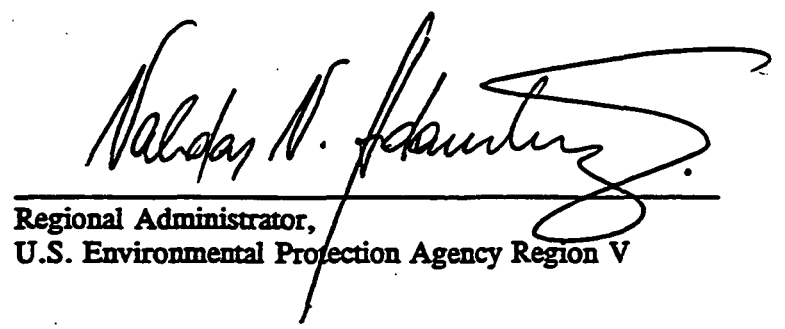

3/01/95

Regional Administrator,
U.S. Environmental Protection Agency Region V

Date

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LIST OF ACRONYMS

AEC	Atomic Energy Commission
ARAR	applicable or relevant and appropriate requirement
AWWT	Advanced Waste Water Treatment (facility)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, as amended
CIS	Characterization Investigation Study
COC	Constituents of Concern
CPC	Constituents of Potential Concern
CT	central tendency
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
ETF	Experimental Treatment Facility
FEMP	Fernald Environmental Management Project
FFCA	Federal Facility Compliance Agreement
FMPC	Feed Materials Production Center
FRESH	Fernald Residents for Environmental Safety and Health
HWMU	Hazardous Waste Management Unit
HI	Hazard Index
HQ	Hazard Quotient
ILCR	incremental lifetime cancer risk
µg/L	micrograms per liter
MCL	Maximum Contaminant Level
mg	milligram
mg/L	milligrams per liter
mrem	millirem
mrem/yr	millirem equivalent man per year
MSL	mean sea level
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System

LIST OF ACRONYMS
(Continued)

NTS	Nevada Test Site
O&M	operation and maintenance
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/L	picoCuries per liter
pCi/g	picoCuries per gram
PRG	proposed remediation goals
RCRA	Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, as amended
RI/FS	Remedial Investigation/Feasibility Study
RME	reasonable maximum exposure
SARA	Superfund Amendments and Reauthorization Act
S.R.	State Route
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan
TCA	1, 1, 1-trichloroethane
TBC	to be considered
UAP	uranyl ammonium phosphate
WAC	waste acceptance criteria

DECISION SUMMARY

1.0 SITE LOCATION AND DESCRIPTION

1.1 INTRODUCTION

This document is the Record of Decision for remediating Operable Unit 1 of the Fernald Environmental Management Project (FEMP) site. It is prepared in accordance with U.S. Environmental Protection Agency (EPA) guidance on preparing remedial action decision documents (EPA 1992a). The FEMP site, formerly known as the Feed Materials Production Center, is owned by the U.S. Department of Energy (DOE) and was operated from 1952 until 1989. While in operation, the uranium ore processing facility provided high-purity uranium metal products in support of the nation's defense program. Operable Unit 1 is located within the Waste Storage Area, where wastes generated during production operations are stored.

1.2 LOCATION AND DESCRIPTION

The 425-hectare (1,050-acre) FEMP site is located in southwestern Ohio, about 29 kilometers (18 miles) northwest of the city of Cincinnati, Ohio, and is situated on the boundary between Hamilton and Butler counties (Figure 1-1). Former uranium processing operations at the FEMP were limited to a fenced, 55-hectare (136-acre) tract, closed to public access, known as the former Production Area. The remaining FEMP site areas consist of forest and pasture lands, a portion of which is leased for grazing livestock.

The western portion of the FEMP property lies within the north-south corridor of the 100- and 500-year Paddys Run floodplain. On-site surface waters are confined to Paddys Run and its unnamed tributaries, and total approximately 3.6 hectares (8.9 acres). Results from a site-wide wetlands delineation indicate a total of 14.5 hectares (35.9 acres) of freshwater wetlands on-site. The Great Miami Aquifer is the principal aquifer within the FEMP study area and has been designated a sole-source aquifer by the EPA, under provisions of the Safe Drinking Water Act.

The land adjacent to the FEMP is primarily devoted to agriculture and recreation. There is some commercial activity in close proximity to the site, such as a panel truss company and several plant

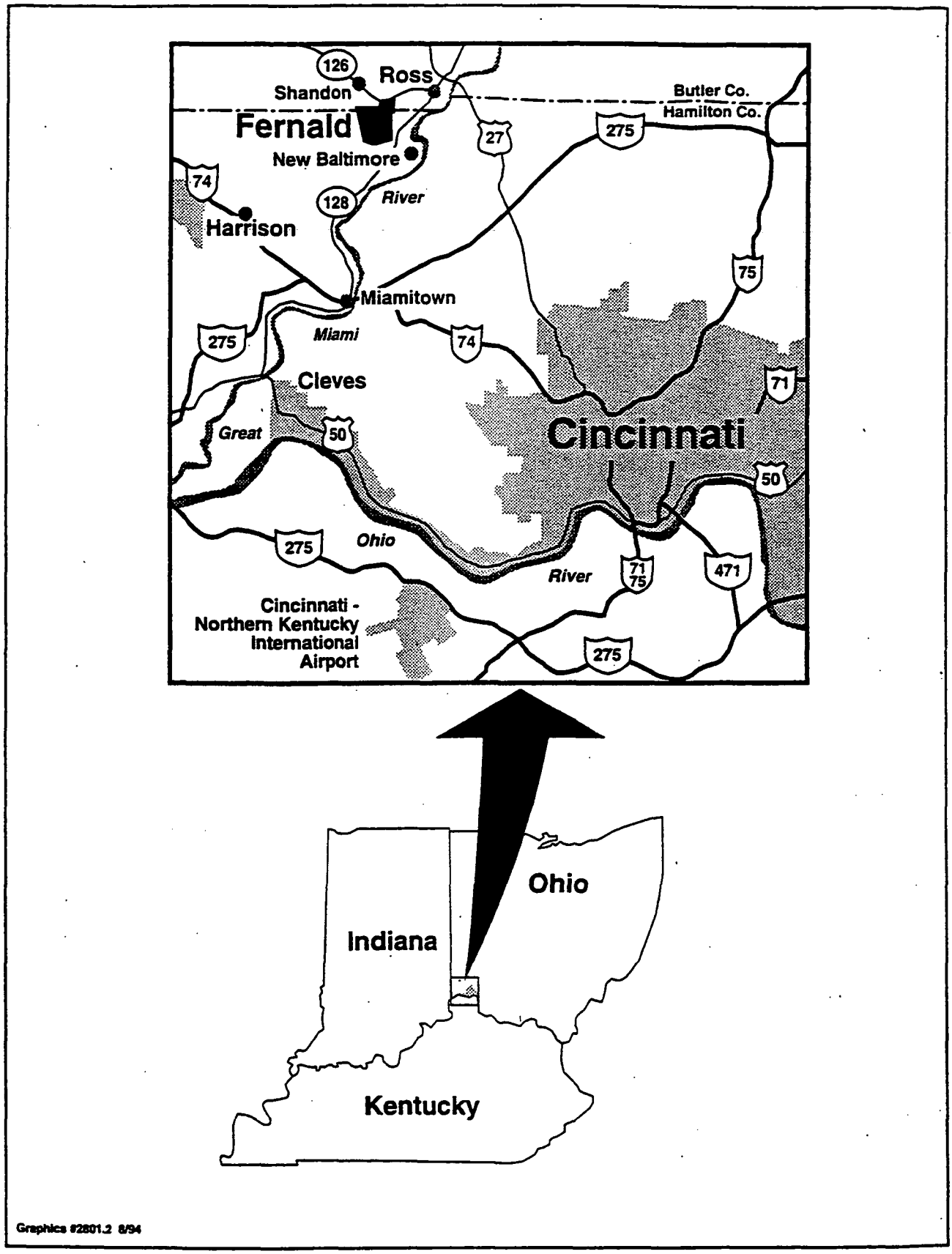

FIGURE 1-1 FEMP Facility Location Map

nursery suppliers. However, the majority of commercial activity is generally restricted to the Village of Ross, approximately 3.2 kilometers (2 miles) northeast of the facility, and along State Route (S.R.) 128 south of Ross. Industrial usage is concentrated in the areas south of the FEMP, along Paddys Run, in Fernald, and in a small industrial park on S.R. 128 between Willey Road and New Haven Road. Open acreage on the FEMP is currently being leased for livestock grazing, but there are no areas within the FEMP boundaries considered to be prime farmland under the Farmland Policy Protection Act of 1981 (DOE 1994b).

Concentrations of residential units are situated northeast of the FEMP in Ross and directly east in a trailer park adjacent to the intersection of Willey Road and S.R. 128. Other residences are scattered around the area, generally in association with farmsteads. An estimated 23,000 residents live within an 8.1-kilometer (5-mile) radius of the FEMP.

Operable Unit 1 is a well-defined, 15.3-hectare (37.7-acre) area located in the northwest quadrant of the FEMP site (depicted in Figure 1-2). Large quantities of liquid and solid wastes were generated by various chemical and metallurgical processing operations and these wastes were stored or disposed in six waste pits and the Clearwell, or burned in the Burn Pit. These pits are located in a portion of the FEMP Waste Storage Area and are contained within the boundaries of Operable Unit 1 (See Figure 1-3). A detailed discussion of each pit's construction, contents, and volume of waste material is provided in the Final Remedial Investigation Report for Operable Unit 1 (DOE 1994b). Relevant information is summarized in Section 2 of this Record of Decision.

1.3 TOPOGRAPHY AND SURFACE WATER HYDROLOGY

The former Production Area, including the Waste Storage Area, rests on a relatively level plain approximately 177 meters (580 feet) above mean sea level (MSL). The plain slopes from 183 meters (600 feet) above MSL along the eastern boundary of the FEMP site to 178 meters (585 feet) above MSL at the center of the Waste Storage Area, then drops off toward Paddys Run to an elevation of 168 meters (550 feet) above MSL. Drainage, including surface water, on the FEMP site is generally from west to east toward the Great Miami River. Operable Unit 1, however, slopes from east to west toward Paddys Run.

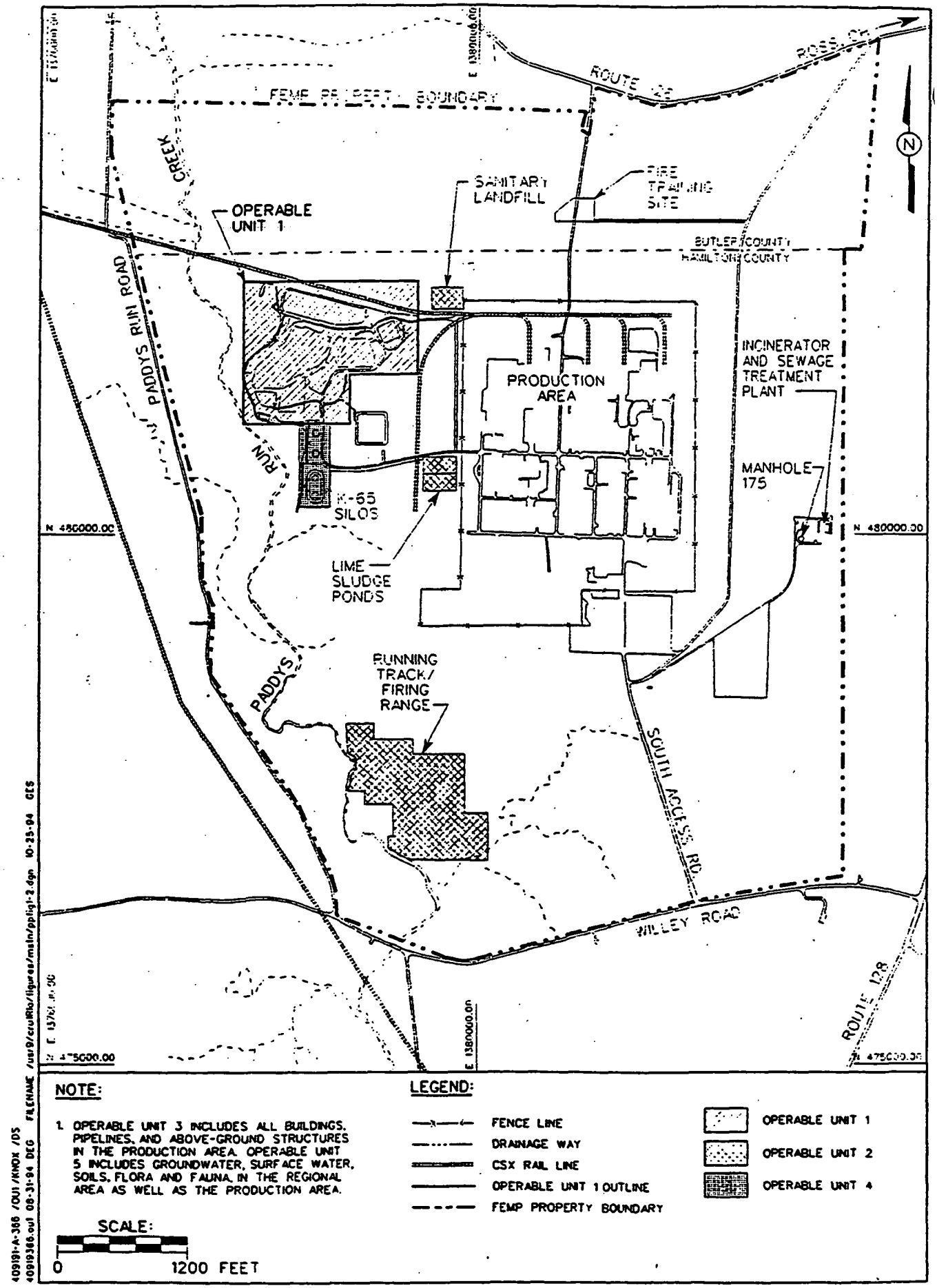

FIGURE 1-2 Location of Operable Unit 1 Within the FEMP

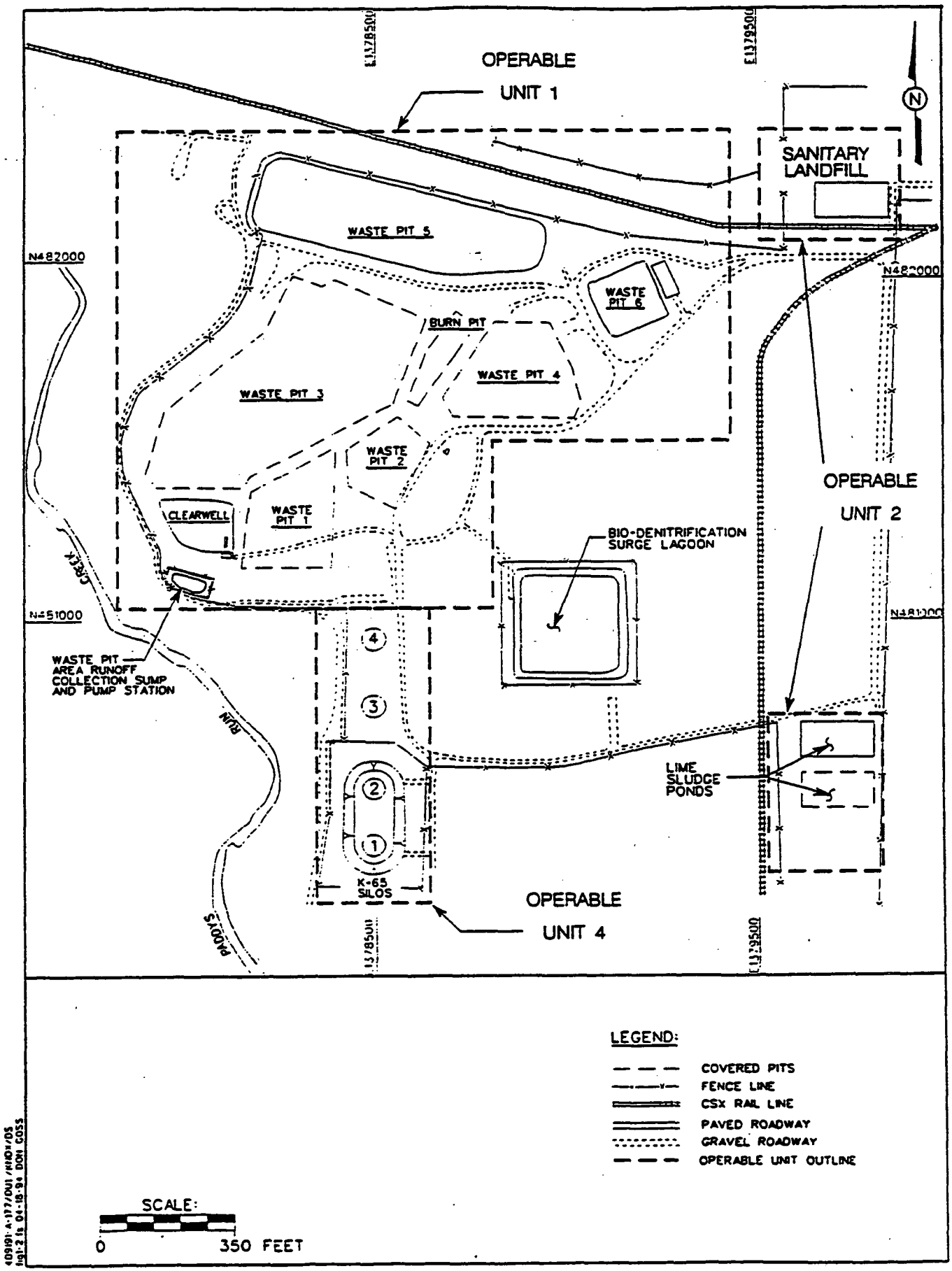

FIGURE 1-3 Waste Storage Area

Surface waters found on and adjacent to the FEMP site include the Storm Sewer Outfall Ditch, Paddys Run, and the Great Miami River. The Storm Sewer Outfall Ditch originates within the FEMP site and flows into an unnamed tributary toward the southwest where it enters Paddys Run, a tributary of the Great Miami River. The ditch historically has conveyed surface water runoff from the former Production Area directly into Paddys Run during periods of heavy precipitation, when the pumping capacity of the FEMP storm sewer lift station was exceeded.

Paddys Run originates north of the FEMP site, flows southward along the western boundary of the facility and Operable Unit 1 (see Figure 1-2), and enters the Great Miami River approximately 2.4 kilometers (1.5 miles) south of the southwest corner of the FEMP property. The stream is approximately 14 kilometers (8.8 miles) long and drains an area of approximately 40.9 square kilometers (15.8 square miles). Due to the highly permeable channel bottom, the stream loses water to the underlying Great Miami Aquifer. The stream is intermittent and is generally dry during the summer months. Paddys Run is a steep-sided stream, and its banks erode severely during high flow periods. In 1961 and 1962, the course of the stream was altered to prevent erosion into the Waste Storage Area (of which Operable Unit 1 is a component).

The Great Miami River is the main surface water feature in the vicinity of the FEMP site and is the receiving water body for a National Pollutant Discharge Elimination System (NPDES)-permitted discharge from the FEMP site. The river flows generally toward the southwest; however, near the FEMP site it flows to the east and south. It has a drainage area of approximately 8,702 square kilometers (3,360 square miles) at the Hamilton gauge, located about 16.1 kilometers (10 miles) upstream from the FEMP site NPDES discharge outfall. The river meanders with sharp directional changes over distances of less than 900 meters (2,952 feet). Directly east of the FEMP site, the river passes through a 180-degree curve known as the Big Bend. A 90-degree bend in the river also occurs near New Baltimore, approximately 3.2 kilometers (2 miles) downstream from the FEMP site discharge outfall.

1.4 GEOLOGY AND HYDROGEOLOGY

The FEMP overlies a 3.2- to 4.8-kilometer (2- to 3-mile) wide buried Pleistocene valley known as the New Haven Trough. This valley was formed (eroded) by the ancestral Ohio River during the Pleistocene period and was subsequently filled with glacial outwash materials that were, in turn, covered by glacial overburden as glaciers retreated across the area. The glacial overburden unit is largely clay-dominated till with variable portions of discontinuous coarse-grained fluvial and lacustrine strata. The glacial outwash deposits under the FEMP are a part of the Great Miami Aquifer, which is a widely distributed buried valley aquifer. In addition to surface water, the valley fill aquifer system is the major source of drinking water in the southwestern Ohio area.

Since the last retreat of continental glaciers, the streams in the area have removed much of the glacial overburden through natural erosion. Consequently, many streams are now in direct contact with the glaciofluvial outwash deposits that comprise the Great Miami Aquifer. Paddys Run is in contact with these deposits in its lower reaches. Streams in direct contact with the upper portion of the Great Miami Aquifer reaches allow surface water leakage directly to the aquifer.

The buried valley of the Great Miami Aquifer is about 0.8 to 3.2 kilometers (0.5 to 2 miles) wide and is U-shaped, having a broad, relatively flat bottom and steep valley walls. Contained within the sand and gravel that underlies much of the FEMP property is a relatively continuous, low-permeability clay interbed, about 1.5 to 4.5 meters (5 to 15 feet) thick. Where present, the interbed divides the aquifer into upper and lower sand and gravel units, referred to as the Upper Great Miami Aquifer and the Lower Great Miami Aquifer.

The glacial overburden that overlies the Great Miami Aquifer is comprised of a sequence of lacustrine and till strata, mostly clays and silts with some discontinuous coarse grained materials. Prior to construction of the waste pits, the in situ glacial overburden was comprised entirely of till; lacustrine strata was not deposited in the Waste Storage Area, although it is present under most of the FEMP site. The waste pits were constructed above and below the original grade of the dissected landscape. The material that was used to make the above-grade additions was obtained from excavations in the Waste Storage Area or elsewhere at the FEMP.

The glacial overburden exposed at the surface has a relatively low permeability. Therefore, most of the precipitation that falls on it is lost to evaporation and surface water runoff. Heterogeneous and asymmetric pockets of silty sand and gravel within the glacial overburden contain zones of perched groundwater. Perched groundwater is separated from the underlying aquifer by the surrounding, relatively impermeable clay/silt components of the overburden. These low-permeable units behave as an aquitard that can store groundwater but transmit it slowly downward from one more porous saturated zone to another. Depth to perched groundwater at the FEMP site ranges from 0.3 to 4.5 meters (1 to 15 feet) below the land surface. This measurement can fluctuate seasonally by up to 3 meters (10 feet) at a single location. The highest water levels occur during the early spring and the lowest during the late fall. Based on the conceptual model for groundwater flow, perched groundwater is likely discharging westward to the bank of Paddys Run and southward in the east-west drainageway.

1.5 ECOLOGY

Ecological communities on the FEMP site consist of grazed and ungrazed pastures, two pine plantations, deciduous woodlands, riparian woodlands, and the "reclaimed flyash pile area." The reclaimed flyash area coincides approximately with the South Field and the inactive Flyash Pile, which is considered to be a distinct habitat due to the unique plant and animal species composition. A total of 47 species of trees and shrubs, 190 species of herbaceous plants, 22 mammal species, 98 bird species, 10 species of amphibians and reptiles, 19 species of fish, 47 families of benthic macroinvertebrates, and 132 families of terrestrial invertebrates inhabit the FEMP site.

Typical grasses found on the FEMP site are red fescue, Kentucky bluegrass, timothy, and red top. Herbs include teasel, red and white clovers, and goldenrod. The dominant tree species in the pine plantations are the white and Austrian pine, with an occasional Norway spruce. Common trees in the deciduous woodlands are white ash, American elm, shagbark hickory, and slippery elm. Dominant tree species in the riparian woodlands are eastern cottonwood, hackberry, American elm, and box elder. The reclaimed flyash pile area is dominated by American elm, eastern cottonwood, and black locust.

Mammal species observed on the FEMP site include white-tailed deer, coyote, red fox, opossum, raccoon, groundhog, eastern cottontail, fox squirrel, and several species of bats. Common small mammals are the white-footed mouse, short-tailed shrew, meadow vole, meadow jumping mouse, and eastern chipmunk.

The most common birds breeding on the site include the mourning dove, American robin, blue jay, American crow, American goldfinch, northern bobwhite, and common grackle. Species occurring in the greatest density are the goldfinch, song sparrow, and robin. Raptor species observed on-site are the red-shouldered hawk, Cooper's hawk, red-tailed hawk, and American kestrel. In addition, the eastern screech owl and great horned owl have been observed in the vicinity of the FEMP site.

Amphibians and reptiles that occur on the FEMP site include the American toad, spring peeper, eastern box turtle, and snapping turtle. Several species of snakes also occur on property, including the eastern garter snake, Butler's garter snake, black rat snake, northern water snake, and the queen snake.

Fish species in Paddys Run are stonerollers, bluntnosed minnows, and orange throat darters.

Approximately 130 insect families from 15 orders are represented in FEMP site habitats. Leaf hoppers are abundant in all FEMP site habitats. Less abundant groups include short-horned grasshoppers, leaf beetles, springtails, fruit flies, dark-winged fungus gnats, ants, bees, and wasps.

Operable Unit 1 is a previously disturbed area with extremely limited ecology, consisting primarily of introduced grassland.

2.0 SITE AND OPERABLE UNIT 1 HISTORY AND ENFORCEMENT ACTIVITIES

2.1 FEMP HISTORY AND ENFORCEMENT ACTIVITIES

In May 1951, the Atomic Energy Commission, predecessor to the U.S. Department of Energy (DOE), initiated construction operations at the Feed Materials Production Center (FMPC). Full-scale production was initiated after pilot operations began in 1952 and continued until July 1989. Production peaked in 1960 at approximately 12,000 metric tons (13,288 tons) of uranium per year. A decline in product demand began in 1964 and reached a low in 1975 of about 1,230 metric tons (1,355 tons). In the early 1980's, production increased significantly, resulting in a major facilities restoration program. Production ceased in the summer of 1989 and plant resources were directed toward environmental remediation activities. The facility was formally closed by congressional authorization in June 1991. To identify the environmental nature of the site's new mission, the name of the facility was changed to the Fernald Environmental Management Project (FEMP).

On March 9, 1985, the U.S. Environmental Protection Agency (EPA) issued a Notice of Noncompliance to the FMPC, identifying EPA's concerns about environmental impacts associated with the facility's past and ongoing operations. On July 18, 1986, a Federal Facility Compliance Agreement (FFCA) was approved, detailing the actions to be taken by the FMPC to assess and investigate the environmental impacts. As required by the FFCA, a Remedial Investigation and Feasibility Study (RI/FS) was initiated in July 1986, pursuant to 42 U.S.C. 9601 et. seq., to meet Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements.

Production operations were halted in 1989, due to a declining defense demand for uranium. Available resources were redirected to focus on environmental restoration of the facility. Potential impacts from past releases and continued releases resulting from the accumulation of a large inventory of uranium process materials and mixed wastes at the FEMP prompted concern relative to potential impacts on human health and the environment.

In November 1989, the EPA placed the FEMP on the National Priorities List (NPL). Inclusion on the NPL reflects the relative importance placed by the federal government on ensuring the expedient

completion of the remedial investigations and resulting cleanup actions. On April 9, 1990, the EPA and the DOE entered into a Consent Agreement that became effective on June 29, 1990; the Consent Agreement identified five operable units for response actions and revised the deadlines for the RI/FS. The Consent Agreement between the EPA and the DOE called for cleanup actions to address the identified concerns at the FEMP. The Consent Agreement, as amended on September 20, 1991 and effective December 19, 1991 (Amended Consent Agreement), among other things, further revised the schedules for the operable units.

The term "operable unit" identifies a grouping of environmental issues at a cleanup site. The FEMP Operable Units, for which discrete studies and reports are being completed, are defined as follows:

- Operable Unit 1 - Waste Pits 1 through 6, the Burn Pit, the Clearwell, and berms, liners, and soil within the operable unit boundary.
- Operable Unit 2 - Two flyash piles, other South Field disposal areas, two lime sludge ponds, solid waste landfill, berms, liners, and soil within the operable unit boundary.
- Operable Unit 3 - Former Production Area and production associated facilities and equipment (includes all above- and below-grade improvements) including, but not limited to, all structures, equipment, utilities, drums, tanks, solid waste, waste, product, thorium, effluent lines, the K-65 transfer line, wastewater treatment facilities, fire training facilities, scrap metal piles, feedstocks, and coal pile.
- Operable Unit 4 - Concrete Storage Silos 1 through 4, berms, decant tank system, and soil within the operable unit boundary.
- Operable Unit 5 - Environmental media, including groundwater, surface water, and soil not included in Operable Units 1 through 4.

Remediation of the FEMP is being conducted under CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300.

Following the issuance of the Record of Decision for the last of the five operable units, the Amended Consent Agreement provides for a Comprehensive Site-Wide Operable Unit (Operable Unit 6). If needed, Operable Unit 6 will be created to perform a final assessment from a site-wide perspective to ensure that ongoing or planned remedial actions identified in the Records of Decision for the five operable units will provide a comprehensive remedy for the FEMP site which is protective of human health and the environment. If it is determined that the remedial actions specified in the Record of Decisions for Operable Units 1 through 5 are not protective from a site-wide perspective, a feasibility study would be initiated. The Record of Decision for the Comprehensive Site-Wide Operable Unit would be issued following the Record of Decision for the last of the other five operable units.

2.2 OPERABLE UNIT 1 HISTORY

2.2.1 Description of Operable Unit 1 Components

Beginning in 1952, the waste pits were constructed to store slurried or dry residuals resulting from various stages of uranium processing. Historically, the wastes generated at the FEMP facility, as well as some wastes shipped from other DOE facilities, were disposed on the property. Table 2-1 provides a summary of the physical features and operating periods of the Waste Storage Area, while a summary of waste pit information is provided below.

Waste Pit 1

Waste Pit 1 was constructed in 1952 and is considered a dry pit, since the waste slurries other than effluent from the general sump were filtered or calcined to remove water before they were placed in the pit. This waste pit received primarily depleted magnesium fluoride slag, and depleted residues with smaller amounts of trailer cake, uranyl ammonium phosphate (UAP) filtrate, graphite/ceramics, and general sump sludge. It was, however, used as a clearwell for liquids removed from Waste Pit 2 in 1958 and 1959. Waste Pit 1 was closed and covered with clean fill in 1959, and is currently classified as a Resource Conservation and Recovery Act (RCRA) Solid Waste Management Unit (SWMU).

TABLE 2-1

WASTE UNIT CHARACTERISTICS

Waste Unit	Operation Period	Cover Type	RCRA Status	Liner Type	Est. Waste[a] Volume (CY)	Est. Total[a] Volume (CY)	Approx. Depth (feet)	Surface Area (acre)
Pit 1	1952-1959	Soil	SWMU[b]	Clay[c]	48,500	68,400	29.5	2.11
Pit 2	1957-1964	Soil	SWMU[b]	Clay[c]	24,200	37,400	23.5	0.90
Pit 3	1958-1977	Soil	SWMU[b]	Clay[c]	204,100	307,500	42	5.00
Pit 4	1960-1986	RCRA Cap	HWMU[d]	Clay[c]	55,100	72,800	32	1.50
Pit 5	1968-1983	Water	HWMU[d]	EPDM[e]	97,900	97,900	29	3.74
Pit 6	1979-1985	Water	SWMU[b]	EPDM[e]	9,600	9,600	20	0.74
Burn Pit	1957-1968	Soil	SWMU[b]	None	30,300	30,300	26	0.50
Clearwell	1959-1987	Water	SWMU[b]	Clay[c]	3,700	4,300	12	0.65

[a] From Section 1.0 of the Final Remedial Investigation Report for Operable Unit 1 (DOE 1994b)
[b] RCRA Solid Waste Management Unit
[c] Native clay liner
[d] RCRA Hazardous Waste Management Unit
[e] 60-mil thick Royal Seal ethylene propylene diene monomer elastomeric membrane

SOURCE: Final Remedial Investigation Report for Operable Unit 1 (DOE 1994b).

Waste Pit 2

In 1957, Waste Pit 2 was constructed northeast of Waste Pit 1. Waste Pit 2 is also considered a dry pit and received primarily trailer cake and general sump sludge with smaller amounts of UAP filtrate, raffinate, depleted residues and graphite/ceramics. Waste Pit 2 was also used as a settling basin for neutralized raffinate during 1958 and 1959, prior to completion of Waste Pit 3, because the drying equipment available at that time could not process all of the raffinate produced by plant operations. Waste Pit 2 was closed and covered with clean fill in 1964, and is currently classified as a RCRA SWMU.

Waste Pit 3

Waste Pit 3 was placed in service in December 1958, and was the first waste pit built specifically for settling solids from liquid waste streams. Primarily, lime-neutralized raffinate slurries, as well as contaminated storm water from the Burn Pit, were pumped to Waste Pit 3. After Waste Pit 2 was filled, Waste Pit 3 received general sump sludge, raffinate, trailer cake and slag leach with lesser amounts of water treatment sludge, and thorium wastes. Starting in December 1958, lime sludge from the Water Treatment Plant was added to supplement the lime used for raffinate neutralization. Also, large quantities of neutralized residues from acid leaching of uranium-bearing magnesium fluoride slag were pumped to Waste Pit 3 during the late 1960s, prior to completion of Waste Pit 5. In 1973, fill material, including filter cake, slag leach residue, lime sludge, and flyash, was placed in Waste Pit 3, and construction activities were initiated to cover this waste pit with soil. Waste Pit 3 covering activities were completed in 1977; it is currently classified as a RCRA SWMU.

Waste Pit 4

Waste Pit 4 was constructed in 1960 and received solid wastes that included trailer cake, depleted slag, and depleted residues, with lesser amounts of thorium wastes and graphite/ceramics, as well as unknown quantities of noncombustible wastes. The process residues included filter sludges, raffinates, graphite, magnesium fluoride slag, and pyrophoric uranium-bearing materials. Thorium metal and residues were hauled to the waste pits in drums and were placed in Waste Pit 4, when additional metal recovery was not economically feasible. At least 100 drums were deposited on the west side of this waste pit. Waste Pit 4 also received noncombustible trash, including cans, concrete,

asbestos, and construction rubble. Lime was occasionally added to standing water within Waste Pit 4 for uranium precipitation prior to the transfer of liquids to Waste Pit 5 for settling and discharge. Barium chloride-contaminated floor sweepings were also disposed in Waste Pit 4 from 1980 to 1983. Disposal activities in Waste Pit 4 were terminated in 1985. Waste Pit 4 is currently classified as a RCRA Hazardous Waste Management Unit (HWMU) and has undergone interim closure. Waste Pit 4 was classified as a HWMU in 1984 because, at that time, it was believed that the pit contained characteristic barium waste, since this waste pit was used to dispose of barium chloride salts from May 1981 to April 1983.

The waste pit was closed in 1986 and cover activities started. During interim closure, the pit was covered will fill material, clay, and a polyethylene liner. Final closure documentation of Waste Pit 4 will be completed in conjunction with remedial actions under CERCLA.

Waste Pit 5

Waste Pit 5 was constructed and placed into service in 1968. Waste Pit 5 served as a settling basin for slurries in the form of general sump sludge, raffinate, slag leach, water treatment sludge, and thorium waste. Lime sludge was added to this waste pit to supplement the lime used to neutralize the raffinate and heat treatment quench water was discharged directly to Waste Pit 5. The supernatant and sludges produced by the co-precipitation of thorium wastes with barium carbonate and aluminum sulfate, and by the precipitation of uranium with calcium oxide, were deposited in Waste Pit 5. The discharge of slurried waste materials into Waste Pit 5 was stopped in 1983 and use of this waste pit as a settling basin was discontinued in 1987. Waste Pit 5 is currently covered by water, and is classified as a RCRA HWMU.

Waste Pit 5 was declared a HWMU in 1991 because, at that time, it was believed that it had received wastewater containing solvent concentrations in excess of 25 ppm spent 1,1,1-trichloroethane (TCA), an F-listed hazardous waste under RCRA. This designation was re-evaluated, and it was found that discharged spent TCA concentrations were less than 25 ppm, thus qualifying Waste Pit 5 for the wastewater exemption under State of Ohio regulations. Accordingly, the designation of Waste Pit 5 as a HWMU, managing listed wastes, has been withdrawn. It is still being formally considered a

HWMU, based on the possibility that it contains a characteristic hazardous waste. Waste Pit 5 material will be sampled and analyzed after treatment to ensure compliance with disposal facility waste acceptance criteria. A final characterization of the waste will be completed at that time.

Waste Pit 6

Waste Pit 6 was constructed from September 1978 to June 1979, and received only depleted wastes in the form of depleted slag and depleted residues. Extrusion residue and heat treatment quench water were also deposited in Waste Pit 6. Use of Waste Pit 6 ceased in 1985. Waste Pit 6 is currently covered by water, and is classified as a RCRA SWMU.

Burn Pit

The clay used to line Waste Pits 1 and 2 during their construction was obtained from an area immediately northeast of Waste Pit 2, which at that time was called the clay pit. A gravel dumping pad was eventually built up on the north end of the resulting excavation so that trucks could back into the deepest part of the waste pit to dump combustible wastes. Thus, the waste pit became known as the Burn Pit. Although records were not kept on all of the materials or amounts deposited, it is known that the Burn Pit was used primarily to burn combustible materials such as laboratory chemicals; pyrophoric and reactive chemicals; oils; low-level contaminated combustible material, such as pallets and skids; and cafeteria debris. In addition, several materials were deposited directly into the Burn Pit, including cans, bottles, general refuse, and laboratory glassware. The Burn Pit was filled in 1968 during the construction of Waste Pit 5, and is currently classified as a RCRA SWMU.

Clearwell

The Clearwell was constructed in 1959 during Waste Pit 3 construction activities and received surface water runoff from the waste pits and surface liquid (supernatant) from Waste Pits 3 and 5. It acted as a final settling basin prior to periodic discharge to the Great Miami River. The Clearwell is currently classified as a RCRA SWMU.

2.2.2 Investigative Studies

Environmental monitoring and sampling of the waste pits and soil, surface and groundwater, sediment, and air associated with Operable Unit 1 occurred in several programs beginning in 1984. These investigations include the Characterization Investigation Study in 1986-1988, the Remedial Investigation/Feasibility Study in 1991 and 1992, the ongoing FEMP Environmental Monitoring Program, the site's RCRA Groundwater Study that began in 1985, and other special site programs undertaken to characterize the physical, chemical, and radiological properties of the site. These programs are discussed in detail in Section 2 of the Final Remedial Investigation Report for Operable Unit 1 and itemized in Table 2-1 of that report.

In addition, operating records, waste inventories, drawings, other site documentation, and information obtained from long-time plant employees, were thoroughly reviewed to learn more about waste pit contents and to provide a basis for comparing the results of the sampling programs.

2.3 OPERABLE UNIT 1 RESPONSE ACTIONS

2.3.1 Removal Actions

The Amended Consent Agreement also provided for the implementation of removal actions intended to address site conditions that pose an imminent threat to public health and welfare or the environment. These actions were initiated to accelerate cleanup activities prior to final remedial actions. The following five removal actions have been conducted within Operable Unit 1:

- Removal Action No. 2: Waste Pit Area Runoff Control
- Removal Action No. 6: Control of Exposed Material in Pit 6
- Removal Action No. 11: Waste Pit 5 Experimental Treatment Facility
- Removal Action No. 18: Control of Exposed Material in Pit 5
- Removal Action No. 22: Waste Pit Area Containment Improvement

Removal Action No. 2: Waste Pit Area Runoff Control

This removal action can be broadly defined as management of radioactively-contaminated stormwater runoff from Operable Unit 1. Runoff from the concrete storage silos in Operable Unit 4 also was included in this removal action. The eight-phase removal action was completed in mid-1992. This

removal action continues to provide runoff control and collection. The potentially contaminated storm water runoff is collected and pumped to the BioSurge Lagoon and the effluent treatment system before discharge to the Great Miami River. Thus, the potential for release of contaminants to the environment has been reduced.

Removal Action No. 6: Control of Exposed Material in Pit 6

This removal action involved redistributing exposed soil and waste material such that all solids are below the water level in Waste Pit 6 to reduce particulate emissions to the environment. Field activities for the removal action were completed on December 19, 1990. A procedure was jointly agreed to by DOE and EPA to ensure that none of the material will be exposed. This ongoing procedure provides that the water level on the waste pit will be maintained (i.e., lowered after heavy rainfall or increased to compensate for losses, such as those due to evaporation).

Removal Action No. 11: Waste Pit 5 Experimental Treatment Facility

Built in 1984, the Experimental Treatment Facility (ETF) was designed to test the feasibility of solar drying sludge material. However, in 1988, high winds removed the plastic roof from the facility and caused some sludge to be deposited on the surrounding soils. This removal action involved dismantling the ETF, removing the surrounding soils to prevent any potential spread of contamination beyond the immediate area, and packaging the waste materials generated during the removal action for storage pending final disposition. Field activities were completed in March 1992. All potentially-contaminated material was packaged and stored temporarily, pending final disposition. The demolished site has been backfilled and capped with clay.

Removal Action No. 18: Control of Exposed Material in Pit 5

This removal action involved moving the exposed soil and waste material, built up in the east end of the pit, to below the waterline to prevent the release of airborne contaminants. The dredged materials were moved to the west end of the pit and redistributed. Activities for this removal action were completed in December 1992.

Removal Action No. 22: Waste Pit Area Containment Improvement

This removal action involved minimizing the potential for wind and water erosion of contaminated materials by seeding exposed and stressed surfaces in the Operable Unit 1 study area. Field activities for this removal action were completed on June 30, 1993.

2.3.2 Waste Pit 4 Interim Closure

Waste Pit 4 underwent interim RCRA closure, as certified by the Ohio Environmental Protection Agency in 1989, with final closure deferred to the CERCLA program. Interim closure activities included covering the waste pit with soil and rocks overlaid with 0.6 meters (2 feet) of clay, compacted to 1 x 10^{-7} centimeters per second (4 x 10^{-8} inches per second) permeability, and covered with a 45- millimeter (1/8-inch) thick reinforced Hypalon liner. During this interim closure period, Waste Pit 4 is monitored with groundwater wells and weekly inspections. There is a maintenance plan to repair deficiencies noted during inspections. Final closure of Waste Pit 4 will be completed in conjunction with remedial actions under CERCLA.

3.0 COMMUNITY PARTICIPATION

HIGHLIGHTS OF COMMUNITY PARTICIPATION IN THE OPERABLE UNIT 1 RI/FS

The U.S. Department of Energy's (DOE's) community relations program, when initiated in 1985, focused on public information activities. A variety of forums were used to provide information to the community, including a periodic newsletter, regular community meetings, and other availability sessions. Other activities included site tours, open houses, a speakers bureau, and development of fact sheets about the Fernald Environmental Management Project (FEMP) site. Several reading rooms, which later were consolidated into one facility located near the FEMP site, were opened, and contain information about all aspects of the Remedial Investigation and Feasibility Study. In 1990, DOE established an Administrative Record for the site; it is located at the Public Environmental Information Center, in the JAMTEK Building at 10845 Hamilton-Cleves Highway, Harrison, Ohio, 45030. A copy of the Administrative Record also is maintained at the U.S. Environmental Protection Agency's (EPA's) Region V offices in Chicago at 77 W. Jackson Blvd., Chicago, Illinois, 60604.

DOE has implemented a public participation program at the FEMP site, which aims to involve community members and other interested parties in decision making at the site. This public involvement program consists of three elements:

1. Public information activities
2. Management involvement
3. Person-to-person communication

These efforts, in concert with the community relations activities required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), reflect DOE's intent to fully involve the community in decision making.

As part of community involvement at FEMP site, Operable Unit 1 managers decided to provide the public with maximum opportunities for commenting on proposed actions relating to the remediation of

the Waste Pit Area. The strategy consisted of a combination of written information and public workshops to solicit public input.

The first workshop was held December 7, 1993, to follow up on the October 1993 submittal of the Draft Remedial Investigation Report for Operable Unit 1 to EPA and Ohio Environmental Protection Agency (Ohio EPA). The workshop focused on these issues:

- What is in the waste pits?
- What are the contaminants, and where are they going?
- What are the cleanup options being considered?
- How can the public become involved in decision making?

The second informational workshop was held March 29, 1994, several weeks after the March 4, 1994 submittal of the Draft Feasibility Study and Proposed Plan for Operable Unit 1 to EPA and Ohio EPA. The topics addressed in this workshop included:

- How does DOE propose to clean up the waste pits and how did DOE arrive at its recommendation?
- What are the risks of this proposed action?
- How can the public become involved in decision making?

At the informational workshop held on March 29, 1994, members of the public focused their questions and concerns on transportation issues. Therefore, DOE offered a separate workshop on August 9, 1994, to address transportation issues. An advertisement to announce the workshop was published in the *Harrison Press* newspaper on August 3, 1994, and in the *Cincinnati Enquirer* and the *Journal News* newspapers on August 7, 1994. Additionally, flyers publicizing the August 9 workshop were mailed to approximately 300 members of the public listed on the Fernald mailing list. Topics addressed in the August 9 workshop included:

- What are the transportation alternatives?
- What are the routes and logistics?
- What emergency response/notification plans are in place?
- How can the public become involved in the decision-making?

At the August 9 workshop, stakeholders requested an opportunity to discuss their transportation concerns with representatives from CSX, a railway transport company. Therefore, a public availability session was held on August 16, 1994. Again, approximately 300 members of the public were mailed invitation letters.

In addition to the public workshops sponsored by the DOE, Ohio EPA held a local availability session on August 17, 1994. Members of the Fernald Citizens Task Force and representatives from the local citizens group, Fernald Residents for Environmental Safety and Health (FRESH) were invited to attend this session to ask questions about the proposed plan for the cleanup of Operable Unit 1. Representatives from EPA and Ohio EPA were available to answer questions and address concerns from approximately 12 people who attended the session. Announcements about this availability session were made at the prior public workshops sponsored by the DOE, the monthly FRESH meeting, and the monthly Fernald Citizens Task Force meeting.

The Final Remedial Investigation Report for Operable Unit 1, the Final Feasibility Study for Operable Unit 1, and the Proposed Plan are available to the public in the Administrative Record locations at EPA Region V offices in Chicago and at the Public Environmental Information Center. The notice of availability for public inspection of the Draft Remedial Investigation Report for Operable Unit 1 was published October 20, 1993, in the *Cincinnati Enquirer*, the *Journal News*, and the *Harrison Press*. The Final Remedial Investigation Report for Operable Unit 1 was published in August 1994. The notice of availability for the Draft Feasibility Study and the Proposed Plan for Operable Unit 1 was published March 9, 1994, in the *Cincinnati Enquirer*, the *Journal News*, and the *Harrison Press*. The Final Proposed Plan was published in August 1994; the notice of availability was published August 10, 1994, in the *Cincinnati Enquirer*, the *Journal News* and the *Harrison Press*. The Final Feasibility Study for Operable Unit 1 was published in October 1994.

A 30-day public comment period was held from August 10, 1994, to September 8, 1994, inclusive. In addition, a public meeting was held on August 23, 1994. At this meeting, representatives from DOE, EPA and Ohio EPA answered questions about the remedial alternatives under consideration for Operable Unit 1. A response to comments received during this period is included in the

Responsiveness Summary, which is part of this Record of Decision. This decision document presents the selected remedial action for Operable Unit 1 at the Fernald Environmental Management Project in Fernald, Ohio, chosen in accordance with CERCLA and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan.

The Proposed Plan was submitted to the Tooele County, Utah, commissioners and to the State of Utah (the state where the representative permitted commercial disposal facility is located). The Proposed Plan also was distributed to the Nevada public including the State of Nevada and the local steering committee through the DOE Nevada organization. No comments were received.

In addition to traditional public involvement activities, DOE assisted in the development of the Fernald Citizens Task Force, an independent, site-specific advisory board, in August 1993. The mission of the Task Force is to advise DOE, EPA, and Ohio EPA on environmental restoration and waste management issues at the FEMP site. Specifically, the group will consider, and make recommendations on, the following environmental issues:

- Future use of the site
- Cleanup objectives
- Waste disposal options
- Cleanup priorities

The Task Force determined at an early stage that it would address future land use of the FEMP site as its first priority. Representatives of DOE, EPA, and Ohio EPA sit on the Task Force as ex officio members; all three agencies have agreed to carefully consider the Task Force's recommendations in their decision-making process and to incorporate Task Force recommendations where practicable.

DOE shall continue to offer opportunities for public involvement throughout the Remedial Design and Remedial Action phases of the cleanup at the FEMP.

4.0 SCOPE AND ROLE OF OPERABLE UNIT 1 REMEDIAL ACTION

The primary focus of remedial action for Operable Unit 1 is the permanent disposition of contaminated contents of the six waste pits, the Clearwell, and the Burn Pit. The purpose of the remedial action is to prevent unacceptable current or future exposure to the contaminated materials of Operable Unit 1 and to mitigate the release of hazardous substances into the environment. The selected remedy addresses the principal threats associated with the contaminated materials in Operable Unit 1. However, the remedial action fits into a broader, more comprehensive scheme of remediation for the site as a whole. As previously discussed in Section 2.1, the Fernald Environmental Management Project (FEMP) site and associated environmental issues have been segmented into five operable units. The operable unit concept at the FEMP site involves grouping waste areas or related environmental concerns in a manner that will expedite completion of the Comprehensive Environmental Response, Compensation, and Liability Act remediation process. The five FEMP operable units are:

- Operable Unit 1 - Waste Pit Area
- Operable Unit 2 - Other Waste Units
- Operable Unit 3 - Production Area
- Operable Unit 4 - Silos 1 through 4
- Operable Unit 5 - Environmental Media

Separate Remedial Investigation/Feasibility Study documentation and Records of Decision are being issued for Operable Units 1 through 5. A sixth operable unit, known as the Comprehensive Site-Wide Operable Unit, may be created pursuant to the provisions of the Amended Consent Agreement. If needed, Operable Unit 6 will be created to perform a final assessment from a site-wide perspective to ensure that ongoing or planned remedial actions identified in the Records of Decision for the five operable units will provide a comprehensive remedy for the FEMP site which is protective of human health and the environment. If it is determined that the remedial actions specified in the Record of Decisions for Operable Units 1 through 5 are not protective from a site-wide perspective, a feasibility study will be initiated. If deemed appropriate, the Record of Decision for the Comprehensive Site-Wide Operable Unit will be issued following the Record of Decision for the last of the other five operable units.

The schedule for submittal of Draft Records of Decision to the EPA for each operable unit is as follows:

- Operable Unit 3 Interim Record of Decision: July 22, 1994 (actual signature date)
- Operable Unit 4: August 8, 1994
- Operable Unit 1: November 4, 1994
- Operable Unit 2: January 5, 1995
- Operable Unit 5: July 3, 1995
- Operable Unit 3 Final Record of Decision: April 2, 1997

5.0 SUMMARY OF OPERABLE UNIT 1 CHARACTERISTICS

5.1 INTRODUCTION

Section 5 summarizes characterization data regarding contaminants within the waste units of Operable Unit 1. Contaminant sources considered in this section include Waste Pits 1 through 6, the Burn Pit, and the Clearwell. This discussion builds on the general overview of Operable Unit 1, presented in Sections 1 and 2. "Overview" information to this discussion includes:

- Section 1.1, which includes geographical information, including natural resource use, adjacent land use, location in a floodplain, and distance to nearby populations.
- Section 1.2, which includes topographical information and general surface and subsurface features.
- Section 2.2, which describes and provides a history of each waste pit included in Operable Unit 1.

5.2 KNOWN OR SUSPECTED SOURCES OF CONTAMINATION

The principal source of contamination within Operable Unit 1 is the contents of the waste pits, the Clearwell, and the Burn Pit. As discussed in Section 2 of this Record of Decision and below, these waste units contain radiological, organic, and inorganic contaminants associated with the wastes that were placed in the waste pits during production.

5.2.1 Waste Pit Contents

The waste pits in Operable Unit 1 were used to store the following materials:

- Waste Pit 1 primarily received depleted magnesium fluoride slag and depleted residues, with smaller amounts of trailer cake, uranyl ammonium phosphate (UAP) filtrate, graphite/ceramics, and general sump sludge.
- Waste Pit 2 primarily received trailer cake and general sump sludge, with smaller amounts of UAP filtrate, raffinate, depleted residues, and graphite/ceramics. Waste Pit 2 was also used as a settling basin for neutralized raffinate prior to the completion of Waste Pit 3.

- Waste Pit 3 primarily received lime-neutralized raffinate slurries, as well as contaminated storm water from the general sump sludge, trailer cake, slag leach with lesser amounts of water treatment sludge, and thorium wastes.

- Waste Pit 4 primarily received solid waste that included trailer cake, depleted slag and depleted residues with lesser amounts of thorium wastes, and graphite/ceramics; as well as process residues including filter sludges, raffinates, graphite, magnesium fluoride slag; and pyrophoric uranium-bearing materials. Waste Pit 4 also received noncombustible trash, including cans, concrete, asbestos, and construction rubble.

- Waste Pit 5 primarily received raffinate, slag leach, water treatment sludge, thorium waste, supernatant and sludges produced by the co-precipitation of thorium waste with barium carbonate and aluminum sulfate, and the precipitation of uranium with calcium oxide.

- Waste Pit 6 received depleted wastes in the form of depleted slag and depleted residues. Extrusion residue and heat treatment quench water were also deposited in Waste Pit 6.

- The Clearwell primarily received surface water runoff from the waste pits and surface liquid supernatant from Waste Pits 3 and 5.

- The Burn Pit was used to burn combustible materials such as laboratory chemicals; pyrophoric and reactive chemicals; oils; low-level contaminated combustible material such as pallets and skids; and cafeteria debris. Cans, bottles, general refuse, and laboratory glassware were also deposited directly into the Burn Pit.

The volume of waste in the pits and the total volume of waste pit material (including covers, liners, etc.) are presented in Table 2-1 of this Record of Decision.

The majority of the hazardous constituents identified during characterization of Operable Unit 1 were introduced to the plant in feed materials during the refining process. These materials were raw feedstock from which uranium metal and thorium products were separated in plant operations.

The Characterization Investigation Study (CIS) and the Remedial Investigation/Feasibility Study (RI/FS) programs sampled the contents of the waste pits to identify the radiological and chemical constituents in the waste pits. An examination of the waste pit contents, derived from process knowledge and discussed in Section 1 of the Final Remedial Investigation Report for Operable Unit 1, indicates consistency between process knowledge and sampling among the types of metal constituents

found in the waste pits. The sampling results provide a pit-by-pit "profile" of contaminants. (Refer to Figure 1-2 in this Record of Decision for a map of Operable Unit 1 and to Section 4 of the Final Remedial Investigation Report for Operable Unit 1 for a thorough discussion of these results.)

5.2.2 Radiological Characteristics

Radiological contaminants are presented in Table 5-1 of the Record of Decision. (All contaminants that were later identified to be Constituents of Concern (COCs) in environmental media are identified in Table 5-1.) Detailed CIS and RI/FS radiological analytical results are presented in Appendices A and B of the Final Remedial Investigation Report for Operable Unit 1 and are summarized in Section 4 of that report.

The predominant radiological contaminants in all waste pits are uranium-238, uranium-234, and thorium-230, all of which are part of the uranium-238 decay series. Technetium-99 and strontium-90 are also present, although to a lesser extent. Results of both sampling programs indicate that depleted and natural uranium are present in the waste pits. This is consistent with process knowledge; very limited quantities of enriched uranium were produced at the FEMP.

5.2.3 Chemical Characteristics

Inorganic metal and organic chemicals were identified in waste pit samples. Table 5-1 presents data on selected metal contaminants--antimony, beryllium, cadmium, chromium, manganese, mercury, molybdenum, nickel, silver, thallium, uranium, and vanadium. Waste Pits 3, 4, and 5, and the Clearwell contain the highest concentrations of inorganic constituents. Although not shown on Table 5-1, all of the waste pits contain high levels of magnesium, consistent with the disposal of large quantities of magnesium fluoride slag. One of the primary sources of metals found in the waste pits is raffinates, a residual product from processing concentrated ores.

The presence of all organic chemicals is considered to be waste-related. Organic contaminants, identified in Table 5-1, include dioxins, furans, several semivolatile organic compounds, polychlorinated biphenyls (PCBs), tetrachloroethene, and vinyl chloride. These constituents are not normally present in the soils, groundwater, or surface water; there are, therefore, no background

TABLE 5-1

PIT WASTE CONCENTRATION RANGES FOR ENVIRONMENTAL MEDIA CONTAMINANTS OF CONCERN[a]

Contaminant	Background Concentration	Waste Pits Concentration
Radionuclides	**pCi/g**	**pCi/g**
Cesium-137	<0.01	Background to 450
Neptunium-237	<0.01	Background to 46
Plutonium-238	<0.01	Background to 4.4
Plutonium-239/240	<0.01	Background to 15
Radium-228	1.25	Background to 440
Strontium-90	0.5	Background to 140
Technetium-99	<0.9	Background to 3,000
Thorium-230	1.85	Background to 12,000
Thorium-232	1.24	Background to 840
Uranium-234	0.94	Background to 18,000
Uranium-235/236	0.13	Background to 8,800
Uranium-238	0.92	Background to 42,000
Inorganics	**mg/kg**	**mg/kg**
Antimony	6.7	Background to 320
Beryllium	0.62	Background to 27
Cadmium	0.59	Background to 39
Chromium	19	Background to 1,500
Manganese	922	Background to 20,000
Mercury	0.29	Background to 5.1
Molybdenum	2.7	Background to 1,400
Nickel	28.5	Background to 1,700
Silver	2.2	Background to 760

Contaminant	Background Concentration	Waste Pits Concentration
Inorganics (Continued)	**mg/kg**	**mg/kg**
Thallium	0.43	Background to 110
Total Uranium	3.68	Background to 120,000
Vanadium	36.9	Background to 9,700
Organics		**µg/kg**
Benzo(a)anthracene	N/A	Undetected to 130,000
Benzo(a)pyrene	N/A	Undetected to 120,000
Benzo(b)fluoranthene	N/A	Undetected to 130,000
Benzo(k)fluoranthene	N/A	Undetected to 75,000
Chyrsene	N/A	Undetected to 100,000[b]
Dioxins	N/A	Undetected to 45.9[b]
Furans	N/A	Undetected to 14[b]
Indeno(1,2,3-cd)pyrene	N/A	Undetected to 46,000
PCBs	N/A	Undetected to 13,000
Tetrachoroethene	N/A	Undetected to 29,000
Vinyl chloride	N/A	Undetected to 1,900

[a] Only concentration ranges for chemicals determined to be Contaminants of Concern in environmental media are shown on this table.
[b] Concentration range is for individual chemicals or congeners.

N/A - Not Applicable

SOURCE: Tables 4-1.1A to 4-1.8C, Final Remedial Investigation Report for Operable Unit 1, (DOE, 1994b).

concentrations for these constituents. Organic contamination is discussed in Section 4 of the Final Remedial Investigation Report for Operable Unit 1.

PCBs are generally distributed throughout the waste pits, but are present only in small concentrations in Waste Pit 6 and the Clearwell. Low concentrations of polychlorinated benzo-p-dioxins (dioxins) and dibenzofurans (furans) were identified in Waste Pits 2, 3, and 4; they are the by-products of high-temperature processes such as oxidation of PCB-contaminated oil. Waste Pits 5 and 6 and the Clearwell were not analyzed for dibenzofurans. Tetrachloroethene was found in Waste Pits 1, 2, 3, 4, 6, and the Burn Pit, while vinyl chloride was identified in Waste Pits 2 and 4, and the Burn Pit; these constituents were found in low concentrations.

5.3 OVERVIEW OF THE NATURE AND EXTENT OF CONTAMINATION

This section summarizes the nature and extent of contamination within environmental media in Operable Unit 1. These environmental media include surface and vadose zone soil, groundwater, surface water and sediment, and air. This section also contains an overview of the levels of direct radiation associated with the current conditions within Operable Unit 1. Additional detail on these conditions is provided in Section 4 of the Final Remedial Investigation Report for Operable Unit 1, which the public is encouraged to review.

5.3.1 Surface and Vadose Zone Soil

Radiological analyses of surface soil show that uranium is the predominant radionuclide contaminant in Operable Unit 1 surface soils. Uranium-238 was present at above-background (higher than naturally occurring) concentrations at all sample locations. The highest noted uranium-238 activity concentration was 1,500 picoCuries per gram, found at a sample point located south of Waste Pit 6 and east of Waste Pit 4. An area east of Waste Pit 2 yielded uranium-238 activity concentrations in the range of 25 to 750 picoCuries per gram.

Chemical analyses of surface soil indicate that cadmium, chromium, manganese, molybdenum, and silver are the principal inorganic contaminants. Organics analyses revealed elevated concentrations of pesticides and PCBs in those samples within the boundaries of Operable Unit 1. These contaminants

correspond to the characteristics of waste material contained in the adjacent waste pits. Pesticides and herbicides were used throughout the lifetime of the waste pits for insect control (principally those waste pits with surface water present, Waste Pits 5 and 6) and weed/grass control. Because of the pesticide and herbicide use, their presence in the waste pits was anticipated. One sample exhibited a high concentration of polyaromatic hydrocarbons.

Subsurface soil from four geologic zones was analyzed: (1) glacial overburden; (2) upper saturated sand and gravel layer; (3) lower saturated sand and gravel layer; and (4) the deep saturated sand and gravel layer. Principal radiological constituents found within the glacial overburden include uranium-238 and its progeny products (uranium-234, thorium-230, and radon-226). In the upper saturated sand and gravel layers, radionuclide activity concentrations were significantly lower than those found in the glacial overburden. One sample, obtained at a depth of 20.27 meters (66.5 feet), showed levels of uranium-234 and strontium-90 slightly above background (i.e., levels of a chemical or radionuclide found in areas near the FEMP not affected by the site). No radiological constituents exceeded background levels in samples from either the lower or deep saturated sand-and-gravel layer.

5.3.2 Groundwater

As previously indicated, groundwater, including perched water, is being investigated as part of Operable Unit 5. To provide an overview, however, a discussion of Operable Unit 1 groundwater contamination is presented here. Additional information can be found in Section 4 of the Final Remedial Investigation Report for Operable Unit 1 (DOE 1994b).

Radionuclide Contamination

All Operable Unit 1 1000-series monitoring wells, which are screened within the glacial overburden (see Section 4.4 of the Final Remedial Investigation Report for Operable Unit 1 for well locations) showed elevated concentrations of uranium isotopes. RI/FS program samples indicate that the pattern of elevated uranium concentrations within Operable Unit 1 perched groundwater appears to be centered primarily in the vicinity of Waste Pit 1. An elevated uranium concentration was detected at Well 1073, located within or near the border of Waste Pit 1. However, Well 1073 may intersect waste pit material, thereby affecting groundwater sample contaminant concentrations.

In the upper sand and gravel layer of the Great Miami Aquifer (GMA), radionuclide contamination appears to be localized around Waste Pit 4 and the Burn Pit. In this interval, groundwater flows from west to east; consequently, wells located west of Waste Pit 4 and the Burn Pit contained significantly lower concentrations of radionuclides. It appears that these two source areas are the primary contributors to radionuclide contamination of the groundwater at this level.

Elevated uranium concentrations were detected in all but one 3000-series well, which are located in the northwest corner of Operable Unit 1, upgradient of the Waste Pit Area. The 3000-series wells monitor the lower saturated sand and gravel layer of the Great Miami Aquifer. The highest levels of total uranium occurred in wells located in the northeast part of Operable Unit 1. Due to the limited amount of data on the 4000-series monitoring wells, which monitor the lowest portion of the Great Miami Aquifer, the extent of radiological contamination has not been fully characterized at this time. The Great Miami Aquifer will be fully characterized as part of the Operable Unit 5 RI, which includes environmental media such as groundwater. From these data, it appears that Operable Unit 1 is contributing radiological constituents to perched zones and to the upper and lower saturated sand-and-gravel layers of the Great Miami Aquifer.

Inorganic Contamination

Twenty-six inorganic contaminants were detected at above-background levels in the 1000-series wells, mostly correlating to those contaminants detected in the pit waste material and leachate samples. The more significant contaminants, elevated in both the perched groundwater and waste material leachate samples, are: beryllium, cadmium, manganese, molybdenum, nickel, and vanadium.

Fifteen inorganic contaminants were detected at above-background concentrations in at least one sample collected from the 2000-series wells. The three wells that consistently showed elevated levels of these constituents are located in the northeast section of Operable Unit 1. Since regional groundwater, in the area of the waste pits, flows from west to east, it appears that the waste pits are a source of inorganic contamination to the Great Miami Aquifer.

Nine inorganic constituents were detected at above-background concentrations in at least one sample collected from the 3000-series wells. The most significant contaminants include: manganese, mercury, and vanadium. Similar to the 2000-series well characterization, it appears that the majority of the inorganic chemical contamination in the 3000-series horizon is located in the northeast portion of the site, possibly indicating Waste Pit 3 as a source.

Only five inorganic constituents were detected at above-background concentrations in the 4000-series wells.

Organic Contamination

The presence of organic constituents in the 1000-series monitoring wells is limited. A well located southwest of Waste Pit 1 was the only well to identify significant organic constituents in the glacial overburden. The volatile organic compound and COC, tetrachloroethene, was detected in this well. The majority of the organic constituents in the perched zones are likely waste-related.

Ten organic constituents were detected in the 2000-series wells; none were determined to be COCs. Wells located in the vicinity of the Burn Pit and Waste Pit 4, and located east of the Clearwell, have detected concentrations of two to four organic constituents each.

The 3000-series wells had very limited organic chemical detections. No COCs were detected.

There is no indication of significant organic contamination of the deep saturated sand and gravel layer of the Great Miami Aquifer in the vicinity of Operable Unit 1. Only four organic constituents were detected in the 4000-series wells samples; all detections were at low levels. Two common laboratory contaminants also were detected in the 4000-series wells during the Resource Conservation and Recovery Act (RCRA) program. Operable Unit 1 does appear to be a minor contributor to organic contamination in the deep saturated sand-and-gravel layer of the Great Miami Aquifer.

5.3.3 Surface Water and Sediment

A review of data from site studies shows a high degree of variability in the surface water contamination concentration pattern. The reasons for variations in the data could be attributed to the amount of rainfall runoff during the time of sampling, topography that would affect flow from the area, the settling of contaminated suspended solids, and the existence of a contaminant source upgradient of the sampling location.

The highest concentration of contaminants in surface water was detected in drainageways that received surface runoff from Waste Pits 3, 4, 5, and 6. The predominant contaminant is uranium. The two drainageways running east-west between Waste Pits 3, 4, and 5 were found to be contaminated along their entire lengths. Another drainageway, running southeast and turning southwest between Waste Pits 4 and 6, contained water with elevated uranium concentrations. The drainageways in the north part of Operable Unit 1 were found to be the least contaminated. However, these drainageways were significantly modified to re-route runoff, as part of the Storm Water Control Removal Action, which included removal of some contaminated soils in these areas.

Sediments were sampled along drainageways that are downstream of potential sources of releases within Operable Unit 1. The highest levels of contaminants were detected at locations downgradient from Waste Pit 4. The predominant contaminant was depleted uranium. The drainageway located south of Waste Pits 4 and 6 revealed elevated levels of uranium along its entire length. Another drainageway between Waste Pits 4 and 5 showed elevated uranium concentrations.

5.3.4 Air and Direct Radiation

Airborne radon measurements are routinely collected both on and off the FEMP property, as part of the ongoing environmental monitoring program. The FEMP monitors radon concentrations at 21 locations along the FEMP perimeter fence. The average annual radon concentration along the FEMP fenceline for 1989 through 1992 was 0.74 picoCurie per liter in 1989, 0.74 picoCurie per liter in 1990, 0.90 picoCurie per liter in 1991 and 0.57 picoCurie per liter in 1992. The maximum annual radon concentration recorded during this period was 1.5 picoCuries per liter observed at the radon monitoring station located at the northeast corner of the site. During this period, none of the

observed radon concentrations exceeded either the DOE guideline of 3.0 picoCuries per liter above background levels, or the EPA limit of 4.0 picoCuries per liter for indoor radon concentrations.

The FEMP operates nine on-site air monitoring stations to measure the concentration of airborne radioactive particulates along the site perimeter. The average annual concentration of airborne uranium at each fence line monitoring station was well below the DOE guideline of 0.1 picoCurie per cubic meter during the period 1989 through 1992. Each year, since production operations ceased in 1989, data have shown a general decrease in airborne uranium concentrations along the FEMP fence line.

Direct radiation measurements were taken throughout Operable Unit 1 as part of a worker health and safety assessment, and to identify appropriate soil sampling locations. Localized areas had elevated exposure rates greater than 3 millirad per hour. The highest dose rate, 35 millirad per hour, was located near the southwest perimeter of Waste Pit 6. Radiological analyses of soil samples revealed that uranium-238 and short-lived progeny are the principal contaminants causing elevated dose rates.

5.4 POTENTIAL MIGRATION PATHWAYS

Contaminant transport from Operable Unit 1 may occur via the following pathways:

- Surface water runoff
  - Erosion of contaminated soils into Paddys Run from the vicinity of the waste pits
- Groundwater transport
  - Leaching of contaminants from the waste pits through the vadose (unsaturated) zone to underlying groundwater
  - Infiltration of contaminated surface water from Paddys Run to the Great Miami Aquifer
- Air emissions
  - Volatilization of organic compounds, wind erosion of contaminated particulate matter, and the direct release of radon gas

Each of these potential contaminant transport pathways is discussed below. Refer to Appendix D of the Final Feasibility Study for Operable Unit 1, and the Baseline Risk Assessment (Appendix E, which is summarized in Section 6 of the Final Operable Unit 1 Remedial Investigation Report for

Operable Unit 1) for detailed information about each pathway, its associated transport mechanisms, and its impact on environmental media and receptors.

5.4.1 Surface Water Pathway

Surface water runoff is a viable contaminant transport pathway for Operable Unit 1. During a rainfall event, soil particles are dislodged by the impact of raindrops and the flow of runoff across the soil surface. The amount of soil erosion depends on rainfall intensity, slope length, slope steepness, vegetative cover, and erosion control practices. Contaminants adsorbed onto soil surface particles can also be desorbed and transported into the receiving surface water. Each contaminant can be present in the runoff water in two forms:

- Adsorbed to the soil particles
- Dissolved and transported in the water

In recognition of this pathway, Removal Action No. 2, Waste Pit Area Runoff Control, was undertaken to control and collect runoff (See Section 2.3.1 for a discussion of this removal action).

5.4.2 Groundwater Pathway

Rainfall and surface water runoff can infiltrate through the surface of the waste pits and percolate through the waste and through the soil that overlies the groundwater aquifer. The FEMP is situated above the Great Miami Aquifer, which serves as a principal source of domestic, municipal, and industrial water throughout the region. The Great Miami Aquifer is considered the primary pathway by which contaminants released from Operable Unit 1 could be transported to a human receptor. The four controlling mechanisms for this migration pathway are:

- The leaching of contaminants from the waste or soil matrix into the dissolved phase,
- The percolation of the contaminated leachate to the underlying aquifer through soil layers and/or leaking wells,
- The infiltration of contaminated surface water from Paddys Run to the Great Miami Aquifer, and

- Movement of water in the Great Miami Aquifer carrying dissolved contaminants and, potentially, contaminants adsorbed to colloidal particles of up to 2 microns.

The contaminant concentrations in leachate that reach groundwater depend on the precipitation infiltration rate, the initial contaminant concentrations, contaminant mass, solubility of the contaminants, degradation rates, soil textures, soil hydraulic conductivities, depth to the groundwater, and a number of other chemical- and soil-specific factors. Predicted contaminant concentrations in the Great Miami Aquifer were used as the basis for the assessment of human exposure by water intake and exposure pathways as discussed in the Baseline Risk Assessment.

5.4.3 Air Pathway

Air emissions associated with Operable Unit 1 may involve different types of release mechanisms. If organic compounds are present within the surface soil or exposed pit materials, then volatilization of these compounds may occur. The Operable Unit 1 area may also involve the direct release of radon gas, which is generated as a result of radioactive decay of radium-226 and uranium-238. Finally, during periods of turbulent wind conditions, particles of contaminated surface soil can become suspended in the air and potentially may be subject to inhalation by on-site or off-site human receptors. Should the waste materials within the waste pits become uncovered, the transport of these materials via wind erosion may also become a concern. The amount of material that may be suspended depends on wind speed and other site conditions such as soil moisture, particle size, and vegetative cover. Concentrations of these airborne contaminants at on-site and off-site receptor locations form the basis for the assessment of human exposure by the air pathways, as discussed in Section 6 of the Final Remedial Investigation Report for Operable Unit 1.

6.0 SUMMARY OF OPERABLE UNIT 1 RISKS

6.1 OVERVIEW OF THE BASELINE ASSESSMENT RISK TO HUMAN HEALTH

During the Operable Unit 1 Remedial Investigation, an analysis was conducted to estimate the human health risks that could result from exposure to Operable Unit 1 waste if no remediation is performed beyond that accomplished to date. This analysis is referred to as a Baseline Risk Assessment.

The Baseline Risk Assessment consists of five primary steps. First, chemical and radiological constituents that might cause adverse health effects are determined; this process is called Constituent of Potential Concern (CPC) determination and is discussed in Section 6.1.1. The second step defines how the land will be used, how exposure to contaminants might occur and how receptors (hypothetical inhabitants and visitors to the site) would be exposed; this is called exposure assessment and is discussed in Section 6.1.2. In the third step, the hazardous effects of all CPCs are characterized; this step is termed toxicity assessment and is discussed in Section 6.1.3. The next step of the Baseline Risk Assessment is the hazard assessment where results of the first three steps are combined to determine health hazards for all receptors. This step is summarized in Section 6.1.4. A semi-quantitative analysis of uncertainties and the effect of these uncertainties on the baseline risk assessment is the next step of the Baseline Risk Assessment, and is presented in Section 6.1.5. The public is encouraged to review Section 6 and Appendix E of the Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994a) for detailed information on risks associated with Operable Unit 1.

6.1.1 Developing COCs from CPCs

Section 5 of this Record of Decision presents a summary of the results of the chemical analysis for the waste pits of Operable Unit 1. The summary described the inorganic and organic chemicals, as well as the radionuclides, considered to be a concern for Operable Unit 1 and the media in which they were found. This section describes how the list of contaminants initially identified is pared down to a list of constituents of possible concern (COPC), how further evaluation produces the list of CPC, which are further evaluated in the risk assessment to produce the final list of Constituents of Concerns (COCs). This evaluation process identifies and retains those chemicals capable of producing an

unwanted or adverse health effect at the exposure level considered and removes those chemicals not considered to be serious health threats to receptors.

Briefly, the on-site chemicals identified as those most likely to be present as a result of Fernald's production activities and subsequently identified by chemical analysis are called Constituents of Possible Concern. This list is further evaluated to determine those chemical toxins that are a possible risk to human health and the environment. Those chemicals on the list that are normally present in the environment, are produced as artifacts during chemical analysis, or are known not to produce unwanted toxic effects at the levels found on site, are removed from the list. This new list of chemicals is called contaminants of potential concern, known as CPCs. The Baseline Risk Assessment is performed based on this list of CPCs, and the resulting quantitative assessment reveals the COCs.

Three categories of CPCs were found: radionuclides, inorganic chemicals and organic compounds. Most of the 13 radioactive CPCs retained were of the uranium and thorium decay series. Inorganic CPCs included silver, arsenic, lead, copper and cyanide. Organic chemicals retained in the CPC list include polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), dioxins, furans and various organic solvents used on-site. (Refer to Appendix E of the Final Remedial Investigation Report for Operable Unit 1 [DOE, 1994a], Section E.2 for a complete listing of CPCs.)

6.1.2 Exposure Assessment

The exposure assessment identifies the sources and pathways of exposure and possible receptors under different land-use scenarios. First, sources of exposure, or source terms, were identified as being the waste pit materials in Waste Pits 1 through 6, the Burn Pit, and the Clearwell; surface water in Waste Pits 5 and 6 and the Clearwell; and surface soil within the Operable Unit 1 study area.

Two source term configurations were considered: the current and future source terms. The current source-term configuration considers the Waste Storage Area as it exists today.

The future source-term assumes that all maintenance activities within Operable Unit 1 were discontinued. As a result, the cap over Waste Pit 3 was assumed to partially fail, allowing direct exposure to pit contents in 30 percent of the waste pit surface area. Caps and covers on Waste Pits 1, 2, and 4, and the Burn Pit remained intact. Water in Waste Pits 5 and 6 was assumed to evaporate, exposing waste pit contents over half of the surface area of each waste pit. The Clearwell was assumed to have remained filled with water. The surface-water-runoff-control system was assumed nonfunctional under the future source-term scenario as maintenance ceases.

Land use scenarios addressed in the Operable Unit 1 Baseline Risk Assessment are: (1) current land use with access controls; (2) current land use without access controls; (3) future land use with access controls and; (4) future land use without access controls.

Under the first scenario (current land use with access controls), the site access restrictions historically provided by the U.S. Department of Energy (DOE) were maintained and no further remedial actions were taken other than those completed to date. The scenario further assumes that no members of the public are allowed access to the site; the integrity of the Waste Storage Area is maintained by inspections, and barriers repairs, when necessary. Potential receptors for this scenario are: a groundskeeper, an off-property farmer, and an off-property child.

The next land use scenario was current land use without access controls. Under this scenario, strict access controls were relaxed increasing the likelihood of public trespass and livestock grazing on-site. This scenario is considered for both the current and future source term as described in the previous section. Receptors considered under this scenario for the current source term are the trespasser and the off-property user of meat and milk products. Receptors considered under this land use scenario for the future source term are: the off-property farmer, the off-property child, the Great Miami River user, the off-property user of meat and milk products, and the groundskeeper.

Two future land use scenarios are considered: future land use with and without access controls. For future land use with access controls, the government retains ownership of the site, but site

maintenance and strict access controls are relaxed. Two receptors were evaluated under this scenario: the "expanded trespasser" and the "groundskeeper."

If the government were to relinquish all control over the site, unrestricted use of the site could permit exposure routes associated with development of residences, such as a home and farm, within the boundaries of Operable Unit 1. Access controls are assumed to be absent and no additional remedial actions were assumed. Receptors considered under this scenario are the reasonable maximum exposure (RME) resident farmer and child, the central tendency (CT) resident farmer, the off-property resident farmer and child, the home builder and the off-property user of meat and milk products.

6.1.3 Toxicity Assessment

Two human health hazards were addressed in the toxicity assessment for Operable Unit 1: cancer induction and non-carcinogenic toxicity. Cancer may be induced by exposure to a chemical carcinogen or from ionizing radiation from a radionuclide. Non-carcinogenic toxicity refers to organ tissue effects. These effects are numerous and range from systemic effects such as kidney or liver damage to localized effects such as skin or eye irritation.

Cancer risk is quantified by Incremental Lifetime Cancer Risks (ILCR) and is expressed in terms of the probability that a given receptor will develop cancer due to estimated exposures. For example, if the receptor has an additional one chance in 10,000 of contracting cancer due to these exposures, the probability is expressed as a 1×10^{-4} risk. Chemical intakes calculated in the exposure assessment are used in conjunction with the cancer slope factor to determine the ILCR. The target risk range for Superfund sites is 10^{-6} to 10^{-4}.

In the evaluation of potential exposures for the noncarcinogenic assessment, it was assumed that a dose threshold exists below which no toxic effect will occur. This threshold is used to develop an acceptable intake level. To determine if Operable Unit 1 constituents may cause toxic effects, the estimated intake (calculated from the exposure assessment) was divided by the acceptable intake. This ratio is called the hazard quotient (HQ). When HQs for multiple CPCs are summed for a particular

pathway, the resultant value is the hazard index (HI). If the ratio of estimated intake to the acceptable intake is greater than one, the site-related intake is assumed to have a potential of inducing non-carcinogenic toxic effects.

6.1.4 Risk Characterization Results

Summary results of the baseline risk assessment by land use are presented in this section. These results may be compared to the ranges of generally acceptable risk under CERCLA, which are an incremental lifetime cancer risk of one in one million (10^{-6}) to one in ten thousand (10^{-4}) or a Hazard Index equal to or less than one. Based on the baseline risk assessment results, chemicals that contribute an ILCR greater than one in one million ($1x10^{-7}$) or a hazard quotient greater than 0.1 were identified. These chemicals were designated as COCs for the Final Feasibility Study for Operable Unit 1 (1994c); they are presented in Table 6-9.

6.1.4.1 Current Land Use

Current Land Use With Access Controls

Three of the hypothetical receptors listed in Tables 6-1 and 6-2, the groundskeeper, the off-property farmer, and the off-property child, were evaluated under the assumption that both active maintenance and access controls continue. The maximally exposed individual in this case is the groundskeeper, with ILCR approaching one in ten thousand (10^{-4}) (Table 6-2). These risks are dominated by radiation exposures from isotopes of uranium, thorium, and radium in pit contents and surface soil. The hazard index of systemic toxic effects for the groundskeeper is less than one. Calculated risks to the off-property farmer are just over one in one million (10^{-6}), while calculated risks to the resident child are well below one in one million (10^{-6}). The HI for both the farmer and child are less than one, so no increase in impact of non-carcinogenic toxic effects is expected.

Current Land Use Without Access Controls

If access controls are relaxed, two additional hypothetical receptors are assumed to become plausible - the trespassing youth, and the off-property user of meat and milk. The greatest health effects are expected to occur to the off-property user of meat and milk products. Most of the total calculated risks to this receptor (about one in one thousand [10^{-3}]) are from the uptake of PCBs by grazing

TABLE 6-1

INCREMENTAL LIFETIME CANCER RISK SUMMARY
CURRENT LAND USE, CURRENT SOURCE TERM

Media	Groundskeeper	Off-property Farmer	Off-property Young Child	Trespassing Youth	Off-property User of Meat and Milk Products
Air					
Radiocarcinogenic Risk	6.0E-06	3.1E-06	1.6E-07	7.1E-07	NA
Chemical Carcinogenic Risk	1.1E-08	1.5E-07	7.8E-08	2.2E-09	NA
Total:[a]	6.0E-06	3.3E-06	2.4E-07	7.1E-07	NA
Surface Soil					
Radiocarcinogenic Risk	7.7E-05	NA	NA	2.7E-05	5.1E-04
Chemical Carcinogenic Risk	1.2E-05	NA	NA	9.4E-06	8.8E-04
Total:[a]	8.9E-05	NA	NA	3.6E-05	1.4E-03
Buried Pit Material					
Radiocarcinogenic Risk	4.6E-05	NA	NA	1.7E-05	NA
Chemical Carcinogenic Risk	NA	NA	NA	NA	NA
Total:[a]	4.6E-05	NA	NA	1.7E-05	NA
On-property Surface Water					
Radiocarcinogenic Risk	NA	NA	NA	NA	2.2E-04
Chemical Carcinogenic Risk	NA	NA	NA	NA	5.6E-06
Total:[a]	NA	NA	NA	NA	2.3E-04
Sum All Media					
Radiocarcinogenic Risk	1.3E-04	3.1E-06	1.6E-07	4.5E-05	7.3E-04
Chemical Carcinogenic Risk	1.2E-05	1.5E-07	7.8E-08	9.4E-06	8.9E-04
Total:[a]	1.4E-04	3.3E-06	2.4E-07	5.4E-05	1.6E-03

NA - Not applicable. Exposure route not evaluated for receptor.

[a] Radiocarcinogenic and chemocarcinogenic risks are not truly additive. A total is provided for reference only.

SOURCE - Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

TABLE 6-2
HAZARD INDEX SUMMARY
CURRENT LAND USE, CURRENT SOURCE TERM

Media	Groundskeeper	Off-property Farmer	Off-property Child	Trespassing Youth	Off-property User of Meat and Milk Products
Air	0.0E+00	2.7E-04	1.3E-03	0.0E+00	NA
Surface Soil	3.0E-01	NA	NA	4.9E-01	2.7E+00
On-property Surface Water	NA	NA	NA	NA	2.3E-01
Sum All Media	3.0E-01	2.7E-04	1.3E-03	4.9E-01	2.9E+00

NA - Not applicable. Exposure route not evaluated for receptor.

SOURCE - Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

cattle. Radionuclides contribute risks on the order of one in ten thousand (10^{-4}). The HI for this receptor exceeds 1.0 (2.9), due primarily to antimony, cadmium, and uranium uptake by cattle. Impacts on the hypothetical trespassing youth are much lower (ILCR = 5.4×10^{-5} and HI = 0.49), so no increase in impact of non-carcinogenic toxic effects is expected.

Current Land Use Without Access Controls (Future Source Term)

Tables 6-3 and 6-4 present the ILCRs and HIs for the hypothetical trespassing youth and the Great Miami River user evaluated under this exposure scenario. The trespassing youth incurs a ILCR of 3.3 in ten thousand (10^{-4}) and HI of 1.9, but impacts to the Great Miami River user were minimal.

6.1.4.2 Future Land Use

Future Land Use With Access Controls (Government Reserve)

Summaries of cancer risks and hazard indices for hypothetical receptors evaluated under future land use with access controls are summarized in Tables 6-5 and 6-6. The groundskeeper was projected to incur cancer risks in the order of one in one thousand (10^{-3}). Hazard Indices for the groundskeeper and expanded trespasser were 2.2 and 4.0 respectively, both primarily due to contact with exposed pit material.

Future Land Use Without Access Controls

Summaries of cancer risks and hazard indices for hypothetical receptors evaluated under future land use without access controls are summarized in Tables 6-7 and 6-8. All receptors were calculated to incur risks in excess of one in ten thousand (10^{-4}). The greatest calculated risks are incurred by the hypothetical on-property farmer using perched water (ILCR = 1.5×10^{0}). If domestic use of perched groundwater is included in the analysis, the risks approach one. The risks to this receptor are due primarily to uranium and arsenic in groundwater. Similarly, predicted exposures to all receptors produce HIs exceeding 1. The highest HI (6,100) is produced when the on-property farmer uses perched water. If this potential source is discounted, the highest HI (1,600) is incurred by the resident child using groundwater from beneath the operable unit. Risks to the off-property farmer and child in the future land use scenario are the same as for the current scenario. Under this scenario, the total ILCR for children is 1.7×10^{-4}, while the corresponding total HI is 90.

TABLE 6-3

INCREMENTAL LIFETIME CANCER RISK SUMMARY
CURRENT LAND USE, FUTURE SOURCE TERM

Medium	Trespassing Youth	Great Miami River User
Air		
Radiocarcinogenic Risk	8.5E-05	NA
Chemical Carcinogenic Risk	4.3E-05	NA
Total:[a]	1.3E-04	NA
Surface Soil		
Radiocarcinogenic Risk	1.1E-04	NA
Chemical Carcinogenic Risk	7.4E-05	NA
Total:[a]	1.8E-04	NA
Buried Pit Material		
Radiocarcinogenic Risk	7.2E-06	NA
Chemical Carcinogenic Risk	NA	NA
Total:[a]	7.2E-06	NA
Paddys Run Surface Water		
Radiocarcinogenic Risk	6.6E-08	NA
Chemical Carcinogenic Risk	5.7E-08	NA
Total:[a]	1.2E-07	NA
Paddys Run Sediment		
Radiocarcinogenic Risk	3.5E-06	NA
Chemical Carcinogenic Risk	9.5E-06	NA
Total:[a]	1.3E-05	NA
Great Miami River Surface Water		
Radiocarcinogenic Risk	NA	2.5E-07
Chemical Carcinogenic Risk	NA	2.8E-08
Total:[a]	NA	2.8E-07
All Media		
Radiocarcinogenic Risk	2.0E-04	2.5E-07
Chemical Carcinogenic Risk	1.3E-04	2.8E-08
Total:[a]	3.3E-04	2.8E-07

NA - Not Applicable. Exposure route not evaluated for this receptor.

[a] Radiocarcinogenic risk and chemocarcinogenic risk are not truly additive. A total is provided for reference only.

SOURCE - Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

TABLE 6-4

HAZARD INDEX SUMMARY
CURRENT LAND USE, SORUCE TERM

Medium	Trespassing Youth	Great Miami River User
Air	2.5E-01	NA
Surface Soil	1.5E+00	NA
Paddys Run Surface Water	3.9E-02	NA
Paddys Run Sediment	1.1E-01	NA
Great Miami River Surface Water	NA	4.2E-03
All Media	1.9E+00	4.2E-03

NA = Not Applicable. Exposure route not evaluated for this receptor.

SOURCE: Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

TABLE 6-5

INCREMENTAL LIFETIME CANCER RISK SUMMARY
FUTURE LAND USE (GOVERNMENT RESERVE)
FUTURE SOURCE TERM

Medium	On-property Groundskeeper	Expanded Trespasser
Air		
Radiocarcinogenic Risk	7.2E-04	1.3E-04
Chemical Carcinogenic Risk	2.2E-04	6.0E-05
Total:[a]	9.4E-04	1.9E-04
Surface Soil/Exposed Pit Material		
Radiocarcinogenic Risk	4.4E-04	2.5E-04
Chemical Carcinogenic Risk	2.1E-04	2.0E-04
Total:[a]	6.6E-04	4.5E-04
Buried Pit Material		
Radiocarcinogenic Risk	4.7E-05	2.6E-05
Chemical Carcinogenic Risk	NA	NA
Total:[a]	4.7E-05	2.6E-05
Paddys Run Surface Water		
Radiocarcinogenic Risk	NA	6.6E-08
Chemical Carcinogenic Risk	NA	5.7E-08
Total:[a]	NA	1.2E-07
Paddys Run Sediment		
Radiocarcinogenic Risk	NA	3.5E-06
Chemical Carcinogenic Risk	NA	9.5E-06
Total:[a]	NA	1.3E-05
All Media		
Radiocarcinogenic Risk	1.2E-03	4.1E-04
Chemical Carcinogenic Risk	4.3E-04	2.7E-04
Total:[a]	1.6E-03	6.8E-04

NA - Not Applicable. Exposure route not evaluated for this receptor.

[a] Radiocarcinogenic risk and chemocarcinogenic risk are not truly additive. A total is provided for reference only.

SOURCE - Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

TABLE 6-6

HAZARD INDEX SUMMARY
FUTURE LAND USE (GOVERNMENT RESERVE)
FUTURE SOURCE TERM

Medium	Groundskeeper	Expanded Trespasser
Air	6.2E-01	2.9E-01
Surface Soil/Exposed Pit Material	1.6E+00	3.5E+00
Paddys Run Surface Water	NA	3.9E-02
Paddys Run Sediment	NA	1.1E-01
All Media	2.2E+00	4.0E+00

NA = Not Applicable. Exposure route not evaluated for this receptor.

SOURCE: Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

TABLE 6-7

INCREMENTAL LIFETIME CANCER RISK SUMMARY
FUTURE LAND USE (AGRICULTURAL USE)
FUTURE SOURCE TERM

Media	On-property RME Farmer	On-property RME Farmer (User of Perched GW)	On-property CT Farmer	On-property Young Child	Off-property Farmer	Off-property Young Child	Homebuilder	Off-property User of Meat and Milk Products
Air								
Radiocarcinogenic Risk	4.8E-03	4.8E-03	3.5E-04	9.2E-05	2.1E-04	4.2E-06	1.4E-04	1.3E-05
Chemical Carcinogenic Risk	4.8E-03	4.8E-03	3.2E-04	1.2E-03	2.9E-04	7.4E-05	4.5E-05	7.7E-04
Total: [a]	9.6E-03	9.6E-03	6.7E-04	1.3E-03	5.0E-04	7.8E-05	1.9E-04	7.8E-04
Exposed Waste Pit Materials								
Radiocarcinogenic Risk	2.3E-02	2.3E-02	2.2E-03	1.7E-03	NA	NA	7.3E-05	NA
Chemical Carcinogenic Risk	9.5E-03	9.5E-03	5.8E-04	3.8E-03	NA	NA	1.7E-04	NA
Total: [a]	3.3E-02	3.3E-02	2.8E-03	5.5E-03	NA	NA	2.4E-04	NA
Surface Soil								
Radiocarcinogenic Risk	6.7E-04	6.7E-04	3.9E-05	9.9E-05	NA	NA	NA	5.1E-04
Chemical Carcinogenic Risk	1.1E-03	1.1E-03	6.4E-05	5.3E-04	NA	NA	NA	8.8E-04
Total: [a]	1.8E-03	1.8E-03	1.0E-04	6.3E-04	NA	NA	NA	1.4E-03
Buried Pit Material								
Radiocarcinogenic Risk	1.2E-03	1.2E-03	1.6E-04	2.5E-07	NA	NA	6.8E-09	NA
Chemical Carcinogenic Risk	NA	NA	NA	NA	NA	NA	NA	NA
Total: [a]	1.2E-03	1.2E-03	1.6E-04	2.5E-07	NA	NA	6.8E-09	NA
On-property Surface Water								
Radiocarcinogenic Risk	2.5E-04	2.5E-04	1.5E-05	4.2E-05	NA	NA	NA	2.5E-04
Chemical Carcinogenic Risk	6.2E-06	6.2E-06	4.1E-07	1.4E-06	NA	NA	NA	6.2E-06
Total: [a]	2.6E-04	2.6E-04	1.5E-05	4.3E-05	NA	NA	NA	2.6E-04
Groundwater								
Radiocarcinogenic Risk	2.3E-02	5.2E-01	1.6E-03	1.2E-03	1.7E-03	9.1E-05	NA	NA
Chemical Carcinogenic Risk	4.0E-02	9.1E-01	2.8E-03	9.5E-03	0.0E+00	0.0E+00	NA	NA
Total: [a]	6.3E-02	9.6E-01	4.4E-03	1.1E-02	1.7E-03	9.1E-05	NA	NA
All Media								
Radiocarcinogenic Risk	5.3E-02	5.5E-01	4.4E-03	3.1E-03	1.9E-03	9.5E-05	2.1E-04	7.7E-04
Chemical Carcinogenic Risk	5.5E-02	9.3E-01	3.8E-03	1.5E-02	2.9E-04	7.4E-05	2.2E-04	1.7E-03
Total: [a]	1.1E-01	1.5E+00	8.2E-03	1.8E-02	2.2E-03	1.7E-04	4.3E-04	2.5E-03

NA - Not applicable. Exposure route not evaluated for receptor.

[a] Radiocarcinogenic and chemocarcinogenic risks are not truly additive. A total is provided for reference only.

SOURCE - Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

TABLE 6-8

HAZARD INDEX SUMMARY
FUTURE LAND USE (AGRICULTURAL USE)

Media	On-property RME Farmer	On-property RME Farmer (User of Perched GW)	On-property CT Farmer	On-property Young Child	Off-property Farmer	Off-property Young Child	Homebuilder	Off-property User of Meat an Milk Products
Air	8.4E+00	8.4E+00	4.3E+00	2.8E+01	5.2E-01	1.7E+00	6.4E+00	1.9E+00
Exposed Waste Pit Materials	2.3E+01	2.3E+01	9.9E+00	9.8E+01	NA	NA	5.4E+01	NA
Surface Soil	5.3E+00	5.3E+00	2.6E+00	2.7E+01	NA	NA	NA	2.7E+00
On-property Surface Water	3.3E-01	2.4E-01	1.5E-01	2.7E+00	NA	NA	NA	3.3E-01
Groundwater	5.0E+02	5.1E+03	2.7E+02	1.4E+03	3.1E+01	8.8E+01	NA	NA
All Media	5.4E+02	6.1E+03	2.9E+02	1.6E+03	3.2E+01	9.0E+01	6.0E+01	4.9E+00

NA - Not applicable. Exposure route not evaluated for receptor.
SOURCE - Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

TABLE 6-9

OPERABLE UNIT 1
CONSTITUENTS OF CONCERN FOR ENVIRONMENTAL MEDIA[a]

	Sediment	Air	Surface Soil	Groundwater	Perched Water	Surface Water
RADIOLOGICAL COCs						
Cs-137	X	X	X			X
Np-237		X	X		X	
Pu-238		X	X	X	X	
Pu-239/240	X	X	X			
Ra-228 + 1 dtr		X				
Sr-90 + 1 dtr		X	X		X	X
Tc-99		X	X	X	X	X
Th-230		X	X	X	X	
Th-232 + 10 dtr	X	X	X		X	
U-234		X	X	X	X	X
U-235 + dtr	X	X	X	X	X	X
U-238 + 2 dtr	X	X	X	X	X	X
INORGANICS						
Antimony			X			
Beryllium	X	X	X			
Cadmium		X	X			
Chromium		X	X		X	
Manganese		X	X	X	X	
Molybdenum		X	X		X	
Mercury		X	X			
Nickel		X	X		X	
Silver		X	X		X	X
Thallium	X	X	X			
Uranium		X	X	X	X	X
Vanadium		X	X			

TABLE 6-9
(Continued)

	Sediment	Air	Surface Soil	Groundwater	Perched Water	Surface Water
ORGANIC COMPOUNDS						
Benzo(a)anthracene		X	X			
Benzo(a)pyrene		X	X			
Benzo(b)fluoranthene		X	X			
Benzo(k)fluoranthene			X	X		
Chrysene		X	X			
Dioxins			X	X		
Furans			X	X		
Indeno(1,2,3-cd)pyrene		X	X			
PCBs		X	X			
Tetrachloroethene						X
Vinyl Chloride				X	X	

[a] The criteria for selection was 10^{-7} for ILCR and 0.1 for the HI.

SOURCE: Final Feasibility Study for Operable Unit 1 (DOE, 1994a)

6.1.5 Summary of Uncertainties

It is generally recognized that uncertainty is inherent in quantitative risk assessment. The objective of the uncertainty analysis is to identify key site-related variables that contribute most to uncertainty, and to characterize the nature and magnitude of impact of these uncertainties on the conclusions of the risk assessment.

Table 6-10 summarizes the semi-quantitative evaluation of uncertainty for the Operable Unit 1 Baseline Risk Assessment. Sources of uncertainty were identified for all steps of the risk assessment process: selection of CPCs, exposure assessment, toxicity assessment and risk characterization. The majority of uncertainties tended toward increased conservatism of the risk evaluation. Taken together, the uncertainties identified with site data, exposure parameters, fate and transport particularly with respect to groundwater modeling, toxicity assessment and risk characterization were judged high and could overestimate risk by two or more orders of magnitude.

6.2 OVERVIEW OF THE BASELINE ECOLOGICAL RISK ASSESSMENT

The purpose of the ecological risk assessment, which was completed as a companion to the preliminary site-wide baseline risk assessment in the Site-Wide Characterization Report, was to estimate the potential and future baseline risks of FEMP contaminants to ecological receptors.

The U.S. Environmental Protection Agency (EPA) and DOE have agreed in the Amended Consent Agreement (September 1991) that the Site-Wide Ecological Risk Assessment in the Remedial Investigation for Operable Unit 5 will quantify and assess the possible risks from current concentrations of site contaminants to ecological receptors inhabiting on-property and off-site areas not presently targeted for remediation based on human-health concerns. Discussion on the Risk Assessment and Ecological Risk issues specific to Operable Unit 1 can be found in the Final Operable Unit 1 Proposed Plan.

The ecological receptors potentially exposed to FEMP contaminants include all organisms, exclusive to humans and domestic animals. The ecological risk assessment focused on a group of indicator species selected to represent a variety of exposure pathways and trophic positions. Terrestrial

TABLE 6-10

UNCERTAINTIES ASSOCIATED WITH ESTIMATED RISKS FROM OPERABLE UNIT 1

Source of Uncertainty	Magnitude[a]	Expected Direction[b]	Remark
Selection of CPCs:			
• Adequacy of database	Low to Moderate	Increases or decreases conservatism	CPCs may be underestimated. Principal constituents were identified.
Exposure Assessment:			
• Calculated exposure point concentrations			
- positive bias in sampling	Moderate	Increases conservatism	Source concentrations based on 95% UCL or maximum. Sampling was biased for radiological CPCs.
- conservative modeling assumptions	High	Increases conservatism	Modeled concentrations were conservative.
• Determination of land uses			
- current scenario	Low	Increases conservatism	Scenario based on current environmental setting.
- future scenario	High	Increases conservatism	Worst case scenario assumed.
• Assumptions for source terms			
- current source term	Low	Increases or decreases conservatism	Current source term assumes waste pits covered and surface water runoff treated.
- future source term	Moderate	Increases conservatism	Future source term assumes failure of Waste Pit 3 cap.
• Selection of receptors			
- current scenario	Low	Increases conservatism	Scenario based on current environmental setting.
- future scenario	High	Increases conservatism	Worst case scenario assumed.
• Determination of exposure factors	Low to moderate	Increases conservatism	Receptor and exposure pathway specific.

TABLE 6-10
(Continued)

Source of Uncertainty	Magnitude[a]	Expected Direction[b]	Remark
Toxicity Assessment:			
• Dose-response assessment			
- chemical CPCs	High	Increases conservatism	Dose-response based on animal data.
- radiological CPCs			
internal	Low	Increases conservatism	Dose-response based on human data.
external	Moderate to high	Increases conservatism	Conservative assumptions made for external exposure.
• Other OU1 CPCs			
- dose-response for PAHs	Low	Increases conservatism	PAHs pose low risk.
- dose-response for PCBs	Low	Increases conservatism	PCBs pose relatively low risk.
- dose-response for dioxins/furans	Low	Increases conservatism	Furans/dioxins relatively low risk.
- dose-response for Rn-222 (indoors)	Low to moderate	Increases conservatism	Assumptions for indoor Rn-222 differ from those made for the CSF.
Risk Characterization:			
• Additivity	Low to moderate	Increases conservatism	Health effects dominated from few CPCs and exposure pathways.
• Effect of tentatively identified compounds (TICs)	Low	Decrease conservatism	Relatively few TICs.
	Unknown	Increases conservatism	Data unknown.
• Failure to consider antagonism	Unknown	Decreases conservatism	Data unknown.
• Failure to consider synergism	Low		HIs dominated by few CPCs and exposure pathways.
• Failure to consider segregation of HIs		Increases conservatism	
Overall	High	Increases conservatism	High uncertainty from combining low, moderate, and highly uncertain parameters.

[a] Magnitude is assessed qualitatively based on professional judgment and includes the following:
Low-impact risk by a factor of 10 or less.
Moderate-impact risk by a factor of 10 to 100.
High-impact risk by a factor of 100 or more.

[b] Direction is assessed qualitatively where an increased conservatism increases final health effects calculated in risk assessment.

SOURCE: Final Remedial Investigation Report for Operable Unit 1 (DOE, 1994b)

vegetation was represented by a generic plant species. Terrestrial wildlife species to be evaluated were selected based on species abundance on the FEMP site, trophic level position, and habitat requirements. The species evaluated were the white-tailed deer (*Odocoileus virginianus*), white-footed mouse (*Peromyscus leucopus*), raccoon (*Procyon lotor*), red fox (*Vulpes fulva*), muskrat (*Ondatra zibethica*), American robin (*Turdus migratorius*), and red-tailed hawk (*Buesto jamaicensis*).

The assessment examined risks to terrestrial organisms associated with contaminants in two environmental media -- surface soils, summarized for the entire site, and surface water in Paddys Run from the northern boundary of the FEMP site to the confluence with the storm sewer outfall ditch. Risks to aquatic organisms were evaluated for exposure to contaminants in Paddys Run, the Great Miami River, and in runoff into the storm sewer outfall ditch. All nonradioactive and radioactive constituents of greatest human health risk were considered to be of concern for the ecological risk assessment. Estimated ecological risks associated with exposure to FEMP site COCs are primarily due to nonradioactive inorganic chemicals in soils, rather than to organic chemicals or radionuclides. This is true for both terrestrial and aquatic organisms and for plants as well as wildlife. In particular, estimated intakes of arsenic, cobalt, lead, and silver from FEMP soils were all higher than the estimated No Observed Effect Levels for at least six of the seven indicator species selected for this assessment. The relative hazards to individual species varied, but the white-footed mouse consistently had the highest indices of these chemicals. This can be attributed to the assumed intake by the mouse of insects (using earthworms as surrogates), which in turn were assumed to assimilate chemicals from soil with a transfer coefficient of 1.0.

Estimated hazards to terrestrial organisms of exposure to COCs in FEMP surface waters were relatively low, with HIs greater than one only for arsenic, lead, molybdenum, and silver. These chemicals presented hazards of two, five, four, and three to species, respectively, and the highest HI estimated was for lead intake by the mouse.

Estimated doses to terrestrial organisms at the FEMP site, originating from soil uptake by plants and earthworms, were below levels expected to cause detectable effects. However, as with inorganic chemicals, this conclusion is sensitive to assumptions about muscle-to-muscle transfer of

radionuclides. If perfect transfer or biomagnification of uranium occurs (i.e., transfer factor equals 1.0), it could expose terrestrial wildlife at the FEMP to potentially harmful radiation levels. However, if more realistic muscle-to-muscle transfer coefficient were assumed (i.e., 0.1), the estimated radiation doses would fall below the range likely to result in harmful effects. Radiation doses due to water intake were insignificant.

Exposure to radiological contaminants does not appear to pose a significant risk to aquatic organisms at the measured concentrations in the surface waters and sediments impacted by the FEMP site. However, modeled concentrations of radionuclides in runoff from the FEMP site into surface water would cause estimated exposures to exceed the upper limit of 1 rad/day. A chronic dose rate of 1 rad/day or $3.65 \times 10^{+5}$ mrad/year or less to the maximally exposed member of a population of aquatic organisms would ensure that there were no deleterious effects from radiation on the population. The most affected organisms would be aquatic plants, receiving a total dose from internal and external exposure of about 140 rad/day. The total dose to fish is minimally over the limit, at 1.6 rad/day, and the total dose to benthic macroinvertebrates is about 14 rad/day. The maximum concentrations calculated in the storm sewer outfall ditch were used in source runoff calculations. Doses to aquatic organisms in the storm sewer outfall ditch may exceed the limit of 1 rad/day. Doses in Paddys Run and the Great Miami River would be lower than that indicated in the storm sewer outfall ditch and would be well below 1 rad/day. The measured concentrations of cadmium in Paddys Run and the Great Miami River, copper in the Great Miami River, mercury in Paddys Run, the Great Miami River, and the storm sewer outfall ditch, and silver in Paddys Run water exceeded chronic toxicity criteria for the protection of freshwater organisms.

Field studies on the impact of the FEMP site on terrestrial and aquatic communities do not indicate any effects consistent with contaminant impacts except for above-background levels of arsenic and mercury recorded in RI/FS plant samples. In addition, although potential impacts at the individual level were predicted for wildlife species, detrimental or adverse impacts have not been observed in the field. This indicates that the predicted potential effects have not occurred and that the risk model is sufficiently conservative. A comparison of the concentrations of inorganic chemical concentrations in FEMP soils to regional background values indicate the mean FEMP concentrations may be similar

to the upper 95 percent confidence levels of background values. This indication suggests that ecological risks estimated using background values of inorganics would be comparable to those estimated for the FEMP site, and emphasizes conservative nature of the method used.

6.3 CONCLUSION

In summary, actual or threatened releases of hazardous substances from Operable Unit 1, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment. Although radionuclides are the most ubiquitous contaminants at the FEMP, estimated ecological risks to both terrestrial and aquatic organisms are primarily associated with nonradioactive inorganic chemicals. Although estimated risks are substantial in some instances, they are based on soil inorganic chemical concentrations comparable to background levels, and deleterious effects have not been observed in the field. This suggests that current FEMP site-specific ecological risks are low. However, remedial actions are appropriate to address contaminants which have potential to cause harm in the future.

7.0 DESCRIPTION OF ALTERNATIVES

The remedial alternatives which underwent detailed analysis in the Final Feasibility Study for Operable Unit 1 (DOE 1994a) are described in this section of the Record of Decision.

- Alternative 1 - No Action
- Alternative 4 - Removal, Treatment, and On-Property Disposal
  - Alternative 4A - Removal, Treatment (Vitrification), and On-Property Disposal
  - Alternative 4B - Removal, Treatment (Cementation), and On-Property Disposal
- Alternative 5 - Removal, Treatment, and Off-Site Disposal
  - Alternative 5A - Removal, Treatment (Thermal Drying), and Off-Site Disposal at the Nevada Test Site (NTS)
  - Alternative 5B - Removal, Treatment (Thermal Drying), and Off-Site Disposal at a Permitted Commercial Waste Disposal Facility

Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that remedial action be protective of human health and the environment, and attain a level or standard of control that is consistent with federal or state environmental laws or state facility siting regulations, which are termed Applicable or Relevant and Appropriate Requirements (ARARs). ARARs can pertain to all aspects of a remedial action, including the establishment of cleanup levels, the operation and performance of treatment systems, and the design of disposal facilities. This section presents a brief summary of each of the alternatives that underwent detailed analysis, followed by a discussion of how each complies with the statutory requirements referenced above.

Appendix D of the Final Feasibility Study for Operable Unit 1 (DOE 1994a) documents assessment of residual and short-term risk associated with each of the four alternatives considered for detailed analysis. This quantitative assessment concluded that the residual and short-term risks associated with

each alternative fall within a range considered to be protective as established in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

7.1 ARARs

Except for the No-Action Alternative, all other alternatives (4A, 4B, 5A, 5B) would either attain pertinent ARARs or could potentially requires a waiver of one or more ARAR(s). (References to "action alternatives" will mean all alternatives except the No-Action Alternative). Appendix F of the Final Feasibility Study for Operable Unit 1 includes a comprehensive identification of the potential ARARs and the To Be Considered (TBC) criteria relative to remediation of Operable Unit 1. Also included is an assessment of each alternative's ability to comply with identified ARARs and TBCs. Major requirements are discussed below. Section 10.2 of this Record of Decision provides a description of the following types of ARARs, as they pertain to the selected alternative: chemical-specific, location-specific, and action-specific.

Chemical-Specific ARARs

Each action alternative would meet the chemical-specific ARARs associated with potential releases to groundwater, air, and surface water. Included among the chemical-specific ARARs are standards for chemicals discharged to surface water (Ohio Administrative Code [OAC] 3745-1), inorganic and organic chemicals in drinking water (40 CFR 141/OAC 3745-81), and radionuclides in surface and drinking water (40 CFR 141/OAC 3745-81 and U.S. Department of Energy [DOE] Order 5400.5).

Location-Specific ARARs

Among the location-specific ARARs for the site is the Ohio Solid Waste Siting Criteria (OAC 3745-27-07). However, the selected remedial alternative does not include on-site disposal; therefore, it is not an ARAR for Operable Unit 1. OAC 3745-27-07(B)(5) prohibits construction of new solid waste disposal facilities over sole-source aquifers. The Great Miami Aquifer has been designated a sole-source aquifer under the provisions of the Safe Drinking Water Act. An exemption or CERCLA waiver from this ARAR would be required in order to implement any on-site disposal alternatives. Location-specific ARARs include the requirements associated with the discharge of dredged and

excavated material into "Waters of the United States," protection of wetlands, floodplains, and endangered species during the on-site management of materials.

Action-Specific ARARs

All action alternatives would comply with action-specific ARARs. For Alternatives 4A and 4B, the above-grade disposal cell would incorporate design requirements for the disposal of uranium mill tailings (40 CFR 192), and hazardous waste under RCRA (i.e., treatment, storage, and disposal facility requirements). The design of the on-site disposal cell design would also include appropriate engineering features that satisfy the requirements of the Clean Water Act (40 CFR Parts 104 and 125), the Ohio Water Quality Standards, and Resource Conservation and Recovery Act (RCRA) (40 CFR Parts 262 and 264).

For Alternatives 5A and 5B, hazardous materials transport requirements would be complied with by following the appropriate U.S. Department of Transportation (DOT) shipping standards in 49 CFR Parts 172 and 173.

7.2 ALTERNATIVES SUMMARY

Except for the No-Action Alternative, the alternatives being considered for Operable Unit 1 include a number of common components. Each alternative involves removal of more than 700,000 cubic yards of pit waste, soil, caps, liners, etc., some form of treatment (vitrification, drying, or cement stabilization), and disposal of Operable Unit 1 wastes. Oversize structural-type debris is expected to be encountered during excavation of the waste pit contents. Such material not readily amenable to size reduction in the Operable Unit 1 remedial process will be decontaminated and forwarded to Operable Unit 3 for management in the same manner as debris and rubble generated from the demolition of the process area buildings. In addition to the pit wastes and associated material discussed above, other contaminated soils are present within Operable Unit 1. Specifically, surface soils adjacent to the waste pits and soils beneath the waste pits exhibit varying degrees of contamination. These soils will be excavated to health-based levels (see Section 9.2 of this Record of Decision) that will result in a residual risk that is within the acceptable range, as established in the NCP. If amenable to the remedy selected in the Operable Unit 5 Record of Decision, surface soils,

contaminated soils from beneath the excavated pits and some cover soils, as appropriate, will be forwarded to Operable Unit 5 for disposition. If not amenable to the Operable Unit 5 remedy, these materials will be managed in the same fashion as the pit waste.

Additionally, groundwater remediation will be addressed by Operable Unit 5. All action alternatives incorporate institutional controls that include continued federal ownership and maintenance of fencing and signs.

7.2.1 Alternative 1 - No-Action Alternative

Capital Cost	$ 0
Present Worth (PW)	$ 0
Months to Implement	0

The No-Action Alternative for Operable Unit 1 provides a baseline for comparison with the other alternatives per the NCP. Under the No-Action Alternative, designated as Alternative 1, the contaminated materials within the Operable Unit would remain unchanged without any further waste removal, treatment, containment, or mitigating activities. The No-Action Alternative would not decrease the toxicity, mobility, or volume of contaminants through treatment or reduce public health or environmental risks.

7.2.2 Alternative 4A - Removal, Treatment (Vitrification), and On-Property Disposal

Capital Cost	$654,852,965
Present Worth (PW)	$457,740,000
Months of Operation	120

Alternative 4A requires the excavation of Waste Pits 1 through 6, the Burn Pit, and the Clearwell, including the waste, covers, surface soils outside the capped areas, liners and soils below the liners to health-based limits. Excavated material would be dried and treated by vitrification (a process that transforms the waste into a glassified material). Due to the heterogenous nature of the waste in the pits, size reduction, homogenization, and blending would be required for uniform drying. Minimum treatment standards would be implemented to produce a waste form that will resist contaminant leaching and meets or exceeds regulatory standards. Treatment to meet these minimum standards, in

the context of waste solidification technologies, is discussed in detail in Section 2.4.6.2 of the Operable Unit 1 Feasibility Study. The treated material would be disposed on site in an engineered waste disposal cell. Long-term risk mitigation would be provided by the combination of waste treatment which reduces waste mobility, and placement in the engineered disposal facility, which precludes human and ecological contact, and unacceptable impacts to the Great Miami Aquifer. The waste pits would be backfilled and covered with an infiltration-limiting multilayer cover. The areas where surface soil is excavated would be graded and vegetated. Topsoil would be used to support vegetative growth, where required. This alternative would incorporate institutional controls (continued federal ownership with fencing) and monitoring measures. The on-site Operation and Maintenance (O&M) cost for Alternative 4A is approximately $280,796. O&M, including maintenance and repair, surveillance, and monitoring, is estimated based on 30 years of O&M following remediation. O&M is included in the present worth value.

Active waste processing will take approximately 10 years. The vitrification alternative takes almost twice as long as the other alternatives because it includes almost all the steps that make up the other alternatives, plus the additional time required to vitrify the waste.

7.2.3 Alternative 4B - Removal, Treatment (Cement Solidification), and On-Property Disposal

Capital Cost	$525,063,363
Present Worth (PW)	$404,903,000
Months of Operation	60

Alternative 4B includes the same remedial action components as Alternative 4A with the exception of the treatment process used. In this alternative, cement solidification would be used instead of vitrification. As with alternative 4A, the heterogenous nature of the waste in the pits will require size reduction, homogenization, and blending to allow uniform drying. Minimum treatment standards would be implemented to produce a waste form that will resist contaminant leaching and meets or exceeds regulatory standards. Treatment to meet these minimum standards, in the context of waste solidification technologies, is discussed in detail in Section 2.4.6.2 of the Operable Unit 1 Feasibility Study. The volume of the treated material would be more than vitrified material, which in turn would increase the size of the site disposal cell. Long-term risk mitigation is provided by the

combination of waste treatment which reduces waste mobility and placement in the engineered disposal facility, which precludes human and ecological contact, and unacceptable impacts to the Great Miami Aquifer. The excavated material would be processed in about 5 years, yieldingapproximately 1.3 million cubic yards of cement-solidified waste. Remedial action components of drying within Alternative 4B which are identical to Alternative 4A include site preparation, excavation, drying and treatment, on-property disposal in an above-grade cell (the cell would be larger), site restoration, access control measures and monitoring. The on-site O&M cost for Alternative 4B is approximately $280,796. O&M, including maintenance and repair, surveillance, and monitoring is estimated based on 30 years of O&M following remediation. O&M is included in the present worth value.

7.2.4 Alternative 5A - Removal, Treatment (Thermal Drying), and Off-Site Disposal at the NTS

Capital Cost	$856,102,282
Present Worth (PW)	$645,870,000
Months of Operation	60

Alternative 5A is identical to Alternative 4A except that the vitrification is eliminated and, instead of on-site disposal, off-site disposal will be at the NTS. The NTS is a DOE-owned facility that currently accepts low-level radioactive waste from DOE facilities for disposal. It is located approximately 3,219 kilometers (2,000 miles) from the FEMP site in an arid environment far from any population centers. For this alternative, the excavation rate would be limited by the capacity of the dryers. It is estimated that active waste processing would require approximately 5 years.

Off-site disposal at the NTS involves drying and packaging the treated waste in sealed containers that comply with DOE and DOT requirements. The wastes would then be transported in accordance with all DOT requirements.

For this alternative, the waste would be processed and treated by thermal drying to meet the waste acceptance criteria for disposal at the NTS. The dried waste would be sampled prior to shipment. Based on available data in the Final Remedial Investigation Report for Operable Unit 1 and NTS

Waste Acceptance Criteria, Operable Unit 1 pit wastes can meet NTS disposal requirements. However, due to the extreme heterogeneity of the pit wastes, it is possible that isolated pockets of waste could be encountered that would not meet NTS waste acceptance criteria, potentially including mixed wastes. As a contingency, wastes that do not meet the NTS waste acceptance criteria, up to 10 percent of the total waste by volume, may be disposed at a permitted commercial waste disposal facility.

It is possible that localized areas of RCRA characteristic wastes for metals and/or volatile organics could be encountered during remediation and, therefore, not meet NTS waste acceptance criteria (WAC). In the event RCRA characteristic wastes are encountered during waste acceptance criteria sampling, treatment options could be employed. Waste drying will be designed such that it will thermally desorb volatile organics in the waste. Simple modifications to the water treatment process, such as lime addition during the crushing phase of the process, would be undertaken to immobilize metals encountered. If a waste is treated such that it no longer demonstrates a hazardous characteristic, then it is no longer a RCRA hazardous waste. Therefore, any RCRA characteristic wastes that are identified during WAC sampling could be treated such that they are no longer RCRA regulated, leaving only a radiological concern. Since the wastes of Operable Unit 1 are considered low-level radiological wastes which are acceptable for disposal at the NTS, and since they can be treated for RCRA characteristics as noted above, it is anticipated that all waste could meet NTS waste acceptance criteria.

The on-site O&M cost for Alternatives 5A and 5B is approximately $63,722 for each. O&M, including maintenance and repair, surveillance, and monitoring, is estimated based on 30 years of O&M following remediation. O&M is included in the present worth value.

7.2.5 Alternative 5B - Removal, Treatment (Thermal Drying), and Off-Site Disposal at Permitted Commercial Facility

Capital Cost	$513,050,560
Present Worth (PW)	$389,509,000
Months of Operation	60

Alternative 5B is identical to Alternative 5A except that the treated waste would be shipped in bulk directly to a permitted commercial waste disposal facility. Under this alternative, the excavation and drying rate would be the same as Alternative 5A. At this rate, active waste processing would require approximately 5 years.

For this alternative, the waste would be processed and treated by thermal drying to meet the waste acceptance criteria of the disposal facility. Due to the heterogenous nature of the waste in the pits, size reduction, homogenization, and blending would be required for uniform drying. The dried waste would be sampled prior to being loaded into the rail cars. Any waste determined by sampling to be RCRA waste would be packaged separately and then shipped to the commercial disposal facility. Any RCRA characteristic wastes that are identified during WAC sampling could be treated such that they are no longer RCRA regulated, leaving only radiological concerns for the WAC. As a contingency, if any isolated pockets of waste are ready for disposal that do not meet the waste acceptance criteria of the permitted commercial waste disposal facility, it could be disposed at the NTS as long as it meets the NTS waste acceptance criteria. Such alternative disposal would be allowed for up to 10 percent of the total waste volume.

It is possible that localized areas of RCRA characteristic wastes for metals and/or volatile organics could be encountered during remediation and, therefore, not meet the NTS waste acceptance criteria. In the event RCRA characteristic wastes are encountered during waste acceptance criteria sampling, treatment options could be employed. Volatile organic compounds (VOCs) are removed from the waste through thermal desorption during drying and do not return. Simple modifications to the water treatment process, such as lime addition during the crushing phase of the process, would be undertaken to immobilize metals encountered. If a characteristic waste is treated such that it no longer demonstrates a hazardous characteristic, then it is no longer a RCRA hazardous waste. Therefore, any RCRA characteristic wastes that are identified during WAC sampling could be treated such that they are no longer RCRA-regulated, leaving only a radiological concern. Since the wastes of Operable Unit 1 are considered low-level radiological wastes that are acceptable for disposal at NTS, and since they can be treated for RCRA characteristics as noted above, it is anticipated that all waste could meet NTS waste acceptance criteria, if necessary.

8.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

8.1 EVALUATION CRITERIA

Specific legal requirements for remedial actions are established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 121. These requirements include protection of human health and the environment, compliance with Applicable or Relevant and Appropriate Requirements (ARARs) (unless a waiver is obtained), a preference for permanent solutions which use treatment as a principal element (to the maximum extent possible), and cost effectiveness. To determine whether alternatives meet the requirements, the U.S. Environmental Protection Agency (EPA) has identified nine criteria in the National Oil and Hazardous Substances Pollution Contingency Plan that must be evaluated for each alternative selected for detailed analysis. These criteria are as follows:

1. **Overall protection of human health and the environment:** Examines whether a remedy would provide adequate overall protection to human health and the environment in the short- and long-term. Evaluates how risks would be eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls included in the alternative.

2. **Compliance with ARARs:** Addresses whether the alternative attains compliance with federal and state environmental laws and requirements, unless a waiver of an ARAR is obtained.

3. **Long-term effectiveness and permanence:** Evaluates the permanence of the remedy, long term effectiveness and likelihood that the remedy will be successful.

4. **Reduction of toxicity, mobility, or volume through treatment:** Reviews the anticipated treatment technologies to reduce the hazards of, prevent the movement of, or reduce the quantity of waste materials.

5. **Short-term effectiveness:** Evaluates the ability of a remedy to achieve protection of workers, the public, and the environment during construction and implementation of the remedial action.

6. **Implementability:** Examines the ease or difficulty of implementing a remedy, including the availability of materials and services needed during implementation of the remedial action.

7. **Cost:** Reviews both estimated capital and operation and maintenance costs of the remedy. Costs are presented as present worth costs. "Present worth" is defined as the amount of money that, if invested in the first year of implementing a remedy and paid out as needed, would be sufficient to cover all costs associated with the remedy over its planned life.

Present worth costs allow remedies that would occur over different time periods to be compared on an even basis.

8. **State Acceptance:** Evaluates the technical and administrative issues and concerns that the state(s) may have regarding each of the alternatives; and the state comments on ARARs or proposed use of waivers.

9. **Community Acceptance:** Evaluates the issues and concerns the public may have regarding each of the alternatives, including which parts of the alternatives are supported or opposed.

The first two criteria are considered threshold criteria and must be met by the final remedial action alternatives for the Fernald Environmental Management Project (FEMP) site. The next five criteria are considered primary balancing criteria and are considered together to identify and evaluate the balance of tradeoffs among the alternatives. The last two are considered modifying criteria which are considered after comments on the Proposed Plan are received.

8.2 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 8-1 provides an overview of the analysis of the five alternatives. A brief discussion of the nine criteria with respect to the five alternatives follows.

8.2.1 Overall Protectiveness

Alternative 1, the No-Action Alternative, would not protect human health or the environment, since no remedial activities would be conducted and Operable Unit 1 currently presents unacceptable risks to human health and the environment. The other four alternatives, collectively referred to as the "action alternatives," would provide removal, treatment, and disposal of the waste pit material and contaminated soils to levels that would protect human health and the environment. (Alternatives 4A and 4B provide for on-property disposal, while Alternatives 5A and 5B provide for off-site disposal.) Once remediation is complete, the total calculated residual risk (incremental lifetime cancer risk) for Alternatives 5A and 5B, assuming continued use of the land as a government reserve, is 2.9×10^{-7} with a corresponding Hazard Index of 0.1. Under this scenario, the off-property farm family and the expanded trespasser are the hypothetical receptors. For a more detailed discussion of residual risk, see Appendix D, Section 7, in the Final Feasibility Study for Operable Unit 1 .

TABLE 8-1

OPERABLE UNIT 1
COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility or Volume Through Treatment	Short-Term Effectiveness	Implementability	Present Worth Cost
1 - No Action	Not protective	Does not meet all ARARs	Not effective or permanent	No treatment	High	Easy	Very Low
4A - Removal, Treatment, (Vit), and On-Property Disposal	Protective[a]	Complies with all ARARs[b]	Effective	Reduces toxicity, mobility, and volume	Moderate	Innovative Technology; Difficult	Moderately High
4B - Removal, Treatment (Cem) and On-Property Disposal	Protective[a]	Complies with all ARARs[b]	Effective	Reduces mobility, but increases volume	Moderate	More Reliable Technology; Difficult	Moderate
5A - Removal, Treatment (Drying), and Off-Site Disposal at NTS	Protective[a]	Complies with all ARARs	Highly Effective	Does not affect toxicity or mobility, but slightly decreases volume	Moderate	Reliable Technology; Moderately Difficult	High
5B - Removal, Treatment (Drying), and Off-Site Disposal at a Permitted Commercial Disposal Facility	Protective[a]	Complies with all ARARs	Highly Effective	Does not affect toxicity or mobility, but slightly decreases volume	Moderate	Reliable Technology; Moderately Difficult	Moderate

[a] Assessment of protectiveness assumes the use of continued federal government ownership and evaluates risk to the off-property farmer.
[b] Assumes substantive technical requirements for Ohio disposal facility siting are met sufficiently to obtain a waiver from the ARAR.

SOURCE - Final Feasibility Study for Operable Unit 1 (DOE, 1994a)

8.2.2 Compliance with ARARs

All action alternatives would either attain pertinent ARARs or justify that a waiver of an ARAR(s) may be appropriate. A comprehensive list of potential ARARs is presented in Appendix F of the Final Feasibility Study for Operable Unit 1 for both on-site and off-site disposal alternatives. Key requirements are discussed in Section 10.

8:2.3 Long-Term Effectiveness and Permanence

Alternative 1, No-Action, would not be effective in the long term, since the Baseline Risk Assessment indicates that the current site conditions would not, in the long term, be protective of human health and the environment and no remedial activities would be conducted on Operable Unit 1 under this alternative.

The four action alternatives (Alternatives 4A, 4B, 5A, and 5B), if they perform as designed, are expected to be effective in the long term and provide permanent solutions. Alternatives 4A and 4B provide excavation, treatment, on-property disposal in an on-site engineered disposal facility, designed for a 1,000-year life with minimal maintenance, as well as capping of residual contamination. These alternatives would be approximately equal in effectiveness at reducing the residual risks to potential receptors. Long-term environmental impacts associated with construction of the on-property disposal cell and the probable maximum flood (PMF) channel for Alternatives 4A and 4B include permanent disruption of up to 47.3 hectares (116.9 acres) of land. No significant long-term impacts are expected for water quality and hydrology, air quality, socioeconomics, or cultural resources. The construction of an on-property disposal cell for Operable Unit 1 remediation waste would permanently disrupt 0.5 hectare (1.3 acres) of drainage ditch/swale wetlands. The 100- and 500-year floodplains would not be permanently altered by regrading and revegetation activities.

Alternatives 5A and 5B would provide excavation, treatment, off-property disposal, and capping of residual contamination. Approximately 1.89 hectare (4.67 acres) of wetlands would be impaired by various equipment traffic and soil removal, resulting in physical disturbance and filling of wetland areas. The 100- and 500-year floodplains would not be permanently altered by regrading and revegetation activities. These two alternatives would be equally effective at reducing residual risks to potential receptors. The long-term effectiveness of these alternatives is judged to be more certain than

for Alternatives 4A and 4B, since the pit waste material, a potential contaminant source, would be removed from the site. As discussed in the following paragraphs, the two potential off-site disposal locations are in a very dry climatic region with no surface water in the vicinity, no usable groundwater and no human populations within many miles. The FEMP site, however, overlies a sole-source aquifer and is in a relatively populated area. In the event waste treatment and/or engineering and institutional controls fail, there is a greater potential for human health and the environment to be impacted at the FEMP site then at either of the two off-site locations.

There are no long-term environmental impacts at the FEMP pertaining to the removal and treatment processes as a result of implementing mitigative measures. Long-term environmental impacts off-site (e.g., acquisition of borrow material) and on site (2.8 hectares [7 acres] north and adjacent to the waste pit area) would include some permanent disturbance of soils associated with backfilled cover or disposal activities. No significant long-term impacts from off-site disposal would be expected for water quality and hydrology, air quality, biotic resources, socioeconomics and land use, or cultural resources.

The Nevada Test Site (NTS) disposal facility (Alternative 5A) is located in a sparsely populated, arid environment with minimal potential for leachate generation and contaminant migration. Because the NTS is owned and maintained by U.S. Department of Energy (DOE) and utilized for the disposal of selected low-level wastes from other DOE sites, the uncertainties associated with institutional controls are low. As the result of a low average annual precipitation and very deep groundwater, impacts to human health and the environment would be effectively mitigated in the event engineering and institutional controls fail.

Similar to the NTS, the representative permitted commercial waste disposal facility in Utah (Alternative B), is located in a sparsely populated, arid environment with insignificant potential for leachate generation and contamination migration. A combination of the high evapotranspiration rate, dry-dense soil bodies, highly mineralized and unusable groundwater, and lack of surface waters in the area make the facility physically conducive for the disposal of treated waste. As a result of the arid climate and the distance from population centers, impacts to human health and the environment would be effectively mitigated in the event engineering and institutional controls fail.

8.2.4 Reduction of Toxicity, Mobility, or Volume

Alternative 1, the No-Action Alternative, does not include treatment and would not result in a reduction of toxicity, mobility, or volume. The treatment process for the on-property disposal Alternatives 4A and 4B consists of vitrification and cement solidification respectively. For Alternatives 5A and 5B, the wastes would be treated by drying to meet the waste acceptance criteria of the off-site disposal facilities.

The treatment associated with Alternatives 4A (vitrification, which physically binds the constituents into a glass-like matrix) and 4B (cement solidification, which physically binds constituents into a cement mixture) would reduce the mobility of contaminants. In addition, the high temperatures associated with vitrification would destroy any residual organics remaining in the waste after drying. After drying, cement solidification would significantly increase the overall waste volume while vitrification would very slightly reduce it.

Alternatives 5A and 5B would not provide any treatment that significantly alters toxicity, mobility, or volume of contaminants. They employ treatment of the waste by drying. The drying technology has limited ability to irreversibly treat waste. Volatile organic compounds are removed from the waste through thermal desorption during drying and do not return. In addition, drying and size reduction would slightly reduce the volume of material by reducing the moisture content and void ratio. Upon treatment, it is anticipated that the material would meet the waste acceptance criteria of the off-site disposal facilities. Appendix J of the Final Feasibility Study for Operable Unit 1 presents the criteria for both facilities and documents DOE's capability to meet those criteria.

8.2.5 Short-Term Effectiveness

Alternative 1, No Action, would be very effective in the short term, relative to adverse impacts during construction since there would be no remedial activities. Therefore, there would be no additional risk to workers or the community near the FEMP site due to implementation of the No-Action Alternative.

The four action alternatives involve remedial activities and therefore all pose some risk to workers and the community. However, all four of the action alternatives would protect human health and the

environment in the long term. Remediation workers, non-remediation workers, and the community would be subject to minimal chemical and radiological exposures. In addition, remediation workers would be subject to occupational hazards while performing remedial activities. Appendix D of the Final Feasibility Study for Operable Unit 1 documents assessment of these risks.

The short-term risks (excluding transportation) to remediation workers would be approximately the same for Alternatives 4A and 4B, with Alternative 4B having a slightly higher potential for accidents than Alternative 4A. The short-term risks for Alternatives 5A and 5B (excluding transportation and waste container handling) would be equal to, and somewhat lower than, Alternatives 4A and 4B, due to the higher potential for accidents associated with on-property disposal. However, there would be the potential for exposures and accidents associated with transportation and waste container handling. Taking these risks into account, Alternative 5A would have higher dose equivalents and potential accidents for remediation workers than any of the other action alternatives. Alternative 5B, with less waste handling required by bulk waste shipment, would have the potential for significantly fewer accidents and exposures than the other alternatives, even after adding risks associated with transportation.

The short-term risks (excluding transportation) to off-site individuals and non-remediation workers would be approximately the same for all four action alternatives. During transportation of waste materials, Alternative 5A would result in slightly higher risks to communities along the transportation route than Alternative 5B because of the double handling of waste sent to NTS. No transportation risks are associated with Alternatives 4A and 4B.

The active waste processing and disposal periods for Alternatives 4B, 5A, and 5B are all approximately 5 years. That period is approximately 10 years for Alternative 4A.

During remediation, all four action alternatives would protect the community and workers through the use of engineered and institutional controls. Short-term risks to the community (not including transportation) and to non-remediation workers would be approximately equal and within acceptable risk limits for all four action alternatives.

Short-term impacts associated with the action alternatives would include temporary disruption of approximately 2.8 hectares (7 acres) of land at the FEMP site as a result of borrow areas and approximately 6.1 hectares (15 acres) of land for construction of the support facilities. Potential impacts associated with increased fugitive dust emissions during excavation activities and minor impacts to biota and wetlands (up to 42 hectares [98 acres]) exist. However, appropriate engineering controls would minimize these potential short-term impacts. All transportation to off-site facilities would be in compliance with DOT regulations and DOE orders and guidelines.

Since both Alternatives 4A and 4B involve site preparation and construction for a treatment facility and an on-site disposal cell, they would result in an additional temporary disruption of 5.3 hectares (13 acres) from equipment movement during on-site disposal cell construction. The nature and extent of impacts to biota from implementing Alternatives 4A and 4B would be similar. Potential environmental impacts associated with implementing Alternatives 4A and 4B include the permanent loss of some on-site habitats. Short-term impacts include the temporary loss of habitats at the FEMP site and possible impacts of accidental spills of construction and operational materials. Long- and short-term impacts include potential threatened or endangered (federal or state) species habitat. Mitigative measures and engineering controls would be employed to minimize these short-term impacts and risks.

8.2.6 Implementability

The technical implementability for the selected alternative (Alternative 5B) is judged to be better than for the alternatives involving additional treatment and on-site disposal. The technologies associated with waste excavation, handling, drying, containerization and off-site transportation are commonly applied throughout various industries. Further, the heterogeneity of the waste pit contents is not likely to adversely affect the implementability of any of these technologies. In contrast, the waste heterogeneity does impact the ability to treat the wastes using cement solidification or vitrification (Alternatives 4A and 4B, respectively). The impacts of waste heterogeneity are discussed further in the technical feasibility discussion.

8.2.6.1 Technical Feasibility

Alternative 1 would be easy to implement because there would be no removal, treatment or disposal actions required.

For the action alternatives (Alternatives 4A, 4B, 5A, and 5B), removal and disposal activities would be very similar. All could be implemented using standard equipment, procedures, and readily available resources. Dry and wet excavation methods would be implemented with careful excavation planning. The disposal cell size for Alternative 4B, although still readily implementable, would be approximately double the size of the Alternative 4A cell due to the 100 percent increase in volume produced by cement solidification used in Alternative 4B. Variations in treatment options employed by these alternatives have varying degrees of technical feasibility. The vitrification process used in Alternative 4A would be considered to be marginally less difficult to implement generically for all types of waste material encountered at Operable Unit 1. Vitrification process equipment would be more complex to construct and operate than that of the cement solidification process, yet the extreme heterogeneity of the waste would make successful cement/waste mix formulation and quality control extremely difficult. A full-scale facility for vitrification of hazardous or radioactive waste similar to the waste at Operable Unit 1 has not yet been constructed elsewhere, and thus the start-up of a first-of-its-kind facility is expected to be difficult. Cement solidification has been previously applied to similar low-level wastes with varying degrees of success. The construction of either the vitrification facility or the cement solidification facility is expected to be straightforward. Vitrification technology is not as widely available as the cement solidification technology. The complexity of off-gas treatment for gases emitting during vitrification is also an additional complexity where difficulties could occur. However, operational experience is being gained as part of the structured treatability studies and vitrification pilot facility planning currently in progress.

The cement solidification facility would be difficult to operate due to the heterogenous nature of the waste in the pits. The mix would need constant testing to ensure that the solidified waste would meet performance requirements. However, EPA considers cement solidification a demonstrated treatment technology and has approved its use in the final remedy for many National Priorities List sites. The cement solidification process would require large quantities of cement and other additives which increases the volume of the treated waste.

The technical feasibility of Alternatives 5A and 5B are dependent upon meeting the waste acceptance criteria of the disposal site and off-site transportation requirements. Based on the evaluation of the waste material, it is expected that the treated waste would meet the waste acceptance criteria at both the representative permitted commercial waste disposal facility and the NTS. It is possible that localized areas of Resource Conservation and Recovery Act (RCRA) characteristic wastes for metals and/or volatile organics could be encountered during remediation and, therefore, not meet NTS waste acceptance criteria. In the event RCRA characteristic wastes are encountered during waste acceptance criteria sampling, treatment options could be employed. Waste drying will be designed such that it will thermally desorb volatile organics in the waste. Simple modifications to the waste treatment process, such as lime addition during the crushing phase of the process, would be undertaken to immobilize metals encountered. It should be noted that if a characteristic waste is treated such that it no longer demonstrates a hazardous characteristic, then it is no longer a RCRA hazardous waste. Therefore, any RCRA characteristic wastes that are identified during waste acceptance criteria sampling could be treated such that they are no longer RCRA regulated, leaving only radiological concerns for waste acceptance criteria. Since the wastes of Operable Unit 1 are considered low-level radiological wastes which are acceptable for disposal at NTS and since they can be treated for RCRA characteristics as noted above, it is anticipated that all wastes could meet NTS waste acceptance criteria, if necessary.

Off-site transportation is technically feasible for both alternatives as further discussed under administrative implementability. Nevertheless, logistics issues associated with transporting large volumes of material would make implementation moderately difficult for both Alternatives 5A and 5B. Both the NTS and the representative permitted commercial waste disposal facility have the capacity to accept wastes from Operable Unit 1. Appendix J of the Final Feasibility Study for Operable Unit 1 discusses the ability of Alternatives 5A and 5B to meet the respective waste acceptance criteria.

8.2.6.2 Administrative Feasibility

Alternatives 4A and 4B would be conducted entirely on site and would not require issuance of any permits. The only known administrative barrier to implementing Alternatives 4A and 4B is the need to obtain a waiver of the ARAR prohibition against building a disposal facility over a sole-source

aquifer. Specifically, a waiver from the Ohio ARAR would be required to implement these alternatives.

Off-site disposal Alternatives 5A and 5B consist of on-site and off-site activities. The excavation, material handling and processing of the wastes will occur entirely on site. For these portions of the remedial alternative the administrative feasibility analysis presented above would apply, i.e., no permit is required for on-site remediation. However, the off-site transportation and disposal of the wastes would have to comply with applicable permitting requirements.

The Off-Site Rule (58 FR 49200) provides that a facility used for off-site management of wastes generated from CERCLA response actions must be in physical compliance with RCRA, and/or other applicable Federal and State laws. In addition, the following criteria must be met:

- Units receiving CERCLA waste at RCRA Subtitle C facilities must not be releasing any hazardous wastes, hazardous constituents, or hazardous substances.
- Receiving units at Subtitle C land disposal facilities must meet minimum technology requirements.
- All releases from non-receiving units at land disposal facilities must be addressed by a corrective action program prior to using any unit at the facility.
- Environmentally significant releases from non-receiving units at Subtitle C treatment and storage facilities, and from all units at other-than-Subtitle C facilities, must also be addressed by a corrective action program prior to using any unit at the facility for the management of CERCLA wastes.

EPA makes the final determination as to whether potential receiving facilities can receive CERCLA waste, with the respective state in which the receiving facility is located, being an active participant in the decision-making process. In addition, the distinction between criteria for CERCLA wastes resulting from pre- and post-SARA decision documents has been removed.

DOE will conduct an audit of the disposal facility prior to shipping Operable Unit 1 waste to confirm the facility's status and compliance history. The review will be conducted annually throughout the term of the remediation project. In the event the compliance status of the disposal facility would change, DOE would temporarily suspend waste shipments until the actions/requirements for regaining

acceptability status under the policy were implemented and the facility becomes designated as acceptable.

Review of applicable DOT regulations (49 CFR Parts 171-173) indicates there are currently no provisions that would prohibit shipments of the Operable Unit 1 waste from the site to the NTS or a permitted commercial waste disposal facility using either trucks or rail. In addition, there are no known transit state or local regulations that would categorically prohibit waste shipment.

For Alternative 5B, which proposes off-site disposal at a permitted commercial waste disposal facility, it is noted that DOE Order 5820.2A currently prohibits use of commercial disposal facilities for disposal of low-level radioactive wastes of the type present in Operable Unit 1; but the order does have an exemption provision. An exemption request to DOE Order 5820.2A has been approved by DOE Headquarters, Office of Waste Management, so that Operable Unit 1 pit wastes can be disposed at a permitted commercial waste disposal facility (DOE 1994d).

In summary, the on-site disposal alternatives (4A and 4B) would require a waiver of the State of Ohio prohibition against disposal over a sole-source aquifer [OAC 3745-27-07(B)(5)]; this regulation is an ARAR. The administrative feasibility of the off-site disposal alternatives (5A and 5B) are moderately difficult because of the transportation of wastes through a number of states and municipalities. There is no administration involved with the No-Action Alternative.

8.2.7 Cost

The selected alternative, with disposal at a permitted commercial waste disposal facility, has a very slight cost advantage compared to Alternative 4B. There is a larger cost advantage compared to Alternative 4A. The most costly alternative is for off-site disposal at the Nevada Test Site. Cost calculations are provided in Appendix E of the Final Feasibility Study Report.

8.2.8 State Acceptance

The State of Ohio supports DOE's selected remedy; a letter detailing Ohio support is shown in Appendix A.

Copies of the Proposed Plan were distributed to the State of Utah and to the State of Nevada. No comments were received.

8.2.9 Community Acceptance

Based on public comment received during the formal public comment period, the public generally accepted the selected remedy. Public comments focused on how the remedy should be implemented, instead of whether it should be implemented. All comments received are identified and responded to in the Responsiveness Summary (Appendix A).

9.0 SELECTED REMEDY

Based upon consideration of the requirements of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the detailed analysis of the alternatives using the nine criteria, and public and State comments, the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) have determined that Alternative 5B is the most appropriate remedy for Operable Unit 1 at the Fernald Environmental Management Project (FEMP).

The primary components of the selected remedy (Alternative 5B) include the excavation of the waste pit contents, waste processing and treatment by thermal drying, and off-site disposal at a permitted commercial disposal facility. All key components of the selected remedy are summarized below.

9.1 KEY COMPONENTS

The selected remedy consists of the following key components:

- Construction of waste processing and loading facilities and equipment.
- Removal of water from open waste pits for treatment at the site's wastewater treatment facility.
- Removal of waste pit contents, caps and liners, and excavation of surrounding contaminated soil.
- Confirmation sampling of waste pit excavations to verify achievement of remediation levels.
- Pretreatment (sorting/crushing/shredding) of waste.
- Treatment of the waste by thermal drying as required to meet the waste acceptance criteria of the disposal facility.
- Waste sampling and analysis prior to shipment to ensure that the waste acceptance criteria (WAC) of the disposal facility are met.
- Off-site shipment of waste for disposal at a permitted commercial waste disposal facility. It is estimated that over 600,000 cubic yards of waste material will be excavated and disposed as low-level radioactive waste.
- As a contingency, shipment of any waste that fails (due to radiological concentrations) to meet the waste acceptance criteria of the permitted commercial waste disposal

facility (up to 10 percent of the total waste volume) for disposal at the Nevada Test Site (NTS).

- Decommissioning and removal of the drying treatment unit and associated facilities, as well as miscellaneous structures and facilities within the operable unit. Oversized material that is amenable to the selected alternative for Operable Unit 3 would be segregated from Operable Unit 1 waste, decontaminated, and forwarded to Operable Unit 3 to be managed as construction rubble.
- Disposition of remaining Operable Unit 1 residual contaminated soils consistent with selected remedies for contaminated process area soils as documented in the Operable Unit 5 Record of Decision. Any materials not amenable to the Operable Unit 5 remedy will be disposed as waste materials (i.e., shipped off site).
- Placement of backfill into excavations and construction of cover system.

Table 9-1 summarizes the total capital cost associated with each major cost element of the selected remedy, including the estimated annual maintenance costs after the completion of active remedial action. The total net present value cost of the selected remedy is estimated at $389,509,000.

The selected remedial alternative offers a reduction of the potential risk to human health associated with the site as it currently exists. Results of the Baseline Risk Assessment, performed as part of the Operable Unit 1 Remedial Investigation Report, indicated that the potential risk to human health associated with the "no further action" alternative was unacceptably high.

According to Table D.6-1 of the Final Feasibility Study for Operable Unit 1, the total dose equivalent to remediation workers during implementation of Alternative 5B is 100 millirem. The mechanical hazard risk to remediation workers is quantified for Alternative 5B as 25 potential occurrences for injuries and 0.36 potential occurrences for fatalities during implementation of the remedial alternative. As shown in Table D.6-3 of the Final Feasibility Study for Operable Unit 1, the total radiological and chemical cancer risk to nonremediation workers during implementation of remedial Alternative 5B is 5.2×10^{-5}. The total radiological and chemical risk to off-site individuals during implementation of the remedial alternative is 2.9×10^{-6}. Finally, the transportation risk for Alternative 5B is 4.6×10^{-5}.

For more detailed discussion of risks during remediation, see Appendix D, Section 6.0, of the Final Feasibility Study for Operable Unit 1.

TABLE 9-1
OPERABLE UNIT 1
COST ESTIMATE FOR ALTERNATIVE 5B:
REMOVAL, TREATMENT, AND OFF-SITE DISPOSAL AT
A REPRESENTATIVE COMMERCIAL DISPOSAL FACILITY

Item	Cost ($Million)
Capital Cost	
Ancillary Facilities	10
Waste Pit Excavation (5 years)	63
Waste Pit Backfill (5 years)	12
Pretreatment Facility	14
Rail Sidings	6
Rotary Drying (5 years)	78
D&D Off-Site Disposal	8
Shipping and Disposal (Commercial)	322
Total Capital Cost	513
Post-Remediation O&M Cost[a]	2
	515

[a] Post-Remediation O&M Cost would continue for 30 years (Cost estimating purposes only) at an annual cost of approximately 0.06 million dollars per year.

SOURCE - Final Feasibility Study for Operable Unit 1 (DOE, 1994a)

Once remediation is complete, the total calculated residual risk (incremental lifetime cancer risk) for Alternative 5A and 5B assuming continued use of the land as a government reserve is 2×10^{-7}. Under this scenario, the off-property farm family and the expanded trespasser are the hypothetical receptors. For a more detailed discussion of residual risk, see Appendix D, Section 7.0 of the Final Feasibility Study for Operable Unit 1.

As discussed in Section 7 of this Record of Decision, the selected remedy attains all Applicable or Relevant and Appropriate Requirements.

9.2 SOIL CLEANUP CRITERIA

The Remedial Investigation, including the Baseline Risk Assessment, has documented that the waste pit contents are significantly contaminated and require remediation. There are varying degrees of contamination of the surface soil within Operable Unit 1, which are not associated with the waste pit contents. There is also expected to be varying degrees of contamination in the soils beneath the waste pits.

Accordingly, remediation levels have been established for both surface soils and the soils beneath the waste pits. Remediation levels are presented in Table 9-2 (for surface soils) and Table 9-3 (for subsurface soils beneath the waste pits). These levels are protective of human health and the environment, assuming continued Federal ownership of the site as provided in the selected remedy. No remediation levels are presented for waste pit materials since this material will be removed as part of the Remedial Action. Additionally, only COCs for which remediation was determined to be needed are shown on Tables 9-2 and 9-3.

The Operable Unit 1 remediation levels in this Record of Decision will be re-examined by the Operable Unit 5 Feasibility Study and Record of Decision, based upon available Operable Unit 5 Feasibility Study conclusions, recommendations from the Fernald Citizens Advisory Task Force, and public comment. Specifically, the risk assessment for the Operable Unit 5 Feasibility Study will include additional trespassing scenarios as well as recreational exposure scenarios, which will be fully developed on a site-wide basis, in the Operable Unit 5 Remedial Investigation/Feasibility Study. A full array of trespassing and recreational scenarios, ranging from no trespassing through full

TABLE 9-2

REMEDIATION LEVELS IN SURFACE SOILS

Constituent of Concern	Expanded Trespasser HI = 1 PRG	Expanded Trespasser 10^{-6} ILCR PRG	Background (95th percentile)	ARAR Target	Max. Detected Soil Concentration		**Remediation Levels**[a]	HI to Receptors from Remediation Levels Expanded Trespasser	Risk to Receptors from Remediation Level Expanded Trespasser[b]
					Surface	Sub surface			
Radionuclides (pCi/g)									
Cs-137 + 1 progeny	N/A	1.1	0.71	None	6	<0.2	**1.8**	N/A	1.6×10^{-6}
Th-230	N/A	900	2.0	None	972	3.5	**902**	N/A	1×10^{-6}
U-235	N/A	9.2	0.15	None	51	3.9	**9.3**	N/A	$< 1 \times 10^{-6}$
U-238 + 2 progeny	N/A	55	1.2	None	1500	104	**56**	N/A	1.9×10^{-6}
Chemical (mg/kg)									
Beryllium	130	2.1	0.6	None	0.77	NA	**2.1**	<0.01	2.5×10^{-5}
Uranium	380	N/A	3.6	None	2100	309	**190**[c]	0.5	N/A

[a] This column is formatted in bold print for ease of reference only.
[b] Includes the direct radiation, soil ingestion, and inhalation pathways.
[c] 0.5 times the PRG, to protect against multiple chemicals.

NA = Not Available.
N/A= Not Applicable.

SOURCE - Final Feasibility Study for Operable Unit 1 (DOE, 1994a)

TABLE 9-3
OPERABLE UNIT 1
PIT SUBSURFACE SOIL REMEDIAL LEVELS
BASED ON GROUNDWATER MODELING

	Waste Pit 1				Waste Pit 2				Waste Pit 3			
Constituent of Concern	Off-Property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**	Off-Property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**	Off-Property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**
Radionuclides (pCi/g)												
Tc-99	2.5E+00	2.2E-01	0.0E+00	**NR**	5.5E+00	3.3E-01	6.2E+02	**5.5E+00**	7.5E-01	7.7E-02	1.1E+03	**7.5E-01**
U-238 +2d	1.3E+04	1.9E+02	1.6E+04	**1.3E+04**	3.1E+04	4.0E+02	1.8E+04	**NR**	2.2E+03	4.6E+01	1.7E+03	**NR**
Chemical (mg/kg)												
PCBs[c]	7.8E-01	4.8E-03	4.6E+00	**7.8E-01**	NC	NC	0.0E+00	**NR**	NC	NC	0.0E+00	**NR**

TABLE 9-3
(Continued)

Constituent	Waste Pit 4				Waste Pit 5				Waste Pit 6			
	Off-Property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**	Off-property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**	Off-property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**
Radionuclides (pCi/g)												
Tc-99	2.6E-01	2.0E-01	2.3E+02	**2.6E-01**	1.4E+00	9.5E-02	3.0E+03	**1.4E+00**	7.3E+00	4.2E-01	1.6E+02	**7.3E+00**
U-238 +2d	1.1E+04	1.9E+02	4.2E+04	**1.1E+04**	4.7E+03	6.4E+01	1.5E+03	**NR**	4.1E+04	4.8E+02	2.3E+04	**NR**
Chemicals (mg/kg)												
PCBs[c]	NC	NC	0.0E+00	**NR**	NC	NC	0.0E+00	**NR**	NC	NC	0.0E+00	**NR**

TABLE 9-3
(Continued)

	Burn Pit				Clearwell			
Constituent of Concern	Off-Property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**	Off-Property User PRG	On-Property User PRG	Pit Waste Conc. (95% UCL)	**Remedial Level[a,b]**
Tc-99	1.4E+01	2.9E-01	6.4E+01	**1.4E+01**	9.9E+00	5.9E-01	7.0E+02	**9.9E+00**
U-238 +2d	8.4E+04	3.6E+02	2.0E+03	**NR**	5.9E+04	7.1E+02	1.6E+03	**NR**
Chemicals (mg/kg)								
PCBs[c]	NC	NC	0.0E+00	**NR**	NC	NC	0.0E+00	**NR**

[a] Type is boldfaced to highlight remediation levels.
[b] Where calculated remedial levels are lower than background, the COC will be cleaned to established background levels.
[c] PCBs (polychlorinated biphenyls)include all Aroclor congeners.
NC = Not calculated
NR = No Remediation Required

SOURCE - Final Feasibility Study for Operable Unit 1 (DOE, 1994a)

recreational use of the site will be developed. If found to be necessary, the Operable Unit 5 Record of Decision will modify the Operable Unit 1 remediation levels downward to ensure protectiveness of human health and the environment. The Operable Unit 5 Record of Decision will be finalized prior to excavation at Operable Unit 1. As noted previously, groundwater remediation will be addressed by Operable Unit 5.

The remediation levels for soil cleanup, presented in this Record of Decision, were developed for an expanded trespasser receptor under a future land use with continued federal ownership. The future land use with continued federal ownership scenario represents a government reserve which remains under government control with no future development intended. Active access controls currently in place at the FEMP site would be discontinued, but the federal government would exercise the right to preclude site development through deed restrictions. This land use scenario was not included in the Baseline Risk Assessment, but it was developed in a part of the Feasibility Study for Operable Unit 1 to facilitate evaluation of long-term risks with continued land use restrictions. In addition to deed and land development restrictions, fences will be erected and equipped with signs posted to prohibit trespassing.

The expanded trespasser receptor was developed to represent an adult and/or child that visits the site despite restrictions imposed under continued federal ownership. The possible activities of this hypothetical receptor include hiking, roaming, bird watching, and other similar activities.

9.3 MEASURES TO MINIMIZE ENVIRONMENTAL IMPACTS

All practical measures would be employed at the FEMP site to minimize environmental impacts during the implementation of the Operable Unit 1 Remedial Action. DOE has factored environmental impacts into the decision making process for the Operable Unit 1 Remedial Action.

Measures to minimize environmental impacts to on-property natural resources (e.g., wildlife and wildlife habitat, wetlands, floodplains, surface water, groundwater) have been identified in the Final Feasibility Study for Operable Unit 1 and the Proposed Plan and will be factored into the Remedial Design and Remedial Action. Operable Unit 1 remedial activities would not significantly impact floodplain areas at the FEMP. The implementation of engineering controls (e.g., expeditious

backfilling, silt fences, and hay bales) will minimize indirect impacts such as runoff and sediment deposition to the floodplain. All physically disturbed areas of the floodplain would be regraded to near original contours, resulting in no change to flood elevations.

The temporary disturbance of on-property vegetation and wildlife habitat would result from excavation of pit waste and residual soil, utilization of the on-property borrow area, and construction of support facilities. Approximately 5.37 hectares (13.27 acres) of riparian habitat supporting potential habitat of threatened and endangered species and a wide variety of other flora and fauna would be impacted. Potential habitat of threatened and endangered species to be impacted include the Federally-endangered Indiana bat, and the state endangered slender fingergrass and mountain bindweed. Actual habitat of the state threatened Sloan's crayfish would also be impacted from increased sediment load into Paddys Run.

Impacts to biotic resources from Operable Unit 1 Remedial Action activities would be offset by implementing mitigative measures in consultation with appropriate Federal and State agencies. The riparian habitat could be restored by planting riparian tree species such as sycamores and cottonwoods upon completion of remedial activities. Shagbark hickories, which provide optional roosting habitat for the Indiana bats, would also be planted. Shrub species could also be planted in the Operable Unit 1 area to assist in the secondary successional process and wildlife boxes could be installed to re-establish mammal and bird populations. To mitigate the loss of Indiana bat habitat, snags (transplanted dead trees) could be placed along Paddys Run, upstream of the Waste Storage Area. Slender fingergrass and mountain bindweed could be relocated to suitable habitat elsewhere in the State of Ohio.

Sloan's crayfish populations in Paddys Run would be impacted from increased sediment load as a result of remedial activities. Mitigation of these impacts include runoff control measures (silt fences, hay bales) to minimize sediment deposition. To further minimize impacts to Sloan's crayfish, regrading activities near Paddys Run should occur in the dry season, when the presence of Sloan's crayfish is primarily in the northern section of Paddys Run, under the railroad trestle. If necessary Sloan's crayfish would be relocated further upstream of remedial activities in pooled sections of Paddys Run.

A total of approximately 1.89 hectares (4.67 acres) of wetlands would be impacted as a result of implementation of the Operable Unit 1 Remedial Action. Mitigation for wetland impacts would be determined using the 404 (b)(1) guidelines of the Clean Water Act.

Regrading and excavation activities would result in the potential for increased sediment loads to Paddys Run. Sediment deposition would be minimized through appropriate engineering controls such as vegetative cover, silt fences, and hay bales. In addition, gaseous emissions from the shredding and drying processes would pass through a combination quencher/scrubber equipped with High Efficiency Particulate Air (HEPA) filters to remove regulated pollutants and particulates, reducing emissions to the ambient air to acceptable levels.

To avoid impacts on cultural resources, an archeological survey will be performed at the FEMP to determine the presence of Historic and Pre-Historic (archaeological) sites eligible for the National Register of Historic Places. However, since most areas of Operable Unit 1 have been previously disturbed, and because of associated safety hazards, cultural resource surveys associated with Operable Unit 1 will be limited. If an undertaking is found to have an adverse impact, consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office would be required under the National Historic Preservation Act Section 106 process. If an adverse impact to a cultural resource cannot be avoided, a Memorandum of Agreement, Programmatic Agreement, or Understanding of Agreement must be adhered to by the Advisory Council, State Historic Preservation Office, and DOE.

The selected remedy for Operable Unit 1 includes the removal of contaminated surface soil from the entire Operable Unit 1 Area and replacement with fill material. The primary pathways of concern for ecological receptor contact with Operable Unit 1 include surface soil and runoff of surface soil to surface water bodies. Therefore, ecological receptors would have minimal contact with residual contaminants and residual contamination would not pose a risk to ecological receptors within Operable Unit 1.

10.0 STATUTORY DETERMINATIONS

In accordance with the requirements of Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), remedial actions taken pursuant to Sections 104 and 106 must satisfy the following:

- Be protective of human health and the environment.
- Comply with all Applicable or Relevant and Appropriate Requirements (ARARs) established under federal and state environmental laws (or justify a waiver).
- Be cost effective.
- Utilize permanent solutions and alternative technologies or recovery technologies to the maximum extent practicable.
- Satisfy the statutory preference for remedies that utilize treatment and also significantly reduce the toxicity, mobility, and volume of the hazardous substances, pollutants or contaminants.

In addition, the Amended Consent Agreement requires five-year reviews to determine if adequate protection of human health and the environment is being maintained when remedial actions result in hazardous substances remaining on site above health-based levels. The first review takes place five years after remedial action initiation. The health-based cleanup levels established in this Record of Decision are protective of human health and the environment assuming continued Federal ownership of the site. However, the remediation levels will be reviewed by the Operable Unit 5 Feasibility Study and Record of Decision, based upon available Operable Unit 5 Feasibility Study conclusions, recommendations concerning future land use from the Fernald Citizens Task Force, and further public comment. If found to be necessary, the Operable Unit 5 Record of Decision will modify the Operable Unit 1 remediation levels downward to further ensure protectiveness of human health and the environment. The Operable Unit 5 Record of Decision will be finalized prior to waste pit excavation at Operable Unit 1.

10.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy is protective of human health and the environment by: 1) removing the sources of contamination to health-based levels, 2) treating (by thermal drying) the materials causing the

principal threats from Operable Unit 1, 3) disposing of treated materials at an off-site location which provides the appropriate level of long-term protectiveness, and 4) remediating residual contaminated soils to levels which are protective. The waste pit contents, contaminated liners, and grossly contaminated cover materials and residual soils as required will be excavated, treated by thermal drying and disposed off site at a permitted commercial disposal facility. Thermal drying will facilitate material handling for disposal, allow compliance with waste acceptance criteria at the disposal facility, thermally desorb volatile organic contaminates in the wastes, and inhibit contaminant migration after disposal by removing the large volume of contaminated leachate currently available in the wastes. Contaminated surface soil, contaminated soil beneath the pits and cover soils, as appropriate, will be excavated and managed in a manner consistent with the remedy selected in the Operable Unit 5 Record of Decision, as related to the process area soils. If it is not possible to excavate or manage the soils in a manner consistent with the Operable Unit 5 remedy, these materials will be managed as pit wastes. Baseline cancer risks from current conditions exceed the 1×10^{-4} to 1×10^{-6} (1 in 10,000 to 1 in 1,000,000) acceptable cancer risk range established by the U.S. Environmental Protection Agency (EPA). Under the future land use scenario of continued federal ownership and the expanded trespasser receptor, the residual cancer risk associated with Operable Unit 1 will be reduced to levels within the acceptable target risk range. Non-carcinogenic risks would be reduced to acceptable levels as well. Short-term threats associated with the remedy would be managed through appropriate engineering controls.

10.2 COMPLIANCE WITH ARARs

The selected remedy will comply with all ARARs and To Be Considered (TBCs) and will be performed in accordance with all pertinent U.S. Department of Energy (DOE) Orders. The ARARs associated with the selected remedy are summarized below according to type of ARAR: location-specific, action-specific, and chemical-specific.

10.2.1 Location-Specific ARARs

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location. Remedial actions associated with Operable Unit 1 will invoke compliance with various requirements under Executive Orders, EPA regulations, Ohio Environmental Protection Agency (Ohio EPA) regulations, and DOE orders that are

related to location-specific actions. The laws generally protect resources, and contain some substantive requirements, but the majority of the requirements are administrative. Off-site CERCLA actions are required to meet administrative requirements, but on-site CERCLA actions need only comply with substantive requirements.

The analysis of location-specific ARARs is presented in Appendix B. Each requirement includes an explanation of how compliance with the requirement will be achieved.

10.2.2 Chemical-Specific ARARs

Chemical-specific ARARs are health- or risk- based numerical values that establish the acceptable amount or concentration of a chemical that may be found in or discharged to the environment. Chemical-specific ARARs were analyzed to identify each environmental law or regulation pertinent to the types of contaminants that will be encountered during the remedial action. The analysis of compliance with chemical-specific ARARs and TBCs is presented in Appendix B.

10.2.3 Action-Specific ARARs

Action-specific ARARs are technology- or activity-based requirements or limitations on actions taken that are triggered by the particular remedial activities selected to accomplish the remedy. The analysis of action-specific ARARs addressed the following tasks for the selected alternative:

- Excavation: Removal of pit wastes, liners, and adjacent soils from the waste pit area
- Sorting and size reduction
- Treatment: Thermal drying of excavated material
- Waste Transportation
- Disposal: Disposing treated material at a permitted commercial disposal facility.

The analysis of action-specific ARARs and TBCs is presented in Appendix B.

10.2.4 To Be Considered Criteria

TBCs are non-promulgated advisories or guidance that become enforceable cleanup standards under CERCLA when included in the Record of Decision. Examples of TBCs include RCRA Closure Guidance documents, DOE Orders, and Permitting Guidance Manuals. TBC criteria will be

considered during the Remedial Design and Remedial Action phases as appropriate. TBCs for chemical- and action-specific standards appear in Appendix B.

10.3 COST EFFECTIVENESS

The selected remedy has been determined to be protective of human health and the environment and is cost effective. The total estimated capital cost for this remedy is $513,050,560. The estimated net present value of the remedy is $389,509,000.

The selected remedy had the lowest cost among those alternatives considered to be protective of human health and the environment. The selected remedy is significantly less expensive than the alternative involving off-site disposal at the Nevada Test Site (NTS) primarily due to the fact that wastes can be shipped in bulk via rail directly to the evaluated permitted commercial disposal facility. Direct rail shipment is not available to NTS, resulting in higher estimated transportation and containerization costs. The costs associated with both cementation and vitrification, and of constructing an on-site disposal facility, are higher than the cost of transporting and disposing the waste at the evaluated permitted commercial disposal facility. All other cost elements were common to each of the action alternatives that were subjected to detailed analysis in the Final Feasibility Study for Operable Unit 1. As discussed in Section 8 of this Record of Decision, the selected remedy provides a greater degree of certainty of protectiveness and long-term effectiveness and permanence. This, coupled with the fact that the selected remedy has the lowest estimated cost of the alternatives considered in detail, has lead to the conclusion that it is the most cost effective remedy of those considered.

10.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

EPA and DOE have determined that the selected remedy for Operable Unit 1 represents a permanent solution and the maximum extent to which treatment technologies can be utilized in a cost-effective manner. Of the action alternatives, all of which are protective of human health and the environment and comply with ARARs (or could potentially justify a waiver), EPA and DOE have determined that this selected remedy provides the best balance of tradeoffs among the alternatives in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, and volume through treatment,

short-term effectiveness, implementability, and cost. The selected remedy also meets the statutory preference for treatment, by thermal drying. Further, the State of Ohio also accepts this remedy. Community acceptance is documented in the responsiveness summary, which is part of this Record of Decision.

Excavating the waste pit contents, treating them by thermal drying, and disposing of the waste at a permitted commercial disposal facility will provide a permanent solution to the threats posed by the subject contaminated materials. Treatment by thermal drying as required to meet waste acceptance criteria would accomplish several objectives. First, there is the potential that a slight volume decrease would be realized by removal of excess interstitial pore water in the wastes. More importantly, this would remove a large volume of contaminated leachate from the wastes that might otherwise migrate from the disposed wastes. The treatment will thermally desorb volatile organic contaminants present in the waste. Finally, the thermal drying facilitates more efficient material handling through the remediation process, as well as more economical shipment of the waste. In addition, waste must be dried to the optimum moisture content specified by the waste acceptance criteria at the permanent disposal facility. Permanent disposal of the waste will occur at a facility appropriately cited and permitted for such land use.

As indicated above, the selected remedy was determined based on an evaluation of tradeoffs among the action alternatives related to the five primary balancing criteria. The criteria of implementability, long-term effectiveness and permanence, and cost were the most decisive criteria in the selection decision.

The technical implementability of this alternative is judged to be better than for the alternatives involving additional treatment and on-site disposal. The technologies associated with waste excavation, handling, drying, containerization and off-site transportation are commonly applied throughout various industries. The heterogeneity of the waste pit contents is not likely to significantly affect the implementability of any of these technologies. The waste heterogeneity does impact the ability to treat the wastes using cement solidification or vitrification, because the effectiveness of both vitrification and cement solidification depends on use of the appropriate reagent or additive ratios which, in turn, is dependent on the waste form and type. The waste heterogeneity of Operable Unit 1

would make operational field control of the appropriate reagent or additive ratio difficult. Additionally, vitrification has never been implemented at the scale that would be required for even a portion of Operable Unit 1 wastes, thereby further increasing uncertainties associated with application of that technology.

The long-term effectiveness of the selected alternative is judged to be more certain than for the alternatives involving additional treatment and on-site disposal. It is recognized that, if successfully implemented, the additional treatment of cement solidification or vitrification can significantly reduce the contaminant mobility, thereby increasing the long-term effectiveness and permanence of the alternative. A combination of three factors, however, results in a determination that the long-term effectiveness of the selected alternative is more certain.

- The first factor is that over the long term, despite treatment and placement in an on-site engineered disposal facility, releases from the disposed waste are possible. This statement takes into account the uncertainties discussed above that are associated with technical implementation of cement solidification and vitrification.
- The second factor is the location of the Great Miami Aquifer beneath the Fernald Environmental Management Project (FEMP), designated as a sole-source aquifer by EPA under the provisions of the Safe Drinking Water Act. A release from Operable Unit 1 wastes could have significant impacts on this valuable resource.[1]
- The third factor is the fact that, at the NTS and at the representative permitted commercial waste disposal facility, there are no usable groundwater resources, surface water resources or residences within many miles of the disposal location. Because of these factors, the potential impacts of a release at the NTS or the representative permitted commercial waste disposal facility are considered to be less significant than for a similar scenario with on-site disposal. This statement considers the presence of the sole-source Great Miami Aquifer beneath the FEMP and the relatively large number of potential human and ecological receptors in the vicinity of the FEMP. It is also noted that, due to area demographics, there is a greater long-term potential for intrusion into an on-site disposal cell. In the future event that facility institutional

[1] Since the Operable Unit 1 Feasibility Study/Proposed Plan have been approved by the U.S. EPA, there have been other efforts at the FEMP to site an on-site disposal cell. OEPA indicated that the maximum on-site disposal facility Waste Acceptance Criteria for U-238 should be a maximum of 360 picoCuries per gram (for Operable Unit 2 material), as presented in the Operable Unit 2 Feasibility Study and as discussed in the OEPA letter dated December 13, 1994. The average U-238 activity for all Operable Unit 1 waste pits exceeds this limit, in some cases by an order of magnitude or more. Thus, the higher concentrations of U-238 in Operable Unit 1 waste material render Operable Unit 1 waste unacceptable for disposal in an on-site disposal cell (as compared to on site contaminated soils and structural material). It is noted, however, that soils beneath the waste that meet the on-site Waste Acceptance Criteria may be disposed of on site. In addition, the heterogeneity has high uncertainty with respect to treatment of Operable Unit 1 waste and as such would preclude on-site disposal.

controls broke down, the FEMP would be attractive for various uses, including agriculture. This is not the case for the potential off-site disposal locations.

The selected alternative, with disposal at a permitted commercial disposal facility, has a slight cost advantage compared to cement solidification and on-site disposal. As stated above, there is a larger cost advantage compared to vitrification and on-site disposal and also compared to disposal at NTS. Cost is the major difference between the off-site disposal alternatives. It is the cost advantage of disposal at a permitted commercial facility which led to the identification of the selected alternative over use of NTS.

Short-term effectiveness of the action alternatives was approximately equal so this criterion did not factor into the remedy selection significantly. Reduction of mobility, toxicity, and volume through treatment is actually greater for the alternatives involving vitrification and cement solidification. This advantage was offset, however, by the advantages of the selected alternative relative to implementability, long-term effectiveness and permanence and cost.

The State of Ohio concurs with this selected alternative, thus satisfying the requirements for state acceptance. As discussed in Section 3, the community has been informed of progress and involved in decisions affecting the selection of the selected alternative. Community comments indicate the community believes the remedy should be implemented. Most public comments received focused on implementation of the remedy, not selection. Only two comments questioned the selection. All comments received during the public comment period are provided and responded to in the Responsiveness Summary (Appendix A).

10.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The selected remedy utilizes treatment by thermal drying as a principal element. As discussed above, this treatment satisfies several objectives. It has the potential to achieve a slight waste volume reduction by removal of excess interstitial pore water. This remedy also reduces the potential of contaminant migration from a disposal facility by removing contaminated leachate that would otherwise be available for migration. The treatment thermally desorbs volatile organic contaminants present in the waste and, thereby, reduces the toxicity of the wastes themselves. Finally, thermal

drying facilitates more efficient waste handling through the remedial process and facilitates meeting disposal facility waste acceptance criteria.

10.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Natural resources and associated services would be permanently committed as a result of implementing the selected remedy. These commitments not only include the resources and land, but the services they provide as well.

Implementing the selected remedy would permanently commit 4.7 hectares (11.6 acres) of land at the representative permitted commercial disposal facility for disposal.

Approximately 5.37 hectares (13.2 acres) of riparian habitat and associated species along Paddys Run at the FEMP property would be permanently disturbed during excavation and regrading activities. An example of mitigation activities that could restore the riparian habitat includes planting native riparian riparian tree species, such as sycamores and cottonwoods, upon completion of remedial activities. Wildlife boxes could also be installed to re-establish mammal and bird populations.

Potential habitats for several threatened and endangered species would also be permanently disturbed, including potential habitat for the Indiana bat, slender fingergrass and mountain bindweed. Additionally, aquatic species, including the state threatened Sloan's crayfish, which was identified in Paddys Run, and aquatic habitat would be impacted by excavation activities. Examples of mitigation activities for the Indiana bat include erecting snags (transplanted dead trees) along Paddys Run upstream from the Waste Storage Areas. Slender fingergrass and mountain bindweed could be relocated to other suitable habitat in southwestern Ohio or re-established within the restored riparian area. The Sloan's crayfish could be relocated to neighboring streams where suitable habitat exists.

The selected remedy would impact a total of 1.89 hectares (4.67 acres) of wetlands from remedial activities. These wetland areas include 0.72 hectares (1.77 acres) of isolated scrub-shrub/persistent emergent wetlands west of the waste pits and 0.08 hectares (0.21 acres) of drainage ditch/swale wetlands east of the waste pits. Approximately 1.09 hectares (2.7 acres) of drainage ditch/swale would be lost due to the borrow area. Mitigation for wetlands impacts would be determined using the

404 (b)(1) guidelines of the Clean Water Act. No wetlands or floodplains are present at the representative commercial disposal facility or the Nevada Test Site.

Consumptive use of geological resources (e.g., quarried rock, sand, and gravel) and petroleum products (e.g., diesel fuel and gasoline) would be required for removal, construction, and disposal activities. Supplies of these materials would be provided by the construction contractor. Additional fuel use would result from off-site transport of the materials. However, adequate supplies are available without affecting local requirements for these products.

The thermal drying treatment process would require consumptive use of natural gas, which can be obtained from the local utility.

REFERENCES

National Council on Radiation Protection and Measurements (NCRP), August 31, 1991, "Some Aspects of Strontium Radiobiology," NCRP Report No. 110, National Council on Radiation Protection and Measurement, Bethesda, MD.

Paustenbach, D.J., 1989, "The Risk Assessment of Environmental Hazards," p. 95, John Wiley & Sons, New York, NY.

U.S. Department of Energy, 1992, "Risk Assessment Work Plan Addendum," prepared for Remedial Investigation and Feasibility Study, Fernald Environmental Management Project, DOE, Fernald Field Office, Fernald, OH.

U.S. Department of Energy, 1993, "Site-Wide Characterization Report, FEMP, Fernald, Ohio, Remedial Investigation and Feasibility Study, Draft," DOE, Fernald Field Office, Fernald, OH.

U.S. Department of Energy, 1994a, "Final Feasibility Study for Operable Unit 1," Fernald Environmental Management Project, DOE, Fernald Field Office, Fernald, OH.

U.S. Department of Energy, 1994b, "Final Remedial Investigation Report for Operable Unit 1," Fernald Environmental Management Project, DOE, Fernald Field Office, Fernald, OH.

U.S. Department of Energy, 1994c, "Final Proposed Plan for Operable Unit 1," Fernald Environmental Management Project, DOE, Fernald Field Office, Fernald, OH.

U.S. Department of Energy, 1994d, Memorandum from Jill E. Lytle, Deputy Assistant Secretary for Waste Management, to John E. Baublitz, Acting Deputy Assistant Secretary for Environmental Restoration, Subject: Approval for disposal of Fernald low-level radioactive waste from Operable Unit 1 at a commercial disposal facility, dated November 8, 1994.

U.S. Environmental Protection Agency, 1989, "Risk Assessment Guidance for Superfund: Human Health Manual, Part A, Interim Final," EPA/540/1-89/002, EPA, Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, 1992a, "Guidance on Preparing Superfund Decision Documents, Preliminary Draft," U.S. EPA, Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, 1992b, "Health Effects Assessment Summary Tables, Annual Update FY 1993," including Suppl. A, March 1993, prepared by the Environmental Criteria and Assessment Office, Cincinnati, OH, for the Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, 1993, "Integrated Risk Information System (IRIS)" computer database, EPA, Washington, DC.

APPENDIX A

RESPONSIVENESS SUMMARY

FOR

PUBLIC COMMENTS RECEIVED

ON THE OPERABLE UNIT 1

PROPOSED PLAN

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A.1 INTRODUCTION AND ORGANIZATION

This Responsiveness Summary documents formal public comments on the Operable Unit 1 Proposed Plan made during the Operable Unit 1 Public Meeting at the Meadowbrook Inn, in Ross, Ohio, on August 23, 1994, and those comments submitted in writing during the 30-day public comment period that commenced on August 10, 1994, and ended September 8, 1994. It also presents the United States Department of Energy's (DOE's) response to all comments received.

Based on the evaluation of alternative remedial actions in the Operable Unit 1 Feasibility Study, and on public comments recorded in this Responsiveness Summary, the Preferred Alternative of removal, treatment (thermal drying), and off-site disposal at a permitted commercial waste disposal facility, as identified in the Operable Unit 1 Proposed Plan, has been selected in the Record of Decision.

As stated in Environmental Protection Agency Guidance on preparing Superfund Decision Documents (EPA 1989b), this Responsiveness Summary serves three important purposes. First, it provides the DOE and the Environmental Protection Agency with information about community concerns with the site and preferences regarding the proposed remedial alternative. Second, it demonstrates how public comments were integrated into the decision-making process. Third, it allows DOE to formally respond to public comments.

This Responsiveness Summary has been prepared pursuant to the terms of the 1991 Amended Consent Agreement between DOE and the Environmental Protection Agency, as well as other requirements, including:

- The Comprehensive Environmental Response, Compensation, and Liability Act as amended by the Superfund Amendments Reauthorization Act, 42 United States Code, Sections 9601, et. seq.
- National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations (CFR), Part 300
- Community Relations in Superfund: A Handbook, January 1992c, EPA/540/R-92/009

- Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment, Interim Final, July 1989b, EPA/540/G-89/007.

As stated above, this Responsiveness Summary documents the DOE's responses to all comments received. After reviewing the transcripts of verbal comments and written comments, DOE grouped comments together according to common issue areas. These issue areas are presented in the Comment Tracking Table (Table A.1.1.). For each issue identified, DOE has summarized all individual comments into summary comments and prepared a response to each summary comment. After the response, the individual comments summarized in summary comment are quoted. Summary comments, responses, and individual comments are provided in Section A.2.

Section A.3 contains the transcript of the August 23, 1994 public meeting formal comment period and copies of all written comments submitted during the public comment period which began August 10, 1994 and ended September 8, 1994. Verbal and written comments submitted formally are presented exactly as received, bracketed, and identified by a number that corresponds to the number assigned to each issue.

This Appendix is organized so that commentors can find their comments and DOE's response to their comments in several ways. The subsequent subsections provide directions for the following:

- Finding DOE's response to a topic of concern by using Table A.1.1
- Finding DOE's response to a comment by using the name of the commentor
- Finding DOE's response to an individual verbal comment in the public meeting transcript presented in Section A.3.1
- Finding DOE's response to an individual written comment in the letters presented in Sections A.3.2

A.1.1 Finding DOE's Response to a Topic of Concern

DOE's response to comments made in a particular topic area can be found using Table A.1.1 as follows:

Step 1 - Turn to Table A.1.1, The Comment/Response Cross Reference Table, on Page A-1-6.

Step 2 - Select an issue of interest from the list in the second column from the left. Topics are organized by larger issue areas that include:

1. Identification of Preferred Alternative
2. Remedial Action Implementation
3. Transportation Concerns
4. Post-Remedial Action
5. Community Involvement and Notification

Step 3 - Follow the row to the right from the topic to the last column on the right. This column lists the page number of where the summary comment and DOE Response can be found.

The column titled "commentor" on Table A.1.1 lists the last name and first initial of all the commentors who provided comments on the same issue. After DOE's response, the individual comments referred to in the summary comment are quoted in italics. The name of the commentor appears before each quote.

Step 4 - Turn to the page number listed in the right-hand column. The referenced page will be in Section A.2 of this Responsiveness Summary.

A.1.2 Finding DOE's Response to a Comment by the Commentor's Name

DOE's response to a comment made in a particular topic area can be found by the name of the commentor by following the steps outlined below. Because one commentor often submitted comments on several topics, it is easiest to use Table A.1.1 to find a comment by the commentor's name. Table A.1.1 lists the page number of the summary comment and DOE's Response as well as the page number where the actual comment can be found.

Step 1 - Turn to Table A.1.1, the Comment Tracking Table, on page A-1-6.

Step 2 - Select a topic of interest, then the name of the commentor or scan the column headed "Commentor" for the name of interest.

Step 3 - Follow the row across to the right from the commentors' name to find the page number of the actual comment in the forth column and/or the page number of the summary comment and DOE's response in the far right column.

Step 4 - Turn to the page number listed for either the actual comment (Section A.3) or the DOE response (Section A.2).

A.1.3 Finding DOE's Response to Comments found in the Public Meeting Transcript

Section A.3.1 presents the transcript of the public meeting held at the Meadowbrook Inn in Ross, Ohio. Only those verbal comments made during the formal comment segment of this meeting received a formal response from DOE. The DOE response to these comments are presented in Section A.2 and can be located as follows:

Step 1 - Find a comment in the transcript presented in Section A.3.1.

Step 2 - Find the issue number assigned to the comment on a bracket in the right-hand margin of the page. The number identifies the issue and a lower case letter identifies a subtopic within the broader issue area.

Step 3 - Turn to Table A.1.1 and find the topic that corresponds to that issue number. Issue numbers are listed in the left-hand column.

Step 4 - Follow the row to the right from the topic to the last column on the right. This column lists the page number where the summary comment and DOE response can be found.

Step 5 - Turn to the page number listed in the right-hand column. The page will be in Section A.2 of the Responsiveness Summary.

Steps 3 and 4 may be omitted by turning directly to Section A.2 after finding the issue number assigned to the comment in the margin of the transcript. Section A.2 is organized numerically by issue number with lowercase letters identifying subtopics within an issue.

A.1.4 Finding DOE's Response to a Written Comment

Written comments submitted during the public comment period are presented alphabetically by commentor last name in Section A.3.2 of this Appendix. DOE's responses to these comments are presented in Section A.2 and can be located as follows:

Step 1 - Find a written comment in Section A.3.2.

Step 2 - Find the issue number assigned to the comment on a bracket in the right-hand margin of the page.

Step 3 - Turn to Table A.1.1 and find the topic that corresponds to that issue number. Issue numbers are listed in the left-hand column of the table.

Step 4 - Follow the row to the right from the topic to the last column on the right. This column lists the page number where the summary comment and DOE response can be found.

Step 5 - Turn to the page number listed in the right-hand column. The page will be in Section A.2 of this Responsiveness Summary.

Steps 3 and 4 may be omitted by turning directly to Section A.2 after finding the issue number assigned to the comment in the margin of the letter. Section A.2 is organized numerically by issue number with lowercase letters identifying subtopics within an issue.

TABLE A.1.1

OU1 ROD COMMENTS TRACKING TABLE

Issue No.	Topic	Commentor	Page # of Original Comment[a]	Page # of DOE Response
1. SELECTION OF PREFERRED ALTERNATIVE				
1a	Support for the Preferred Alternative	D. Huff L. Crawford V. Dastillung P. Dunn Morgan Twp. Trustees N. Nungester Ohio EPA E. Yocum	A-3-4 A-3-5 A-3-6 A-3-32 A-3-34 A-3-37 A-3-43 A-3-44 A-3-45 A-3-59	A-2-3
1b	Opposition to the Perferred Alternative	W. Lewis Jr.	A-3-41	A-2-6
1c	Request for More Specific Implementation Information in the Proposed Plan	I. Lewis	A-3-18 A-3-19	A-2-8
1d	Exemption from DOE Order 5820.2A	L. Crawford P. Dunn Ohio EPA	A-3-32 A-3-37 A-3-45	A-2-9
1e	An Alternate Remedial Strategy	G. Willeke	A-3-58	A-2-10
1f	Preferred Alternative Effectiveness	W. Lewis Jr. B. McKay	A-3-41 A-3-42	A-2-12
1g	Cost Estimates in the Operable Unit 1 Feasibility Study	W. Lewis Jr.	A-3-41	A-2-14

TABLE A.1.1
(Continued)

Issue No.	Topic	Commentor	Page # of Original Comment[a]	Page # of DOE Response
1h	On-Site Disposal Issues	D. Huff V. Dastillung P. Dunn N. Nungester	A-3-10 A-3-11 A-3-36 A-3-37 A-3-44	A-2-17
1i	Conflict of Interest	W. Lewis Jr.	A-3-41	A-2-18
2. REMEDIAL ACTION IMPLEMENTATION				
2a	Real-Time Monitoring	L. Crawford V. Dastillung B. McKay N. Nungester Ohio EPA E. Yocum	A-3-31 A-3-35 A-3-42 A-3-44 A-3-46 A-3-59	A-2-19
2b	Controlling Contaminant Release During Remediation	L. Crawford P. Dunn Ohio EPA	A-3-31 A-3-37 A-3-46	A-2-21
2c	Proposed Soil Remediation Levels	V. Dastillung N. Nungester	A-3-34 A-3-35 A-3-44	A-2-23
2d	Contingency Planning	C. Schwab N. Schwab V. Dastillung	A-3-14 A-3-15 A-3-16 A-3-51 A-3-36	A-2-24

TABLE A.1.1
(Continued)

Issue No.	Topic	Commentor	Page # of Original Comment[a]	Page # of DOE Response
3. TRANSPORTATION				
3a	Track Conditions in Ohio and Indiana	D. Huff	A-3-7 A-3-9	A-2-26
		M. Ramsey	A-3-12	
		E. Ramsey	A-3-12 A-3-13	
		N. Schwab	A-3-16 A-3-17 A-3-18 A-3-51 A-3-52	
		W. Bruck	A-3-28 A-3-29	
		L. Crawford	A-3-31	
		A. Herrmann	A-3-39	
		Morgan Twp. Trustees	A-3-43	
		Ohio EPA	A-3-45	
3b	Track Inspections	D. Huff	A-3-8	A-2-31
		N. Schwab	A-3-17 A-3-18	
		N. Nungester	A-3-23 A-3-44	
3c	Train Speed Limit	D. Huff	A-3-7 A-3-8	A-2-34
		L. Crawford	A-3-31	
		E. Yocum	A-3-59	
3d	Train Lighting	C. Schwab	A-3-48 A-3-49	A-2-36

TABLE A.1.1
(Continued)

Issue No.	Topic	Commentor	Page # of Original Comment[a]	Page # of DOE Response
3e	DOE Use of Shandon Switchyard	D. Huff L. Crawford Morgan Twp. Trustees E. Yocum	A-3-9 A-3-31 A-3-43 A-3-59	A-2-37
3f	Track Access Control	D. Huff S. Butterfield	A-3-9 A-3-30	A-2-38
3g	Additional Track at Morgan-Ross Road Crossing	S. Butterfield	A-3-30	A-2-40
3h	Transportation Risk and Safety	I. Lewis W. Bruck L. Crawford P. Dunn	A-3-18 A-3-28 A-3-29 A-3-31 A-3-37	A-2-40
3i	Runoff/Drainage	E. Ramsey J. Francis	A-3-13 A-3-38	A-2-42
3j	Pre-shipment Radiation Monitoring Along Railroad (FEMP to Cottage Grove, Indiana)	D. Huff S. Schulte	A-3-6 A-3-22	A-2-44
3k	Private Property Issues: Structures/Barriers Surrounding Tracks	D. Huff N. Schwab A. Herrmann	A-3-8 A-3-17 A-3-50 A-3-51 A-3-39	A-2-45
3l	Liability in the Event of an Accident	D. Huff	A-3-9 A-3-10	A-2-47
3m	Railroad Safety Records	N. Schwab W. Bruck	A-3-16 A-3-29	A-2-48

TABLE A.1.1
(Continued)

Issue No.	Topic	Commentor	Page # of Original Comment[a]	Page # of DOE Response
3n	Cost Sharing with Other Industries on Local Rail	N. Nungester	A-3-23 A-3-44	A-2-49
3o	Preference for Containerized Waste	N. Schwab	A-3-18	A-2-50
4. POST-REMEDIAL ACTION				
4a	Preference for Continued Technology Development - Post-Remedial Action Periodic Reviews of Current Remedial Technologies	V. Dastillung P. Dunn	A-3-34 A-3-37	A-2-51
5. COMMUNITY INVOLVEMENT AND NOTIFICATION				
5a	General Impacts of the FEMP	D. Huff M. Ramsey N. Schwab	A-3-11 A-3-11 A-3-14	A-2-52
5b	Continuing Public Involvement	D. Huff L. Crawford V. Dastillung P. Dunn B. McKay N. Nungester Ohio EPA E. Yocum	A-3-10 A-3-31 A-3-35 A-3-36 A-3-37 A-3-42 A-3-44 A-3-46 A-3-59	A-2-53
5c	Revise the Community Relations Plan	L. Crawford Ohio EPA	A-3-31 A-3-46	A-2-56
5d	Community and Emergency Personnel Notification	I. Lewis R. Janssen E. Yocum	A-3-19 A-3-24 A-3-40 A-3-61	A-2-57

TABLE A.1.1
(Continued)

Issue No.	Topic	Commentor	Page # of Original Comment[a]	Page # of DOE Response
5e	Emergency Response	I. Lewis L. Crawford Ohio EPA N. Schwab	A-3-19 A-3-20 A-3-31 A-3-46 A-3-15 A-3-52	A-2-59

[a] Page number in Section A.3.1 or A.3.2.

A.2 SUMMARY COMMENTS AND RESPONSES

This section presents summary comments and DOE responses to these summary comments, followed by individual comments quoted from meeting transcripts and letters. Written and formal oral comments accepted during the 30-day public comment period have been grouped by issue. The categories are:

1. Selection of the Preferred Alternative
2. Remedial Action Implementation
3. Transportation
4. Post-Remedial Action
5. Community Involvement and Notification

Comments were further broken down under these categories into individual issues specifically raised in public comments. The issues are identified by the number of the general topic category and a lower case letter. DOE has addressed all public comments under one of the topics identified below. In parenthesis is the number of comments received on the particular issue.

1. Selection of Preferred Alternative
   - 1a Support for the Preferred Alternative (8 commentors)
   - 1b Opposition to the Preferred Alternative (1 commentor)
   - 1c Request for More Specific Implementation Information in the Proposed Plan (1 commentor)
   - 1d Exemption from DOE Order 5820.2A (3 commentors)
   - 1e Alternate Remedial Strategy (1 commentor)
   - 1f Preferred Alternative Effectiveness (2 commentors)
   - 1g Cost Estimates in the Operable Unit 1 Feasibility Study (1 commentor)
   - 1h On-Site Disposal Issues (3 commentors)
   - 1i Conflict of Interest (1 commentor)
2. Remedial Action Implementation
   - 2a Real-Time Monitoring (6 commentors)
   - 2b Controlling Contaminant Release During Remediation (3 commentors)

- 2c Proposed Soil Remediation Levels (2 commentors)
- 2d Contingency Planning (4 commentors)

3. Transportation
   - 3a Track Conditions in Ohio and Indiana (11 commentors)
   - 3b Track Inspections (5 commentors)
   - 3c Train Speed Limit (3 commentors)
   - 3d Train Lighting (1 commentor)
   - 3e DOE Use of Shandon Switchyard (4 commentors)
   - 3f Track Access Control (3 commentors)
   - 3g Additional Track at Morgan-Ross Road Crossing (1 commentor)
   - 3h Transportation Risk and Safety (4 commentors)
   - 3i Runoff/Drainage (2 commentors)
   - 3j Pre-shipment Radiation Monitoring Along Railroad (FEMP to Cottage Grove, Indiana) (2 commentors)
   - 3k Private Property Issues: Structures/Barriers Surrounding Tracks (4 commentors)
   - 3l Liability in the Event of an Accident (1 commentor)
   - 3m Railroad Safety Records (1 commentor)
   - 3n Cost Sharing with Other Industries on Local Rail (1 commentor)
   - 3o Preference for Containerized Waste (1 commentor)

4. Post-Remedial Action
   - 4a Preference for Continued Technology Development - Post-Remedial Action Periodic Reviews of Current Remedial Technologies (2 commentors)

5. Community Involvement and Notification
   - 5a General Impacts of the FEMP (3 commentors)
   - 5b Continuing Public Involvement (7 commentors)
   - 5c Revise the Community Relations Plan (2 commentors)
   - 5d Community and Emergency Personnel Notification (4 commentors)
   - 5e Emergency Response (4 commentors)

Table A.1.1 provides the page number of the transcript or letter where each original comment appears. Public meeting transcripts can be found in Section A.3.1, cross referenced to summary

comments and DOE responses by the numbers identified above, and written comments can be found in Section A.3.2 also cross referenced to the summary comments and DOE responses above by the number of the topic category and the letter of the specific issue raised. All verbal and written comments are part of the Administrative Record for Remedial Action at Operable Unit 1.

1. SELECTION OF PREFERRED ALTERNATIVE

SUMMARY COMMENT #1a **Support for the Preferred Alternative**

Several members of the public and the Ohio Environmental Protection Agency expressed support for the Preferred Alternative and the proposed method of transportation.

DOE RESPONSE #1a

The Proposed Plan summarized information from the Operable Unit 1 Remedial Investigation/Baseline Risk Assessment and Feasibility Study; and identified the Operable Unit 1 Preferred Alternative of Removal, Treatment (Thermal Drying), and Off-Site Disposal at a Permitted Commercial Waste Disposal Facility. In the Feasibility Study, the Preferred Alternative was evaluated against seven of the nine evaluation criteria required under the National Oil and Hazardous Substance Contingency Plan (40 CFR 300). The remaining two criteria, state acceptance and community acceptance, have been evaluated based on comments received during the public comment period. Based on all nine criteria, the Preferred Alternative identified in the Proposed Plan has been selected in the Record of Decision.

In addition to the specific comments below supporting the preferred remedial alternative, there were only two comments that questioned the appropriateness of the Preferred Alternative. The vast majority of comments received were related to how to safely implement the Preferred Alternative rather than questioning its selection. Accordingly, DOE has concluded that, in general, the public and the State of Ohio accepts the Selected Remedy. DOE will continue to work with the community

throughout the remedial design and remedial action phases to expand further upon the details of the design and cleanup process, and to ensure incorporation of concerns into the remedial design.

SPECIFIC COMMENTS #1a[1]

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 66, lines 19-24, and page 67, lines 1-3

> *"I would first like to say that I generally support the Unit 1 Proposed Theory -- Plan in theory. Although there are serious short-term risks associated with transporting the waste pit materials off-site, the risks are outweighed by the very real long-term threat that these unidentified wastes located in unplanned, ad hoc disposal pits at Fernald pose to the Great Miami aquifer.*
>
> *Far too long, people have been short-sighted when it comes to the subject of safety at Fernald. We can be short-sighted no longer. Thus, I favor DOE's plan to thermally dry the waste and to ship the waste to a commercial disposal facility, namely Envirocare.*
>
> *Envirocare was designed and permitted to receive these types of waste, and since that part of Utah gets so little rain, the threat of contaminants leaching into the groundwater there is far less than it is here.*
>
> *Also, Envirocare is not located over a sole source aquifer. Envirocare is a privately owned facility located in sparsely populated area that is in the business of waste disposal. It contributes to the tax base of the surrounding area that specifically zoned that land for that use.*
>
> *As for the method of shipment, I again favor DOE's plan, which is to transport the waste from Fernald by rail to Utah. While there are and will be many problems associated with train transport, the alternative to that, transport by truck, clearly is not feasible for an operation of this magnitude and duration. The waste must leave somehow, and train is safer and more efficient than truck."*

Lisa Crawford; Written Comments

> *"With the above concerns being addressed (see page A-3-93 for Ms. Crawford's entire comment) I support DOE's selection of Alternative 5B as long as the above concerns are addressed. I look forward to receiving your responses with regard to my concerns/questions."*

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[1] Quotations are presented exactly as they were recorded by transcriptionist at the U.S. DOE Operable Unit 1 Public Meeting, held at the Meadowbrook Inn, Ross, Ohio, August 23, 1994, and as received in writing during the public comment period.

Vicky Dastillung; Written Comments

"While I would have liked to see a plan that would have brought all contaminants back down to natural background levels, Alternative 5B is probably a reasonable plan given the costs and risks that we face."

Pamela Dunn; Written Comments

"The purpose of this letter is to submit commit [sic] on OU 1's Proposed Plan. While I agree in principle with the alternative selected for OU 1's remediation I would like a response to the following concerns pertaining to the OU 1 ROD."

Morgan Township Board of Trustees, Written Comments

"We have no objection to transportation by rail of these waste materials through Morgan Township as we believe this to be the safest mode of transportation."

Norma Nungester; Written Comments

"The proposed Alternative 5B-Treatment (Thermal Drying), and Off-Site Disposal at Permitted Commercial Facility seems to be the best alternative of those offered."

Ohio EPA; Written Comments

"The OU1 Proposed Plan is the culmination of efforts by U.S. DOE, Ohio EPA, and U.S. EPA to understand and develop a plan for mitigating releases to the environment from OU1. Ohio EPA believes the alternative selected in the Proposed Plan is the most protective alternative with regard to human health and the environment. Ohio EPA supports DOE's selection of Alternative 5B and looks forward to its expeditious implementation."

Edwa Yocum; Written Comments

"I recommend the OU1 alternative (Preferred Remedial) 5B - Removal, Treatment and Off Site Disposal at a Permitted Commercial facility."

SUMMARY COMMENT #1b Opposition to the Preferred Alternative

One commentor stated opposition to moving the waste off site after drying, expressing concern that DOE was simply moving a problem from one place to another. The commentor preferred vitrification and on-site disposal for at least part of the waste and suggested that drying was comparable in cost to vitrification.

DOE RESPONSE #1b

Various alternatives were evaluated in the Operable Unit 1 Feasibility Study. One of these, Alternative 4a, included vitrification and on-site disposal. A combination of several factors favor the selection of disposal at a permitted commercial disposal facility. At the FEMP, the Operable Unit 1 waste is currently located above a Safe Drinking Water Act-designated sole-source aquifer and would continue to be located above a sole-source aquifer if on-site disposal were part of the Preferred Alternative. As discussed in the Operable Unit 1 Feasibility Study, this increases the uncertainty of long-term protectiveness due to the fact that if, over the long term, any releases of Operable Unit 1 waste from an on-site disposal cell were to occur, the valuable Great Miami Aquifer could be adversely impacted. In addition, on-site disposal would require application to the Environmental Protection Agency for a waiver from the State of Ohio applicable requirement that prohibits siting hazardous waste facilities over sole-source aquifers. Through detailed and continuous interaction with the State of Ohio, it has become clear the State does not believe a waiver for the on-site disposal of Operable Unit 1 wastes would be appropriate and the State would not support such a waiver. It is important to note that the State of Ohio concern is specific to Operable Unit 1 wastes and should not be construed to mean that the State of Ohio would not support on-site disposal of other FEMP wastes. Other FEMP wastes may contain lower levels of radiological and hazardous contamination.

The FEMP is located in a populated region heavily utilized for agriculture. Conversely, the representative permitted commercial disposal facility that could receive waste from Operable Unit 1 under the Preferred Alternative is located in an arid region where there are no residents within 40 miles, no surface water, and no usable groundwater. Moreover, the disposal facility lies within a 10 mile x 10 mile area specifically zoned by the State of Utah for hazardous and radiological waste treatment and disposal. These factors contributed heavily in the licensing and permitting process for the representative facility.

Also, again as described in the Operable Unit 1 Proposed Plan, DOE believes the technical implementability of the Selected Remedy is significantly more certain than for on-site disposal, which involves additional forms of treatment. Technologies such as vitrification and cementation are technically more difficult to implement due to the extreme heterogeneity of wastes found in the waste

pits. Extreme heterogeneity makes operational control of the waste stream feed during processing difficult. Such control is important to successful implementation of vitrification. For these reasons, the vitrification alternative was eliminated from further consideration in the Operable Unit 1 Feasibility Study. DOE emphasizes that vitrification may be an appropriate remedial technology for other FEMP waste streams that are more uniform in character (less heterogeneous) than Operable Unit 1 waste. Additional discussion of the possible use of vitrification for Operable Unit 1 wastes can be found in the DOE response to Comment 1e. Waste heterogeneity has less effect on robust technologies such as drying.

Relative to the concern about the cost of melting (i.e., vitrification) compared to drying, the cost of vitrification versus drying was evaluated in the Operable Unit 1 Feasibility Study. Vitrification was determined to be more expensive because, in part, the cost of vitrifying the waste must be added to the cost of drying the waste, because drying is required before vitrification.

SPECIFIC COMMENTS #1b

William Lewis Jr.; Written Comments

> *"I am deeply concerned about the direction that the FERNALD remedial effort is taking. The decision to excavate, dry, and ship the wastes from the pits is not remediation, but simply moving a problem from one area to another...."*
>
> *"...To simply dig up and move a waste material (after drying-which can't cost much less than melting) represents an environmentally irresponsible, profit driven and short sighted solution to long term problem."*

SUMMARY COMMENT #1c **Request for More Specific Implementation Information in the Proposed Plan**

One commentor requested additional information be added to the Operable Unit 1 Proposed Plan that would specify activities to be taken to implement the Preferred Alternative.

DOE RESPONSE #1c

The purpose of the Proposed Plan is to facilitate public participation in the remedy selection process. The Proposed Plan summarizes essential information for the Operable Unit 1 Remedial Investigation/Feasibility Study; identifies the decision-making process leading to DOE's selection of the Preferred Alternative, including all key components of the proposed remedy; and solicits public comment on the Preferred Alternative. The level of detail concerning the Preferred Alternative in the Proposed Plan and the Selected Remedy in the Record of Decision is consistent with guidance published by the Environmental Protection Agency. Specific details concerning implementation of the Selected Remedy are a product of the remedial design and remedial action phases of the project. Implementation-related details will be documented in the Final Remedial Design package[2], inclusive of operational planning documents.

The DOE has committed to keeping the community informed about the progress of the remedial design process through a variety of mechanisms, potentially including fact sheets, workshops, and public review sessions, which will occur periodically throughout the remedial design process. The purpose of these public sessions will be to solicit public comment on the design progress and to enable public concerns to be incorporated into remedial design. The Remedial Design Work Plan, which will be available for public inspection shortly after the Record of Decision is signed, will include more specific plans and schedules for the implementation of all remedial design activities. Following completion of the final remedial design package, DOE will distribute to the community and other interested persons a fact sheet about the final engineering design. The fact sheet will inform the public about activities related to the final design, including: the schedule for implementing the Remedial Action; the site's appearance during construction; the roles of DOE and the Environmental

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[2] The design phase of the remedial action at Operable Unit 1 includes development of a detailed graphic and verbal description of the elements that comprise the selected remedial action. A design, or design package, consists of drawings, calculations, plans, specifications, and cost estimates. Design calculations present quantities of all items required to perform remedial action—everything from pipe in a certain diameter and hoses to rotary dryers, sheet metal, and more. From these drawings and calculations, specifications will be drafted. Specifications are written statements prescribing materials, dimensions, and workmanship for something to be constructed.

After the Record of Decision for Operable Unit 1 is signed, DOE will initiate the preparation of the remedial design package. This design will be reviewed and revised, as needed, for final certification.

Protection Agency; the contingency plan, and any potential inconveniences to local residents and on-site employees resulting from remedial activities.

SPECIFIC COMMENTS

Irene Lewis; Verbal Comments, Public Meeting Transcript, page 80, line 24, and page 81, lines 1-8

> *"I think these are some of the things that we really want to look at is how did you come to this decision, and that's throughout here. So my comment is that I would like to see more specifics go into this plan. You know, a law is one thing, how it's implemented is another.*
>
> *I would like to see the implementation steps spelled out. How you're going to do this."*

SUMMARY COMMENT #1d **Exemption from DOE Order 5820.2A**

Members of the public and the Ohio Environmental Protection Agency expressed concern that DOE's Proposed Plan for Operable Unit 1 identified a commercial disposal facility as part of the Preferred Alternative; yet, DOE Order 5820.2A does not allow for disposal of DOE waste at a commercial disposal facility.

DOE RESPONSE #1d

An exemption request to DOE Order 5820.2A has been approved by DOE Headquarters, Office of Waste Management, so that Operable Unit 1 pit wastes can be disposed at a permitted commercial waste disposal facility.

SPECIFIC COMMENTS #1d

Lisa Crawford; Written Comments

> *"With regard to DOE developing a Proposed Plan calling for disposal of the O.U.1 waste at a commercial facility and yet DOE has yet not addressed the issue of DOE Order 5380.2A [sic]. We understand that a waiver of this order has been requested,*

but that DOE headquarters has not yet acted on it. This issue needs to be resolved and written in stone prior to the finalizing of the Operable Unit 1 ROD."

Pamela Dunn; Written Comments

"The preferred alternative is for disposal at a commercial facility. What is the status of the request for a waiver to DOE Order 5280.2A [sic] which prohibits disposal at a commercial facility?"

Ohio EPA; Written Comments, dated August 24, 1994

"Ohio EPA is concerned that DOE has developed a Proposed Plan calling for disposal of the OU1 waste at a commercial facility, yet DOE Order 5280.2A [sic] precludes disposal at a commercial facility. Ohio EPA understands that a waiver of this Order has been requested, but DOE Headquarters has failed to act upon it. DOE HQ must address the need for a waiver of this Order. Ohio EPA expressed concerns with DOE's failure to address this issue during the development of the OU3 Interim Record of Decision and Proposed Plan. At that time DOE committed to addressing issues precluding disposal at Envirocare within OU1. To date DOE has not met this commitment. Ohio EPA believes that DOE must complete the waiver of this Order and address other issues precluding disposal at Envirocare prior to finalizing the OU1 ROD. The need for DOE to take action on its own waiver is especially relevant considering DOE is asking USEPA to waive Ohio's Solid Waste Siting Criteria for on-site disposal of other operable unit wastes. Ohio EPA's support of such a waiver could only be considered once DOE has fulfilled the commitment to waiving 5280.2A [sic]."

SUMMARY COMMENT #1e **Alternate Remedial Strategy**

One commentor suggested dividing Operable Unit 1 into two units. The commentor felt that doing so would support two different remedial strategies: one strategy for more highly radioactive wastes and another strategy for less radioactive/hazardous waste. The commentor thought this division could reduce the need for material to be placed in an off-site disposal facility.

DOE RESPONSE #1e

The Operable Unit 2 Feasibility Study (which OEPA has conditionally approved), indicated that the maximum acceptable Waste Acceptance Criteria for uranium-238 would be 360 pCi/g (Letter from

Thomas A. Schneider, Ohio EPA to Gary Stegner, DOE, dated December 13, 1994). As reported in the Operable Unit 1 Remedial Investigation Report, the average uranium-238 concentration in Waste Pit 1 is 3900 pCi/g; for Waste Pit 3, 978 pCi/g; and for Waste Pit 5, 809 pCi/g. Using the proposed uranium-238 Waste Acceptance Criterion as a guide, it is clear this number is less than the average uranium-238 concentrations found in the waste pits.

It is also important to consider that state acceptance of disposal of waste materials from the pits on site would require an exemption from OEPA or a waiver from U.S. EPA of the regulation that prohibits disposal facilities located above sole-source aquifers. As discussed in Comment #1b, Ohio has indicated that it would not support such a waiver for Operable Unit 1 waste pit material.

On-site disposal of portions of waste would still result in a large volume of material over the Great Miami Aquifer, which could be adversely impacted in the long term in the event of releases. No such concern exists at the representative permitted commercial disposal facility, where there is no usable groundwater resource and no surface water or nearby residential populations. Moreover, the disposal facility lies within a 10 mile x 10 mile area specifically zoned by the State of Utah for waste disposal. This permit has been publicly reviewed. Thus, to the extent that Operable Unit 1 meets the waste acceptance criteria of that facility, the public has already agreed with the determination that that site would be used to dispose of low-level radioactive wastes. Accordingly, the certainty that long-term protectiveness will be maintained is greater for the Selected Remedy than for alternatives in which all or a portion of the wastes are disposed on site.

As discussed in DOE's response to Comment 1b, the implementability of vitrification is adversely impacted by the extreme heterogeneity of the waste pit contents, which makes operational control of waste processing very difficult. The preference for off-site disposal for all Operable Unit 1 wastes was not based on a conclusion that vitrification would not be effective, but rather that the uncertainties associated with vitrification and on-site disposal are greater than the uncertainties associated with the Preferred Alternative. This statement applies to all Operable Unit 1 waste. It is again emphasized that DOE's concern with vitrification is very specific to the extremely heterogeneous Operable Unit 1 wastes. It is also noted that the State of Ohio prohibition on

construction of hazardous waste landfill facilities over a sole-source aquifer would still apply if only a portion of the wastes were to be disposed on site. While the State of Ohio has indicated that they believe on-site disposal of some FEMP wastes may be appropriate, they have consistently maintained that all Operable Unit 1 wastes should be disposed off site.

SPECIFIC COMMENTS #1e

Gene Willeke; Written Comments

> *"I continue to think OU1 should be divided into two parts: Pits 2, 4, 6 which have high uranium levels and Pits 1, 3, 5 with lower levels of uranium. With such a division, I believe less material would need to be placed in a disposal facility. There is justifiable concern that moving all this material to Utah & Nevada will generate enough adverse reaction from the public that it will make it more difficult to dispose of wastes at these facilities from other DOE facilities.*
>
> *Such a division of OU1 into 2 parts may well support some vitrification and on-site disposal, although it isn't obvious."*

SUMMARY COMMENT #1f **Preferred Alternative Effectiveness**

Several commentors expressed concern that the Preferred Alternative should provide long-term effectiveness and permanence; and reduce toxicity, mobility, or volume by a greater degree of treatment. These comments document public concern for long-term protection of human health and the environment in the nearby surrounding community, as well in the more distant communities that may be affected by implementation of the Preferred Alternative.

DOE RESPONSE #1f

Drying is considered physical treatment in the National Contingency Plan. Accordingly, DOE concluded that additional treatment, beyond drying, would not substantively contribute to further long-term permanence or protectiveness. DOE believes the Preferred Alternative is a permanent and cost-effective remedy and is protective of human health and the environment. The Preferred Alternative would be effective at reducing risks to potential receptors because the alternative removes the pit materials from the FEMP to a site that has been specifically designated for disposal of

radiological waste. As discussed in the Operable Unit 1 Feasibility Study, the representative permitted commercial disposal facility will be protective against exposure to the pit waste materials as well as migration of contaminants and materials, because the waste would be placed in an engineered disposal facility, designed to function over the long term. Additionally, there are no residences within 40 miles of the facility. Also, there is no usable groundwater resource at the facility and there is no surface water at the facility. Even if a release from the waste disposal facility occurred in the future, the potential impacts to human health and the environment would be minimal, due to a lack of probable receptors.

Additional treatment does not affect the ability of the waste to meet waste acceptance criteria at the representative permitted commercial disposal facility. The quantitative transportation risk assessment, presented in Appendix D of the Operable Unit 1 Feasibility Study, concluded that the risks associated with transportation were in a range considered acceptable by the Environmental Protection Agency. In light of this, additional treatment for off-site disposal would not be cost-effective, which is a requirement of Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act. The uncertainties associated with additional treatment and on-site disposal are discussed in DOE's response to Comments 1b, Opposition to the Selected Alternative, and 1e, An Alternate Remedial Strategy.

With respect to the Comprehensive Environmental Response, Compensation, and Liability Act mandate for reduction in toxicity, mobility, and volume, the Selected Remedy does utilize thermal treatment by drying, which reduces the toxicity and mobility of the contaminated waste. Waste toxicity is reduced as volatile organic compounds are removed from the waste through thermal desorption during drying and do not return. Most important, drying reduces contaminant mobility by removing a large volume of contaminated leachate that would otherwise be available for migration after disposal.

SPECIFIC COMMENTS #1f

William Lewis Jr.; Written Comments

> *"CERCLA mandates that remedial activities result in a reduction in "toxicity, mobility, and volume" of contaminated materials. The technology exists to do this with these wastes, in an economically competitive way.*

Betty McKay; Written Comments

> *"Need long-term effectiveness and permanence, reduction of toxicity, mobility, or volume by treatment."*

SUMMARY COMMENT #1g **Cost Estimates in the Operable Unit 1 Feasibility Study**

One commentor expressed concern that the Operable Unit 1 Feasibility Study cost estimates were biased in such a way that advanced technologies other than drying would not appear as attractive and would be screened out of the selection process unfairly.

DOE RESPONSE #1g

Within the Operable Unit 1 Feasibility Study for Operable Unit 1, DOE evaluated advanced technologies for potential selection (see Sections 2 and 3). Vitrification, an example of an advanced technology, was evaluated extensively within the Feasibility Study, particularly within Chapter 4. A detailed cost analysis of all elements in each alternative is presented in Appendix E of the Operable Unit 1 Feasibility Study. The estimates in the Operable Unit 1 Feasibility Study for Vitrification were not based on pilot-scale vitrification runs; none has been performed for the Operable Unit 1 waste. In addition, the data used to support the estimate were obtained from a 1992 Conceptual Design Report for the Remediation of Waste Pit Area, Removal, Treatment, and On-site Disposal prepared for FERMCO by Ralph M. Parsons, Corporation, as well as from catalog data, verbal vendor quotations, current contract and FERMCO labor rates, conventional cost estimating guides, and generic unit costs.

Vitrification of Operable Unit 1 waste was not eliminated out solely on the basis of cost. DOE has implemented and is implementing treatability studies to support feasibility studies for Operable Units 1, 4, and 5. In all cases, the appropriate technology came out of the screening.

Cost estimators and engineers responsible for the conceptual design were aware of the vitrification demonstration facilities considered for use and operating at DOE's Savannah River, Hanford, West Valley, and Oak Ridge sites. Treatability studies considering vitrification were performed as an adjunct to the Operable Unit 1 Feasibility Study process and a report of the results are attached to the Feasibility Study (see Appendix C of the Feasibility Study). However, a full-scale facility for vitrification of radioactive wastes similar to those of Operable Unit 1 has not yet been constructed. Thus, there is no comparable base of operating and design data on which to base conceptual designs and associated cost estimates; the Operable Unit 1 Feasibility Study cost estimates are necessarily heavily based on the judgement and experience of the engineers and cost estimating staff.

All of the Feasibility Study cost estimates, including those for the use of vitrification at Operable Unit 1, were extensively reviewed by DOE and the Environmental Protection Agency. One reason that the cost of vitrification appears to be high is that size reduction and waste drying are required before vitrification can proceed.

Cost estimates in the Operable Unit 1 Feasibility Study are used to eliminate remedial alternatives that are significantly more expensive than competing alternatives, but do not offer commensurate performance or health protectiveness. Estimates in the Operable Unit 1 Feasibility Study are considered to be order-of-magnitude, because of the uncertainties in the information used to develop the estimates. Specifically, the cost estimates were developed with an intended accuracy range of -30/+50 percent as prescribed by the Environmental Protection Agency guidance. DOE believes that the cost estimates in the Operable Unit 1 Feasibility Study fall within this range of accuracy and thereby are appropriate for their intended use.

Finally, an analysis of the implementability of vitrification for the (approximately) 640,000 cubic yards of (in place) waste requiring remediation within Operable Unit 1 was made (see the analysis for

Alternative 4A). When evaluating each alternative against the criteria prescribed by Environmental Protection Agency guidance, the Preferred Alternative (waste drying and off-site disposal at a permitted commercial disposal facility) was determined to be effective at reducing risks to potential receptors and determined to be technically implementable for the expenditure required.

Soil washing was not retained for detailed analysis for Operable Unit 1. A discussion of soil washing is included in Subsection 2.4.6.4 of the Operable Unit 1 Feasibility Study, under the subheading, Chemical Treatment Technologies.

SPECIFIC COMMENTS #1g

William Lewis Jr.; Written Comments

> *"FERMCO has steadfastly maintained the position of not using advanced technologies for remediation. The cost and time estimates for this construction type of remediation were crafted to make other technologies look less attractive. These estimates, as well as the engineering back up, should be challenged and closely evaluated as to adequacy, validity, and fairness...*
>
> *...Technologies such as soil washing and vitrification offer significant volume reductions, durable waste forms, and significantly reduced containerization, transportation, and disposal costs (not to mention a reduced risk for exposure during an accident scenario). These savings have not been fairly evaluated or publicized. Cost estimates used in the OU1 FS for vitrification do not appear to be anywhere near realistic. Were these estimates based on actual pilot scale vitrification runs? If not, what type of data were used to develop these estimates, and how old was the data?"*

SUMMARY COMMENT #1h **On-Site Disposal Issues**

Although the Preferred Alternative does not include on-site disposal, portions of some comments referred to the possibility of on-site disposal of Operable Unit 1 wastes. In the event the Preferred Alternative could not be implemented, the commentors did not want on-site disposal of Operable Unit 1 pit material to be considered and expressed the need to review alternative plans. Another commentor inquired about possible integration of a single on-site disposal cell versus a disposal cell for each operable unit. Commentors were generally opposed to on-site disposal of Operable Unit 1

waste and opposed to a waiver of the State of Ohio prohibition against siting a waste disposal facility over the sole-source drinking water aquifer which underlies the FEMP.

DOE RESPONSE #1h

DOE acknowledges the commentors' opposition to on-site disposal alternatives and to waiving the prohibitions against siting a hazardous waste facility over a sole-source drinking water aquifer for disposal of Operable Unit 1 waste.

In the unlikely event new information that could adversely affect implementation of the Preferred Alternative is discovered after the Operable Unit 1 Record of Decision is approved, another alternative could be selected. Changing the current Operable Unit 1 Preferred Alternative would be considered a fundamental change under the National Contingency Plan. When a fundamental change is proposed, the lead agency (in this case, DOE) is required to develop a Record of Decision Amendment and to hold a new public comment period and prepare a new Responsiveness Summary.

The Selected Remedy does not include provisions for on-site disposal of the Operable Unit 1 pit waste material, itself. The Operable Unit 1 Feasibility Study evaluated alternatives that include on-site disposal, specifically an on-site cell for disposal of pit waste, as a component of the remedial action. The on-site disposal cell considered in the Operable Unit 1 Feasibility Study was for Operable Unit 1 only. This was because of uncertainties associated with mixing materials from other operable units

and the need to provide a uniform basis of comparison among alternatives in the Operable Unit 1 Feasibility Study. The preferred alternative in the Operable Unit 2 Proposed Plan includes designing and locating an on-site disposal facility that will be used for disposal of Operable Unit 2 materials that will remain at the FEMP. This on-site cell, however, will not include pit waste materials from Operable Unit 1. Some residual soils could be disposed of in this cell, as described in the Preferred Alternative.

SPECIFIC COMMENTS #1h

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 72, line 24, and page 73, lines 1-7

> *"For example, what would happen if those unknown waste pit materials failed Envirocare's acceptance requirements and the Nevada Test Site had previously closed it's [sic] doors to incoming waste? Finalizing an alternative plan would require public acceptance, but there is no mechanism for that that the public can see in writing."*

Vicky Dastillung; Written Comments

> *"If for some reason the 5b alternative can't be executed, the public needs to be able to comment on a new plan. In particular, I am opposed to on-site disposal of this OU's waste and I would not like to see EPA grant a waiver for it. The Great Miami aquifer has already been contaminated with FEMP wastes. Our drinking water quality is too valuable a resource to be at risk from OU 1 waste."*

Pamela Dunn; Written Comments

> *"The alternatives listed with on-site disposal discuss the design and engineering of an on-site disposal cell. Is this cell in addition to or an expansion of the disposal cell planned for OU 2?"*

SUMMARY COMMENT #1i **Conflict of Interest**

One commentor was concerned about conflict of interest situations between teaming partners supporting FERMCO and the representative permitted commercial waste disposal facility.

DOE RESPONSE #1i

DOE is not aware of any individual or team member within the FERMCO team with specific interests in, or current contracts with, the representative permitted commercial disposal facility.

Envirocare has been presented in the Operable Unit Feasibility Study as a representative permitted commercial disposal facility in order to prepare appropriate estimates for evaluation of transportation risk, representative disposal fees, and environmental impacts. This does not mean that Envirocare will be the selected facility; the government procurement process will be utilized to obtain disposal capacity. Once the Record of Decision is effective, DOE will seek competitive bids for contractors to

perform various aspects of the Preferred Alternative. All disposal facilities would be invited to bid in a published Request For Proposals or Bids. All facilities responsive to the specification described in the Request for Proposals would be evaluated, and the most technically responsive bidder will be chosen. After that choice is made, DOE will evaluate the issue of Organizational Conflict of Interest involving the successful bidder. The company would be required to disclose to the DOE all current contracts and all investments or companies it owns or is owned by, to determine if award of the disposal contract would give it an opportunity to gain an unfair advantage over other firms of its kind.

SPECIFIC COMMENTS #1i

William Lewis Jr.; Written Comments

> *"I also believe that one of the teaming partners has been involved (and may still be involved) with the disposal facility (ENVIROCARE). Could this be construed as conflict of interest?"*

2. REMEDIAL ACTION IMPLEMENTATION

SUMMARY COMMENT #2a **Real-Time Monitoring**

Many members of the public and the Ohio Environmental Protection Agency requested that DOE commit to real-time environmental monitoring during remedial activities. Ohio Environmental Protection Agency requested that DOE attempt to incorporate new developments in real-time monitoring from the DOE's Office of Technology Development and requested that data obtained from real-time monitors and any additional monitoring activities be provided to the Ohio Environmental Protection Agency and the public in a timely manner.

DOE RESPONSE #2a

The maximum, practical use of real-time monitoring is an integral part of DOE's process to ensure that remediation facilities are constructed and operated in a manner that is safe and in compliance with applicable or relevant and appropriate requirements, as well as DOE orders. Real-time monitoring provides data on emissions immediately so that decisions and public notification can be made quickly,

as opposed to sampling that requires laboratory analysis, where results are not available to facility operations for several weeks. Real-time monitoring data will be made available to the public through the Public Environmental Information Center.

DOE acknowledges commentors' stated preferences for computerized monitors and portable monitors, an independent entity to implement monitoring, and incorporation of new developments in monitoring technology as they are identified. DOE plans for incorporating real-time monitoring will be communicated in future public involvement activities (i.e., public workshops and fact sheets).

SPECIFIC COMMENTS

Lisa Crawford; Written Comments

> *"DOE should commit to real-time monitoring during the remediation of O.U. 1 and this should include any treatment systems. The results of the real-time monitoring should be reported to the public in a timely manner.*
>
> *DOE should check into the cost of portable/permanent real-time monitors, with checks & balances and using real people (not averages or scenarios)."*

Vicky Dastillung; Written Comments

> *"Air monitoring during excavation, drying, and transport will be extremely important to the community and workers. Unless there are constraints that I am currently unaware of, I would like to see real time monitoring both in the vicinity of OU1 and at the site boundaries. There should be a constant analysis of the data, so shut-down of work can occur immediately if elevated levels of contaminants in the air should occur. Action levels should be developed and shared with the community, as should the data as it is accumulated. This should include monitoring for the appropriate radioactive, & chemical contaminants, as well as for asbestos. If cost or technological constraints will be a factor, this should be explained to the public."*

Betty McKay; Written Comments

> *"Need some one who is capable and independent and reliable for the monitoring and to keep a log on the information found and report to the public."*

Norma Nungester; Written Comments

> *"We need real-time monitoring of any and all emissions. The current system does not give you an alarm when emissions go up. We also need to have monitoring every day."*

Ohio EPA; Written Comments

"DOE should commit to including and/or developing real-time monitoring for discharges to the environment resulting from remedial actions including any treatment system. DOE should attempt to incorporate any new developments in real time-monitoring from the Office of Technology Development. Data obtained from real-time monitors and any additional monitoring activities should be provided to the Ohio EPA and public in a timely manner."

Edwa Yocum; Written Comments

"Real time monitoring during clean up of site. Procedure to be connected to a computer or a communication line to check the reading (print out)."

SUMMARY COMMENT #2b **Controlling Contaminant Release During Remediation**

The Ohio Environmental Protection Agency and two members of the public requested that DOE implement pollution prevention and control measures during the remediation of the site.

DOE RESPONSE #2b

It is DOE policy, in accordance with Executive Order 12856, to apply pollution prevention and waste minimization principles into the design and operation of all its facilities. The DOE is committed to employing all available methods and techniques to minimize waste and/or eliminate discharges from remedial treatment systems in a manner protective of human health and the environment.

All available contaminant control measures will be considered in the remedial design phase. For example, the potential for fugitive dust and blowing dust-carrying contamination during excavation of the pits, sizing operations, and drying can be controlled through the use of several techniques. These include: wetting down waste and soil using fogging or misting nozzles, spreading plastic or foam on exposed pit walls and floors, paving some areas, constructing enclosures, using negative ventilation around the crushing and drying operations, and implementing treatment and filtering of process gas from the dryers. Other technologies for contaminant control include revegetation to stabilize soil, and the use of berms and sumps to control water running on or off the exposed waste pit excavation face.

Expeditious backfilling of the excavation may be used to control fugitive dust. The details of design will be finalized in the final Remedial Design Package.

Although it is not appropriate to develop this level of design detail before the Record of Decision is signed, pollution control measures will be included in the remedial design. The remedial design package will be available for review by the Environmental Protection Agency and Ohio Environmental Protection Agency. DOE plans for incorporating pollution prevention activities will be communicated through future public workshops and fact sheets.

SPECIFIC COMMENTS #2b

Lisa Crawford; Written Comments

> *"DOE should commit to use pollution prevention activities whenever possible during the design & operation of the O.U. 1 remedial action system. All available methods to reduce discharges from the treatment system should be considered."*

Pamela Dunn; Written Comments

> *"Additional discharges of contaminates [sic] has a result of the remediation of OU1 should be significantly reduced and /or avoided. Measures to accomplish this should be incorporated into the RD/RA of OU 1."*

Ohio EPA; Written Comments

> *"DOE should attempt to incorporate pollution prevention activities whenever possible during the design and operation of the OU1 remedial action system. All available methods to reduce or eliminate discharges from the treatment system should be considered during the design of the system."*

SUMMARY COMMENT #2c **Proposed Soil Remediation Levels**

Two commentors expressed concern about the proposed soil remediation levels for Operable Unit 1, and discussed the need to follow an as-low-as-reasonably-achievable principle in designing and implementing remedial actions. One commentor expressed a concern that the levels have been so leniently established so as not to preclude using the site to store waste if Ohio grants a waiver of its requirements prohibiting disposal of solid waste over a sole-source aquifer.

DOE RESPONSE #2c

The Operable Unit 1 soil remediation levels presented in the Record of Decision are for a future land use scenario involving an on-site expanded trespasser and an off-site residential farmer. A final decision on future land use has not been made. However, the soil remediation levels presented in the Record of Decision are accompanied by the assumption and reflect the fact that DOE has committed to perpetual ownership and maintenance of the Fernald property.

The as-low-as-reasonably-achievable principle is applied to soil remediation levels throughout the entire Operable Unit 1 Feasibility Study process, and is inherent in the Record of Decision when alternatives are evaluated against the evaluation criteria set forth in the National Contingency Plan. In addition, it is DOE's policy, as stated in DOE Order 5480.11, to maintain radiation exposures of workers and the public as far below acceptable maximum exposure limits as is reasonably achievable during implementation of the remedial action. Specific measures will be included in the final Remedial Design package and associated operational planning documents.

Soil remediation levels are protective of human health and the environment, assuming continued federal ownership of the site, as provided in the Selected Remedy. Additional input from the Fernald Citizens Task Force and the public is necessary before making final recommendations on land use from a site-wide perspective. The Operable Unit 1 remediation levels in the Record of Decision will be re-examined by the Operable Unit 5 Feasibility Study Report and Record of Decision, based upon available Operable Unit 5 Feasibility Study conclusions, recommendations from the Fernald Citizens Task Force, and public comment. Specifically, the risk assessment for the Operable Unit 5 Feasibility Study will include additional trespassing scenarios as well as recreational exposure scenarios, which will be fully developed on a site-wide basis, in the Operable Unit 5 Remedial Investigation/Feasibility Study. A full array of trespassing and recreational scenarios from no trespassing through full recreational use of the site will be developed. If found to be necessary, the Operable Unit 5 Record of Decision will modify the Operable Unit 1 proposed remediation levels downward to ensure protectiveness of human health and the environment. The Operable Unit 5 Record of Decision will be finalized prior to excavation at Operable Unit 1.

It is emphasized that establishment of the soil remediation levels for Operable Unit 1 based on the expanded trespasser use scenario is in no way intended to support possible on-site disposal of Operable Unit 1 wastes.

SPECIFIC COMMENTS #2c

Vicky Dastillung; Written Comments

> *"I am not totally comfortable with the initial proposed soil remediation levels. I realize that the land uses chosen for the site will affect the levels as well. I would like to see a strong statement in the ROD stating that DOE will follow a sort of ALARA principle in designing and executing the remediation. The remediation levels should be as close to background as possible given the technological and cost constraints. If an additional process or activity could get us substantially closer to background at a reasonable cost, this should be pursued. The goal should be background levels, not just to stay within a remediation level."*

Norma Nungester; Written Comments

> *"I am concerned, however, that you have chosen only to clean up to the Expanded Trespasser Level for Operable Unit 1 and for Operable Unit 4 (K65 Silos). Was this done to facilitate using the site for storage of waste and in the hopes of the Waiver being granted by the EPA for storage over a single source aquifer? I do not agree with this line of thinking, if indeed, this is the case."*

SUMMARY COMMENT #2d **Contingency Planning**

Several commentors expressed safety and risk concerns with respect to two contingency situations: an unanticipated rail delay, and failure of the waste to meet the Waste Acceptance Criteria at the Nevada Test Site or the representative permitted commercial disposal facility, thereby requiring waste to return to Fernald.

DOE RESPONSE #2d

Before any waste leaves the FEMP, the waste will be analyzed to ensure compliance with the receiving facility's Waste Acceptance Criteria. Through this sampling program, DOE will verify that waste meets the disposal facility's waste acceptance criteria before it is shipped. Waste will not be shipped if it does not meet the waste acceptance criteria. As discussed in Section 7.2.5 of the

Operable Unit 1 Record of Decision, the possibility does exist that waste could fail to meet the waste acceptance criteria of the disposal facility. In these cases, the waste would be immediately repackaged and shipped to the Nevada Test Site or returned to the FEMP for determination of final disposition. In this unlikely event, DOE is committed to implementing the same procedures required to ensure the safe outward shipment of this waste for the return trip.

If an accident or other situation caused a stoppage of rail shipments for an extended, but temporary, period of time, DOE would have the option of adjusting the timing of excavation and treatment to ensure that interim storage does not take place during remediation. The excavation rate of the waste could be modified to accommodate the stoppage. The possibility of a loaded train being stopped on a track for an extended period of time will be addressed in the contingency plan, which is a part of the Final Remedial Design package.

Procedures in the event of an accident will be addressed in emergency response plans that will provide the necessary procedures to minimize risks to the public and the environment. These plans will be drafted and emergency response training will be held to prepare first responders in the event of an accident during transportation. See the DOE response to Comment 5e, Emergency Response.

SPECIFIC COMMENTS #2d

Carol Schwab; Verbal Comments, Public Meeting Transcript, page 76, lines 2-20

> *"Yes. I would like to talk about page ES11, lines 12 through 14, which is the contingency plan for waste that fails to meet the criteria and they're going to send it to the Nevada Test Site.*
>
> *Well, as I understand this. This would be before it leaves the Fernald property they decide where to send it [sic]. But I am concerned about if it already has left the property and goes to Utah and they decide they don't want to accept it at Utah because for some reason it doesn't meet the criteria. I think that it should be sent directly to Nevada without coming back to Ohio.*
>
> *And some of the other stuff that you sent out, I know there was a case where something came back or a contaminated car came back, and I think it should just go directly to the other site for the more hazardous material without coming back and re-exposing us again. Thank you."*

Nick Schwab; Verbal Comments, Public Meeting Transcript, page 77, line 24, and page 78, lines 1-5

"Or what really concerns me since there has been so much concern about the train sitting down in Shandon would be a contingency plan that would address a problem if there is a stopped train on that track for some reason for an extended period of time."

Vicky Dastillung; Written Comments

"If for some reason the 5B alternative can't be executed, the public needs to be able to comment on a new plan."

Nick Schwab; Written Comments

"Furthermore, any accident or stoppage of this unit train would be of a concern for all residents living along the tracks."

3. TRANSPORTATION

SUMMARY COMMENT #3a **Track Conditions in Ohio and Indiana**

The Ohio Environmental Protection Agency and nine members of the public submitted comments concerning the condition of the rail tracks in Ohio and Indiana. These comments included concerns about the effectiveness of track inspections, which are addressed specifically in Summary Comment 3c, Train Speed Limit. These comments reveal local residents' concerns about the following specific conditions:

- Track blockages
- Whether sprayer trucks and limb cutters would be used to ensure visibility near crossings
- Tracks and culverts beneath the tracks washed out
- Tracks in bad shape with loose spikes
- Blocked culverts
- Clearing brush at unsignalized crossings
- Inspection of cross bucks and pavement markings
- Drainage problems threatening structural integrity of the track

DOE RESPONSE #3a

DOE acknowledges the public's concern that the tracks and crossings along the railroad line between the FEMP and Cottage Grove, Indiana, are maintained and are in good repair in a condition that

allows for safe shipment of the wastes from Operable Unit 1. It is the responsibility of the railroad to ensure that the tracks are in good repair; DOE does not have enforcement authority over the railroad. It is also the railroad's responsibility to inspect the tracks it uses for DOE shipments to ensure they are in compliance with applicable federal and state regulations.

Federal and State of Ohio regulations govern maintenance of tracks and crossings. The Federal Railroad Administration is the federal agency with jurisdiction over the condition of rail lines and associated matters such as inspections. Federal regulations governing track safety standards can be found in the Code of Federal Regulations (CFR) Title 49, Transportation, Subtitle B, Other Regulations Relating to Transportation, Chapter II- Federal Railroad Administration, Department of Transportation. Subpart B (49 CFR 213) contains the requirements for track safety standards for road beds. The following section (49 CFR 213.37) is relevant to public comments made on vegetation:

> Vegetation on railroad property which is on or immediately adjacent to the road bed must be controlled so that it does not:
>
> - Become a fire hazard to track-carrying structures
> - Obstruct visibility of railroad signs and signals
> - Interfere with railroad employees performing normal track duties
> - Prevent proper functioning of signal and communication lines
> - Prevent railroad employees from visually inspecting moving equipment from their normal duty stations

The State of Ohio also has regulations that are applicable to vegetation surrounding the tracks; these regulations are relevant to some of the public comments made on the Operable Unit 1 Proposed Plan. These regulations include Ohio Revised Code Title 49, Section 4959.11, which states that the manager of the railroad is responsible for the destruction of noxious weeds and brush within the limits of the actual railroad bed or within the limits of any right-of-way belonging to the railroad company according to the schedule set in Section 5579.04 of the Ohio Revised Code.

Several commentors were concerned with the condition of the track and crossties, specifically. 40 CFR 213.53 is the federal regulation that specifies the required geometry of the track. 40 CFR 213.109 is the federal regulation that specifies the track safety standards for crossties. The latter regulation spells out the number and condition of crossties placed within a length of track.

In addition, the State of Ohio public utility regulations also provide requirements for crossings that are relevant to some of the comments made on the Operable Unit 1 Proposed Plan. The State of Ohio Public Utilities Commission is charged with the responsibility of monitoring crossings and continually updating its list of crossings in need of upgrade. The State of Ohio is responsible for determining what entities shoulder the cost of repairs or upgrades of the crossings within Ohio.

DOE will forward all comments regarding specific repairs of track structures to the railroad. DOE encourages the public to forward future comments regarding condition of the rail track to the railroad.

Additionally, DOE will require the railroad to document its compliance with regulations and laws prior to shipment, and will require, upon request, that the railroad document its ongoing compliance. In this way, DOE will be satisfied that the tracks and surrounding structures, such as culverts and crossings, are in a condition suitable to support safe shipping of dried Operable Unit 1 wastes before shipping commences.

SPECIFIC COMMENTS #3a

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 69, lines 18-22

> *"There have been too many track blockages in that area where residents have had to do the cleanup for them to accept the blockage will be cleaned up before one of the Fernald trains come to it."*

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 71, lines 1-9

> *"What if the States of Ohio and Indiana are unable to afford the massive crossing upgrades that the increased rail traffic will make necessary to keep area residents safe? Will DOE help foot the bill for those upgrades?*
>
> *How often will DOE require CSX to run sprayer trucks and limb cutters along the line to ensure visibility for both the engineers and area drivers?"*

Mildred Ramsey; Verbal Comments, Public Meeting Transcript, page 74, lines 3-7

"So I know we've stopped a train three different times when the tracks were out when the water washed through and different things, so we're concerned that that's all upgraded and taken care of. Thank you."

Eugene Ramsey; Verbal Comments, Public Meeting Transcript, page 74, lines 10-24, and page 75, line 1 and lines 11-23

"Well, my wife pretty well covered what I was going to say except that I will add this that Nick Schwab and I walked part of the track the other night before the CSX meeting, and that track is in bad shape. Your spikes are loose, you can go along and pull them up and so on. And also I know one culvert that's completely plugged.

And like my wife said we keep a close watch on that because we own ground on both sides. We're right there at the New Kirk crossing where New Kirk used to be. There used to be a station there. And I've had to call them because of trees blocking the thing, blocking the tracks, culverts washed out and CSX has always cooperated and so on and stopped the trains up at Raymond, Indiana...."

"...So we've lived there going on 29 years so we've seen a lot up and down that tracks. And I've seen them burn stuff in the tracks in a rainstorm, what it was I don't know. I told CSX about that the other night, of course they don't remember what it was or anything else.

But I understand you're talking maybe $3,000,000 to upgrade the tracks and I hope before one car goes up through there or one train, which I understand is suppose to be 47 cars, what they was talking the other night, I think 47 cars, that them tracks is gone over with a fine tooth comb and really checked because they need it. Thank you."

Nick Schwab; Verbal Comments, Public Meeting Transcript, page 78, line 24, and page 79, lines 1-10, and page 80, lines 1-3

"Other factors that need to be considered is part of a contract with the railroad. Number one, cutting and clearing of the brush that limits sight distances at many of the unsignalized crossings. Mr. Woody last week I think he said it's been several years since they cut the brush and sprayed along there. And Mr. Woody was with CSX railroad...."

"...Number five, the drainage problems that threaten the structural integrity of the tracks need to be addressed in this plan."

Wanda Bruck; Written Comments

"I am writing to you concerning the route the Fernald waste will take thru [sic] our county.

I know that the train has traveled thru here for yrs [sic], but not 47 cars on one train. The tracks are not in safe conditions as they were years ago. I know of what I speak, for my father was the section foreman at Bath for years and after that supervisor at Perm, In and Maysville, Ky. He said 20 years ago that the tracks are not maintained as they were years ago... Why in the world wasn't this bridge fixed at Miamitown year ago? I agree with Mr. Paddock when he stated, he was not impressed by your improvement pledges. Seeing is believing. a concerned Mother, Grandma friend & neighbor."

Lisa Crawford; Written Comments

"It is crucial for DOE to ensure that the railroad tracks between Fernald, Cottage Grove, Indiana--to Hamilton, Ohio and into and out of Cincinnati are safe, well maintained and that if a problem arises with regard to the integrity that the problem is corrected immediately. This should be the case all the way to the final resting place of the waste."

Alan Herrmann; Written Comments

"I'm sending a request for a drainage pipe repair at 826.32 feet south of Reily Peoria Road marked with a white cross tie in road bed.

The west end is deteriorated and collapsed. This has slowed the water flow from our fields and tile outlets. This problem has caused us to replant our crops at various times. This is a hazard to the road bed on the CSX line which is going to haul waste from Fernald."

Morgan Township Board of Trustees, Written Comments

"We however do expect that all track, crossings, bridges and trestles in Morgan Township must be brought up to standards required for safety for this new and increased flow of rail traffic in our township."

Ohio EPA; Written Comments

"In order for DOE to effectively and safely implement the preferred alternative, Ohio EPA feels it is critical for DOE to ensure the quality and integrity of railroad line between the site and Cottage Grove, Indiana. A number of citizen concerns have been expressed over the past month concerning this railway. Ohio EPA expects DOE will address all reasonable requests."

Nick Schwab; Written Comments

"Once again I would urge that any DOE contract with CSX contain language that would assure residents along the tracks that the RR would live up to their responsibilities under the Ohio Revised Code...."

"Other issues that need to be resolved is the cutting of brush along the right of way, drainage problems that threaten the structural integrity of the track,..."

SUMMARY COMMENT #3b **Track Inspections**

Several comments included concerns about the effectiveness of track inspections by the railroad. These comments reveal local residents' concerns about the following specific conditions:

- Effectiveness of weekly track inspections
- DOE providing track inspections
- Inspection of cross bucks and pavement markings
- Inspection of the North Weaver Road trestle
- Request that CSX do more than a drive-by visual inspection of tracks

DOE RESPONSE #3b

The Federal Railroad Administration is the federal agency with jurisdiction over the condition of rail lines and associated matters such as inspections. Track inspections by the railroad are conducted under the guidelines established in 49 CFR Part 213, the U.S. Department of Transportation regulations. Inspection frequency is governed by the following: (1) class of track and (2) tonnage traveling over the track.

According to 49 CFR 213.233, each inspection must be made on foot or by riding over the track in a vehicle at a speed that allows the person making the inspection to visually inspect the track structure for compliance with this part. However, mechanical, electrical, and other track inspection devices may be used to supplement visual inspection. If a vehicle is used for visual inspection, the speed of the vehicle may not be more than 5 miles per hour when passing over track crossing, highway crossings, or switches.

Each track inspection must be made in accordance with the schedule presented in Table A.2.1.

TABLE A.2.1

REQUIRED TRACK INSPECTION SCHEDULE

Class of Track	Type of Track	Required Frequency
Unclassified	All types	Weekly with at least 3 calendar days interval between inspections, or before use, if the track is used less than once a week, or (see next row)
1, 2, 3	Main track and sidings	Twice weekly with at least 1 calendar day interval between inspections. If the track carries passenger trains or more than 10 million gross tons of traffic during the preceding calendar year.
1, 2, 3	Other than main track and sidings	Monthly with at least 20 calendar days interval between inspections.
4, 5, 6	All types	Twice weekly with at least 1 calendar day interval between inspections.

If the person making the track inspection finds a deviation from the requirements of this part, remedial action shall be immediately initiated by the railroad.

According to 49 CFR 213.235, each switch and track crossing must be inspected on foot at least monthly. In addition, in the case of track that is used less than once a month, each switch and track crossing must be inspected on foot before it is used.

It is the responsibility of the railroad to ensure compliance with Federal Railroad Administration regulations and that the tracks and related structures such as trestles used by its trains are in good repair. It is also the responsibility of the railroad to maintain safe and sufficient crossings where a street, lane, public road, or highway crosses the railway track. DOE does not have enforcement authority over the railroad. However, DOE will require the railroad to document its compliance with regulations and laws prior to shipment, and will require, upon request, that the railroad document its ongoing compliance. In this way, DOE will be satisfied that the tracks and surrounding structures,

such as culverts and crossings, are in a condition suitable to support safe shipping of dried Operable Unit 1 wastes before shipping commences.

DOE encourages the public to forward comments regarding conditions of the rail track directly to the railroad.

SPECIFIC COMMENTS #3b

Darryl Huff; Verbal Comment, Public Meeting Transcript, page 70, lines 8-18

"This issue leads me straight into another one, which is the effectiveness of the weekly track inspections CSX conducts. With the stories I have heard from area residents concerning blockages they have removed from the track themselves, I have to think that these must be somewhat ineffective.

Perhaps DOE needs to supplement these with their own personnel or perhaps more frequent inspections should be negotiated into DOE's contract with CSX."

Nick Schwab; Verbal Comments, Public Meeting Transcripts, page 79-80

"The number two, the regular inspection and maintenance of all cross bucks and pavement markings on the spur line.

Six, a complete & through inspection of the North Weaver Road trestle"

Norma Nungester; Verbal Comments, Public Meeting Transcript, page 85, lines 2-9

"And I think that CSX should do more than a visual inspection of those railroad tracks once a week. Somebody needs to get down there and actually see, you know, what's happening. A visual inspection as you're driving by you don't see all that much. Maybe they have better eyes than I do, but I don't think they can see any real damage that might be there."

Norma Nungester; Written Comments

"Also needed is better inspection of the railroad tracks. Eyeballing tracks as you ride the train is one thing (probably o.k. for normal freight shipment) and real hands-on or physical inspection for hazardous, nuclear waste, and chemical is another."

Nick Schwab; Written Comments

"...a complete and through [sic] inspection of the North Weaver Road trussel [sic]..."

SUMMARY COMMENT #3c **Train Speed Limit**

Three commentors voiced concern that upgrading the track would change the track classification from a Class 2 to a Class 3 track. This could result in the permissible speed of the trains on the track changing from 25 miles per hour to 35 miles per hour. One commentor asked that if an increase to 35 miles an hours was proposed, he would like to see at the very least a comparison of stopping distances for a loaded 47-car unit train. It was his opinion that maintaining the 25 miles per hour speed limit would mean the train would be able to come to a complete stop using less track, giving the engineer more time to react to any problem such as track blockages.

DOE RESPONSE #3c

The Fernald-Cottage Grove branch line is, and shall remain, Class 2 track. None of the improvements that may be deemed necessary to support shipments of pit waste by rail would be responsible for track classification increases or speed limit increases on tracks between the FEMP and: (1) Cottage Grove, Indiana; (2) Hamilton, Ohio; and (3) Cincinnati. The improvements to the on-property spur that may be required are necessary to accommodate increased activity on the on-property rail spur. Any upgrades to tracks in the local area would be structural upgrades required to accommodate increased activity and maintain safety on the railroad track. These activities will not be utilized as the basis to seek upgrades to the official classification of the railroad track that determines allowable speed limits.

DOE agrees that at 25 miles per hour, a train would need less track to stop, and the engineer would have more time to react to emergencies. DOE is not proposing to increase the train speed limit by making structural upgrades to the track. DOE does not anticipate that its actions on behalf of greater safety on the track would result in an increase of the speed limit locally or on distant rail segments. Since DOE has not proposed an increase in the train speed limit along any length of track, DOE has not compiled a study of comparative train stopping distances.

Federal Regulation 49 CFR 213.9 describes the classes of track and the operating speed limits on those tracks. Table A.2.2 presents the speed limits allowed for different classes of tracks.

TABLE A.2.2

FREIGHT TRAIN SPEED LIMITS (IN MILES PER HOUR)

49 CFR 213.9 Track Classification	Maximum Allowable Operating Speed for Freight Trains
Class 1 Track	10
Class 2 Track	**25**
Class 3 Track	40
Class 4 Track	60
Class 5 Track	80
Class 6 Track	110

SPECIFIC COMMENTS #3c

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 69, lines 11-17

"Another issue concerning track conditions is ascertaining what the impact would be of the proposed upgrade. If this upgrade were sufficient to boost the track classification from Class 2 to Class 3, then the speed limit for the trains would increase from 25 miles per hour to 35 miles per hour. That concerns many residents."

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 69, lines 23-24, and page 70, lines 1-7

"Maintaining the 25 miles per hour speed limit would mean the train would be able to come to a complete stop using less track, thus giving the engineers more time to react to any accidents or blockages on this branch line.

At very least I would like to see some figures on stopping distances for a loaded 47 car unit train going 35 miles per hour versus the same train going 25 miles per hour."

Lisa Crawford; Written Comments

"Loaded rail cars cannot travel over 25 mph along residents [sic] land and within cities between Fernald and Cottage Grove, IN and then back into Butler Co. and on into the Cincinnati area."

Edwa Yocum; Written Comments

"Recommend a 25 mph of unit train when passing communities."

SUMMARY COMMENT #3d **Train Lighting**

The commentor suggested reconfiguring train lighting to improve rail safety.

DOE RESPONSE #3d

Testing, promoting, and approving innovative lighting schemes on vehicles and determining official transportation markings are outside the jurisdiction of the DOE. This suggestion will be forwarded to the railroad for consideration. DOE encourages the public to forward comments regarding train safety directly to the railroad.

SPECIFIC COMMENTS #3d

Carol Schwab; Written Comments

"I am very concerned about the safety of the unit trains that will be going through my farm on their way from Fernald to Utah. The recent deaths that occurred on the Cottage Grove line makes me wonder about the lights on the locomotive & the cars. We have changed the lights on automobiles to make them safer, but train lights have remained the same for years. In addition to the single headlight on the engine, why not borrow an idea from teenagers & outline the front of the engine with chasing lights. This would enable a person at the crossing to see the shape of the engine on the tracks as well as the headlight.

Reflective tape could be put on the train cars at different levels to reflect the automobile headlights no matter how high or low the crossing may be. Because of the break between cars, this tape would give the appearance of flashing lights to automobiles approaching unmarked crossings.

These two ideas might be a great way to run the entire rail system, however, the unit trains from Fernald would be a wonderful way to test the idea. Since the cars & engines will only be used for that purpose the cost would be minimal and we might be able to avoid the one or two train wrecks that statistics predict will occur in that number of miles."

SUMMARY COMMENT #3e **DOE Use of Shandon Switchyard**

Commentors expressed concern about and opposition to the possible use of Shandon Switchyard to store cars containing hazardous materials from the FEMP. Part of the concern revolved around adequate security and safety in a location not under DOE control. Another part of the concern revolved around whether off-site storage would shift responsibility for the material from DOE to another party.

DOE RESPONSE #3e

DOE acknowledges public concern with regard to storing loaded rail cars at the Shandon Switchyard. In response to that concern, the DOE completed a comparative analysis of track requirements to manage railroad car logistic in support of remediation activities in Operable Unit 1 (OU1). This analysis looked at options ranging from: full unrestricted use of the Shandon Switchyard; thru, no use of the Shandon Switchyard with necessary support trackage totally located on current site property within the boundary of the security perimeter fence, to receive and store rail cars.

This analysis clearly identified that the on-site option is technically implementable, and more favorable from a cost standpoint and has less unforeseen complications than the using of Shandon Switchyard. As such, the DOE will pursue operation of a FEMP rail system using existing, upgraded and new track, totally located on current site property within the boundary of the security perimeter fence, to receive and store rail cars.

SPECIFIC COMMENTS #3e

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 71, lines 10-15

> *"Another issue of concern is the possible use of the Shandon switchyard to store empty cars that have not been decontaminated and also loaded cars waiting to depart for Utah. DOE needs to consider extending the fence line and building track on-site to store the trains."*

Lisa Crawford; Written Comments

"Loaded railroad cars cannot sit along the tracks outside of DOE's fenceline or in the Shandon Switching Station. Rail cars must be loaded within the fenceline property (on-site) and then move the train out all at once without sitting or stopping along the tracks. All DOT regulations should be followed and adhered to strictly."

Morgan Township Board of Trustees, Written Comments

"That the Morgan Township Board of Trustees send a letter to FERMCO and DOE stating that the Trustees will not tolerate the storage of any material from the FERNALD SITE in Morgan Township. Our reasons for rejecting the proposal to reactivate Shandon Switching Yard is due to the concern of security, and safety of storage of hazardous or potentially hazardous materials off site may remove the burden of responsibility from the DOE and FERMCO. We believe DOE and FERMCO to be the proper authority, and the authority should not be shifted to some other party such as CSX, who we feel may not be the proper responsible party."

Edwa Yocum; Written Comments

"Unit trains loaded or unloaded be layover on site not on spurs outside of Fernald site."

SUMMARY COMMENT #3f **Track Access Control**

Several commentors stated their preference for a fence or an upgraded fence around the tracks including, but not limited to, those at Shandon Switchyard that may be used to transport waste from Operable Unit 1 or for the maneuvering of empty cars. The commentors indicated that a fence would: keep children and animals off the tracks; facilitate cleanup; provide greater security; discourage vandalism; and isolate contaminated cars from the public.

DOE RESPONSE #3f

DOE agrees that fences would provide some degree of security. All areas where rail cars will be loaded and stored pending formation of a complete unit train will be fenced and provided with an appropriate level of security and lighting. Options for staging rail cars and the actual location of fences on FEMP property during the remediation of Operable Unit 1 will be developed in the design phase.

SPECIFIC COMMENTS #3f

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 71, lines 16-20

"If there were an accident, cleanup would be facilitated by having everything within the fence line. Security to prevent vandals and curiosity seekers from getting to the cars would be easier to arrange as well."

Sandy Butterfield; Written Comments

"The area where the train track comes out of the FEMP crosses Morgan-Ross Rd. and continues along the south side of our property until it joins the main track of the CSX railroad. The property adjacent to ours, through which this spur track travels, is owned by the United States Government and controlled by D.O.E. We are concerned because the entire area is not fenced and is open to the public at large. If train cars filled with this disposable material are left sitting on this spur track waiting for pick-up on the main line, they will become an exposure possibility to the entire community. Children will have access to them as will any of the people who seem to hang out around train tracks as is evident by the cans and garbage left behind.

We asked a year ago that this area be mowed and cleaned up. We were told that the D.O.E. was letting it go back to a wildlife area and they would see what they could do about mowing it. It's now a year later and nothing has been done yet. Weeds and grass have grown up around the track and right in the track to a height of three feet or so.

Realizing that OU 1 is just the tip of the iceberg, we need to have this area addressed before many more loads are scheduled to be taken across it. When it leaves the fenceline of the plant, it also becomes public responsibility (i.e., neighbors, Morgan Twp. fire dept., public officials, etc.)."

SUMMARY COMMENT #3g **Additional Track at Morgan-Ross Road Crossing**

One commentor stated opposition to converting the rail spur that leaves the FEMP at the Morgan-Ross Road crossing into a holding area for rail cars. The commentor also stated that she opposed the construction of additional track in this area.

DOE RESPONSE #3g

At this time, no decision has been made regarding the use of the track where it leaves the FEMP and crosses Morgan-Ross Road as an area for staging rail cars. DOE will include the public in future decisions regarding transportation of Operable Unit 1 waste from the FEMP.

SPECIFIC COMMENTS #3g

Sandy Butterfield; Written Comments

> *"We do not want this spur to be used as a holding area, waiting sometimes days to be picked up by a train on the main track. We also do not want additional track put in this area thus making it into a rail yard. Rail cars should be kept inside the plant until they are scheduled for pick up and only be brought out at that time."*

SUMMARY COMMENT #3h **Transportation Risk and Safety**

Five commentors expressed concern about railroad safety and the risk associated with transportation of the waste from FEMP to the representative permitted disposal facility and to Nevada Test Site. Concern focused on the completeness of the analysis of accidents involving rail transportation. Commentors also expressed concern about the physical risk of transporting wastes over local roads and the cancer risk associated with rail cars sitting for periods of time on local track sidings and spurs.

DOE RESPONSE #3h

A transportation risk assessment comparing the risks of Operable Unit 1 remedial alternatives is provided in Appendix D of the Operable Unit 1 Feasibility Study; conclusions are presented in D.6.2. The risk assessment assessed the direct radiation and the transportation risk impacts associated with transporting the waste. Risk associated with routine delays, such as mechanical repairs and engine and car switching, are included in the assessment. The risk assessment also evaluated potential risks associated with accident-free waste transportation and the risks associated with an accident scenario.

The calculated excess cancer risk to members of the general public for routine, accident-free waste transportation is 1.2×10^{-10} (or 12 in 1 billion). This estimated risk is well below the range considered to be acceptable by the Environmental Protection Agency. The calculated excess cancer risk to members of the general public for the accident scenario is 4.6×10^{-5} (or 46 in 100,000), which is within the range considered to be acceptable by the Environmental Protection Agency. It is noted that, while this assessment did include consideration of routine delays as described above, the assessment did not consider extended delays. Since the waste will be shipped in unit trains, which have priority over regularly scheduled freight trains, and because the waste will be confirmed as acceptable to the receiving site prior to shipment, no long-term transportation delays are expected. Adding further to this expectation is the fact that per 49 CFR 174, Subpart A, loaded rail car layovers are limited to 48 hours (Saturdays, Sundays, and holidays excluded).

In the unlikely event of an extended delay, it is noted that per 49 CFR 174, Subpart K, there are limits on the amount of external radiation that can emanate from the rail cars. These radiation limits are health-designed to protect human health. All rail cars will be monitored for external radiation prior to leaving the FEMP to ensure compliance with these requirements. DOE is committed to making this information available to the public in a timely manner. Additional protection would be provided by waste containment in the form of the liner within and a hard cover fastened over each gondola rail car.

DOE is committed to shipping waste safely in accordance with all applicable requirements. Department of Transportation requirements will be strictly adhered to by the railroad and detailed emergency response plans will be developed to assure that accidents are responded to effectively. Cleanup of any resultant contamination will be rapid and complete to background levels.

SPECIFIC COMMENTS #3h

Irene Lewis; Verbal Comments, Public Meeting Transcript, page 80, lines 18-23

> *"For instance, will DOE look at the potential risk if the train sits in a rail yard for days. Says DOE did consider the potential risk of having cars, and they were assessed and concluded that there was no risk. What went into this discussion to bring you to this conclusion?"*

Wanda Bruck; Written Comments

"My concern is cancer risk in all the people on the route. We have a high rate of cancer in Union Co. & Franklin Co. where I live.

My grandson died of leukemia 14 yrs ago. The young man next door to him died also of leukemia. They both lived 1/4 mile from the tracks. My father-in-law died of cancer, he too lived a 1/2 mile from the tracks. I could go on and name a half a dozen more afflicted with this disease and all living within 1/2 mile of the tracks.

What would happen if just one car upset and spills that darn waste?"

Lisa Crawford; Written Comments

Rail cars should be monitored prior to leaving the site to be sure that all radiation readings are within limits and also when it has had to sit along the route for engineer changeover or unforeseeable delays and then when it reaches it final destination. These results should be reported to stakeholders in a timely manner.

Pamela Dunn; Written Comments

"The transportation issues are of concern to numerous areas of the public and warrant serious consideration and response. Safety and protection of the public, workers and the environment along the shipping routes must be conducted throughout the project, as with all such projects on the site, due to the nature and volumn [sic] of the materials involved and the time required to complete the project(s)."

SUMMARY COMMENT #3i **Runoff/Drainage**

Two commentors expressed concern about the migration of contamination from railroad property to adjacent property. Stormwater runoff, inadequate maintenance of drainage ways, and train accidents were identified as potential sources of contamination.

DOE RESPONSE #3i

DOE acknowledges land owners' concerns about the risks associated with a train accident. DOE believes these concerns are most appropriately addressed by a combination of three factors aimed at reducing or containing the impacts of an accident. The first is railroad compliance with Federal Railroad Administration regulations concerning track conditions and inspection. This is discussed in

detail in DOE's responses to Comments 3a, Track Conditions in Ohio and Indiana, and 3b, Track Inspections. The second factor is containerization of wastes to minimize releases in the event of an accident. The rail car used for transporting Operable Unit 1 waste would be lined and have a fastened hard cover. This level of containment is beyond that required by United States Department of Transportation regulations and prevents contact between rain water and waste material. Therefore, this would effectively eliminate the potential for contaminated runoff.

The third factor aimed at reducing the impacts of an accident is immediate response. An emergency response plan will be developed to address responsibilities in the event of a train accident. Details of this plan will be developed during remedial design and be available for public inspection. DOE is committed to ensuring that any material released while in transit from the FEMP to the disposal site is cleaned up to background levels.

SPECIFIC COMMENTS #3i

Eugene Ramsey; Verbal Comments, Public Meeting Transcript, page 75, lines 2-10

> *"So because there's a lot of waterways up there where these culverts go up under the track and them waterways ends up clear down at Paddys Run Road--or Paddys Run Crick and then on down to wherever, so if any car would ever spill up there no telling where that would end up and I just don't want to see my property or anybody else's property ruined by any waste, because we have seen cars jump the tracks and everything else up there."*

John Francis; Written Comments

> *"My concern is over the transportation of waste material over the CSX railroad system.*
>
> *I am a farm property owner adjacent to the Shandon Yard. I feel that sometime--even if track is laid on site--trains loaded with hazardous material will be standing on the Shandon Yard siding. If and when this happens and we have a heavy rain the run off breaks over the railroad ditches and flows through a thirty acre field on my farm.*
>
> *I need to be assured that the railroad will clean out their side ditches of all vegetation and reshape these ditches to divert drainage to their property."*

SUMMARY COMMENT #3j **Pre-Shipment Radiation Monitoring Along Railroad (FEMP to Cottage Grove, Indiana)**

Two commentors asked if a radiation survey would be completed along the tracks before wastes are transported off site. The commentors indicated their preference for a pre-shipment radiation survey.

DOE RESPONSE #3j

Both DOE and the local railroad owner, CSX, believe that a limited radiation survey is a prerequisite to waste shipment. DOE and CSX are very interested in this information because knowing what contamination is present prior to shipment would help determine the extent of contamination in the event a release of material occurs during transportation of Operable Unit 1 waste to a disposal facility.

However, DOE does not own the tracks, so it is inappropriate for DOE to commit to a survey at this time. DOE will pursue this during contractual negotiations with the railroad. Any survey conducted would likely focus on the track from the FEMP to Cottage Grove, Indiana.

SPECIFIC COMMENTS #3j

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 68, lines 15-24, and page 69, lines 1-10

> *"I would like to start by addressing several issues related to track conditions. The first of these is one that has troubled me for some time. I am concerned that no one has any idea whether the rail lines that stretch between Fernald and Cottage Grove, Indiana are contaminated at the moment. This is significant for several reasons.*
>
> *The first of these is that people often come in contact with the track. Kids play on the track. Hunters walk along the track. Concerned citizens remove debris from the track. Workers will be upgrading the track. We need to know if these people are at risk of being contaminated.*
>
> *Another reason is to check for radiation is that DOE would have a number to use as a norm for the track, so that the track can be checked in the future in case of a leaking car or, heaven forbid, an accident. Finally, it would give area residents valuable peace of mind."*

Steve Schulte; Verbal Comments, Public Meeting Transcript, page 84, lines 15-19

"I was just wondering if there is going to be an eminent [sic] condition study done along the railroad tracks to compare figures with later on as far as the radiation that's along the railroad tracks now?"

SUMMARY COMMENT #3k **Private Property Issues: Structures/Barriers Surrounding Tracks**

Four commentors indicated concern about the quality and responsibility for maintenance and construction of fences alongside the track. These fences would prevent animals and people from entering the track roadbed. The comments primarily revolved around who would pay for construction and maintenance of such fences along side the railroad tracks.

Several comments referenced the fact that Ohio law requires fences along the railroad track be maintained by the railroad. Their comments indicate concern that this responsibility had been neglected in the past.

One commentor requested that "No Hunting" signs be posted and that enforcement include prosecution of violators.

DOE RESPONSE #3k

DOE acknowledges public concern about the construction and maintenance of fences along the railroad between the FEMP and Cottage Grove, Indiana. DOE is prepared to forward all comments regarding fences on specific private property along the transportation route to the railroad.

According to the Ohio Revised Code, Section 4959.02, in general, the company owning or operating the railroad is responsible for constructing and maintaining in good repair on each side of the railroad, along the line of the lands owned by the company operating the railroad, a fence sufficient to turn livestock. State regulations along the rest of the route may vary, depending upon the presiding states' transportation or public utility regulations. Fencing requirements were established to

protect the property of adjoining owners, prevent cattle and other domestic animals from endangering themselves, and to guard the lives of passengers and workers on the train that might be endangered by animals getting on the track.

The railroad is responsible for taking "ordinary care and prudence" to avoiding injuring animals. The rail company operating the rail from the FEMP through Indiana and Ohio must comply with all laws that apply to its operation.

Concerning the comment about posting "No Hunting" signs and associated enforcement, DOE will forward the comment to the railroad for its consideration. Since the railroad is the current owner of the property and DOE has no legal jurisdiction in this area, DOE believes this is the most appropriate action.

SPECIFIC COMMENTS #3k

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 70, lines 19-24

> *"Next, I have some questions about what surrounds the track, namely fences, crossings, and vegetation. Will there by upgrades to the fences bordering the tracks to keep animals and people off the tracks, and if so, who will pay for that?"*

Nick Schwab; Verbal Comments, Public Meeting Transcript, page 79, lines 11-24

> *"Three, the posting at appropriate locations along the spur line of no hunting signs and a method of enforcement that includes prosecution of violators because of the danger that they could leave something on the tracks that could cause a possible derailment that would place the residents at risk.*
>
> *Number four, the building and repair of farm fences along the spur line as required by Ohio law. This has been neglected in the past by the railroad. And since DOE is going to assure profitability of this line the railroad needs to live up to their responsibility to the landowners along this spur line and to maintain their fences."*

Alan Herrmann; Written Comments

> *"I am also requesting that your fence along the railroad property starting at 1089 feet south of Reily Peoria Road and running south approximately 820 feet be replaced. Our farm is fenced on all other sides as we pasture our cattle at various times and this railroad fence will not hold cattle."*

Nick Schwab; Written Comments

"At DOE's Public Comment meeting on Aug 23 I expressed several safety concerns about the CSX line that runs through Reily Twp. One concern was that CSX has neglected to maintain & repair farm fences through our township. I had expressed the same concern at the Aug 16 meeting with CSX officials. I was told by Mr Rich Johnson that he would research the issue of farm fences & the RR's responsibility & be in contact with me.

Aug 24, 1994 [sic] Mr Rich Johnson told my wife by phone that the RR's lawyers researched the question & CSX only had responsibility to maintain fences if the farm was fenced on the other 3 sides. I then returned the call to Mr Johnson & asked for the section of the Ohio Revised Code or the Court case on which the lawyers were baseing their opinion. I was told I could expect a call the next day with this information as their lawyers had just finished the search. As of this date I have yet to receive a reply from Mr Johnson.

I am enclosing a copy of the section of the Ohio Revised Code that deals with the RR's responsibility to maintain fences. This was provided to me by State Representative Gene Krebs.

I am also enclosing a copy of a letter asking for additional information from me so that the railroad can "research your exact situation & work with you to resolve it."

I pointed out at the Aug 16 meeting with CSX that this is not just a personal problem but rather one shared by almost all farmers in Reily Township."

SUMMARY COMMENT #31 Liability in the Event of an Accident

One commentor asked about financial responsibility for cleanup and cleanup levels in the event of a train accident.

DOE RESPONSE #31

DOE is committed to ensuring that any material released while in transit from the FEMP to the disposal site is cleaned up to background levels. Liability details will be contractually negotiated between DOE and the railroad.

SPECIFIC COMMENTS #3l

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 71, lines 21-24, and page 72, line 1-4

"Liability in the event of an accident is another problem area. Who would pay for the cleanup of an accident, CSX or DOE? How clean will that cleanup be? Where will residents be able to see that in writing?

I realize that the contract between DOE and CSX cannot be negotiated until the Record of Decision is signed, but residents need to know."

SUMMARY COMMENT #3m **Railroad Safety Records**

One commentor requested that DOE consider local safety records when awarding a contract for rail transportation services.

DOE RESPONSE #3m

DOE's number one priority is safety. The railroad's safety record will be taken into consideration when negotiating a rail transportation contract. DOE will require that the railroad comply with all applicable regulations regarding the integrity and safety of the railroad line.

SPECIFIC COMMENTS #3m

Nick Schwab; Verbal Comments, Public Meeting Transcript, page 78, lines 6-23

"It's important that the DOE in considering a contract that the nationwide safety record or the carrier not be considered, but rather the safety record of the railroad along this particular spur line, the number of miles along the spur line, the number of miles along the spur line, and more importantly the fact that only three trains a week travel this line need to be considered in the accident rate and what remedial action needs to be taken.

The neighbor directly north of me was killed on this spur liner [sic] at Peoria several years ago. The neighbor directly west of me was hit by a train and had the front of his car torn off. If you read CSX material that they passed out last week nobody alive should know--have two neighbors injured on a little short piece of track like this."

Wanda Bruck; Written Comments

"We've had at least 2 wrecks east of Cottage Grove in the last 2 years. The last one killed two young boys."

SUMMARY COMMENT #3n **Cost Sharing with Other Industries on Local Rail**

One commentor indicated concern that more than one company uses the local railroad spur and would receive benefit from upgrades required for waste transported from the FEMP. The commentor felt the other companies should share in the cost of the upgrade.

DOE RESPONSE #3n

DOE acknowledges the commentor's preference for cost sharing among the companies using the local railroad spur, to pay for upgrades required to safely transport FEMP waste. However, DOE does not anticipate that private industries currently using the track will be asked to share in the cost of upgrades that their shipments do not require.

SPECIFIC COMMENTS #3n

Norma Nungester; Verbal Comments, Public Meeting Transcript, page 85, lines 10-19

"Also I have a real concern about these tracks. They are currently being used by three companies that sit--or two companies I guess it is, that sit southeast or southwest of the Fernald site, and they're using these tracks and I understand that they don't need the upgrade to use them, but I think that somehow they should also share in the cost of these tracks because they're going to get the benefit when they are made better."

Norma Nungester; Written Comments

"During attendance at the workshops, etc., it was explained the DOE would be responsible for the cost of any accidents, for the improvement of tracks and overpasses, and the cost of adding an additional mile of railroad tracks onto the site. I believe that although the two chemical companies South of the plant may not be required to have track improvements, they use this railroad and should share a portion of the cost."

SUMMARY COMMENT #3o **Preference for Containerized Waste**

One commentor asked whether the waste would be containerized and suggested that the waste would be more secure if it were containerized in the rail car during shipment.

DOE RESPONSE #3o

According to Department of Transportation regulations, low-specific-activity material must be shipped in strong and tight packages that permit no leakage of radioactive material under normal transportation conditions. Operable Unit 1 waste will be containerized inside each rail car. The rail car will have a liner and a fastened hard cover. This complies with Department of Transportation regulations for shipping low-level radioactive waste.

SPECIFIC COMMENTS #30

Nick Schwab; Verbal Comments, Public Meeting Transcript, page 80, lines 6-10

> *"Alternative 5B doesn't indicate whether or not that the waste shipped by rail will be containerized, and wouldn't the waste be more secured if it were containerized and placed in the rail cars. Thank you."*

4. POST-REMEDIAL ACTION

SUMMARY COMMENT #4a **Preference for Continued Technology Development - Post-Remedial Action Periodic Reviews of Current Remedial Technologies**

Commentors expressed the desire for DOE to continue research in treatment and disposal technologies for radioactive wastes; and that if such technologies would develop to a point where they should be implemented, that DOE, as well as the disposal facilities, consider implementing such technologies in the future.

DOE RESPONSE #4a

DOE has identified the Preferred Alternative as the permanent disposition of Operable Unit 1 waste material. While it is possible that more advanced technologies would become available in the future, DOE is committed to implementing the remedy identified in the Operable Unit 1 Record of Decision. Thus, no wording as requested in the comment will appear in the Record of Decision.

However, DOE maintains an active, ongoing technology assessment program that identifies and demonstrates technological advances that may be suitable for FEMP wastes in the future. Should new developments warrant, new technologies could be applied to any Operable Unit 1 soils or debris remaining on site.

Operable Unit 1 waste disposed off site would be subject to the decision of the disposal facility (in the case of Operable Unit 1, a permitted commercial disposal facility or the Nevada Test Site) regarding implementation of any future technologies.

SPECIFIC COMMENTS #4a

Vicky Dastillung; Written Comments

> *"In light of the fact that 5B does not allow for totally unrestricted use of the site after remediation, I would like to see the ROD include wording stating that the periodic reviews of the effectiveness of the action will also include an analysis of the then current technologies' ability to pursue further remediation both at the FEMP and at the disposal facility. If at such a future time a technology would allow for a way to truly deactivate the radioactivity or hazardous chemicals or for a way to greatly enhance the long-term storage of the material, we would want to be able to evaluate if it was desirable to pursue further action. This process would also call attention to the TD needs of the DOE."*

Pamela Dunn; Written Comments

> *"Continued efforts in technology development should proceed in attempting to discover more effective methods for treatment and disposal of the waste streams present."*

5. COMMUNITY INVOLVEMENT AND NOTIFICATION

SUMMARY COMMENT #5a **General Impacts of the FEMP**

Several comments focused on long-term concern about impacts of the FEMP on the land along the rail route and at the disposal site. Some commentors, especially those who previously lived within the five-mile radius of the FEMP and now live along the proposed rail route, expressed frustration about FEMP environmental issues continuing to impact their land and their families.

DOE RESPONSE #5a

DOE's acknowledgement of the public's concern is reflected in the main components of the Selected Remedy and will be further detailed in the Remedial Design and Remedial Action work plans. It is concern for human health and the environment--as reflected in the Environmental Protection Agency criteria that remediation reduces the mobility of the contamination--that motivated the excavation of the waste pit material and surrounding affected soils. The thermal drying that follows excavation produces a waste form that can be safely packaged and shipped to a disposal site that does not impact local populations or a regional aquifer. DOE will ensure that the Selected Remedy will comply with all federal and state requirements regarding the shipment of waste.

SPECIFIC COMMENTS #5a

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 73, lines 8-17

> *"These are some of the issues that I have heard other stakeholders mention and also ones I have considered. As a resident of the area with the track on my property, I cannot overemphasize the significance of this operation to my family, my community, and myself.*
>
> *Two things will be left when I'm gone, my family and the land, I want to ensure that both are left in the best condition possible. Thank you."*

Mildred Ramsey; Verbal Comments, Public Meeting Transcript, page 73, lines 20-24, and page 74, lines 1-2

> *"I'm from Riley Township and I was also interested in the tracks. And I think he pretty well discussed it. I know the train runs through our farm.*
>
> *We did live in the five-mile radius and we moved out and thought we got away, now it's following us. We can't get away from it."*

Nick Schwab; Verbal Comments, Public Meeting Transcript, page 76, lines 23-24, and page 77, lines 1-12

"I'm Nick Schwab, Riley Township Trustee. And I also and my wife lived within these five miles and hopefully moved out of it and find ourselves in the position where they're going to bring it right through the middle of our farm. However, as a township trustee there are certain things that I think that we need to make our concerns--voice our concerns.

Certainly in Ohio--or yeah, in Ohio, Riley Township is the only township where you're going to send it up one side, the west side of the township, to Cottage Grove and bring it back down through the east side of the township, so our township is going to see this train twice."

SUMMARY COMMENT #5b **Continuing Public Involvement**

The Ohio Environmental Protection Agency and six members of the public made comments concerning opportunities for continued public involvement throughout the duration of the cleanup process at Fernald. Commentors stressed the importance of public input in the decision-making concerning Operable Unit 1 and the site as a whole. Stakeholders also stressed the need for continued public involvement opportunities after the Operable Unit 1 Record of Decision is signed and throughout the duration of the Remedial Design and Remedial Action phase of the cleanup. Commentors said DOE should commit to this in the Operable Unit 1 Record of Decision and the (revised) site Community Relations Plan.

DOE RESPONSE #5b

DOE values public involvement in FEMP decision-making. Feedback confirms that community members want and expect to remain involved during the design and cleanup phases of the project. Accordingly, DOE shall continue to offer opportunities for public involvement beyond those required by Comprehensive Environmental Response, Compensation, and Liability Act regulations and Environmental Protection Agency guidance, during the Remedial Design and Remedial Action phases of the cleanup.

Public involvement activities for each issue or project phase shall be determined through consultation with interested parties. In this way, the level of public involvement will meet not only the regulatory requirements, but also the needs of the community for information about the project and opportunities for influencing decision-making.

Section 3 of the Operable Unit 1 Record of Decision focuses on community participation. Activities used to inform and educate the public about cleanup plans for Operable Unit 1 are highlighted in this section. In addition, DOE has committed to involving stakeholders in decision-making in the Remedial Design and Remedial Action phase of the cleanup. The FEMP revised Community Relations Plan outlines public involvement activities for the entire site. Activities that can be used are fact sheets and other publications, workshops, and community meetings. (See the DOE response to Summary Comment 5c, Revise the Community Relations Plan, for a list of public involvement activities.)

SPECIFIC COMMENTS #5b

Darryl Huff; Verbal Comments, Public Meeting Transcript, page 72, lines 5-23

> *"That brings me to what is perhaps the most important issue of all, that of continuing public involvement after the Record of Decision is signed. Many important decisions will be made after the Record of Decision is signed, and residents should have input on those decisions.*
>
> *The CSX contract is an excellent example. DOE has already assured the public that there will be public review of the transportation plans before it is final and also that residents can oversee the track upgrading.*
>
> *There needs to be more official public involvement, however, all the way through 2002 when the last empty train returns from Utah. I would like to see DOE publicly announce how the residents will be systematically be included in the decision-making process after the Record of Decision is signed. A specific promise here and a specific promise there is not enough."*

Lisa Crawford; Written Comments

> *"DOE must insure public involvement will not be lessened during the RD/RA and should commit in the ROD for Operable Unit 1 to continuing the on-going public involvement during the RD/RA."*

Vicky Dastillung; Written Comments

"Public involvement during the RD/RA phases, as well as the actual remediation, must be continued, and tailored to the needs of the community. Public involvement has improved dramatically in recent years, and must be sustained through remediation to ensure that the best possible remediation occurs. Working with the stakeholders on the details of the transportation issues will be vital as well. As the designs for the drying of the waste and the designs for the cover system (after backfilling) are developed. I hope the public will be able to provide some input too."

Pamela Dunn; Written Comments

"Commitment to meaningful public participation beyond the ROD and throughout the RD/RA process. Continued public input in the decision making that affects the remediation of the site must be maintained. This commitment should be included in the site's Community Relations Plan and the OU 1's ROD."

Betty McKay; Written Comments

"Need more public participation before final rod. [sic]

Need public involvements after RD/RA work plan.

Need public involvement before complete remediation."

Norma Nungester; Written Comments

"We need a firm public involvement commitment between the RD/RA Work Plan and Begin Remediation and between Begin Remediation and Complete Remediation."

Ohio EPA; Written Comments

"DOE must ensure the public that their involvement will not be diminished during Remedial Design and Remedial Action (RD/RA). DOE should commit within the Record of Decision for OU1 to maintaining the exceptional on-going public involvement during RD/RA."

Edwa Yocum; Written Comments

"Public involvement through out the whole process after ROD and Remediation."

SUMMARY COMMENT #5c **Revise the Community Relations Plan**

Two commentors suggested that DOE revise the Community Relations Plan for Fernald. Commentors want the need for continued public involvement emphasized in the revised plan. In

addition, mechanisms for public involvement during the Remedial Design and Remedial Action phase of the project should be included.

DOE RESPONSE #5c

The following comprise some, but not all, of the activities undertaken by DOE to inform and involve the public about the cleanup at Fernald. DOE anticipates modifying these public involvement program activities as necessary on a case-by-case basis to meet the needs and desires of its stakeholders. A few of the opportunities for public involvement include:

- Community meetings and formal public meetings
- The Fernald Envoy Program
- Regular attendance and briefings at FRESH and local township trustee and civic meetings
- The Fernald Citizens Task Force
- Formal public comment periods
- Media relations
- Written publications such as fact sheets and news releases
- The Public Environmental Information Center
- The Fernald Visitors Bureau
- Regular mailings to interested stakeholders
- Response to public inquiries

DOE shall continue to offer opportunities for public involvement beyond those required by Comprehensive Environmental Response, Compensation, and Liability Act regulations and Environmental Protection Agency guidance, during both the Remedial Design and Remedial Action phases of the cleanup.

Public involvement activities are stated in Fernald's Community Relations Plan, which has been revised and was submitted to the Environmental Protection Agency and Ohio Environmental Protection Agency on September 15, 1994. Key stakeholders, including representatives from

FRESH, the Fernald Citizens Task Force, and local government officials, reviewed the Community Relations Plan. The revised plan details ways in which DOE will involve the public in decisions made at Fernald. The ultimate objective of the Community Relations Plan is to bring public interests and project interests into alignment, thereby ensuring that project decisions reflect community values. Upon completion and approval, the plan will be available in the Public Environmental Information Center at 10845 Hamilton-Cleves Highway, Ross, Ohio, (513) 738-0164.

SPECIFIC COMMENTS #5c

Lisa Crawford; Written Comments

> *"DOE should also revise it's Community Relations Plan to reflect the need for continued public involvement during the RD/RA. I look forward to working with DOE in revising this document."*

Ohio EPA; Written Comments

> *"DOE should revise the site Community Relations Plan to address the need for continued public involvement during the RD/RA. Ohio EPA looks forward to working with DOE to revise this document."*

SUMMARY COMMENT #5d **Community and Emergency Personnel Notification**

Three commentors said they would like the public and appropriate emergency response personnel along the route by which rail cars from the FEMP will be traveling to be notified before rail shipments leave the FEMP. In addition, stakeholders would like to know the mechanisms that will be used to notify the public.

DOE RESPONSE #5d

DOE recognizes that members of the public are interested in Fernald rail transportation issues. Despite the fact the Department of Transportation does not require advance notification of shipments, DOE intends to provide advance notification to local stakeholders about the start of the rail shipment program. Specifically, information about the time frames over which rail shipments will occur, the number of shipments anticipated, and the quantities and types of waste to be shipped by rail will be

provided to local stakeholders. The exact mechanism of how this notification will occur will be determined at a later date.

As part of emergency response preparations, DOE will contact and work with representatives from Ohio, Utah, and transited states prior to the first waste shipment to brief them on overall shipment plans. This information will allow states to prepare, as necessary, for any potential emergency response activities involving waste shipments from Fernald and to ensure that potential responders are aware of the transport of these wastes. Additional notifications will be at the discretion of the states.

SPECIFIC COMMENTS #5d

Irene Lewis; Verbal Comments, Public Meeting Transcript, page 81, lines 8-13

> *"For instance, you say that the residents are going to be receiving notification, do you mean notification or do you mean a schedule of when the trains depart? There's is difference. Is it going to be, you know, notification like we got under the other operation when it started."*

Rita Janssen; Verbal Comments, Public Meeting Transcript, page 86, lines 11-20

> *"Her comment reads as follows: Will communities along the rail route be notified when shipments of pit waste take place, through what mechanism will this notification be made, through community newspapers, through government agencies, or both? Will emergency personnel along the rail shipping route be notified prior to the waste shipment through their area?"*

Edwa Yocum; Written Comments

> *"Notification of all community & fire personnel when unit train pass through or layover."*

SUMMARY COMMENT #5e **Emergency Response**

Four commentors favored preparation of a plan addressing emergency response responsibilities and roles. One of the commentors specifically indicated that the potential threat of release and any resulting potential threat to the public health and welfare pointed to the need for DOE to conduct emergency response training of fire departments along the spur line.

DOE RESPONSE #5e

Once the Operable Unit 1 Record of Decision is signed, DOE will prepare a plan which will address emergency response in the event of an accident, before any rail shipments are initiated. The emergency response plan will contain procedures, a map of the route, directions for coordinating organizations that would become involved, and will assign responsibilities should a rail incident involving pit waste occur. DOE would immediately notify local response agencies in the event of an accident. DOE would also participate and have resources available to assist the on-scene commander, either through the FEMP site and/or through DOE Regional Emergency Response Centers. The incident commander would be the authorized local first responder. DOE also plans to prepare a contingency plan for remedial activities.

DOE holds an annual joint response exercise at the FEMP. The annual emergency response exercise provides an opportunity to include training and mock rail accident exercises involving local first responders (i.e., between FEMP and Cottage Grove). In addition, DOE will participate, as requested, and as relevant to the transportation of Operable Unit 1 waste, in periodic training programs sponsored by the railroad carrier and by organizations responsible for emergency planning and response located in the transited states.

SPECIFIC COMMENTS #5e

Nick Schwab; Verbal Comments, Public Meeting Transcript, page 77, lines 13-23

> *"In the plan ES2, lines 27 to 29, you talk about if actual threat and release of hazardous substance and it goes on may present, I don't want to read it all, but may present a potential threat to the public health and welfare of the environment.*
>
> *Points out that the need that the plan include training of the volunteer fire departments along the spur line to handle the specified waste, the securing of a site in case of an accident."*

Irene Lewis; Verbal Comments, Public Meeting Transcript, page 81, lines 14-24, and page 82, lines 1-24

> *"I would like to see a map of Butler County where the train track runs, like Nick said it comes through his farm twice, so you know, we have concerns every place that his train travels through. I know that there is more concerns in rural areas naturally. So I would like to see a map of the county with the train track, the route that this takes, that the train takes.*

I would like to see an emergency plan, not just a basic plan like CSX gives to us and some other people, but like Nick said some procedures, specific procedures, one, two, three, four, five, this is what you do when this happens, the next step is this, the next step is this, and some things really spelled out.

Who do you consider an incident commander? Is that the people on the train crew. You know, I think these are the things--it's too late to do something when there is an incident and you go out there and try to decide now what was it I was supposed to do, know that person's responsibility. You know, it's too late when you have an incident and have to try to work out who's going to do what, so I would like to see this and see some input.

I don't know if you're going to stop after this September the 8th meeting or not. You said that was the last meeting, is that September the 8th or whatever it was?

MR. LOJEK: September the 8th is the close of the comments.

MS. LEWIS: Oh, the comments, okay. Where are you going then from here, after all the comments and so on are you going to start working on specific plans?"

MR. LOJEK: Yes. We can answer that formally.

Lisa Crawford; Written Comments

"If there's a problem or emergency--all members of the immediate community should be notified within a reasonable amount of time. I encourage DOE to expand its outreach activities to local first responders and this should include training, emergency exercises, etc. All members of the local communities should be informed about these activities and encouraged to be active participants. This should include Indiana, also."

Ohio EPA; Written Comments

"Due to significant public concern with regard to emergency preparedness, Ohio EPA encourages DOE to expand its outreach activities to local first responders along the train route in Ohio and Indiana. These activities could include training, mock exercises, etc. involving multiple agencies and fire departments. Ohio EPA would gladly participate in these activities."

Nick Schwab; Written Comments

"...& a training program involving the volunteer fire departments along the spur line as to the steps needed to be taken & the area that needs to be secured in case of a derailment or an incident that would result in stopping the train for a period of time."

SECTION A.3

ORIGINAL COMMENTS

A.3 ORIGINAL COMMENTS

Section A.3 presents the actual comments, both verbal and written, exactly as they were received by DOE. Formal comments have been bracketed with an issue number so that the DOE response to the comment can be found in Section A.2 of this Responsiveness Summary by following the issue number back to a summary comment and response. Every formal comment has been bracketed with the exception of some transition material between speeches during the verbal comments at the Operable Unit 1 public meeting. The informal question and answer period at the Operable Unit 1 public meeting was recorded by the transcriber at the public meeting, but these transcripts were not included in this Responsiveness Summary. A formal response has not been drafted by DOE to these informal comments because a response was already made during the informal question and answer period at the public meeting. Formal verbal comments are presented in Section A.3.1. Written comments are presented in Section A.3.2 in alphabetical order. The written comments include comments made by the Ohio Environmental Protection Agency.

Brackets on all formal comments contain a number that corresponds to an issue number in Section A.2. The issue number identifies the location of DOE's response to the comment. DOE did not respond to each comment individually since there were so many comments that raised topics of concern to a number of speakers. Comments that were similar or identical were grouped together. Comments unique to only one commentor were addressed individually with as much weight given to the response to the comment as was given to those presented by multiple commentors.

SECTION A.3.1
TRANSCRIPTS FROM THE PUBLIC MEETING HELD IN ROSS, OHIO ON AUGUST 23, 1994

So that's the format that we'll cover and I'll just briefly touch on that again. Go ahead, we have some refreshments here provided in the room, go ahead and just kind of stretch your legs and mingle for awhile and we'll reconvene in about 15, 20 minutes.

(Brief recess.)

MR. LOJEK: Okay. I think What we would like to do now is start back up with our session here, so if you would please take your seats we'll reconvene the meeting.

Okay. Thank you. I think that was a good break. I enjoyed mingling, and talking, and meeting some people here. I enjoy that at all our of meetings and sessions, just meeting somebody new every chance I can.

It brings us this evening to our acceptance of formal comments. Let's go over a few of the ground rules and basically just to cover how I want to move through this.

This is the opportunity for the stakeholders to submit comments for public record which will be considered and addressed in the responsiveness summary for the Record of Decision.

The way I plan on going through this is basically the verbal comments, we'll receive those first. I'll have a roll call one by one for those who have indicated on the registration sign-in sheets that they have an intention to submit a verbal comment. I have a list of names here, we'll move through that.

After that, after the roll call, I will open the floor to any others here attending this evening. If anybody else would like to make a verbal comment based on maybe something they've heard somebody else mention, they're welcome to do so at that point.

I would just like everybody to step up to a microphone. We have one here, moved it back a little bit farther in the room, just step up to the microphone, speak clearly, state your name, if you need to please spell your name. These comments are being transcribed, so we need to get them down accurately so that we can respond to them in writing accurately also.

One thing else I just wanted to mention here on the bottom of the slide here I indicated written comments, I did receive one

written comment here during the break.

If there are others that you write up during our period here, please feel free just to hand them to me or raise your hand and show me that you have a written comment, and I'll be glad to get that from you. And I will read them after we go through the verbal comment session.

I guess with that let's go ahead and start the formal comment period, and the first on my list is Darryl Huff.

MR. HUFF: Thank you. My name is Darryl Huff. I'm a Morgan Township resident, and the train tracks on which waste will be exported from Fernald run through my backyard. I am also a Fernald Citizens Task Force member and the chair of the Waste Disposal Subcommittee, although tonight I am speaking as an individual and not for either the subcommittee or the task force.

I would first like to say that I generally support the Unit 1 Proposed Theory -- Plan in theory. Although there are serious short-term risks associated with transporting the waste pit materials off-site, the risks are outweighed by the very real long-term threat that

1a

these unidentified wastes located in unplanned, ad hoc disposal pits at Fernald pose to the Great Miami aquifer.

Far too long, people have been short-sighted when it comes to the subject of safety at Fernald. We can be short-sighted no longer. Thus, I favor DOE's plan to thermally dry the waste and to ship the waste to a commercial disposal facility, namely Envirocare.

Envirocare was designed and permitted to receive these types of waste, and since that part of Utah gets so little rain, the threat of contaminants leaching into the groundwater there is far less than it is here.

Also, Envirocare is not located over a sole source aquifer. Envirocare is a privately owned facility located in sparsely populated area that is in the business of waste disposal. It contributes to the tax base of the surrounding area that specifically zoned that land for that use. 1a

As for the method of shipment, I again favor DOE's plan, which is to transport the waste from Fernald by rail to Utah. While there are and will be many problems associated with train

transport, the alternative to that, transport by truck, clearly is not feasible for an operation of this magnitude and duration. The waste must leave somehow, and train is safer and more efficient than truck. 1a

While I do support the Operation Unit Proposed Plan in theory, I am concerned about several issues related to its implementation. I have listened to comments made during the public meetings and I've heard valid points raised about potential flaws in the plan. I will repeat some of those comments to ensure they are submitted to DOE for consideration and response. I also have some concerns of my own that I will voice.

I would like to start by addressing several issues related to track conditions. The first of these is one that has troubled me for some time. I am concerned that no one has any idea whether the rail lines that stretch between Fernald and Cottage Grove, Indiana are contaminated at the moment. This is significant for several reasons. 3j

The first of these is that people often come in contact with the track. Kids play on the track. Hunters walk along the track.

Concerned citizens remove debris from the track. Workers will be upgrading the track. We need to know if these people are at risk of being contaminated.

Another reason is to check for radiation is that DOE would have a number to use as a norm for the track, so that the track can be checked in the future in case of a leaking car or, heaven forbid, an accident. Finally, it would give area residents valuable peace of mind. 3j

Another issue concerning track conditions is ascertaining what the impact would be of the proposed upgrade. If this upgrade were sufficient to boost the track classification from Class 2 to Class 3, then the speed limit for the trains would increase from 25 miles per hour to 35 miles per hour. That concerns many residents. 3c

There have been too many track blockages in that area where residents have had to do the cleanup for them to accept the blockage will be cleaned up before one of the Fernald trains come to it. 3a

Maintaining the 25 miles per hour speed limit would mean the train would be able to 3c

come to a complete stop using less track, thus giving the engineers more time to react to any accidents or blockages on this branch line.

At very least I would like to see some figures on stopping distances for a loaded 47 car unit train going 35 miles per hour versus the same train going 25 miles per hour. 3c

This issue leads me straight into another one, which is the effectiveness of the weekly track inspections CSX conducts. With the stories I have heard from area residents concerning blockages they have removed from the track themselves, I have to think that these must be somewhat ineffective. 3b

Perhaps DOE needs to supplement these with their own personnel or perhaps more frequent inspections should be negotiated into DOE's contract with CSX.

Next, I have some questions about what surrounds the track, namely fences, crossings, and vegetation. Will there be upgrades to the fences bordering the tracks to keep animals and people off the tracks, and if so, who will pay for that? 3k

What if the States of Ohio and Indiana are unable to afford the massive crossing upgrades that the increased rail traffic will make necessary to keep area residents safe? Will DOE help foot the bill for those upgrades? 3a

How often will DOE require CSX to run sprayer trucks and limb cutters along the line to ensure visibility for both the engineers and area drivers?

Another issue of concern is the possible use of the Shandon switchyard to store empty cars that have not been decontaminated and also loaded cars waiting to depart for Utah. DOE needs to consider extending the fence line and building track on-site to store the trains. 3e

If there were an accident, cleanup would be facilitated by having everything within the fence line. Security to prevent vandals and curiosity seekers from getting to the cars would be easier to arrange as well. 3f

Liability in the event of an accident is another problem area. Who would pay for the cleanup of an accident, CSX or DOE? How clean will that cleanup be? Where will residents be able to 3l

see that in writing?

I realize that the contract between DOE and CSX cannot be negotiated until the Record of Decision is signed, but residents need to know. 3l

That brings me to what is perhaps the most important issue of all, that of continuing public involvement after the Record of Decision is signed. Many important decisions will be made after the Record of Decision is signed, and residents should have input on those decisions.

The CSX contract is an excellent example. DOE has already assured the public that there will be public review of the transportation plans before it is final and also that residents can oversee the track upgrading. 5b

There needs to be more official public involvement, however, all the way through 2002 when the last empty train returns from Utah. I would like to see DOE publicly announce how the residents will be systematically be included in the decision-making process after the Record of Decision is signed. A specific promise here and a specific promise there is not enough.

For example, what would happen if 1h

those unknown waste pit materials failed Envirocare's acceptance requirements and the Nevada Test Site had previously closed its doors to incoming waste? Finalizing an alternative plan would require public acceptance, but there is no mechanism for that that the public can see in writing. 1h

These are some of the issues that I have heard other stakeholders mention and also ones I have considered. As a resident of the area with the track on my property, I cannot overemphasize the significance of this operation to my family, my community, and myself. 5a

Two things will be left when I'm gone, my family and the land, I want to ensure that both are left in the best condition possible. Thank you.

MR. LOJEK: Thank you, Darryl. I would like to call Mildred Ramsey.

MS. RAMSEY: I'm from Riley Township and I was also interested in the tracks. And I think he pretty well discussed it. I know the train runs through our farm. 5a

We did live in the five-mile radius

and we moved out and thought we got away, now it's following us. We can't get away from it.

So I know we've stopped a train three different times when the tracks were out when the water washed through and different things, so we're concerned that that's all upgraded and taken care of. Thank you. 3a

MR. LOJEK: Thank you, Mildred. I would like to call Eugene Ramsey.

MR. RAMSEY: Well, my wife pretty well covered what I was going to say except that I will add this that Nick Schwab and I walked part of the track the other night before the CSX meeting, and that track is in bad shape. Your spikes are loose, you can go along and pull them up and so on. And also I know one culvert that's completely plugged. 3a

And like my wife said we keep a close watch on that because we own ground on both sides. We're right there at the New Kirk crossing where New Kirk used to be. There used to be a station there. And I've had to call them because of trees blocking the thing, blocking the tracks, culverts washed out and CSX has always cooperated and so on

and stopped the trains up at Raymond, Indiana.

So because there's a lot of waterways up there where these culverts go up under the track and them waterways ends up clear down at Paddy's Run Road-- or Paddy's Run Crick and then on down to wherever, so if any car would ever spill up there no telling where that would end up and I just don't want to see my property or anybody else's property ruined by any waste, because we have seen cars jump the tracks and everything else up there. 3i

So we've lived there going on 29 years so we've seen a lot up and down that tracks. And I've seen them burn stuff in the tracks in a rainstorm, what it was I don't know. I told CSX about that the other night, of course they don't remember what it was or anything else.

But I understand you're talking maybe $3,000,000 to upgrade the tracks and I hope before one car goes up through there or one train, which I understand is suppose to be 47 cars, what they was talking the other night, I think 47 cars, that them tracks is gone over with a fine tooth comb and really checked because they need it. Thank you. 3a

MR. LOJEK: Thank you, Eugene. I

would like to call Carol Schwab.

MS. SCHWAB: Yes. I would like to talk about page ES11, lines 12 through 14, which is the contingency plan for waste that fails to meet the criteria and they're going to send it to the Nevada Test Site.

Well, as I understand this this would be before it leaves the Fernald property they decide where to send it. But I am concerned about if it already has left the property and goes to Utah and they decide they don't want to accept it at Utah because for some reason it doesn't meet the criteria. I think that it should be sent directly to Nevada without coming back to Ohio. 2d

And some of the other stuff that you sent out, I know there was a case where something came back or a contaminated car came back, and I think it should just go directly to the other site for the more hazardous material without coming back and re-exposing us again. Thank you.

MR. LOJEK: Thank you, Carol. I would like to call Nick Schwab.

MR. SCHWAB: I'm Nick Schwab, Riley Township Trustee. And I also and my wife lived 5a

within these five miles and hopefully moved out of it and find ourselves in the position where they're going to bring it right through the middle of our farm. However, as a township trustee there are certain things that I think that we need to make our concerns -- voice our concerns.

Certainly in Ohio -- or yeah, in Ohio, Riley Township is the only township where you're going to send it up one side, the west side of the township, to Cottage Grove and bring it back down through the east side of the township, so our township is going to see this train twice.

In the plan ES2, lines 27 to 29, you talk about if actual threat and release of hazardous substance and it goes on may present, I don't want to read it all, but may present a potential threat to the public health and welfare of the environment. 5e

Points out that the need that the plan include training of the volunteer fire departments along the spur line to handle the specific waste, the securing of a site in case of an accident.

Or what really concerns me since 2d

there has been so much concern about the train sitting down in Shandon would be a contingency plan that would address a problem if there is a stopped train on that track for some reason for an extended period of time. 2d

It's important that the DOE in considering a contract that the nationwide safety record or the carrier not be considered, but rather the safety record of the railroad along this particular spur line, the number of miles along the spur line, the number of miles along the spur line, and more importantly the fact that only three trains a week travel this line need to be considered in the accident rate and what remedial action needs to be taken. 3m

The neighbor directly north of me was killed on this spur liner at Peoria several years ago. The neighbor directly west of me was hit by a train and had the front of his car torn off. If you read CSX material that they passed out last week nobody alive should know -- have two neighbors injured on a little short piece of track like this.

Other factors that need to be 3a

considered is part of a contract with the railroad. Number one, cutting and clearing of the brush that limits sight distances at many of the unsignalized crossings. Mr. Woody last week I think he said it's been several years since they cut the brush and sprayed along there. And Mr. Woody was with CSX railroad. 3a

The number two, the regular inspection and maintenance of all cross bucks and pavement markings on the spur line. 3b

Three, the posting at appropriate locations along the spur line of no hunting signs and a method of enforcement that includes prosecution of violators because of the danger that they could leave something on the tracks that could cause a possible derailment that would place the residents at risk.

Number four, the building and repair of farm fences along the spur line as required by Ohio law. This has been neglected in the past by the railroad. And since DOE is going to assure profitability of this line the railroad needs to live up to their responsibility to the landowners along this spur line and to maintain their fences. 3k

Number five, the drainage problems that threaten the structural integrity of the tracks need to be addressed in this plan. 3a

Six, a complete and thorough inspection of the North Weaver Road trestle. 3b

Alternative 5B doesn't indicate whether or not that the waste shipped by rail will be containerized, and wouldn't the waste be more secured if it were containerized and placed in the rail cars. Thank you. 3o

MR. LOJEK: Thank you, Nick. Next up I would like to call Irene Lewis.

MS. LEWIS: Thank you so much. What I'm going to say really is going to be very brief. I have a problem with questions at one meeting and the answer written down and brought back with no specifics, just generalities.

For instance, will DOE look at the potential risk if the train sits in a rail yard for days. Says DOE did consider the potential risk of having cars, and they were assessed and concluded that there was no risk. What went into this discussion to bring you to this conclusion? 3h

I think these are some of the things 1c

that we really want to look at is how did you come to this decision, and that's throughout here. So my comment is that I would like to see more specifics go into this plan. You know, a law is one thing, how it's implemented is another.

I would like to see the implementation steps spelled out. How you're going to do this. For instance, you say that the residents are going to be receiving notification, do you mean notification or do you mean a schedule of when the trains depart? There's is difference. Is it going to be, you know, notification like we got under the other operation when it started.

I would like to see a map of Butler County where the train track runs, like Nick said it comes through his farm twice, so you know, we have concerns every place that this train travels through. I know that there is more concerns in rural areas naturally. So I would like to see a map of the county with the train track, the route that this takes, that the train takes.

I would like to see an emergency plan, not just a basic plan like CSX gives to us and some other people, but like Nick said some

1

5d

5e

procedures, specific procedures, one, two, three, four, five, this is what you do when this happens, the next step is this, the next step is this, and some things really spelled out.

Who do you consider an incident commander? Is that the people on the train crew. You know, I think these are the things -- it's too late to do something when there is an incident and you go out there and try to decide now what was it I was suppose to do, know that person's responsibility. You know, it's too late when you have an incident and have to try to work out who's going to do what, so I would like to see this and see some input. 5e

I don't know if you're going to stop after this September the 8th meeting or not. You said that was the last meeting, is that September the 8th or whatever it was?

MR. LOJEK: September the 8th is the close of the comments.

MS. LEWIS: Oh, the comments, okay. Where are you going then from here, after all the comments and so on are you going to start working on specific plans?

MR. LOJEK: Yes. We can answer that formally.

MS. LEWIS: Right, okay. That's really all that I have to say, but I would like to see some of these specifics and not leave all these general remarks hanging. And almost every question and answer on here is general. The law says we'll do that, you know.

But you know, we've heard for years everything with this plan is acceptable, how many years have we heard this people? You know. And all of a sudden when this comes into place it's like quoting Rush Limbaugh, shazaam, look, it's unacceptable all of a sudden, and this is where we're at. We want it to be acceptable and not have to go through all this again. Thank you, Dave.

MR. LOJEK: Thank you, Irene Lewis. I would like to call Gene Willeke. No Gene Willeke.

MS. CRAWFORD: I think he left.

MR. LOJEK: You think he left, okay, thank you. I saw Willy Benson standing up in the back there, he's in the dark and I was trying to strain to see who that was.

At this point that's the roll call list that I had for people who designated officially they wanted to make a verbal comment.

At this point I open the floor to others who would like to make a verbal comment at the meeting. If you would just raise your hand I will go ahead and catch you and get you on the microphone and state your name and speak clearly, and we'll go ahead through the room.

Okay. I take it there are no further verbal comments to be presented. Okay. We do have, okay, thank you.

MR. SCHULTE: Hi, my name is Steve Schulte and I also own land, a half a mile of land, that borders CSX railroad tracks and I was just wondering if there is going to be an eminent condition study done along the railroad tracks to compare figures with later on as far as the radiation that's along the railroad tracks now? 3j

MR. LOJEK: Okay. Thank you. We will respond to your concern. Do we have another one here?

MS. NUNGESTER: I'm going to make a written comment, but I have a couple of quick ones

I wanted to make.

And I think that CSX should do more than a visual inspection of those railroad tracks once a week. Somebody needs to get down there and actually see, you know, what's happening. A visual inspection as you're driving by you don't see all that much. Maybe they have better eyes than I do, but I don't think they can see any real damage that might be there. 3b

Also I have a real concern about these tracks. They are currently being used by three companies that sit -- or two companies I guess it is, that sit southeast or southwest of the Fernald site, and they're using these tracks and I understand that they don't need the upgrade to use them, but I think that somehow they should also share in the cost of these tracks because they're going to get the benefit when they are made better. 3n

I didn't give my name again. Norma Nungester, N U N G E S T E R, Mt. Hope Road, Harrison, Ohio.

MR. LOJEK: Thank you, Norma. Any additional verbal comments from the open floor? I

saw Lisa, I've given her, Lisa Crawford, the eye here expecting her to get up, but that's fine.

I did receive -- Norma you mentioned that you have a written comment, you'll not hear for the meeting for a later date, correct?

MS. NUNGESTER: (Nodding head.)

MR. LOJEK: Okay. I did receive one written comment and I'll go ahead and read that comment now. This is a comment from Rita Janson. She's 2343 Ranch, that's in Lawrence, Kansas.

Her comment reads as follows: Will communities along the rail route be notified when shipments of pit waste take place, through what mechanism will this notification be made, through community newspapers, through government agencies, or both? Will emergency personnel along the rail shipping route be notified prior to the waste shipment through their area? All right. That concludes the written comment that I received here at the meeting. 5d

What I would like to do here we'll move to basically close up our meeting. I have a couple of short items to close out with.

First, I would like to identify that

if you have any lingering, or if you have any new comments, or if you choose to present your comments in writing after this meeting you can do so by submitting those comments to Mr. Gary Stegner. He's Director of our public affairs group at the Department of Energy, the Fernald Branch, that's Post Office Box 538705. In your Proposed Plan document the post office box is listed as 398705. We've just recently changed our post office box and if you use either post office box the mail will get to us.

The OU1 our public comment period, we started that on August 10th. The written comments if you submit them need to be postmarked by the closing of our public comment period which is September 8th, 1994. So please make sure that you -- we look forward to getting any additional, make sure you get them in the mail by then.

And I need to stress at the bottom of my slide here I say this is the time to make your views known. And I appreciate all the comments that I do receive and all the input and concerns that you have for us implementing our proposed cleanup of those waste pits.

At this point let me just mention for the public affairs people there was an evaluation form placed on your chair, if you would please go ahead and fill that evaluation form out.

And I would like to thank sincerely everyone for attending the meeting this evening and providing verbal and any written comments and their input into the meeting tonight. Thank you very much -- hold on a second. Okay. You're all right. Okay, very good. Thank you very much for attending.

- - -

PROCEEDINGS CONCLUDED AT 9:15 P.M.

- - -

C E R T I F I C A T E

I, CONNIE DUPPS, RPR, the undersigned, a notary public-court reporter, do hereby certify that at the time and place stated herein, I recorded in stenotypy and thereafter had transcribed with computer-aided transcription the within (88), eighty-eight pages, and that the foregoing transcript of proceedings is a complete and accurate report of my said stenotypy notes.

MY COMMISSION EXPIRES: AUGUST 13, 1997.

CONNIE DUPPS, RPR
NOTARY PUBLIC-STATE OF OHIO

SECTION A.3.2

WRITTEN COMMENTS SUBMITTED

BY THE PUBLIC ON THE

OPERABLE UNIT 1 PROPOSED PLAN

Aug 6, 1994

H-5669

Dear Mr. Stegner 10:03 i...

I'm writing to you concerning the route the ~~Fernald~~ waste will take thru our County.

I know that the train has traveled thru here for yrs, but not 47 cars on one train. The tracks are not in safe condition as they were years ago. I know of what I speak, for my father was the section foreman at Batch for years and after that supervisor at Peru In. + Maysville Ky. He said 20 yrs ago that the tracks are not maintained as they were years ago.

3a

My concern is cancer risk for all the people in the route. We have a high rate of Cancer in Union Co. + Franklin Co Ohio like Ohio.

3h

My grandson died of leukemia 14 yrs ago. The young man next door to him died also of leukemia. They both lived ¼ mile from the tracks

My father-in-law died of cancer, he too lived a ½ mile from the tracks I could go on and name a half a dozen more afflicted with this disease and all living within ½ mile of the tracks 3h

We've had at least 2 wrecks just N Cottage Grove in the last 2 years. The last one killed two young boys. What would happen if just one car upset & spilled that dam waste? 3m 3h

Why in the world wasn't this judge fired at Williamston years ago? I agree with Mr. Paddock when he stated, he was not impressed by your environment pledges. Seeing is believing. 3a

a concerned Mother, Grandma friend & neighbor.

Sincerely,

Wanda Brack

RR#1 Box 282
West College Corner, In. 47003

H-5/1

September 5, 1994

Comments on Operable Unit 1 Cleanup

My name is Sandy Butterfield. I live at 4535 Morgan-Ross Rd. bordering the Fernald facility. The following statement is my comment concerning the cleanup of Operable Unit 1.

The area where the train track comes out of the FEMP crosses Morgan-Ross Rd. and continues along the south side of our property until it joins the main track of the CSX railroad. The property adjacent to ours, through which this spur track travels, is owned by the United States Government and controlled by D.O.E. We are concerned because the entire area is not fenced and is open to the public at large. If train cars filled with this disposable material are left sitting on this spur track waiting for pick-up on the main line, they will become an exposure possibility to the entire community. Children will have access to them as will any of the people who seem to hang out around train tracks as is evident by the cans and garbage left behind. 3f

We asked a year ago that this area be mowed and cleaned up. We were told that the D.O.E. was letting it go back to a wildlife area and they would see what they could do about mowing it. It's now a year later and nothing has been done yet. Weeds and grass have grown up around the track and right in the track to a height of three feet or so.

Realizing that OU 1 is just the tip of the iceberg, we need to have this area addressed before many more loads are scheduled to be taken across it. When it leaves the fence-line of the plant, it also becomes public responsibility (i.e., neighbors, Morgan Twp. fire dept., public officials, etc.). We do not want this spur to be used as a holding area, waiting sometimes days to be picked up by a train on the main track. We also do not want additional track put in this area thus making it into a rail yard. Rail cars should be kept inside the plant until they are scheduled for pick up and only be brought out at that time. 3g

August 26, 1994

H-5572

Mr. Gary Stegner
Director, Public Information
U.S. DOE - Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

RE: PUBLIC COMMENTS FOR O.U. 1 PROPOSED PLAN

Dear Mr. Stegner:

The purpose of this letter is to provide my official comments on the O.U. 1 Proposed Plan.

1. DOE must insure public involvement will not be lessened during the RD/RA and should commit in the ROD for O.U. 1 to continuing the on-going public involvement during the RD/RA. DOE should also revise it's Community Relations Plan to reflect the need for continued public involvement during the RD/RA. I look forward to working with DOE in revising this document. [5b] [5c]

2. DOE should commit to real-time monitoring during the remediation of O.U. 1 and this should include any treatment systems. The results of the real-time monitoring should be reported to the public in a timely manner. [2a]

   DOE should check into the cost of portable/permanent real-time monitors, with checks & balances and using real people (not averages or senerios).

3. DOE should commit to use pollution prevention activities whenever possible during the design & operation of the O.U. 1 remedial action system. All available methods to reduce discharges from the treatment system should be considered. [2b]

4. It is crucial for DOE to ensure that the railroad tracks between Fernald, Cottage Grove, Indiana -- to Hamilton, Ohio and into and out of Cincinnati are safe, well maintained and that if a problem arises with regard to the integrity that the problem is corrected immediatedly. This should be the case all the way to the final resting place of the waste. [3a]

   Loaded railroad cars <u>cannot</u> sit along the tracks outside of DOE's fenceline or in the Shandon Switching Station. Rail cars must be loaded within the fenceline property (on-site) and then move the train out all at once without sitting or stopping along the tracks. <u>All</u> DOT regulations should be followed and adhered to strictly. [3e]

   If there's a problem or emergency -- all members of the immediate community should be notified within a reasonable amount of time. I encourage DOE to expand its outreach activities to local first responders and this should include training, emergency exercises, etc. All members of the local communities should be informed about these activities and encouraged to be active participants. This should include Indiana, also. [5e]

   Loaded rail cars cannot travel over 25 mph along residents land and within cities between Fernald and Cottage Grove, IN and then back into Butler Co. and on into the Cincinnati area. [3c]

   Rail cars should be monitored prior to leaving the site to be sure that all radiation readings are within limits and also when it has had to sit along the route for engineer changeover or unforeseeable delays and then when it reaches it final destination. These results should be reported to stakholders in a timely manner. [3h]

RE: PUBLIC COMMENTS FOR O.U. 1 PROPOSED PLAN

5. With regard to DOE developing a Proposed Plan calling for a disposal of the O.U. 1 waste at a commercial facility and yet DOE has yet not addressed the issue of DOE Order 5380.2A. We understand that a waiver of this Order has been requested, but that DOE headquarters has not yet acted on it. This issue needs to be resolved and written in stone prior to the finalizing of the O.U. 1 ROD. **1d**

With the above concerns being addressed I support DOE's selection of Alternative 5B as long as the above concerns are addressed. I look forward to receiving your responses with regard to my concerns/questions. **1a**

If you have any questions, please feel free to contact me at 738-1688. Thanks!

Sincerely,

Lisa Crawford

Lisa Crawford
President, F.R.E.S.H., Inc.
P.O. Box 129
Ross, OH 45061

(513)948-8055 (phone/fax)

LC:eac

cc: files

CSX
TRANSPORTATION
Sales and Marketing

500 Water Street
Jacksonville, FL 32202

August 19, 1994

Ms. Lisa Crawford
FRESH
10206 Crosby Road
Harrison, Ohio 45030

Dear Ms. Crawford,

I hope that our session on Tuesday night was helpful in understanding CSX Transportation's and the Union Pacific Railroad's role in the transportation of the OU-1 materials from Fernald. Both railroads are fully committed to ensuring we provide safe, incident-free transportation of this hazardous material.

There is one issue that I'm not sure was fully communicated during our question and answer period. There has never been any discussion between CSXT and DOE about upgrading the classification of the Fernald-Cottage Grove line to increase the speed limit above 25 miles per hour. I believe the confusion arose because of DOE's remarks on August 9 when they used the term "upgrade" rather liberally. The track maintenance program that our roadmaster is requesting in his budget for next year and thereafter is for routine maintenance; it will not result in any change in the track's classification or the legal speed limit.

Please recognize that many issues have yet to be discussed between DOE/FERMCO and the railroads prior to even entering the negotiating stage. Some of the ideas will no doubt arise from public comments. But, realize that they are just ideas, some of which may end up in the final plan while others certainly will not. DOE and FERMCO seem to have a firm policy of public involvement, and, while I certainly cannot speak for them, I'm sure there will be opportunities to comment on the plan.

In the event questions come up about the rail transportation aspects of the OU-1 plan, I would encourage you to contact me directly. CSXT, the Union Pacific, and FRESH share the goal of ensuring that the waste is moved safely.

Sincerely,

R T Johnson

Rich Johnson
Assistant Market Manager
Government Sales & Marketing

Comments on the Proposed Plan
for OU 1

Submitted by Vicky Dastillung (9/9/94)

While I would have liked to see a plan that would have brought all contaminants back down to natural background levels, Alternative 5B is probably a reasonable plan given the costs and risks that we face. 1a

① In light of the fact that 5B does not allow for totally unrestricted use of the site after remediation, I would like to see the ROD include wording stating that the periodic reviews of the effectiveness of the action will also include an analysis of the then current technologies' ability to pursue further remediation both at the FEMP and at the disposal facility. If at such a future time a technology would allow for a way to truly deactivate the radioactivity or hazardous chemicals or for a way to greatly enhance the long-term storage of the material, we would want to be able to evaluate if it was desirable to pursue further action. This process would also call attention to the TD needs of the DOE. 4a

② I am not totally comfortable with the initial proposed soil remediation levels. I realize that the land uses chosen for the site will affect the levels as well. I would like to 2c

see a strong statement in the ROD stating that DOE will follow a sort of ALARA-principle in designing and executing the remediation. The remediation levels should be as close to background as possible given the technological and cost constraints. If an additional process or activity could get us substantially closer to background at a reasonable cost, this should be pursued. The goal should be background levels, not just to stay within a remediation level. 2c

③ Air monitoring during excavation, drying, and transport will be extremely important to the community and workers. Unless there are constraints that I am currently unaware of, I would like to see real time monitoring both in the vicinity of OU1 and at the site boundaries. There should be a constant analysis of the data, so shut-down of work can occur immediately if elevated levels of contaminants in the air should occur. Action levels should be developed and shared with the community, as should the data as it is accumulated. This should include monitoring for the appropriate radioactive & chemical contaminants, as well as for asbestos. If cost or technological constraints will be a factor, this should be explained to the public. 2a

④ Public involvement during the RD/RA phases, as well as the actual remediation, must be continued, and tailored to the needs of the community. 5b

Public involvement has improved dramatically in recent years, and must be sustained through remediation to ensure that the best possible remediation occurs. Working with the stakeholders on the details of the transportation issues will be vital as well. As the designs for the drying of the waste and the designs for the cover system (after backfilling) are developed, I hope the public will be able to provide some input too. 5b

⑤ If for some reason the 5B alternative can't be executed, the public needs to be able to comment on a new plan. In particular, I am opposed to on-site disposal of this OU's waste and I would not like to see EPA grant a waiver for it. The Great Miami aquifer has already been contaminated with FEMP wastes. Our drinking water quality is too valuable a resource to be at risk from OU 1 waste. 2d 1h

September 07, 1994

Mr. Gary Stegner
Director, Public Information
U.S. DOE Fernald Office
P.O. Box 538705
Cincinnati, Ohio 45253-8705

RE: Comments on the Proposed Plan for Remediation of OU 1

Dear Mr. Stegner,

The purpose of this letter is to submit commit on OU 1's Proposed Plan. While I agree in principle with the alternative selected for OU 1's remediation I would like a response to the following concerns pertaining to the OU 1 ROD. 1a

1.Commitment to meaningful public participation beyond the ROD and throughout the RD/RA process. Continued public input in the decision making that affects the remediation of the site must be maintained. This commitment should be included in the site's Community Relations Plan and the OU 1's ROD. 5b

2. The transportation issues are of concern to numerous areas of the public and warrant serious consideration and response. Safety and protection of the public, workers and the environment along the shipping routes must be conducted thruoghout the project, as with all such projects on the site, due to the nature and volumn of the materials involved and the time required to complete the project(s). 3h

3. Continued efforts in technology development should proceed in attempting to discover more effective methods for treatment and disposal of the waste streams present. 4a

4. The alternatives listed with on-site disposal discuss the design and engineering of an on-site disposal cell. Is this cell in addition to or an expansion of the disposal cell planned for OU 2? 1h

5. The preferred alternative is for disposal at a commercial facility. What is the status of the request for a waiver to DOE Order 5280.2A which prohibits disposal at a commercial facility? 1d

6. Additional discharges of contaminates has a result of the remediation of OU 1 should be significantly reduced and /or avoided. Measures to accomplish this should be incorporated into the RD/RA of OU 1. 2b

Should you have any questions please feel free to contact me.

Submitted by,

Pamela Dunn

Pamela Dunn
Officer of F.R.E.S.H., Inc.
7781 New Haven Rd.
Harrison, Ohio 45030

cc: file

FRANCIS FARMS at SHANDON #5530

JOHN D. FRANCIS
3756 HAMILTON - NEW LONDON RD.
SHANDON, OHIO 45063
PH. 513-738-2397

August 25, 1994

Mr. Gary Stegner
Public Information
Fernald Area Office
P.O. Box 538705
Cincinnati, Ohio 45253-8705

Dear Mr. Stegner,

This letter is for your "COMMENT SHEET" concerning Operable Unit 1 at the Fernald site.

My concern is over the transportation of waste material over the CSX railroad system.

I am a farm property owner adjacent to the Shandon Yard. I feel that sometime---even if track is laid on site---trains loaded with hazardous material will be standing on the Shandon Yard siding. If and when this happens and we have a heavy rain the run off breaks over the railroad ditches and flows through a thirty acre field on my farm. 3i

I need to be assured that the railroad will clean out their side ditches of all vegetation and reshape these ditches to divert drainage to their property.

John D Francis

John D. Francis

September 7, 1994

Atten., Gary Stegner

I'm sending a request for a drainage pipe repair at 826.32 feet south of Relly Peoria Road marked with a white cross tie in road bed.

The west end is deteriorated and collapsed. This has slowed the water flow from our fields and tile outlets. This problem has caused us to replant our crops at various times. This is a hazard to the road bed on the CSX line which is going to haul waste from Fernald. 3a

I am also requesting that your fence along the railroad property starting at 1089 feet south of Relly Peoria Road and running south approximately 820 feet be replaced. Our farm is fenced on all other sides as we pasture our cattle at various times and this railroad fence will not hold cattle. 3k

Alan Herrmann
1400 State Line Rd.
Oxford, Ohio 45056
(513) 756 9558

Alan Herrmann

COMMENT SHEET

DOE is interested in your comments on the cleanup alternatives being considered in the *Feasibility Study Report/Proposed Plan - Environmental Assessment* for Operable Unit 1 at the Fernald site. The preferred alternative is to remediate the Waste Pits by excavation, treatment by thermal drying, and off-site disposal at a permitted commercial disposal facility. Please use the space provided below to write your comments, then fold, staple or tape, and mail this form. We must receive your comments on or before the close of the public comment period on September 8, 1994. If you have questions about the comment period, please contact Gary Stegner in DOE's Public Information Office at Fernald, at (513) 648-3153.

Will communities along the rail route be notified when shipments of pit waste to take place? Through what mechanism will this notification be made - through community newspapers or through government agencies or both?

Will emergency personnel along the rail shipping route be notified prior to waste shipment through their area?

5d

Name: Rita Janssen
Address: 2343 Ranch
City: Lawrence **State/Zip:** Kansas 66047
Phone: (913) 843-5016

MAILING LIST ADDITIONS:

Please add my name to the Fernald Mailing List to receive additional information on the cleanup progress at the Fernald Environmental Management Project:

YES ✓ NO ___

Mr Gary Stegner

I am deeply concerned about the direction that the FERNALD remedial effort is taking. The decsion to excavate , dry, and ship the wastes from the pits is not remediation, but simply moving a problem from one area to another. 1b

CERCLA mandates that remedial activities result in a reduction in "toxicity, mobility, and volume" of contaminated materials. The technology exists to do this with these wastes, in an economically competitive way. 1f

FERMCO has steadfastly maintained the position of not using advanced technologies for remediation. The cost and time estimates for this construction type of remediation were crafted to make other technologies look less attractive. These estimates, as well as the engineering back up, should be challenged and closely evaluated as to adequacy, validity, and fairness. 1g

I believe that the public and DOE have been sold down the road by this approach. I also believe that one of the teaming partners has been involved (and may still be involved) with the disposal facility (ENVIROCARE). Could this be construed as conflict of interest? 1i

Technologies such as soil washing and vitrification offer significant volume reductions, durable waste forms, and significantly reduced containerization, transportation, and disposal costs (not to mention a reduced risk for exoposure during an accident scenario). These savings have not been fairly evaluateed or publicized. Cost esimates used in the OU1 FS for vitrification do not appear to be anywhere near realistic. Were these estimates based on actual pilot scale vitrification runs? If not, what type of data were used to develop these estimates, and how old was the data?. 1g

To simply dig up and move a waste material (after drying-which can't cost much less than melting) represents an environmentally irresponsible, profit driven and short sighted solution to long term problem. 1b

Wm. Lewis Jr.

COMMENT SHEET

DOE is interested in your comments on the cleanup alternatives being considered in the *Feasibility Study Report/Proposed Plan - Environmental Assessment* for Operable Unit 1 at the Fernald site. The preferred alternative is to remediate the Waste Pits by excavation, treatment by thermal drying, and off-site disposal at a permitted commercial disposal facility. Please use the space provided below to write your comments, then fold, staple or tape, and mail this form. We must receive your comments on or before the close of the public comment period on September 8, 1994. If you have questions about the comment period, please contact Gary Stegner in DOE's Public Information Office at Fernald, at (513) 648-3153.

Need more public participation before final rod.
Need public involvement after RD/RA work plan
Need public involvement before complete remediation. — 5b

Need long term effectiveness and permanence
Reduction of toxicity mobility or volume by
treatment. — 1f

need some one who is capable and independent
and reliable for the monitoring and to
keep a log on the information found
and report to the public. — 2a

Name: Betty C McKay
Address: 2 New Haven Drive
City: HARRISON State/Zip: Ohio 45030
Phone: 513-738-2940

MAILING LIST ADDITIONS:

Please add my name to the Fernald Mailing List to receive additional information on the cleanup progress at the Fernald Environmental Management Project:

YES___ NO___

MORGAN TOWNSHIP
BUTLER COUNTY
OKEANA, OHIO 45053

ARD OF TRUSTEES
ROBERT COPELAND
ED DILLHOFF
ANTHONY SEARS

CLERK
CHARLOTTE LAHMANN

DOE
FERNALD Department of Energy
Mr. Ray Hansen, Site Manager
P:O. Box 398705
Cincinnati, Ohio 45239

August 15, 1994

Dear Sir,

The Morgan Township Board of Trustees requested I forward a copy of this resolution to your attention.

RESOLUTION BY: Mr. Robert Copeland #53-94

Resolved by the Board of Trustees of Morgan Township, Butler County, Ohio,

That the Morgan Township Board of Trustees send a letter to FERMCO and DOE stating that the Trustees will not tolerate the storage of any material from the FERNALD SITE in Morgan Township. Our reasons for rejecting the proposal to reactivate the Shandon Switching Yard is due to the concern of security, and safety of all residents of Morgan Township. Also, we are concerned that storage of hazardous or potentially hazardous materials off site may remove the burden of responsibility from the DOE and FERMCO. We believe DOE and FERMCO to be the proper authority, and the authority should not be shifted to some other party such as CSX, who we feel may not be the proper responsible party. 3d

We have no objection to transportation by rail of these waste materials through Morgan Township as we believe this to be the safest mode of transportation. 1a

We however do expect that all track, crossings, bridges and trestles in Morgan Township must be brought up to standards required for safety for this new and increased flow of rail traffic in our township. 3a

Mr. Sears seconded the above resolution and upon roll call, the vote resulted as follows:

Mr. Copeland yes,
Mr. Dillhoff yes,
Mr. Sears yes.

Motion Carried.

Adopted: August 15, 1994

Attest: Charlotte Lahmann
Charlotte Lahmann

PROPOSED PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT I DOE/EA-0938

WASTE PITS

COMMENTS BY: Norma J. Thompson
8574 Mt. Hope Road
Harrison, OH 45030

The proposed Alternative 5B-Treatment (Thermal Drying), and Off-Site Disposal at Permitted Commercial Facility seems to be the best alternative of those offered. I am concerned, however, that you have chosen only to clean up to the Expanded Trespasser Level for Operable Unit 1 and for Operable Unit 4 (K65 Silos). Was this done to facilitate using the site for storage of waste and in the hopes of the Waiver being granted by the EPA for storage over a single source aquifer? I do not agree with this line of thinking, if indeed, this is the case. 1a 1h 2c

During attendance at the workshops, etc., it was explained the DOE would be responsible for the cost of any accidents, for the improvement of tracks and overpasses, and the cost of adding an additional mile of railroad tracks onto the site. I believe that although the two chemical companies South of the plant may not be required to have track improvements, they use this railroad and should share a portion of the cost. 3n

We need real-time monitoring of any and all emissions. The current system does not give you an alarm when emissions go up. We also need to have monitoring every day. 2a

Also needed is better inspection of the railroad tracks. Eyeballing tracks as you ride the train is one thing (probably o.k. for normal freight shipment) and real hands-on or physical inspection for hazardous, nuclear waste, and chemical is another. 3b

We need a firm public involvement commitment between the RD/RA Work Plan and Begin Remediation and between Begin Remediation and Complete Remediation. 5b

OhioEPA
ate of Ohio Environmental Protection Agency
outhwest District Office
South Main Street
ayton, Ohio 45402-2086
13) 285-6357
AX (513) 285-6404

H-55 35

George V. Voinovich
Governor

August 24, 1994

RE: DOE FEMP
HAMILTON COUNTY
OU1 PROPOSED PLAN -
PUBLIC COMMENTS

Mr. Gary Stegner
Director, Public Information
U.S. DOE Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

Dear Mr. Stegner:

The purpose of this letter is to provide official comments on the Operable Unit 1 Proposed Plan:

1. The OU1 Proposed Plan is the culmination of efforts by U.S. DOE, Ohio EPA, and U.S. EPA to understand and develop a plan for mitigating releases to the environment from OU1. Ohio EPA believes the alternative selected in the Proposed Plan is the most protective alternative with regard to human health and the environment. Ohio EPA supports DOE's selection of Alternative 5B and looks forward to its expeditious implementation. **1a**

2. Ohio EPA is concerned that DOE has developed a Proposed Plan calling for disposal of the OU1 waste at a commercial facility, yet DOE Order 5280.2A precludes disposal at a commercial facility. Ohio EPA understands that a waiver of this Order has been requested, but DOE Headquarters has failed to act upon it. DOE HQ must address the need for a waiver of this Order. Ohio EPA expressed concerns with DOE's failure to address this issue during the development of the OU3 Interim Record of Decision and Proposed Plan. At that time DOE committed to addressing issues precluding disposal at Envirocare within OU1. To date DOE has not met this commitment. Ohio EPA believes that DOE must complete the waiver of this Order and address other issues precluding disposal at Envirocare prior to finalizing the OU1 ROD. The need for DOE to take action on its own waiver is especially relevant considering DOE is asking USEPA to waive Ohio's Solid Waste Siting Criteria for on-site disposal of other operable unit wastes. Ohio EPA's support of such a waiver could only be considered once DOE has fulfilled the commitment to waiving 5280.2A. **1d**

3. In order for DOE to effectively and safely implement the preferred alternative, Ohio EPA feels it is critical for DOE to ensure the quality and integrity of railroad line between the **3a**

site and Cottage Grove, Indiana. A number of citizen concerns have been expressed over the past month concerning this railway. Ohio EPA expects DOE will address all reasonable requests. 3a

4. Due to significant public concern with regard to emergency preparedness, Ohio EPA encourages DOE to expand its outreach activities to local first responders along the train route in Ohio and Indiana. These activities could include training, mock exercises, etc involving multiple agencies and fire departments. Ohio EPA would gladly participate in these activities . 5e

5. DOE should commit to including and/or developing real-time monitoring for discharges to the environment resulting from remedial actions including any treatment system. DOE should attempt to incorporate any new developments in real-time monitoring from the Office of Technology Development. Data obtained from real-time monitors and any additional monitoring activities should be provided to the Ohio EPA and public in a timely manner. 2a

6. DOE should attempt to incorporate pollution prevention activities whenever possible during the design and operation of the OU1 remedial action system. All available methods to reduce or eliminate discharges from the treatment system should be considered during the design of the system. 2b

7. DOE must ensure the public that their involvement will not be diminished during Remedial Design and Remedial Action (RD/RA). DOE should commit within the Record of Decision for OU1 to maintaining the exceptional on-going public involvement during RD/RA . 5b

8. DOE should revise the site Community Relations Plan to address the need for continued public involvement during the RD/RA. Ohio EPA looks forward to working with DOE to revise this document. 5c

If you have any questions concerning these comments please contact me at (513) 285-6466.

Sincerely,

Thomas A. Schneider
Project Manager

cc: Lisa Crawford, FRESH
Jack Van Kley, Ohio AGO
Jim Saric, USEPA
Ken Alkema, FERMCO
Lisa August, Geotrans
Jean Michaels, PRC
Manger TPSU, OEPA/DERR
Jeff Hurdley, OEPA/Legal
Robert Owen, ODH
Jim Crawford, OEPA/Emergency Response

6844 Dunwoody Rd.
Oxford, OH 45056
September 7, 1994

Mrs Gary Stegner
Public Information
Fernald Area Office
US Department of Energy
PO Box 538705
Cincinnati, Ohio 45253-8705

To Whom It May Concern:

I am very concerned about the safety of the unit trains that will be going through my farm on their way from Fernald to Utah. The recent deaths that occured on the ~~[redacted]~~ Cottage Grove line makes me wonder about the lights on the locomotive + the cars. We have changed the lights on automobiles to make them safer, but train lights have remained the same for years. In addition to the single headlight on the engine, why not borrow an idea from teenagers + outline the front of the engine with chasing lights? This would enable a person at the crossing to see the shape of the engine on the tracks as well as the headlight. 3d

Reflective tape could be put on the train cars at different levels to reflect the automobile headlights no matter how high or low the crossing may be.

Because of the break between the cars, this tape would give the appearance of flashing lights to automobiles approaching unmarked crossings.

These two ideas might be a great way to run the entire rail system, however, the visit train from Fernald would be a wonderful way to test the idea. Since the cars & engines will only be used for that purpose, the cost would be minimal and we might be able to avoid the one or two train wrecks that statistics predict will occure in that number of miles. 3d

Sincerely,

Carl Schwab
6844 Dunwoody Road
Oxford, Ohio 45056
Phone 513-756-9576

6844 Dunwoody Rd
Oxford, Ohio 45056
Sept 7, 1994

Mr Gary Stegner
Public Information
Fernald Area Office
U.S. Department of Energy
P.O. Box 538705
Cincinnati, Ohio 45253-8705

At DOE's Public Comment meeting on Aug 23 I expressed several safety concerns about the CSX line that runs through Reily Twp. One concern was that CSX has neglected to maintain & repair farm fences through our township. I had expressed the same concern at the Aug 16 meeting with CSX officials. I was told by Mr Rick Johnson that he would research the issue of farm fences + the RR's responsibility + be in contact with me. 3k

Aug 24, 1994 Mr Rick Johnson told my wife by phone that the RR's lawyers researched the question + CSX only had responsibility to maintain fences if the farm was fenced on the other 3 sides. I then returned the call to Mr Johnson + asked for the section of the Ohio Revised Code or the Court case

on which the lawyers were basing their opinion. I was told I could expect a call the next day with this information as their lawyers had just finished the search. As of this date I have yet to receive a reply from Mr Johnson.

I am enclosing a copy of the section of the Ohio Revised Code that deals with the RR's responsibility to maintain fences. This was provided to me by State Representative Gene Krebs. 3k

I am also enclosing a copy of a letter asking for additional information from me so that the railroad can "research your exact situation & work with you to resolve it".

I pointed out at the Aug 16 meeting with CSX that this is not just a personal problem but rather one shared by almost all farmers in Reily Township. Furthermore any accident or stoppage of this unit train would be of a concern for all residents living along the tracks. 2d

Once again I would urge that any DOE contract with CSX contain language that would assure resident along the tracks that the RR would live up to their responsibilities under the Ohio Revised Code. 3a

Other issues that need to be resolved is the cutting of brush along the right of

way, drainage problems that threaten the structural integrity of the track, a complete & through inspection of the North Pleasant trussed + a training program involving the volunteer fire Department along the Spur line as to the steps needed to be taken & the area that needs to be secured in case of a derailment or an incident that would result in stopping the train for a period of time. 3a 5e

Sincerely,
Nick Schumb
Reily Twp. Trustee
Butler Co.
513-756-9576

CSX
TRANSPORTATION
Sales and Marketing

500 Water Street
Jacksonville, FL 32202

August 24, 1994

Mr. and Mrs. Nick Schwab
6844 Dunwoody Road
Reily, Ohio 45056

Dear Mr. and Mrs. Schwab,

As we discussed today, Mr. Don Fette, one of our district project engineers, is the man responsible for resolving the issue regarding your fence. His address is 1717 Dixie Highway, Suite 400, Fort Wright, KY 41011-2785. His phone number is (606)344-8137. I spoke with him today about your situation, and he is expecting to hear from you.

Mr. Fette asked that you send him a letter with the following information: the length of the fence, fence construction type (barbed wire, wood, etc.), distance from either end to one of our mileposts, and distance from the fence to the track. Based on this, he will research your exact situation and work with you to resolve it.

I appreciate your comments last week during the public meeting. CSX Transportation is strongly committed to operate safely for the benefit of our neighbors and the people we work with. The project at Fernald is one that we will watch very closely to ensure that we provide safe, incident free transportation services.

Sincerely,

R T Johnson

Rich Johnson
Market Manager
Government Sales & Marketing

§ 4959.02 Fences.

A company or person having control or management of any railroad except a scenic railway shall construct and maintain in good repair on each side of such railroad, along the line of the lands of the company owning or operating it, a fence sufficient to turn stock. When such fence is constructed of barbed wire, or separate lateral strands not connected by interwoven wire, or cross-perpendicular wire not more than fifteen inches apart, there shall be securely fastened to the posts, at the top thereof, at right angles thereto, at least one board, not less than one and one-eighth inches thick and five inches wide, and extending the entire length thereof. If an owner of land abutting a scenic railway requests the company or person having control or management of the railway to construct and maintain in good repair such a fence along the abutting line of land of the railway, the company or person having control or management of the railway shall do so, and the cost of constructing and maintaining the fence shall be equally shared between the railway and owner of land. As used in this section and in section 4959.06 of the Revised Code, "scenic railway" means a railroad operated not for profit and exclusively as a tourist or historical attraction.

HISTORY: RS § 3324; S&C 331; 71 v 85; 78 v 199; 88 v 295; 91 v 297; 99 v 59; GC § 8913; Bureau of Code Revision, 10-1-53; 137 v H 458. Eff 11-3-77.

Cross-References to Related Sections

Exception, RC § 4959.07.
Fence as nuisance, RC § 5571.14.
Forfeiture for not constructing and repairing fences, RC § 4959.10.
Landowner may construct fence, RC § 4959.05.
Owner may repair fence, RC § 4959.06.
Partition fences, RC § 971.01 et seq.

Comparative Legislation

Fences:
CA—Pub Util Code § 7626
IL—Ann Stat ch 95½ § 18c-7504
IN—Code § 8-4-33-1
MI—Comp Laws Ann § 466.15
NY—R R Law § 52

Text Discussion

Liability for injuries to animals. 2 Ohio Civ. Prac. § 19.05

Research Aids

Fences along railroad:
O-Jur3d: R R §§ 104, 106, 111
Am-Jur2d: R R §§ 125, 139
C.J.S.: R R § 569

Railroad to build fences to turn stock:
O-Jur3d: Agency & Ind Contr § 222
Am-Jur2d: R R § 139
C.J.S.: R R §§ 558, 566

West Key No. Reference
R R 103

CASE NOTES AND OAG

INDEX

1. (1910) The liability of a railroad company under this section, to respond in damages for injuries to stock in consequence of its neglect to construct and maintain a sufficient fence on each side of its road, is limited to loss or injuries occurring upon its own right of way. Accordingly, a railroad company is not liable for stock which has entered upon its right of way by reason of its failure to fence; and has crossed to the right of way of another railroad company where such stock is killed: Hocking Val. R. Co. v. Phillips, 81 OS 453, 55 Bull 71, 7 OLR 615, 29 LRA(NS) 573, 91 NE 118.

2. (1908) Where a railroad company is proceeding to repair or rebuild a defective fence along the line of its right of way and upon the line where the fence has always been, and the adjoining landowner orders the company's employees off the premises and notifies the company to stop work, claiming that the line of the old fence is not the true line, and the adjoining proprietor continues to use his land as pasture, knowing that the fence is defective and dangerous, without revoking or modifying his warning to the company or doing anything to determine the true line, and his horse is then injured by becoming entangled in the loose barbed wire of the defective fence, he cannot recover for the injury to the animal, because his own conduct has proximately contributed to bring about the condition which resulted in the injury: Baltimore & O.R. Co. v. McIlyar, 77 OS 391, 53 Bull 27, 5 OLR 564, 83 NE 497.

3. (1904) The fence required by this section is one sufficient to turn stock; and this section does not require railroad companies to fence against persons: Lake Shore &c. R. Co. v. Liidtke, 69 OS 384, 49 Bull 23, 1 OLR 753, 69 NE 653.

4. (1903) This statute refers only to the road and the right of way; and not to other real property belonging to the railway: Ann Arbor R. Co. v. Kinz, 68 OS 210, 48 Bull 442, 1 OLR 21, 67 NE 479.

5. (1899) The duty to fence includes the duty to construct adequate and suitable gates in the fence, if necessary; but it does not include the duty to see that such gates are kept closed: Megrue v. Lennox, 59 OS 479, 41 Bull 49, 52 NE 1022; see, to the same effect, Didman v. Michigan Cent. R. Co., 7 NP 380, 5 OD 140, 31 Bull 240 (1900).

6. (1899) An averment in a petition that the railway

corporation did not maintain a suitable fence is not supported by evidence which shows that the cattle entered the right of way through a gate which was left open carelessly, there being no evidence to show that such gate was constructed improperly or was out of repair: Megrue v. Lennox, 59 OS 479, 41 Bull 49, 52 NE 1022.

7. (1896) Where it is shown that the owner was bound, by contract with the company, to maintain a gate placed by him for his convenience in the fence dividing his land from that of the company's right of way, and the animals get upon the track by reason of the neglect of the owner to perform that duty, liability on the part of the company arises only when it is shown that the injury resulted from the intentional act, or gross carelessness of those operating the train: Lake Erie & W.R. Co. v. Weisel, 55 OS 155, 36 Bull 220, 44 NE 923 [approving and following Pittsburgh, C. &c. R. Co. v. Smith, 26 OS 124].

8. (1896) If animals trespass upon the track of a railway corporation without the fault of the owner thereof, the railway must exercise ordinary care to avoid injuring them: Lake Erie & W.R. Co. v. Weisel, 55 OS 155, 36 Bull 220, 44 NE 923; see, to the same effect, Cranston v. Cincinnati, H. & D.R. Co., 12 DecRep 97, 1 H 193.

9. (1896) Where domestic animals are injured by a railroad train while trespassing upon the track of the company, and the owner of the animals is free from negligence contributing to their injury, the company will be liable for a failure on the part of those operating the train to exercise ordinary care to avoid injury; but if the owner was bound, by contract with the company, to maintain a gate placed by him for his convenience in the fence dividing his land from that of the company's right of way, and the animals get upon the track by reason of the neglect of the owner to perform that duty, liability on the part of the company arises only when it is shown that the injury resulted from the intentional act, or gross carelessness of those operating the train: Lake Erie & W.R. Co. v. Weisel, 55 OS 155, 36 Bull 220, 44 NE 923 [approving and following Pittsburgh, C. &c. R. Co. v. Smith, 26 OS 124].

10. (1890) General Code § 8918 (RC § 4959.07), which provides that "the provisions of the five preceding sections relating to fences and private crossings shall not apply to any case in which compensation for building a fence or private crossing has been or may hereafter be taken into consideration, and estimated as a part of the consideration to be paid for the right of way, so far as the fence, or right to private crossing, has been or may be settled or paid for," it was held that where stock of a third person gets upon the track of a railroad company by reason of such fences not being built by the landowner, the company is not, in the absence of negligence in running its trains, liable to the owner for injury to them. The duty of the company is, in such case, to use ordinary care and prudence to avoid injuring the animals: Baltimore & O.R. Co. v. Wood, 47 OS 431, 28 Bull 465, 24 NE 1077.

11. (1889) Where, in an action for damages to stock, brought against a railroad company on the ground of negligence in failing to maintain a fence between the company's right of way and the land of the plaintiff, the defense interposed is that in the condemnation proceeding by which the company's right of way was acquired, the expense of fencing was taken into account by the jury, and included in the verdict, and the company, to sustain such defense, gives in evidence the record of the proceeding, and the record is silent on the subject, no presumption arises that the matter of building and maintaining fences along the line of the railroad was considered, and compensation to the owner therefor awarded in the verdict: Cincinnati, W. & B.R. Co. v. Hoffhines, 46 OS 643, 22 Bull 424, 22 NE 871.

12. (1888) A covenant whereby the owner of realty agrees to maintain a fence between his land and the railway does not run with the land so as to bind his grantee, unless such grantee has notice thereof; and the fact that the railway uses and occupies its right of way does not amount to constructive notice of such covenant: Pittsburgh, C. &c. R. Co. v. Bosworth, 46 OS 81, 20 Bull 390, 2 LRA 199, 18 NE 533 [affirming Bosworth v. Pittsburgh, C. &c. R. Co., 1 CC 69, 1 CD 42].

13. (1886) An action against a railroad company to recover damages for killing or injuring a domestic animal which had strayed upon its track, and was killed or injured without fault or negligence of the railroad company in operating its train, but solely by the neglect to fence the road as required by law, is founded upon a "liability created by statute, other than a forfeiture or penalty," and is barred in six years: Seymour v. Pittsburgh, C. &c. R. Co., 44 OS 12, 15 Bull 87, 4 NE 236.

14. (1885) This section is to be reasonably construed; and where damage results from defects (occurring without the fault or neglect of the company) in an otherwise sufficient fence, there is no liability: Baltimore & O.R. Co. v. Schultz, 43 OS 270, 13 Bull 516, 1 NE 324, 57 AmRep 805.

15. (1883) The duty of fencing and keeping fences in repair is not limited or restricted to the protection and benefit of the owners and occupiers of abutting land: Pittsburgh, C. &c. R. Co. v. Allen, 40 OS 206, 10 Bull 240.

16. (1883) A railway company, having sold a portion of its right of way on its south side to a section company, which had bought additional right of way from the landowners on the same side, for the purpose of constructing thereon a parallel railroad, and the maintenance of a fence between the two roads becoming impracticable, a contract was entered into between the two companies, by which the second company agreed to keep up and maintain lawful fences on the south side of the dividing line between the two railroads; and the second company entered into a contract with the owner of an abutting field, whereby he bound himself to erect and maintain a sufficient fence between said field and said parallel road. It was held that the second company and the owner of said field having neglected to keep up a sufficient fence to turn stock, between said field and the railroad, the first company was not relieved from liability for injury by one of its passing trains to animals whose owner was a stranger to said contracts, and which, without their owner's fault, had strayed from an adjoining pasture into said field, and thence through said insufficient fence upon its track: Pittsburgh, C. &c. R. Co. v. Allen, 40 OS 206, 10 Bull 240.

17. (1883) If by a special contract, the railway corporation is bound to keep a fence in good condition, and such liability is also imposed by statute, a property owner who turns hogs into an adjoining field with full knowledge of such defects in the fence, is not, by reason thereof, guilty of contributory negligence; and he may recover if such hogs pass through such defective fence upon this right of way and are there killed: Cleveland, C., C. & I.R. Co. v. Scudder, 40 OS 173, 9 Bull [25]iii.

18. (1883) Where animals that are breachy or unruly escape from an inclosed field into another field (of the

same farm) which abuts on a railroad, and between which and the railroad the railroad company has neglected to construct a fence, as required by statute, and while straying upon the railroad track are killed or injured by a passing train, their owner may recover from the company for the loss or injury, provided the animals were at large without his fault, and he has used that reasonable care and precaution in restraining them, which a prudent and cautious man would use who had knowledge of their breachy or unruly character: Pittsburgh, C. &c. R. Co. v. Howard, 40 OS 6, 9 Bull 234.

19. (1883) A landowner agreed with a railroad company to keep a line of fence in repair. The company, in order to rebuild a bridge, removed a portion of the fence and replaced it by a fence of a different character. The latter was accepted by the landowner as an inclosing fence to his fields, then, in law, it became the duty of the landowner to keep the same in repair, and he is without remedy where his stock is killed by neglect to make such repairs, unless the killing was caused by negligence in running the train: Pittsburgh, C. &c. R. Co. v. Heiskill, 38 OS 666, 9 Bull 137.

20. (1882) Under the present form of this statute, a railroad company, which has neglected to keep a fence at the side of its track in sufficient repair, is liable to the owner of livestock injured by reason of such neglect, notwithstanding the fact that the owner pastured such livestock on adjacent lands with knowledge of the insufficiency of the fence. By the terms of the statute, the duty of maintaining the fence in sufficient repair is imposed upon the company, and it cannot escape responsibility by showing that it had no notice of the actual condition of the fence: Railway v. Smith, 38 OS 410, 8 Bull 232; Baltimore & O.R. Co. v. Scudder, 40 OS 173, 9 Bull [25]iii (1883). See also Church v. Baltimore & O. R. Co., 10 OApp 80, 30 OCA 44, (1918) [motion to order record certified overruled, 16 OLR 404, 63 Bull 501].

21. (1882) In an action against a railroad company to recover damages for killing livestock, the plaintiff must prove affirmatively that want of ordinary care on the part of the company or its employees caused the injury: Pittsburgh, C. &c. R. Co. v. McMillan, 37 OS 554, 7 Bull 112.

22. (1882) The fact that an animal was killed on the right of way of a railway corporation does not raise the inference that such animal was killed by the negligence of the railway corporation or its employees: Pittsburgh, C. &c. R. Co. v. McMillan, 37 OS 554, 7 Bull 112.

23. (1877) Where a fence, constructed by an individual and landowner, serves as a partition fence between a railroad track and the inclosed fields of such individual owner, but not so divided that each owner is charged with maintaining in repair a distinct portion thereof, the railroad company and individual landowner are each under equal obligations to keep and maintain the entire fence in repair until so divided: Railroad v. Miami Co. Infirmary, 32 OS 566.

24. (1875) The duty to fence includes the duty to construct and maintain fences within the limits of municipal corporations as long as such fences do not obstruct the streets, highways and other public grounds: Cleveland & P.R. Co. v. McConnell, 26 OS 57.

25. (1871) In an action brought by a private person to recover damages for the violation of a duty imposed upon the defendant by statute, it is a competent and sufficient defense to show (unless precluded from so doing by the terms of the statute or by clear implication arising therefrom), that the plaintiff by his own negligence contributed to the injuries complained of, and it matters not, as to such defense, whether the contributory negligence of the plaintiff arose from the violation of his part of a duty imposed upon him by statute or a common law duty: Pittsburgh, Ft. W. &c. R. Co. v. Methven, 21 OS 586.

26. (1871) A covenant on the part of the railway corporation to construct and maintain fences is a covenant which runs with the land; and the vendee of the original owner of the realty may maintain an action thereon against the vendee of the railway corporation. The fact that the original railway did not build such a fence does not prevent its vendee from being liable, since the covenant was a continuing one: Huston v. Cincinnati & Z.R. Co., 21 OS 235.

27. (1870) Where the owner of land, by his written contract, agreed to give to a railroad company the perpetual right of way through the same, at a stipulated price which was paid to him, with a provision in the contract that when the road should be completed the company should fence the same, it was held that after the road is completed, the owner of the land cannot, upon failure to put up the fence, eject the company from the land: Hornback v. Cincinnati & Z.R. Co., 20 OS 81.

28. (1861) A railway corporation may make use of its realty to the same extent that any other owner of realty might; although it must exercise due care to avoid doing unnecessary damage to others: Central Ohio R. Co. v. Lawrence, 13 OS 66.

29. (1860) A railway corporation is not liable for an injury which does not result from its negligence; and the fact that the injury occurred and that it was negligent does not impose liability on it, if such injury could not have been prevented by the use of due care: Bellefontaine & I.R. Co. v. Bailey, 11 OS 333.

30. (1950) The provision of GC § 8913 (RC § 4859.02), requiring railroad companies to construct and maintain fences in good repair on each side of their roads constitutes a general requirement, and, under such provision, liability of a railroad company is predicated on negligence: Counts v. Chesapeake & O.R. Co., 91 OApp 130, 48 OO 269, 107 NE2d 896.

31. (1950) A railroad company's duty to construct and maintain fences in good repair sufficient to turn stock includes the duty of constructing and maintaining gates in such fences, and, where it is disclosed that cattle killed by a locomotive were enabled to enter the railroad's right of way through a defectively constructed gate in such fence, which gate was insufficient to turn stock, the railroad company is liable: Counts v. Chesapeake & O.R. Co., 91 OApp 130, 48 OO 269, 107 NE2d 896.

32. (1938) A railroad company, by constructing a crossing over its tracks for the convenience of an abutting property owner, as required by GC § 8858 (RC § 4955.27), does not thereby relieve itself of the duty of maintaining a fence along its tracks, sufficient to turn stock, as required by GC § 8913 (RC § 4959.02), or the additional duty of providing some means, by gate or otherwise, whereby the abutting owner may pass through the fence and adequately close the passageway behind him: Davis v. Baltimore & O.R. Co., 60 OApp 245, 14 OO 103, 20 NE2d 381.

33. (1918) Where a railroad company neglects or refuses to construct and maintain fences along its right of way, under this section, its liability to respond in damages is limited to such loss or injuries as occur upon its right of way, and not elsewhere, and an adjoining landowner cannot recover the cost of herding his cattle or other animals upon abutting pasture lands, where such company has neglected or refused to fence its right of way along the same;

nor can he recover for loss of profits from dairy cows by reason of their not being permitted to remain in such abutting pasture lands during the night season: Church v. Baltimore & O.R. Co., 10 OApp 80, 30 OCA 44 [motion to certify record overruled, 16 OLR 404, 63 Bull 501]. See to the same effect, Millhouse v. Chicago, St. L. &c. R. Co., 7 CC 466, 4 CD 682 (1893) [affirmed, without opinion, 55 OS 684].

34. (1915) The provision of this section, that fences shall be built and maintained on each side of the railway track, does not apply to electric or interurban roads: Brindle v. Cleveland, S. &c. R. Co., 4 OApp 135, 21 CC(NS) 552.

35. (1905) As a general rule a railway engineer is not chargeable as a matter of law with knowledge of a break in the fences along the line of the road through which the cattle may stray upon the track, and where after discovering that cattle are upon the track, he does all that a man of ordinary prudence would do to avoid an accident, it cannot be charged that the derailment which followed and resulted in his injury and death was due to his contributory negligence: Isley v. Wabash R. Co., 5 CC(NS) 669, 17 CD 785.

36. (1894) If a railway corporation neglects or refuses to build a fence, as required by statute, the owner may build it and recover the cost thereof from such railway. If this is a reasonable step to take in mitigating damages, it is the duty of such owner so to do; and he cannot omit to construct such fence and recover from the railway corporation damages for the loss of pasture during the time that such fence was not constructed: Millhouse v. Chicago, St. L. &c. R. Co., 7 CC 466, 4 CD 682.

37. (1907) An action for the common law liability for negligently killing cattle by a railroad company is barred in four years, and an action for liability created by this section is barred in six years: Roice v. Cleveland, C., C. &c. R. Co., 5 NP(NS) 7, 17 OD 505.

38. (1903) The design of the act of April 18, 1874, requiring railroads to fence their roads, was not only to protect the property of adjoining owners, and prevent cattle and other domestic animals from endangering themselves, but also to guard the lives of passengers that would be put in peril by animals getting upon the track: Hall v. Lake Shore &c. R. Co., 14 OD(NP) 74.

39. (1903) A railway corporation is liable for injuries caused by failure to maintain adequate fences; and accordingly a railway corporation which maintains no fence between its road and that of another corporation, whose right of way runs parallel to and adjoining its own, is liable for stock which strays across the land of the adjoining corporation, and is killed upon its tracks, although the adjoining corporation maintains a sufficient fence upon the opposite side of its right of way: Hall v. Lake Shore &c. R. Co., 14 OD(NP) 74.

40. (1900) Unless violation of a statutory duty is shown, the evidence must show that the employes of the railway corporation were guilty of negligence, in order to render such corporation liable for injury to stock upon the right of way: Didman v. Michigan Cent. R. Co., 7 NP 380, 5 OD 140, 31 Bull 240.

41. (1900) The fact that a railway corporation has constructed a suitable fence relieves it from liability for injury to stock upon its right of way, unless it was guilty of negligence: Didman v. Michigan Cent. R. Co., 7 NP 380, 5 OD 140, 31 Bull 240.

42. (1900) The fact that a third person injures a fence constructed by a railway is said not to make it liable, as a matter of law, at once for injuries caused by such defect: Didman v. Michigan Cent. R. Co., 7 NP 380, 5 OD 140, 31 Bull 240.

43. (1880) As to the duty imposed upon a railway corporation, with reference to human beings in case of the absence of a fence, see also Devereaux [Devereux] v. Thornton, 4 DecRep 449, 2 ClevLRep 177, 4 Bull 355 [affirmed by supreme court, without report, 10 Bull 266 (1883)].

§ 4959.03 Cattle guards and crossings.

Before operating a railroad, the company or person having control or management of such railroad shall maintain at every point where a public road, street, lane, or highway used by the public crosses such railroad, safe and sufficient crossings, and on each side of such crossings cattle guards sufficient to prevent domestic animals from going upon such railroad. Such company or person shall be liable for all damages sustained in person or property by reason of the want or insufficiency of such fence, crossing, or cattle guard, or neglect or carelessness in the construction or keeping in repair of such fence, crossing, or cattle guard.

HISTORY: RS § 3324; S&C 331; 71 v 85; 78 v 199; 88 v 295; 91 v 297; 99 v 59; GC § 8914; Bureau of Code Revision. Eff 10-1-53.

Cross-References to Related Sections

Exception, RC § 4959.07.
Forfeiture for not constructing and repairing fences, RC § 4959.10.
Landowner may construct fence, RC § 4959.05.
Owner may repair fence, RC § 4959.06.

Comparative Legislation

Cattle guards:
IN—Code § 8-4-32-1
KY—Rev Stat Ann § 277.330
MI—Comp Laws Ann § 466.15
NY—R R Law § 52

Text Discussion

Liability for injuries to animals. 2 Ohio Civ. Prac. § 19.05

Research Aids

Statutory obligation to maintain cattle guards and crossings:
O-Jur3d: R R §§ 106, 107, 208, 336, 388, 390
Am-Jur2d: R R §§ 126, 135, 136
C.J.S.: R R § 560
West Key No. Reference
R R 103

ALR

Trespassaing animals, liability for personal injury or death caused by trespassing or intruding livestock. 49 ALR-4th 710.

CASE NOTES AND OAG

INDEX

COMMENT SHEET

DOE is interested in your comments on the cleanup alternatives being considered in the *Feasibility Study Report/Proposed Plan - Environmental Assessment* for Operable Unit 1 at the Fernald site. The preferred alternative is to remediate the Waste Pits by excavation, treatment by thermal drying, and off-site disposal at a permitted commercial disposal facility. Please use the space provided below to write your comments, then fold, staple or tape, and mail this form. We must receive your comments on or before the close of the public comment period on September 8, 1994. If you have questions about the comment period, please contact Gary Stegner in DOE's Public Information Office at Fernald, at (513) 648-3153.

I continue to think OU1 should be divided into two parts: Pits 2, 4, 6 which have high uranium levels and Pits 1, 3, 5 with low levels of uranium. With such a division, I believe less material would need to be placed in a disposal facility. There is just too much concern that moving all this material to Utah + Nevada will generate enough adverse reaction from the public that it will make it more difficult to dispose of waste at those facilities from other DOE facilities.

Such a division of OU1 into 2 parts may well support some vitrification and on-site disposal, although it isn't obvious.

1e

Name: Gene E. Willeke

Address: IES, Miami U.

City: Oxford State/Zip: OH 45056

Phone: 513-529-5811

MAILING LIST ADDITIONS:

Please add my name to the Fernald Mailing List to receive additional information on the cleanup progress at the Fernald Environmental Management Project:

YES___ NO___

COMMENT SHEET

8/23/94

DOE is interested in your comments on the cleanup alternatives being considered in the *Feasibility Study Report/Proposed Plan - Environmental Assessment* for Operable Unit 1 at the Fernald site. The preferred alternative is to remediate the Waste Pits by excavation, treatment by thermal drying, and off-site disposal at a permitted commercial disposal facility. Please use the space provided below to write your comments, then fold, staple or tape, and mail this form. We must receive your comments on or before the close of the public comment period on September 8, 1994. If you have questions about the comment period, please contact Gary Stegner in DOE's Public Information Office at Fernald, at (513) 648-3153.

1. I ~~recommend~~ the OU1 alternative (Preferred Remedial) 5B - Removal, Treatment and Off Site Disposal at a Permitted Commercial facility. — 1a

2. Recommend a 25mph of unit Train when passing communities. — 3c

3. Unit trains Loaded or unloaded be layover on site not on open outside of Fernald site. — 3e

4) Public involvement through out the whole process after ROD and Remediation. — 5b

5. Real time monitoring during clean up of site. Should be ~~with~~ connected to a computer or a communication link to check the reading (printout) — 2a

Name: Edwin Yocum

Address: 9860 Hamilton Cleves PK

City: Harrison State/Zip: OH 45030

Phone: 513 - 738 - 1659

6) Notification of all community & fire personnal when unit train pass through or layover. — 5d

MAILING LIST ADDITIONS:

Please add my name to the Fernald Mailing List to receive additional information on the cleanup progress at the Fernald Environmental Management Project:

YES___ NO___

APPENDIX B

ARARs ANALYSIS

LIST OF TABLES

TABLE B-1
LOCATION-SPECIFIC ARARS
(APPLICABLE REQUIREMENTS; RELEVANT AND APPROPRIATE REQUIREMENTS)

Applicable Requirements	Attainments
16 USC 153i et. seq., and 50 CFR 17.21, 17.31, 17.61, 17.71, 17.94, 50 CFR 402, and Endangered Species Act All federal agencies must ensure 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. Additional requirements apply if it is determined that a proposed activity could adversely affect these species or their habitat.	In 1994, updated surveys at the FEMP determined the presence of summer habitat for the federally-listed endangered Indiana bat along Paddys Run including areas adjacent to Operable Unit 1. This area is not critical habitat. Consultation with U.S. Fish and Wildlife Service will determine restorative measures that may need to be taken during and after remedial actions. If any endangered or threatened species are encountered, the additional requirements of the referenced regulation would be applicable.
ORC 1531.25, 1518.02, and 1501: 18-1, Ohio Endangered Species Regulations No person shall take or possess any native species of wild animal, or any eggs, or offspring thereof, that is endangered with state-wide extinction.	Updated surveys in 1993-94 found state-listed threatened Sloan's crayfish populations in sections of Paddys Run, including sections directly adjacent to Operable Unit 1 area. Appropriate mitigation will be utilized during and after remedial activities to minimize any impacts from runoff and siltation.
16 USC 66 *et seq.*, Fish and Wildlife Coordination Act Requires consultation with other state agencies for any activities which might affect any body of water for the purpose of conserving fish and wildlife resources.	Remedial actions at Operable Unit 1 may have the potential to affect wildlife and fish in Paddys Run and the Great Miami River. Consultation with state agencies will be conducted prior to commencing remedial activities.
16 USC 469, Archaeological and Historic Preservation Act Requires preservation of artifacts and data associated with archaeological finds.	Historical data and artifacts are not expected to be discovered or destroyed during remedial activities at Operable Unit 1. Nevertheless, the requirements of the law are applicable.

TABLE A-1
(Continued)

Applicable Requirements	Attainments
16 USC 470 *et seq.*, National Historic Preservation Act DOE must take into account the effect of an undertaking on historic properties and accord the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are described as any prehistoric or historic district, building, site, structure, or object included in, or eligible for inclusion in the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. Historic properties that are substantially altered or demolished must be recorded for future use and reference.	Areas adjacent to Operable Unit 1 boundaries will be surveyed pursuant to the programmatic agreement by the DOE, the Advisory Council on Historic Preservation, and the Ohio Historic Preservation Office. The programmatic agreement will stipulates what actions are required for compliance with the National Historic Preservation Act. Historic sites listed or eligible for listing in the *National Register of Historic Places* are not present within Operable Unit 1 nor is it expected that any will be. Nevertheless, the requirements of the law are applicable.
16 USC 470 (aa) - 470 (11), Archaeological Resources Protection Act Requires permit for removal of any archaeological resources from federal lands.	Operable Unit 1 is located on federal land. Although archeological resources are not expected on the site, the requirements of the law remain applicable to Operable Unit 1 remedial activities.
16 USC 431-433 and USC 461-467, Antiquities Act and Historic Sites Act. Requires that no person may appropriate, excavate, injure or destroy any historical or prehistoric ruin or monument or any object or antiquity situated or controlled by the government of the Unites States without an applicable permit. Also requires the identification and preservation of cultural resources on federal lands.	Although Operable Unit 1 is not expected to contain cultural resources or natural landmarks of significance, it is located on federal land and the law is applicable should any cultural resources be discovered during remedial actions on site.
25 USC 3001, Native American Graves Protection and Repatriation Act Provides for return of human remains and cultural objects from Native American graves to affiliated tribes.	Although Operable Unit 1 does not contain known American Indian burial grounds, this law would apply should graves and human remains be discovered during excavation of the waste pits or construction of a disposal cell.
42 USC 1996, American Indian Religious Freedom Act Provides for tribal access by native peoples to grave sites and sites of cultural, symbolic, or religious significance.	Although no sites of this nature have been identified at Operable Unit 1, the law is applicable to federal lands and activities. Provisions will be included in the Remedial Action Work Plan to comply with the law should any sites be unexpectedly encountered.

TABLE A-1
(Continued)

Applicable Requirements	Attainments
Executive Order 11593, Protection and Enhancement of Cultural Environment. Requires an inventory of site for potential historic places for eligibility in the *National Register of Historic Places*.	The requirement is applicable to activities at Operable Unit 1. An updated inventory will be completed prior to remedial action.
Executive Order 11990, Protection of Wetlands This order requires that Federal agencies take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction, to preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of the Executive Order.	The remedial activities taking place at the FEMP qualify as a Federal agency action. Wetlands identification efforts indicate the presence of wetlands within and adjacent to the Operable Unit 1 boundary. The order is codified at 10 CFR 1022 (see below).
Executive Order 11988, Floodplain Management This order requires Federal agencies undertaking actions within a floodplain to evaluate the potential the action has for adverse impact on the floodplain. If it is determined that adverse impacts could occur, the effects of the action must be minimized to the extent practical.	The remedial activities taking place at the FEMP qualify as a Federal agency action. Operable Unit 1 is in the immediate vicinity of the Paddys Run Floodplain. At a minimum, the requirement to evaluate effects of the remedial action on the floodplain should be considered. Preliminary engineering efforts indicate that remedial action can be undertaken while minimizing impacts to the floodplain.
10 CFR 1022, Protection of Wetlands and Floodplain Management 10 CFR 1022 contains the DOE regulation implementing Executive Order 11990. 40 CFR 6, Appendix A describes EPA's policy for complying with Executive Order 11990	The remedial activities taking place at the FEMP qualify as a Federal agency action. Wetlands identification efforts indicate the presence of wetlands within the Operable Unit 1 boundary and others in the immediate vicinity of Operable Unit 1. Surveys have identified small areas of emergent wetlands associated with the tributaries and ditches of Paddys Run. The remedial activities relative to wetlands will be handled through the U.S. Corps of Engineers Nationwide Permit Program where possible. When not covered by a Nationwide Permit, the action will meet requirements mandated by individual permits per 33 CFR 323. The floodplains of Paddys Run also fall within the boundaries of Operable Unit 1. Preliminary engineering indicates that remedial action can be implemented while minimizing floodplain impacts.

TABLE A-1
(Continued)

Applicable Requirements	Attainments
33 CFR 330, Nationwide Permit Program (33 CFR 323 and OAC 3745-32) The U. S. Corps of Engineers can issue a Nationwide Permit as a general permit for certain classes of actions that involve dredge or fill activities in wetlands or navigable waters. Discharges into wetlands may require a wetland delineation.	Waste will be excavated from the waste pits at Operable Unit 1. The waste will be handled, treated by drying, and transported on-site before being transported for disposal off site. These activities may require dredge and fill and construction operations that impact jurisdictional wetlands on site. Nationwide Permit #38 applies to the class of dredge and fill operations associated with the cleanup of hazardous and toxic waste. If remedial activities exceed the limitations for a Nationwide Permit, an individual permit for the dredge and fill activities may be sought.
40 CFR 6, Appendix A Must take action to avoid adverse impacts to wetlands. Minimize potential harm and preserve and enhance wetlands.	Surveys have identified small amounts of wetlands within the Operable Unit 1 boundaries. Larger wetland tracts are in the general vicinity of Operable Unit 1. CERCLA requires that the lead agency in a CERCLA action consult with agencies expert in determining the impact on wetlands. The Corps of Engineers has jurisdictional authority over characteristic wetlands. Remedial design will minimize impacts to wetlands. Any unavoidable impacts will be undertaken in accordance with 33 CFR 323 or 330.
40 CFR 6.302 Must protect fish and wildlife from activities affecting streams or rivers. Contact Fish and Wildlife Service to assure protection.	CERCLA requires consultation with other expert agencies when remedial activities are off-site; when actions are on-site, consultations are recommended but not required. Through consultation with the Fish and Wildlife Services, DOE will determine the substantive requirements of 40 CFR 6.302 that apply to Operable Unit 1. 40 CFR 6.302 is an ARAR to remedial actions at Operable Unit 1 because they may potentially impact Paddys Run or other tributaries of the Great Miami River.

TABLE A-1
(Continued)

Relevant and Appropriate Requirements	Attainment
Clean Water Act § 404 and 33 CFR 321 Provides standards for discharge of dredged fill material to navigable waters and wetlands. CWA Section 401 states water quality certifications required for activities that constitute the discharge of dredged or fill material into wetlands or waters of the U.S.	CWA 404 and 33 CFR 321 are relevant and appropriate to the selected remedy for Operable Unit 1 with regard to discharge of dredged fill material into navigable waters. No navigable waters are found on-site; however, material such as soil, debris and old fill material may be excavated from the waste pits at Operable Unit 1 and discarded in an on-site landfill or shipped off-site. These activities must comply with the requirements of the CWA protecting surface waters of the State of Ohio; the water quality standards promulgated by the State of Ohio are found in OAC 3745-1 and are promulgated in compliance with the Federal Clean Water Act, 33 U.S.C. Section 1251, et seq. Remedial activities involving the discharge of dredge or fill material in wetlands or water of the U.S. will be conducted in accordance with the substantive requirements of 33 CFR 323 and 330 and OAC 3745-32.

TABLE B-2

CHEMICAL-SPECIFIC ARARS
(APPLICABLE REQUIREMENTS; RELEVANT AND APPROPRIATE REQUIREMENTS; TBCs)

Media	Applicable Requirements	Attainment
Chemicals Discharged to Surface Water	OAC 3745-1 Ohio Water Quality Standards It is the purpose of these Water Quality Standards to establish minimum water quality requirements for all surface waters of the State, thereby protecting public health and welfare; and to enhance, improve, and maintain water quality as provided under the laws of the State of Ohio, and ORC 6111.041, the Federal Clean Water Act, 33 U.S.C. Section 1251 *et seq.* Whenever two or more use designations apply to the same surface water, the more stringent criteria of each use designation will apply.	These general water quality criteria are applicable to all surface waters in the State of Ohio and no actions are excluded. SWQL are promulgated under the laws of the state of Ohio pursuant to Section 6111.041 of the ORC. State Water Quality Standards consist of designated uses for water and criteria for pollutants set at levels that are protective of those uses. State Water Quality Standards are regulatory requirements, and permit limits are established to ensure that the State use designations and criteria are met. Water Quality criteria do not apply where criteria are exceeded due to natural conditions alone. This exception does not in any way preclude abatement of human-induced nonpoint source pollution. These water quality standards do not apply to streams when the flow is less than the seven-day, ten-year, low-flow value or other critical low-flow values dependent on low-flow augmentation or point source augmentation.

TABLE A-2
(Continued)

Media	Applicable Requirements	Attainment
Chemicals Discharged to Surface Water	OAC 3745-01-04 Criteria Applicable to All Waters The following general water quality criteria shall apply to all surface waters of the State including mixing zones. To every extent practical and possible as determined by the director, these waters shall be: (A) Free from suspended solids or other substances that enter the waters as a result of human activity and that will settle to form putrescent or otherwise objectionable sludge deposits, or that will adversely affect aquatic life; (B) Free from floating debris, oil, scum and other floating materials entering the waters as a result of human activity in amounts sufficient to be unsightly or cause degradation; (C) Free from materials entering the waters as a result of human activity producing color, odor or other conditions in such a degree as to create a nuisance; (D) Free from substances entering the waters as a result of human activity in concentrations that are toxic or harmful to human, animal or aquatic life and/or are rapidly lethal in the mixing zone; (E) Free from nutrients entering the waters as a result of human activity in concentrations that create nuisance growths of aquatic weeds and algae.	These general water quality criteria are applicable to all surface waters in the State of Ohio and no actions are excluded. The criteria are promulgated under Revised Code Chapter 119. State Water Quality Standards consist of designated uses for water and criteria for pollutants set at levels that are protective of those uses. State Water Quality Standards are regulatory requirements, and permit limits are established to ensure that the State use designations and criteria are met. These general water quality criteria are applicable for discharges and actions impacting Paddys Run and the Clearwell because the discharges are to the Great Miami River. Water Quality criteria do not apply where criteria are exceeded due to natural conditions alone. This exception does not in any way preclude abatement of human-induced nonpoint source pollution. These water quality standards do not apply to streams when the flow is less than the seven-day, ten-year, low-flow value of other critical low-flow values dependent on low-flow augmentation or point source augmentation.

TABLE A-2
(Continued)

Media	Applicable Requirements	Attainment
Chemicals Discharged to Surface Water	OAC 3745-1-07, Table 7-1 Numerical and Narrative Criteria for Aquatic Life Habitat and Water Supply Use Designation Surface Waters in the State of Ohio must comply with the maximum concentrations of each contaminant of concern listed in Table I-5 and I-6 in Attachment I for inside and outside the mixing zones of the receiving water to protect warm water aquatic habitats.	The water quality criteria for specific pollutants are ARARs to remedial actions at OU1 because the pollutants have been identified as chemicals of concern at the site and routes of entry or discharge of pollutants to State surface waters have been identified. For example, the Clearwell currently discharges water to the FEMP WWTS which discharges to the Great Miami River. The Great Miami River and Paddys Run have been designated warm water aquatic habitats. Thus the warm water habitat criteria are ARARs when discharges of pollutants to these streams are involved.
Chemicals Discharged to Surface Water	OAC 3745-1-07, Table 7-10, Outside Mixing Zone Maximum Criteria for Water Hardness Dependent Parameters in Warm Water Habitats Table I-7 in Attachment I contains the numerical limits on cadmium, copper, chromium, lead, and silver.	The water quality criteria for specific pollutants are applicable to remedial actions at OU1 because the pollutants have been identified as chemicals of concern at the site and routes of entry or discharge of pollutants to State surface waters have been identified. For example, the Clearwell currently discharges water to the FEMP WWTS which discharges to the Great Miami River. The Great Miami River and Paddys Run have been designated warm water aquatic habitats. Thus the warm water habitat criteria are applicable when discharges of pollutants to these streams are involved.

TABLE A-2
(Continued)

Media	Applicable Requirements	Attainment
Chemicals Discharged to Surface Waters	OAC 3745-1-07, Table 7-11 Outside Mixing Zone 30-Day Average Criteria for Water Hardness Dependent Parameters in Warm Water Habitats Table I-8 in Attachment I contains the average numerical limits for cadmium, copper, chromium, lead, and silver.	The water quality criteria for specific pollutants are applicable to remedial actions at OU1 because the pollutants have been identified as chemicals of concern at the site and routes of entry or discharge of pollutants to State surface waters have been identified. For example, the Clearwell currently discharges water to the FEMP WWTS which discharges to the Great Miami River. The Great Miami River and Paddys Run have been designated warm water aquatic habitats. Thus the warm water habitat criteria apply when discharges of pollutants to these streams are involved.
Chemicals Discharged to Surface Waters	OAC Table 7-12 Inside Mixing Zone Maximum Criteria for Water Hardness Dependent Criteria in Warm Water Habitats Table I-8 in Attachment I contains numerical limits for cadmium, copper, chromium, lead, and silver.	The water quality criteria for specific pollutants are ARARs to remedial actions at OU1 because the pollutants have been identified as chemicals of concern at the site and routes of entry or discharge of pollutants to State surface waters have been identified. For example, the Clearwell currently discharges water to the FEMP WWTS which discharges to the Great Miami River. The Great Miami River and Paddys Run have been designated warm water aquatic habitats. Thus the warm water habitat criteria apply when discharges of pollutants to these streams are involved.
Chemicals Discharged to Surface Waters	OAC 3745-1-07 Outside Mixing Zone Maximum Criteria for pH dependent Parameters in warm water Aquatic Habitats Table I-10 in Attachment I contains the numerical limits for pentachlorophenol. OAC 3745-1-07 Inside the Mixing Zone Maximum Criteria for pH dependent Parameters in warm water Aquatic Habitats Table I-11 in Attachment I contains the numerical limits for pentachlorophenol.	The water quality criteria for specific pollutants are applicable to remedial actions at OU1 because the pollutants have been identified as chemicals of concern at the site and routes of entry or discharge of pollutants to State surface waters have been identified. For example, the Clearwell currently discharges water to the FEMP WWTS which discharges to the Great Miami River. The Great Miami River and Paddys Run have been designated warm water aquatic habitats. Thus the warm water habitat criteria apply when discharges of pollutants to these streams are involved.

TABLE A-2
(Continued)

Media	Applicable Requirements	Attainment
Chemicals Discharged to Surface Water	OAC 3745-1-07 Lower Miami River Temperature Criteria in Fahrenheit and degrees (Celsius) Table I-12 in Attachment I contains the acceptable monthly temperatures for water discharged to the Lower Great Miami River.	The water quality criteria for temperature in warm water aquatic habitats may be applicable if remedial actions at OU1 result in discharges of water at temperatures that would impact the maximum or average monthly temperatures in Paddys Run or the Great Miami River.
Particulates in Air	OAC 3745-17-07 Ohio Ambient Air Quality Standards Visible particulate emissions from any stack may exceed twenty per cent opacity, as a six minute average, for not more than six consecutive minutes in any sixty minutes, but shall not exceed sixty per cent opacity, as a six-minute average, at any time.	The State standard for particulate emissions is an ARAR because it places a time limit on particulate emissions that may work in tandem with the Federal annual average. There is the potential that a chosen alternative at the site would contribute particulates to the air.
Radionuclides in Air	40 CFR 61.92 EPA Regulations on National Emission Standards for Hazardous Air Pollutants (40 CFR 61.90 to 61.97) Limit airborne radionuclide emissions from the entire site to 10 mrem per person (general public). NESHAPS for emissions other than radon from DOE facilities. Monitoring requirements for individual sources with an EDE of more than 0.1 mrem/yr are found at 40 CFR 61.93(b).	40 CFR 61.92 is applicable to remedial actions taken at OU1 because radionuclides have been identified as chemicals of concern at OU1 and may be released to the air as a result of actions taken at the site.

TABLE A-2
(Continued)

Media	Relevant and Appropriate Requirements	Attainment
Chemicals in Drinking Water	40 CFR 141.51 Federal Maximum Contaminant Level Goals for Inorganic Chemicals Chemical — MCLG (mg/L) Arsenic — 0.05 Barium — 2 Cadmium — 0.005 Chromium — 0.1 Copper and Compounds — 1.3 Thallium — 0.0005	The MCLGs for inorganic chemicals in 40 CFR 141.51 are not applicable to remedial actions at OU1 because they are not enforceable standards or levels of control. Also, there are no drinking water systems on the site to be directly impacted by remedial actions. The MCLGs at 40 CFR 141.51 are relevant and appropriate to remedial actions at OU1 because remedial actions could potentially contribute contaminants to surface and/or groundwater that may be used for drinking water. Specifically, the Great Miami Aquifer is beneath the site and has been identified as a sole-source aquifer. In addition, OU1 may contribute contaminants to tributaries of the Great Miami River. Section 121(d)(2)(A) of CERCLA requires on-site remedial actions to obtain MCLGs under the SDWA where they are relevant and appropriate. Under the NCP, EPA requires that MCLGs set at levels above zero be obtained during a CERCLA cleanup where they are relevant and appropriate. Note: The MCL listed in 40 CFR 141.62 is in almost every case the same as the MCLG. If the MCL is less stringent than or equal to the goal, the goal becomes the standard and the MCL is no longer an ARAR.

TABLE A-2
(Continued)

Media	Relevant and Appropriate Requirements	Attainment
Radionuclides in Drinking Water	40 CFR 141.15 National Primary Drinking Water Standards, Maximum Contaminant Levels for Radium-226, Radium-228, and Gross Alpha Particle Radioactivity in Community Water Systems OAC 3745-81-15 Ohio Drinking Water Regulations, Maximum Contaminant Levels for Radium-226, Radium-228, and Gross Alpha Particle Radioactivity in Community Water Systems Maximum contaminant levels for radioactivity in community water systems are set as follows: • 5 Pci/L of combined radium-226 and radium-228 • 15 Pci/L of gross alpha particle activity (including radium-226, but excluding radon and uranium)	This requirement is not applicable to activities at OU1 because there are no community drinking water systems involved in this remediation. The requirement is an ARAR to remedial action because several radionuclides were found in elevated concentrations on-site. Radionuclides in this operable unit could be released such that the radioactive materials in the waste could contribute to radioactivity in potential water supplies. This requirement becomes less relevant to OU1 because it excludes radon and uranium. Most of the studies performed at the site have identified uranium as the principal contaminant in surface water and sediment. Ra-226 is not widespread, nor is it found in as elevated concentrations as U-238. However, other radionuclides such as U-234, Th-230, and Tc-99 were found in elevated concentrations in several areas.
Radionuclides in Drinking Water	40 CFR 141.16 National Primary Drinking Water Standards, Maximum Contaminant Levels for Beta Particulate and Photoradioactivity from Man-made Radionuclides in Community Water Systems OAC 3745-81-16 Ohio Drinking Water Regulation, Maximum Contaminant Levels The average annual concentration of beta particle and photon (i.e., gamma) radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 mrem/yr.	This requirement is not applicable to activities at OU1 because there are no community drinking water systems involved in remediation. The requirement is an ARAR to remedial action because several radionuclides were found in elevated concentrations on-site. Radionuclides in this operable unit could be released such that the radioactive materials in the waste could contribute to radioactivity in community water systems.

TABLE A-2
(Continued)

Media	Relevant and Appropriate Requirements	Attainment
Chemicals in Drinking Water	40 CFR 141.50 Federal Maximum Contaminant Level Goals (MCLG) for Organic Chemicals Chemical — MCLG (mg/L) Polychlorinated Biphenyls (PCB) — 0.0005 Tetrachloroethylene — 0.005 Vinyl Chloride — 0.002	The MCLGs for organic chemicals set in 40 CFR 141.50 are not applicable to remedial actions at OU1 because they are not enforceable standards and because there are no drinking water systems on the site directly impacted by remedial actions. There are, however, surface waters, and groundwater that could potentially be used for drinking water. The Great Miami Aquifer lies below the site and tributaries of the Great Miami River may have received contaminants from OU1 or could receive contaminants as a result of remedial action. Section 121(d)(2)(A) of CERCLA requires on-site remedial actions to attain MCLGs under the SDWA where they are relevant and appropriate. Under the NCP, EPA requires that MCLGs set at levels above zero be attained during a CERCLA cleanup where they are relevant and appropriate. For the chemicals listed (Contaminants of Concern at OU1), and because there is a potential that remedial actions at OU1 may contaminate potential drinking water sources, the MCLGs at 40 CFR 141.50 are ARARs. Note: The MCL listed in 40 CFR 141.61 for these chemicals have been removed from the ARARs table when the MCLG was more stringent than or equal to the MCL. If the MCLG is relevant and appropriate, the MCL no longer is. However, for most of the chemicals, the MCL and MCLG are the same.

TABLE A-2
(Continued)

Media	Relevant and Appropriate Requirements	Attainment
Radionuclides in Drinking Water	OAC 3745-81-16 Ohio Drinking Water Regulations, Maximum Contaminant Levels for Beta Particle and Photon Radioactivity from Man-made Radionuclides in Community Water Systems Except for Tritium and Strontium, the concentration of man-made radionuclides causing 4 mrem total body or organ dose equivalents shall be calculated on the basis of a 2-liter per day drinking water intake using the 168-hr data listed in "Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure", NBS Handbook 69 as amended August 1963, U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 mrem/year. The average concentration of Tritium assumed to produce a total body or organ dose of 4 mrem/year is 20,000 pCi per liter. The average concentration of Strontium-90 assumed to produce a total body or organ dose of 4 mrem/year is 8 pCi/liter.	This requirement is not applicable to activities at OU1 because there are no community drinking water systems involved in remediation. The requirement is an ARAR because Strontium-90 has been identified as a potential contaminant of concern due to its presence in OU1.

TABLE A-2
(Continued)

Media	Relevant and Appropriate Requirements	Attainment
Inorganic Chemicals in Drinking Water	40 CFR 141.62 National Primary Drinking Water Standards, Maximum Contaminant Levels for Inorganic Chemicals OAC 3745-81-11 Ohio Drinking Water Regulations, Maximum Contaminant Levels for Inorganic Chemicals Pursuant to 40 CFR 141.62, MCLs for Inorganic Contaminants in community, non-transient non-community, and transient non-community drinking water systems, the following MCLs are relevant and appropriate to groundwater at Operable Unit 1: Chemical — MCL (mg/L) — Ohio (mg/L) Antimony — 0.006 Arsenic — 0.05 Barium — 2.00 — 1.00 Beryllium — 0.004 Cadmium — 0.005 Chromium — 0.1 — 0.05 Cyanide — 0.2 Mercury — 0.002 Nickel — 0.1 Selenium — 0.01 Silver — 0.05	Neither the Federal or State requirement is applicable because water at OU1 is not distributed to a public water system (as defined in 40 CFR 141). The Federal requirement is relevant and appropriate to protecting potential drinking water sources from the contaminants found in the operable unit. There is evidence that inorganic contaminants are present. Results of inorganic chemical analyses show that pit residues contain elevated concentrations of aluminum, calcium, iron, and magnesium. Other inorganics present in the samples included: arsenic, barium, cadmium, and lead. A possibility exists that contaminants may leach or migrate into the underlying Great Miami Aquifer which has been designated a sole source aquifer in Ohio (53 FR 15876 and 53 FR 25670). Any contaminants infiltrating into the Great Miami Aquifer near the waste storage area would flow easterly toward the Great Miami River and Southwestern Ohio Water Company. Contaminants entering the aquifer near the outfall ditch would flow south toward the village of Fernald. State regulation OAC 3745-81-11 is only an ARAR for OU1 for barium, and chromium because in these cases State MCLs are more stringent than the Federal MCLs.
	Pursuant to 40 CFR 141.80, Control of Copper and Lead, the action level is exceeded for copper at 1.3 mg/L and the action level for lead is exceeded at 0.015 mg/L. Thus, although the standards are not MCLs, the action levels for copper and lead have been added as a relevant and appropriate regulatory requirement for drinking water. Chemical — Action Level (mg/L) Copper — 1.3 mg/L Lead — 0.015 mg/L	

TABLE A-2
(Continued)

Media	Relevant and Appropriate Requirements	Attainment
Organic Chemicals in Drinking Water	40 CFR 141.61 EPA National Primary Drinking Water Regulations, Maximum Contaminant Levels for Organic Contaminants Chemical — MCL (mg/L) Vinyl chloride 75-01-4 — 0.002 OAC 3745-81-12 Ohio Drinking Water Regulations Maximum Contaminant Levels for Organic Chemicals The following MCLs for organic chemicals are the maximum levels of a contaminant in water which is delivered to the entry point to a distribution system after treatment: Chemical — MCL (mg/L) Benzo(a)pyrene — 0.0002 Pentachlorophenol — 0.001 Tetrachloroethene — 0.005 Vinyl chloride — 0.002 PCBs — 0.0005	The requirement is not applicable because water from OU1 is not distributed through a public water system (as defined in 40 CFR 141). Sampling for these contaminants takes place per the regulation at entry points to the distribution system after treatment. The standard is an ARAR to remedial actions at OU1 because remedial actions may cause contaminants to migrate or leach into the underlying aquifer. The underlying aquifer is the Great Miami Aquifer which has been designated a sole-source aquifer in Ohio (53 FR 15876 and 53 FR 25670). Results of an organic chemical analysis of waste material in the pits show elevated concentrations of PCBs. The PCBs most frequently detected were Aroclor-1221, Aroclor-1254, Aroclor-1248, and Aroclor-1260. Waste from the Former Production Area were also stored in the waste pits.
Fugitive Dust	OAC 3745-17-08 Ohio Ambient Air Quality Use water or a dust suppression chemical when demolishing buildings, grading roads, clearing land. Applicable to the City of Cincinnati and Hamilton County.	The Ohio standard for fugitive dust is applicable to remedial actions at OU1 because there is a good possibility one or more of the remedial alternatives involve grading or earth moving activities that will contribute particulates to the air. The standard is an ARAR because it applies to the city of Cincinnati and Hamilton County. Part of the plant falls in Hamilton County. The other part of the plant falls in Butler County.
Radiation in All Media	40 CFR 192.41 Provisions The total amount of radioactive materials entering the environment from the entire uranium fuel cycle, per gigawatt-year of electrical energy produced by the fuel cycle, contains less than 50,000 curies of krypton-85, 5 millicuries of iodine-129, and 0.5 millicuries of combined plutonium-239 and other alpha-emitting transuranic radionuclides with half-lives greater than one year.	40 CFR 192.41 implements standards for Uranium Mill Tailings. Because OU1 contains large quantities of uranium including radionuclides U-238, U-234, and Ra-226, the standards promulgated for uranium mill tailings are relevant to remedial actions proposed at OU1.

TABLE A-2
(Continued)

Media	Relevant and Appropriate Requirements	Attainment
Uranium	40 CFR 192.12 Standards for Uranium Mill Tailings Remedial Actions shall be conducted so as to provide reasonable assurance that as a result of residual radioactive materials from any designated processing site: a) The concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than 1) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and 2) 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.	40 CFR 192.12 is relevant and appropriate for remedial actions at OU1 because much of the waste contained in the waste pits at OU1 contain material similar to the uranium mill tailings and thorium mill tailings regulated by the standard. Pit 1 contains 114,000 lbs of uranium Pit 2 contains 2,653,000 lbs of uranium and 880 lbs of thorium Pit 3 contains 284,000 lbs of uranium and 880 lbs of thorium Pit 4 contains 6.6 million lbs of uranium and 136,000 lbs of thorium Pit 5 contains 111,000 lbs of uranium and 37,000 lbs of thorium The purpose of 40 CFR 192 includes providing for long-term stabilization and isolation of residual radioactive material and control of exposure to radioactive material. This purpose is compatible with the purpose of remedial action at OU1.
Gamma	40 CFR 192.12 Standards for Uranium Mill Tailings Remedial Actions shall be conducted so that the level of gamma radiation shall not exceed the background level by more than 20 microroentgens/hour.	40 CFR 192.12 is relevant and appropriate to remedial actions at OU1 because much of the waste contained in the waste pits at OU1 is similar to the uranium mill tailings and thorium mill tailings regulated by the standard. The purpose of 40 CFR 192 includes providing for long-term stabilization and isolation of residual radioactive material and control of exposure to radioactive material. This purpose is compatible with the purpose of remedial action at OU1.
Ra-226 + 5 daughters Ra-228 + daughter Th-230 Th-232	40 CFR 192.32 40 CFR 192.41 Limit releases of radon from uranium and thorium by-product materials to the atmosphere so as not to exceed an average release rate of 20 picoCuries per square meter per second.	40 CFR 192.32 and 40 CFR 192.41 are relevant and appropriate to remedial actions at OU1 because uranium and thorium are contaminants of concern at OU1 and may be released to the atmosphere.

TABLE A-2
(Continued)

Media	To-be-Considered	Attainment
	Proposed MCLs from 'Drinking Water Regulations and Health Advisories' by the Office of Water, U.S. EPA, Washington, D.C., May 1993. Chemical — MCL (mg/L) Benzo(a)anthracene — 0.0001 Benzo(b)fluoranthene — 0.0002 Chrysene — 0.0002 Indeno(1,2,3-c,d)pyrene — 0.0004	The proposed regulations are not ARARs for Operable Unit 1 because they are not promulgated at this time. However, the proposed limits can be used to establish cleanup levels for the site in the absence of promulgated federal and state regulations. The listed chemicals have been found to be present at Operable Unit 1 during the Remedial Investigation.
Radionuclides in Drinking Water	DOE Order 5400.5, Chapter II, Section 1.d Radiation Protection of the Public and Environment Provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE so that persons consuming water from the supply shall not receive an effective dose equivalent greater than 4 mrem in a year. For multiple radionuclides, the sum of the effective dose equivalents from the radionuclides (excluding radium-226, radium-228, and radon) shall not exceed 4 mrem in a year from drinking water.	The DOE Order 5400.5 is not promulgated; thus, it is not an ARAR. It is, however, to-be-considered guidance. Note: The guidance duplicates and supplements the State of Ohio regulations OAC 3745-81-16 and the Federal regulations at 40 CFR 141.16.

TABLE A-2
(Continued)

Media	To-be-Considered	Attainment
Radionuclides in Surface or Groundwater	DOE Order 5400.5 Radiation Protection of the Public and the Environment The derived concentration guides contained in this order are based on the intake of water contaminated with the radionuclide of concern in concentrations that would result in a committed dose equivalent of 100 mrem for the radionuclide taken in during one year. Derived concentration guides are not release limits. The guides are used by DOE to screen waste streams for application of best available technologies for bringing annual averages of a contaminant below the derived concentration guide.	DOE Orders are not ARARs because they are not promulgated. Because they document policy, responsibilities, procedures, and/or standards specifically at DOE facilities, they should be considered when setting cleanup standards for radionuclides, particularly if they give guidance where none is available in promulgated form. The Derived Concentration Guides are relevant to OU1 because radioactive material is involved in the cleanup of OU1 and because there is evidence of contamination (uranium) in the surface water and sediments in the immediate vicinity of the waste pits. Although the derived concentration guides presented in DOE Order 5400.5 apply to liquid process waste streams, it is appropriate that these guides be considered during cleanup at OU1 because of the possibility of releasing liquid radioactive material to surface waters during remedial action.

TABLE A-2
(Continued)

Media	To-be-Considered	Attainment
Radionuclides in Natural Waterways (Aquatic Species)	DOE Order 5400.5 Radiation Protection of the Public and the Environment To prevent buildup of radionuclide concentrations in sediment, liquid process waste streams containing radioactive material in settle-able solids may be released to natural waterways if the concentration of radioactive material in the solids present in the waste stream do not exceed 5 pCi/g above background levels of settle-able solids of alpha-emitting radionuclides or 50 pCi/g above background level of settle-able solids for beta-gamma-emitting radionuclides. To protect native animal aquatic organisms, the absorbed dose to these organisms shall not exceed 1 rad per day from exposure to the radioactive material in liquid wastes discharged to material waterways.	DOE Orders are not ARARs because they are not promulgated. However, they document and direct policy, responsibilities, and procedures and/or standards specifically at DOE facilities and should be considered when setting cleanup standards for radionuclides at a DOE facility. DOE Orders should be considered if the standards give guidance where none exists in promulgated form. The concentration limits on radioactive solids in liquid waste streams and on radioactive materials in liquid waste streams discharged to material waterways is relevant to cleanup actions at OU1 because of the presence of uranium in concentrations above background levels in surface water and sediment samples taken from Pits 5 and 6, the Clearwell, Paddys Run, and the drainage paths in the immediate vicinity of the waste pits. There is a possibility that remedial action at OU1 will contribute to radioactivity in the surface water and sediments of natural waterways in the vicinity of the Fernald site. Thus, although DOE Order 5400.4 refers to contributions of radioactive materials from process waste streams discharged to streams, runoff from OU1 that contributes radionuclides to natural streams is similar enough to the circumstances of active waste discharge that cleanup activities at OU1 should take into consideration the limits set forth in the Order.

TABLE A-2
(Continued)

Media	To-be-Considered	Attainment
Radionuclides	DOE Order 5400.5 Radiation Protection of the Public and Environment DOE Order 5400.5 sets desired concentration guides (DCG) for radioactive emissions to air resulting from DOE activities. The DCG values for internal exposure are based on a committed dose equivalent of 100 mrem for the radionuclides taken into the body during one year. The DCGs comply with 40 CFR Part 61, Subpart H criterion of 10 mrem/year effective dose equivalent. Compliance is demonstrated using AIRDOS/RADDISK models as described by EPA. The DCGs are not release limits. They are one step in the process of controlling releases. DOE uses the guides to screen waste streams for application of best available technologies. If the concentration of a contaminant is above the DCG, the best available technology is applied to bring the annual averages of the contaminant below the DCG at the point of discharge. See Attachment I, Table I-21.	The guidance presented in DOE Order 5400.5 is not applicable or relevant and appropriate to remedial actions at OU1 because it is not promulgated. However, it should be considered because DOE orders set policy and procedures at DOE facilities and in this particular case provides guidance on how to control releases in such a way that the regulatory limits are met. Radionuclides are contaminants of concern at OU1.
Radionuclides	DOE Order 5400.5 The DCGs are given for different lung retention classes (noted as D,W, or Y, where D equals a removal half-time of 0.5 days, W equals a removal half-time of 50 days, and Y equals a removal half-time of 500 days). The derived concentration guides can be found in Table I-21 in Attachment I.	The guidance presented in DOE Order 5400.5 is not an applicable or relevant and appropriate requirement because it is not promulgated. However, it should be considered because DOE orders set policy and procedures at DOE facilities and in this particular case provides guidance on how to control releases in such a way that the regulatory limits are met. Radionuclides are contaminants of concern at OU1.

TABLE A-2
(Continued)

Media	To-be-Considered	Attainment
Radiation in All Media	DOE Order 5480.11 The effective dose equivalent received by any member of the public entering a controlled area is limited to 100 mrem per year. Limiting values for the assessed dose from exposure of worker to radiation are as follows. These values represent maximum limits; It is DOE policy to maintain radiation exposures as far below these limits as is reasonably achievable. Radiation Effect — Annual Dose* Equivalent (rem) Stochastic effects — 5 Nonstochastic effects lens of the eye — 15 Organ, extremity, or tissue including skin of the whole body — 50 Unborn child, full gestation period — 0.5 *annual effective dose equivalent	DOE Order 5480.11 is to-be-considered (TBC) guidance because it is not promulgated. However, DOE Orders set policy and procedures on DOE facilities and may be based on promulgated regulations. Thus at DOE facilities, DOE Orders should be given consideration.

TABLE A-2
(Continued)

Media	To-be-Considered	Attainment
PCBs in Soil	40 CFR 761.125 Requirements for PCB Spill Cleanup PCBs at concentrations greater than 50 ppm are subject to decontamination TSCA requirements in 40 CFR 761.120(b). PCB containers containing non-liquid PCBs, such as contaminated soil, rags, and debris designated for disposal may be stored temporarily (up to 30 days from the date of removal) in an area that does not comply with the storage building requirements at 40 CFR 761.65 (b). 40 CFR 761.125(c) Soils in non-restricted access areas contaminated by a PCB spill will be decontaminated to 10ppm PCB by weight, provided that the soil is excavated to a minimum depth of 10 inches. The excavated soils will be replaced with clean soils, i.e., containing 21ppm PCB, and the spill site will be restored (e.g., replacement of turf) [40 CFR 761.125(c)(4)(v)]. For soils in restricted access areas, decontaminate to 25ppm PCB by weight [40 CFR 761.125(c)(3)(v)].	Concentrations of PCBs at OU1 are expected to be less than 50 ppm. This regulation would then be considered guidance to be considered.
Cs-137 + daughter Np-237 + daughter Pu-238 Pu-239/240 Ru-106 Sr-90 + daughter Tc-99 Th-228 + 7 daughters U-234 U-235 + daughter U-238 + daughters	DOE Order 5400.5 Residual plus natural dose limit for public exposure to residual radioactive material are 100 mrem effective dose equivalent per year. Guidelines for residual concentrations of radionuclides in soil shall be derived from the basic dose limits by means of an environment 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 square meters. Control and Stabilization and Administrative Control features shall be designed to provide to the extent reasonably achievable, an effective life of 50 years with a minimum life of at least 25 years. Groundwater shall be protected in accordance with legally applicable Federal and State standards.	DOE Order 5400.5 presents DOE limits on residual radionuclides in soil without specifying their source. The order should be considered during the remediation of OU1 because the radionuclides listed are contaminants of concern at OU1 and may be released to the environment during remediation or after closure.

TABLE A-2
(Continued)

Media	To-be-Considered	Attainment
Ra-226 + 5 daughters Ra-228 + daughter Th-230 Th-232	DOE Order 5400.5 Residual plus natural dose limit for public use exposure to residual radioactive material are 100 mrem effective dose equivalent per year. Guidelines for residual concentrations 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.	Remedial actions at OU1 may result in residual radioactivity in waste or soil. DOE Order 5400.5 issues limits for residual dose and concentrations for radionuclides of concern at OU1.

TABLE B-3

ACTION-SPECIFIC ARARS
(APPLICABLE REQUIREMENTS; RELEVANT AND APPROPRIATE REQUIREMENTS; TBCs)

Applicable Requirements	Attainment
40 CFR Part 61, Subpart H (40 CFR 61.90 to 61.97) Emissions of other radionuclides at DOE facilities are limited to a 10 mrem/yr annual dose. The rule also contains specific regulatory procedures for EPA approvals and reporting requirements.	Any contribution by the remediation selected for Operable Unit 1 to the overall dose for the entire site must not result in exceedance of the standard. The engineering practices that will be implemented for controlling air emissions and fugitive dust for excavation, drying, and handling of waste will ensure compliance with this requirement.
40 CFR Part 61, Subpart Q Emission of radon-222 from DOE facilities is limited to 20 $pCi/m^2/s$ on an annual average.	The FEMP has been specifically identified as a regulated entity in the regulations based on the history of releases at this facility. The engineering practices that will be implemented for controlling air emissions and fugitive dust for excavation, drying, and handling of waste will ensure compliance with this requirement.
40 CFR 122.26 (OAC 3745-38) Discharge of Storm Water Runoff Storm water runoff from landfills, construction sites, and industrial activities must be monitored and controlled. A Storm Water Pollution Prevention Plan (SWPPP) is required for construction activities which result in a total land disturbance of 5 or more acres.	Required of all industrial waste sites and construction sites of greater than 5 acres that discharge storm water runoff to the waters of the United States. The substantive requirements of a SWPPP will be met prior to disturbance of the area.
ORC 3734.02(H) Digging Where Hazardous or Solid Waste was Located Filling, grading, excavating, building, drilling, or mining on land where hazardous waste or solid waste facility was operated is prohibited without prior approval from the Director of the Ohio EPA.	State concurrence of the RI/FS-PP and Record of Decision will meet the requirement of this regulation.
OAC 3745-56-51, 54 and 58; Waste Piles Design and Operating requirements, monitoring and inspection, closure and post-closure care.	The requirements for hazardous waste piles would be applicable to waste excavated. The design packages for the entire OU1 waste processing facilities will address design requirements for the feed piles as a component of the process, and monitoring and inspection during remedial activities. Closure of the facilities will be addressed in the site restoration plan, administrative closure requirements are not required.
OAC 3745-9-10 Ohio Water Well Standards Abandonment of Test Holes and Wells	Upon completion of testing, a test hole or well shall be either completely filled with grout or such material as will prevent contaminants from entering groundwater.

TABLE A-3
(Continued)

Applicable Requirements	Attainment
OAC 3745-15-07(A) Ohio Air Pollution Control Regulations Describes forms of air pollution nuisances and prohibits their emission or escape.	Both excavation and waste treatment processes have the potential to generate prohibited fugitive emissions, including smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, or odors in such a manner or in such amounts as to endanger health, safety, or welfare. Fugitive and blowing dust carrying contamination would be controlled on active excavation faces and spoil piles by wetting, fogging, or misting. Dust from inactive excavation faces would be controlled with plastic, applied foam, shotcrete, or paving. Crushing and drying activities would take place in enclosures.
OAC 3745-17-08 Control of Fugitive Dust Requires the minimization or elimination of visible emissions of fugitive dust generated during grading, loading, or construction operations and other practices which emit fugitive dust.	The implementation of remedial action alternatives will require the movement of dirt and other material likely to result in fugitive dust emissions. Fugitive and blowing dust carrying contamination would be controlled on active excavation faces and spoil piles by wetting, fogging, or misting. Dust from inactive excavation faces would be controlled with plastic, applied foam, shotcrete, or paving. Crushing and drying activities would take place in enclosures.
OAC 3745-21-02(C) and OAC 3745-21-03(D) Ambient air quality standards and guidelines and methods of ambient air quality measurements (for non-methane hydrocarbons). Mean ambient concentration of non-methane hydrocarbons not to exceed 160 μg/cubic meters (0.24 ppm as carbon) between 6 and 9 a.m.; methods for determining ambient concentration of non-methane hydrocarbons.	During drying, hydrocarbon soil contaminants may be evolved with the steam. An uncontrolled release could lead to violations of this standard. Therefore, process off-gases will be treated through a condenser and a scrubber during drying.
OAC 3745-21-07 (G)(2) Control of emissions of organic material from stationary sources. Emissions of photochemical reactive material from processes, including drying, not to exceed 40 lbs/day, with a peak of 8 lbs/hour.	Data from the Operable Unit 1 Remedial Investigation Report indicate that VOCs do not need to be controlled because of their low concentrations. However, off-gases will be treated through a condenser and scrubber during drying. Although the concentration of organic material in the pit waste is expected to be low, the volume of the waste to be treated could result in sufficient emissions for this standard to be violated if emissions are uncontrolled. (It is current OEPA policy to consider all VOCs to be photochemical reactive materials.)
OAC 3745-31-05(A)(3) Permit to Install The director shall issue a permit to install if he determines that the installation or modification and operation of the air contaminant source will employ the best available technology.	Although an administrative Permit to Install is not required for alternatives involving treatment, the substantive requirements of this section must be met by employing Best Available Technology for treating particulate and off-gas emissions.

TABLE A-3
(Continued)

Applicable Requirements	Attainment
10 CFR 1021.2 DOE actions must be subjected to NEPA evaluation as outlined by CEQ regulations in 40 CFR 1500-1508.	This requirement is applicable because the FEMP is a DOE facility, and this requirement requires NEPA evaluation for specific actions at DOE facilities. On June 13, 1994, the DOE issued a revised policy statement on NEPA. The new policy allows DOE, at CERCLA sites, to rely on the CERCLA process to satisfy the procedural aspects of NEPA. NEPA values have been incorporated into the Final Operable Unit 1 Feasibility Study Report.

TABLE A-3
(Continued)

Relevant and Appropriate Requirements	Attainment
40 CFR 61.670 Subpart OOO Stack emissions from affected facilities shall not: • Contain particulate matter in excess of 0.05 g/dscm; or • Exhibit greater than 7 percent opacity, unless the stack emmissions are discharged from an affected facility using a wet scrubbing control device.	These standards are relevant and appropriate to OU1 remedial activities since they specify requirements for crusher and conveyor systems. The standards will be considered when determining BAT requirements for these systems in accordance with OAC 3745-31-05(A)(3).
40 CFR 125.100 and 125.104 Discharge of Treatment System Effluent Best Management Practices Development and implement a BMP program to prevent the release of toxic or hazardous pollutants to waters of the U.S. Development and implementation of a sitewide BMP Program is also required as a condition of the FEMP NPDES Permit.	All of the proposed actions have the potential for releases and runoff from the operable unit. The requirement is not applicable because BMP under the NPDES permit program applies only to ancillary facilities of manufacturing units that might have releases of toxic or hazardous pollutants. The purpose of the BMP program is relevant and appropriate to prevent releases from spills or runoff during the implementation of remedial actions. The FEMP has an approved Best Management Practices Plan.
40 CFR 241 Subpart B (OAC 3745-27), RCRA Subtitle D On-Property Solid Nonhazardous Waste Management Facilities Design standards are presented in the following citations: 241.200-2, 241.201-2, 241.202-2, 241.203-2, 241.204-2, 241.205-2, 241.206-2, 241.207-2, 241.208-2, 241.209-2, and 241.210-2.	Solid, nonhazardous wastes generated as a result of remediation must be managed in accordance with Federal and State regulations. However, the selected remedy involves off-site shipment of Operable Unit 1 pit wastes. On-site facility design requirements do not apply to this remedy.
40 CFR 262.11 (OAC 3745-52-11) Hazardous Waste Determinations Any generator of waste must determine whether or not the waste is hazardous.	These procedures are established to determine whether wastes are subject to the requirements of RCRA. These procedures are relevant and appropriate to determine whether Operable Unit 1 pit wastes exhibit the characteristics of hazardous waste, or are otherwise similar to RCRA hazardous waste. Characterization of the treated material will be conducted prior to off-site shipment. Characterization will be based on process knowledge of the waste generated (as documented in the Operable Unit 1 Remedial Investigation Report) and through sampling of waste after treatment.

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(Continued)

Relevant and Appropriate Requirements	Attainment
Closure 40 CFR 264, Subpart G (OAC 3745-55-(11-16)) Operator must close facility in a manner that: • Minimizes the need for further maintenance • Minimizes post-closure escape of hazardous constituents • Complies with specific unit type closure requirements	These requirements are relevant and appropriate because the residues are sufficiently similar to hazardous waste and some remedial alternatives might require closure as outlined in this standard.
40 CFR 264.1030 - 264.1036, Subpart AA Air Emission Standards for Process Vents	No regulations have been promulgated for process vents associated with thermal drying; however, 40 CFR 264.1030 - .0136 may be relevant and appropriate but not applicable to air emission standards for process vents associated with thermal drying.
Post-Closure 40 CFR 264 Subpart G 40 CFR 264.117 (OAC 3745-55-17) 40 CFR 264.119 (OAC 3745-55-19) Post-closure care and use of property for a period as necessary to protect human health and the environment including: • Access controls • Monitoring Post-closure notices must include deed notation/use restriction.	These requirements are relevant and appropriate because the residues are sufficiently similar to hazardous waste and some remedial alternatives might leave residues in place.
OAC 3745-57-91 and 92, Miscellaneous Methods of Waste Treatment Parts 91 and 92 include requirements for miscellaneous units environmental performance standards and monitoring, analysis, inspection, response, reporting, and corrective action.	All operating facilities within Operable Unit 1 will be located, designed, constructed, operated, maintained, and closed in a manner that ensures protection of human health and the environment by preventing releases that could have adverse effects due to migration of waste constituents through ground water, surface water, wetlands, or the air. Monitoring requirements identified as ARAR's will insure compliance with these requirements.
Corrective Action for SWMUs 40 CFR Subpart S 40 CFR 264.552,.553 Corrective Action Management Units (CAMUs) might be designed at the site as areas where remediation wastes (solid, hazardous, or contaminated media and debris) might be placed during the process of remediation. Temporary units (TUs) consisting of tanks and container storage units might be used to store and treat hazardous waste during the process of corrective action.	During the process of remeidation, waste materials might require temporary managment in containment buildings, temporary units, stockpiles, or other land based units for the purpose of staging, treating or disposing of the material. All of the material generated from remediation of OU1 are considered remediation wastes. Some of the waste material might exhibit a RCRA characteristic, or otherwise be sufficiently similar to hazardous waste to make this requirement relevant and appropriate.

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(Continued)

To-be-Considered	Attainment
DOE Order 5400.1 @ p. iv - 1 Since each DOE facility is unique, the need and level of effort for monitoring programs shall be determined by the appropriate field organization on a case-by-case basis.	Operable Unit 1 is part of a DOE facility and is subject to these orders. Monitoring programs implemented at the facility will be based on appropriate requirements identified through the ARARs analysis as well as DOE Orders.
DOE Order 5400.1 @ iv - 9, 10 Groundwater that is or could be affected by DOE activities shall be monitored to determine and document the effects of operations on groundwater quality and quantity and to demonstrate compliance with DOE requirements and applicable Federal, State, and local laws and regulations.	Site-specific characteristics determine monitoring needs. For sites with multiple groundwater pollutant sources, extensive groundwater pollution or other unique site problems, groundwater monitoring programs could require more extensive information than those specified in 40 CFR Parts 264 and 265. Monitoring for radionuclides shall be in accordance with DOE Orders in the 5400 series dealing with radiation protection of the public and the environment. Remediation of groundwater at the facility and related monitoring will be managed under Operable Unit 5.
DOE Order 5820.2A @ 1 Radioactive Waste Management DOE 5820.2A III.3h Management of Low-Level Waste, Long-Term Storage Radioactive and mixed wastes shall be managed in a manner that assures protection of the health and safety of the public, DOE and contractor employees, and the environment. 5820.2A III.3h requires achieving performance objectives of DOE. 5820.2A III.3a requires records and documentation be kept for storage of low-level waste and permits the storage of waste until disposal by approved methods.	The generation, treatment, storage, transportation, and/or disposal of radioactive wastes, and the other pollutants or hazardous substances they contain, will be accomplished in a manner that minimizes the generation of such waste across program office functions and complies with all applicable Federal, State and local environmental, safety, and health laws and regulations, and DOE requirements.