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OPERABLE UNIT 4 DRAFT RECORD OF DECISION/RESPONSIVENESS SUMMARY

08/05/94

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REPORT

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PROPOSED DRAFT
RECORD OF DECISION
R REMEDIAL ACTIONS AT
OPERABLE UNIT 4

D ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

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AUGUST 1994

U.S. DEPARTMENT OF ENERGY
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U.S. DEPARTMENT OF ENERGY
FERNALD FIELD OFFICE

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Department of Energy
Fernald Environmental Management Project
P. O. Box 398705
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AUG 05 1994
DOE-2185-94

Mr. James Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, IL 60604-3590

Mr. Thomas Schneider, Project Manager
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

OPERABLE UNIT 4 DRAFT RECORD OF DECISION/RESPONSIVENESS SUMMARY

Enclosed for your review and approval is the Operable Unit 4 Draft Record of Decision/Responsiveness Summary (DROD/RS). As we have discussed previously, an expedited review of the RS is being sought. After your approval of the RS, which will serve as the Environmental Impact Statement (EIS), the Department of Energy (DOE) will initiate a 30-day waiting period, as required by the National Environmental Policy Act (NEPA). At the close of the waiting period, it is anticipated that all comments on the DROD/RS could be incorporated, and both the DOE and the United States Environmental Protection Agency (EPA) could sign the document as a NEPA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision.

If you have any comments or questions, please contact Randi Allen at (513) 648-3102.

Sincerely,

for Jack R. Craig
Fernald Remediation Action
Project Manager

FN:Allen

Enclosures: As Stated

Recycled and Recyclable

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DECLARATION STATEMENT

SITE NAME AND LOCATION

Fernald Environmental Management Project (FEMP) Site -- Operable Unit 4,
Fernald, Hamilton County, Ohio

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for Operable Unit 4 of the Fernald Site in Fernald, Ohio. This remedial action was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable 40 Code of Federal Regulations (CFR) Part 300, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

In making this decision, it is the United States Department of Energy's (DOE's) policy to integrate the National Environmental Policy Act (NEPA) values into the CERCLA remedial action process; however, it is not the intent of the DOE to make a statement on the legal applicability of NEPA to CERCLA actions. This single document is intended to serve as DOE's Record of Decision (ROD) for Operable Unit 4 made jointly under both CERCLA and NEPA.

The decision presented herein is based on the information available in the administrative record for this site maintained in accordance with CERCLA. The major documents prepared through the CERCLA process included the Remedial Investigation (RI), the Feasibility Study (FS), and the Proposed Plan (PP) for Operable Unit 4. Through DOE's integration policy, the FS and the PP also comprised DOE's draft Environmental Impact Statement (EIS) and were made available for public review and comment. This decision is also based on the public hearing held on March 21, 1994, in Harrison, Ohio, and the public meeting held on May 11, 1994, in Las Vegas, Nevada following the issuance of the Feasibility Study/Proposed Plan-Draft Environmental Impact Statement (FS/PP-DEIS). DOE has considered all comments received during the public comment period on the FS/PP-DEIS and following issuance of the final EIS in the preparation of this ROD.

The State of Ohio concurs with the remedy and the applicable or relevant and appropriate requirements (ARARs) put forth in this ROD for Operable Unit 4.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from Operable Unit 4, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

This is the selected remedial action for Operable Unit 4, 1 of 5 operable units at the FEMP. The materials within Operable Unit 4 exhibit a wide range of properties. Most notable would be the elevated direct radiation associated with the K-65 residues versus the much lower direct radiation associated with cold metal oxides in Silo 3. Even more significant would be the much lower levels of contamination associated with the soils and building materials, like concrete, within the Operable Unit 4 Study Area. To account for these differences and for the varied cleanup alternatives applying to each waste type, Operable Unit 4 was segmented into three subunits. These subunits are described as follows:

Subunit A: Silos 1 and 2 contents (K-65 residues and bentonite clay) and the sludge in the decant sump tank

Subunit B: Silo 3 contents (cold metal oxides

Subunit C: Silos 1, 2, 3, and 4 structures; contaminated soils within the Operable Unit 4 boundary, including surface and subsurface soils and the earthen berm around Silos 1 and 2; the decant sump tank; the radon treatment system; the concrete pipe trench and the miscellaneous concrete structures within Operable Unit 4, any debris (i.e., concrete, piping, etc.) generated through implementing cleanup for Subunits A and B, and any perched groundwater encountered during remedial activities.

On the basis of the evaluation of final alternatives, the selected remedy addressing Operable Unit 4 at the FEMP is a combination of Alternatives 3A.1/Vit - Removal, Vitrification, and Off-site Disposal - Nevada Test Site (NTS); 3B.1/Vit - Removal, Vitrification, and Off-site Disposal - NTS; and 2C - Demolition, Removal and On-Property Disposal. These alternatives apply to Subunits A, B, and C respectively. The major components of the selected remedy include:

- Removal of the contents of Silos 1, 2, and 3 (K-65 residues and cold metal oxides) and the decant sump tank sludge.
- Vitrification (glassification) to stabilize the residues and sludges removed from the silos and decant sump tank.
- Off-site shipment for disposal at the NTS of the vitrified contents of Silos 1, 2, 3, and the decant sump tank.
- Demolition of Silos 1, 2, 3, and 4 and decontamination, to the extent practicable, of the concrete rubble, piping, and other generated construction debris.
- Removal of the earthen berms and excavation of contaminated soils within the boundary of Operable Unit 4, to achieve remediation levels. Placement of clean backfill following excavation to original grade.
- Demolition of the vitrification treatment unit and associated facilities after use. Decontamination or recycling of debris prior to disposition.
- On-property interim storage of excavated contaminated soils and remaining contaminated debris in a manner consistent with the approved Work Plan for Removal Action 17 (improved storage of soil and debris).
- Continued access controls and maintenance and monitoring of the stored wastes inventories.
- Institutional controls of the Operable Unit 4 area such as deed and land use restrictions.
- Potential additional treatment of stored Operable Unit 4 soil and debris using Operable Unit 3 and 5 waste treatment systems.

- Pumping and treatment as required of any contaminated perched groundwater encountered during remedial activities.

- Disposal of Operable Unit 4 contaminated soils and debris consistent with the Records of Decision for Operable Units 3 and 5.

The remedy specifies off-site disposal of vitrified contents of Silos 1, 2 and 3 at the NTS. At the time of the signing of this ROD, The Department of Energy - Nevada Operations Office (DOE-NVO) is in the process of preparing a site-wide environmental impact statement (EIS) under NEPA for the NTS. Shipments of Operable Unit 4 vitrified waste are not proposed to begin until after the expected completion of the EIS for the NTS.

The decision regarding the final disposition of the remaining Operable Unit 4 contaminated soil and debris will be placed in abeyance, until completion of the Records of Decision for Operable Units 3 and 5 remedial actions, in order to take full advantage of planned and in progress waste minimization treatment processes by these operable units. Further, this strategy enables the integration of disposal decisions for contaminated soils and debris on a site-wide basis.

In the unlikely event unforeseen circumstances preclude the integration of Operable Unit 4 soil and debris into the Operable Unit 3 and/or Operable Unit 5 treatment and disposal decisions, the disposal decision for Operable Unit 4 contaminated soils and debris will be documented in a ROD amendment for Operable Unit 4 in accordance with Section 117(c) of CERCLA and United States Environmental Protection Agency (EPA) guidance. The ROD amendment will provide the public and the EPA further opportunity to review and comment on the final disposal option for Operable Unit 4 soils and debris. A ROD amendment to the Operable Unit 4 ROD will not be necessary in the event the Operable Unit 3 remedy for debris and the Operable Unit 5 remedy for contaminated soils can be feasibly implemented for Operable Unit 4.

In reaching the decision to implement this remedial alternative, DOE evaluated other alternatives for each subunit, in addition to no action. The other alternatives are: (a) *Subunit A - Silos 1 and 2 Contents*: (1) Removal, Cement Stabilization, Off-Site Disposal at Nevada Test Site; (b) *Subunit B - Silo 3 Contents*: (1) Removal, Vitrification, On-Property Disposal; (2) Removal, Cement Stabilization, On-Property Disposal; (3) Removal, Cement Stabilization, Off-Site Disposal at Nevada Test Site; (c) *Subunit C - Silos 1, 2, 3, and 4 Structures, Soils, and Debris*: (1) Demolition, Removal, Off-Site Disposal at Nevada Test Site; (2) Demolition, Removal, Off-Site Disposal at Permitted Commercial Facility.

A description of the alternatives is provided in the Decision Summary of the ROD, hereby incorporated by reference for DOE's NEPA ROD, and is available in the Administrative Record. CERCLA's nine criteria set forth in 40 CFR Part 300, the National Oil and Hazardous Substances Pollution Contingency Plan were used to evaluate the alternatives. The selected remedy represents the best balance among the alternatives with respect to these criteria and is the environmentally preferable alternative.

The preferred alternative for Operable Unit 4 provides the best performance when compared with the other alternatives, with respect to the evaluation criteria. This remedy will achieve substantial risk reduction by removing the sources of contamination, treating the material for which exposures result in the highest risk, shipping the treated residues off-site for disposal, managing the remaining contaminated soils and debris consistent with the site-wide strategy. The selected treatment alternative both reduces the mobility of the hazardous constituents and results in significant reduction in the volume of materials requiring disposal. The selected remedy also provides the highest degree of long-term protectiveness for human health and the environment.

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 toxicity, mobility, or volume as a principal element. This remedy will result in contaminated debris and soil being dispositioned by Operable Units 3 and 5, respectively. Because this remedy will result in hazardous substances (i.e., contaminated soil and debris) remaining on site, above health-based levels, a review will be conducted every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

All practical means to avoid or minimize environmental harm from implementation of the selected remedy have been adopted. During excavation activities, sediment controls will be implemented to eliminate potential surface water runoff and sediment deposition to Paddys Run. The remedy may result in the permanent filling of approximately 0.52 acres of a drainage ditch/swale wetlands with minimal quality habitat located on the northeast portion of the site. Final site layout and design will include all practicable means (e.g., sound engineering practices and proper construction practices) to minimize environmental impacts.

_____ _____

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

_____ _____

Assistant Secretary for Environmental Management Date
U.S. Department of Energy

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ACRONYM LIST

AEA	Atomic Energy Act
AEC	Atomic Energy Commission
ARAR	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIS	Characterization Investigation Study
CFR	Code of Federal Regulations
CMSA	Consolidated Metropolitan Statistical Area
COC	Constituents of Concern
COE	United States Army Corps of Engineers
CT	central tendency
DOE	United States Department of Energy
DOE-FN	United States Department of Energy - Fernald Field Office
DOE-NVO	United States Department of Energy - Nevada Operations Office
DOT	U. S. Department of Transportation
EIS	Environmental Impact Statement
EP	Extraction Procedure
EPA	United States Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FFCA	Federal Facility Compliance Agreement
FMPC	Feed Materials Production Center
FRESH	Fernald Residents for Environment, Safety, and Health
FS	Feasibility Study
FS/PP-DEIS	Feasibility Study/Proposed Plan - Draft Environmental Impact Statement
HEAST	Health Effects Assessment Summary Table
HEPA	High-Efficiency Particulate Air (filter)
HI	Hazard Index
HQ	Hazard Quotient
IARC	International Agency for Research on Cancer
ILCR	incremental lifetime cancer risk
IRIS	Integrated Risk Information System
ISA	Initial Screening of Alternatives

LRA	leading remedial alternative
MCL	maximum containment level
MCLG	maximum containment level goal
MCW	Mallinckrodt Chemical Works
MSL	mean sea level
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NEPA	National Environmental Policy Act
NOEL	No Observed Effect Level
NOI	Notice of Intent
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NTS	Nevada Test Site
O&M	operation and maintenance
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
ORC	Office of Regional Council
PAH	polyaromatic hydrocarbons
Pb	lead
PCB	polychlorinated biphenyls
PEIC	Public Environmental Information Center
Po	polonium
PP	Proposed Plan
PRG	proposed remediation goals
PRL	proposed remediation level
Ra	radium
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	reasonable maximum exposure
Rn	radon
ROD	Record of Decision

RTS	radon treatment system
SARA	Superfund Amendment and Reauthorization Act
SDWA	Safe Drinking Water Act
TBC	to be considered
TCLP	Toxicity Characteristic Leaching Procedure
Th	thorium
U	uranium
USDA	United States Department of Agriculture
VOC	volatile organic compounds

LIST OF WEIGHTS AND MEASURES

cm	centimeter
ft	feet
ha	hectare
in	inch
kg	kilogram
km	kilometer
km^2	square kilometers
L	liters
m	meter
m^3	cubic meters
$\mu g/l$	micrograms per liter
M	million
mi	miles
mi^2	square miles
mg	milligram
mg/kg	milligrams per kilogram
mg/kg-day	milligrams per kilogram per day
mg/l	milligrams per liter
pCi/l	picoCuries per liter
pCi/g	picoCuries per gram
ppb	parts per billion
yd^3	cubic yards

1.0 SITE LOCATION AND DESCRIPTION

1.1 LOCATION

The Fernald Environmental Management Project (FEMP) site is a 425 hectare (ha) (1050 acres), government-owned facility located in southwestern Ohio, approximately 29 kilometers (km) (18 miles) northwest of downtown Cincinnati. The facility is located just north of Fernald, Ohio, a small farming community, and lies on the boundary between Hamilton and Butler counties (Figure 1-1).

In accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the FEMP was placed on the National Priorities List (NPL) in November 1989 as a result of environmental impacts caused by facility operations.

From 1952 until 1989, the FEMP site provided high-purity uranium metal products to support United States defense programs. Uranium production was halted in 1989 due to declining demand and a recognized need to commit available resources to environmental remediation. Former uranium operations at the FEMP site were limited to a fenced 55 ha (136 acres) tract of land known as the former Production Area located near the center of the site. The former Production Area consists of plant buildings, scrap metals, equipment, and drummed inventories all of which are components of Operable Unit 3. Large quantities of liquid and solid wastes were generated by the various production operations at the FEMP site. Prior to 1984, solid and slurried wastes received from off site sources and generated from FEMP processes were stored or disposed in the Waste Storage Area. This area, located west of the production facilities, includes: six low-level radioactive waste storage pits, two earthen-bermed concrete silos containing K-65 residues, one concrete silo containing metal oxides, one unused concrete silo, two lime sludge ponds, a burn pit, a clearwell, and a solid waste landfill. The Waste Storage Area, shown graphically in Figure 1-2, is addressed under FEMP Operable Units 1, 2, and 4. The former Production Area and Waste Storage Area are fenced and closed to the general public. Operable Unit 5 consists of all environmental media not associated with the preceding operable units. The remaining FEMP site areas consist of forest and pasture lands, a portion on which a nearby dairy farmer is authorized to graze livestock.

A sixth operable unit, known as the Comprehensive Site-Wide Operable Unit, was added as a provision of the Amended Consent Agreement (signed in 1991). This is not a specific site area; rather, it was created to enable DOE, the EPA, and the public to make a final assessment from a site-wide perspective that ongoing planned remedial actions identified in the Records of Decision for

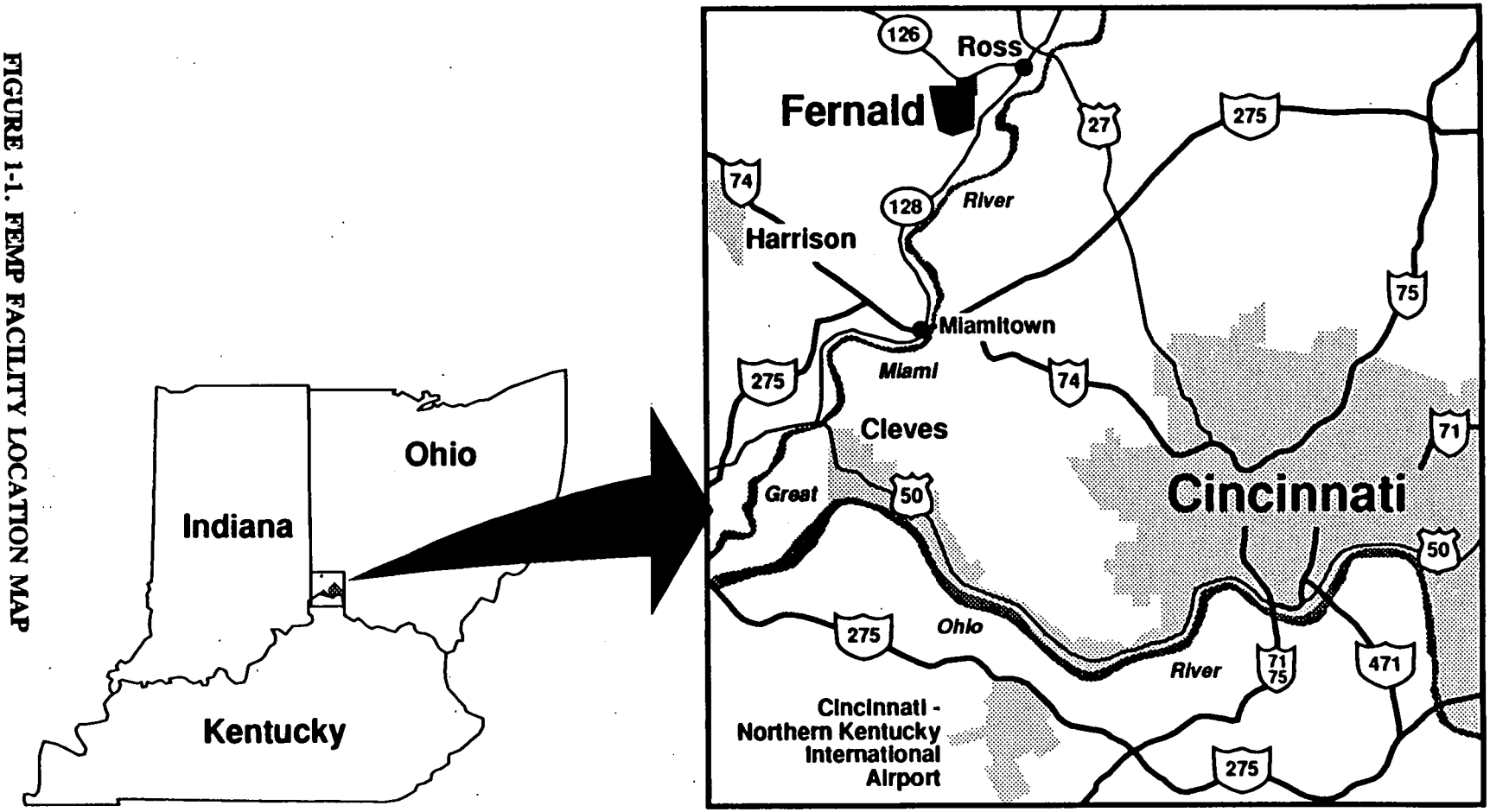

FIGURE 1-1. FEMP FACILITY LOCATION MAP

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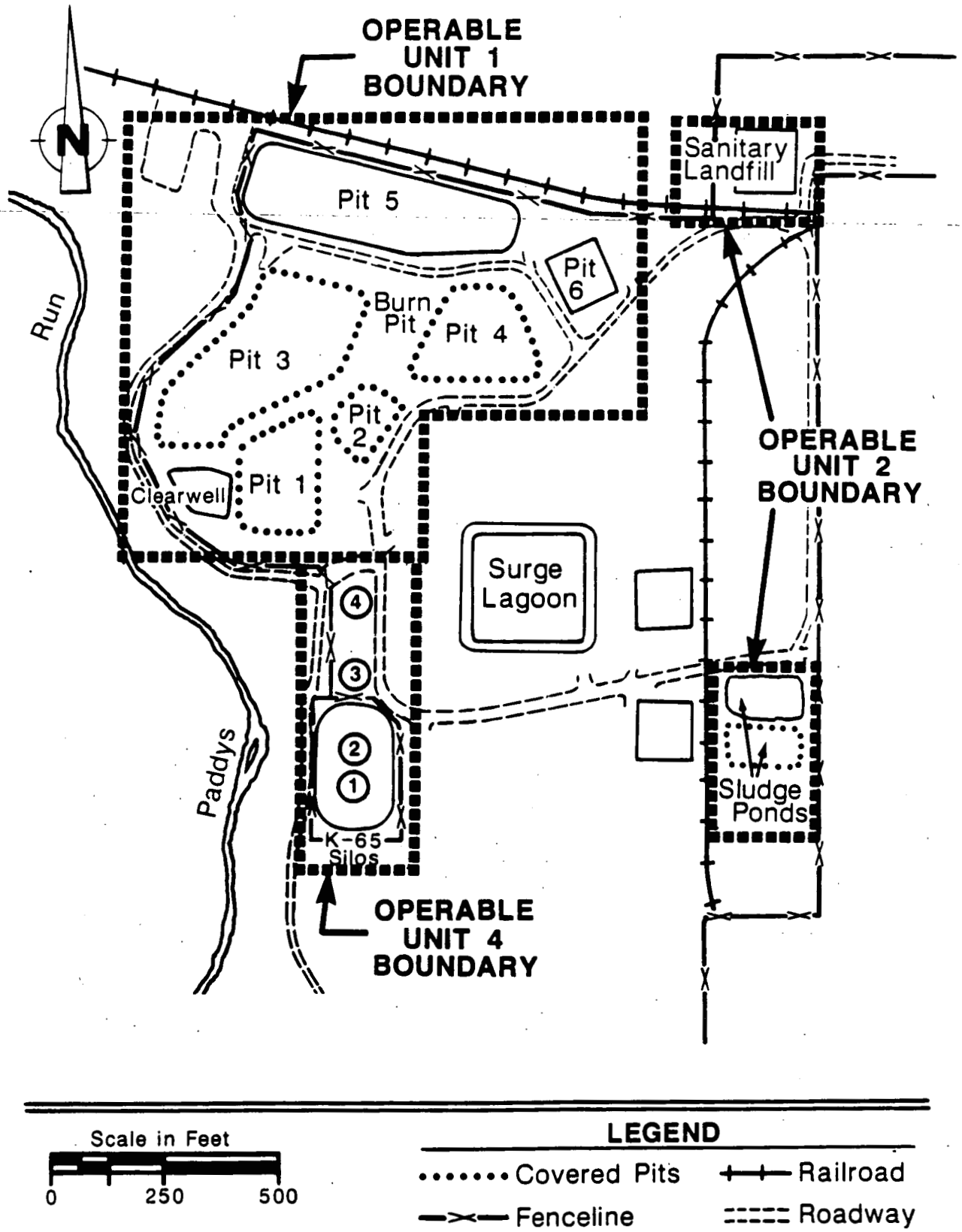

FIGURE 1-2. WASTE STORAGE AREA

the five operable units will provide a comprehensive remedy which is protective of human health and the environment.

This remedial action addresses Operable Unit 4 at the FEMP. Operable Unit 4 (Figure 1-3) is a 2.3 ha (5.8 acres) area located on the western side of the facility and is comprised of the following facilities and associated environmental media:

- Silos 1 and 2 and their contents (also termed K-65 silos);
- Silo 3 and its contents (termed cold metal oxide silo);
- Silo 4 (empty);
- The decant sump (an underground tank and its contents);
- A radon treatment system;
- A portion of a concrete pipe trench and other concrete structures;
- An earthen berm surrounding Silos 1 and 2;
- Soils beneath and immediately surrounding Silos 1, 2, 3, and 4;
- Perched groundwater in the vicinity of the silos that are encountered during the implementation of remedial actions;

Silos 1 and 2, the K-65 silos, contain 6,120 cubic meters (m^3) [8,005 cubic yards (yd^3)] of K-65 residues generated from the processing of high-grade uranium ore. The silos are large, cylindrical, above-grade, concrete vessels with post-tensioned steel reinforcing. Each of the domed silos is 24.4 meter (m) [80 feet (ft)] in diameter and 11 m (36 ft) high to the center of the dome.

The K-65 residues contain large activity concentrations of radionuclides, including radium and thorium. These radionuclides contribute to an elevated direct penetrating radiation field in the vicinity of the silos and to the chronic emission of significant quantities of the radioactive gas, radon, to the atmosphere from the silos. The K-65 residues are classified as by-product materials, consistent with Section 11(e)2 of the Atomic Energy Act (AEA), generated consequential to the processing of natural uranium ores.

Silo 3 contains 3,890 m^3 (5,088 yd^3) of residues, known as cold metal oxides, which were generated at the FEMP site during uranium extraction operations in the 1950s involving the previously

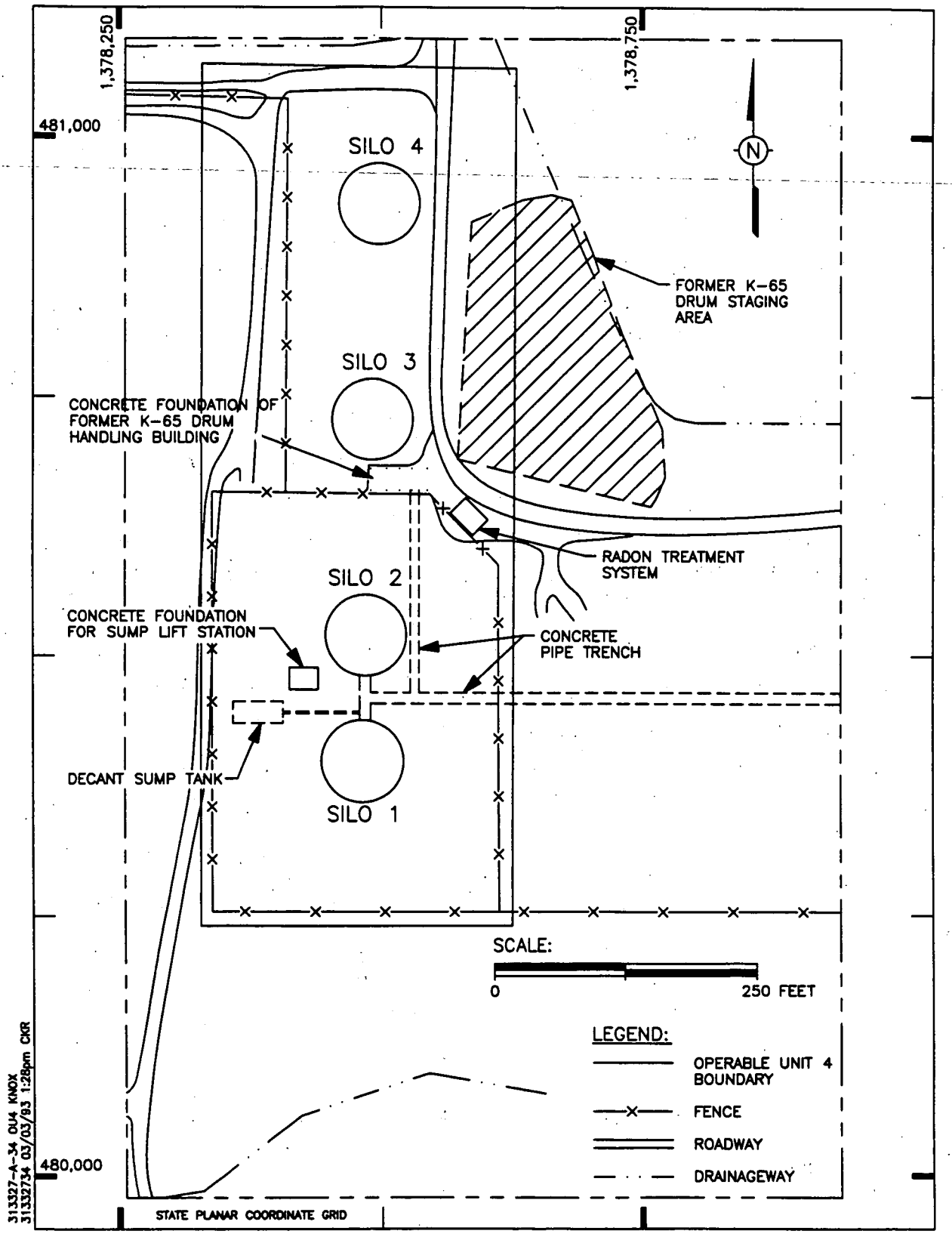

FIGURE 1-3. OPERABLE UNIT 4

mentioned uranium ores and ore concentrates received from a variety of uranium mills in the United States and abroad. Silos 3 and 4 are identical in design and construction to Silos 1 and 2. The residues within Silo 3 are similarly classified as by-product materials pursuant to Section 11(e)2 of the AEA. Silo 4 was never used for waste storage; however, rainwater has infiltrated the silo and has been removed in 1989 and again in 1991.

1.2 DEMOGRAPHICS AND LAND USE

The FEMP is located in the Cincinnati Consolidated Metropolitan Statistical Area (CMSA) which encompasses a regional area comprised of eight counties in Ohio, Kentucky, and Indiana. Population within the eight-county metropolitan area exceeded 1.7 million in 1990, and within a 5-mile radius of the FEMP site, there were an estimated 22,927 residents in 1990.

The on-property work population includes employees of DOE, it's site restoration management contractor, the Fernald Environmental Restoration Management Corporation (FERMCO), and other subcontractors. Physical structures are located on approximately 82 ha (203 acres) in the center of the FEMP site, in the administration area and in the former Production Area. The FEMP maintains strict access controls, including a security force and fences, which control public access to the site.

The land adjacent to the FEMP is primarily devoted to open land use such as agriculture and recreation. Scattered residences and several villages, including Fernald, New Baltimore, Ross, New Haven, and Shandon are located near the FEMP site. The nearest residence is within three quarters of a mile from the center of the facility. The nearest residences to the western FEMP property boundary (the boundary along the eastern side of Paddys Run Road) are located along the western side of Paddys Run Road. A dairy farm is located on Willey Road just outside the southeast corner of the FEMP property boundary. Several residences are located off Paddys Run Road approximately 2.4 km (1.5 mi) south of the FEMP property. These residences are in the vicinity of the South Plume, a portion of the Great Miami Aquifer that contains a plume of uranium contamination originating from the FEMP extending south of the property boundary for approximately three-quarters of a mile.

More than 160 ha (395 acres) of the open land on the FEMP property are leased to a nearby dairy farmer who grazes livestock on the property. Pine plantations are located to the northeast and southwest of the former Production Area. A considerable amount of the soils within the boundaries of the FEMP site are designated by the United States Department of Agriculture (USDA) as prime

agricultural soil (USDA 1980, 1982). However, none of the land on the FEMP site is designated prime farmland under the Farm and Policy Protection Act regulations (7 CFR §658) of 1981. Because the area had been intensively used for agricultural purposes prior to the establishment of the FEMP facility, there is no land on or in the vicinity of the FEMP site where a pre-developed natural environment remains intact. The land closest to this description would be recreated prairie lands on the Miami Whitewater Forest Park, several miles south of the FEMP site.

The area surrounding the FEMP site has a large and diverse archaeological and historical resource base. According to records kept by the Miami Purchase Association for Historic Preservation, an unusually high percentage of the existing 19th century buildings in the area are historically important. Within the vicinity of the FEMP site [a 3.2 km (2 mi) radius from the boundary], there are properties listed on the National Register of Historic Places (NRHP) and a number of additional structures that have been judged eligible for inclusion in the listing. Six major archaeological sites lie within five miles of the FEMP site and five of these are included in the NRHP. No archaeological sites or properties on the NRHP are located in or adjacent to Operable Unit 4.

1.3 TOPOGRAPHY AND SURFACE WATER HYDROLOGY

The maximum elevation along the northern boundary of the FEMP property is a little more than 213 m (700 ft) above mean sea level (MSL). The former Production Area and Waste Storage Area rest on a relatively level plain at about 174 m (580 ft) above MSL. The plain slopes from 183 m (600 ft) above MSL along the eastern boundary of the FEMP to 174 m (570 ft) above MSL at the K-65 silos, and then drops off toward Paddys Run stream at an elevation of 168 m (550 ft) above MSL.

All drainage, including surface water on the FEMP site is generally from east to west towards Paddys Run, with the exception of the extreme northeast corner which drains east toward the Great Miami River. Major surface water bodies on and adjacent to the FEMP site include the Storm Sewer Outfall Ditch, Paddys Run, and the Great Miami River (see Figure 1-4). The Storm Sewer Outfall Ditch originates within the FEMP site and flows toward the southwest where it enters Paddys Run, which flows southward along the western boundary of the facility. Paddys Run is a tributary of the Great Miami River. The Great Miami River flows generally toward the southwest; however, locally it flows to the east and south of the FEMP site.

Paddys Run originates north of the FEMP site, flows southward along the western boundary of the facility, and enters the Great Miami River approximately 2.4 km (1.4 mi) south of the southwest

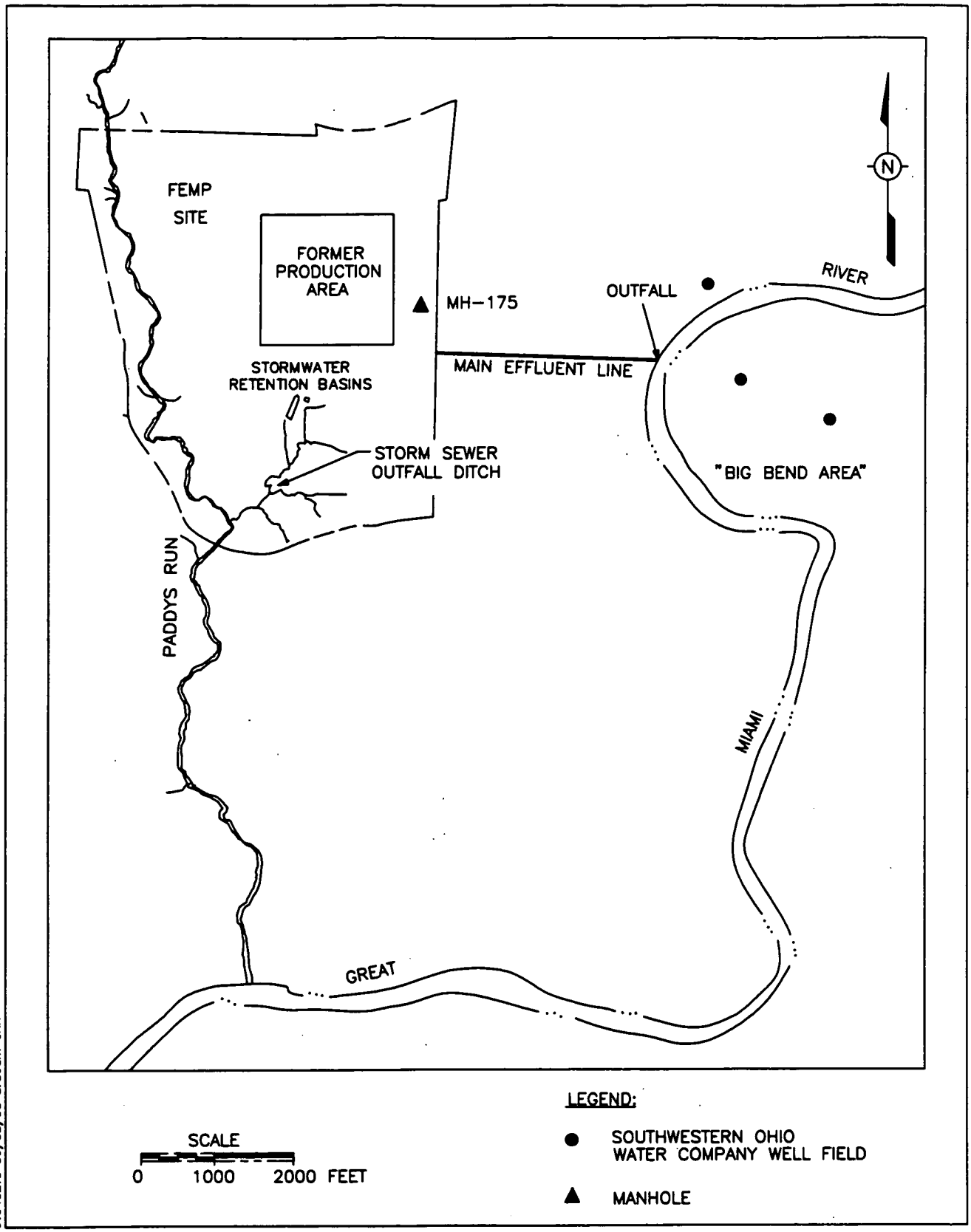

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FIGURE 1-4. SURFACE WATER HYDROLOGY

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corner of the FEMP property. The stream is approximately 14 km (8.8 mi) long and drains an area of approximately 40.9 square kilometers (km^2) [15.8 square miles (mi^2)]. Due to the highly permeable channel bottom, the stream loses water to the underlying Great Miami Aquifer in some locations. In addition, the stream is ephemeral and is generally dry during the summer months.

The Great Miami River is the main surface water feature in the vicinity of the FEMP site, which receives effluent water from a National Pollutant Discharge Elimination System (NPDES) permitted discharge from the FEMP site. The river flows generally to the southwest and has a drainage area of approximately 8702 km^2 (3360 mi^2) at the Hamilton gauge, which is located about 16.1 km (10 mi) upstream from the FEMP site NPDES discharge outfall.

The river exhibits meandering patterns that result in sharp directional changes over distances of less than 900 m (2,953 ft). Directly east of the FEMP site and within the site-wide Remedial Investigation/Feasibility Study (RI/FS) Area, 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 km (2 mi) downstream from the FEMP site discharge outfall.

Surface water flow within Operable Unit 4 is directed through a series of trench drains, concrete curbs, and gutters to an inground concrete sump located in waste storage area. Water from these storm water control facilities are directed through existing site treatment systems prior to discharge through the FEMP effluent line to the Great Miami River.

1.4 GEOLOGY AND HYDROGEOLOGY

The FEMP overlies a 3.2 to 4.8 km (2 to 3 mi) 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 advanced across the area. The 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 and lacustrine strata left by the ice sheets. The Great Miami River has eroded through

the glacial overburden and is now in direct contact with the outwash deposits that comprise the Great Miami Aquifer. Paddys Run is also in contact with these deposits in its lower reaches.

The Great Miami Aquifer is the principal aquifer within the FEMP Study Area and has been designated a sole-source aquifer under the provisions of the Safe Drinking Water Act (SDWA). The buried valley in which it occurs varies in width from about 0.8 km (0.5 mi) to more than 3.2 km (2 mi), having a U-shaped cross section with a broad, relatively flat bottom and steep valley walls. This valley is filled with extensive deposits of sand and gravel that range in thickness from 36 to 60 m (120 to 200 ft) in the valley to only several feet along the valley walls, along with scattered silt and clay deposits.

Contained within the sand and gravel that underlies much of the FEMP property is a relatively continuous, low-permeability clay interbed ranging from about 1.5 to 4.5 m (5 to 15 ft) in thickness. The clay interbed which exists below the Operable Unit 4, occurs at an approximate elevation of 140 m (460 ft) above MSL. This clay 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.

Overlying the Great Miami Aquifer throughout most of the FEMP property, including Operable Unit 4, are a series of glacial overburden deposits. The glacial overburden is composed primarily of till, a dense, silty clay that contains discontinuous and isolated lenses of poorly sorted fine- to medium-grained sand and gravel, silty sand, and silt. The glacial overburden exposed at the surface has relatively low permeability, so most of the precipitation that falls on it is lost to evaporation and surface water runoff. Within Operable Unit 4, sand and gravel outwash deposits of the buried valley are overlain by 1.5 to 3 m (5 to 10 ft) of till that is in turn overlain by 4.5 to 6 m (15 to 20 ft) of lacustrine sediments. The till is an unsorted mixture of clay, silt, sand, and pebble to cobble size material with 70 to 80 percent of the material falling in the clay and silt size range.

Erratically distributed 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 and silt components of the overburden. These low-permeability units behave as an aquitard that can store groundwater, then transmit it slowly downward from one more porous saturated zone to another.

The conceptual model for groundwater flow in the glacial overburden in Operable Unit 4 indicates that the lacustrine strata have good, but slow, hydraulic communication and that the till that underlies the lacustrine strata acts as an aquitard. Groundwater within the approximately 6 m (20 ft) of lacustrine strata is predicted to flow at a lateral rate that is significantly greater than its downward rate. Therefore, groundwater is likely discharging westward to the bank of Paddys Run and southward in the east-west drainageway immediately south of Silo 1.

1.5 ECOLOGY

The FEMP site and surrounding areas lie in a transition zone between two distinct sections of the Eastern Deciduous Forest Province; the Oak-Hickory and the Beech-Maple. The dominant species are oaks, with an abundance of hickories. The fauna vary little between the two forest sections and include white-tailed deer, gray fox, gray squirrel, white-footed mouse, and short-tailed shrew; the cardinal, woodthrush, summer tanager, red-eyed vireo, and the hooded warbler; the box turtle, common garter snake, and timber rattlesnake.

The Indiana bat is listed as both a federally and state endangered species and occurs in Butler and Hamilton Counties. Surveys were conducted at the FEMP to determine the distribution and presence of the Indiana bat and to identify potential habitat on the FEMP and in the immediate vicinity. The Indiana bat has not been identified at the FEMP. Potential habitat for the Indiana bat occurs in portions of the riparian woodland associated with Paddys Run.

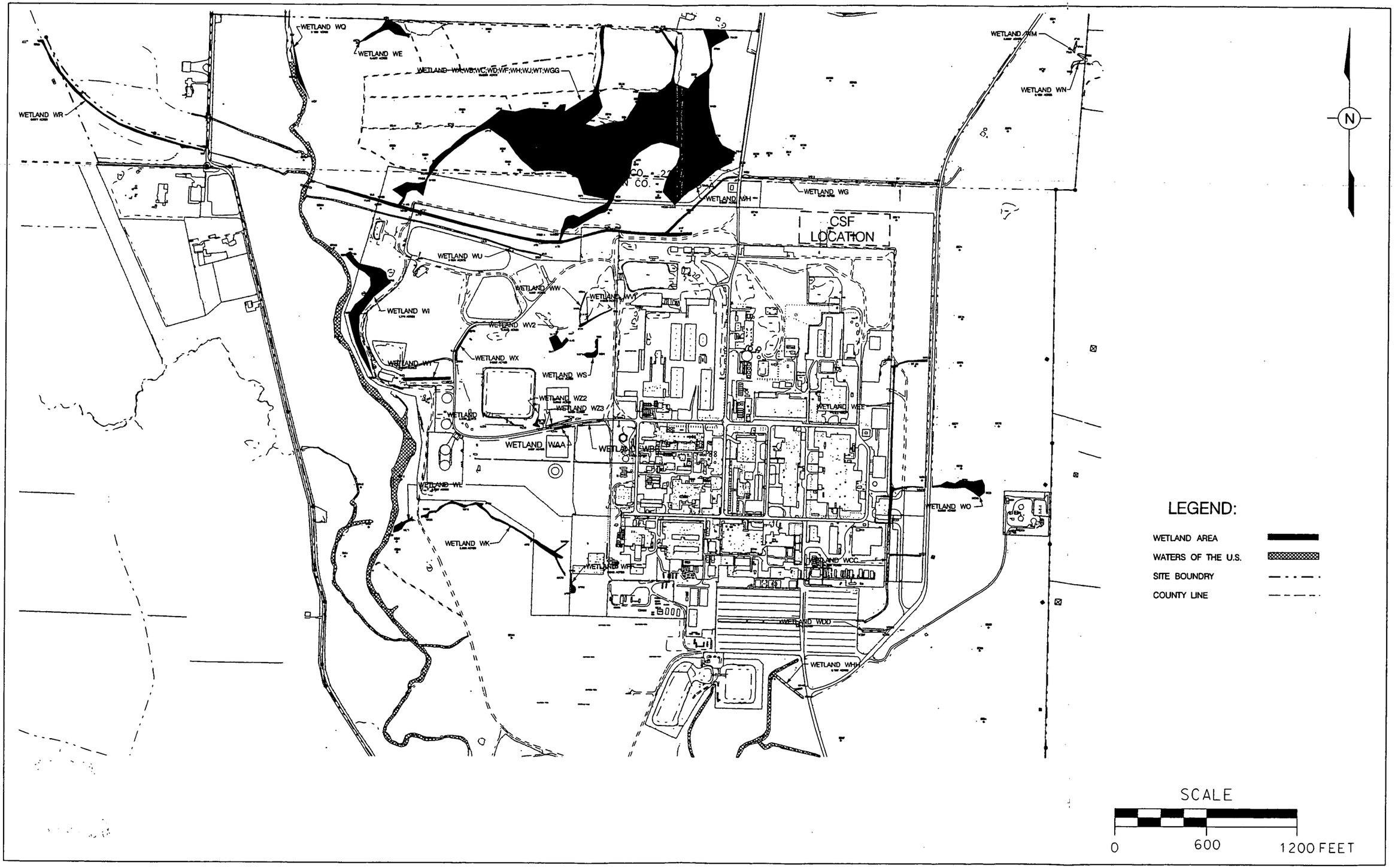
The Sloan's crayfish, a state listed threatened species, has been identified in Paddys Run in northern sections on property and southern sections off property in preliminary surveys in September 1993. Potential harm may occur as a result of siltation and runoff into Paddys Run.

The cave salamander, a state listed endangered species, has not been identified at the FEMP site. Moderate habitat has been identified in a well in the northeastern section of the FEMP and a ravine in the north woodlot.

A site-wide wetland delineation was conducted in February 1993, in accordance with the 1987 United States Army Corps of Engineers (COE) Wetlands Delineation Manual. A jurisdictional determination was approved in August 1993 by the COE that verified wetland boundaries and waters of the United States. Results from the site-wide delineation, subject to COE approval, indicate a total of 14.4 ha (35.9 acres) of wetlands that include 10.6 ha (26.6 acres) of palustrine forested wetlands, 2.8 ha (7

acres) of drainage ditches/swales, and 0.95 ha (2.37 acres) of isolated emergent and emergent-scrub/shrub wetlands (see Figure 1-5).

Floodplains within the FEMP property are confined to the north-south corridor containing Paddys Run. Outside the boundaries of the FEMP site, the 100-year floodplain of the Great Miami River extends west nearly to the eastern boundary of the facility (see Figure 1-6). The 100-year floodplain of the river also extends northward along Paddys Run from the confluence of the two streams to a point about 180 m (600 ft) from the southern boundary of the FEMP site.



WETLANDS/RES NO.2227-11x17-FIG1-10.DGN-CRU#4
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FIGURE 1-5 APPROXIMATE BOUNDARIES OF JURISDICTIONAL WETLANDS AT FEMP.

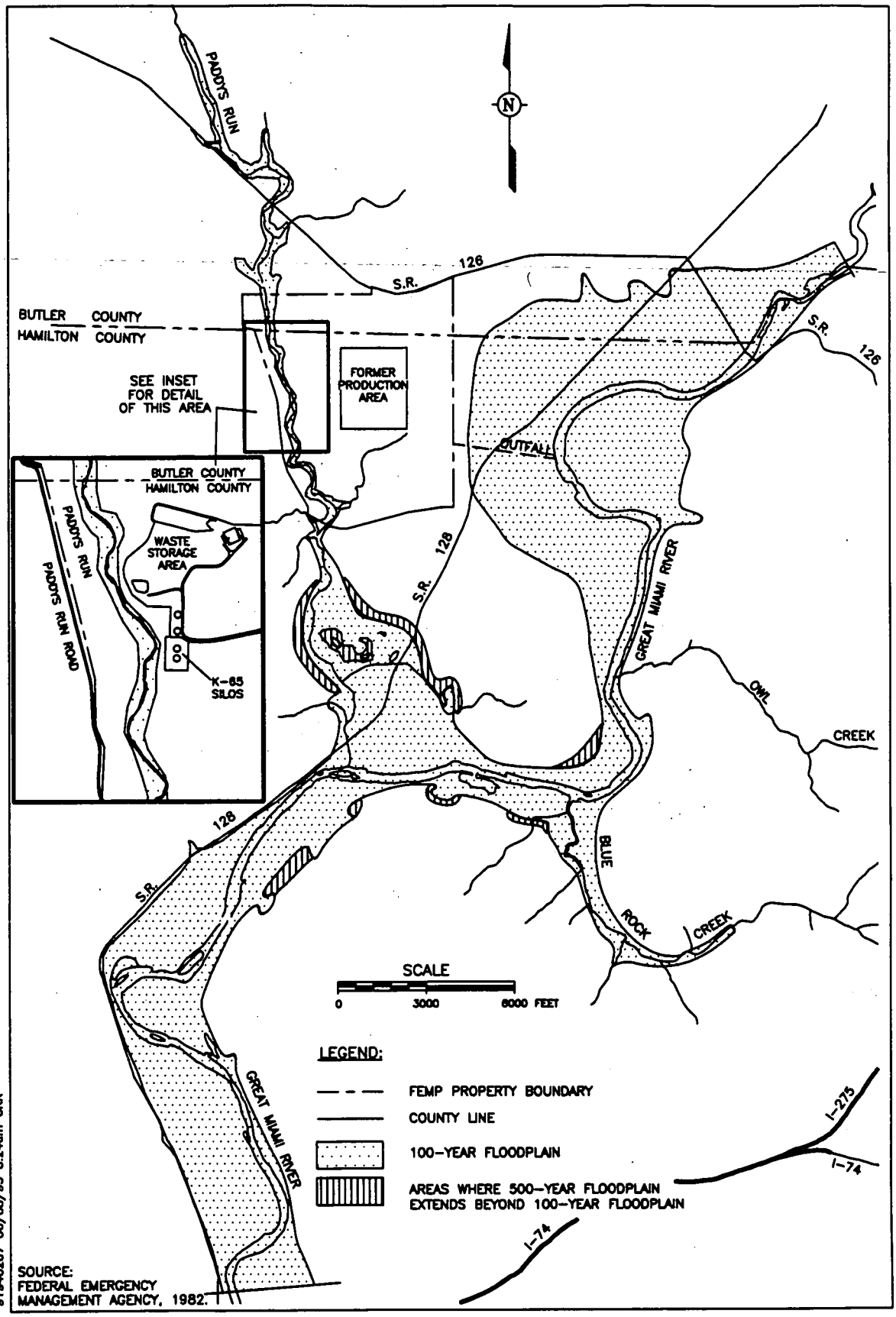

FIGURE 1-6. GREAT MIAMI RIVER AND PADDYS RUN 100-YEAR AND 500-YEAR FLOODPLAIN

2.0 SITE AND OPERABLE UNIT 4 HISTORY AND ENFORCEMENT ACTIVITIES

2.1 SITE HISTORY

In January 1951, the New York Operations Office of the Atomic Energy Commission (AEC) proceeded on an expedited basis with the selection of a suitable site for the construction of a new feed material production center to supply high purity uranium products. Sixty-three sites were considered with a site near Fernald, Ohio being selected as best meeting established criteria. Construction operations were initiated in May 1951, on the 1050 acre site. The facility was designated the Feed Material Production Center (FMPC) prior to initiation of on-property pilot operations in October 1951. Production operations were initiated in 1952 and continued until July 1989, at which time operations were placed on standby to focus on environmental compliance and waste management initiatives. Following appropriate congressional authorizations, the facility was formally closed in June 1991. To reflect a new site mission focused on environmental restoration, the name of the facility was changed to the Fernald Environmental Management Project (FEMP) in August 1991.

On March 9, 1985, the EPA issued a Notice of Noncompliance to the DOE identifying EPA's concerns over potential environmental impacts associated with the FEMP's past and ongoing operations. On July 18, 1986, a Federal Facility Compliance Agreement (FFCA) detailing actions to be taken by DOE to assess environmental impacts associated with the FEMP was signed by DOE and EPA. The FFCA was entered into pursuant to Executive Order 12088 (43 FR 47707). The purpose of the FFCA was to ensure compliance with existing environmental statutes and implementing regulations. Also, environmental impacts associated with past and present activities at the FEMP site would be thoroughly and adequately investigated so that appropriate response actions could be implemented. As required by the FFCA, a RI/FS was initiated in July 1986, pursuant to 42 U.S.C. 9601 et seq., CERCLA.

In November 1989, the FEMP was placed on the NPL for investigation and remediation under CERCLA. This placement, in addition to progressive findings in the RI/FS program, necessitated the amendment of the FFCA. The 1986 FFCA was superseded by a Consent Agreement under Sections 120 and 106(a) of CERCLA (Consent Agreement) providing for the implementation of operable units for the FEMP RI/FS and revising the milestone commitments for the RI/FS program without modifying the underlying objectives of the FFCA. The Consent Agreement also provided for the implementation of removal actions to address site conditions which pose an immediate threat to

human health and the environment, including removal actions for Operable Unit 4, such as the K-65 Silos Removal Action. The Consent Agreement was signed on April 9, 1990, and became effective on June 29, 1990, following a period of public comment.

In October 1990, the first version of the RI Report for Operable Unit 4 was submitted to the EPA for review and comment. The EPA determined that the FMPC had not adequately characterized Operable Unit 4, and subsequently, issued a Notice of Violation (NOV) against the site. The EPA issued two other NOVs at approximately the same time regarding other components of the ongoing RI/FS. Following negotiations between the EPA and DOE, a resolution agreement was jointly signed by the EPA and DOE. Pursuant to the terms of this resolution agreement, DOE paid a financial penalty to EPA, agreed to perform a supplemental project beneficial to the environment surrounding the site, and also agreed to enter into negotiations with EPA to define new schedules for re-submittal of the RI/FS documents.

The Consent Agreement was amended in 1991 to revise the schedules for completing the RI/FS for the five identified operable units. This Amended Consent Agreement was signed on September 20, 1991, and became effective on December 19, 1991, following a period of public comment.

2.2 OPERABLE UNIT 4 HISTORY

Originally constructed in 1951 and 1952, three of the four reinforced concrete storage silos within Operable Unit 4 received by-product materials until 1960. Silos 1 and 2 received K-65 residues generated from the processing of high assay uranium ores, termed pitchblende ores, at the FEMP and the Mallinckrodt Chemical Works (MCW) in St. Louis, Missouri. The pitchblende ores processed at MCW and the vast majority of pitchblende ores processed at the FEMP came primarily from one mine, the Shinkolobwe Mine in the Belgian Congo (now Zaire).

The Shinkolobwe Mine was owned and operated by the African Metals Corporation. These ores contained relatively high concentrations of uranium oxides (U_3O_8) in the range of 40 to 50 percent as well as high concentrations of radium. Based on the high value of radium at the time, the agreement reached between the AEC and the African Metals Corporation stipulated that the African Metals Corporation would retain ownership of the radium within any processing residues; after the United States had processed the pitchblende ore to extract uranium, the residue would be returned to the African Metals Corporation.

The K-65 silos were constructed at the FEMP site to provide interim storage of the residues, pending the return of the materials to the country of origin. For more than 30 years, these materials remained in storage at the FEMP site, under the terms of the original agreement, awaiting transfer. In 1984, ownership of the K-65 residues was transferred to DOE.

As the drums were received by railroad car at the FEMP, from MCW, the drums were temporarily staged in an area to the east of Silos 3 and 4 (Figure 1-3). The drummed material was slurried in the Drum Handling Building, formerly located between Silos 2 and 3, and then pumped to Silos 1 and 2 for storage. Approximately 31,000 drums of residues generated through MCW processing operations were received at the FEMP. Approximately 24,000 of these drums were transferred to Silo 1, completely filling the structure in November 1953. The remaining 7,000 drums were transferred to Silo 2 for storage.

Additionally, Silo 2 received residues generated at the FEMP from the processing of pitchblende ores from the Shinkolobwe Mine and a small quantity of Australian ores from two mines, the Rum Jungle Mine and the Radium Hill Mine. The last residues were placed in Silo 2 in January 1959. Following the end of K-65 processing operations at the FEMP, approximately 150 drums of radium contaminated material, consisting of soils from drum staging areas, clean-up materials, and excess K-65 samples were placed into Silo 2 in June 1960.

Silos 3 and 4 were constructed in 1952 for storing metal oxides generated by the FEMP refinery. Unlike Silos 1 and 2, which received residues from the processing of ores from mainly one mine, Silo 3 received metal oxides generated from FEMP refinery operations from May 1954, until late 1957. During this period, the FEMP refinery processed the previously mentioned pitchblende ores and uranium ore concentrates received from a number of foreign and domestic uranium mills. Select refinery waste streams were first filtered to remove radium and subsequently directed to an evaporator and calciner. These finely powdered, dried refinery residues (termed cold metal oxides) were transferred to a surge hopper from where the materials were pneumatically conveyed through a pipeline to Silo 3.

Following a programmatic decision in early 1957 to utilize raffinate surface impoundments, the calcining systems were eventually abandoned. As a result of this decision, Silo 4 was never employed for the storage of cold metal oxides or other site materials and remains empty. Inspections

completed on Silo 4 during the RI-related site investigations confirmed that no waste materials are present within the silo.

In 1963, it became visually obvious that Silos 1 and 2 were deteriorating. In 1964, site workers repaired the concrete coating around each silo and constructed an earthen berm around them to counterbalance the outward load from the silos contents. The berm also protected the silos walls from weathering and served as a radiation shield. This berm was expanded in 1983 to reduce soil erosion.

Other improvements to Silos 1 and 2 included: sealing the vents in the domes in 1979; installing plywood covers on the domes in 1986; and adding a polyurethane coating in 1987 to reduce weathering and to help lower radon emissions. This coincided with the installation of the radon treatment system (RTS), which was designed to draw air from the silos, remove moisture and radon through a charcoal-adsorption process, and recirculate clean air back into the silos. The RTS, which was upgraded in 1991, helped to lower radon emissions to allow workers to apply a layer of bentonite clay (November 1991) over the K-65 residues within the silos (K-65 Silo Removal Action No. 4).

The bentonite clay layer has reduced the amount of radon escaping from the silos into the environment and would help prevent the release of contaminants into the air if a natural disaster (e.g., a tornado) should occur or if the silo dome should collapse. An expedited removal action was conducted in December 1991 to remove the Silo 3 dust collector after an inspection had revealed significant deterioration of the dust collector (Removal Action No. 21). Also, in April 1991, a time-critical removal action was performed to remove approximately 30300 liters (8000 gallons of) liquid from the decant sump (Removal Action No. 5).

3.0 COMMUNITY PARTICIPATION

Various forums has been 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 fact sheets about the Fernald site. Several readings rooms, which later were consolidated into one facility near the Fernald site, were opened. This reading room contains information about all aspects of the RI/FS at Fernald. In 1990, DOE established an "Administrative Record" for the site; a copy of the Administrative Record also is maintained at the offices of U.S. EPA's Region 5 offices in Chicago.

In November 1993, DOE implemented a public participation program at Fernald, in an attempt to involve community members and other interested parties in the Fernald decision-making process. The public involvement program at Fernald consists of three elements:

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

These efforts, in concert with other community relations activities, such as publication of notices of availability, which are required by law, reflect DOE's new initiative to offer opportunities for interested parties to take part in the decision-making process at Fernald.

3.1 OPERABLE UNIT 4 PUBLIC INVOLVEMENT ACTIVITIES

To encourage stakeholders to review drafts of the Operable Unit 4 RI/FS documents, Notices of Availability for public inspection were published in April 1993 for the Operable Unit 4 RI Report and in September 1993 for the FS/PP-DEIS in three local newspapers: *The Cincinnati Enquirer*, the *Journal-News* and *The Harrison Press*. No public comments were received on the RI Report for Operable Unit 4.

On September 9, 1993, the FS/PP-DEIS were made available at the Public Environmental Information Center, and stakeholders were encouraged to provide informal comments on the preliminary documents. Encouraging public inspection and informal comment on these preliminary documents, prior to EPA approval, provided a genuine opportunity for stakeholders to identify issues, voice their concerns and learn about proposed cleanup plans for Operable Unit 4. The informal opportunity for

the public to provide input enabled DOE to address some stakeholder questions and concerns in advance of the formal public comment period.

On October 14, 1993, approximately 29 stakeholders attended a public roundtable on "Proposed Plans and Technology for Operable Unit 4 Remediation." At the roundtable, attendees were invited to offer opinions on the draft final Proposed Plan and the preferred alternative for Operable Unit 4 remediation. These stakeholder comments were documented and evaluated during preparation of the final document.

In addition, a two-way information exchange on the Operable Unit 4 Risk Assessment occurred at the October 19, 1993, Science, Technology, the Environment and the Public (STEP) session on "Risk." Again, Fernald personnel addressed the stakeholders' questions and concerns presented at the meeting. Information about the Operable Unit 4 Remedial Investigation Report was also provided at DOE's October 21, 1993, RI/FS public meeting and at local township trustee meetings.

In response to stakeholder requests at the January 5, 1994, formal public hearing on the Operable Unit 3 (Production Area) Interim Record of Decision, a public roundtable to discuss integration of CERCLA and NEPA was held January 24, 1994. The roundtable included discussions on differences between environmental assessments and environmental impact statements; approximately 45 stakeholders attended.

On February 21, 1994, invitations to attend the March 21, 1994, formal public hearing on the FS/PP-DEIS were mailed to 2,000-plus Fernald stakeholders. The *Proposed Plan for Remedial Actions at Operable Unit 4* fact sheet was enclosed with each invitation.

On February 24, 1994, advance copies of the *Proposed Plan for Remedial Actions at Operable Unit 4* were mailed to several key stakeholders. Also on February 24, copies of the final FS/PP-DEIS and Proposed Plan fact sheets were mailed to the Nevada Operations Office and to Nevada environmental protection organizations. The DOE Operable Unit 4 Branch Chief personally distributed several advance copies of the Proposed Plan to attendees at the February 24, 1994, Fernald Residents for Environmental, Safety, and Health (FRESH) meeting. In addition, she provided an update on Operable Unit 4 activities, plans and progress, and was available for an informal question-and-answer session.

To encourage stakeholders to review and offer input on the final FS/PP-DEIS, a Notice of Availability for formal public comment was published in March 1994 in the *Federal Register* and three local newspapers: *The Cincinnati Enquirer*, the *Journal-News* and *The Harrison Press*. On March 1, 1994, the Proposed Plan, FS/PP-DEIS became available at the Public Environmental Information Center.

On March 2, 1994, Ohio EPA representatives discussed the FS/PP-DEIS with members of the Fernald Citizens Task Force and FRESH.

On March 4, 1994, a Fernald site news release titled "Key Fernald Cleanup Plan Receives Conditional U.S. EPA Approval" was sent to local electronic and print media, as well as local elected officials, FRESH and the Fernald Citizens Task Force. Articles were published in local newspapers.

On March 7, 1994, the formal public comment period on the final FS/PP-DEIS officially began.

On March 8, 1994, Fernald representatives met formally with officials of the DOE Nevada Operation Office and Nevada protection agencies.

On March 15, 1994, postcard reminders about the March 21, 1994, formal public hearing were mailed to Fernald stakeholders. In addition, courtesy phone calls were made to key stakeholders, inviting them to the formal public hearing.

Display advertisements announcing the March 21, 1994, formal public hearing were published in three local newspapers: *The Cincinnati Enquirer*, March 18 and March 20; *The Cincinnati Post*, March 18; and the *Journal-News*, March 18.

On March 21, 1994, approximately 80 people attended the formal public hearing on the Operable Unit 4 FS/PP-DEIS. Formal oral public comments were documented by a court reporter and are available in a transcript at the Public Environmental Information Center. In addition, several stakeholders submitted formal written comments. All formal written and oral stakeholder comments and questions asked informally during the March 21 public hearing, as well as DOE's responses, are documented in the Operable Unit 4 Responsiveness Summary.

The formal public comment period for the Operable Unit 4 FS/PP-DEIS was originally scheduled to conclude April 20, 1994. However, the public comment period was extended *30 days*, until May 20, 1994, in response to a request for a 60-day extension by a Nevada State Clearinghouse representative.

The extension request was made on behalf of a group of concerned Nevadans, affected indian tribes and local government officials, who, along with officials from the State of Nevada and DOE, jointly participated in the establishment of a site-specific advisory board for the U.S. Department of Energy - - Nevada Operations Office (DOE-NVO) Environmental Restoration and Waste Management Program at the Nevada Test Site (NTS). "The Citizens Advisory Board for NTS Programs (CAB)" will play a key role in advising DOE-NVO about stakeholder concerns involving major program decisions at NTS, such as those proposed for Fernald's Operable Unit 4 waste. CAB's first meeting was held March 8, 1994.

The National Contingency Plan, section 300.430(f) (3)(i) (C) states, " . . . Upon timely request, the lead agency will extend the public comment period by a minimum of 30 additional days. . . ." In accordance with the Amended Consent Agreement (1991), DOE and U.S. EPA concurred with a *30-day* extension of the formal public comment period to minimize impact to the Operable Unit 4 schedule, yet still provide what DOE and EPA considered adequate time for stakeholder review. A Notice of Availability was published May 4 in *The Cincinnati Enquirer*, the *Journal-News* and *The Harrison Press*.

On May 11, 1994, during a presentation of the Operable Unit 4 FS/PP-DEIS by Fernald representatives, CAB requested a second 30-day extension of the Operable Unit 4 formal public comment period. DOE and EPA concurred with the second extension of the formal public comment period, which finally concluded June 19, 1994. A Notice of Availability regarding the second 30-day extension was published May 25, 1994, in *The Cincinnati Enquirer*, the *Journal-News* and *The Harrison Press*.

During the Operable Unit 4 formal public comment period, stakeholders expressed concern regarding public participation opportunities and activities after the conclusion of the RI/FS Study process. In 1994, Records of Decision will be completed for Operable Unit 4 and Operable Unit 1 (Waste Pits), and an Interim Record of Decision will be completed for Operable Unit 3 (Production Area).

In 1994, Fernald's Community Relations Plan, which guides public involvement activities, was revised with input from stakeholders who participated in formal in-person and telephone "community assessment" interviews. Fernald's Community Relations Plan is located in the *RI/FS Work Plan, Volume III*, which is available at the Public Environmental Information Center, 10845 Hamilton-Cleves Highway, Harrison, Ohio (phone: 513-738-0164).

The community assessment interviews were conducted to ensure stakeholder participation in determining public involvement activities and programs during Remedial Design and Remedial Action at Fernald. Fernald's first community assessment was done in 1986, when Fernald's original Community Relations Plan was developed. In 1988, minor revisions were made to the Community Relations Plan and were reflected in the *RI/FS Work Plan, Volume III*. In 1989, a second community assessment was conducted, and the Community Relations Plan was again revised and approved in August 1990. In 1992, Fernald's Community Relations Plan was revised a fourth time; however, no community assessment was conducted in 1992.

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4.0 SCOPE AND ROLE OF REMEDIAL ACTION

The 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 so as to permit the more expedient completion of the RI/FS process. The five FEMP operable units are broadly defined as:

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

Separate RI/FS documentation and RODs are being issued for Operable Units 1 through 5. A sixth operable unit known as the Comprehensive Site-Wide Operable Unit was added as a provision of the Amended Consent Agreement. Operable Unit 6 is not a specified area; however, it was created to perform a final assessment from a site-wide perspective that ongoing or planned remedial actions identified in the RODs for the five operable units will provide a comprehensive remedy for the FEMP site which is protective of human health and the environment.

The primary focus of this remedial action is the permanent disposition of inventoried processing residues contained in three concrete silos and an underground sump at the FEMP. The scope also includes the disposition of contaminated building materials associated with the concrete silos and ancillary support facilities. The action further involves the disposition of contaminated soils, process wastewater and perched water encountered within the Operable Unit 4 Study Area. The nature of the residues, coupled with their potential threat of release from their present storage configuration and the potential threat of contaminant migration from the affected soils into the atmosphere and the underlying aquifer system, represent a potential treat to human health and the environment. The purpose of the remedial action is to prevent current and future exposure to the inventoried residues, contaminated soil and debris within Operable Unit 4, and remove the threat of release of hazardous substances into the environment.

Several removal actions are ongoing or have been completed within the Operable Unit 4 study area. These removal actions are summarized as follows:

- Installation of a bentonite clay layer over the K-65 residues in Silos 1 and 2.
- Removal and treatment of water from the K-65 decant sump tank at the FEMP advanced wastewater treatment plant. Water within the tank is removed whenever the liquid level in the sump reaches 80 percent of the tanks capacity.
- Removal of a deteriorated dust collector on the dome of Silo 3.
- Installation of a series of drainage control structures, swales, and culverts to direct surface runoff to the existing in-ground sump.

In addition to the removal actions listed above, polyurethane foam insulation was applied to the exterior of the dome surfaces of Silos 1 and 2 to inhibit wide temperature swings within the silos. These removal actions have been conducted to respond to contaminant releases and to mitigate health and safety threats in accordance with CERCLA. These actions have also been conducted in accordance with Council on Environmental Quality regulations for implementing the provisions of NEPA.

Cleanup decisions for groundwater beneath the Operable Unit 4 Study Area, sediment in Paddys Run, and soil and waste source areas outside the Operable Unit 4 Study Area are not included in the scope of this remedial action. Separate RI/FS and other remediation documentation will be prepared for these facilities and media by other FEMP operable units. These documents will be issued consistent with the terms of the Amended Consent Agreement.

4.1 INTEGRATION OF NEPA INTO CERCLA

It is DOE's policy to integrate the NEPA requirements into the procedural and documentation requirements of CERCLA whenever practicable. In accordance with this policy, the RI/FS documents prepared to support the Operable Unit 4 decision process include information on the evaluation elements and criteria employed in the development of an EIS under NEPA.

Separate RI/FS documentation including RI Reports, Initial Screening of Alternatives (ISA) Reports, FS Reports, PPs, and RODs are being issued on varied time schedules for each of the five operable units as established by the Amended Consent Agreement. The lead operable unit (i.e., chronologically, the first operable unit issuing RI/FS documents) for the FEMP site is Operable

Unit 4. The integrated CERCLA/NEPA documents for Operable Units 1, 2, 3, and 5 will tier from the lead Operable Unit 4 FS/PP-DEIS. The Operable Unit 4 FS/PP-DEIS functions as the lead CERCLA/NEPA integrated document and addresses the cumulative impacts of the leading remedial alternatives (LRAs) for each operable unit. The CERCLA/NEPA integrated documents prepared subsequent to Operable Unit 4 will be derived from or be fully encompassed by the impact analysis presented in the Operable Unit 4 FS/PP-DEIS. If the LRAs for any of the operable units change, additional NEPA review will be performed and documented as appropriate to evaluate the impacts to human health and the environment. This additional analysis will be presented in the integrated CERCLA/NEPA documents for the remaining operable units where appropriate.

In accordance with both CERCLA and NEPA processes, these documents are made available to the public for comment. Public involvement is an important factor in the decision-making process for site remediation. Public comments will be considered in the selection of remedy for each operable unit, which will be presented in a ROD. Applying the integrated approach for CERCLA and NEPA, DOE plans to prepare and issue a single ROD to be signed by both DOE and EPA. The contents of the documents prepared for the remedial actions at the FEMP are not intended to represent a statement on the legal applicability of NEPA to remedial actions conducted under CERCLA.

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5.0 SUMMARY OF OPERABLE UNIT 4 CHARACTERISTICS

Several investigative studies were conducted to determine the characteristics of the contamination sources and the nature and extent of contamination within Operable Unit 4. These investigative activities focused on the following facilities and associated environmental media:

- Silos 1 and 2 and their contents (also termed the K-65 silos)
- Silo 3 and its contents (also termed the cold metal oxide silo)
- Silo 4
- K-65 decant sump tank, its contents, and associated piping
- A radon treatment system (RTS)
- A portion of a concrete pipe trench and other concrete structures
- An earthen berm surrounding Silos 1 and 2
- Soils beneath and immediately surrounding Silos 1, 2, 3, and 4
- Perched groundwater encountered in the vicinity of the silos during implementation of Operable Unit 4 cleanup activities. Note that groundwater within the Great Miami Aquifer underlying the silo area is not within the scope of Operable Unit 4, but it is within the scope of Operable Unit 5.

5.1 INVESTIGATIVE STUDIES

The Operable Unit 4 RI/FS sampling program was the primary source of the information utilized to characterize contamination sources and to evaluate the nature and extent of contamination associated with Operable Unit 4. Other investigative studies which provided characterization data for Operable Unit 4 include the Waste Pit Area Runoff Control Removal Action, the FEMP Environmental Monitoring Program, and the Characterization Investigation Study (CIS). Section 6 provides a list of the contaminants of concern which were identified and used to determine baseline risks attributable to Operable Unit 4.

5.2 SUMMARY DESCRIPTION OF CONTAMINATION SOURCES

5.2.1 Classification of Contamination Sources

The residues in Silos 1, 2, and 3 are classified as by-product material as defined under the AEA of 1954, and are therefore excluded from regulation as solid or hazardous waste under the Resource

Conservation and Recovery Act (RCRA), 40 CFR § 261.4(a)(4). By-product material, as defined by the AEA, includes tailings or wastes produced as a result of the extraction or concentration of uranium (U) and thorium (Th) from any ore processed primarily for its source material content (42 United States Code 2014).

Since the residues contained in the silos are excluded from regulation as solid or hazardous waste, the requirements under RCRA are not applicable to Operable Unit 4 remedial actions. However, analytical data for the silo residues indicate that these materials exceed Toxicity Characteristic Leaching Procedure (TCLP) limits for various metals, as defined under RCRA. The silo residues are therefore sufficiently similar to hazardous waste regulated under RCRA resulting in some RCRA requirements being appropriate for the conditions of release or potential release of hazardous constituents during disposal. As a result of this, the relevant and appropriate substantive requirements of RCRA are being applied as part of the Operable Unit 4 remedy for the silo residues.

5.2.2 Source Characteristics

Silos 1 and 2, known as the K-65 silos, contain approximately 6,796 m^3 (8,890 yd^3) of waste residues generated from processing high-grade uranium ores. As part of the remedial investigation, samples were collected from the contents of the silos. The waste materials within the silos are primarily a silty clay with an average moisture content of approximately 40 percent. Analytical results from these samples confirmed prior process knowledge and identified significant activity concentrations of radionuclides within the uranium decay series. The two silos contain in excess of 3,700 Curies of radium (Ra)-226, 600 Curies of Th-230, and 1,800 Curies of lead (Pb)-210. It is also estimated that Silos 1 and 2 contain more than 28 metric tons of uranium. Other significant metals include more than 118 metric tons of barium, 830 metric tons of lead, and 2.6 metric tons of arsenic. TCLP tests indicate that the lead is leachable with leach test concentrations from Silo 1 averaging 614 milligrams per liter (mg/l) and leach test concentrations from Silo 2 averaging 516 mg/l. The silos also contain elevated concentrations of the polychlorinated biphenyls (PCBs) Aroclor-1248 [1.2 milligrams per kilogram (mg/kg)], Aroclor-1257 (7.4 mg/kg), Aroclor-1260 (2.6 mg/kg), and tributylphosphate (15 mg/kg).

Silos 1 and 2 are equipped with a decant sump tank, which was first used to decant liquids from waste slurried into the silos. The system also served to collect silo leachate that entered the Silos 1 and 2 underdrain system. The tank is located beneath the silo berm, between Silos 1 and 2, at a depth approximately 0.6 m (2 ft) below the base of the silos. The decant sump tank is connected to

the berm surface via a standpipe. In 1990, personnel noted 1.2 m (4 ft) of liquid in the standpipe. In 1991, and again in February 1993, the decant sump tank was emptied and sampled. Analytical results of the decant sump tank liquids are, in general, consistent with the contents of Silos 1 and 2.

The presence of significant quantities of liquid in the decant sump tank indicates that the system is collecting leachate from the silo underdrain system, as it was designed to do. Excess quantities of liquid in the decant sump tank, causing liquid to overflow into the standpipe, appear to provide a mechanism for leachate from the silos to enter perched groundwater.

Structural evaluations completed in 1986 on Silos 1 and 2 identified a significant loss of the load-carrying capability at the center portion of the domes on both structures. A protective barrier was placed over the deteriorated central portions of the silo domes in 1986 to minimize potential environmental impacts in the event of a catastrophic dome collapse. The remaining structures, Silos 3 and 4, like Silos 1 and 2, are beyond their original design life and show visible signs of deterioration due to the effects of weathering. However, based on the more recent February 1994 Silo Structural Integrity Report, the silos are considered to be more structurally sound than previously reported in the 1986 study by Camargo. The extensive non-destructive testing and computer analysis indicated that the silos are not in immediate danger of collapse.

As a natural consequence of the decay of the Ra-226 present in the Silo 1 and 2 waste materials, a radioactive gas, Rn-222, is generated. Samples collected in 1987 from the unfilled, upper portions of Silos 1 and 2 showed a maximum concentration of 30 million picocuries per liter (pCi/l). Average background concentrations of Rn-222 in ambient air are approximately 0.5 pCi/l. In 1991, a layer of bentonite clay was placed over the residues in Silos 1 and 2. This clay layer was installed to reduce the release of radon gas to the atmosphere. Samples collected following emplacement of the bentonite clay show a significant reduction in the Rn-222 present in the headspace of the silos.

The inventory of radionuclides present in the K-65 residues significantly elevates the direct penetrating radiation field in the vicinity of the silos. Measurements collected from the dome surfaces prior to the installation of the bentonite clay layer showed exposure rates in excess of 200 millirem per hour, or approximately 20,000 times natural background radiation levels. Measurements collected from the surfaces of the domes following bentonite installation showed a greater than 95 percent decrease in the direct radiation fields on the dome surfaces.

Silo 3 contains waste residues, known as cold metal oxides, which were generated at the FEMP site during uranium extraction operations in the 1950s. The residues in Silo 3 are substantially different than those in Silos 1 and 2. First, Silo 3 residues are dry, while the residues in Silos 1 and 2 are moist. Second, while the radiological constituents are similar to those in Silos 1 and 2, certain radionuclides, such as radium, are present in Silo 3 in much lower concentrations. Thus, Silo 3 exhibits a significantly lower direct radiation field and radon emanation rate than Silos 1 and 2.

Samples collected from the contents of Silo 3 confirmed process knowledge and indicated the presence of significant activity concentrations of the radionuclides within the uranium decay series. The predominant constituent identified within Silo 3 was Th-230, a radionuclide produced from the natural radioactive decay of U-238. Distributed within the 3,890 m^3 (5,088 yd^3) of waste residues inside Silo 3 is approximately 450 Curies of Th-230. Extraction Procedure (EP) Toxicity tests performed on samples of the Silo 3 residues to determine the leachability of inorganic substances present detected eight metals, with the highest mean concentrations being attributed to arsenic (9.48 mg/l), cadmium (0.85 mg/l), chromium (5.05 mg/l), and selenium (2.65 mg/l).

5.3 NATURE AND EXTENT OF CONTAMINATION

Investigations were performed as part of the RI and other site programs to examine the nature and extent of contamination present in environmental media associated with Operable Unit 4. These investigations included the collection and laboratory analysis of samples and the collection of direct field measurements. The investigations included examination of surface and subsurface soil, surface water and sediment, and groundwater.

5.3.1 Surface Soils

Sampling performed as part of the RI/FS and other site programs in the vicinity of Operable Unit 4 indicates the occurrence of above background concentrations of uranium, and to a lesser degree other radionuclides, in the surface soils within and adjacent to the Operable Unit 4 Study Area. Activity concentrations observed during the RI for the surface soils in the vicinity of Operable Unit 4 were as much as 20.8 picocuries per gram (pCi/g) for U-238, or 16 times natural background, and 4.8 pCi/g for Th-230, or two times background. These above background concentrations appear to be generally limited to the upper six inches of soil.

Of the inorganic constituents detected in the Operable Unit 4 surface soils, antimony, beryllium, chromium, copper, magnesium, nickel, silver, and sodium were consistently above background. The

only volatile organic compounds detected consisted of common laboratory contaminants. With the exception of one sample collected at a depth of 0.5 to 0.6 m (1.5 to 2.0 ft), which contained elevated concentrations of a number of semivolatile organic compounds including benzo(a)pyrene, semivolatile organic compounds were at or only slightly above the contract required quantitation limit for the laboratory. Available sample data and process knowledge indicate no direct relationship between the surface soil contamination in the Operable Unit 4 Study Area and the silo contents. Further, more than 70 percent of the surface soil samples indicate that the uranium contamination in surface soils is depleted uranium (i.e., the uranium contains depleted percentages of U-235). The silo residues consist of natural uranium. Thus, the existence of these activity concentrations in the surface soils is attributed to air deposition resulting from the former Production Area and past plant production operations and/or waste handling practices in the waste pit area.

Soil samples were collected from the soils contained in the earthen embankment (berm) surrounding Silos 1 and 2. The highest concentrations of radionuclide constituents were detected in a sample taken at a location 9 m (30 ft) below the berm surface, near the base of Silo 1. This sample indicates the occurrence of either some spillage of silo residues during filling operations or seepage from the silo onto the original surface soils adjacent to the silo at that location. Analytical results from other berm samples showed the presence of radionuclides at relatively lower concentrations, with the majority of samples showing concentrations near background.

The concentration ranges for those constituents in relatively higher concentrations are 0.62 to 417 pCi/g for Pb-210; 1.03 to 943 for polonium (Po)-210; 0.62 to 876 pCi/g for Ra-226; 0.74 to 51.2 pCi/g for Th-230; and 0.75 to 24.7 pCi/g for U-238. Inorganic constituents detected consisted mostly of metals in concentrations close to background concentrations. There were also some organic constituents reported. Most of these constituents are common laboratory contaminants and do not demonstrate any direct linkage to the silo contents.

5.3.2 Subsurface Soils

As part of the RI for Operable Unit 4, samples were collected from the subsurface soils located under and adjacent to the K-65 silos. Analytical results reveal elevated concentrations of radionuclides from the uranium decay series in the soils at the interface between the berm and the original ground level.

Elevated concentrations (up to 53 pCi/g for U-238, about 40 times background) were also noted in slant boreholes, which passed in close proximity to the silo underdrains. The occurrence of these above background concentrations in soils near the silo underdrains are attributed to vertical migration of leakage from the silo underdrains or decanting system. Elevated readings at the interface between the silo berms and the native soils may be attributed to historical air deposition or past spillage from the silos during filling operations in the 1950s, prior to installation of the berms.

5.3.3 Surface Water and Sediment

Extensive sampling was conducted on the sediment and surface water present in Paddys Run and on key drainage swales leading to Paddys Run, as part of the RI for Operable Unit 4 and other site programs. Results of the surface water sampling indicate the occurrence of above background concentrations of U-238, up to 1500 times background, in the drainage swales in the vicinity of the Silos 1 through 4. The highest readings were recorded in a drainage ditch, which flows from east to west, located approximately 76 m (250 ft) south of Silo 1. The most probable source of the contamination in Paddys Run and the drainage swales is the resuspension of contaminated particles from surface soils within the Operable Unit 4 and Operable Unit 1 Study Areas into storm water.

5.3.4 Groundwater

Groundwater samples were collected from wells within the Operable Unit 4 Study Area during the RI for Operable Unit 4. Groundwater occurs not only in the Great Miami Aquifer underlying the FEMP site, but also in discrete zones of fine-grained sands located in the glacial overburden. The water contained in these sand pockets in the clay-rich glacial soils are termed perched water zones. Samples were collected from slant borings placed adjacent to and under Silos 1 and 2; 1000-series wells screened in the glacial overburden; 2000-series wells screened at the water table in the Great Miami Aquifer; and 3000-series wells screened at approximately the central part of the Great Miami Aquifer, just above the clay interbed.

Background concentrations of naturally occurring inorganics and radionuclides in groundwater in the vicinity of FEMP site were being established under the site-wide RI/FS during the completion of the RI for Operable Unit 4. In accordance with background data available at the time, background concentration of total uranium in groundwater of less than 3 micrograms per liter (μg/l) or 3 parts per billion (ppb) was utilized.

Perched Water

Uranium was the major radionuclide contaminant found in the perched water. Elevated concentrations of total uranium were detected in the slant boreholes under and around Silos 1 and 2. Slant Boring 1617, immediately southwest of Silo 1, contained the highest concentration of total uranium (9,240 μg/l). Uranium concentrations were also elevated in samples collected from the 1000-series wells. The highest observed total uranium concentrations obtained from 1000-series wells were in samples collected from Well No. 1032, located 46 m (150 ft) due west of Silo 2. The range of the concentrations was 196 to 276 μg/l. Considering both the slant borings and 1000-series wells, U-238 was found in the range of 1.1 to 1313 pCi/l.

The major inorganic constituents found in the perched water samples taken from 1000-series wells and the slant borings, included elevated concentrations for major cations (iron, magnesium, manganese, and sodium) and major anions (chloride, nitrate, and sulfate). In particular, the concentrations of sodium, sulfate, and nitrate were significantly above background in slant boring samples. Boring 1615, northwest of Silo 2, had the highest sodium concentration(1,040 mg/l), boring 1618, southeast of Silo 1, had the highest sulfate concentration (2,200 mg/l), and boring 1617 had the highest nitrate concentration (554 mg/l). Low levels of organic constituents, determined to be contaminants, were detected in some samples. Overall, well measurements and analytical results confirmed that the perched groundwater in the vicinity of Operable Unit 4 flows from west to east. Further, contaminants within Operable Unit 4 are contributing to contamination of perched groundwater in this region of the site.

Great Miami Aquifer

The concentration of total uranium in the upper portion of the Great Miami Aquifer, based on analysis of samples from the 2000-series wells, ranged from less than 1 μg/l to 40.3 μg/l. These data do not necessarily suggest that the silos are the source of the observed contamination because both upgradient and downgradient wells contain above background concentrations of total uranium. Well No. 2032, located 46 m (150 ft) west of Silos 1 and 2, exhibited a concentration of total uranium at 39.0 μg/l. Well No. 2033, located 46 m (150 ft) east of Silos 1 and 2, exhibited a concentration of total uranium at 40.3 μg/l. Because groundwater flow in this region of the Great Miami Aquifer is from west to east, these two wells are located upgradient and downgradient of Operable Unit 4, respectively.

The isotopic ratio of U-234 and U-238 would suggest a natural uranium ratio in these samples. Such a ratio may be expected from Operable Unit 4, but is not a "fingerprint" for this source. The presence of uranium upgradient in the aquifer from an Operable Unit 4 source could be explained by leachate travel in the perched groundwater zone of the glacial overburden with emergence to Paddys Run. Here the diluted leachate could enter the aquifer via stream bed infiltration or flow at the perched zone/stream channel interface. No evidence is available to support or preclude this potential route.

The concentration of total uranium measured at deeper levels in the Great Miami Aquifer (3000-series wells) ranged from less than 1 to 4 μg/l, with the exception of 1 sample out of 16, which contained 15 μg/l. Like the 2000-series wells, no conclusion could be drawn that linked this contamination to the silos.

5.4 POTENTIAL EXPOSURE PATHWAYS FOR CONTAMINANT MIGRATION

Contaminant transport from Operable Unit 4 may occur via the following pathways:

- Direct radiation
  - Direct exposure to gamma radiation from radioactive constituents within the silos.
  - Direct exposure to Silo 3 residues under the future source term scenario assuming structural collapse of the silo.
  - Direct exposure to gamma radiation from radioactive constituents in surface soil.
- Air emissions
  - Dispersion of radon that escapes from the silos into the atmosphere.
  - Dispersion of volatile organic compounds (VOC) or fugitive dust emissions generated from soil erosion.
  - Dispersion of Silo 3 contents under the future source term scenario assuming structural collapse of the silo.
- Surface water runoff
  - Erosion of contaminated soils into Paddys Run from the vicinity of the silos.
  - Erosion of released Silo 3 contents under the future source term scenario assuming structural collapse of the silo.

- Groundwater transport
  - Leaching of contaminants from the silo contents via soils to underlying groundwater.

Each of these potential contaminant transport pathways is discussed below. The summary of the baseline risk assessment presented in Section 6 provides additional information about the impacts on environmental media or human receptors.

5.4.1 Direct Radiation

Gamma radiation from the K-65 residues and surface soils are transported as electromagnetic radiation, thus requiring no transport mechanism. As the distance from the K-65 silos and the surface soil source increases, the magnitude of the radiation's intensity decreases. The soil berms around Silos 1 and 2 provide shielding to potential receptors from the direct gamma radiation associated with the K-65 residues. The bentonite clay layer covering the silo residues decreases the diffusion of radon into the silo headspace. Radon progeny are gamma-emitters that contribute significantly to direct radiation exposure. Therefore, as long as the integrity of the berms, the bentonite clay liner, and silos is maintained, there should be no change or increase in direct radiation exposure due to this pathway.

5.4.2 Air Emissions

Rn-222 generated by the radioactive decay of Ra-226 in the K-65 and metal oxide residues accumulates in the void headspace inside the silos. At the time of their design, the four silos were not required to be airtight; therefore, air exchanges with the outside environment occur. The air exchange is a result of changes in ambient temperatures that cause expansion and contraction of the air mass inside the silos. The foam installed on top of Silos 1 and 2 in 1987 has reduced the K-65 silo breathing losses by limiting daily temperature variations inside the silo dome. In addition to direct release to the atmosphere, radon gas can also diffuse through the K-65 silo walls into the surrounding soil berms. Radon has a short half-life (3.82 days) and is expected to decay into its progeny, Pb-210 and Po-210, in the silo walls and in the soil berms surrounding Silos 1 and 2. These are nonvolatile constituents that accumulate in the soil berms. These progeny could be transported via resuspension if the berms are eroded to a point where this area is exposed. Contaminated soil particulates can also be resuspended into the air from the surface of the K-65 berms and the surrounding Operable Unit 4 soils and transported by winds to other locations.

5.4.3 Surface Water Runoff

Contaminants in the surface soils can be transported away from Operable Unit 4 through surface soil erosion caused by surface water runoff. If the existing runoff control structures (i.e., trench drains and curb and gutters) at the perimeter of Operable Unit 4 were to fail, this would permit storm water runoff to directly enter Paddys Run. Contaminants contained in near surface soils which are subject to erosion can be transported to Paddys Run by either dissolving in the runoff surface water or attaching to entrained sediment carried by the water. A portion of these contaminants will partition (i.e., separate) into stream sediment and will not be available for immediate transport to the aquifer. Contaminants in the dissolved phase could be transported to the Great Miami Aquifer by recharge from Paddys Run throughout the length of Paddys Run from Operable Unit 4 to the Great Miami River.

5.4.4 Groundwater Transport

The final potential transport route is via groundwater. Contamination may be transported through the vadose zone into the Great Miami Aquifer in the vicinity of Operable Unit 4 by traveling through the glacial overburden present beneath the silos. A conceptual model of potential contaminant transport from the bottom of the silos to the Great Miami Aquifer has been developed. This model is based on the current understanding of the Operable Unit 4 Study Area and data from past investigations and is listed below:

- Leachate derived from Silos 1 and 2 is formed under the current storage configuration of the silos from liquids used to slurry waste materials into the silos. Additional leachate may be formed based on the assumption that precipitation infiltrates the silos through the silo top and sidewalls and interacts with the wastes within. This leachate may pass through the wastes, out the bottom of the silo, and enter the glacial overburden.

- Perched groundwater in the vicinity of Operable Unit 4 flows to the west, toward Paddys Run. Thus, once out of the silo, leachate may migrate through the glacial overburden toward the west, until it reaches Paddys Run, or in a vertical direction until it reaches the Great Miami Aquifer.

- Once in Paddys Run or the Great Miami Aquifer, the contamination can be transported through surface water or groundwater to either on-property or off-site receptors.

6.0 BASELINE RISK ASSESSMENT

Baseline risk assessments were performed to determine the potential human health effects and ecological risks which could result from exposure to contaminants currently present in Operable Unit 4.

The baseline assessment of human health risks quantified the health risks to hypothetical human receptors due to exposure from chemical sources in Operable Unit 4 under the no-action alternative. The process analyzed the human health consequences that could occur under different scenarios if no remedial actions were taken to address identified environmental concerns. This process utilized a structured, sequential analytical process that:

- Identified the specific Constituents of Concern (COCs) for Operable Unit 4.
- Assessed contaminant transport from the sources to potential exposure points.
- Quantified potential exposures to receptors under current and future land use scenarios.
- Characterized the potential baseline risks associated with Operable Unit 4 under current and potential future land use scenarios.

Appendix D and Section 6.0 of the RI Report for Operable Unit 4 provide detailed information on the baseline assessment of human health risks.

Site-wide baseline ecological risks were evaluated and included in the Site-Wide Characterization Report (DOE 1993b). An overview of that discussion is included in Section 6.2 of this ROD. The purpose was to conduct a qualitative assessment of the potential current and future risks posed by FEMP site contaminants to ecological receptors (e.g., plants and animals) if no remediation is implemented, thus, serving as a baseline for all future assessments. The Amended Consent Agreement between EPA and DOE stipulates that Operable Unit 5 is responsible for the preparation of the Site-Wide Ecological Risk Assessment as part of the RI and FS Reports for Operable Unit 5.

6.1 SUMMARY OF THE BASELINE ASSESSMENT OF RISKS TO HUMAN HEALTH

6.1.1 Constituents of Concern

The COCs for human health and their ranges of concentration in effected Operable Unit 4 media are provided in Table 6-1. COCs were detected in Silos 1, 2, and 3, the surrounding surface soil and subsurface soil, and the silo berm soils. Baseline risk assessment source term concentrations were determined for the COCs in these media. Fate and transport modeling was then conducted to estimate the exposure point concentrations of contaminants in environmental media (e.g., groundwater, air, and surface water). Contaminants with the potential of posing risk to human health include radionuclides, metals, inorganic anions, polyaromatic hydrocarbons (PAHs), and pesticides/polychlorinated biphenyls (PCBs). The selection of COCs was based on the evaluation of characterization data with respect to the distribution on contaminants in various media and the potential contribution of these contaminants to the overall human health effects. Appendix E of the RI Report for Operable Unit 4 provides full details of the process for selecting COCs.

6.1.2 Exposure Assessment

The exposure assessment and baseline risk assessment follow the methodology described in the Risk Assessment Work Plan Addendum (DOE 1992), with the exception of those items identified in Section D.1.0 of Appendix D of the RI Report for Operable Unit 4 (DOE 1993a). Baseline risks were calculated under a number of contaminant release mechanisms providing exposure to hypothetical receptors under three separate land use scenarios. Baseline risks under these land use scenarios were calculated for a current source term and a future source term. The concentrations of contaminants found in the contents of Silos 1, 2, and 3, the surrounding surface soil, the silo berm soil, and subsurface soil within the Operable Unit 4 Study Area were used to determine the source term concentrations used in each exposure scenario.

Land use scenarios include: (1) current land use without access controls, (2) current land use with access controls, and (3) future land use without access controls. Under the first scenario, the FEMP site is assumed to be managed by an industrial concern other than DOE. Access restrictions currently provided by DOE are assumed to be discontinued. In addition, no remedial actions are assumed to have been taken, and no members of the public establish residence within the boundaries of Operable Unit 4. Thus, potential receptors include an off-property resident farmer, a trespassing child, an on-property worker (groundskeeper), and an off-property user of surface water from the Great Miami River.

TABLE 6-1

CONSTITUENTS OF CONCERN FOR OPERABLE UNIT 4

	Silo 1 & 2	Silo 3	Surface Soil	Berm Soil
Range of Detection for Chemicals (mg/kg)				
2-Butanone	0.002-0.022		0.002-0.008	0.011[a]
2-Hexanone	0.002-0.017			
2-Nitrophenol		.052[a]		
4,4'-DDE	0.029-0.120			
4,4'-DDT	0.014-0.068			
4-Methyl-2-pentanone	0.002-0.003			
4-Nitrophenol		.045[a]		
Acenaphthylene			1.30[a]	
Acetone	0.033-0.150		0.004-0.079	0.064[a]
Aldrin	0.056[a]			
Ammonia	1.100-8.90			
Anthracene			0.780[a]	
Antimony	13.300-77.4		22.60-32.30	19.100-24.900
Aroclor-1248	1.700-10.0			
Aroclor-1254	0.420-20.0			
Aroclor-1260	0.340-3.50			
Arsenic	3.100-1960	532-6380	2.70-9.50	5.000-8.000
Barium	89.20-22100	118.000-332.000	44.7-113.0	47.100-89.400
Benzo(a)anthracene			0.062-4.70	
Benzo(a)pyrene			5.20[a]	
Benzo(b)fluoranthene			0.150-9.70	
Benzo(g,h,i)perylene			5.30[a]	
Benzoic Acid	0.075-0.390		0.059[a]	
Beryllium	0.590-6.00	10.000-39.900	0.670-1.00	0.670-0.850
Bis(2-ethylhexyl)phthalate	0.070-6.00		0.075-1.60	
Boron	18.400-81.20			
Cadmium	0.560-19.1	21.500-204.000	4.70-6.20	2.600-4.200
Carbon tetrachloride	0.170[a]			
Chromium	0.207-165	139-560	10.20-22.60	16.400-28.400
Chrysene			0.062-3.50	
Cobalt	6.20-2430	1100-3520		
Copper	122-1790	1610-7060	16.200-23.50	19.300-23.800
Cyanide	0.520-7.10		0.120[a]	0.120[a]
Di-n-butyl phthalate	0.046-0.057		0.190[a]	0.048[a]
Di-n-octyl phthalate	0.045-0.970			
Dieldrin	0.093[a]			
Diethyl phthalate	0.410[a]			
Dimethyl phthalate	0.068-0.160			
Endosulfan-II	0.082-0.260			
Endosulfan-I	0.011-0.092			

Table 6-1

(continued)

	Silo 1 & 2	Silo 3	Surface Soil	Berm Soil
Range of Detection for Chemicals (mg/kg)				
Endrin	0.089[a]			
Fluoranthene	0.064[a]		0.040-6.70	
Fluoride	15.0-394			
Heptachlor epoxide	0.022-0.20			
Indeno(1,2,3-cd)pyrene			4.20[a]	
Lead	153-299000	646-4430		
Manganese		2420-6500		
Mercury	0.150-2.80	0.300-0.690		
Methylene chloride	0.015-0.190		0.025[a]	
Molybdenum	148-8600		3.60-4.90	2.400-13.300
N-nitroso-di-n-propylamine	0.059-0.260			
Nickel	14.60-3380	1760-6170	22.8-38.9	21.700-32.400
Nitrate	2216-8900			
Phenanthrene			2.60[a]	
Phenol	0.40[a]		0.230[a]	0.110[a]
Phosphorus	0.40-3290			
Pyrene	0.047[a]		0.045-8.20	
Selenium	49.60-2810	101.000-349.000		
Silver	5.0-34.9	9.200-23.800	6.60-9.70	5.800-14.400
Tetrachlorethene	0.140[a]			
Thallium	0.090-5.700	4.000-73.900	0.510[a]	0.710[a]
Toluene	0.002-0.190		0.001[a]	0.002-0.200
Total xylenes	0.003[a]			0.069[a]
Tributyl Phosphate	0.200-73.00			
Uranium	137.0-8394.0	738.0-4554.0	4.0-64.0	10.50-12.40
Vanadium	21.90-535.00	418-4550	15.9-27.7	24.600-28.400
Zinc	7.70-212.00	301-672	32.9-65.2	44.200-59.600

Table 6-1

(continued)

	Silo 1 & 2	Silo 3	Surface Soil	Berm Soil
Range of Detection for Radionuclides (pCi/g)				
Actinium-227	2905.0-17390	234.0-1363		
Cesium-137				0.23[a]
Lead-210	48980.0-399200	454.0-6427		0.98-4.45
Polonium-210	55300-43400			1.68-4.70
Protactinium-231	4041[a]	266.0-931		
Radium-224		64.00-453.00		1.020[a]
Radium-226	657.0-890700	467.0-6435	0.6-2.3	1.04-6.68
Radium-228		82.0-559	0.5-1.7	0.8-0.98
Strontium-90			0.8-1.8	
Technetium-99			1.2-3.6	
Thorium-228	411.0-7360	459.0-996	0.9-1.4	1.12-1.52
Thorium-230	8365.0-132800	21010.0-71650	1.4-4.8	1.69-4.78
Thorium-232	661.0-1106	411.0-1451	0.9-1.7	0.86-1.45
Uranium-234	89.0-1548	348.0-1935	2.4-6.9	1.26-3.62
Uranium-235/236	19.1-172	42.0-158		
Uranium-238	46.0-1925	320.0-2043	2.4-20.8	1.13-4.19

[a]-only one sample was found to be above the detection limit.

Under the second scenario, the site access restrictions historically provided by DOE are assumed to be maintained, and no remedial actions are assumed to have been taken. The scenario further assumes that no members of the public have established residence in the Operable Unit 4 Study Area, and that DOE maintains a site-specific health and safety program to ensure that non-remediation workers and visitors are properly protected. Therefore, the risk assessment addresses workers subjected to short exposure durations under controlled conditions. These controls include engineered emission control equipment, personnel protective equipment, and administrative health and safety practices. Potential receptors under this scenario include an off-property resident farmer, a trespassing child, and an off-property user of surface water from the Great Miami River.

The third land-use scenario, future land use without access controls, includes exposure routes that require development time, such as establishing a home and farm within Operable Unit 4. Access controls are assumed to be absent and no remedial actions are assumed to have been taken. In addition, members of the public are assumed to have established a residence within the Operable Unit 4 boundaries. Hypothetical receptors under this scenario are a reasonable maximum exposure (RME) on-property resident farmer, a central tendency (CT) on-property resident farmer, an on-property resident child, an off-property resident farmer, and an off-property user of surface water from the Great Miami River.

In addition to the three land use scenarios, there are two source term scenarios: the current source-term scenario and the future source term scenario. The current source term scenario considers the silos as they exist today. The future source term scenario considers complete structural failure of Silo 3, resulting in the spread of its contents to Operable Unit 4 surface soil, and dome collapse for Silos 1 and 2, consequently exposing their contents to the elements and increasing leaching of the contents through the interception of rainwater.

Under the current land use scenario without access control and the future land use scenario, risks are calculated using both the current source term and the future source term. Under the current land use with access control scenario, the future source term does not apply; if the site remains under the institutional control of DOE, the assumption is made that measures would be undertaken to maintain the current configuration of the silos and implement mitigative action in the event of silo failure. Thus, under the current land use with access control scenario, risk was calculated only for the current source term.

The on-property resident farmer receptor was also evaluated using exposure and intake parameters such as exposure duration, which represents the CT of risk. This was performed in response to new guidance from EPA, which suggests that all risk assessments provide an evaluation of the CT of the risk range, using the best information available to describe the average situation (EPA 1992a). This scenario is used to provide an estimate of risk closer to average for the resident adult scenario. This receptor scenario is currently being developed by EPA and will require additional review as guidance becomes available. The CT receptor for this scenario is located at the same location as the RME on-property resident farmer receptor. Table 6-2 provides a summary of the land use/source term/receptor scenarios used for the Baseline Risk Assessment.

Exposure pathways quantified in the risk assessment for each scenario are shown in Figures 6-1 and 6-2 and are discussed in greater detail in Appendix D of the RI Report for Operable Unit 4. A summary of exposure pathways that have the most impact to site risks is presented in Section 6.1.4. The conceptual model depicted in Figures 6-1 and 6-2 indicates which exposure routes are quantitatively evaluated in the risk assessment for each receptor and land use scenario, and the basis for excluding other exposure routes. Exposures to the RME resident farmer due to the ingestion of groundwater consider two scenarios, which include water obtained from the Great Miami Aquifer and water obtained from perched water beneath and west of Silos 1 and 2.

Section 5.0 and Appendix E of the RI Report for Operable Unit 4 address in detail all fate and transport modeling efforts employed in the determination of exposure point concentrations of the COCs. Appendix D of the RI Report for Operable Unit 4 discusses the assumptions regarding source term and potential release mechanisms upon which the fate and transport modeling is based.

6.1.3 Toxicity Assessment

The human health hazards identified in the toxicity assessment are cancer induction and chemical toxicity. Chemical toxicity includes numerous health effects such as kidney damage, liver disease, or eye irritation. For both types of health hazards, dose-response data from human and animal studies are used to determine the potency of the individual radionuclides and chemicals.

Intakes calculated in the exposure assessment are used in conjunction with the cancer slope factor from the dose-response data to determine the incremental lifetime cancer risk (ILCR). Toxicity data for the Operable Unit 4 risk assessment were taken from the Integrated Risk Information System

TABLE 6-2

SUMMARY OF LAND-USE/RECEPTOR/SOURCE TERM SCENARIOS

	RECEPTORS	
LAND USE	**CURRENT SOURCE TERM**	**FUTURE SOURCE**
Current Land Use Without Access Control	Off-Property Farmer, Trespassing Child, Groundskeeper Worker, Off-Property User of Surface Water from the Great Miami River	Off-Property Farmer, Trespassing Child, Groundskeeper Worker, Off-Property User of Surface Water from the Great Miami River
Current Land Use With Access Control	Off-Property Farmer, Trespassing Child, Off-Property User of Surface Water	N/A
Future Land Use	RME On-Property Resident Farmer, CT On-Property Resident Farmer, On Property Resident Child, Off-Property Farmer, Off-Property User of Surface Water from the Great Miami River	RME On-Property Resident Farmer, CT On-Property Resident Farmer, On Property Resident Child, Off-Property Farmer, Off-Property User of Surface Water from the Great Miami River

Notes: N/A Not Applicable
RME Reasonable Maximum Exposure
CT Central Tendency

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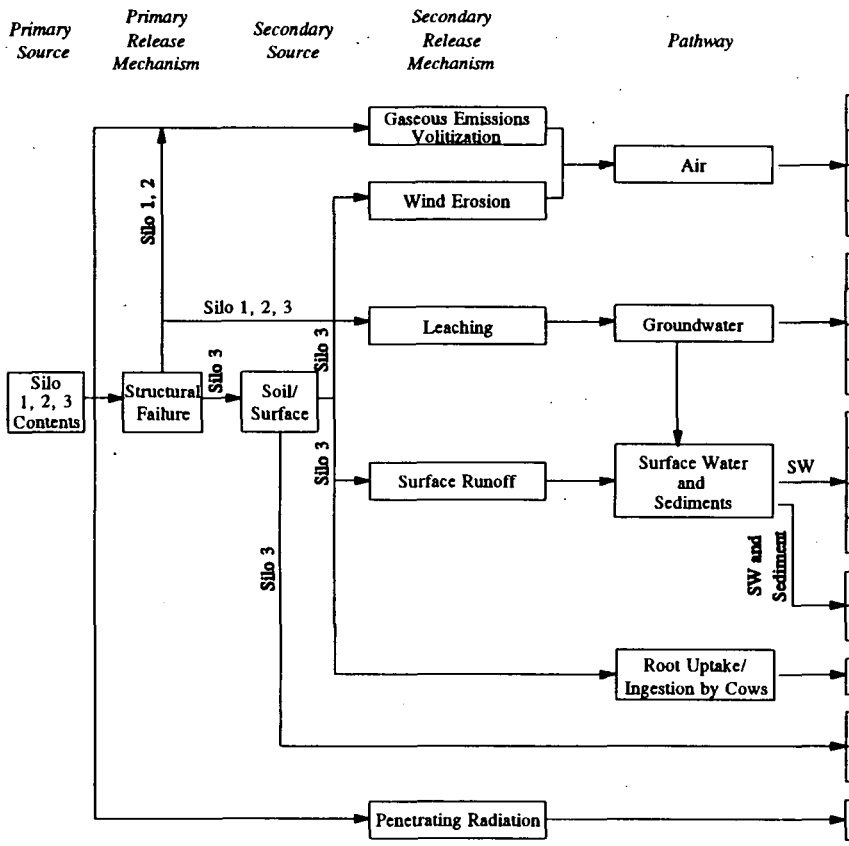
Cross-hatched boxes indicate receptor exposure routes that are included in the quantiatove risk assessment

CT = Central Tendency
RME = Reasonable Maximum Exposure



Exposure Routes	Receptors: Current Land Use without Access Controls: Trespassing Child	Groundskeeper Worker	Off-Property Farmer	Off-Property User of Surface Water	Current Land Use with Access Controls: Trespassing Child	Off-Property Farmer	Off-Property User of Surface Water	Future Land Use: Typical On-Property Farmer	RME On-Property Farmer	On-Property Resident Child	Off-Property Farmer	Off-Property User of Surface Water
Inhalation				1			1					1
Dermal Contact	2	2	2	1	2	2	1	2	2	2	2	1
Direct Radiation	2,3	2,3	2,3	1	2,3	2,3	1	2,3	2,3	2,3	2,3	1
Food Stuffs	4	4		1	4		1					1
Ingest Drinking Water	4	4		1	4		1					1
Inhalation VOCs	4	4		1	4		1		8			1
Dermal Contact	4	4		1	4		1					1
Food Stuffs	4	4		1	4		1					1
Ingest Drinking Water	4	4	7		4	7		7	7	7	7	
Inhalation VOCs	4	4	7		4	7		7	7	7	7	
Dermal Contact	4	4	7		4	7		7	7	7	7	
Food Stuffs	4	4	7		4	7		7	7	7	7	
Incidental Ingestion	9	8	2	2	9	2	2	2	2	9	2	2
Dermal Contact	9	8	2	2	9	2	2	2	2	9	2	2
Food Stuffs	4	4	6	1	4	6	1				6	1
Incidental Ingestion			6	1		6	1				6	1
Dermal Contact			6	1		6	1				6	1
Direct Radiation			2	1		2	1				2	1

1) The objective of quantifying exposure routes to the off-property user of surface water is to isolate and evaluate the impact of contamination from the Great Miami River through water pathways.
2) Potential impact of exposure route is minor compared to other exposure routes .
3) EPA Risk assessment methodology for radionuclides dos not address this exposure route.
4) Exposure route is not applicable to a transient, non-resident receptor.
5) Evaluated using two different exposure point concentrations: modeled aquifer concentration and modeled sand lens concentration.
6) Off-property soils is within the scope of OU5. Impact on food stuff exposure routes from air deposition is included in the air exposure routes.
7) Receptor is assumed to obtain water for all needs from groundwater.
8) Receptor is assumed to restrict activities to work at OU4 and not contact surface water via these exposure routes.
9) Evaluated for sediment ingestion and dermal contact with sediment using modeled concentration impacted by sand lens.

FIGURE 6-1. OU4 CONCEPTUAL MODEL – SILO CONTENTS

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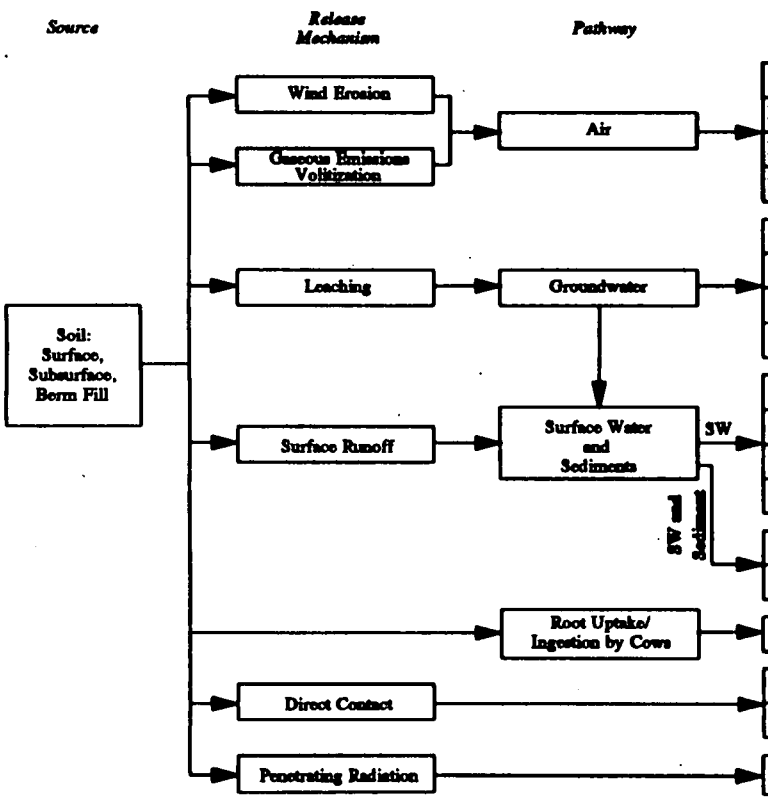
Cross-hatched boxes indicate receptor exposure routes that are included in the quantistove risk assessment

CT = Central Tendency
RME = Reasonable Maximum Exposure



Exposure Route	Current Land Use without Access Controls: Trespassing Child	Groundskeeper Worker	Off-Property Farmer	Off-Property User of Surface Water	Current Land Use with Access Controls: Trespassing Child	Off-Property Farmer	Off-Property User of Surface Water	Future Land Use: Typical On-Property Farmer	RME On-Property Farmer	On-Property Resident Child	Off-Property Farmer	Off-Property User of Surface Water
Inhalation				1			1					1
Dermal Contact	2	2	2	1	2	2	1	2	2	2	2	1
Direct Radiation	2,3	2,3	2,3	1	2,3	2,3	1	2,3	2,3	2,3	2,3	1
Food Stuffs	4	4		1	4		1					1
Ingest Drinking Water	4	4	5	1	4	5	1	5	5	5	5	1
Inhalation VOCs	4	4	5	1	4	5	1	5	5	5	5	1
Dermal Contact	4	4	5	1	4	5	1	5	5	5	5	1
Food Stuffs	4	4	5	1	4	5	1	5	5	5	5	1
Ingest Drinking Water	4	4	7		4	7		7	7	7	7	
Inhalation VOCs	4	4	7		4	7		7	7	7	7	
Dermal Contact	4	4	7		4	7		7	7	7	7	
Food Stuffs	4	4	7		4	7		7	7	7	7	
Incidental Ingestion		8	2	2		2	2	2	2		2	2
Dermal Contact		8	2	2		2	2	2	2		2	2
Food Stuffs	4	4	6	1	4	6	1				6	1
Incidental Ingestion			6	1		6	1				6	1
Dermal Contact			6	1		6	1				6	1
Direct Radiation			2	1		2	1				2	1

1) The objective of quantifying exposure routes to the off-property user of surface water is to isolate and evaluate the impact of contamination from the Great Miami River through water pathways.
2) Potential impact of exposure route is minor compared to other exposure routes .
3) EPA Risk assessment methodology for radionuclides dos not address this exposure route.
4) Exposure route is not applicable to a transient, non-resident receptor.
5) Soil in Operable Unit 4 is not included as a source term to groundwater modeling.
6) Off-property soils is within the scope of OU5. Impact on food stuff exposure routes from air deposition is included in the air exposure routes.
7) Receptor is assumed to obtain water for all needs from groundwater.
8) Receptor is assumed to restrict activities to work at OU4 and not contact surface water via these exposure routes.

FIGURE 6-2. OU4 CONCEPTUAL MO[illegible] - SOIL AND BERM FILL MATERIAL

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(IRIS, EPA 1992a) and the updated Health Effects Assessment Summary Table (HEAST, EPA 1992b). Cancer slope factors have been developed by the EPA for estimating ILCRs associated with exposure to carcinogenic chemicals. The slope factors, which are expressed in units of milligrams per kilograms-day (mg/kg-day)$^{-1}$, are multiplied by the estimated intake of a carcinogen, in mg/kg-day, to provide an upper-bound estimate of the ILCR associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the slope factor. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer slope factors are derived from the results of human epidemiological studies, or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. Tables 6-3 and 6-4 provide the cancer slope factors for Operable Unit 4 chemical COCs and radiological COCs respectively.

For cancer induction, it is assumed that no dose threshold exists. Therefore, for any dose of a carcinogen, there exists a possibility, however small, of contracting cancer. Incremental lifetime cancer risks are expressed in terms of the probability that a given receptor (person) will contract cancer due to the calculated exposures. For example, if the receptor has an additional 1 chance in 10,000 of contracting cancer due to the calculated exposures, the probability of developing cancer is expressed as a 10^{-4} (1 in 10,000) risk. However, these risk factors should only be used to make a qualitative estimate of individual receptor impact, because the risk coefficients are intended for predicting cancer in a large population.

For chemical toxicants, the data suggests a dose threshold or reference dose (RfD) exists below which no toxic effect is observed. RfDs have been developed by the EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse non-carcinogenic effects to occur. Table 6-5 provides the RfDs for Operable Unit 4 COCs.

To determine if the exposure levels of Operable Unit 4 constituents may cause adverse health effects, the estimated intake of a particular constituent (calculated from the exposure assessment) is compared

TABLE 6-3

CANCER SLOPE FACTORS FOR CARCINOGENIC EFFECTS OF CONSTITUENTS OF CONCERN FOR OPERABLE UNIT 4

Chemical	Oral Cancer Slope Factor $(mg/kg/day)^{-1}$	Inhalation Cancer Slope Factor $(mg/kg/day)^{-1}$[a]	Tumor Site		Cancer Classification[ab]	Reference
			Oral	Inhalation		
Inorganics						
Ammonia	ND[c]	ND	ND	ND	ND	ND
Antimony	ND	ND	ND	ND	D	d
Arsenic	1.75	15	skin	respiratory tract	A	e
Barium	ND	ND	ND	ND	D	d
Beryllium	4.3	8.4	gross tumors	lung	B2	e
Boron	ND	ND	ND	ND	ND	ND
Cadmium (food)	ND	6.3	ND	respiratory tract	B1	e
Cadmium (water)	ND	6.3	ND	respiratory tract	B1	e
Chromium (VI)	ND	42	ND	lung	A	e
Cobalt	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	D	e
Cyanide	ND	ND	ND	ND	D	e
Fluoride	ND	ND	ND	ND	ND	ND
Lead	ND	ND	kidney	ND	B2	e
Manganese	ND	ND	ND	ND	D	e
Mercury	ND	ND	ND	ND	D	e
Molybdenum	ND	ND	ND	ND	D	d
Nickel	ND	0.84	ND	respiratory tract	A	e
Nitrate	ND	ND	ND	ND	ND	ND
Phosphorus	ND	ND	ND	ND	D	e
Selenium	ND	ND	ND	ND	D	e
Silver	ND	ND	ND	ND	D	e
Thallium compounds	ND	ND	ND	ND	ND	e

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TABLE 6-3
(Continued)

Chemical	Oral Cancer Slope Factor (mg/kg/day)$^{-1}$	Inhalation Cancer Slope Factor (mg/kg/day)$^{-1}$[a]	Tumor Site: Oral	Tumor Site: Inhalation	Cancer Classification[ab]	Reference
Uranium	ND	ND	ND	ND	ND	f
Vanadium	ND	ND	ND	ND	ND	d
Zinc	ND	ND	ND	ND	D	e
Volatiles						
2-Butanone	ND	ND	ND	ND	D	e
2-Hexanone	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	D	e
Carbon tetrachloride	0.13	0.053	liver	ND	B2	e
Methylene chloride	0.0075	0.0016	liver	lung, liver	B2	e
Tetrachloroethene	0.052	0.002	lung	lung	B2-C	g
Toluene	ND	ND	ND	ND	D	e
Total xylenes	ND	ND	ND	ND	D	e
Semivolatiles						
Acenaphthylene	ND	ND	ND	ND	D	e
Aldrin	17	17	liver	ND	B2	e
Anthracene	ND	ND	ND	ND	D	e
Benzo(a)anthracene	7.3	6.1	ND	ND	B2	h
Benzo(a)pyrene	7.3	6.1	stomach	respiratory tract	B2	e, g
Benzo(b)fluoranthene	7.3	6.1	ND	ND	B2	h
Benzo(g,h,i)perylene	ND	ND	ND	ND	D	e
Benzoic acid	ND	ND	ND	ND	D	e
bis(2-Ethylhexyl)phthalate	0.014	ND	liver	ND	B2	e
Chrysene	7.3	6.1	lymphoma, skin	ND	B2	h
Di-n-butylphthalate	ND	ND	ND	ND	D	e

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TABLE 6-3
(Continued)

Chemical	Oral Cancer Slope Factor $(mg/kg/day)^{-1}$	Inhalation Cancer Slope Factor $(mg/kg/day)^{-1}$[a]	Tumor Site		Cancer Classification[ab]	Reference
			Oral	Inhalation		
Di-n-octylphthalate	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	7.3	6.1	ND	ND	B2	h
Diethyl phthalate	ND	ND	ND	ND	D	e
Dimethyl phthalate	ND	ND	ND	ND	D	e
Fluoranthene	ND	ND	ND	ND	D	e
Indeno(1,2,3-cd)pyrene	7.3	6.1	ND	ND	B2	h
2-Nitrophenol	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	7	ND	multiple	ND	B2	e
Phenanthrene	ND	ND	ND	ND	D	e
Phenol	ND	ND	ND	ND	D	e
Pyrene	ND	ND	ND	ND	D	e
Tributyl phosphate	ND	ND	ND	ND	D	i
Pesticides/PCBs						
Aroclor-1248	7.7	ND	liver	ND	B2	i
Aroclor-1254	7.7	ND	liver	ND	B2	i
Aroclor-1260	7.7	ND	liver	ND	B2	e
4,4'-DDE	0.34	ND	liver	ND	B2	e
4,4'-DDT	0.34	0.34	liver	ND	B2	e
Dieldrin	16	16	liver	ND	B2	e
Endosulfan I	ND	ND	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	D	d
Heptachlor epoxide	9.1	9.1	liver	ND	B2	e

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TABLE 6-3
(Continued)

Chemical	Oral Cancer Slope Factor $(mg/kg/day)^{-1}$	Inhalation Cancer Slope Factor $(mg/kg/day)^{-1}$[a]	Tumor Site		Cancer Classification[ab]	Reference
			Oral	Inhalation		

[a]Derived from inhalations unit risk.
[b]Cancer weight-of-evidence Group A = human carcinogen; Group B1 and B2 = probable human carcinogen; Group C = possible human carcinogen; Group D - not classifiable as to carcinogenicity to humans; Group E = evidence of noncarcinogenicity to humans
[c]ND - no data
[d]EPA 1993b, "Drinking Water Regulations and Health Advisories"
[e]Integrated Risk Information System (IRIS), 1993 (EPA 1993a) current as of April 1993
[f]The carcinogenicity of uranium is attributed to its radioactivity; see Appendix D of the Operable Unit 4 Remedial Investigation.
[g]EPA, Health Effects Assessment Summary Table (HEAST)(EPA 1992a).
[h]The oral and inhalation cancer slope factors for benzo(a)pyrene are used for the other polyaromatic hydrocarbons assigned to cancer classification B2 (see the toxicological profile for polyaromatic hydrocarbons of Appendix D from the Operable Unit 4 Remedial Investigsation for additional information).
[i]EPA, 1993d, Memorandum from J. Dollarhide ECAO to P. VanLeeuwen Region V, 7/21/93, including Attachments 1-6.

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TABLE 6-4

CANCER SLOPE FACTORS FOR OPERABLE UNIT 4 RADIONUCLIDES OF CONCERN[a]

Radionuclide	ICRP Lung Class[b]	Inhalation $(pCi)^{-1}$	GI Absorption Factor (f_1)	Ingestion $(pCi)^{-1}$	Penetrating External Exposure $(pCi \cdot yr/g)^{-1}$
Uranium - 238 Series					
U-238 + 2 dtrs	Y	5.2×10^{-8}	5.0×10^{-2}	2.8×10^{-11}	3.6×10^{-8}
U-234	Y	2.6×10^{-8}	5.0×10^{-2}	1.6×10^{-11}	3.0×10^{-11}
Th-230	Y	2.9×10^{-8}	2.0×10^{-4}	1.3×10^{-11}	5.4×10^{-11}
Ra-226 + 5 dtrs	W	3.0×10^{-9}	2.0×10^{-1}	1.2×10^{-10}	6.0×10^{-6}
Rn-222 + 4 dtrs	Gas	7.7×10^{-12}	1.0×10^{0}	1.7×10^{-12}	5.9×10^{-6}
Pb-210 + 2 dtrs	D	4.0×10^{-9}	2.0×10^{-1}	6.6×10^{-10}	1.6×10^{-10}
Uranium - 235 Series					
U-235 + 1 dtr	Y	2.5×10^{-8}	5.0×10^{-2}	1.6×10^{-11}	2.4×10^{-7}
Pa-231	Y	3.6×10^{-8}	1.0×10^{-3}	9.2×10^{-11}	2.6×10^{-8}
Ac-227 + 7 dtrs	Y	8.8×10^{-8}	1.0×10^{-3}	3.5×10^{-10}	8.5×10^{-7}
Thorium - 232 Series					
Th-232	Y	2.8×10^{-8}	2.0×10^{-4}	1.2×10^{-11}	2.6×10^{-11}
Ra-228 + 1 dtr	W	6.9×10^{-10}	2.0×10^{-1}	1.0×10^{-10}	2.9×10^{-6}
Th-228 + 7 dtrs	Y	7.8×10^{-8}	2.0×10^{-4}	5.5×10^{-11}	5.6×10^{-6}
Fission Products					
Tc-99	W	8.3×10^{-12}	8.0×10^{-1}	1.3×10^{-12}	6.0×10^{-13}
Sr-90 + 1 dtr	D	6.2×10^{-11}	3.0×10^{-1}	3.6×10^{-11}	0.0×10^{0}

[a]EPA, Health Effects Assessment Summary Tables, Annual FY 1992 including the July 1992 and November 1992 supplements (EPA 1992a)
[b]Classification recommended by the ICRP for half-time for clearance from the lung. "Y" = years, "W" = weeks, "D" = days.

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TABLE 6-5

REFERENCE DOSES FOR NONCARCINOGENIC EFFECTS OF CONSTITUENTS OF CONCERN FOR OPERABLE UNIT 4

Chemical	Oral Reference Dose (mg/kg/day)	Inhalation Reference Dose (mg/kg/day)[a]	Target Organ		Uncertainty Factor	
			Oral	Inhalation	Oral	Inhalation
Inorganics						
Ammonia	ND	0.029[b]	ND	Respiratory system	ND	30
Antimony	0.0004[b]	ND[c]	Liver	ND	1000	ND
Arsenic	0.0003[b]	ND	Skin	ND	3	ND
Barium	0.07[b]	0.00014[d]	Cardiovascular system	Fetus	3	1000
Beryllium	0.005[b]	ND	ND	ND	100	ND
Boron	0.09[b]	0.0057[d]	Testis	Respiratory system	100	100
Cadmium (food)	0.001[b]	ND	Kidney	Cancer (see Table 6-3)	10	ND
Cadmium (water)	0.0005[b]	ND	Kidney	Cancer (see Table 6-3)	10	ND
Chromium (VI)	0.005[b]	ND	ND	ND	500	ND
Cobalt	0.06[e]	0.0000003[f]	Cardiovascular system	Respiratory system	ND	1000
Copper	ND	ND	ND	ND	ND	ND
Cyanide	0.02[b]	ND	Central nervous system	ND	500	ND
Fluoride	0.06[b]	ND	Teeth	ND	1	ND
Lead	ND	ND	Central nervous system	Central nervous system	ND	ND
Manganese	0.14 (food)[b]	0.00011[b]	Central nervous system	Respiratory system	1	300
Manganese	0.005 (water)[b]	0.00011[b]	Central nervous system	Respiratory system	1	300
Mercury	0.0003[d]	0.000086[d]	Kidney	Central nervous system	1000	30
Molybdenum	0.005[b]	ND	Liver	ND	30	ND
Nickel	0.02[b]	ND	ND	Cancer (see Table 6-3)	300	ND
Nitrate	1.6[b]	ND	Blood	ND	1	ND

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TABLE 6-5
(Continued)

Chemical	Oral Reference Dose (mg/kg/day)	Inhalation Reference Dose (mg/kg/day)[a]	Target Organ		Uncertainty Factor	
			Oral	Inhalation	Oral	Inhalation
Inorganics						
Phosphorus	0.00002[b]	ND	Reproductive system	ND	1000	ND
Selenium	0.005[b]	ND	Skin	ND	3	ND
Silver	0.005[b]	ND	ND	ND	3	ND
Thallium	0.00006[b,g]	ND	Central nervous system	ND	3000	ND
Uranium	0.003[b]	ND	Kidney	ND	1000	ND
Vanadium	0.007[d]	ND	ND	ND	100	ND
Zinc	0.3[b]	ND	Blood	ND	3	ND
Volatiles						
2-Butanone	0.05[d]	0.3[b]	ND	Fetus	1000	1000
2-Hexanone	0.04[k]	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	0.05[d]	0.023[d]	Liver	Liver	1000	1000
Acetone	0.1[b]	ND	Liver	ND	1000	ND
Carbon tetrachloride	0.0007[b]	0.00057[h]	Liver	ND	1000	ND
Methylene chloride	0.06[b]	0.86[d]	Liver	Liver	100	100
Tetrachloroethene	0.01[b]	ND	Liver	ND	1000	ND
Toluene	0.2[b]	0.11[d]	Liver	Central nervous system	1000	300
Total xylenes	2[b]	ND	Central nervous system	ND	100	ND
Semivolatiles						
Acenaphthylene	ND	ND	ND	ND	ND	ND
Aldrin	0.00003[b]	ND	Liver	ND	1000	ND
Anthracene	0.3[b]	ND	ND	ND	3000	ND

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TABLE 6-5
(Continued)

Chemical	Oral Reference Dose (mg/kg/day)	Inhalation Reference Dose (mg/kg/day)[a]	Target Organ		Uncertainty Factor	
			Oral	Inhalation	Oral	Inhalation
Semivolatiles						
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND
Benzoic acid	4[b]	ND	ND	ND	1	ND
bis(2-Ethylhexyl)phthalate	0.02[b]	ND	Liver	ND	1000	ND
Chrysene	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	0.1[b]	ND	ND	ND	1000	ND
Di-n-octylphthalate	0.02[d]	ND	Liver	ND	1000	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND
Diethyl phthalate	0.8[b]	ND	ND	ND	1000	ND
Dimethyl phthalate	10[d]	ND	Kidney	ND	10	ND
Fluoranthene	0.04[b]	ND	Kidney	ND	3000	ND
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ND	ND	ND	ND	ND	ND
4-Nitrophenol	0.008[h]	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND
Phenol	0.6[b]	ND	Fetus	ND	100	ND
Pyrene	0.03[b]	ND	Kidney	ND	3000	ND
Tributyl phosphate	0.005[k]	ND	ND	ND	ND	ND

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TABLE 6-5
(Continued)

Chemical	Oral Reference Dose (mg/kg/day)	Inhalation Reference Dose (mg/kg/day)[a]	Target Organ		Uncertainty Factor	
			Oral	Inhalation	Oral	Inhalation
Pesticides/PCBs						
Aroclor-1248	0.00007[b,i]	ND	Fetus	ND	100	ND
Aroclor-1254	0.00007[b,i]	ND	Fetus	ND	100	ND
Aroclor-1260	0.00007[b,i]	ND	Fetus	ND	100	ND
4,4'-DDE	ND	ND	ND	ND	ND	ND
4,4'-DDT	0.0005[b]	ND	Liver	ND	100	ND
Dieldrin	0.00005[b]	ND	Liver	ND	100	ND
Endosulfan I	0.00005[j]	ND	Kidney	ND	3000	ND
Endosulfan II	0.00005[j]	ND	Kidney	ND	3000	ND
Endrin	0.0003[b]	ND	Liver	ND	100	ND
Heptachlor epoxide	0.000013[b]	ND	Liver	ND	1000	ND

[a]Derived from inhalation RfC.
[b]Integrated Risk Information System (IRIS) (EPA 1993[a]) current as of April 1993.
[c]ND - no data.
[d]EPA, Health Effects Assessment Summary Tables, (HEAST) Annual FY 92 including July and November Supplements (EPA 1992a).
[e]EPA 1992[e], Memorandum from D. L. Forman, U. S. EPA Region VII, Philadelphia, Pennsylvania, "Subject: Cobalt Toxicity," dated March 12, 1992.
[f]EPA 1990c, Memorandum from Pei-Fung Hurst, ECAO, Cincinnati, Ohio, to R. Riccio, U.S. EPA Region III, Philadelphia, Pennsylvania, "Subject: Toxicity of Cobalt (Halby Chemical/Wilmington, Delaware)," dated October 9, 1990.
[g]Derived by analogy to thallium sulfate, adjusting for differences in molecular weight.
[h]EPA 1993c
[i]Based on anology to Aroclor - 1016.
[j]EPA, 1993e, Health Effects Assessment Summary Tables, (HEAST), March, 1993.
[k]EPA, 1993d, Memorandum from J. Dollarhide, ECAO to P. VanLeeuwen, Region V, 7/21/93.

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to the RfD, which defines the acceptable intake. If the ratio of estimated intake to the acceptable intake is greater than one, the site-related intake may cause toxic effects. This ratio is called the Hazard Quotient (HQ). When HQs for multiple COCs are summed, the resultant value is the Hazard Index (HI).

6.1.4 Risk Characterization Results

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g. 1×10^{-6} or 1E-6). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, an individual had a one in one million chance of developing cancer as result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the HQ (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the HI can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Tables 6-6 and 6-7 shows the baseline risks and HIs for each hypothetical receptor by land use and source term scenario. Risk values in Table 6-6 are reported in units of ILCR for radiological, chemical, and total risk. The chemical HI, which has no units, is presented in Table 6-7.

6.1.4.1 Current Land Use Without Access Control/Current Source-Term Scenario

The receptor with the greatest total radiological risk is the trespassing child (Table 6-6). The greatest contributor under this scenario is from exposure to external radiation while the receptor is on top of the Silo 1 or 2 dome (5×10^{-3}). In addition, the receptor is exposed to air, soil, and surface water pathways resulting in radiological risk of 3×10^{-5}. The total radiological risk to the trespassing child is 5×10^{-3} (external radiation) plus 3×10^{-5} (nuclide-specific radiation) totalling 5×10^{-3}. The receptor with the greatest total chemical risk (1×10^{-4}) is the off-property resident farmer (Table 6-6). The greatest contribution under this scenario is from exposure to air pathways (1×10^{-4}). The receptor with the greatest total radiological plus chemical risk under this scenario (5×10^{-3}, Table 6-6) is the trespassing child. The greatest HI is 0.3 to the trespassing child (Table 6-7). The greatest contribution, under this scenario is from soil exposure pathways (0.2).

TABLE 6-6

INCREMENTAL LIFETIME CANCER RISK SUMMARY ALL SOURCES/ALL PATHWAYS

Land Use/ Source Term Scenario	Type of Risk	Trespassing Child	Grounds Keeper	Off-Property Resident Farmer	Off-Property User of Surface Water	CT On-Property Resident Farmer	RME On-Property Resident Farmer[a]	On-Property Resident Child
Current Land Use without Access Control/Current Source Term Scenario	Radiological-Nuclide Specific[b]	3.0×10^{-5}	8.0×10^{-5}	1.0×10^{-5}	1.0×10^{-7}	NA[c]	NA	NA
	Radiological-External[d]	5×10^{-5}	1×10^{-4}	NA	NA	NA	NA	NA
	Chemical Risk	1.0×10^{-5}	2.0×10^{-5}	1.0×10^{-4}	1.0×10^{-7}	NA	NA	NA
	Total Risk	5.0×10^{-3}	2.0×10^{-4}	1.0×10^{-4}	2.0×10^{-7}	NA	NA	NA
Current Land Use without Access Control/Future Source Term Scenario	Radiological-Nuclide Specific	1.0×10^{-2}	3.0×10^{-2}	2.0×10^{-3}	1.0×10^{-6}	NA	NA	NA
	Chemical Risk	4.0×10^{-4}	6.0×10^{-4}	2.0×10^{-4}	7.0×10^{-7}	NA	NA	NA
	Total Risk	1.0×10^{-2}	3.0×10^{-2}	2.0×10^{-3}	2.0×10^{-6}	NA	NA	NA
Current Land Use with Access Control/Current Source Term Scenario	Radiological-Nuclide Specific	3.0×10^{-5}	NA	1.0×10^{-5}	1.0×10^{-7}	NA	NA	NA
	Radiological-External	5.0×10^{-3}	NA	NA	NA	NA	NA	NA
	Chemical Risk	1.0×10^{-5}	NA	1.0×10^{-4}	1.0×10^{-7}	NA	NA	NA
	Total Risk	5.0×10^{-3}	NA	1.0×10^{-4}	2.0×10^{-7}	NA	NA	NA
Future Land Use/Current Source Term Scenario	Radiological-Nuclide Specific	NA	NA	1.0×10^{-5}	1.0×10^{-7}	2.0×10^{-4}	3.0×10^{-3}	3.0×10^{-4}
	Radiological-External	NA	NA	NA	NA	2.0×10^{-4}	2.0×10^{-3}	9.0×10^{-3}
	Chemical Risk	NA	NA	1.0×10^{-4}	1.0×10^{-7}	5.0×10^{-3}	8.0×10^{-2}	5.0×10^{-2}
	Total Risk	NA	NA	1.0×10^{-4}	2.0×10^{-7}	5.0×10^{-3}	9.0×10^{-2}	6.0×10^{-2}
Future Land Use/ Future Source Term Scenario	Radiological-Nuclide Specific	NA	NA	2.0×10^{-3}	1.0×10^{-6}	1.0×10^{-1}	1.0×10^{0}	1.0×10^{-1}
	Chemical Risk	NA	NA	2.0×10^{-4}	7.0×10^{-7}	1.0×10^{-2}	2.0×10^{-1}	9.0×10^{-2}
	Total Risk	NA	NA	2.0×10^{-3}	2.0×10^{-6}	1.0×10^{-1}	>1.0	2.0×10^{-1}

[a]The ILCR values were identical for the future land use/future source term scenario evaluated for either the Great Miami Aquifer or for perched water.
[b]The ILCR result from exposure to radionuclides from air, water, (ground and surface), soil and sediment as detailed in Attachment II of Appendix D and summarized in tables within Section D.5.
[c]NA signifies not applicable.
[d]This risk results from exposure to direct external radiation from large sources (Silos 1, 2, and 3) and are presented in Table D.5-2. It does not include exposure to external radiation emanating from radionuclides in surface soils. These later risk are accounted for in the nuclide-specific ILCR.

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TABLE 6-7

HAZARD INDEX SUMMARY ALL SOURCES/ALL PATHWAYS

Land Use/ Source Term Scenario	Type of Risk	Trespassing Child	Grounds Keeper	Off-Property Resident Farmer	Off-Property User of Surface Water	CT On-Property Resident Farmer	RME On-Property Resident Farmer[a]	On-Property Resident Child
Current Land Use without Access Control/Current Source Term Scenario	Chemical Hazard Index	0.3	0.1	0.05	0.0004	NA[b]	NA	NA
Current Land Use without Access Control/Future Source Term Scenario	Chemical Hazard Index	20	20	5	0.002	NA	NA	NA
Current Land Use with Access Control/Current Source Term Scenario	Chemical Hazard Index	0.3	NA	0.05	0.0004	NA	NA	NA
Future Land Use/Current Source Term Scenario	Chemical Hazard Index	NA	NA	0.05	0.0004	8	20	100
Future Land Use/Future Source Term Scenario	Chemical Hazard Index	NA	NA	5	0.002	300	500	2000

[a]The HI (500) was identical for the future land use/future source-term scenario.
[b]NA signifies not applicable.

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6.1.4.2 Current Land Use Without Access Control/Future Source-Term Scenario

The receptor with the greatest total radiological risk is the groundskeeper (Table 6-6). The greatest contribution under this scenario is from exposure to soil pathways (2×10^{-2}). The total radiological risk to the groundskeeper under this scenario is 3×10^{-2} (Table 6-6). The receptor with the greatest total chemical risk is also the groundskeeper (Table 6-6). The greatest contribution is from exposure to soil pathways (5×10^{-4}). The total chemical risk to the groundskeeper under this scenario is 6×10^{-4}. The total radiological plus chemical risk to the groundskeeper under this scenario is 3×10^{-2} (Table 6-6). The greatest HI is 20 to the groundskeeper (Table 6-7) and to the trespassing child (Table 6-6). The greatest contribution to both receptors under this scenario is from exposure to air pathways.

6.1.4.3 Current Land Use With Access Control/Current Source-Term Scenario

This scenario most closely approximates current conditions at the FEMP site. However, the risk and HI results for this scenario are numerically the same as the results for the current land-use scenario without access controls assuming the current source term (Section 6.1.4.1). This is because the presence or absence of access controls does not change the numerical values of exposure parameter values for receptors. The trespassing child's exposure parameter values reflect the standard scenario specified by the EPA. Also, the off-property resident farmer, and surface water user exposures are not impacted by the status of access controls.

6.1.4.4 Future Land Use/Current Source-Term Scenario

The receptor with the greatest total radiological risk is the on-property resident child (Table 6-6). The greatest contribution under this scenario is from exposure to external radiation while the receptor is on top of the Silo 1 or 2 dome (9×10^{-3}). In addition, the receptor is exposed to air, soil, and surface water pathways resulting in a radiological risk of 3×10^{-4}, primarily from the soil pathway (2×10^{-4}). The total radiological risk to the on-property resident child is 9×10^{-3} plus 3×10^{-4} totalling 9×10^{-3}. The receptor with the greatest total chemical risk (8×10^{-2}) is the RME on-property resident farmer (Table 6-6). The greatest contribution under this scenario is from exposure to soil pathways (8×10^{-2}). The receptor with the greatest total radiological plus chemical risk under this scenario (9×10^{-2}, Table 6-6) is the RME on-property resident farmer. The greatest HI is 100 to the on-property resident child (Table 6-7). The greatest contribution to chemical hazard under this scenario is from soil exposure pathways (100).

6.1.4.5 Future Land Use/Future Source-Term Scenario

This represents the most conservative scenario considered under the baseline risk assessment. Within this scenario, a family is assumed to have established a residence within the Operable Unit 4 boundaries. Additionally, the domes of Silos 1 and 2 are assumed to have failed and Silo 3 is assumed to have suffered total structural failure, spreading its contents to the surface of Operable Unit 4. As described in Section D.3 of the RI Report for Operable Unit 4, the failure of Silo 3 and the assumed distribution of its contents on the surrounding surface makes it more appropriate to evaluate direct external exposure in a nuclide- specific manner rather than as a large source. With the failure of the domes of Silos 1 and 2 it is no longer appropriate to evaluate direct external radiation exposure at these locations. Therefore, the separate entry in Table 6-6 for external radiation does not appear for the future source-term scenario.

The receptor with the greatest total radiological risk is the RME on-property resident farmer (Table 6-6). The greatest contribution under this scenario is from exposure to soil pathways (approaching unity risk). The total radiological risk to the RME on-property resident farmer under this scenario also approaches unity (1) risk. The receptor with the greatest total chemical risk is also the RME on-property resident farmer (Table 6-6). The greatest contribution is from exposure to soil pathways (2×10^{-1}). The total chemical risk to the RME on-property resident farmer under this scenario is 2×10^{-1}. The total radiological plus chemical risk to the RME on-property resident farmer under this scenario exceeds unity (Table 6-6). The greatest HI is 2000 to the on-property resident child (Table 6-7). The greatest contribution to this receptor under this scenario is from exposure to soil pathways.

6.1.5 Risk Assessment Uncertainties

The uncertainties inherent in the risk assessment process are presented in detail in Section D.6.0 of Appendix D of the RI Report for Operable Unit 4. These uncertainties are summarized below to enable a better understanding of their impacts on the foregoing risk assessment.

Uncertainty is a factor in each step of the exposure and toxicity assessment process. Such uncertainty can involve variations in sample analytical results, the values of variables used as input to a given model, the accuracy with which the model itself represents actual environmental or biological processes, the manner in which the exposure scenario is developed, and the high-to-low dose and interspecies extrapolations for dose-response relationships.

Generally, risk assessments carry two types of uncertainty. First, measurement uncertainty refers to the usual variance that accompanies scientific measurements (such as the range of an exposure estimate) and reflects the accumulated variances of the individual measured values used to develop the estimate. The second form of uncertainty is due to the absence of information needed to complete the database for the assessment. In some instances, the impact is significant, such as the absence of information on the adverse effects or the biological mechanism of action of a chemical agent.

6.1.5.1 Sources of Uncertainty

As noted previously, uncertainties are associated with the information and data used in each phase of the Operable Unit 4 baseline risk assessment. The first source of uncertainty arises from data gaps or limitations in the data. For example, the data set for soil is limited, and virtually nothing is known regarding contaminants in the area of the former Drum-Handling Building. These limitations could result in failure to identify some COCs which may result in underestimating risk. (This data limitation and its expected impact on the baseline risk assessment is further discussed in greater detail in Section 7.5 of the RI Report for Operable Unit 4).

Other sources of uncertainty include the conservative bias of parameters, parameter variability (random errors or natural variations), and the necessity of using computer models to predict complex environmental interactions. Uncertainties also arise from the use of animal data to predict the toxic effects and the toxic potency in humans. Uncertainties associated with information and data are evaluated below to provide the spectrum of information in regard to the overall quality of the risk assessment results. The uncertainties are associated with exposure route selection, selection of COCs, exposure point concentrations, and exposure factors.

6.1.5.2 Toxicity Assessment

Considerable uncertainty is associated with the qualitative (hazard assessment) and quantitative (dose-response) evaluations of a Superfund risk assessment. A hazard assessment deals with characterizing the nature and strength of the evidence of causation, or the likelihood that a chemical that induces adverse effects in animals will induce adverse effects in humans. Hazard assessment of carcinogenicity is evaluated as a weight-of-evidence determination, using either the International Agency for Research on Cancer (IARC) (1987) or EPA (1986) schemes. Positive cancer test data in experimental animals suggest that a human exposed to the same agent may suffer adverse effects. However, animal data, may not accurately predict the same response or the same target organ tissue for cancer in humans. Also, biochemical repair mechanisms present in humans may inhibit or

preclude an identical response. Accordingly the uncertainty of possible effects is significant. In assessing noncancer effects, however, positive experimental animal data from well designed studies in appropriate models suggest both the target tissues and type of effects that may be anticipated in humans (EPA 1989a).

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 (SWCR), was to estimate the potential and future baseline risks of FEMP contaminants to ecological receptors.

The EPA and DOE have agreed in the Amended Consent Agreement (September 1991) that the Site-Wide Ecological Risk Assessment will be performed as part of the RI for Operable Unit 5. The Site-Wide Ecological Risk Assessment in the RI 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. More discussion on the Risk Assessment and Ecological Risk issues specific to Operable Unit 4 can be found in the Operable Unit 4 Proposed Plan.

The ecological receptors potentially exposed to FEMP contaminants include all organisms, exclusive of 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 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*), racoon (*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 (NOELs) 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 3.65×10^{-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 suggests that the potential exposures predicted by modeling may not occur in the field or that the resulting potential effects as a result of exposures may not occur. 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 the conservative nature of the method used.

In summary, 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.

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7.0 DESCRIPTION OF REMEDIAL ALTERNATIVES

As previously discussed in Section 5.0, the waste materials within Operable Unit 4 exhibit a wide range of properties. Most notable would be the elevated direct radiation associated with the moist to wet Silos 1 and 2 residues versus the much lower direct radiation associated with the dry, powdery cold metal oxides in Silo 3. Even more significant would be the much lower levels of contamination associated with the soils and building materials, like concrete, within the Operable Unit 4 Study Area. To account for these differences and for the varied cleanup alternatives applying to each type of waste, Operable Unit 4 was segmented into three subunits. These subunits, which are listed below, were used through the detailed evaluation of alternatives and the identification of the preferred alternative.

Subunit A: Silos 1 and 2 (K-65 residues and bentonite clay) and the sludge in the decant sump tank

Subunit B: Silo 3 (cold metal oxides)

Subunit C: Silos 1, 2, 3, and 4 structures; contaminated soils within the Operable Unit 4 boundary including surface and subsurface soils and the earthen berm around Silos 1 and 2; the decant sump tank; the radon treatment system; the concrete pipe trench and the miscellaneous concrete structures within Operable Unit 4, any debris (i.e., concrete, piping, etc.,) generated through implementing cleanup for Subunits A and B, and any perched groundwater encountered during remedial activities.

With the exception of Alternatives 2A/Vit and 2A/Cem (see Section 11 for details) the remedial alternatives, which went through detailed analysis during the FS for Operable Unit 4, are summarized below. The discussions presented here are based on the information used for detailed analysis of alternatives during the FS. Actual methods used during the implementation of the selected alternative(s) will be determined during detail engineering design described in the remedial design and may differ from the descriptions provided below.

Section 121 of CERCLA requires that remedial actions be protective of human health and the environment, and 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 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.

The baseline risk assessment performed as part of the RI Report for Operable Unit 4, quantified the health risks to hypothetical human receptors due to exposure from chemical and radiological sources in Operable Unit 4 under the no-action alternative. A summary of the risk assessment and results is presented in Section 6.0. Essentially, the results emphasize the need to effectively complete the selected remedial actions at Operable Unit 4 in order to ensure overall protection of human health and the environment.

Potential remedial alternatives were developed and evaluated in the FS Report for Operable Unit 4 as to how these risks would be eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls. Both long-term and short-term risks associated with implementing an alternative were considered in determining whether a given alternative was protective. Each alternative evaluated provides a description of its overall effectiveness in reducing risks to human health and the environment.

ARARs consist of two sets of requirements, those that are applicable and those that are relevant and appropriate. Applicable requirements are those substantive standards that specifically address a situation at a CERCLA site. Relevant and appropriate requirements are standards that address problems sufficiently similar to the situation at a CERCLA site that their use is well suited to the site. In certain cases, standards may not exist in the promulgated regulation that address the proposed action or the constituents of concern. In these cases, non-promulgated advisories, criteria, or guidance that were developed by the EPA, other federal agencies, or states are to be considered (TBC) in establishing remedial action objectives that are protective of human health and the environment.

A detailed discussion of all ARARs and TBC criteria associated with the remedial alternatives being evaluated for Operable Unit 4 is presented in Appendix F of the FS Report for Operable Unit 4. From these detailed lists, certain major ARARs and TBCs were selected based on their importance in protecting human health and the environment. These include those associated with the protection of drinking water sources, the control of radionuclide emissions, the design and siting of a solid waste disposal facility, the management of RCRA hazardous waste, and compliance with NEPA. The major ARARs associated with the remedial alternatives evaluated in this section, with the exception of the no action alternatives, are presented in Appendix A of this ROD. These major ARARs are segregated into three types:

(a) Chemical-specific ARARs are usually health- or risk-derived numerical values or methodologies that establish an acceptable level or concentration of chemical or radionuclide that may remain in specific environmental media after remediation is complete. These levels are deemed to be protective of human health and are used to help establish remedial cleanup goals.

(b) Location-specific ARARs generally restrict certain activities or dictate where certain activities may be conducted, solely because of geographical, hydrologic, hydrogeologic, or land use concerns.

(c) Action-specific ARARs are usually technology or activity based requirements or restrictions on the conduct of certain activities or the operation of certain technologies at the site.

Appendix A identifies all remedial alternatives evaluated along with their major regulatory requirements, the rationale for designation of each regulatory requirement as an ARAR/TBC, and the mechanism by which the remedial alternative will comply with the requirement.

7.1 NO-ACTION ALTERNATIVE FOR ALL SUBUNITS

The No-Action Alternative for Subunits A, B, and C is presented to provide a baseline for comparison with the other alternatives per the President's Council on Environmental Quality and 40 CFR Part 300, the National Oil and Hazardous Substances Pollution Contingency Plan regulations. Under the No-Action Alternatives, designated as 0A, 0B, and 0C for each of the three subunits, the contaminated and/or uncontaminated materials within each subunit would remain unchanged without any further waste removal, treatment, or containment activities.

Alternatives 0A, 0B, and 0C do not provide for the monitoring of soil, groundwater, or radon emissions from the Operable Unit 4 facilities or soils, and do not provide for access controls (e.g., physical barriers and deed restrictions) to reduce the potential for exposure to any human or ecological receptors. The No-Action Alternatives would not decrease the toxicity, mobility, or volume of contaminants or reduce public health or environmental risks. Also, goals for protecting the underlying groundwater aquifer would not be met. No costs are associated with the No-Action Alternative.

ARAR Compliance for No-Action Alternatives

Alternatives 0A, 0B, and 0C would not comply with a number of chemical-specific, location-specific, or action-specific ARARs. Under the no-action alternatives, Silos 1, 2, and 3 would eventually fail, resulting in the release of silo contents to the air, soil, groundwater, and surface water. Fate and transport modeling indicates that uranium and gross alpha and beta radiation would exceed safe

drinking water limits under 40 CFR §141. In addition, localized "hot spots" could exceed the limits established in 40 CFR §192.12.

7.2 SUBUNIT A - CONTENTS OF SILOS 1 AND 2 AND THE DECANT SUMP TANK

With the exception of Alternatives 2A/Vit and 2A/Cem (see Section 11 for details) this section presents the alternatives which were evaluated for Subunit A during the detailed analysis of alternatives phase of the FS for Operable Unit 4. These alternatives focus on the remediation of the K-65 residues contained in Silos 1 and 2 and the sludges in the decant sump tank.

All of the alternatives would provide overall protection of human health (assuming continued federal government control) and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls, or institutional controls. The selected remedy (3A.1/Vit) would provide greater certainty for overall protection than other alternatives because the Subunit A residues would be vitrified and removed to the NTS to reduce the potential for contaminant migration to human and ecological receptors. The source of unacceptable risks to the Operable Unit 4 expanded trespasser and off-site farmer would be eliminated, and in the event that the government lost control of the FEMP site, there would be no risk from Subunit A residues to an on-property farmer.

Overall protection at the NTS would be maintained because the vitrified residues resist leaching and the NTS is located in a climatic, demographic, and hydrogeologic setting which favors minimization of contaminant migration to both human and environmental receptors. In the long-term event of degradation of engineered features or loss of institutional controls, these site characteristics coupled with the treated residue would provide for a greater certainty of continued protectiveness than a site such as the FEMP.

7.2.1 Alternative 3A.1/Vit - Removal, Vitrification, and Off-Site Disposal - Nevada Test Site

Capital Cost:	$38.3 Million (M)
O&M Costs:	
During Remediation:	$11.7 M
Post-Remediation:	$0
Present Worth:	$43.7 M
Years to Implement:	6

This alternative involves the removal, vitrification, and off-site disposal of the treated Silos 1 and 2 contents and decant sump tank sludge. Treated material would be transported by rail, then truck, to the NTS, a DOE-owned facility that currently accepts low-level radioactive material from DOE facilities for disposal. Under Alternative 3A.1/Vit, approximately 6,796 m^3 (8,890 yd^3) of untreated residues would be removed from Silos 1 and 2 and combined with approximately 3,785 Liters (L) (1,000 gallons) of sludge from the decant sump tank and treated. Approximately 2,770 m^3 (3,623 yd^3) of vitrified material would be packaged in containers and transported to the NTS for disposal. Disposal of contaminated materials from the berms, Silos 1 and 2 structures, the material removal equipment, and the vitrification system would be managed under the selected alternative for Subunit C. No five-year CERCLA reviews would be required under this alternative since no Subunit A residue material would remain at the FEMP. The components of this alternative not previously described are as follows.

Material Removal

Silos 1 and 2 residues and decant sump tank sludge would be slurried and pumped to the vitrification plant for processing. During the material removal phase, Silos 1 and 2 and the decant sump tank would be equipped with an off-gas handling system to treat radon and other potential airborne contaminants. This off-gas handling system would be operational during material removal and before personnel enter the area above the silo domes to reposition material removal equipment and conduct repairs or maintenance. The off-gas handling system and operating procedures would be designed as necessary to minimize exposure to personnel located over the work areas and to prevent the escape of radon and radioactive particulates from the silos and the decant sump tank to the atmosphere.

Material Stabilization

Silos 1 and 2 residues and decant sump tank sludge would be combined with glass forming agents, processed in a high temperature furnace, and converted into a stable vitrified glass form exhibiting excellent durability and constituent leaching characteristics. It should be noted that current planning focuses upon pouring the molten glass directly into containers capable of withstanding the high temperature of the vitrified waste form. The final waste form would continue to be optimized in pilot plant treatability studies and final decision regarding the final waste form would be reached during the pilot plant treatability studies. Process tanks/vessels and piping containing slurried K-65 residues would be designed to minimize potential radon and particulate emissions to the atmosphere during treatment. The direct radiation associated with the treated residues would remain relatively unchanged from the untreated form of the K-65 residues.

Disposal of Treated Material

Off-site disposal for this alternative involves the packaging, loading, and shipping of the treated material, in accordance with all required United States Department of Transportation (DOT) specification regulations, to the low-level radioactive waste disposal site at the NTS, a DOE-owned facility that currently accepts low level radioactive material from DOE facilities for disposal. Shipment of the treated material to the NTS would be performed by rail transportation from the FEMP site. Currently, there are no direct rail lines into the NTS. The treated material would be transported by rail to either a point near Las Vegas, Nevada, or one of the areas north of Las Vegas. From either location, the containers carrying the treated material would be transferred to trucks for transportation over roads to the NTS.

The NTS is located approximately 3,219 kilometers (km) [2,000 miles (mi)] from the FEMP site. Disposal at the NTS would be very effective at precluding human contact with and contaminant migration from the treated residues from Subunit A. The FEMP site has an approved NTS waste shipment and certification program that is periodically audited by the NTS. Efforts have been initiated to amend the current program to include Operable Unit 4 treated material. All the NTS waste acceptance requirements would need to be satisfied prior to any shipment of the Operable Unit 4 treated material to the NTS.

Implementation Time and Costs

Remedial action activities under Alternative 3A.1/Vit could be completed in approximately six years. Approximately three years is projected for completion of site preparation, facilities construction, and equipment installation. Material removal and treatment activities would require about three years. Transportation and off-site disposal would conclude shortly after the completion of material processing. Capital costs for Alternative 3A.1/Vit are estimated to be 38.3 million dollars. O&M costs during remediation are estimated at 11.7 million dollars over three years. Due to the off-site disposal option, there are no post-remediation O&M costs associated with this alternative. The total present worth cost for this alternative is estimated at 43.7 million dollars.

7.2.2 Alternative 3A.1/Cem - Removal, Cement Stabilization, and Off-Site Disposal - NTS

Capital Cost:	$71.8 M
O&M Costs:	
During Remediation:	$11.7 M
Post-Remediation	$0

Present Worth:	$73.1 M
Years to Implement:	6

This alternative is identical to Alternative 3A.1/Vit except that the vitrification of the Silos 1 and 2 contents and decant sump tank sludge have been replaced by cement stabilization. Treated material and debris would be transported by rail, then truck to the NTS. Under Alternative 3A.1/Cem, approximately 6,796 m^3 (8,890 yd^3) of untreated materials would be removed from Silos 1 and 2, combined with approximately 3,785 L (1,000 gallons) of sludge from the decant sump tank, and treated. Approximately 18,166 m^3 (23,760 yd^3) of cement stabilized product would be packaged in containers and transported to NTS for disposal. Disposal of contaminated materials from the berms, Silos 1 and 2 structures, the material removal equipment, and the cement stabilization system would be managed under the selected alternative for Subunit C. No five-year CERCLA reviews would be required since all Subunit A materials would be removed from the site. The components of this alternative not previously described under alternative 3A.1/Vit are as follows.

Material Stabilization

Silos 1 and 2 residues and the decant sump tank sludge would be combined with cement and other additives necessary for stabilizing the materials into a cement form. Similar to Alternative 3A.1/Vit, process tanks/vessels and piping containing slurried K-65 residues would be designed to minimize potential radon and radionuclide particulate emissions to the atmosphere during treatment. Studies conducted on a small scale in a laboratory, as part of the Operable Unit 4 RI/FS, indicate that an estimated 150 percent increase can be expected in the volume of waste requiring disposal following stabilization. This increase is a result of the large volume of additives needed to effectively stabilize the silo residues and decant sump tank sludge in cement. These studies have also concluded that the cement stabilization of the wastes effectively reduces the radon emission rate from the waste and the tendency of the waste to leach contaminants into groundwater. The direct radiation associated with the untreated residues would be slightly reduced due to the effects of mixing the additives with the residues. The solidified materials would be packaged in containers for disposal.

Implementation Time and Costs

Remedial action activities under Alternative 3A.1/Cem could be completed in about six years. Approximately three years are projected for completion of site preparation, facilities construction, and equipment installation. Material removal and treatment activities would require about three years. Transportation and off-site disposal would conclude shortly after the completion of material

processing. Capital costs for Alternative 3A.1/Cem are estimated to be 71.8 million dollars. O&M costs during remediation are estimated at 11.7 million dollars over three years. Due to the off-site disposal option, there are no post-remediation O&M costs associated with this alternative. The total present worth cost of this alternative is estimated at 73.1 million dollars.

7.3 SUBUNIT B - CONTENTS OF SILO 3

This section presents the alternatives which were evaluated for Subunit B during the detailed analysis of alternatives phase of the Operable Unit 4 FS. These alternatives focus on the remediation of the cold metal oxides contained in Silo 3.

As discussed in Section 6, this evaluation assumes that the federal government would continue to own the FEMP site. For a cleanup remedy to be considered protective, it should not result in any unacceptable risks to an Operable Unit 4 expanded trespasser or an off-site farmer.

All alternatives would provide overall protection of human health and the environment. These alternatives will eliminate, reduce, or control the health or environmental risks resulting from constituents in Subunit B materials. All of the action alternatives, except Alternative 4B, would limit exposure to contaminants by removing the material, treating the material by either vitrification or cement stabilization, and then disposing the treated material in an on-property above-grade disposal vault (Alternative 2B) or off site at NTS (Alternative 3B.1). Alternative 4B's protection is based on removal and disposal in an on-property above-grade vault, and by retaining institutional controls. Long-term effectiveness would be attained for each of these alternatives.

Off-site disposal would provide for a greater certainty of sustained overall protectiveness than on-property disposal over the long-term, for the same reasons discussed under this criterion for Subunit A. For Subunit B residues the inadvertent intruder to the on-property, above-grade disposal vault would not be exposed to levels of direct radiation as high as those for Subunit A residues.

In summary, the preferred alternative (3B.1/Vit) would provide greater certainty than other alternatives for overall protection because the Subunit B residues would be vitrified and removed to the NTS to reduce the potential for contaminant migration to human and ecological receptors.

7.3.1 Alternative 2B/Vit - Removal, Vitrification, and On-Property Disposal

Capital Cost:	$25.2 M
O&M Costs:	
During Remediation:	$4.9 M
Post-Remediation:	$3.2 M
Present Worth:	$28.0 M
Years to Implement:	4

This alternative requires the removal, vitrification, and on-property disposal of the Silo 3 contents. Under Alternative 2B/Vit, approximately 3,890 m^3 (5,088 yd^3) of untreated materials would be removed from Silo 3 and stabilized in a vitrified glass form. Following treatment, approximately 1,471 m^3 (1,924 yd^3) of vitrified material would be packaged in containers and placed in an on-property above-grade reinforced concrete disposal vault. The Silo 3 structural materials, associated soils, the material removal system and the vitrification system would be managed under the selected alternative for Subunit C. In accordance with CERCLA 121(c) requirements, after commencement of remedial activities, a review would be performed every five years by the EPA to ensure the continued protection of human health and the environment.

Material Removal

Due to the powder-like characteristics of Silo 3 cold metal oxide residues, Alternative 2B/Vit would utilize a pneumatic removal process to transport Silo 3 contents to the material processing facility. The pneumatic removal system consists of a compressed air-driven pump that displaces and removes the dry wastes. Air entrained in the cold metal oxides, suctioned from Silo 3, would be separated using filter/receiver systems allowing the cold metal oxides to be pneumatically "pushed" to the vitrification facility. A glove box system will be used at the interface of the pneumatic removal system and the silo dome to function as secondary containment. This arrangement, along with appropriate operations procedures, would be designed to prevent releases to the atmosphere during operations.

Material Stabilization

The vitrification process is identical to that described in Section 7.2.1 for Alternative 3A.1/Vit. Bench-scale studies conducted in a laboratory as part of the RI/FS for Operable Unit 4 indicate that vitrification can effectively reduce the tendency of the Silo 3 residues to leach inorganics and radionuclides to groundwater. This testing also demonstrated that over a 50 percent reduction in the

volume of material requiring disposal could be achieved through the application of vitrification technology to the Silo 3 residues. The vitrified residues would be packaged in containers for disposal.

Disposal of Treated Material

Studies completed on a bench-scale as part of the RI/FS project that the volume of material requiring disposal can be reduced by over 50 percent as a result of applying the vitrification process. The vitrified material would be containerized and disposed in an above-grade reinforced concrete disposal vault located on property. The vault would be constructed on a reinforced concrete mat and equipped with a leachate collection/detection system to facilitate the collection of any contaminated leachate after final closure. The capping system would be composed of alternating composite soil liners and drainage layers to minimize the potential release of contaminated leachate to the underlying Great Miami Aquifer. The proposed disposal facility would be located at a suitable location of the FEMP site.

Final closure would be completed by the construction of a multimedia cap over the vault. This cap would include a clay cover to eliminate radon emanation from the disposed materials to the atmosphere and a barrier to preclude intrusion by burrowing animals and hypothetical future residents of the area. Upon completion of the multimedia cap, security controls such as fencing would be installed. Monitoring wells would be appropriately located to evaluate the effectiveness of the above-grade disposal vault in ensuring long-term protection of human health and the environment.

To provide added assurance against any future activities by humans to intrude into the disposal vault, permanent markers would be installed to identify the vault, and restrictions would be placed on the site. Additionally, in order to ensure long-term protectiveness for this alternative, it is assumed that the effected disposal areas at the FEMP would require the perpetual ownership by the federal government. While the disposal vault would be designed to not require any continued active operations or maintenance, perpetual ownership would permit the government to continue to exercise the right to preclude any development or drilling in areas where contaminated materials are disposed.

All facilities and equipment installed and used by this alternative would be disassembled and decontaminated during the post-remediation phase. Contaminated materials would be disposed in accordance with the selected remedy for Subunit C.

Implementation Time and Costs

Remedial action activities under Alternative 2B/Vit could be completed in about four years. Site preparation and construction activities would take approximately three years. Removal and material processing activities would require about one year. Capital costs for Alternative 2B/Vit are estimated to be 25.2 million dollars. O&M costs during remediation are estimated at 4.9 million dollars over one year, while post-remediation O&M costs are estimated at 3.2 million dollars over a thirty year period. The total present worth cost for this alternative is estimated at 28.0 million dollars.

7.3.2 Alternative 2B/Cem - Removal, Cement Stabilization, and On-Property Disposal

Capital Cost:	$35.9 M
O&M Costs:	
During Remediation:	$4.9 M
Post-Remediation:	$3.2 M
Present Worth:	$37.4 M
Years to Implement:	4

This alternative uses the material removal methodology presented in Alternative 2B/Vit, followed by treatment of the Silo 3 contents by cement stabilization and on-property disposal of the stabilized material. Under Alternative 2B/Cem, approximately 3,890 m^3 (5,088 yd^3) of untreated materials would be removed from Silo 3 and stabilized in a cement form. Approximately 5,999 m^3 (7,846 yd^3) of stabilized material would be packaged in containers and placed in an on-property above-grade reinforced concrete disposal vault. The Silo 3 structural materials, the material removal system, and the cement stabilization system and associated soils would be remediated with the selected alternative for Subunit C. In accordance with CERCLA 121(c) requirements, after commencement of remedial activities, a review would be performed every five years by the EPA to ensure the continued protection of human health and the environment. The components of this alternative not previously discussed are as follows.

Material Stabilization

The cement stabilization process is identical to that described in Section 7.2.2 for Alternative 3A.1/Cem with the exception of differences in the cement formulations required to accommodate physical and chemical differences between K-65 residues and Silo 3 cold metal oxides. The FS Report for Operable Unit 4, Appendix C, discusses the results of bench-scale treatability studies

which indicate that cementation of the Silo 3 metal oxides would result in an approximately 50 percent increase in the volume of treated material requiring disposal.

Implementation Time and Costs

Remedial action activities under Alternative 2B/Cem could be completed in about four years. Site preparation and construction activities would take approximately three years. Removal and material processing activities would require about one year. Capital costs for Alternative 2B/Cem are estimated to be 35.9 million dollars. O&M costs during remediation are estimated at 4.9 million dollars over one year, while post-remediation O&M costs are estimated at 3.2 million dollars over a thirty year period. The total present worth cost for this alternative is estimated at 37.4 million dollars.

7.3.3 Alternative 3B.1/Vit - Removal, Vitrification, and Off-Site Disposal - NTS

Capital Cost:	$26.8 M
O&M Costs:	
During Remediation:	$4.9 M
Post-Remediation:	$0
Present Worth:	$28 M
Years to Implement:	4

This alternative involves the removal, stabilization, and off-site disposal of the Silo 3 contents. This alternative is identical to Alternative 2B/Vit, except the on-property disposal, monitoring, and institutional controls have been replaced by the transportation of the treated material by rail and/or truck to the NTS for disposal. Under Alternative 3B.1/Vit, approximately 3,890 m^3 (5,088 yd^3) of untreated materials would be removed from the silo. Approximately 1,471 m^3 (1,923 yd^3) of vitrified material would be packaged in containers and transported to NTS for disposal. Alternative 3B.1/Vit would have to meet applicable off-site requirements, which include the NTS material acceptance criteria and DOT regulations pertaining to the transport of hazardous and radioactive materials. No five-year reviews would be required since all Subunit B wastes would be removed from the site under this alternative.

Implementation Time and Costs

Remedial action activities under Alternative 3B.1/Vit could to be completed in about four years. Site preparation and construction activities would take approximately three years. Removal activities

would require about one year. Transportation and off-site disposal would conclude shortly after the completion of material processing. Capital costs for Alternative 3B.1/Vit are estimated to be 26.8 million dollars. O&M costs during remediation are estimated at 4.9 million dollars over one year. Due to the off-site disposal option, there are no post-remediation O&M costs associated with this alternative. The total present worth cost of this alternative is estimated at 28 million dollars.

7.3.4 Alternative 3B.1/Cem - Removal, Cement Stabilization, and Off-Site Disposal--NTS

Capital Cost:	$36.8 M
O&M Costs:	
During Remediation:	$4.1 M
Post-Remediation:	$0
Present Worth:	$36 M
Years to Implement:	4

This alternative is identical to Alternative 3B.1/Vit (Section 7.3.3), except that Silo 3 contents would be stabilized in cement prior to off-site disposal at NTS as described for Alternative 2B/Cem (Section 7.3.2). Under Alternative 3B.1/Cem, approximately 3,890 m^3 (5,088 yd^3) of contaminated materials would be removed from Silo 3. Approximately 5,999 m^3 (7,846 yd^3) of stabilized material would be transported to NTS for disposal. No five-year reviews would be required since all Subunit B wastes would be removed from the site under this alternative.

Implementation Time and Costs

Remedial action activities under Alternative 3B.1/Cem could be completed in about four years. Site preparation and construction activities would take approximately three years. Removal activities would require about one year. Transportation and off-site disposal would conclude shortly after the completion of material processing. Capital costs for Alternative 3B.1/Cem are estimated to be 36.8 million dollars. O&M costs during remediation are estimated at 4.1 million dollars over one year. Due to the off-site disposal option, there are no post-remediation O&M costs associated with this alternative. The total present worth cost of this alternative is estimated at 36 million dollars.

7.3.5 Alternative 4B - Removal and On-Property Disposal

Capital Cost:	$21.8 M
O&M Costs:	
During Remediation:	$1.1 M

Post-Remediation:	$3.2 M
Present Worth:	$22.0 M
Years to Implement:	2

This alternative requires removal of the Silo 3 contents, packaging, and on-property disposal of the untreated material. This alternative is identical to Alternative 2B, with the exception that it does not include treatment. Under Alternative 4B, approximately 3,890 m^3 (5,088 yd^3) of contaminated materials would be removed from Silo 3 and packaged in containers for disposal in an on-property above-grade reinforced concrete disposal vault. The Silo 3 structural materials, associated soils, and removal system would be managed under the Subunit C alternative. In accordance with CERCLA 121(c) requirements, after commencement of remedial activities, a review would be performed every five years by the EPA to ensure the continued protection of human health and the environment.

Implementation Time and Costs

Remedial action activities under Alternative 4B could be completed in about two years. Site preparation and construction activities would take approximately one year. Removal and packaging activities would require about one year. Capital costs for Alternative 4B are estimated to be 21.8 million dollars. O&M costs during remediation are estimated at 1.1 million dollars over one year. Post-remediation O&M costs are estimated to be 3.2 million dollars. The total present worth cost of this alternative is estimated at 22 million dollars.

7.4 SUBUNIT C - SILOS 1, 2, 3, AND 4 STRUCTURES, SOILS, AND DEBRIS

This section presents the alternatives which were evaluated for Subunit C during the detailed analysis of alternatives phase of the FS for Operable Unit 4. These alternatives focus on the remediation of Silos 1, 2, 3, and 4 structures, contaminated soils within the Operable Unit 4 boundary including surface and subsurface soils and the earthen berms around Silos 1 and 2, the existing Radon Treatment System (RTS), the K-65 Drum Handling Building pad, standing water within Silo 4 (if any), the decant sump tank, the process piping and trenches, and any rubble or debris [i.e., decontamination and decommissioning (D&D) of the treatment facility] generated consequential to the implementation of remedial actions for all Operable Unit 4 subunits. The volumes of soil, rubble, and debris to be generated under Subunit C are small in comparison to the volume of similar materials that will be generated by other FEMP operable units. All the Subunit C alternatives evaluated through detailed analysis consider integration of disposal activities with Operable Unit 3 and

Operable Unit 5. These integration efforts allow waste minimization initiatives developed for Operable Units 3 and 5 to be integrated into the final remedy chosen for Subunit C materials.

As discussed in Section 6, evaluations were conducted for future land uses with and without continued federal ownership. For a cleanup remedy to be considered protective, it would not result in any unacceptable risks to an Operable Unit 4 expanded trespasser or an off-site farmer under the future land use with continued federal ownership scenario.

All of the evaluated alternatives would limit exposure to constituents by decontaminating, demolishing, and removing the material to either an on-property above-grade disposal facility or off-site disposal facility, and then excavating contaminated soils and placing clean fill over residual contaminated subsurface soils. The placement of the clean fill was not used as a measure to limit exposures but rather to restore the natural drainage patters and promote revegetation. Table 9-2 summarizes the proposed remedial levels for soils, all of which would be protective to the Operable Unit 4 expanded trespasser, trespassing child and off-site resident over the long-term. Short-term risks would be higher for off-site disposal due to the increased risk of transportation accidents. These action alternatives would be protective of all anticipated receptors assuming continued federal government ownership and control of the area; this includes the off-site farmer and the Operable Unit 4 expanded trespasser receptors.

The basic difference among the action alternatives is the disposal option. On-property disposal (Alternative 2C) would be in an above-grade disposal facility. Off-site disposal options include NTS (Alternative 3C.1) and a permitted commercial disposal site (Alternative 3C.2).

The on-property, above-grade disposal facility would be designed for a 1,000 year life with no active maintenance. Fate and transport modeling using conservative assumptions concludes that protectiveness would be maintained over the long-term.

NTS and the permitted commercial disposal facility would incorporate engineering controls to ensure protectiveness. Both are located in a climatic, demographic, and hydrogeologic setting which favors minimization of constituent migration to human or environmental receptors. Short-term risks to the public and workers are slightly greater for the off-site disposal options due to the increased risks of transportation accidents resulting in injuries or radiation exposure.

For all of the Subunit C alternatives, hazardous substances (i.e., contaminated soil or debris) will remain on site at levels which preclude unlimited use or unrestricted exposure. Therefore, in accordance with the requirements of CERCLA 121(c), all the Subunit C alternatives would require that a review be conducted every five years, after commencement of remediation to ensure that the alternative continues to provide adequate protection of human health and the environment.

7.4.1 Alternative 2C - Demolition, Removal, and On-Property Disposal

Capital Cost:	$36.3
O&M Costs:	
During Remediation:	$0
Post-Remediation:	$3.6 M
Present Worth:	$34.3 M
Years to Implement:	2

Alternative 2C involves the demolition of the Silos 1, 2, 3, and 4 structures and disposal of the materials from the removal of the earthen berm, decant sump tank, process piping, and trenches. Alternative 2C further addresses the excavation of contaminated subsurface soils within the operable unit boundary and disposal of the debris generated as a result of implementing remedial actions for Subunits A and B. Contaminated material would be placed in an above-grade disposal vault at the FEMP site. Under Alternative 2C, approximately 34,956 m^3 (45,748 yd^3) of material would be placed in an on-property above-grade disposal vault.

Demolition and Decontamination of the Silo Structures

Before Silos 1, 2, 3, and 4 are demolished, loose interior materials and concrete would be removed from the silo surfaces. Concrete exhibiting highly elevated direct radiation levels would be segregated from other Subunit C waste and dispositioned as part of the selected remedy for Subunit A. Silo demolition would consist of the systematic decontamination, removal, dismantling, and disposal of the Silos 1, 2, 3, and 4 domes, walls, floor slabs and footers. Removal would involve cutting each of the silo structures into manageable pieces after appropriate bracing has been installed. The demolition would begin with the dismantling of Silo 4, since this silo has never been used, making it an ideal full-scale model to test and confirm demolition methodologies with minimal risk of radiological release to the environment. Based on experience obtained through the dismantling of Silo 4, demolition of Silos 1, 2, and 3 would proceed according to the sequencing and procedures established during the remedial design and remedial action phases.

Demolition and Decontamination of Other Operable Unit 4 Structures

The existing RTS, Drum Handling Building pad, sump lift station foundation, concrete pipe trench, and the decant sump tank would also be removed and decontaminated. It is estimated that approximately 790 m (2,600 ft) of process piping in the process piping trenches would be cut into manageable sections and disposed. It is estimated that 280 m^3 (365 yd^3) of concrete from the trench, decant sump tank process piping, and existing RTS would be disposed. Additionally, all facilities constructed and equipment installed and used to implement the selected alternatives for Subunits A and B would be disassembled, decontaminated (if necessary), and either recycled, reused, or disposed.

Non-porous materials, such as steel fencing and structural steel, attaining the unrestricted use, free release criteria defined in DOE Order 5400.5 would be released from the site as uncontaminated. Materials not attaining these levels would be retained for disposal as contaminated waste consistent with the approved Operable Unit 3 Record of Decision.

Remediation of Soil

After the silos are demolished, the contaminated surface soils within the boundary of Operable Unit 4 would be excavated to attain proposed remediation levels for each of the constituents of concern. These cleanup levels consist of incremental concentration levels above background. The concentration of each of these constituents, which naturally occurs in local soils, would be added to the incremental constituent concentration levels to yield the final goals of the soil excavation process. Attainment of these levels would be demonstrated applying regulatory guidance available at the time. The cleanup levels are considered protective of the hypothetical expanded trespasser receptor. To attain these goals, a minimum of 15 centimeters (cm) [6 inches (in)] of soils across the entire operable unit area would be excavated. Additional soils beneath the silos, decant sump tank, concrete pipe trench, or other locations below this depth would be removed as necessary to attain these cleanup goals.

Soils exhibiting highly elevated direct radiation levels (i.e., potentially contaminated soils beneath Silos 1 and 2) would be segregated from other Subunit C wastes and dispositioned as part of the selected remedy for Subunit A. Following excavation, the affected areas would be returned to original grade with the placement of clean backfill and seeded. The area would then be fenced and appropriate signs placed indicating no trespassing and no hunting. Continued federal ownership with

appropriate deed restrictions would be implemented to ensure that any future transfer of property would be consistent with CERCLA 120(h).

Water Treatment

Wastewater generated as a result of this remedial action, along with water removed from the decant sump tank, Silo 4 (if any), and any perched groundwater encountered during remedial activities would be collected, pretreated if necessary, and sent to the FEMP Advanced Wastewater Treatment facility for treatment prior to discharge to the Great Miami River. In accordance with the Amended Consent Agreement, groundwater remediation will be handled by Operable Unit 5. Operable Unit 4 would only handle the cleanup of perched water encountered during remedial action activities.

Disposal of Soil, Debris, and Rubble

The volume of contaminated soil, rubble, and debris to be addressed under Operable Unit 4 represents a small fraction (less than one percent) of the total volume of similar wastes to be addressed under Operable Units 5 and 3. Operable Unit 3 is currently in the process of conducting a RI/FS which will include gaining additional insight into the effectiveness of various decontamination technologies on building materials. Additionally, the Operable Unit 3 RI/FS is evaluating the appropriate type and location of disposal for contaminated rubble and debris. The decision on the Operable Unit 3 RI/FS is presently scheduled at a time which coincides with the implementation of remedial actions for Operable Unit 4.

Contaminated soil and debris generated from the selected remedy for Operable Unit 4 will be placed into interim storage, if necessary, and final disposition of that material will be determined as part of the Record of Decision for Operable Units 5 and 3. Placing the Operable Unit 4 on-property disposal decision in abeyance permits an integrated site-wide (FEMP) disposal approach for soil and debris. In addition, Operable Unit 4 would be able to take advantage of any applicable waste minimization initiatives developed for soil and debris by Operable Units 5 and 3 respectively.

Implementation Time and Costs

Approximately three months would be required for site preparation; 15 months would be required to demolish and decontaminate the silo structures as well as the surface soil, berm soils, subsurface soils, process piping, and decant sump tank. Demobilization activities would extend the duration of the alternative to two years. During this time frame, the above-grade disposal facility would also be constructed and capped. Capital costs for Alternative 2C are estimated to be 36.3 million dollars.

Post-remediation O&M costs are estimated to be 3.6 million dollars. The total present worth cost of this alternative is estimated at 34.3 million dollars.

7.4.2 Alternative 3C.1 - Demolition, Removal, and Off-Site Disposal - NTS

Capital Cost:	$83.6 M
O&M Costs:	$0
Present Worth:	$75.5 M
Years to Implement:	2

This alternative is identical to Alternative 2C, except that the on-property disposal, monitoring, and institutional controls have been replaced by packaging and off-site transportation of the material by rail or truck to the NTS for disposal. The off-site disposal option for Alternative 3C.1 involves the packaging, loading, and shipping of the material generated by this alternative to the NTS.

Implementation Time and Costs

Remedial actions for Alternative 3C.1 could require about two years to complete, including the transportation of the packaged materials to the NTS. Capital costs for Alternative 3C.1 are estimated to be 83.6 million dollars. Due to the off-site disposal aspect of this alternative, there are no O&M costs anticipated. The total present worth cost of this alternative is estimated at 75.5 million dollars.

7.4.3 Alternative 3C.2 - Demolition, Removal, and Off-Site Disposal (Permitted Commercial Disposal Site)

Capital Cost:	$48.6 M
O&M Costs:	$0
Present Worth:	$44.0 M
Years to Implement:	2

This alternative is identical to Alternative 3C.1, except that the off-site disposal at the NTS has been replaced by the off-site disposal at a permitted commercial disposal site and the waste will not be packaged, but rather it would be shipped in bulk. One such site is located near Clive, Utah, approximately 3,058 km (1,900 mi) from the FEMP site. The facility has been permitted by the State of Utah to accept mixed hazardous waste and naturally occurring by-product materials such as those in Subunit C.

Disposal

Due to its relatively long distance from the FEMP site, coordination with several states for transportation of Subunit C wastes would be required. Additionally, an exemption from DOE Order 5280.2A prohibiting disposal of DOE wastes at a commercial facility would be needed for the Operable Unit 4 waste before it could be transported to the disposal site.

Implementation Time and Costs

Remedial actions for Alternative 3C.2 would require about two years to complete, including the transportation of the materials to a permitted commercial disposal site. Capital costs are estimated to be 48.6 million dollars. Due to the off-site disposal option, no operation and maintenance (O&M) costs are anticipated for Alternative 3C.2. The total present worth cost of this alternative is estimated at 44.0 million dollars.

8.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

8.1 EVALUATION CRITERIA

Specific legal requirements for remedial actions are specified under CERCLA Section 121. These requirements include protection of human health and the environment, compliance with 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, 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 applies.

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 practicality of carrying out 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 of Ohio 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 Operable Unit 4 (unless a specific ARAR is waived). The next five criteria are considered primary balancing criteria and are considered together to identify significant tradeoffs that must be addressed. The last two are considered modifying criteria which are considered in final remedy selection. The alternatives comparison for each subunit is summarized in Table 8-1.

8.2 COMPARATIVE ANALYSIS OF ALTERNATIVES

The following sections summarize the information presented in Section 5.0 of the FS Report for Operable Unit 4 and rely upon the detailed analysis of alternatives presented in Section 4.0 of the same report.

8.2.1 Analysis for Subunit A

8.2.1.1 Threshold Criteria

The analysis of the Subunit A alternatives against the threshold criteria of overall protection of human health and the environment and compliance with ARARs is summarized below.

Overall Protection of Human Health and the Environment. As part of the FS, two potential future land uses of the FEMP were evaluated to assess the ability of the individual alternative to adequately protect human health and the environment. These land uses consider potential exposures to contaminants released during or following the implementation of the alternatives and were evaluated for a range of viable receptors. These scenarios included future land use with and without the assumption of continued federal ownership. With continued government ownership, the FEMP land would not be available for residential or farming use. Access to the site would be limited by fencing and physical markers, it would be reasonable to assume that an Operable Unit 4 expanded trespasser would visit the site occasionally.

It is also assumed that the land surrounding the FEMP site would continue to be used for family farms. For a cleanup remedy to be considered protective, it should not result in any unacceptable risks to an expanded trespasser or an off-site farmer. The evaluation also considers the future possibility that the federal government might not have control of the FEMP site. In that case, a farm

TABLE 8-1

COMPARISON OF REMEDIAL ALTERNATIVES

SUBUNIT A - SILOS 1 AND 2 CONTENTS

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	Total Present Worth Cost
0A - No Action	Not protective	Does not comply with all ARARs	Not effective or permanent	No treatment; therefore, no reduction	High	Easy	-0-
3A.1/Vit - Removal, Vitrification, Off-Site Disposal - Nevada Test Site	**Protective**	**Complies with all ARARs**	**Effective and most reliable**	**Reduces toxicity, mobility, and volume**	**Medium**	**Innovative technology, Difficult**	**$43.7M**
3A.1/Cem - Removal, Cement Stabilization, Off-Site Disposal - Nevada Test Site	Protective	Complies with all ARARs	Effective and most reliable	Reduces mobility	Medium	Reliable technology, Difficult	$73.1M

[1] Assessment of protectiveness adopts the use of continued federal goverment ownership and evaluates risk to expanded trespassers and the off-property farmer.
[2] Assumes substantive technical requirements for Ohio disposal facility siting are met.
Bold -- Preferred Remedial Action Alternative.
Shaded areas -- Did not meet threshold criteria (Overall Protection or Compliance with ARARs), therefore, not compared.
Protective -- Risk is within the one in ten thousand to one in a million (10^4 to 10^6) EPA target risk range.

TABLE 8-1
(Continued)

SUBUNIT B - SILO 3 CONTENTS

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	Total Present Worth Cost
0B - No-Action	Not protective	Does not comply with all ARARs	Not effective or permanent	No treatment; therefore, no reduction	High	Easy	-0-
2B/Vit - Removal, Vitrification, On-Property Disposal	Protective[1]	Complies with all ARARs[2]	Effective and reliable	Reduces mobility and volume	Medium	Innovative technology, Moderately Difficult	$28M
2B/Cem - Removal, Cement Stabilization, On-Property Disposal	Protective[1]	Complies with all ARARs[2]	Effective and reliable	Reduces mobility	Medium	Reliable technology, Easy	$37.4M
3B.1/Vit - Removal, Vitrification, Off-Site Disposal - NTS	**Protective**	**Complies with all ARARs**	**Effective and most reliable**	**Reduces mobility and volume**	**Medium**	**Innovative technology, Difficult**	**$28M**
3B.1/Cem - Removal, Cement Stabilization, Off-Site Disposal - NTS	Protective	Complies with all ARARs	Effective and most reliable	Reduces mobility	Medium	Reliable technology, Difficult	$36M
4B - Removal and On-Property Disposal	Protective[1]	Complies with all ARARs[2]	Effective and reliable	No treatment; therefore, no reduction	High	Reliable technology, Easy	$22M

[1] -- Assessment of protectiveness adopts the use of continued federal goverment ownership and evaluates risk to expanded trespassers and the off-property farmer.
[2] -- Assumes substantive technical requirements for Ohio disposal facility siting are met.
Bold -- Preferred Remedial Action Alternative
Shaded areas -- Did not meet threshold criteria (Overall Protection or Compliance with ARARs), therefore, not compared.
Protective -- Risk is within the one in ten thousand to one in a million USEPA target risk range

TABLE 8-1
(Continued)

SUBUNIT C - SILOS 1, 2, 3, AND 4 STRUCTURES, SOILS, AND DEBRIS

Alternative	Overall Protection of Human Health and Environment	Compliance	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility or Volume through treatment	Short-Term Effectiveness	Implementability	Total Present Worth Cost
0C - No-Action	Not protective	Does not comply with all ARARs	Not effective or permanent	No treatment; therefore, no reduction	High	Easy	-0-
2C - Demolition, Removal, On-Property Disposal	**Protective[1]**	**Complies with all ARARs[2]**	**Effective and reliable**	**No treatment; therefore, no reduction**	**Medium**	**Reliable technology, Easy**	**$34.3M**
3C.1 - Demolition, Removal, Off-Site Disposal - Nevada Test Site	Protective	Complies with all ARARs	Effective and most reliable	No treatment; therefore, no reduction	Medium	Reliable technology, Moderately difficult	$75.5M
3C.2 - Demolition, Removal, Off-Site Disposal - Permitted Commercial Facility	Protective	Complies with all ARARs	Effective and most reliable	No treatment; therefore, no reduction	Medium	Reliable technology, Moderately difficult	$44M

[1] -- Assessment of protectiveness adopts the use of continued federal goverment ownership and evaluates risk to expanded trespassers and the off-property farmer.
[2] -- Assumes substantive technical requirements for Ohio disposal facility siting are met.
Bold -- Preferred Remedial Action Alternative
Shaded areas -- Did not meet threshold criteria (Overall Protection or Compliance with ARARs), therefore, not compared.
Protective -- Risk is within the one in ten thousand to one in a million USEPA target risk range

000109

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might be established on the FEMP property. The remedial alternatives were evaluated as to what risks might exist for a hypothetical on-property farmer if government control is no longer present. The basis for and detailed results of these evaluations are in Appendix D of the FS Report for Operable Unit 4.

All of the alternatives would provide protection of human health and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls, or institutional controls. The preferred alternative (3A.1/Vit) would provide greater certainty for overall protection than other alternatives because the Subunit A residues would be treated and removed to the NTS. The source of risks to the Operable Unit 4 expanded trespasser and off-site farmer would be eliminated, and in the event that the government lost control of the FEMP site, there would be no risk from Subunit A residues to an on-property farmer. Overall protection at the NTS would be maintained because the vitrified residues resist leaching and the NTS is located in a sparsely populated, arid region, where depths to groundwater range up to 600 m (1,969 ft).

Compliance with ARARs. CERCLA requires that remedial actions achieve a standard or level of control that is consistent with federal and state environmental laws or state siting regulations, which are termed applicable or relevant and appropriate requirements (ARARs). ARARs apply to all aspects of remedial action, including the establishment of cleanup levels, the operation and performance of treatment systems, and the design of disposal facilities. In addition to meeting ARARs, operations at DOE-owned facilities must be conducted according to DOE Orders. Although DOE Orders are not promulgated standards, the technical requirements may be adapted if they cover areas not addressed by other laws, or if they improve protection of human health and the environment because they are more stringent than existing laws. Detailed discussion of compliance with ARARs is provided in Appendix F of the FS Report for Operable Unit 4.

With the exception of Alternatives 2A/Vit, 2A/Cem (see Section 11 for details) and the no action alternative, all of the Subunit A alternatives would meet ARARs. Since the preferred alternative, Alternative 3A.1/Vit, includes off-site disposal at NTS, there would be no long-term compliance issues associated with the FEMP site. For example, off-site disposal would eliminate the need to demonstrate that drinking water MCLs are attained for Subunit A residues. In the short-term, the on-property remediation activities during removal and treatment would address the operational requirements for airborne emissions, soil pathways, and penetrating radiation by engineered controls.

For Alternative 3A.1/Vit, the packaging and transportation of the treated waste would comply with the requirements for the protection of worker and public safety from the radiological hazards (49 CFR §171-177). This alternative would also comply with other off-site requirements, such as the waste acceptance criteria specified by NTS, to meet their disposal requirements. The probability of an inadvertent intruder coming in contact with the Subunit A residues at NTS is less than that for the FEMP site, based on the demographic characteristics of both locations.

8.2.1.2 Primary Balancing Criteria

Those alternatives which satisfy the threshold criteria comparative analysis were carried forward to the primary balancing criteria for further comparative analysis. Because Alternative 0A (No Action) did not satisfy either of the threshold criteria, and Alternatives 2A/Vit and 2A/Cem (see Section 11 for details) do not satisfy compliance with specific ARARs, these alternatives were not considered further in this analysis.

Long-Term Effectiveness and Permanence. Alternatives 3A.1/Vit and 3A.1/Cem would ensure long-term protectiveness to human health and the environment because residual risks to viable receptors (off-site farmer and expanded trespasser) would be less than a 10^{-6} incremental lifetime cancer risk, and no non-carcinogenic effects (hazard index less than 0.2) would be indicated for either receptor.

All alternatives involve the removal and treatment of Subunit A residues by either vitrification or cement stabilization. The preferred alternative would be most effective based on the results of bench-scale treatability studies conducted during the RI/FS (Feasibility Study Report for Operable Unit 4, Appendix C) on the Subunit A materials which demonstrated that vitrification would be effective in reducing radon emanation and in minimizing the leaching of constituents. Tests using cement stabilization demonstrated that this process would be effective in preventing the movement of constituents from the stabilized form; however, there was little or no reduction in radon emanation rates. The vitrified material is expected to have greater durability over the long term.

The characteristics (i.e., demographics, climate, geology, groundwater level) of the NTS would provide for greater certainty than FEMP on-property disposal over the long term, that the treated residues would not affect human health and the environment.

Reduction of Toxicity, Mobility, or Volume through Treatment. Alternative 3A.1/Vit would use the vitrification process to treat the Subunit A material. This technology would physically bind the

contaminants in a glass-like matrix which would significantly reduce contaminant mobility and material volume. Mobility would be reduced because the contaminants would be bound in the matrix and the volume of the treated material would be less than 50 percent of the untreated material volume. Vitrification would also destroy organic contaminants in the treated material. Although most contaminants in the treated material would be incorporated into the vitrified product to reduce mobility over the long term, some contaminants would be released during the vitrification process and must be treated through an off-gas treatment system. The material generated through the off-gas treatment system may require stabilization to limit subsequent contaminant mobility.

Alternative 3A.1/Cem would use the cement stabilization process to treat contaminated material. This technology will physically and chemically bind the constituents in a cement-like matrix, so the mobility of constituents via leaching from this treated material would be greatly reduced. However, organic constituents would not be destroyed. The total volume of material would increase by approximately 150 percent as a result of adding the cement stabilizing and setting agents.

Alternative 3A.1/Vit is favored over Alternative 3A.1/Cem because they would: reduce the toxicity of organic contaminants; generate a treated form which has very good resistance to leaching; and significantly reduce the volume of Subunit A materials.

Short-Term Effectiveness. Alternatives 3A.1/Vit and 3A.1/Cem, the various removal, treatment, and disposal activities will result in increased short-term risks for exposures (compared to no action). The short-term effectiveness of the material removal operations is expected to be the same among all alternatives for Subunit A. There is some uncertainty associated with controlling and treating the off-gases generated by the vitrification process. The on-property risks for 3A.1/Cem from transportation would be higher than 3A.1/Vit, because the increased volume of the treated material would increase the number of potential transportation accidents. Short-term impacts at the NTS associated with the transportation and off-loading of the treated residues would be indistinguishable from normal operations.

In summary, Alternative 3A.1/Cem is favored over Alternative 3A.1/Vit because of the uncertainty associated with off-gas control and treatment for the vitrification process.

Implementability. The removal and treatment activities in Alternative 3A.1/Cem could be implemented using standard equipment, procedures, and readily available resources. Hydraulic

removal is a standard mining technology that is normally reliable and uses readily available equipment. The cement stabilization technology has been applied successfully at a number of remedial sites. EPA considers cement stabilization a demonstrated treatment technology and has approved its use in the final remedy for many NPL sites. This technology has also been applied at other sites that have radioactively contaminated waste. The cement stabilization process would require large quantities of cement, flyash, and blast furnace slag, which are available.

Although removal and disposal are the same for Alternative 3A.1/Vit as for Alternative 3A.1/Cem, the vitrification process is more difficult to implement than the cement stabilization process. The vitrification process would require fewer chemical reagents than the cement stabilization process, but larger amounts of energy (electricity). Vitrification would allow the re-processing of off-specification treated materials compared to cement stabilization. However, the vitrification process equipment would be more complex to construct and operate than that of the cement stabilization process. There is limited experience available for the types and quantities of the material from the silos and decant sump tank on which to base an assessment of the likely performance of the vitrification technology. The vitrification technology is not as widely available as the cement stabilization technology. Off-gas treatment is also an additional complexity with vitrification where delays could occur. However, operational experience is being gained as part of the structured RI/FS treatability studies and planned vitrification pilot studies currently in progress.

Alternatives 3A.1/Vit and 3A.1/Cem involve off-site transportation and disposal at the NTS. While technically straightforward, off-site transportation would require coordination efforts with a number of states located along the transportation route, as well as the State of Nevada. Demonstrated compliance with the NTS waste acceptance criteria would be required prior to shipping the Subunit A materials. The off-site transportation of material would also comply with the off-site acceptability requirements under CERCLA.

In summary, Alternative 3A.1/Cem would be favored over Alternative 3A.1/Vit, based on relative overall implementation.

Cost. The estimated total present worth costs for the Subunit A alternatives are provided on Table 8-2, and include a breakdown of capital and operating and maintenance costs.

TABLE 8-2

OPERABLE UNIT 4 REMEDIAL ALTERNATIVE COST SUMMARY (MILLION $)

ALTERNATIVE	CAPITAL	OPERATING & MAINTENANCE		TOTAL PRESENT WORTH COST
		SHORT-TERM (During Remediation)	LONG-TERM (Post Remediation)	
Subunit A - Silos 1 and 2 Contents				
OA - No Action	0	0	0	0
3A.1/Vit - Removal, Vitrification, Off-Site Disposal - Nevada Test Site	38.3	11.7	0	43.7
3A.1/Cem - Removal, Cement Stabilization, Off-Site Disposal - Nevada Test Site	71.8	11.7	0	73.1
Subunit B - Silo 3 Contents				
OB - No Action	0	0	0	0
2B/Vit - Removal, Vitrification, On-Property Disposal	25.2	4.9	3.2	28
2B/Cem - Removal, Cement Stabilization, On-Property Disposal	35.9	4.9	3.2	37.4
3B.1/Vit - Removal, Vitrification, Off-Site Disposal - Nevada Test Site	26.8	4.9	0	28
3B.1/Cem - Removal, Cement Stabilization, Off-Site Disposal - Nevada Test Site	36.8	4.1	0	36
4B - Removal, On-Property Disposal	21.8	1.1	3.2	22
Subunit C - Silos 1, 2, 3, and 4 Structures, Soils, and Debris				
0C - No Action	0	0	0	0
2C - Demolition, Removal, On-Property Disposal	36.3	0	3.6	34.3
3C.1 - Demolition, Removal, Off-Site Disposal - Nevada Test Site	83.6	0	0	75.5
3C.2 - Demolition, Removal, Off-Site Disposal - Permitted Commercial Facility	48.7	0	0	44

NOTES:

The accuracy of the cost estimates are between +50% and -30%.

Estimates of capital and operations and maintenance costs are expressed in terms of total costs. The total present worth costs are calculated from the total cost figures applying a discount rate of 7 percent and an operating and maintenance period of 30 years.

The present worth cost of Alternative 3A.1/Cem is approximately 67 percent more expensive than Alternative 3A.1/Vit, primarily due to the additional packaging, transportation, and disposal for the larger volume of cement-stabilized material.

8.2.1.3 Modifying Criteria

State Acceptance

The State of Ohio reviewed the preferred remedial alternative for Subunit A that was provided in the PP, and concurs with the selection of Alternative 3A.1/Vit. A letter from the OEPA conditionally approving the FS and PP for Operable Unit 4 can be found in Appendix E of this ROD.

Community Acceptance

DOE solicited input from the community on the preferred remedial alternative for Subunit A that was provided in the PP. Verbal comments received during the public meeting indicated support of the chosen remedial alternative. Written comments received during the public comment period are addressed in the responsiveness summary (see Appendix C).

8.2.1.4 Subunit A Comparative Analysis Summary

Alternative 3A.1/Vit is identified as the preferred alternative because it would result in the permanent treatment and volume reduction of Subunit A materials and it is cost-effective. It would provide overall protection of human health and the environment with fewer uncertainties over the long-term.

8.2.2 SUBUNIT B

8.2.2.1 Threshold Criteria

Subunit B alternatives would employ the same removal, treatment, and disposal options as those for Subunit A materials. Many of the factors considered and discussed under the Subunit A analysis are identical for Subunit B. Therefore, frequent references will be made to the information presented previously in Section 8.2.1. Only those factors unique to remediation of the Subunit B materials will be emphasized. This approach will be applied to the discussions under the primary balancing criteria as well.

The comparison of the Subunit B alternatives against the threshold criteria of overall protection of human health and the environment and compliance with ARARs is summarized below.

Overall Protection of Human Health and the Environment. As discussed in Section 8.2.1.1, this evaluation assumes that the federal government would continue to own the FEMP site. For a cleanup remedy to be considered protective, it should not result in any unacceptable risks to an expanded trespasser or an off-site farmer.

All alternatives, with the exception of the no-action alternative (0B), would provide overall protection of human health and the environment. These alternatives will eliminate, reduce, or control the health or environmental risks resulting from constituents in Subunit B materials. Except for Alternative 4B, the alternatives would limit exposure to contaminants by removing the material, treating the material by either vitrification or cement stabilization. The treated material is disposed in an on-property above-grade disposal vault for Alternative 2B or off-site at NTS for Alternative 3B.1. Alternative 4B's protection is based on removal and disposal in an on-property above-grade vault and institutional controls. All alternatives would attain long-term effectiveness.

Off-site disposal would provide a greater degree of protectiveness than on-property disposal for the same reasons discussed under this criterion for Subunit A. For Subunit B residues, the intruder to the on-property, above-grade disposal vault would be exposed to levels of direct radiation.

In summary, Alternatives 3B.1/Vit and 3B.1/Cem would provide greater certainty than other alternatives for overall protection to the expanded trespasser and off-site farmer because they would remove the Subunit B residues from the FEMP site.

Compliance with ARARs. With the exception of the no-action alternative, Subunit B alternatives would comply with all pertinent ARARs. Under the no-action alternative, Silo 3 would eventually fail, resulting in the release of cold metal oxides to the environment. This scenario would likely result in radiological releases to the air, soil, groundwater, and surface water (via storm water runoff). For example, fate and transport modeling for this scenario indicates that the safe drinking water limits (MCLs in 40 CFR §141) would be exceeded for uranium, and gross alpha and beta radiation.

For those alternatives that include on-property disposal, an Alternative 4B is the least favorable on-property alternative because the material is not treated.

In summary, Alternatives 2B/Vit, 2B/Cem, 3B.1/Vit, 3B.1/Cem, and 4B, would meet all pertinent ARARs. Because the uncertainty associated with demonstrating that the FEMP on-property disposal vault would provide for the long-term protection of inadvertent intruders, Alternatives 3B.1/Vit and 3B.1/Cem are favored over 2B/Vit, 2B/Cem, and 4B.

8.2.2.2 Primary Balancing Criteria

Those alternatives that satisfy the threshold criteria comparative analysis were carried forward to the primary balancing criteria comparative analysis. Because Alternative 0B (No Action) did not satisfy either of the threshold criteria, it is not considered further in this analysis.

Long-Term Effectiveness and Permanence. All Subunit B alternatives would ensure long-term protectiveness to human health and the environment. For all alternatives, projected FEMP site residual risks to viable receptors (off-site farmer and expanded trespasser) would be less than 10^{-6} incremental lifetime cancer risk, and no non-carcinogenic effects (hazard index less than 0.2) would be indicated for either receptor.

The characteristics of the treated residue form (vitrification or cement stabilization) and the disposal options (on-property or off-site at NTS) are similar to those discussed under long-term effectiveness for Subunit A materials. Long-term environmental impacts are also the same as those considered for Subunit A.

In summary, Alternatives 3B.1/Vit and 3B.1/Cem provide a greater degree of long-term effectiveness than Alternatives 2B/Vit, 2B/Cem, and 4B.

Reduction of Toxicity, Mobility, or Volume through Treatment. Alternatives 2B/Vit and 3B.1/Vit would use the vitrification process to treat the Subunit B material. This technology would physically bind the contaminants in a glass-like matrix, which would significantly reduce contaminant mobility and material volume. Mobility would be reduced since the contaminants would be bound in the matrix and the volume of the treated material would be approximately 62 percent of the untreated material volume.

Alternatives 2B/Cem and 3B.1/Cem would use the cement stabilization process to treat the Subunit B material. This technology will physically and chemically bind the constituents in a cement-like matrix, so the mobility of constituents (via leaching from) in this treated material would be greatly

reduced. However, the total volume of material will increase by 55 percent as a result of adding the cement stabilizing and setting agents.

Alternative 4B does not reduce toxicity, mobility, or volume because it does not include the treatment. In summary, Alternatives 2B/Vit and 3B.1/Vit are favored over Alternatives 2B/Cem, 3B.1/Cem, and 4B because they would generate a treated form which has very good resistance to leaching and would significantly reduce the volume of the Subunit B materials.

Short-Term Effectiveness. For the Subunit B action alternatives, the various removal, treatment, and disposal activities would result in increased short-term risks (compared to no action). The short-term effectiveness of removal operations is expected to be the same among all alternatives for Subunit B. There is some degree of uncertainty associated with controlling and treating the off-gases generated by the vitrification process.

The increased risks due to off-site transportation of the treated residues to NTS and the short-term environmental impacts associated with removal, treatment, and disposal are similar to those described in Section 8.2.1.2. Alternative 4B provides the highest short-term effectiveness because no treatment is provided.

In summary, Alternative 4B is the favored alternative, and Alternatives 2B/Cem and 3B.1/Cem are favored over Alternatives 2B/Vit and 3B.1/Vit because of the uncertainty associated with off-gas control and treatment for the vitrification process.

Implementability. The removal and treatment activities for all Subunit B action alternatives could be implemented with standard equipment, procedures, and readily available resources. Pneumatic removal would be employed for the Subunit B materials and it is a standard technology that is typically reliable and uses readily available equipment. All other aspects of implementing the action alternatives for Subunit B are identical to those discussed for Subunit A under the implementability criterion in Section 8.2.1.2.

In summary, Alternative 4B would be favored and Alternatives 2B/Vit and 3B.1/Vit would be the least favored, based on relative overall implementability.

Cost. The estimated total present worth costs for Subunit B Alternatives are provided in Table 8-2 and include a breakdown of capital and operating and maintenance costs.

Alternative 4B is the least expensive action alternative. The present worth costs of Alternatives 2B/Vit and 3B.1/Vit are approximately the same, and are about 6 million dollars higher than that of Alternative 4B. This is due to the treatment component of those alternatives not included in Alternative 4B. Alternatives 3B.1/Cem and 2B/Cem are approximately 30 percent and 34 percent more expensive, respectively, than Alternatives 3B.1/Vit and 2B/Vit, respectively. Alternative 3B.1/Cem is more expensive than Alternative 3B.1/Vit primarily due to the additional packaging, transportation, and disposal of the larger volume of cement-stabilized material.

8.2.2.3 Modifying Criteria

State Acceptance

The State of Ohio reviewed the preferred remedial alternative for Subunit B that was provided in the Proposed Plan, and concurs with the selection of alternative 3B.1/Vit. A letter from the OEPA conditionally approving the FS and PP for Operable Unit 4 can be found in Appendix E of this ROD.

Community Acceptance

DOE solicited input from the community on the preferred remedial alternative for Subunit B that was provided in the Proposed Plan. Verbal comments received during the public meeting indicated support of the chosen remedial alternative. Written comments received during the public comment period are addressed in the responsiveness summary (see Appendix C).

8.2.2.4 Subunit B Comparative Analysis Summary

Alternative 3B.1/Vit is the preferred alternative because it is cost-effective and would result in the permanent treatment and volume reduction of Subunit B materials. Alternative 3B.1/Vit would provide overall protection of human health and the environment with fewer uncertainties over the long-term.

8.2.3 Subunit C

8.2.3.1 Threshold Criteria

The analysis of the Subunit C alternatives against the threshold criteria of overall protection of human health and the environment, and compliance with ARARs is summarized below.

Overall Protection of Human Health and the Environment. Alternative 0C would not provide adequate protection of human health and the environment. As discussed in Section 8.2.1.1, evaluations were conducted for future land uses with and without continued federal ownership. For a cleanup remedy to be considered protective, it would not result in any unacceptable risks to an expanded trespasser or an off-site farmer under the future land use with continued federal ownership scenario, or an on-property farmer under the future land use without continued federal ownership.

All of the action alternatives (Alternatives 2C, 3C.1, and 3C.2) would limit exposure to constituents by decontaminating, demolishing, and removing the material to either an on-property above-grade disposal facility or off-site disposal facility, and then excavating contaminated soils and placing clean fill over residual contaminated subsurface soils. Section 9.2 presents and discusses the soil cleanup levels, all of which would be protective to the expanded trespasser and off-site resident over the long term. Short-term risks would be higher for off-site disposal due to the increased risk of transportation accidents.

The basic difference among the action alternatives is the disposal option. On-property disposal (Alternative 2C) would be in an above-grade disposal facility. Off-site disposal options include NTS (Alternative 3C.1) and a permitted commercial disposal site (Alternative 3C.2).

The on-property, above-grade disposal facility would be designed for a 1,000 year life with no active maintenance. Fate and transport modeling using conservative assumptions concludes that protectiveness would be maintained over the long term.

NTS and the permitted commercial disposal facility would incorporate engineering controls to ensure protectiveness. Both are located in a climatic, demographic, and hydrogeologic setting which favors minimization of constituent migration to human or environmental receptors.

In summary, Alternatives 3C.1 and 3C.2 would provide greater certainty of sustained overall protectiveness because they would remove the Subunit C excavated soils and debris from the FEMP site.

Compliance with ARARs. All alternatives, other than Alternative 0C (No Action) would meet all pertinent ARARs. Under the no-action alternative, it would be likely that constituents would continue to be released to the air, groundwater, and surface water. There would also be a risk for direct contact with contaminated soil and exposure to direct radiation.

For Alternative 2C, an exemption to Ohio Administrative Code (OAC) rule 3745-27-07(B)(5) may be granted on the basis of meeting certain technical requirements. Supporting technical data for the proposed location of the disposal facility on the FEMP site must be developed to satisfy the requirements of OAC rule 3745-27-07(B)(5).

In summary, Alternatives 3C.1, and 3C.2 would meet all pertinent ARARs. Alternative 2C would require a waiver of OAC rule 3745-27-07(B)(5) based on demonstration that it would meet certain technical requirements.

8.2.3.2 Primary Balancing Criteria

Those alternatives that satisfy the threshold criteria of compliance with ARARs and overall protection of human health and environment were carried forward to the primary balancing criteria comparative analysis. Because Alternative 0C (No Action) did not satisfy either of the threshold criteria, it is the only alternative not considered further in this analysis.

Long-Term Effectiveness and Permanence. All Subunit C alternatives would ensure long-term protectiveness to human health and the environment. For all alternatives, projected FEMP site residual risks to viable receptors (off-site farmer and expanded trespasser) would be less than 10^{-6} incremental lifetime cancer risk and no non-carcinogenic effects (hazard index less than 0.2) would be indicated for either receptor. Although residual contamination would remain in the Operable Unit 4 Study Area, the level of risk from the contaminated soil would be controlled by excavating soil that exceeds proposed cleanup levels, by placing clean soil over the excavated areas, and by providing appropriate access controls and deed restrictions.

Alternative 2C would employ an on-property disposal facility designed to minimize leachate generation from water infiltration and contact with contaminated soil and debris. Fate and transport modeling using conservative assumptions demonstrates that both risk- and ARAR-based protective levels would be maintained for the Great Miami Aquifer over the long term.

Alternatives 3C.1 (NTS) and 3C.2 (permitted commercial disposal facility) would provide long-term protectiveness because the residual soils and debris would be removed from the FEMP site. The institutional controls and adequate facility maintenance are likely to be more reliable at the NTS, as it is a DOE-owned facility.

Following completion of remedial operations, impacted areas would be restored; long-term environmental impacts are expected to be minor. Alternative 2C would result in permanent commitment of approximately 4.7 hectares (11.6 acres) of land for the disposal facility.

In summary, Alternatives 3C.1 and 3C.2 would provide a greater degree of long-term effectiveness than Alternative 2C.

Reduction of Toxicity, Mobility, or Volume through Treatment. Alternatives 2C, 3C.1, and 3C.2 will isolate the material from the environment by containment. Treatment of the contaminated silo structures, berm material, or soils is not included in any of the alternatives, so no reduction in toxicity, mobility, or volume would be achieved.

Short-Term Effectiveness. For all alternatives, the various demolition and removal activities would result in increased short-term exposures compared to no action. Alternatives 3C.1 and 3C.2 would pose additional risks to the public and workers associated with off-site shipment to the NTS or the permitted commercial disposal facility.

During the implementation of any of the action alternatives, the general public is not likely to be exposed to contaminants because of the distance from the work area, the very low levels of contamination, and the methods proposed to control emission dust during demolition and excavation. Potential short-term environmental impacts resulting from the implementation of Alternatives 2C, 3C.1, and 3C.2 include generation of fugitive dust, increased sediment in surface runoff, and disturbance and/or displacement of wildlife as a result of noise, dust, and human activity. Engineering controls would be used to minimize these potential short-term impacts.

In summary, Alternative 2C is favored over Alternatives 3C.1 and 3C.2. The short-term risks to the public and workers for constructing the on-property disposal facility would offset the increased risks to the public and workers associated with off-site transportation of the contaminated soils and debris.

Implementability. Alternatives 2C, 3C.1, and 3C.2 would all employ the same decontamination, demolition, and excavation operations. With the exception of the remotely controlled operations proposed for decontaminating Silos 1, 2, and 3, all operations are standard construction activities which would be easily implemented. The remote silo decontamination operations would be used on the uncontaminated Silo 4 first to attain improved worker familiarity with the operation processes and identify any potential operational difficulties.

Alternative 2C involves on-property disposal facility construction, which would employ standard construction services and materials. The off-site disposal alternatives (3C.1 and 3C.2) would involve standard transportation practices for radioactive materials. Alternatives 3C.1 and 3C.2 would be more administratively difficult to implement than Alternative 2C due to the coordination required with those states through which shipment would pass to the off-site locations. Additional efforts would be required to ensure that the Subunit C materials complied with criteria established by either the NTS or the permitted commercial disposal facility. Alternative 2C would require coordination with the State of Ohio to ensure that all technical requirements for the on-property disposal facility were met.

In summary, Alternative 2C is favored over Alternatives 3C.1 and 3C.2 based on relative overall implementability.

Cost. The estimated total present worth costs for Subunit C alternatives are provided in Table 8-2, and include a breakdown of capital and operating and maintenance cost.

Alternative 2C, which includes an on-property disposal, is the least expensive action alternative. Transportation to the NTS (Alternative 3C.1) or to a permitted commercial disposal facility (Alternative 3C.2) are both more expensive than constructing an on-property vault. However, the overall cost of disposal at a permitted commercial disposal facility is anticipated to be approximately 60 percent lower than the cost of disposal at a DOE-owned facility. This is primarily due to the packaging requirements of the DOE-owned facility. The commercial disposal facility accepts bulk shipment of material.

8.2.3.3 Modifying Criteria

State Acceptance

The State of Ohio reviewed the preferred remedial alternative for Subunit C that was provided in the Proposed Plan, and concurs with the decision that the final disposition of the Subunit C contaminated soil and debris would be placed in abeyance to take full advantage of planned and in progress waste minimization treatment processes. The contaminated soil and debris would either be processed through the selected Operable Unit 5 and Operable Unit 3 remedy identified by the respective Operable Unit 5 and Operable Unit 3 ROD or placed in interim storage to await the finalization of the disposal decisions for soils and debris under Operable Unit 5 and Operable Unit 3. For the sole purpose of evaluating the performance of an overall preferred remedial alternative for Operable Unit 4, the State of Ohio concurs with the identification of Alternative 2C as the preferred alternative for Subunit C.

Community Acceptance

DOE solicited input from the community on the preferred remedial alternative for Subunit C that was provided in the Proposed Plan. Verbal comments received during the public meeting indicated support of the chosen remedial alternative. Written comments received during the public comment period are addressed in the responsiveness summary (see Appendix C).

8.2.3.4 Subunit C Comparative Analysis Summary

Alternatives 2C and 3C.2 are relatively equal, as both would be cost-effective, and would provide overall protection of human health and the environment both in the short-term and the long-term. For evaluation purposes only, Alternative 2C has been identified as the preferred alternative for Subunit C. The decision regarding the final disposition of the Operable Unit 4 Subunit C contaminated soil and debris would be placed in abeyance to take full advantage of planned and in progress waste minimization treatment processes. The contaminated soil and debris would either be processed through the selected Operable Unit 5 and Operable Unit 3 remedy identified by the respective Operable Unit 5 and Operable Unit 3 ROD or placed in interim storage to await the finalization of the disposal decisions for soils and debris under Operable Unit 5 and Operable Unit 3.

9.0 SELECTED REMEDY

On the basis of the evaluation of final alternatives, the selected remedy to be used at Operable Unit 4 at the FEMP is a compilation of the selected alternatives from each subunit; i.e., Alternatives 3A.1/Vit - Removal, Vitrification, and Off-site Disposal - NTS; 3B.1/Vit - Removal, Vitrification, and Off-site Disposal - NTS; and 2C - Demolition, Removal and On-Property Disposal. The selected remedy will satisfy the requirements of both CERCLA and NEPA for the protection of human health and the environment; will comply with all regulatory requirements; will be cost-effective; will utilize permanent solutions to the maximum extent practicable; and will utilize treatment as a principal element of the response. The discussions presented here are based on the information used for detailed analysis of alternatives during the FS for Operable Unit 4. Actual methods used during the implementation of the remedy will be determined during detailed engineering design described in the remedial design and may differ from the descriptions provided below.

9.1 KEY COMPONENTS

The major components of the selected remedy consist of the following:

- Removal of the contents of Silos 1, 2, and 3 (K-65 residues and cold metal oxides) and the decant sump tank sludge.
- Vitrification (glassification) to stabilize the residues and sludges removed from the silos and decant sump tank.
- Off-site shipment for disposal at the NTS of the vitrified contents of Silos 1, 2, 3, and the decant sump tank.
- Demolition of Silos 1-4 and decontamination of the gross and loose contamination, to the extent practicable, of the concrete rubble, piping, and other generated construction debris.
- Removal of the earthen berms and excavation of contaminated soils within the boundary of Operable Unit 4, to achieve proposed remediation levels. Placement of clean backfill following excavation (i.e. structure, foundations or large excavations which affect local topography).
- Segregation of non-contaminated soils, demolition of the vitrification treatment unit and associated facilities after use. Decontamination or recycling of debris prior to disposition.
- On-property interim storage of excavated contaminated soils and remaining contaminated debris in a manner consistent with the approved Work Plan for Removal Action 17 (improved storage of soil and debris).
- Continued access controls and maintenance, and monitoring of the stored wastes inventories.

- Institutional controls of the Operable Unit 4 area such as deed and land use restrictions.
- Potential additional treatment of stored Operable Unit 4 soil and debris using Operable Unit 3 and 5 waste treatment systems.
- Pumping and treatment of any contaminated perched groundwater encountered during remedial activities.
- Disposal of remaining Operable Unit 4 contaminated soils and debris consistent with the selected remedies for Operable Units 5 and 3, respectively.

9.1.1 Removal of Silo 1, 2 and 3, and Decant Sump Tank Contents

The K-65 residues in Silos 1 and 2, the cold metal oxides in Silo 3, and the sludge in the decant sump tank will be removed. Approximately 6,796 m^3 (8,890 yd^3) of K-65 residues from Silos 1 and 2, 3,785 L (1,000 gallons) of sludge from the decant sump, and 3,890 m^3 (5,088 yd^3) of cold metal oxides from Silo 3 will be removed. The silos and the decant sump will be equipped with an off-gas treatment system(s) designed to handle radon emissions generated during removal.

9.1.2 Vitrification of Silo 1, 2 and 3, and Decant Sump Tank Contents

The major treatment component of the selected remedy consists of a vitrification system to stabilize the wastes from Silos 1, 2, and 3 and the decant sump tank. The wastes removed from the silos and the decant sump will be transferred to a vitrification processing facility which will be constructed on site. The wastes will be thickened as necessary for vitrification and then mixed with glass forming agents and placed into a vitrification melter. The vitrification process will convert the contents of the silos and the decant sump into a very durable glass form which is extremely resistant to the effects of time and weather. The process will destroy organic contaminants and the vitrified waste form will significantly reduce both the tendency of the waste to leach contaminants into the environment and the emission rate of radon gas. The direct radiation associated with the treated residues will remain relatively unchanged from the untreated form of the wastes. Off gases produced as a result of the high operating temperatures of the vitrification melter will be routed through an off-gas treatment system designed to remove solid particles and treat gaseous emissions such as radon.

Treatability studies, conducted on a small scale as part of the RI/FS, indicate that the volume of vitrified material requiring disposal can be reduced by as much as 50 percent of the volume of untreated material removed from the silos and the decant sump.

9.1.3 Off-Site Shipment and Disposal of Treated Material

Approximately 2,770 m^3 (3,623 yd^3) of vitrified material from Silo 1 and 2 and the decant sump, along with approximately 1,471 m^3 (1,923 yd^3) of vitrified material from Silo 3, will be packaged and transported to the NTS for disposal.

The NTS is a DOE owned and operated disposal site located near Las Vegas, Nevada. The treated material will be transported by rail to a destination near to or north of Las Vegas, Nevada. The waste containers carrying the treated material will then be transferred to trucks for transportation over roads to the NTS.

The NTS is located approximately 3,219 kilometers (km) [2,000 miles (mi)] from the FEMP. The FEMP has an approved NTS waste shipment and certification program, for low-level radioactive wastes, that is periodically audited by the NTS. Technical oversight of the waste management activities at the NTS is provided by the State of Nevada. This existing waste shipment disposal program will be modified and amended to include the shipment and disposal of treated Operable Unit 4 wastes.

All off-site shipments will comply with the DOT regulations found in 49 CFR Parts 171 - 178 pertaining to transportation of hazardous and radioactive materials. Additionally, all the NTS waste acceptance requirements will be satisfied. The off-site transport of materials would also comply with the off-site acceptability requirements under CERCLA.

The remedy specifies off-site disposal of vitrified contents of Silos 1, 2 and 3 at the NTS. At the time of the signing of this ROD, the Department of Energy - Nevada Operations Office (DOE-NVO) is in the process of preparing a Sitewide Environmental Impact Statement (EIS) under NEPA for the NTS. Shipments of waste generated from the cleanup of Operable Unit 4 are not proposed to begin until after the expected completion of the NTS site-wide EIS.

9.1.4 Demolition and Decontamination of Structures

Demolition of the silo structures will proceed with the systematic removal and dismantling of the Silos 1, 2, 3, and 4 domes, walls, floor slabs and footers. After removal of the silo contents and before Silos 1, 2, 3, and 4 are demolished, loose interior residues and loose concrete will be removed from the surfaces of the silos and transferred to the vitrification facility to be vitrified. Also, contaminated concrete from Silos 1 and 2, which exhibit highly elevated direct radiation fields, will be separated

from the other Operable Unit 4 concrete and construction debris and prepared for processing in the vitrification facility. Contaminated piping, steel fencing, and other non-porous materials will be decontaminated to facilitate segregation for possible unrestricted release or disposal in a permitted commercial landfill. Only non-porous materials attaining the unrestricted use, free release criteria defined in DOE Order 5400.5 or any subsequent DOE order or amendment or final promulgated regulation addressing free release, will be released from the site as uncontaminated.

9.1.5 Demolition and Decontamination of Other Operable Unit 4 Structures

The existing RTS, Drum Handling Building pad, sump lift station foundation, concrete pipe trench, and decant sump tank will be removed and decontaminated. Additionally, all vitrification facilities constructed and equipment installed and used for the implementation of this remedy will be disassembled, decontaminated (if necessary), and dispositioned. Conventional decontamination and decommission techniques and equipment would be employed for these facilities. Uncontaminated materials attaining the unrestricted use, free release criteria defined in DOE Order 5400.5 will be released from the site for unrestricted use or for disposal in a commercial landfill.

9.1.6 Disposition of Demolished Structures and Debris

The selected remedy as defined under Alternative 2C specifies on-property disposal for Operable Unit 4 contaminated rubble and debris. However, this final action will be held in abeyance until a decision is reached in the Operable Unit 3 ROD for the final treatment and disposal of rubble and debris. The final decision on disposal of rubble and debris, generated from the demolition of the Operable Unit 4 silos and other facilities, will be determined as part of the ROD for Operable Unit 3. The Operable Unit 4 waste will be managed consistent with the disposal remedy put forth in the Operable Unit 3 ROD for contaminated rubble and debris. In the unlikely event unforeseen circumstances preclude the integration of Operable Unit 4 rubble and debris into the Operable Unit 3 treatment and disposal decision, the disposal decision for Operable Unit 4 rubble and debris will be documented in a ROD amendment for Operable Unit 4 in accordance with Section 117(c) of CERCLA and EPA guidance. The ROD amendment will provide the public and the EPA further opportunity to review and comment on the on-property disposal option for Operable Unit 4 rubble and debris. A ROD amendment to the Operable Unit 4 ROD will not be necessary in the event the Operable Unit 3 remedy for rubble and debris can be feasibly implemented by Operable Unit 4.

Holding action on the Operable Unit 4 on-property disposal decision in abeyance fosters an integrated site-wide disposal program for rubble and debris. The volume of rubble and debris to be generated from Operable Unit 4 is anticipated to be less than 1 percent of the volume expected to be generated site wide. The largest volume of rubble and debris from the site will be generated from Operable Unit 3, making it more appropriate to fully develop the on-property disposal option for rubble and debris through the Operable Unit 3 ROD. Additionally, Operable Unit 4 will be able to take advantage of any available waste minimization initiatives developed for rubble and debris which are identified in the Operable Unit 3 ROD.

Demolition and removal of Operable Unit 4 structures and facilities will proceed as described above. Operable Unit 4 rubble and debris will be dispositioned according to the selected remedy identified in the Operable Unit 3 ROD. Rubble and debris generated prior to finalization of the Operable Unit 3 ROD will be placed in interim storage to await finalization of the disposal decision for rubble and debris under Operable Unit 3. The design and management of interim storage facilities will be consistent with the approved Work Plan for FEMP Removal Action No. 17 - Improved Storage of Soil and Debris.

9.1.7 Soil Removal

After the silos are demolished, the surface and subsurface soils within the boundary of Operable Unit 4 will be excavated to attain required remediation levels for each of the constituents of concern. These soil remediation levels are considered preliminary until final soil remediation levels can be established through the Operable Unit 5 ROD. As indicated earlier, Operable Unit 5 has site-wide responsibility for soil cleanup. Also, the anticipated volume of soil to be removed from Operable Unit 4 will be less than 1 percent of the anticipated volume of soil to be remediated for the entire site. The surface and subsurface soils within Operable Unit 4 will be excavated to achieve the preliminary remediation levels presented and is discussed in Section 9.2. These Operable Unit 4 soil remedial levels are based upon information available at the time of preparation of this ROD, from the Operable Unit 5 RI/FS. In the event that the Operable Unit 5 ROD determines that lower soil remediation levels are required, further remedial action will be conducted on the Operable Unit 4 residual soils to achieve the lower remediation levels for those COCs which are affected.

Soils exhibiting elevated direct radiation levels (i.e., potentially contaminated soils beneath Silos 1 and 2) will be segregated from other soils and transported to the vitrification facility for processing. Following excavation, the affected areas will be returned to original grade with the placement of clean backfill and revegetated to control erosion.

9.1.8 Soil Disposition

The selected remedy as defined under Alternative 2C specifies on-property disposal for Operable Unit 4 contaminated soils. However, this final action will be held in abeyance until a site-wide decision is reached in the Operable Unit 5 ROD for the final disposal of contaminated soils. The final decision on disposal of contaminated soils generated from Operable Unit 4 will be determined as part of the Record of Decision for Operable Unit 5. The Operable Unit 4 soils will be managed consistent with the disposal remedy put forth in the Operable Unit 5 ROD for contaminated soils. In the event unforeseen circumstances preclude the integration of Operable Unit 4 contaminated soils into the Operable Unit 5 disposal decision, the final disposal decision for Operable Unit 4 contaminated soils will be documented in a ROD amendment for Operable Unit 4 in accordance with Section 117(c) of CERCLA and EPA guidance. The ROD amendment will provide the public and the EPA further opportunity to review and comment on the final disposal option for Operable Unit 4 contaminated soils. A ROD amendment to the Operable Unit 4 ROD will not be necessary in the event the Operable Unit 5 remedy for contaminated soils can be feasibly implemented by Operable Unit 4.

Holding the Operable Unit 4 final disposal decision in abeyance fosters an integrated site-wide disposal approach for contaminated soils. The largest volume of contaminated soils from the site will be generated within Operable Unit 5, making it more appropriate to fully develop the final disposal option for contaminated soil through the Operable Unit 5 ROD. Additionally, Operable Unit 4 will be able to take advantage of any applicable waste minimization initiatives developed for contaminated soils under the Operable Unit 5 ROD.

Excavation and removal of Operable Unit 4 contaminated soils will proceed as described above. Operable Unit 4 contaminated soils will be disposed in accordance with the selected remedy identified in the Operable Unit 5 ROD for soils. Contaminated soils generated prior to finalization of the Operable Unit 5 ROD will be placed in interim storage to await finalization of the disposal decision for contaminated soils under Operable Unit 5. The design and management of interim storage facilities will be consistent with the approved Work Plan for FEMP Removal Action No. 17 -

Improved Storage of Soil and Debris. The management of Operable Unit 4 contaminated soils will include measures to ensure future identification and retrieval of these wastes for final disposition.

Water Treatment

Wastewater generated as a result of this selected remedy along with water removed from the decant sump tank, Silo 4 (if any), and any contaminated perched water encountered during remediation will be treated at the FEMP wastewater treatment facility prior to discharge. In accordance with the Amended Consent Agreement, groundwater cleanup will be handled by Operable Unit 5. Operable Unit 4 would only handle the cleanup of perched water encountered during implementation of the selected remedy.

9.1.9 Cost

The total estimated present worth cost for the selected remedy is 91.7 million dollars. Table 9-1 summarizes the capital and the operating and maintenance costs. The total estimated present worth cost is less than the sum of the total costs of the preferred alternatives for Subunit A, B, and C. This is because Subunits A and B will share common costs for site preparation, construction of the silo contents removal work platform and processing facilities, and packaging and transportation.

9.2 SOIL CLEANUP CRITERIA

After the silos are demolished, the surface and subsurface soils within the Operable Unit 4 boundary will be excavated to attain required remediation levels for each of the constituents of concern. These soil remediation levels are preliminary until final soil remediation levels can be established through the Operable Unit 5 ROD. In the event that the Operable Unit 5 ROD determines that lower soil remediation levels are required, further remedial action will be conducted on the Operable Unit 4 residual soils to achieve the lower remediation levels for those COCs that are affected.

9.2.1 Land Use and Receptor Description

Preliminary remediation levels for soil cleanup were developed for an expanded trespasser receptor under a future land use with continued federal ownership to represent post remediation conditions at Operable Unit 4 and, therefore, provide the basis for establishing cleanup levels.

The future land use with continued federal ownership scenario represents a government reserve which remains under U. S. government control with no future development intended. Active access controls currently in place at the FEMP site (i.e. fencing, security access control, signs, etc.) will be

TABLE 9–1

COMBINED COST ESTIMATE FOR SELECTED REMEDY

DESCRIPTION	DIRECT COST	INDIRECT COST	TOTAL COST
CAPITAL COSTS			
SITE PREPARATION	$768,600	$660,000	$1,428,600
WASTE PROCESSING	$1,695,800	$1,427,700	$3,123,500
VITRIFICATION EQUIPMENT	$2,935,500	$1,703,600	$4,639,100
HYDRAULIC/PNEUMATIC REMOVAL SYSTEM	$6,655,400	$14,068,800	$20,724,200
DEMOLITION & REMOVAL	$3,980,400	$5,977,000	$9,957,400
TRANSPORTATION	$1,915,000		$1,915,000
DISPOSAL	$2,360,200		$2,360,200
PACKAGING (3,694 PKGS. @ $955/PKG.)	$975,200	$2,552,600	$3,527,800
DISPOSAL VAULT	$6,410,200	$10,914,800	$17,325,000
TOTAL CAPITAL	$27,696,300	$37,304,500	$65,000,800
RISK BUDGET	$3,046,600	$4,103,500	$7,150,100
SUBTOTAL	$30,742,900	$41,408,000	$72,150,900
CONTINGENCY (20.0%)	$6,148,600	$8,281,600	$14,430,200
TOTAL ESTIMATED INSTALLED COST	$36,891,500	$49,689,600	$86,581,100
OPERATION AND MAINTENANCE (O&M) COSTS			
DURING CONSTRUCTION			$16,615,500
POST–REMEDIATION			$3,567,000
TOTAL PRESENT WORTH COST (CAPITAL AND O&M @ 7%)			$91,738,000

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discontinued, but the federal government will exercise the right to preclude site development through deed restrictions. This land use scenario was not included in the Baseline Risk Assessment. It was developed in a part of the FS for Operable Unit 4 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 receptor include hiking, roaming, bird watching, and other similar activities. An expanded trespasser may be exposed to Operable Unit 4 residual contaminants through the following pathways:

- Inhalation of fugitive dust, volatile organic compounds, and radon;
- Incidental ingestion of soil;
- Dermal contact with contaminants in soil; and
- External radiation exposure from radionuclides in soil.

9.2.2 Preliminary Remediation Levels

Tables 9-2 and 9-3 provide preliminary remediation levels for soil cleanup and the estimated risk to affected receptors from the residual contaminants left in the soils. Specific details on the development of these preliminary remediation levels are provided in the FS Report for Operable Unit 4.

As mentioned earlier, the future land use scenario for Operable Unit 4 will be as a government reserve with continued federal ownership. The on-property receptor of concern under this scenario will be an expanded trespasser. Cancer risks and chemical hazard to the expanded trespasser, from residual contaminants, are presented in Tables 9-2 and 9-3. For comparison, cancer risks and chemical hazard to an on-property farmer under a future land use scenario without federal ownership are also presented. Proposed remediation goals (PRGs), based on an ILCR of 10^{-6} and an HI of 0.2 were developed in the FS. These PRGs, presented in Tables 9-2 and 9-3 for the expanded trespasser, represent allowable incremental concentrations above background for these COCs based on targets of 10^{-6} incremental risk and hazard index of 0.2. The PRG was added to the background concentration to derive the preliminary remediation level. In those cases where a target concentration level specified by an ARAR is less than the proposed remedial level, the ARAR level was adopted as the remediation level. Remediation would be required for COCs that are present in the surface and subsurface soil at higher concentrations than the preliminary remediation level.

TABLE 9-2

PRELIMINARY REMEDIATION LEVELS IN SOILS - RADIONUCLIDES

Constituent of Concern	Expanded Trespasser 10^{-6} ILCR PRG pCi/g	Background (95th percentile) pCi/g	ARAR Target pCi/g	Max. Detected Soil Concentration, pCi/g		Proposed Remediation Level[a] pCi/g	ILCR above background to an Expanded Trespasser from Proposed Remediation Level[b]
				Surface	Subsurface		
Pb-210 +2 progeny	77	1.33	NA	4.5	101	78	1.0×10^{-6}
Ra-226 +5 progeny	0.37	1.45	5 (top 6" soil) 15 (max. below 6")	88	206	2	1.0×10^{-6}
Ra-228 +1 progeny	0.77	1.19	NA	0.48	1.24	2	1.0×10^{-6}
Sr-90 +1 progeny	1420	ND	NA	1.8	0.8	NR	$< 1 \times 10^{-6}$
Tc-99	38700	ND	NA	3.6	3.6	NR	$< 1 \times 10^{-6}$
Th-228	0.4	1.43	NA	2.9	1.3	2	1.0×10^{-6}
U-238 +2 progeny	59	1.22	NA	37	53	60	1.0×10^{-6}

Notes:
a) Sum of backround and PRG.
b) Includes the direct radiation, soil ingestion, and inhalation pathways.
NA Not Available
NR No Remediation Required

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TABLE 9-3

PRELIMINARY REMEDIATION LEVELS IN SOILS - CHEMICALS

Constituent of Concern	Expanded Trespasser HI = 0.2 PRG mg/kg	Expanded Trespasser 10^{-6} ILCR PRG mg/kg	Background (95th percentile) mg/kg	ARAR Target mg/kg	Max. Detected Soil Concentration, mg/kg		Proposed Remediation Levels mg/kg	HI to an Expanded Trespasser from Proposed Remediation Levels	Risk to an Expanded Trespasser from Proposed Remediation Level[a]
					Surface	Sub surface			
Antimony	31	N/A	7.7	NA	32	32	NR	0.2	N/A
Arsenic	510	23	8.45	NA	10	12	NR	N/A	$<1x10^{-6}$
Barium	>10000	N/A	91.3	NA	112	142	NR	<.1	N/A
Cadmium	26	N/A	0.82	NA	6	7	NR	<.1	N/A
Chromium(III)	NA	N/A	15.5	NA	23	25	NR	<.1	N/A
Molybdenum	930	N/A	2.6	NA	25	30	NR	<.1	N/A
Nickel	8300	N/A	20.9	NA	39	39	NR	<.1	N/A
Silver	130	N/A	2.6	NA	10	18	NR	<.1	N/A
Thallium	31	N/A	0.58	NA	0.5	0.5	NR	<.1	N/A
Vanadium	1700	N/A	30.4	NA	28	33	NR	<.1	N/A
Zinc	>10000	N/A	62.2	NA	65	67	NR	<.1	N/A

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Table 9-3
(Continued)

Constituent of Concern	Expanded Trespasser HI = 0.2 PRG mg/kg	Expanded Trespasser 10^{-6} ILCR PRG mg/kg	Background (95th percentile) mg/kg	ARAR Target mg/kg	Max. Detected Soil Concentration, mg/kg		Proposed Remediation Levels mg/kg	HI to an Expanded Trespasser from Proposed Remediation Levels	Risk to an Expanded Trespasser from Proposed Remediation Level[a]
					Surface	Sub surface			
Benzo(a)anthracene	NA	61	ND	NA	4.7	ND	NR	N/A	$<1x10^{-6}$
Benzo(a)pyrene	NA	8.8	ND	NA	5.2	ND	NR	N/A	$<1x10^{-6}$
Benzo(b)fluoranthene	NA	72	ND	NA	9.7	ND	NR	N/A	$<1x10^{-6}$
Chrysene	NA	2000	ND	NA	3.5	ND	NR	N/A	$<1x10^{-6}$
Dibenzo(a,h)anthracene	NA	7.9	ND	NA	0.9	ND	NR	N/A	$<1x10^{-6}$
Indeno(1,2,3-cd)pyrene	NA	32	ND	NA	4.2	ND	NR	N/A	$<1x10^{-6}$

[a]Includes the direct radiation, soil ingestion, and inhalation pathways.
NA = Not Available.
N/A= Not Applicable.
ND = Not Detected.
NR = No Remediation Required.

Based on the preliminary remediation levels, the COCs driving soil cleanup are Pb-210 and Ra-226. Soil remediation targeted at achieving the preliminary remediation levels for Pb-210 and Ra-226 will generate the largest volume of excavated soils.

9.3 MEASURES TO CONTROL ENVIRONMENTAL IMPACTS

All practical measures will be employed at the FEMP site to minimize environmental impacts during the implementation of the Operable Unit 4 Remedial Action. In accordance with DOE regulations for implementing the NEPA (10 CFR §1021), DOE has factored environmental impacts into the decision making process for the Operable Unit 4 Remedial Action.

Measures to control environmental impacts have been identified in the Operable Unit 4 FS/PP-DEIS and will be implemented during remedial design and remedial action to minimize impacts to on-property natural resources (e.g., wildlife and wildlife habitat, cultural resources, wetlands, surface water, groundwater). Operable Unit 4 remedial activities would not impact floodplain areas at the FEMP. The 100- and 500-year floodplain of Paddys Run is located near the silos and associated support facilities; however, the implementation of engineering controls will eliminate any indirect impact such as runoff and sediment deposition to the floodplain. Direct physical disturbance to the floodplain will not occur; hence, changes in flood elevation will not occur. The following provides a discussion of the measures that will be taken to minimize impacts to the environment on and adjacent to the FEMP Site.

The temporary disturbance of 5.7 ha (14.1 acres) of terrestrial habitat and 0.2 ha (0.5 acres) of drainage ditch wetlands will result from implementation of the Operable Unit 4 Remedial Action. Furthermore, approximately 4.7 ha (11.6 acres) of terrestrial habitat and most of the 0.2 ha (0.5 acres) of drainage ditch wetland will be permanently committed to on-property disposal. However, all areas of terrestrial habitat disturbed will be regraded and revegetated to the extent practical with native species in order to reestablish habitat. Specific regulatory requirements due to the loss of wetlands are discussed in Section 10.

The construction and operation of the various support facilities (e.g., waste processing facility, interim storage facility) east of the silos will result in the potential for increased erosion and sediment loads to Paddys Run. However, appropriate engineering controls such as silt fences, vegetative cover, and runoff control systems will be utilized to minimize runoff to Paddys Run. In addition,

appropriate High Efficiency Particulate Air (HEPA) filtration systems will be utilized during operation of the vitrification facility to minimize the potential for increased emissions to the ambient air.

The on-property disposal facility will be designed with appropriate engineering controls to minimize the potential for releases. A leachate collection/detection system and a low permeability cap will be engineered into the on-property disposal facility to control the potential for releases to groundwater. Furthermore, groundwater, surface water, and air monitoring will be performed before, during, and after remedial activities. If adverse effects are detected in any of these environmental media, work will be immediately stopped until the effects are controlled and/or the appropriate response actions are executed.

The selected remedy for Operable Unit 4 includes the removal of the contaminated surface soil from the entire Operable Unit 4 Area and the replacement with clean fill material. Therefore, the primary residual contaminant would be uranium below the PRL in the subsurface soil. Because the contact of ecological receptors is limited (near background levels) to surface soil and surface waters, residual ecological risks associated with the Operable Unit 4 preferred alternative would be indistinguishable from those risks posed by background levels in the soil.

10.0 STATUTORY DETERMINATIONS

In accordance with the statutory requirements of Section 121 of CERCLA, as amended, remedial actions taken pursuant to Sections 104 and 106 must satisfy the following:

- Be protective of human health and the environment.
- Comply with all 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, CERCLA requires five year reviews to determine if adequate protection of human health and the environment is being maintained where remedial actions result in hazardous substances remaining on-site above health-based levels. A discussion is provided below on how the selected response actions for Operable Unit 4 satisfy these statutory requirements.

10.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy achieves the requirement of being protective of human health and the environment by: (1) removing the sources of contamination, (2) treating and stabilizing the materials giving rise to the principal threats from Operable Unit 4, (3) disposing of treated materials at an off-site location which provides the appropriate level of protectiveness, and (4) remediating contaminated soils and debris to levels which are protective. The contents of Silos 1, 2, and 3 and the Decant Sump Tank will be removed and treated through a vitrification process and disposed at the NTS. Vitrification will stabilize these materials and inhibit leaching of contaminants to the environment when they are disposed. All silo structures and other facilities will be removed from Operable Unit 4 and disposed of in a manner consistent with the forthcoming ROD for Operable Unit 3. Contaminated soil will also be removed and disposed in a manner consistent with the Operable Unit 5 ROD.

Baseline cancer risks from current conditions exceed the 10^{-4} to 10^{-6} acceptable risk range. Under current conditions, the dominant risk is 5×10^{-3} to the trespassing child. Under the future land use scenario of continued federal ownership and the expanded trespasser receptor, the residual cancer risk from Operable Unit 4 will be reduced to less than 1×10^{-6}. There are no short-term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

10.2 COMPLIANCE WITH LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

In accordance with Section 121 of CERCLA, the selected remedy will achieve a standard or level of control consistent with all federal and State of Ohio ARARs and TBCs. The selected remedy will also be performed in accordance with all pertinent DOE Orders as well as other requirements. Appendix B provides a listing of the chemical-, action-, and location-specific ARARs and TBCs which are invoked by this remedy.

No waivers are being sought for any of the ARARs; however, a waiver will be required to comply with the relevant and appropriate requirements of OAC 3745-27-07, if on-property disposal becomes the final disposal action for contaminated soils and debris. This state siting requirement, which is more stringent than its federal counterpart, prohibits the construction of a new solid waste disposal facility over a sole-source aquifer. The Great Miami Aquifer, located below the FEMP site, is a designated sole-source aquifer. Exemptions to the OAC rule require that certain technical criteria pertaining to the hydrogeology of the proposed disposal area be satisfied. These criteria include a significant thickness [minimum 5 m (16.5 ft)] of material of low hydraulic conductivity between the disposal facility liner and the sole-source aquifer, and demonstration of no interconnection between the sole-source aquifer and any significant saturated zones which exist above the sole-source aquifer. It must also be demonstrated that no adverse impact is expected to occur to human health and safety or the environment from siting and construction of the disposal facility.

Although RCRA is cited as an ARAR for remediation of Operable Unit 4, the silo residues destined for remediation are by-product material as defined under Section 11(e)(2) of the Atomic Energy Act of 1954, and as such, are excluded from RCRA regulation [40 CFR § 261.4(a)(4)]. By-product material, as defined by the AEA, includes tailings or wastes produced by the extraction or concentration of uranium and thorium from any ore processed primarily for its source material content (42 U.S.C. 2014).

Since the residues are excluded from regulation as solid or hazardous waste, the requirements under RCRA are not applicable to Operable Unit 4 remedial actions. However, analytical data from Silos 1, 2, and 3 material exceed toxicity characteristic levels for various toxicity characteristic metals under RCRA. Because the residues are sufficiently similar to hazardous waste regulated by RCRA and some RCRA requirements are appropriate for the circumstances of the release or potential release, certain substantive requirements of RCRA are relevant and appropriate for management of these residues, and are included in the table of ARARs.

10.3 COST EFFECTIVENESS

The selected remedial alternatives for each subunit have been determined to be protective of human health and the environment, and to be cost effective. The present worth cost for this remedy is 91.7 million dollars.

The off-site alternatives selected for the contents of Silos 1, 2, and 3 had a lower cost than the on-property disposal alternative for these materials. This is due to the fact that costs associated with construction of a facility that would provide the needed level of protection to human health and the environment from the silo contents would be greater due to the increased intruder protection requirements in the event of a trespasser. Also, the packaging and transportation costs associated with the vitrified material were lower than those for the cement stabilized material. Vitrification is more cost effective than cementation because the reduction in volume of vitrified product minimizes the amount of waste requiring handling, resulting in reduced transportation and disposal costs.

Conversely, transportation and disposal costs associated with disposing Operable Unit 4 soils and debris at NTS or a commercial facility are higher than the costs associated with construction of an engineered facility designed to manage the material on-property. Also, integration of the Operable Unit 4 disposal remedy for soils and debris with Operable Units 5 and 3 respectively, allows for economies of scale through treatment by processes developed for larger volumes of soil and debris.

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

The EPA and the State of Ohio have determined that the selected remedy for Operable Unit 4 represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA, and the State of Ohio 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 remedies also meet the statutory preference for treatment as a principal element, and meet state and community acceptance.

Vitrification and off-site disposal will provide permanent treatment and volume reduction for the silo contents. By physically binding the contaminants into a glass-like matrix, the mobility of the contaminants and the emanation of radon gas would be greatly reduced. Vitrification will also significantly reduce the leachability of metal contaminants of concern to levels that are below RCRA regulatory thresholds. Vitrification will destroy any organic contaminants in the waste material due to the operating temperature of the treatment process. In addition, the treated material would be less than 50 percent of its original volume. As a result, the selected remedy would meet the CERCLA requirement for permanent solutions that reduce the toxicity, mobility, or volume through treatment.

Part of the remedy selected for contaminated soils and debris may also involve treatment of the waste material prior to disposal. The soil and debris will be placed into interim storage pending finalization of the disposal decision for these wastes through the RODs for Operable Units 3 and 5. This allows for the implementation of any applicable resource recovery technologies for these wastes, which are developed and included in the RODs for these operable units.

10.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

By treating the contents of Silos 1, 2, and 3 in a vitrification process, and providing for treatment of contaminated debris and soils should treatment become the selected remedy for these wastes in the Operable Units 3 and 5 RODs, the selected remedy mitigates the principal threats posed by Operable Unit 4 through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied.

10.6 UNAVOIDABLE ADVERSE IMPACTS

A number of unavoidable adverse impacts (Table 10-1) would occur when any of the action alternatives are implemented. As stated in the alternatives and in Table 10-1, many of these impacts would only be temporary.

TABLE 10-1

UNAVOIDABLE ADVERSE IMPACTS ON RESOURCES

Affected Resource	Impact Type
Soil and Geology	Soil at the FEMP site and NTS would be disrupted by construction and excavation activities. Many impacts would be temporary, pending completion of remedial activities and restoration programs. The implementation of the selected remedy would temporarily disturb approximately 6.1 ha (15.1 acres) at the FEMP (e.g., excavation and construction). A permanent disruption of approximately 8 ha (20 acres) at NTS and 4.7 ha (11.6 acres) of land at the FEMP site would occur. All areas disturbed at the FEMP site would be regraded and revegetated. The regional geology of the FEMP site and surrounding area would not be affected by the selected remedy. Implementation of off-site disposal would not affect the regional geology of NTS or surrounding areas.
Water Quality and Hydrology	Potential short-term impacts (e.g., release of sediment and fugitive dust) on water quality and hydrology would be minimal regrading and revegetation around the silos to minimize potential water quality impacts would occur. Institutional actions implemented around the disposal facility at the FEMP site would eliminate impacts to water quality and hydrology. Assuming monitoring and maintenance activities continue at NTS, no long-term impacts would be expected from waste disposal at NTS.
Air Quality	Some temporary impacts to air quality at the FEMP site would result from fugitive dust emissions associated with construction and excavation activities (e.g., grading, compacting, loading). Lesser impacts would also be incurred from vehicle and equipment exhausts. These impacts are not expected to affect human health or the environment. No long-term impacts on air quality would be expected from activities associated with the selected remedy. Disturbed areas would be restored (e.g., regraded and revegetated) after completion of the remedial activities, thus minimizing the potential for the fugitive dust release. Waste disposal facilities at all sites would be designed to prohibit emission from stored waste. Only in the case of an accident during remedial actions would appreciable air quality impacts occur.
Biotic/Ecological Resources	Short-term disturbance of on-property vegetation and riparian and aquatic habitat would be expected. Approximately 6.1 ha (15.1 acres) of habitat at the FEMP site would be distubed during excavation and construction activities. Remedial activities would temporarily displace 5.7 ha (14.1 acres) of terrestrial habitat. In addition, 4.7 ha (11.6 acres) would be permanently committed to disposal. The long-term impacts from the on-property disposal alternatives would be minimal (e.g., potential for temporary displacement of threatened and endangered species, terrestrial biota). Habitat at NTS is limited and it is believed little displacement of native species would occur.

TABLE 10-1
(Continued)

Affected Resource	Impact Type
Wetlands and Floodplains	Alternative 2C would impact approximately 0.2 ha (0.5 acre) of drainage ditch wetlands utilized for on-property disposal. Appropriate notification and mitigation activities would be initiated upon implementation of this alternative. Direct floodplain impacts resulting in a change of flood elevations would not occur. Engineering controls would be implemented to minimize or eliminate impacts. No wetlands or floodplains are present at NTS.
Socioeconomics and Land Use	Minimal short-term impacts (e.g., increased traffic noise) to the socioeconomics and land use would occur. The long-term socioeconomic and land use impacts for the FEMP site would be positive because the waste would be isolated and controlled, thus no changes from current land use would be expected. Removing waste from the site would help to eliminate impacts on future populations and economic growth at the FEMP site. Disposal of this waste at the NTS would not be expected to impact socioeconomics or land use. Total present worth costs of the selected remedy is $91.7M. For this analysis, it is assumed that all resources required for remedial activities can be found within the thirteen county Consolidated Metropolitan Statistical Area (CMSA). The cumulative operating budget for the CMSA was approximately $805,000,000.00. The collectible revenue for the CMSA would increase up to approximately 11.4%.
Visual Resources	Construction and excavation activities would result in some minor incremental increases over the current visual and aesthetic impacts of the FEMP site. Following completion of remedial action activities, some visual and aesthetic impact would remain (e.g., well-lighted, fenced disposal area), but there would be lower magnitude than current impacts at the FEMP site. Visual impacts would be reduced through the maintenance of a vegetative cover. The long-term impacts would be incremental for NTS. Short-term impacts would be incurred at NTS during construction, excavation, and transportation activities. These impacts would be temporary and would cease following completion of remedial action activities and site restoration.
Noise	Ambient noise levels would temporarily increase as a result of construction, excavation, and transportation activities. All noise impacts would be temporary and would cease following completion of remedial activities.

10.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Implementing the selected remedy will result in permanent commitment of on-property land and associated natural resource services for material disposal at the FEMP site and off-site land at the NTS. This discussion of irreversible and irretrievable commitment of resources has been included to secure the exclusion discussed in CERCLA Section 107(f)(1).

Soil at the FEMP site and NTS will be disturbed by construction and excavation activities. Many impacts will be temporary, pending completion of remedial activities and restoration programs. The implementation of the selected remedy will temporarily disturb approximately 6.1 ha (15.1 acres) at the FEMP site. Furthermore, implementation of this remedy will permanently commit 8 ha (20 acres) at NTS and 4.7 ha (11.6 acres) at the FEMP site. All areas disturbed at the FEMP site will be regraded and revegetated.

Approximately 6.1 ha (15.1 acres) of habitat at the FEMP site will be disturbed during excavation and construction activities. The long-term impacts from on-property disposal are expected to be limited to the loss of 4.7 ha (11.6 acres) of terrestrial habitat and associated natural resource services. 220 acres are expected to be permanently committed on a site-wide basis, with another twenty to thirty acres subject to temporary disturbances. It is assumed that processes such as revegetation and regrading are successful; however, the loss of habitat will result in a permanent displacement or loss of wildlife and associated services. Terrestrial habitat at the off-site disposal areas is limited, and little displacement of species is expected to occur.

Approximately 0.2 ha (0.5 acres) of drainage ditch wetlands and associated natural resource services will be injured by on-property disposal. Long-term direct impacts to the floodplain resulting in changes of flood elevations will not occur. Engineering controls would be implemented to minimize or eliminate any indirect impacts. There will be no impacts to wetlands or floodplains with disposal at the off-site disposal areas.

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

The treatment processes for the selected remedy will require the consumptive use of materials and energy. The vitrification process will be energy-intensive and require commitment of a considerable supply of electricity. Electricity can be obtained from the local utility.

The committed land will be actively monitored and maintained. Periodic monitoring of nearby surface water and groundwater from monitoring wells around the perimeter of the facility will be performed, and periodic site inspections will identify any damage to the above-grade disposal facility. Maintenance activities will be performed as necessary. Hence, no impacts to groundwater are expected to occur from the Operable Unit 4 selected remedy.

11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The FS/PP-DEIS for Operable Unit 4 was released for public comment in March 1994. The DOE reviewed all written and oral comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as was originally identified in the FS/PP-DEIS, were necessary. However, it should be noted that the repromulgation of 40 CFR §191 by the EPA, did result in minor changes in the comparative analysis of alternatives presented in the FS/PP-DEIS. The following discussion addresses the nature and extent of these changes.

11.1 REPROMULGATION OF 40 CFR §191

Repromulgation of the 40 CFR §191 requirements for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Wastes has caused changes to be made to the ARARs as described in the Draft Final FS/PP-DEIS, conditionally approved by the EPA on February 9, 1994. DOE chooses not to submit revision pages to the FS/PP-DEIS; all changes to the ARARs for that document and any impacts from the repromulgation are discussed in this section of the Draft ROD. Since the repromulgation resulted in relevant and appropriate, rather than applicable requirements, the repromulgation of 40 CFR §191 will not impact the proposed off-site alternative for disposition of the K-65 material. However, the on-property disposal alternatives (Alternatives 2A/Vit and 2A/Cem) that were previously retained, having passed the threshold criteria of the detailed analysis, are no longer able to meet the threshold criteria of compliance with ARARs, and are consequently dropped from further consideration. Subsequently, all references to Alternative 2A are therefore deleted from reference in the text of the ROD, and in the Appendix A.

The only relevant and appropriate requirement from 40 CFR §191 that is retained as an ARAR in this ROD (Appendices A and B) for the proposed alternative is 40 CFR §191.03(b), which establishes dose limits for management and storage of the K-65 material. However, since this ARAR is relevant and appropriate, rather than applicable, it will pertain only to the on-property portions of the remediation.

11.1.1 Background

The United States Department of Energy - Fernald Field Office (DOE-FN) received conditional approval of the Draft Final FS/PP-DEIS for Operable Unit 4 from USEPA on February 9, 1994. Included in the FS/PP-DEIS applicable or relevant and appropriate requirements (ARARs) was a reference to 40 CFR

§191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Wastes". This reference to 40 CFR §191 was modified in the Operable Unit 4 FS/PP-DEIS, submitted in February 1994 in response to the conditional approval letter, to reflect the changes to the regulation that occurred upon its repromulgation on December 20, 1993. It still accommodates the specific direction previously provided by the USEPA regarding incorporation of the 40 CFR §191 requirements as an ARAR/TBC ("Operable Unit 4 Screening Dispute Resolution U.S. DOE Fernald", Catherine McCord, USEPA, to Andy Avel, DOE, dated October 18, 1990). The final rule became effective on January 19, 1994, during final revision of the Operable Unit 4 FS/PP-DEIS, and agency comments did not address the repromulgation of the rule. This fact was discussed with the USEPA, and a DOE position paper on the incorporation of 40 CFR §191 as an ARAR for Operable Unit 4 remediation was submitted to the USEPA for concurrence. The USEPA disagreed with the draft position proposed by DOE, and responded with a directive to incorporate the substantive elements of the repromulgated rule into the ROD, with an option to resubmit change pages to the FS/PP-DEIS ("Application of 40 CFR §191 to OU #4", Jim Saric, USEPA, to Jack Craig, DOE, dated April 25, 1994). DOE elected not to revise the FS/PP-DEIS, but rather to describe in this section of the ROD changes to the table of ARARs and associated impacts on selection or implementation of remedial alternatives that have occurred between the time the Draft Final FS/PP-DEIS was conditionally approved, and the submittal of the ROD to the USEPA and OEPA. The list of ARARs in the Draft ROD, and proposed approach to compliance with the substantive elements thereof, once approval by the USEPA is obtained, will be the final approved list of applicable or relevant and appropriate requirements for final remediation of Operable Unit 4.

11.1.2 Impacts of Repromulgation

Since 40 CFR §191 cannot be considered a legally "applicable" class of ARAR for this CERCLA remediation, §191 is not applicable to any Operable Unit 4 waste streams. Since compliance with only applicable requirements is required to be demonstrated for off-site remedial alternatives proposed under CERCLA, these requirements will not impact the proposed off-site alternative for disposal of the treated K-65 material at the NTS.

DOE previously included 40 CFR §191 Subpart A as a relevant and appropriate requirement, and Subpart B as to be considered (TBC) criteria for management of K-65 material in accordance with guidance received from the USEPA. Subpart A of §191, entitled "Environmental Standards for Management and Storage" includes public dose rate standards for protection of the public from radiation hazards posed by spent nuclear fuel, high-level, or transuranic waste material. The repromulgation of the Final Rule did

not materially affect the sections of Subpart A referenced in the Operable Unit 4 FS/PP-DEIS; the Subpart A requirement referenced in the Operable Unit 4 FS/PP-DEIS remains unchanged in the table of ARARs as a relevant and appropriate requirement for the on-property portion of the remedial activities to be conducted on the K-65 material.

Prior to repromulgation, Subpart B requirements were in remand, and were therefore considered TBCs in the FS/PP-DEIS submitted to the agencies. Since Subpart B of §191, entitled "Environmental Standards for Disposal", has been repromulgated, the USEPA has directed that sections must now be considered as relevant and appropriate requirements for any on-property disposal alternatives. Since it could not be demonstrated that the on-property disposal of treated K-65 material would comply with specific requirements of this Subpart, those alternatives involving on-property disposal (Alternatives 2A/Vit and 2A/Cem) were no longer able to meet the threshold criteria of compliance with these ARARs, and were consequently dropped from further consideration. All descriptions to Alternative 2A are therefore deleted from reference in the text of the ROD, and in the Appendix A.

A new Subpart C of §191 "Environmental Standards for Groundwater Protection", was created by the repromulgated rule. As with Subpart B, this new Subpart pertains only to disposal systems. The elements of this Subpart must now be considered as relevant and appropriate requirements; however, since the on-property disposal alternatives to which this Subpart pertains were dropped from further consideration on the basis of non-compliance with Subpart B requirements, and since Subpart C will not pertain to any off-site disposal alternatives, these requirements will not be included in the Appendix A or B tables of ARARs. Subpart C will have no effect on the selected alternative, which includes off-site disposal.

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APPENDIX A

SUMMARY OF MAJOR ARARs FOR OPERABLE UNIT 4 REMEDIAL ACTION ALTERNATIVES

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LIST OF ACRONYMS

ALARA	As Low As Reasonably Achievable
ARAR	Applicable or Relevant and Appropriate Requirements
AWWT	Advanced Waste Water Treatment Facility
CAMU	Corrective Action Management Unit
CFR	Code of Federal Regulation
DOE	United States Department of Energy
FEMP	Fernald Environmental Management Project
HEPA	High-Efficiency Particulate Air (filter)
HLRW	High Level Radioactive Waste
m	meter
MCL	Maximum contaminant level
MCLG	Maximum contaminant level goal
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
OAC	Ohio Administrative Code
ORC	Ohio Revised Code
OU4	Operable Unit 4
pCi	picocuries
pCi/l	picocuries per liter
$pCi/m^2/s$	picocuries per square meter per second
RCRA	Resource Conservation and Recovery Act
SWMU	Solid Waste Management Unit
TBC	to be considered
TRU	Transuranic
TSD	Treatment, Storage, or Disposal Facility
TU	Temporary Unit
UMTRCA	Uranium Mill Tailings Radiation Control Act
WWTS	Waste Water Treatment System

A.1.0 INTRODUCTION

This appendix presents a summary of the key Applicable or Relevant and Appropriate Requirements (ARARs) and to be considered (TBCs) which pertain to the remedial alternatives which were retained in the Detailed Analysis of Alternatives (Section 4) of the Feasibility Study Report for Operable Unit 4, and described in Section 7 of the Record of Decision. This table includes ARARs established under federal and state environmental laws, and TBC criteria which were determined to be necessary to ensure protection of human health and the environment.

The appendix has three tables in accordance with the three types of ARARs: Chemical-Specific, Location-Specific, and Action-Specific. The layout of the tables is as follows: the retained alternatives are listed in the first column, followed by the regulatory citation and classification as applicable, relevant and appropriate, or TBC. Next the basis for selection and determination of the class of ARAR is described, followed finally by the strategy for compliance with the ARAR during implementation of the alternative. This format and contained information is consistent with the United States Environmental Protection Agency (EPA) Interim Final Guidance on Preparing Superfund Decision Documents: the Proposed Plan, Record of Decision, Explanation of Significant Differences, and Record of Decision Amendment (OERR; EPA/540/G-89/007, July 1989b).

Summary tables listing all the ARARs/TBCs specifically identified for the selected remedy are provided in Appendix B. A detailed listing, and discussion of compliance with ARARs is provided in Appendix F of the Feasibility Study Report for Operable Unit 4.

TABLE A.1-1

SUMMARY OF MAJOR ARARs/TBCs FOR OPERABLE UNIT 4 REMEDIAL ACTION ALTERNATIVES

Chemical-Specific

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
2B, 4B 2C	Inorganic Chemicals in Drinking Water 40 CFR § 141.11, 40 CFR § 141.15, 40 CFR § 141.16, 40 CFR § 141.51, and 40 CFR § 141.62 and 143.3 (OAC 3745-81-11, 3745-81-15, and 3745-81-16)	Relevant and Appropriate	These requirements are not applicable since no public water system (as defined in 40 CFR § 141) is involved. They are relevant and appropriate to protect drinking water sources from the same contaminants found in the operable unit. These contaminants might migrate or leach into the underlying aquifer as a consequence of various alternatives.	Fate and transport modeling, for the proposed disposal facility, predicts that potential future releases to the aquifer from the facility will not exceed MCLs or MCLGs. This is primarily due to the presence of approximately 9 m (30 ft) of low hydraulic conductivity glacial till, that has no significant hydrologic connections with the underlying aquifer, beneath the proposed disposal facility.

TABLE A.1-1
(Continued)

2B, 4B 2C	Organic Chemicals in Drinking Water 40 CFR § 141.61 (OAC 3745-81-12)	Relevant and Appropriate	The requirement is not applicable since no public water system (as defined in 40 CFR § 141) is involved. It is relevant and appropriate to protect drinking water sources from the same contaminants found in the operable unit. These contaminants might migrate or leach into the underlying aquifer as a consequence of remedial actions.	Fate and transport modeling, for the proposed disposal facility, predicts that potential future releases to the aquifer from the facility will not exceed MCLs. This is primarily due to the presence of approximately 9 m (30 ft) of low hydraulic conductivity glacial till, that has no significant hydrologic connections with the underlying aquifer, beneath the proposed disposal facility.
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	Radionuclide Emissions (Except Airborne Radon-222) 40 CFR § 61, Subpart H	Applicable	Radioactive materials within this operable unit might contribute to the dose to members of the public from the air pathway during implementation of remedial actions. This requirement is applicable to remedial actions implemented in Operable Unit 4, since NESHAP applies to operating units.	The pollution control equipment for the silos and treatment system for off-gas emissions will be designed to limit the discharge of radionuclides to acceptable levels.

TABLE A.1-1
(Continued)

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
3A.1 2B, 3B.1, 4B 2C	Radon-222 Emissions 40 CFR § 61 Subpart Q	Applicable	Facilities such as the silos within this operable unit might qualify as sources since they might contain radium-226 in sufficient concentrations to emit radon-222. This requirement is applicable only to storage and disposal of radium-bearing material.	The radon-222 flux rate standard of 20 pCi/m^2/s would be met during storage and/or disposal. This is due to the presence of a bentonite layer in the silos (prior to treatment), and the stabilized nature of the treated waste.
2B, 4B 2C	Standards for Control of Residual Radioactive Material 40 CFR § 192, Subpart A 40 CFR § 192.02(b)	Relevant and Appropriate	Radioactive materials in this operable unit are residual radioactive material from uranium processing. However, the FEMP site is not an ore processing site designated under the UMTRCA; therefore, management of these residues is relevant and appropriate under this regulation.	Radon-222 emissions would comply with the 20 pCi/m^2/s release flux rate and the 0.5 pCi/L concentration above background at the disposal site boundary. This is due to the presence of a bentonite layer in the disposal cell, and the stabilized nature of the treated waste.

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TABLE A.1-2

SUMMARY OF MAJOR ARARs FOR OPERABLE UNIT 4

REMEDIAL ACTION ALTERNATIVES

Location-Specific

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
2B, 4B 2C	Solid, Nonhazardous Waste Disposal Facility Design Considerations OAC 3745-27-07	Relevant and Appropriate	The State of Ohio solid waste rules are relevant and appropriate to the disposal of silo residues, demolition debris, and other solid wastes generated by the implementation of a remedial alternative within a CAMU. Creation of a solid waste landfill requires that the technical location requirements of the State of Ohio be satisfied. On-site disposal alternatives might trigger this part of the Ohio requirements, which are more stringent than the federal counterparts. The FEMP site is over a sole source aquifer as defined in OAC 3745-27-07. An exemption to this prohibition by demonstration of compliance with the technical criteria in this rule is permitted under ORC 3734.02(G).	The proposed disposal vault meets the technical considerations used to grant exemptions: approximately 9 m (30 ft) of low hydraulic conductivity glacial till lies beneath the proposed liner, saturated zones in the glacial till have no significant hydrologic connections with the underlying aquifer, and fate and transport modeling predicts that potential future releases to the aquifer from the facility will not adversely impact human health or safety or the environment.
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	Compliance with Floodplain/Wetlands Environmental Review Requirements 10 CFR § 1022 (Executive Order 11990)	Applicable	This requirement is applicable because the FEMP is a DOE facility subject to the NEPA requirements for environmental activities at federal facilities. Several alternatives might result in destruction or modification of wetland areas.	These alternatives would comply with all NEPA evaluation and documentation requirements. NEPA documentation will also specify public notice requirements, wetland assessments, and any mitigative measures that may be required.

TABLE A.1-3

SUMMARY OF MAJOR ARARs FOR OPERABLE UNIT 4 REMEDIAL ACTION ALTERNATIVES

Action-Specific

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	Treatment, Storage, or Disposal Facility (General Standards) 40 CFR § 264, Subpart B (OAC 3745-54-13 through 16)	Relevant and Appropriate	Residues, which exhibit a characteristic similar to RCRA hazardous waste, removed from this operable unit might be treated, stored, and disposed in accordance with TSD facility standards.	These alternatives would undertake actions to comply with the TSD Facility general standards.
2B, 4B 2C	Releases from Solid Waste Management Units 40 CFR § 264, Subpart F OAC 3745-54-91 through 99; and OAC 3745-55-01 through 011)	Relevant and Appropriate	This requirement is relevant and appropriate because the residues stored in the silos are sufficiently similar to hazardous waste.	These alternatives would install monitoring wells to comply with the groundwater monitoring requirements.
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	Closure 40 CFR § 264, Subpart G 40 CFR § 264.111, .114, and .116 (OAC 3745-55-11, -14, and -16)	Relevant and Appropriate	These requirements are relevant and appropriate because the residues are sufficiently similar to hazardous waste and the remedial alternatives might require closure of units used to manage waste materials.	These alternatives would design, construct, operate, and monitor the disposal facility to meet the closure performance standard; decontaminate all equipment used in closure, and file a survey plot showing location of disposal facility.

TABLE A.1-3
(Continued)

2B, 4B 2C	Post-Closure 40 CFR § 264.117 (OAC 3745-55-17) 40 CFR § 264.119 (OAC 3745-55-19)	Relevant and Appropriate	These requirements are relevant and appropriate because the residues are sufficiently similar to hazardous waste and some remedial alternatives might leave residues in place.	These alternatives would comply with the post-closure requirements for units involved in disposal, including continued monitoring, access controls, and deed restrictions.
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	Container Storage 40 CFR § 264.171 - 178 Subpart I (OAC 3745-55-71 through -78)	Relevant and Appropriate	These requirements pertain to alternatives utilizing containers for storage, or treatment of hazardous waste in containment buildings. The requirements are relevant and appropriate because the residues in the silos are sufficiently similar to hazardous waste.	These alternatives would take measures to comply with the hazardous waste container requirements.

TABLE A.1-3
(Continued)

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
3A.1 2B, 3B.1	Tank Systems 40 CFR § 264, Subpart J (OAC 3745-55-91 through 96)	Relevant and Appropriate	These requirements pertain to alternatives utilizing treatment or storage in a tank. These requirements are relevant and appropriate because the residues in the silos are sufficiently similar to hazardous waste.	All process tanks will be constructed with durable material that is compatible with the waste and treatment process for which the tank is designed. The tank design will include secondary containment capable of detecting and collecting releases. Approved inspection and maintenance procedures, which include scheduled visual inspection of all tanks will be established prior to management of waste in the tanks.
2B, 4B 2C	Landfill Capping 40 CFR § 264.310 (OAC 3745-57-10)	Relevant and Appropriate	Land disposal of hazardous waste constitutes closure as a landfill, which requires a cap to prevent migration of waste constituents due to leaching. This requirement is relevant and appropriate because the residues are sufficiently similar to hazardous wastes.	Compliance would be achieved through proper design, construction, and implementation of institutional controls at the disposal vault. These controls would include continued inspection, monitoring, and maintenance of the disposal facility and surveyed benchmarks.

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TABLE A.1-3
(Continued)

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	Corrective Action for SWMUs (CAMU and TU) 40 CFR §, Subpart S 40 CFR § 264.552-.553	Relevant and Appropriate	During the process of remediation, waste materials might require management in or consolidation in land based units for the purpose of staging, treating or disposing the material. All of the materials generated from remediation of Operable Unit 4 are considered remediation wastes, amenable to management under this requirement. 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.	These alternatives would demonstrate they can meet the seven criteria required for use of a CAMU, and would use only tanks or containers as temporary units.
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	Radiation Dose Limit (All Pathways) DOE Order 5400.5, Chapter II, Section 1.a	To be considered	Radiation sources within this operable unit might contribute to the total dose to members of the public from this DOE facility. This requirement establishes limits for allowable exposure of the public to radiation sources from all pathways as a result of routine DOE activities. It is included as TBC to ensure adequate protection of human health and the environment from sources of radioactivity.	Where appropriate, the treatment facility design will include HEPA filters to control radioactive particulate emissions. Excavations, excavated soil, and other sources of particulate emissions will be controlled, as appropriate, through good construction practices. Releases to water will be controlled by design and operation of secondary containment features and treatment in the FEMP WWTS and AWWT. Treatment of the waste source will reduce contributions to dose from radon gas, and reduce the likelihood of migration of radionuclides.

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TABLE A.1-3
(Continued)

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
3A.1	Environmental Radiation Protection Standards for Mgt. and Disposal of HLRW, Spent Nuclear Fuel, and TRU Wastes 40 CFR § 191, Subpart A 40 CFR § 191.03(b)	Relevant and Appropriate	As directed by the U.S. EPA letter, "Applicable of 40 CFR § 191 to OU4", Jim Saric, U.S. EPA, to Jack Craig, DOE, dated April 25, 1994.	This requirement would be met through the use of treatment for waste stabilization and management and storage of vitrified material prior to off-site disposal in accordance with ALARA concepts, proper engineering design, and the use of administrative controls.
3A.1 2B, 3B.1, 4B 2C, 3C.1, 3C.2	NEPA Implementation 10 CFR § 1021.2	Applicable	This requirement is applicable because the FEMP is a DOE facility, subject to NEPA evaluation for specific actions at DOE facilities.	NEPA evaluations and documentation will be prepared for the selected remedial alternatives in accordance with established site procedures.

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TABLE A.1-3
(Continued)

Alternative Number	Regulatory Title and Citation	ARAR/TBC	Rationale for Determination as ARAR/TBC	Basis for Compliance
2B, 4B 2C	Standards for Control of Residual Radioactive Material 40 CFR § 192, Subpart A 40 CFR § 192.02(a)	Relevant and Appropriate	Radioactive materials in this operable unit are residual radioactive material from uranium processing. However, the FEMP site is not on ore processing site designated under the UMTRCA; therefore, management of these residues is relevant and appropriate under this regulation.	Treatment of the waste and disposal in a properly designed disposal facility will control residuals for 200-1000 years.
2C, 3C.1, 3C.2	Standards for Cleanup of Lands Contaminated with Residual Radioactive Materials 40 CFR § 192, Subpart B 40 CFR § 192.12(a)	Relevant and Appropriate	Radioactive materials in this operable unit are residual radioactive material from uranium processing. However, the FEMP site is not on ore processing site designated under the UMTRCA; therefore, management of these residues is relevant and appropriate under this regulation.	This requirement would be met by removing contaminated soil down to required levels, and disposal of the residues in an engineered vault with a 3 m (10 ft) thick multimedia cover.
3A.1, 2B, 3B.1, 4B, 2C, 3C.1, 3C.2	Implementation of Health and Environmental Protection Standards for Uranium Mill Tailings 40 CFR § 192, Subpart C	Relevant and Appropriate	Radioactive materials in this operable unit are residual radioactive material from uranium processing. However, the FEMP site is not on ore processing site designated under the UMTRCA; therefore, management of these residues is relevant and appropriate under this regulation.	These alternatives would use this guidance during implementation.

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APPENDIX B

SUMMARY OF ARARs FOR THE OPERABLE UNIT 4 REMEDIAL ACTION

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LIST OF ACRONYMS

A	Applicable
AEA	Atomic Energy Act
ARAR	Applicable or Relevant and Appropriate Requirement
CAA	Clean Air Act
CAMU	Corrective Action Management Unit
CFR	Code of Federal Regulation
CWA	Clean Water Act
DCG	Derived Concentration Guide
DOE	United States Department of Energy
EDE	Effective Dose Equivalent
HLRW	High Level Radioactive Waste
NEPA	National Environmental Policy Act
OAC	Ohio Administrative Code
ORC	Ohio Revised Code
pCi/l	picocuries per liter
$pCi/m^2/s$	picocuries per square meter per second
R&A	Relevant and Appropriate
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SWMU	Solid Waste Management Unit
TBC	to be considered
TSD	Treatment, Storage, or Disposal
TU	Temporary Unit
UMTRCA	Uranium Mill Tailings Radiation Control Act

B.1.0 INTRODUCTION

Appendix B presents a summary of ARARs/TBCs associated with the remedial action alternatives selected for Operable Unit 4. These tables group the ARARs/TBCs according to type (i.e., Chemical-specific, Location-specific, and Action-specific) and by the governing regulatory act (e.g., CAA, CWA, RCRA, etc.). The tables identify all selected remedial alternatives associated with the regulatory requirement, a brief description of the requirement, and the classification of the ARAR/TBC.

TABLE B.1-1

SUMMARY OF ARARs FOR OPERABLE UNIT 4 SELECTED REMEDIAL ACTION ALTERNATIVES

Chemical-Specific

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
3A.1 Vit 3B.1 Vit 2C	CAA	Radionuclide Emissions (Except Airborne Radon-222) 40 CFR§ 61, Subpart H	Operating units shall establish procedures to prevent a member of the public from receiving an EDE of 10 mrem per year.	A
3A.1 Vit 3B.1 Vit 2C	CAA	Radon-222 Emissions 40 CFR§ 61, Subpart Q	Storage and disposal activities for radium-bearing by-product material shall establish measures to ensure emissions of radon are maintained below 20 pCi/m^2/s.	A
3A.1 Vit 3B.1 Vit 2C	CWA	Ohio Water Quality Standards (Five Freedoms of Surface Waters) OAC 3745-1-04	Establishes requirements for maintaining integrity and useability of surface water.	R&A
3A.1 Vit 3B.1 Vit 2C	CWA	Ohio Water Quality Standards OAC 3745-1-07	Establishes allowable limits on discharges or releases to Paddys Run and the Great Miami River.	A
2C	RCRA Sub. D	Chemicals in Drinking Water (Solid Waste Disposal Facility) 40 CFR§ 257.3-4 [OAC 3745-27-10(D)]	Establishes requirements to protect underground drinking water sources from operation of the proposed disposal facility for Subunit C material.	R&A
2C	RCRA Sub. C	Chemicals in Drinking Water (Hazardous Waste Disposal Facility) 40 CFR§ 264.94 (OAC 3745-54-94)	Establishes requirements to assure groundwater concentrations of hazardous constituents do not exceed regulatory levels due to operation of the proposed disposal facility for Subunit C material.	R&A
2C	SDWA	Inorganic Chemicals in Drinking Water 40 CFR§ 141.11 40 CFR§ 141.15, 141.16, 141.51, 141.62 and 143.3 (OAC 3745-81-11, OAC 3745-81-15, and OAC 3745-81-16)	Establishes requirements to assure protection of drinking water sources from inorganic contaminants.	R&A

TABLE B.1-1
(Continued)

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
2C	SDWA	Organic Chemicals in Drinking Water 40 CFR§ 141.61 (OAC 3745-81-12)	Establishes requirements to assure protection of drinking water sources from organic contaminants.	R&A
2C	UMTRCA	Standards for Control of Residual Radioactive Material 40 CFR§ 192.02 (b)	Establishes standards for managing residual radioactive material from inactive uranium processing sites so the average release rate of radon-222 does not exceed 20 pCi/m^2/s or the average concentration in air outside facility boundary does not exceed 0.5 pCi/L above background following remediation activities.	R&A
3A.1 Vit 3B.1 Vit 2C	DOE	Radiation Protection of the Public and the Environment (DCGs for Water) DOE Order 5400.5 Chapter III	Establishes allowable residual concentrations of radionuclides in water. Included as TBC to ensure adequate protection of human health and the environment from sources of radioactivity.	TBC
3A.1 Vit 3B.1 Vit 2C	DOE	Radiation Protection of the Public and the Environment (DCGs for Air) DOE Order 5400.5 Chapter III	Establishes allowable residual concentrations of radionuclides in air. Included as TBC to ensure adequate protection of human health and the environment from sources of radioactivity.	TBC
3A.1 Vit 3B.1 Vit 2C	DOE	Residual Radioactive Material (Interim Storage) DOE Order 5400.5 Chapter IV 6.b	Establishes allowable concentrations of radon-222 in air during interim storage of waste material. Included as TBC to ensure adequate protection of human health and the environment from sources of radioactivity.	TBC

TABLE B.1-2

SUMMARY OF ARARs FOR OPERABLE UNIT 4 SELECTED REMEDIAL ACTION ALTERNATIVES

Location-Specific

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
3A.1 Vit 3B.1 Vit 2C	NEPA/ DOE	Compliance with Floodplains/Wetlands Environmental Review Requirements 10 CFR§ 1022 (Executive Order 11990)	Establishes requirements for DOE to evaluate potential adverse effects DOE actions might have on wetlands.	A
3A.1 Vit 3B.1 Vit 2C	NEPA/ EPA	Endangered Species Protection 50 CFR§ 402 (OAC 1518, 1513.25) (OAC 1501-18-1-01)	Remedial actions must not jeopardize the continued existence of any endangered or threatened species, or potential habitat of threatened or endangered species.	R&A
2C	RCRA Sub. D	Solid, Nonhazardous Waste Disposal Facility Design Considerations OAC 3745-27-07	Establishes requirements for the design, construction, and operation of the proposed disposal facility for Subunit C material.	R&A
2C	RCRA Sub. D	Protection of Wetlands (Solid Waste Disposal Facility) 40 CFR§ 258.12	Establishes restrictions on the location of a solid waste disposal facility with respect to potential impacts on wetlands.	R&A

TABLE B.1-3

SUMMARY OF ARARs FOR OPERABLE UNIT 4 SELECTED REMEDIAL ACTION ALTERNATIVES

Action-Specific

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
3A.1 Vit 3B.1 Vit 2C	CAA	Prevention of Air Pollution Nuisance ORC 3704.01-.05 OAC 3745-15-07	Requires control of emissions of air pollutants during remediation that could endanger health, safety, or welfare of the public.	A
3A.1 Vit 3B.1 Vit	CAA	Control of Visible Particulate Emissions from Stationary Sources OAC 3745-17-07	Establishes requirements to prevent discharge of air emissions of a shade or density greater than 20 percent opacity during treatment operations.	A
3A.1 Vit 3B.1 Vit 2C	CAA	Control of Fugitive Dust OAC 3745-17-08	Visible emissions of fugitive dust generated during grading, loading, or construction activities must be minimized.	R&A
3A.1 Vit 3B.1 Vit	CAA	Restriction on Particulate Emissions from Industrial Processes OAC 3745-17-11	Treatment operations shall maintain emissions below specified particulate material release limits.	A
3A.1 Vit 3B.1 Vit 2C	CWA	Nationwide Permit Program 33 CFR§ 330	Establishes requirements for dredge and fill activities in jurisdictional wetlands.	A
3A.1 Vit 3B.1 Vit 2C	CWA	Discharge of Storm Water Runoff 40 CFR§ 122.26	Establishes requirements for monitoring and controlling runoff from construction sites greater than five acres.	A
3A.1 Vit 3B.1 Vit 2C	CWA	Discharge of Treatment System Effluent (Best Management Practices) 40 CFR§ 125.100 40 CFR§ 125.104	Program establishes measures to prevent releases from spills or runoff during the implementation of remedial actions.	R&A
3A.1 Vit 3B.1 Vit 2C	NEPA/ DOE	NEPA Implementation 10 CFR§ 1021	Requires NEPA evaluation and documentation for DOE activities.	A
2C	RCRA Sub. D	On-Site Solid Nonhazardous Waste Management Facilities (Design Standards) 40 CFR§ 241 Subpart B (OAC 3745-27-08)	Establishes design criteria for the proposed disposal facility for Subunit C material.	R&A

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	Hazardous Waste Determinations 40 CFR§ 262.11 (OAC 3745-52-11)	Establishes procedures for identifying material as hazardous waste so that it may be stored, treated, and disposed in accordance with RCRA requirements.	R&A (This requirement will be applicable to non-excluded solid wastes)
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	Management of Empty Containers 40 CFR§ 261.7 (OAC 3745-51-7)	Requirements to ensure containers are properly emptied and to ensure residuals removed from the containers are properly managed in accordance with RCRA requirements.	R&A
3A.1 Vit 3B.1 Vit	RCRA Sub. C	Generators Who Transport Hazardous Waste for Off-Site Treatment, Storage, or Disposal 40 CFR§ 262.20 - 262.33 and 263.20-31 (OAC 3745-52-20 through 33 and OAC 3745-53-20 through 31)	Establishes standards for generators shipping hazardous waste for off-site treatment, storage, or disposal.	A
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	Treatment, Storage, or Disposal (TSD) Facility (General Standards) 40 CFR§ 264, Subpart B (OAC 3745-54-13 through 16)	Establishes general standards for the proper management of material determined to be hazardous waste.	R&A
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	TSD Facility (Preparedness and Prevention) 40 CFR§ 264, Subpart C (OAC 3745-54-31) 40 CFR§ 264.32 (OAC 3745-54-32) 40 CFR§ 264.33 (OAC 3745-54-33) 40 CFR§ 264.34 (OAC 3745-54-34) 40 CFR§ 264.35 (OAC 3745-54-35) 40 CFR§ 264.37 (OAC 3745-54-37)	Establishes standards for preparedness and prevention against fires, explosions, or unplanned releases of hazardous waste at TSD facilities.	R&A

TABLE B.1-3
(Continued)

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	TSD Facility (Contingency Plan and Emergency Procedures) 40 CFR§ 264, Subpart D 40 CFR§ 264.51 (OAC 3745-54-51) 40 CFR§ 264.52 (OAC 3745-54-52) 40 CFR§ 264.55 and 56 (OAC 3745-54-55 through 56)	Establishes standards for contingency plans and emergency procedures in responding to fires, explosions, or unplanned releases of hazardous waste at TSD facilities.	R&A
2C	RCRA Sub. C	Releases from Solid Waste Management Units 40 CFR§ 264, Subpart F (OAC 3745-54-91 through 99 and OAC 3745-55-01 through 011)	Establishes groundwater monitoring requirements for assuring concentrations of hazardous constituents do not exceed regulatory levels.	R&A
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	Closure 40 CFR§ 264, Subpart G 40 CFR§ 264.111,.114, and .116 (OAC 3745-55-11,-14, and -16)	Establishes closure requirements for TSD facilities.	R&A
2C	RCRA Sub. C	Post-Closure 40 CFR§ 264.117 (OAC 3745-55-17) 40 CFR§ 264.119 (OAC 3745-55-19)	Establishes requirements for the protection of human health and the environment following closure of the facility.	R&A
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	Container Storage 40 CFR§ 264.171 - 178 Subpart I (OAC 3745-55-71 through -78)	Establishes standards for use and management of containers of hazardous waste.	R&A
3A.1 3B.1	RCRA Sub. C	Tank Systems 40 CFR§ 264, Subpart J (OAC 3745-55-91 through 96)	Establishes standards for the tank systems used in the vitrification treatment process.	R&A
3A.1 Vit 3B.1 Vit	RCRA Sub. C	Closure Requirements for Tanks 40 CFR§ 264.197 (OAC 3745-55-97)	Establishes closure and post-closure requirements for tank systems.	R&A
2C	RCRA Sub. C	Landfill Capping 40 CFR§ 264.310 (OAC 3745-57-10)	Establishes design standards for closure of the proposed disposal facility for Subunit C material.	R&A

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
3A.1 Vit 3B.1 Vit	RCRA Sub. C	Miscellaneous Units 40 CFR§ 264, Subpart X (OAC 3745-57-91 through 92)	Establishes standards for treatment, storage, and disposal of hazardous waste in miscellaneous units.	R&A
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	Corrective Action for SWMUs (CAMU and TU) 40 CFR§ 264, Subpart S 40 CFR§ 264.552 -.553	Establishes requirements and criteria for corrective action management units for management of remediation waste during remediation activities.	R&A
3A.1 Vit 3B.1 Vit 2C	RCRA Sub. C	Containment Buildings 40 CFR§ 264, Subpart DD	Establishes standards for containment buildings used for interim storage and management of material determined to be hazardous waste during remediation activities.	R&A
2C	RCRA Sub. C	Digging Where Hazardous or Solid Waste Was Located ORC 3734.02 (H)	Establishes post-remedial action institutional controls for on-site disposal of Subunit C material.	A
3A.1 Vit 3B.1 Vit 2C	SDWA	Ohio Water Well Standards OAC 3745-9-10	Establishes standards for abandonment of test borings, holes, and wells that might be used and/or closed as part of the remediation activities.	A
3A.1 Vit	AEA	Env. Rad. Protection Stds. for Mgt. and Disposal of HLRW, Spent Nuclear Fuel, and TRU Wastes 40 CFR§ 191, Subpart A 40 CFR§ 191.03(b)	Establishes standards for management and storage for disposal of material from Subunit A to ensure the combined annual dose equivalent to any member of the public does not exceed specified limits. (This requirement pertains to only the on-site portion of this alternative).	R&A
2C	UMTRCA	Standards for Control of Residual Radioactive Material 40 CFR§ 192, Subpart A 40 CFR§ 192.02(a)	Requires that controls for the residual radioactive material in the proposed on-site disposal facility be effective for 1000 years, where reasonably achievable, or at least 200 years.	R&A
2C	UMTRCA	Standards for Cleanup of Lands Contaminated with Residual Radioactive Materials 40 CFR§ 192, Subpart B 40 CFR§ 192.12(a)	Establishes standards for remedial actions to ensure residual concentration of radium-226 in soils does not exceed regulatory levels.	R&A
3A.1 Vit 3B.1 Vit 2C	UMTRCA	Implementation of Health and Environmental Protection Standards for Uranium Mill Tailings 40 CFR§ 192, Subpart C	Establishes guidance for remedial activities involving control and cleanup of residual radioactive material from OU4.	R&A

TABLE B.1-3
(Continued)

Alternative	Regulatory Program	Regulatory Title and Citation	Regulatory Description	ARAR/TBC
3A.1 Vit 3B.1 Vit 2C	DOE Order	Radiation Dose Limit (All Pathways) DOE Order 5400.5, Chapter II, Section 1.a	Establishes limits for the allowable exposure of the public to radiation sources from all pathways as a result of routine DOE activities. Included as TBC to ensure adequate protection of human health and the environment from sources of radioactivity.	TBC

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APPENDIX C

RESPONSIVENESS SUMMARY

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LIST OF ACRONYMS

AEA	Atomic Energy Act
BAT	Best Available Technology
CAB	Citizen's Advisory Board
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	United States Department of Energy
DOE-FN	United States Department of Energy-Fernald Field Office
DOE-NV	United States Department of Energy-Nevada Field Office
DOT	United States Department of Transportation
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration management Company
FFCA	Federal Facility Compliance Act
FRESH	Fernald Residents for Environment, Safety, and Health
FS/PP-DEIS	Feasibility Study/Proposed Plan-Draft Environmental Impact Statement
HEAST	Health Effects Assessment Summary Tables
MAWS	Minimum Additive Waste Stabilization
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NTS	Nevada Test Site
OAC	Ohio Administrative Code
OATP	Ohio Air Toxics Policy
OEPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
PEIC	Public Environmental Information Center
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
STEP	Science, Technology, the Environment, and the Public
TCLP	Toxicity Characteristic Leaching Procedure

C.1.0 PURPOSE

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

The Feasibility Study/Proposed Plan/Draft Environmental Impact Statement was conditionally approved on February 9, 1994. In May 1994, five final concerns were received from the EPA on the document. In responding to these five concerns, several pages in the document were revised and are included in Attachment C.II.

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

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

This Responsiveness Summary is used as the mechanism for DOE to identify and document the public involvement with the Operable Unit 4 Feasibility Study/Proposed Plan - Draft Environmental Impact Statement. After public comments and concerns had been formally submitted to DOE, in oral and written form, the comments were summarized into issue statements and responded to accordingly. The actual comments received are included in Attachment C.I of Appendix C.

Section C.2.0 of this Responsiveness Summary gives an overview of public involvement for the Fernald Environmental Management Project (FEMP). Section C.3.0 gives an overview of the public's involvement in the development and approval of the Operable Unit 4 Feasibility Study/Proposed Plan - Draft Environmental Impact Statement. Section C.4.0 discusses the development of the issue statements and presents the public concerns and DOE responses. Section C.5.0 presents comments which did not result in issues.

C.2.0 PUBLIC INVOLVEMENT FOR THE FEMP

Environmental issues at Fernald first became public in 1984 when the site reported that nearly 300 pounds of uranium oxide had been inadvertently released to the atmosphere from the Plant 9 dust-collector system. It was also disclosed during this time that three privately-owned off-property groundwater wells south of Fernald had been found to be contaminated with uranium in 1981. In 1984, the citizens group called Fernald Residents for Environment, Safety and Health (FRESH) was formed and expressed concerns over these events and lack of public notification. In response to this public concern, the FEMP initiated a community relations program in 1985 aimed at informing the community of the mission of the facility and the ongoing and planned operations.

As part of this program, four community meetings were held in 1985 to open communication channels with the members of the public residing near the FEMP. As a result of these meetings and the need to prepare a community relations plan to support the planned Remedial Investigation/ Feasibility Study (RI/FS), a community assessment was conducted in early 1986. The community assessment consisted of a series of interviews with local community members to define their informational needs, their concerns regarding the environmental issues at the site, and viable mechanisms to gain public involvement in the RI/FS decision-making process. As work on the RI/FS continued, DOE authorized the opening of an information repository called the Public Environmental Information Center (PEIC) in the JAMTEK building, 10845 Hamilton-Cleves Highway, Harrison, Ohio 45030. The administrative record, on which cleanup decisions are based, is also located at the JAMTEK building; another administrative record is maintained at EPA Region V headquarters in Chicago, Illinois.

A RI/FS Community Relations Plan was issued in January 1986 detailing the initiatives that would be undertaken by the FEMP to promote community participation in the RI/FS decision-making process. This plan has been progressively revised, as necessary, to accommodate regulatory agency input, the changing concerns of the community, and emerging concepts on improved vehicles for facilitating community participation.

On May 15, 1990, a Notice of Intent (NOI) was published [55 Fed. Reg. 20183 (May 15, 1990)] indicating the intent of DOE to prepare an Environmental Impact Statement (EIS) consistent with the National Environmental Policy Act (NEPA) to evaluate the environmental impacts associated with the cleanup actions for the lead FEMP operable unit (i.e., Operable Unit 4). The NOI further defined the

intent of DOE to prepare integrated CERCLA/NEPA documents for the remaining operable units that will tier from the lead document. The public, interested organizations, and federal, state, and local agencies were invited to provide oral comments at two EIS scoping meetings held on June 12-13, 1990, and to submit written comments until the close of the scoping period on June 29, 1990.

As a result of the scoping meetings, an EIS Implementation Plan was issued by DOE. The EIS Implementation Plan includes: a description of the proposed actions and remedial alternatives; a list of environmental issues to be considered in the EIS (including those identified during the scoping period); a list of proposed agency consultations; a responsiveness summary to comments received during scoping; and a discussion on the interrelationship between the NEPA compliance process and CERCLA project planning and decision-making. Consistent with the NOI and the EIS Implementation Plan, the resulting integrated process and documentation package developed for Operable Unit 4 is termed a Feasibility Study/Proposed Plan-Draft Environmental Impact Statement (FS/PP-DEIS).

In summary, several community relations activities are and have been conducted in support of local organizations at Fernald including:

- A community assessment (June - July 1989);
- A Community Relations Plan (August 1992 version approved October 15, 1992);
- Public reading rooms and administrative record;
- Regular briefings at local township trustee meetings;
- Presentations to the local community group, FRESH;
- Community meetings held approximately each quarter;
- Workshops and roundtable discussions for interested parties;
- Press releases, fact sheets and a newsletter;
- Public comment periods for decision documents and responsiveness summaries;
- Site tours, as requested;
- Open house events;
- Annual joint emergency response exercises;
- Annual environmental monitoring reports; and
- The Fernald Citizens Task Force.

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C.3.0 COMMUNITY PARTICIPATION FOR OPERABLE UNIT 4

As indicated earlier, a community assessment was conducted in early 1986 which consisted of a series of interviews with local community members to define their informational needs, their concerns regarding the environmental issues at the site, and viable mechanisms to gain public involvement in the RI/FS decision process. Significant concerns associated with Operable Unit 4 facilities identified during these interviews included:

- The significantly elevated direct penetrating radiation field in the vicinity of the silos.
- The chronic emissions of significant quantities of the radioactive gas, radon, to the atmosphere from the silos.
- The structural instability of the silos' domes and the age of the remaining portions of the structures.
- The potential for leaching of the stored residues to the underlying sole-source aquifer.

To adequately identify and address community concerns, several initiatives have been undertaken by the FEMP to ensure community involvement in the decision-making process for the remediation of Operable Unit 4.

The draft Remedial Investigation (RI) Report for Operable Unit 4 was released to the public for review and comment in April 1993. The document was made available to the public at the PEIC and the EPA offices in Chicago. The notice of availability for the RI Report for Operable Unit 4 was published in local newspapers near the FEMP site on April 19, 1993. A public comment period was conducted for the RI Report for Operable Unit 4 from April 19, 1993 through May 19, 1993. No comments were received on the RI Report for Operable Unit 4.

On September 9, 1993, the draft Feasibility Study/Proposed Plan-Draft Environmental Impact Statement was made available at the Public Environmental Information Center, and stakeholders were encouraged to provide informal comments on the preliminary documents. Encouraging public inspection and informal comment on these preliminary documents, prior to EPA approval, provided a genuine opportunity for stakeholders to identify issues, voice their concerns and learn about proposed cleanup plans for Operable Unit 4. The informal opportunity for the public to provide input enabled DOE to address some stakeholder questions and concerns in advance of the formal public comment period.

On October 14, 1993, approximately 29 stakeholders attended a public roundtable on "Proposed Plans and Technology for Operable Unit 4 Remediation." At the roundtable, attendees were invited to offer opinions on the draft final Proposed Plan and the preferred alternative for Operable Unit 4 remediation. These stakeholder comments were documented and evaluated during preparation of the final document.

In addition, a two-way information exchange on the Operable Unit 4 Risk Assessment occurred at the October 19, 1993, Science, Technology, the Environment and the Public (STEP) session on "Risk." Again, Fernald personnel addressed the stakeholders' questions and concerns presented at the meeting. Information about the Operable Unit 4 Remedial Investigation Report was also provided at DOE's October 21, 1993, RI/FS public meeting and at local township trustee meetings.

In response to stakeholder requests at the January 5, 1994, formal public hearing on the Operable Unit 3 (Production Area) Interim Record of Decision, a public roundtable to discuss integration of CERCLA and NEPA was held January 24, 1994. The roundtable included discussions on differences between environmental assessments and environmental impact statements; approximately 45 stakeholders attended.

On February 21, 1994, invitations to attend the March 21, 1994, formal public hearing on the Operable Unit 4 FS/PP-DEIS were mailed to approximately 2,000-plus Fernald stakeholders. The *Proposed Plan for Remedial Actions at Operable Unit 4* Fact Sheet was enclosed with each invitation.

On February 24, 1994, advance copies of the *Proposed Plan for Remedial Actions at Operable Unit 4* were mailed to several key stakeholders. Also on February 24, copies of the final FS/PP-DEIS and Proposed Plan fact sheets were mailed to the United States Department of Energy-Nevada Field Office (DOE-NV) and to the State of Nevada Clearinghouse. The DOE Operable Unit 4 Branch Chief personally distributed several advance copies of the Proposed Plan to attendees of the February 24, 1994, FRESH meeting. In addition, she provided an update on Operable Unit 4 activities, plans and progress, and was available for an informal question-and-answer session.

To encourage stakeholders to review and offer input on the final FS/PP-DEIS, a Notice of Availability for formal public comment was published in March 1994 in the *Federal Register* and three local newspapers: *The Cincinnati Enquirer*, the *Journal-News* and *The Harrison Press*. On March 1, 1994, the, FS/PP-DEIS became available at the PEIC.

On March 2, 1994, Ohio EPA representatives discussed the FS/PP-DEIS with members of the Fernald Citizens Task Force and FRESH.

On March 4, 1994, a Fernald site news release titled "Key Fernald Cleanup Plan Receives Conditional EPA Approval" was sent to local electronic and print media, as well as local elected officials, FRESH and the Fernald Citizens Task Force. Articles were published in local newspapers.

On March 7, 1994, the formal 45-day public comment period on the Operable Unit 4 FS/PP-DEIS officially began.

On March 8, 1994, Fernald representatives met formally with officials of the DOE-NV and the Nevada Division of Environmental Protection and provided a presentation on the Operable Unit 4 FS/PP-DEIS.

On March 15, 1994, postcard reminders about the March 21, 1994, formal public hearing were mailed to Fernald stakeholders. In addition, courtesy phone calls were made to key stakeholders, inviting them to the formal public hearing.

Display advertisements announcing the March 21, 1994, formal public hearing were published in three local newspapers: *The Cincinnati Enquirer*, March 18, 1994 and March 20, 1994; the *Cincinnati Post*, March 18, 1994; and the *Journal-News*, March 18, 1994.

On March 21, 1994, approximately 80 people attended the formal public hearing on the Operable Unit 4 FS/PP-DEIS. Formal oral public comments were documented by a court reporter and are available in a written transcript at the PEIC and in Attachment C.IV of Appendix C. In addition, several stakeholders submitted formal written comments. All formal written and oral stakeholder comments and questions asked informally during the March 21, 1994, public hearing, as well as DOE's responses, are documented in the Operable Unit 4 Responsiveness Summary.

During April 1994, the DOE received a request from the State of Nevada to extend the public comment period for sixty (60) days to allow a newly formed Citizen's Advisory Board (CAB) additional time to review and comment on the Operable Unit 4 FS/PP-DEIS. In accordance with the requirements of the NCP and the Amended Consent Agreement, the DOE granted a 30-day extension of the public comment period from April 20, 1994 to May 20, 1994 to accommodate this request.

On May 11, 1994, the DOE-NV conducted a public meeting in Las Vegas, Nevada. The purpose of the meeting was to allow the CAB to receive two presentations by the DOE. The first presentation, furnished by the DOE-FN, summarized the proposal to transport and dispose of low-level radioactive waste, which would be generated by the cleanup and environmental restoration of the FEMP site as a whole (including Operable Unit 4), at the NTS. The second presentation was furnished by the DOE-NV which summarized the current low-level radioactive waste management program at the NTS.

Each presentation was followed by a formal question and answer session, during which the following concerns were discussed:

- Adequacy of characterization process of all FEMP waste shipped to the NTS.
- Classification of the K-65 by-product material as 11(e)(2) material.
- Availability of any alternative disposal sites for the Operable Unit 4 remedial wastes.
- 40 CFR §191 "relevance" to Operable Unit 4 remedial wastes by EPA.
- Transportation and containerization of the Operable Unit 4 remedial wastes.
- Benefits to be derived by the State of Nevada for disposing of the waste at the NTS.

The complete transcript of this meeting is included in Attachment C.IV of Appendix C.

During the meeting, the CAB noted that they had not received a copy of the Operable Unit 4 FS/PP-DEIS for review and comment. It was noted that a copy of the Operable Unit 4 FS/PP-DEIS was available in the DOE-NV Reading Room. Copies of the Proposed Plan and Proposed Plan Fact Sheet were distributed to members at the meeting. A copy of the Operable Unit 4 FS/PP-DEIS was provided to the CAB on May 12, 1994.

In addition, the CAB verbally requested in the meeting that the comment review period for the Operable Unit 4 FS/PP-DEIS be extended an additional thirty days to provide the CAB adequate time to review the document. Subsequently, on May 19, 1994, DOE submitted to EPA a second request for extension in the submittal of the Operable Unit 4 ROD. The EPA reviewed this request pursuant to Section XVIII of the 1991 ACA, which requires EPA to determine whether good cause exists for a schedule extension based upon, among other things, information submitted by DOE. In response to the CAB request, the DOE on May 20, 1994 formally granted the thirty-day extension of the public comment period from May 20, 1994 to June 19, 1994. On May 26, 1994, the EPA granted the 30-day extension for submittal of the Proposed Draft ROD from July 10, 1994, to August 9, 1994.

On August 5, 1994, DOE submitted the *Proposed Draft Record of Decision for Remedial Actions at Operable Unit 4 and the Responsiveness Summary* to the EPA.

C.4.0 SUMMARY OF ISSUES AND RESPONSES

The FS/PP-DEIS for Operable Unit 4 was released for public comment in March 1994. The DOE reviewed all written and oral comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as was originally identified in the Operable Unit 4 FS/PP-DEIS, were necessary.

This Responsiveness Summary document has focused on the formal comments submitted during the public comment period and oral comments received during the March 21, 1994 community meeting held in Harrison, Ohio and the May 11, 1994 public meeting held in Las Vegas, Nevada. Within this Responsiveness Summary, oral and written comments (see Attachment C.I) were categorized into significant issues. For each of these issues, an issue statement has been prepared that addresses the concerns expressed by one or more of the commentors. In many instances, the issue statements are paraphrased from the original comments to succinctly represent the combined concerns of several commentors. The issues resulting from formal comments have been compared with the questions raised during the public question and answer sessions to ensure that all significant issues have been represented by the issue statements.

For the purpose of developing issue statements, a comment is considered significant if it involves:

- The definition of the preferred alternative,
- Public or state acceptance of the preferred alternative,
- The implementation or impacts of the preferred alternative,
- Conclusions drawn from evaluations or assessments provided within the document,
- Safety of the work performed, or the
- Enforceability of the decision reached.

At the end of each issue statement, the specific comment letter(s) or oral comment(s) in which the issue was raised is identified in parentheses. The comments are referred to by an alphabetic identifier. These comments are also part of the administrative record for this action. Table C.4-1 provides a cross-reference of the alphabetic identifiers with the commentors.

TABLE C.4-1
FORMAL ORAL AND WRITTEN COMMENTS RECEIVED

ITEM	COMMENTOR	PAGE NUMBER
	FORMAL ORAL COMMENTS	
A	Norma Nungester, resident and FRESH member	C-I-8
B	Vicky Dastillung, resident and FRESH Vice President	C-I-19
C	Lou Bogar, resident, Hamilton, Ohio	C-I-20
D	Edwa Yocum, resident and FRESH Secretary	C-I-28
	FORMAL WRITTEN COMMENTS	
E	Maud Naroll, State of Nevada, State Clearinghouse (April 18, 1994)	C-I-31
F	Jack and Roberta Warndorf, resident, Okeana, Ohio	C-I-34
G	Edwa Yocum, resident and FRESH Secretary, Harrison, Ohio	C-I-35
H	J. E. Walther, resident, Hamilton, Ohio	C-I-36
I	Martha J. Raymond, Department Head, Technical Review Services, Ohio Historic Preservation Office	C-I-38
J	Lisa Crawford, resident and FRESH President	C-I-40
K	Lawrence L. Stebbins, resident, Hamilton, Ohio	C-I-41
L	Maud Naroll, State of Nevada, State Clearinghouse (April 5, 1994)	C-I-43
M	James K. O'Steen, Director, Office of Hazardous Materials Technology, U.S. Department of Transportation	C-I-45
N	William L. Vasconi, Acting Chairman, Nevada Test Site Citizens Advisory Board	C-I-47
O	Nevada Test Site Citizens Advisory Board	C-I-48
P-1	Nichole Davis, [redacted]	C-I-49
P-2	Shellie Michael, [redacted]	C-I-49
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[a]Postcards were received by the DOE on July 5, 1994.

Issue 1 - Public Participation Process

(a) A formal request was made by Maud Naroll, State of Nevada, Department of Administration, State Clearinghouse, on the behalf of the Nevada Test Site (NTS) Citizens Advisory Board (CAB) to extend the public review period for the Operable Unit 4 FS/PP-DEIS for at least 60 days. The CAB was recently formed and held its first organizational meeting on March 8, 1994. Because of the key role the CAB will play in advising the DOE-NV about stakeholder concerns, the requested extension to the public comment period would allow the CAB adequate time to address the Operable Unit 4 document. (Commentor: L)

(b) On May 17, 1994, a formal request was made by William L. Vasconi, Acting Chairman, NTS CAB to extend the public review period for the Operable Unit 4 FS/PP-DEIS. The NTS CAB had the opportunity to meet with representatives of the Fernald Environmental Management Project on May 11, 1994. The CAB stated that this meeting was the first time it had an opportunity to receive any information about the Operable Unit 4 FS/PP-DEIS. Because the CAB had not yet reviewed the Operable Unit 4 documents and the May 20, 1994 deadline for public comments was near, the extension of time was necessary in order that the CAB may provide substantive input into the process. (Commentor: N)

Response: (a) The United States Department of Energy (DOE) considered the request for extension of the public review period to be in accordance with the provision of the National Oil and Hazardous Pollution Contingency Plan, 40 CFR 300.430(f)(3)(i)(C) as follows:

"Upon timely request, the lead agency [DOE] will extend the public comment period by a minimum of 30 additional days; . . "

The DOE recommended that a 30-day extension, as opposed to the 60-day extension, be granted in an effort to minimize schedule impacts, as well as providing adequate time for the CAB to review the Operable Unit 4 document. In accordance with Sections XVIII.B.5 and XVIII.D of the Amended Consent Agreement (1991), the DOE requested concurrence from the EPA for the 30-day schedule extension to the public review period. The EPA verbally concurred with the DOE 30-day request for schedule extension on April 18, 1994, and followed up with a written

concurrence on April 29, 1994. The DOE issued formal notification of the 30-day extension to the State of Nevada on May 3, 1994. This documentation can be found in the Administrative Record.

(b) The DOE considered the CAB request for extension of the public review period to be in accordance with the provision of the National Oil and Hazardous Pollution Contingency Plan, 40 CFR 300.430(f)(3)(i)(C) as follows:

"Upon timely request, the lead agency [DOE] will extend the public comment period by a minimum of 30 additional days; . . "

On May 20, 1994, the DOE granted an additional 30-day extension to the public review period for the Operable Unit 4 FS/PP-DEIS. In accordance with Sections XVIII.B.5 and XVIII.D of the Amended Consent Agreement (1991), the DOE requested concurrence from the EPA for the 30-day schedule extension to the public review period. The EPA provided written concurrence on the DOE 30-day extension request on May 26, 1994. This documentation can be found in the Administrative Record.

Issue 2 - Characterization of Silo Residues

During the March 21, 1994 Operable Unit 4 public meeting, questions were raised by Mr. Lou Bogar, a resident of the City of Hamilton Ohio, about perceived discrepancies in the isotopic uranium data reported for some of the silo residues. He also expressed concerns about the inorganic chemical data for the silo residues. His specific concerns were as follows:

(a) Why does the analytical data on the silos presented report Uranium 235/236? Do the silos contain uranium-236 (U-236)?

(b) There seems to be a discrepancy in the ratio of U-234 to U-238. The ratio of these isotopes should be close to unity. The U-234/U-238 ratio for Silo 2 appears to be correct however, the ratio for Silo 1 does not appear to be right.

(c) Is there a full list of inorganic constituents for Operable Unit 4? Why isn't gold listed as one of the analytes? Are there other elements, for which analysis was not done, that may impact the vitrification process? In particular, what about rare earths (the lanthanide series of elements)? Could these affect vitrification?

(Commentor: C)

In addition, on June 24, 1994, DOE received significant comments from a member of the Nevada Test Site Citizens Advisory Board (CAB). The CAB expressed the following four concerns over the physical characteristics of the untreated silo residues and the treated waste form:

> Based on the presence of RCRA regulated metals and organics in the waste, we are concerned that the waste contains both hazardous and radioactive constituents.
>
> (d) Please list the radionuclide and inorganic and organic chemical constituents of the waste.
>
> (e) Please identify the concentration of each constituent.
>
> (f) Please identify the risk resulting from each constituent.
>
> (g) Please describe how the proposed treatment and disposal mechanism address both the radionuclide and chemical constituents of the waste.

(Commentor: O)

Response: (a) *The Silos do not contain U-236.* U-236 is a by-product of nuclear reactor processing. The residues in the silos were generated exclusively from the chemical processing of pitchblende ores and uranium concentrates to extract uranium. Consequently, the residues in silos would not contain U-236.

The U-235 analysis was done using the standard radiochemistry technique of alpha spectroscopy. Because the energies emitted by U-235 and U-236 are very close in intensity, it is difficult for the laboratory to individually resolve between U-235 and U-236 activity concentrations. As a result it is accepted laboratory convention to report radiochemical results for these isotopes as U-235/236. The analytical data for U-235 concentrations in the silos were reported from the laboratory using this convention. This was not intended to imply that the silos contain U-236.

(b) In his comments made during the March 12, 1994 Operable Unit 4 Public Hearing, Mr. Bogar pointed out that there appeared to be some anomalies in the isotopic uranium data presented during that meeting. The data provided during the public meeting represented average activity concentrations calculated from individual

sample results contained in Volume 2 of the Operable Unit 4 Remedial Investigation Report (available for review in the PEIC). Through process knowledge it is known that the K-65 Silos contain natural uranium which resulted from the processing of pitchblende ores and uranium concentrates. As such, the activity concentration ratio of U-238 to U-234 in any sample obtained from the silos should be approximately 1. In the data presented for Silo 1, however, the ratio of U-238 to U-234 is 0.8, implying that the uranium contained in Silo 1 may be enriched.

This apparent anomaly is caused by a combination of two factors: the use of average activity concentrations to represent activity concentration ratios and apparent errors in the U-234 activity concentrations reported by the laboratory for four of the Silo 1 samples. While average activity concentrations are adequate for gross estimates of the silo contents, using activity concentration ratios calculated from these average activity concentrations is inappropriate, due to the heterogeneous nature of the silo contents (it should also be noted that averaging of the data can propagate the inherent uncertainty in the analytical data for individual samples). Instead, the activity concentration ratios of U-238 to U-234 should be addressed on a sample-by-sample basis.

Review of the individual sample data (contained in Volume 2 of the Operable Unit 4 RI Report) will indicate that the ratios of U-234 and U-238 are close to unity as expected for natural uranium (within the limits of the total propagated uncertainty) for 16 of the 20 samples taken. The remaining four samples demonstrated higher U-234 values, which yielded U-238 to U-234 ratios in the range of 0.4 to 0.6. This knowledge should have been sufficient to reject the analytical results for these four samples. The sample results, however, had already been validated using standard EPA protocols and the determination had been made to publish and use all validated analytical results. While this decision could have been overturned, it was further determined that these apparently anomalous U-234 analytical results for these four samples had no impact on the risk assessment for Operable Unit 4 and, as a result, would have no impact on the evaluation of remedial action alternatives within the Operable Unit 4 Feasibility Study.

(c) Volume 2 of the Operable Unit 4 Remedial Investigation Report presents a full listing of all analytical data collected during the remedial investigation. The data presented in the public meeting on March 21, 1994 were taken from the Operable Unit 4 Remedial Investigation Report. These data primarily provide critical information used in the risk assessment process to determine the nature and magnitude of potential chemical hazards and/or cancer risk posed by the contents of the silos. Treatability studies were conducted using actual silo residues to determine the effectiveness of the vitrification process in stabilizing these materials (the Operable Unit 4 Treatability Study Report for the Vitrification of Residues from Silos 1, 2, and 3 is available for review in the PEIC). Analysis was performed on the silo residues during the treatability studies to provide information pertinent to determining the effectiveness of vitrification.

The DOE does have historical data on the gold content of the K-65 residues. The vitrification process can be affected if there are large amounts of noble metals such as gold present. However, the gold present in the silo residues does not pose a problem as evidenced by the results of the vitrification treatability studies.

"Rare earths" or elements in the lanthanide series are known to improve the durability of glass [reference, Volf, M.B. 1984, Chemical Approach to Glass (glass Science and Technology: Vol 7), Elsevier, New York]. Analysis was conducted for some "rare earth" elements such as cerium and lanthanum during the treatability studies.

(d, e) The material contained in Silos 1 and 2 (K-65 material), and Silo 3 is by-product material or residue resulting from the processing of uranium ore and is specifically exempt from regulation as solid waste under RCRA 40 CFR §261.4(a)(4). The State of Nevada has expressed similar concerns over the regulatory classification of the Operable Unit 4 remedial wastes. A detailed discussion of these regulatory issues is presented under Issue 4 - State of Nevada Regulatory Concerns.

A complete list of radionuclide, inorganic and organic chemical constituents of the Silos 1, 2 and 3 wastes and their respective concentrations can be found in Tables

A.1-1, A.1-5, A.1-6, A.1-7, A.2-1 and A.2-6 in Appendix A of the FS Report for Operable Unit 4 (FS/PP-DEIS).

(f) Appendix D, Section D.2.0 of the FS Report for Operable Unit 4 (FS/PP-DEIS) presents a summary of risk characterization results from the Operable Unit 4 Baseline Risk Assessment, as reported in the Remedial Investigation Report for Operable Unit 4. The Baseline Risk Assessment was performed, in accordance with available EPA guidance for conducting CERCLA risk assessments and methodology described in the EPA-approved Risk Assessment Work Plan Addendum for performing risk assessments at the FEMP. The complete list of radionuclide, inorganic and organic chemical constituents of the Silos 1, 2 and 3 wastes were evaluated along with information describing their toxicity, mobility and environmental persistence. The baseline risk characterization indicates that baseline conditions do not meet acceptable public health risk criteria.

Appendix D, Section D.3.0 of the FS Report for Operable Unit 4 (FS/PP-DEIS) evaluates the short-term and long-term risks associated with implementing the various remedial alternatives considered for Operable Unit 4. The detailed analysis of the Operable Unit 4 remedial action alternatives is presented in Section 4.0 of the FS Report for Operable Unit 4 (FS/PP-DEIS), where each alternative is evaluated relative to the nine criteria of the NCP. Two of these criteria are short-term effectiveness and long-term effectiveness.

The short-term effectiveness criterion addresses the effect of an alternative during the construction and implementation phase until the remedial action objectives are achieved. The evaluation considers the effects on human health and the environment posed by operations conducted during the remedial action. The long-term effectiveness criterion evaluates the extent to which an alternative achieves an overall reduction in risk to human health and the environment after the remedial action objectives have been met.

The risk assessment presented in Appendix D supports the application of these criteria through the Section 4.0 evaluation of human health risks resulting from potential short-term and long-term exposures associated with the Operable Unit 4

remedial action alternatives. This includes the preferred remedy for disposing of the treated Operable Unit 4 residues at the NTS.

(g) Appendix C, Section C.3.0 of the FS Report for Operable Unit 4 (FS/PP-DEIS) presents a summary of all the vitrification treatability study tests which were carried out in support of the Operable Unit 4 RI/FS process at the FEMP. The tests were completed as specified by the EPA-approved Operable Unit 4 Treatability Study Work Plan for the Vitrification of Residues from Silos 1, 2, and 3 (DOE 1992b). The purpose of these tests was to allow the performance of vitrification of the Silos 1, 2, and 3 residues to be compared to other remediation technologies for the silo residues. The criteria upon which this comparison was to be based were the leachability of the waste form, the waste volume reduction achieved, and the reduction in radon emanation from the waste.

The Toxicity Characteristic Leaching Procedure (TCLP) results for the vitrified wastes demonstrated the effectiveness of glass as a durable leach resistant waste form for Operable Unit 4 remedies. Leachate concentrations of hazardous metals were below regulatory limits for all of the glasses made in these tests, including the leachate concentration of lead which was reduced about 500 times less than from the untreated waste. Radionuclides (in particular, Ra-226) were found to leach from the glasses at the same rate as the major glass constituents, indicating the absence of selective leaching of radionuclides.

Appendix C, Table C.3-13 of the FS Report for Operable Unit 4 (FS/PP-DEIS) reports the specific gravity of the vitrified waste along with the calculated volume reduction. The volume reduction is based upon the difference between the volume of the final glass product (including additives) and the initial volume of the waste in its current state. The waste volume was calculated using the wet, compacted density, which is assumed to be the most representative of the material in its current state. Significant volume reductions ranging from 50 percent to 68 percent are achieved through vitrification of the waste. In summary, the final waste volume ranged from 32 percent of the initial waste volume in the best case to only 50 percent of the initial waste volume in the worst case.

The radon emanation rate from the vitrified K-65 material ranged from 0.01 to 0.06 $pCi/m^2/s$, more than two orders of magnitude less than the EPA limit of 20 $pCi/m^2/s$ for radon emanation from uranium mill tailings. The measured radon emanation rate from the glass is approximately equal to the emanation rate from natural building materials such as brick and concrete, even though the radium content of the waste glass is 10^3 to 10^6 times greater than that of natural building materials.

The NTS has established waste acceptance criteria which consider disposal site characteristics consistent with an appropriate level of protectiveness to human health and the environment. The Operable Unit 4 remedial waste will comply with these waste acceptance criteria and the NTS will also perform evaluation to assure that the acceptance criteria are met.

Issue 3 - Public Participation During Post-RI/FS Activities

The current FEMP Community Relations Plan does not adequately define the public's role, nor its nature and extent of opportunities for participation during post-RI/FS activities. During the Operable Unit 4 formal public comment period, members of the public requested formal definition of their level of participation during the Remedial Design and Remedial Action processes. Members of the community expressed a desire to continue their same level of involvement in post-RI/FS activities, as defined by the current Community Relations Plan for the RI/FS program. (Commentors: A, B, D, G and J)

Response: The DOE is both actively and expeditiously pursuing the revision of the current FEMP Community Relations Plan to include post-RI/FS public involvement activities throughout the Remedial Design and Remedial Action processes. Until a comprehensive Community Relations Plan is finalized by the DOE, an Interim (post-RI/FS) Community Relations Plan has been prepared as guidance to Fernald personnel on public involvement activities. A revised Community Relations Plan addressing post-RI/FS public involvement activities will be issued by September 1994.

Issue 4 - State of Nevada Regulatory Concerns

The State of Nevada and a member for the Nevada Test Site Citizen's Advisory Board have expressed concerns over the regulatory classification of the Operable Unit 4 remedial wastes, as discussed in the Operable Unit 4 Feasibility Study/Proposed Plan - Draft Environmental Impact Statement. More specifically, the State of Nevada suggests that the Operable Unit 4 remedial wastes are "mixed

wastes" [i.e., Resource Conservation and Recovery Act (RCRA) hazardous and radioactive waste] rather than "by-product material" as defined by the Atomic Energy Act (AEA), Section 11(e)(2) excluded from being a RCRA hazardous waste. The CAB stated that, "Based on the presence of RCRA regulated metals and organics in the waste, we are concerned that the waste contains both hazardous and radioactive components." Accordingly, the State of Nevada contends that the hazardous component of the Operable Unit 4 wastes are subject to regulation and control by EPA-delegated state having such authority. (Commentors: E, O)

Response: The State of Nevada's comment concerns the classification of K-65 and Silo 3 material; specifically with respect to its regulation as mixed waste. The following response first discusses in general the issue regarding the classification; secondly, the response addresses specific State of Nevada concerns described in the letter.

(a) General Discussion

The material contained in Silos 1 and 2 (K-65 material), and Silo 3 is by-product material or residue resulting from the processing of uranium ore and is specifically exempt as defined from regulation as solid waste under RCRA 40 CFR §261.4(a)(4). The referenced exclusion applies to ". . . source, special nuclear or by-product material as defined in the . . . AEA. . ." The AEA in part defines by-product as: ". . .the tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content" [AEA Section 11(e)(2)]. Since a material must first be a solid waste in order to be a hazardous waste, and since the material is excluded from regulation as solid waste, the subject material cannot be considered hazardous waste.

The silos contain only residues from the chemical extraction (beneficiation) of uranium from ores; no other solid or hazardous wastes were added to the silos or to the residues. Therefore, the contents of Silos 1, 2, and 3 are pure "by-product materials" by definition, and not solid wastes or hazardous wastes subject to regulation under RCRA. The heavy metals found in the material were present in the natural ore, and were unintentionally extracted from the parent ore along with the uranium during the process of beneficiation, becoming more concentrated in the residue after the uranium was removed. The presence of naturally occurring metals is expected in by-product material, and does not invalidate either the definition or the exclusion. No metals from a non-ore source were added to the stream at any point in the beneficiation process; also, no hazardous waste or waste

constituent was added or created at any time during the beneficiation process. The fact that several metals in the material fail the RCRA toxicity characteristic leaching procedure (TCLP) does not cause the material to become subject to RCRA regulation due to a hazardous waste characteristic, since the metals are not from an external source, but are associated with the parent material (whose residues, including any ancillary metals, are excluded from the definition of solid waste).

(b) Specific State of Nevada Comments and Responses

1. Comment: The comment refers to ". . .thorium mill tailing waste, which is admitted to be mixed waste. . ."

Response: The comment is unclear, since there is no reference to any admission that the material is mixed waste. The FS/PP-DEIS does not claim the material is mixed waste. Rather, the residues in the silos are by-product material from the processing of ore material for its source material, primarily uranium. The by-product material is not itself a mixed waste, nor is it mixed with a solid or hazardous waste which would cause the material to be considered a mixed waste. As stated in the document, while they are not considered applicable as ARARs for the management of this material, various sections of RCRA have been included in the Operable Unit 4 FS/PP-DEIS as relevant and appropriate requirements for the management of this material during CERCLA remediation, due to the similarity of this material to RCRA characteristic hazardous waste. The adoption of various RCRA ARARs in the CERCLA documents does not confer or waive authorities agencies may have to regulate the silo material under RCRA.

2. Comment: "In 1987, DOE promulgated regulations (10 CFR §962.1) stating that RCRA hazardous waste, mixed with by-product material falling under the category defined in the AEA (42 USC 2014(e)(1), would be subject to regulation . . ." "However, the by-product material falling under the category given in 42 USC 2014(e)(2) that was mixed with RCRA hazardous waste, . . . would not be subject to regulations by EPA. . ." ". . .under the Federal Facility Compliance Act (FFCA), Congress defined mixed waste to mean 'waste that contains both hazardous waste and source, special nuclear, or by-product material . . .' This definition shows no distinction between the two categories of by-product material mentioned above. Hence,

the attempted exemption from hazardous waste regulations of the hazardous components of mixed waste containing by-product material . . . has been invalidated."

Response: The DOE Final Rule in 10 CFR §962, promulgated in the May 1, 1987 *Federal Register* (52 FR 15937) for clarification of the term "by-product material," was limited in scope by by-product material as defined under 42 USC 2014(e)(1) meaning "radioactive material . . . yielded in, or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material." An example would be reactor fuel reprocessed for its enriched uranium. This rule does not affect materials that are defined as by-product material under Section 11(e)(2) of the AEA ("tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content"). The silo material falls into this second category.

DOE Order 5400.3 further clarifies the DOE interpretive rule referenced above:

> "DOE interprets these definitions to mean that whenever any hazardous waste identified or listed in 40 CFR §261 is inadvertently mixed [emphasis added] with any source material, special nuclear material, or by-product material, the hazardous waste component is subject to regulation under Subtitle C of RCRA. The May 1, 1987 *Federal Register* notice did not affect materials that are defined as by-product material under Section 11(e)(2) of the AEA."

DOE Order 5820.2A contains definitions consistent with the above. Chapter IV, Management of Waste Containing AEA 11(e)(2) By-product Material and Naturally Occurring and Accelerator Produced Radioactive Material, specifies:

> "By-product 11(e)(2) . . . mixed [emphasis added] with the Resource Conservation and Recovery Act hazardous chemicals, shall be managed consistent with both the Resource Conservation and Recovery Act and 40 CFR Part 192."

The FFCA, DOE Order 5400.3, and DOE Order 5820.2A are consistent in their interpretation of the definition of mixed waste. The FFCA simply reiterates that hazardous waste mixed with source, special nuclear, or by-product material is subject to dual regulation under both the AEA and RCRA, and has no bearing on Operable Unit 4 by-product material, since it is not mixed with a solid or hazardous waste (see General Discussion). The K-65 and Silo 3 material consists of only by-product material as

defined under Section 11(e)(2) of the AEA, therefore, subject to the solid waste exclusion under RCRA.

3. Comment: ". . . EPA delegated to the states regulatory control over all mixed wastes without regard to specific radionuclide content . . . consistent with the expression of Congressional intent in defining mixed waste under the FFCA (see 51 FR, July 3, 1986, 24504-24505)."

   Response: In the referenced July 3, 1986 *Federal Register* notice, EPA is requiring that states seeking authorization to regulate under RCRA the "hazardous component" of radioactive mixed waste revise their programs (if necessary) and demonstrate statutory authority to regulate said "hazardous component." This notice was issued prior to the DOE interpretive rule of May 1, 1987. Although "hazardous component" is not expressly defined, the notice is consistent with previous definitions, and implicitly restates the definition of mixed waste as "wastes containing both hazardous waste and radioactive waste." Again, this Federal Register notice does not detract from the stated position, since the Operable Unit 4 silo material consists solely of by-product material, and is not mixed with a solid or hazardous waste that would be subject to state regulation.

In summary, the Operable Unit 4 silo materials are expressly by-product material excluded from RCRA regulation under 40 CFR §261.4(a)(4), on the basis of "tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content" [AEA Section 11(e)(2)].

NOTE: While not applicable as an ARAR for the management of this material, various sections of RCRA have been included in the FS/PP-DEIS as relevant and appropriate requirements for the management of this material during CERCLA remediation, due to the similarity of this material to RCRA characteristic hazardous waste. The proposed alternative for remediation of this material includes treatment by vitrification, which will remove the "toxicity characteristic" due to the inadvertent presence of various metals in the material. The adoption of various RCRA ARARs in the CERCLA documents does not accede the authority of RCRA to regulate the silo material; these ARARs, among others, are selected on the basis of existing regulatory standards and management

practices to be followed during remediation to ensure adequate protection of human health and the environment.

Issue 5 - Off-Site Transportation of Waste to Nevada Test Site

Several members of the local community expressed concerns related to the transportation of the Operable Unit 4 treated wastes from the FEMP to the Nevada Test Site (NTS). One individual preferred rail shipments over truck transportation, citing that truck transportation is much more dangerous. Others requested more details on transportation (i.e., packaging specifications, and special handling requirements and precautions) and details related to notification when shipments will occur. (Commentors: A, F and Q)

Response: The preferred remedy for Operable Unit 4 requires a combination of rail and truck transportation for the shipment of treated silo residues off site for burial at the NTS. Currently, there are no direct rail lines into the NTS. The treated material would be transported from the FEMP by rail to either a point near Las Vegas, Nevada, or one of the areas north of Las Vegas. From either location, the waste containers carrying the treated material would be transferred to trucks for transportation over roads to NTS. Consistent with regulatory requirements, the DOE will provide proper notification to all affected parties, including emergency response teams, when off-site shipments begin.

Additionally, the DOE is engaged in a program to optimize a container design to meet specific performance requirements for a shipping/burial container and to provide additional protection to workers and the public, for the eventual transport and disposal of the treated Operable Unit 4 wastes to be conducted between the FEMP and the NTS. One of the program's goals are focussed upon the viability of utilizing recycled contaminated scrap metal and other forms of metal for the fabrication of waste containers.

The success of the container investigation will be measured on the basis of achieving a balance of key design parameters and requirements such as:

- vitrified product mixture design
- final waste form of vitrified product
- waste loading of vitrified product
- waste additives of vitrified product

- packaging design
- shielding of package
- shipping limitations
- United States Department of Energy (DOT) requirements
- NTS Waste Acceptance Criteria
- cost

The optimized container design will be modelled in an effort to minimize the estimated short-term risks posed to public by transporting the Operable Unit 4 wastes in the container.

Issue 6 - Monitoring of Remedial Actions

Several members of the local community expressed concerns that "real-time" monitoring should be implemented during the entire remedial action process. It was recommended that the implementation of "real-time" monitoring should be integrated into short-term remedial actions such as process controls, project specific health and safety procedures, emergency alarm systems, standard operating procedures, and emergency response procedures, as well as, long-term actions involving disposal and maintenance. Additionally, it was requested that information gained from "real-time" monitoring and related activities should be made readily available to the public. (Commentors: A, B, D, G, H and J)

Response: As part of the remedial design activities for the Operable Unit 4 remedial actions, a preliminary and final safety assessment will be conducted by DOE to establish the safety basis and design objectives for the construction and the operation of all remedial facilities. The safety basis includes those measures (i.e., procedures, training, monitoring equipment) necessary to ensure that facilities will be constructed and operated in a safe manner and in compliance with applicable or relevant and appropriate requirements.

It is the DOE policy in its conduct of operations to require facility operations procedures to be developed and adhered to during all remedial actions. Training of personnel to those procedures will be paramount to ensure safe conduct of all operations. The FEMP has developed and maintains the necessary emergency plans and procedures to adequately define the emergency management program, provide guidance for all emergency responders, proper notification of the public, ensure adequate monitoring and performance for critical systems, and to meet all regulatory requirements.

The use of "real-time" monitoring is an integral part of this process and will vary in degree for each system or action to be consistent with the safety assessment recommendations and comply with applicable or relevant and appropriate requirements. For example, some systems may require 24-hour "real-time" monitoring (i.e., fire protection, meteorological stations, perimeter air monitoring stations, radon treatment system) while others may only require "real-time" monitoring during normal operations (i.e., air emissions controls, waste water discharge, vitrification process controls, disposal facilities etc.). These features will all be developed and included in the remedial design and remedial action packages for review by the public, EPA, and Ohio Environmental Protection Agency (OEPA). Likewise, "real-time" monitoring data will be made available to the public through the Public Environmental Information Center.

Issue 7 - Impacts to Sites of Archeological and Historical Importance

The Ohio Historical Preservation Office (OHPO) expressed two areas of concern for the identified Operable Unit 4 remedial actions. Due to the FEMP site's proximity in an archeological sensitive area, the first area of concern is the potential for impacts to archeological sites. Secondly, under the current criteria and regulatory guidelines, the FEMP site itself is eligible for inclusion in the National Register of Historic Places, thus the proposed demolition of the silos, or any other structure or facility, could have an adverse effect on the FEMP site. The OHPO recommends the development of a programmatic agreement to address these sitewide and Operable Unit 4-specific historic preservation concerns. (Commentor: I)

Response: It is recognized that the FEMP site does lie in an archaeologically rich area and sitewide remedial activities will result in many ground disturbing and demolition activities. The DOE has effectively coordinated with the OHPO on several projects at the Fernald site in the past. Therefore, until the programmatic agreement has been developed between DOE and the OHPO, individual activities (e.g., the construction of support facilities) will continue to be coordinated with the OHPO.

In response to the second area of concern, it is further recognized that the FEMP site as a whole has recently been determined to be eligible for inclusion on the National Register of Historic Places. Therefore, appropriate steps will be taken to coordinate with the OHPO all activities involving the demolition of structures. The DOE will be pursuing a programmatic agreement with the OHPO in the near future. However, until such an agreement can be put in place, DOE will be coordinating with the OHPO office on an individual project-by-project basis.

Appropriate coordination activities associated with the remediation of Operable Unit 4 and the demolition of structures on the site will be carried out with the OHPO.

Issue 8 - Future Land Use at the FEMP

One member of the public expressed concern over any future development of the FEMP site (i.e., industrial park) which would attract large concentrations of humans, in the event environmental problems would happen to develop in the future (i.e., similar to Love Canal). (Commentor: F)

Response: The DOE, EPA, and OEPA are closely working with the local community (i.e., FRESH) to provide technical guidance to participating community members, in an effort to logically reach a balanced decision regarding the most feasible future land use(s) for the FEMP site. The Operable Unit 4 soil remediation cleanup levels were established with the assumption that in the future, the federal government would maintain ownership of the Operable Unit 4 area.

Issue 9 - Impact to Natural Resources

Members of the public expressed concern over the potential impact from the remedial actions to natural resources surrounding the FEMP site (i.e., wetlands, migratory birds, etc.), and the mitigative measures being taken by the DOE to minimize their effect. (Commentors: B and F)

Response: The end-use of the FEMP site is currently under consideration by the Fernald Citizens Task Force. This task force, based on input from the public and various stakeholders, will make a recommendation to DOE as to what the end-use of the Fernald site should be. This comment will be forwarded to the task force for their consideration. The task force's recommendation will play a key role in determining what happens at the site after remediation.

Depending on the types of environmental impacts that occur during remediation, it is possible that habitats may need to be created as mitigative measures. The specific issue of the need for creating wetlands is currently being evaluated by DOE and Fernald Environmental Restoration Management Company (FERMCO) and will be discussed with the stakeholders and formally addressed in the Operable Unit 5 (Environmental Media) Feasibility Study Report and Record of Decision.

Issue 10 - EPA Promulgation of Residual Soil Standards for Radionuclides

One local resident inquired whether the residual soil radiation levels, which the EPA has not yet published in the *Federal Register* (originally scheduled to be published in March 1994), could possibly impact the remediation decisions in Operable Unit 4. (Commentor: C)

Response: Residual soil standards for radionuclides are currently being finalized by the EPA. The EPA has issued a draft proposal which recommends the establishment of an effective dose limit of 15 mrem/year from residual soil radiation. Until the standards are finalized and promulgated by the EPA, it is uncertain whether they will impact Operable Unit 4. Radionuclide cleanup levels have been established for Operable Unit 4 which approach background concentrations for nearly all radionuclides. When the residual soil standards for radionuclides are promulgated by the EPA, a review of their impact upon the Operable Unit 4 soil remediation will be conducted. Soil cleanup levels for Operable Unit 4 will be modified as directed by the EPA.

Issue 11 - Air Emissions from Remedial Actions

One local resident, who lives downwind of the FEMP site, expressed concerns over the particulate matter and off-gases which could be emitted through the exhausts of the Operable Unit 4 vitrification process. Specific concerns were noted related to the performance of comprehensive site-wide air modeling which includes the Operable Unit 4 vitrification facility contributions to sitewide emissions and the quantification of subsequent risks to the local "downwind" community. (Commentor: K)

Response: Air pathway monitoring focuses on the airborne pollutants that may be carried from the Fernald site as a particulate or gas and how these pollutants are distributed in the environment. Stack and building vent emissions are obvious sources of pollutants, but dust from construction and remediation activities, waste handling, and wind erosion are also important potential sources. The form and chemical makeup of pollutants influence how they are dispersed in the environment as well as how they may deliver radiation doses. Airborne pollutants are subject to whatever weather conditions exist.

The meteorological data gathered at the FEMP site are primarily used to evaluate climatic conditions at the site. Wind speed and direction, rainfall, and temperature play a role in predicting how pollutants are distributed in the environment. The Fernald Environmental Monitoring Program routinely uses atmospheric models to determine how airborne effluents mix and disperse; these models, in turn, are used to assess the impact of operations on the surrounding environment, in

accordance with DOE requirements. Based upon modeling results, risks to the public are calculated based upon exposure from the pollutants emitted from the FEMP site. The *1992 Fernald Site Environmental Report* provides detailed breakdown of sitewide emissions, doses to the public, and their associated risks. This report is updated annually and may be available in the Administrative Record.

To date, computer modeling for expected radionuclide emissions from the proposed vitrification facility has not been conducted due to insufficient engineering design data. However, during remedial design, when these design data become available, this information will be entered into the appropriate air models to determine compliance with 40 CFR §61 Subpart H for radionuclides, including radium under the Clean Air Act. In addition, Ohio Administrative Code (OAC) 3745-31-05(A)(3) requires the use of Best Available Technology (BAT) to control process emissions. Compliance with the requirement to employ BAT will be determined by evaluating, according to the Ohio Air Toxics Policy (OATP), emission data collected from performance testing of the Operable Unit 4 vitrification facility.

Modeling will be conducted on the vitrification facility both prior to startup and during operation. The preliminary modeling will provide estimates of dose levels based on engineering design and expected removal efficiencies. Corroborative modeling conducted during operation will be based on actual data collected during stack performance testing, and will verify engineering design and compliance with the regulatory standard. Risks associated with these dose levels will be evaluated and compared to the other alternatives. Upon comparison a determination will be made to implement design criteria to minimize risk associated with the vitrification facility or if necessary to amend the selected alternative to one which poses less of a risk to the surrounding community.

Air emission modelling specific to the Operable Unit 4 vitrification processing facility will be performed as part of the remedial design process, to ensure that the vitrification facility is designed to meet these air emission ARARs and pertinent DOE Orders. In addition, portable air monitors will be strategically located around the perimeter of field activities during construction of remedial facilities. The air monitors will provide real time data regarding the effectiveness of controls to mitigate fugitive dust emissions.

Issue 12 - Determination of Risk Levels

A local resident questioned the reason the CERCLA elected to use such small risk levels as 10^{-6} (one in a million). In addition, the differences in methodologies like Health Effects Assessment Summary Tables (HEAST) and Biological Effect of Ionizing Radiation result in "vast orders of magnitude" differences in estimated risks. (Commentor: C)

Response: In accordance with the NCP (40 CFR 300), Operable Unit 4 is required to comply with the requirement that the excess risk, posed to humans exposed to carcinogenic materials in Operable Unit 4, would not be greater than one in ten thousand to one in a million. The lower bound of the range, one in a million (10^{-6}) incremental risk, is the most desired level of residual risk to be posed by a clean-up action. This risk refers not to "fatal" cancer risk but the risk of the induction of incremental cancers, over and above the normal risk of contracting cancer, during one's lifetime. Operable Unit 4 is also legally required to utilize the methodologies defined by the United States Environmental Protection Agency for calculating the cancer risk posed by Operable Unit 4.

Issue 13 - Compliance with DOT Transportation Regulations

The U.S. Department of Transportation (DOT) provided two comments regarding compliance with DOT regulations.

(a) The first comment was related to classification of the materials as Low Specific Activity (LSA) and stated, "We [DOT] believe the expected physical form of the material transported will result in the radiological risk to the public being equal to or less than most LSA shipments transported in the Country. However, from Volume Two, Appendix A, Table A.1-1, it appears that the activity per gram of material for some of the package contents might exceed the limits for LSA materials in 49 CFR 173.403(n)."

(b) The second comment expressed concern with the sampling and analysis to be performed prior to shipment. The comment stated "After material vitrification, the external radiation dose rates will clearly be the indications of the most significant radiological hazards of the materials during transportation. However, since the identity of the radionuclides and the activity of the content in each package is required by the regulations, documentation with technical reasoning will be needed

to relate the results of pre-vitrification radioassays to the contents of the packages." (Commentor M)

Response:

(a) The initial classification and container selection of the vitrified materials as LSA was used to perform cost estimates for the remedial alternatives evaluated in the FS for Operable Unit 4. These cost estimates were developed with an intended accuracy of plus 50 percent/minus 30 percent as required by CERCLA. Therefore these cost estimates were considered adequate for alternative evaluation. Since the initial distribution of the FS/PP-DEIS, the FEMP has initiated a study which will further specify the DOT classification of the vitrified material and container types required for shipment of the vitrified material. The final selection of container type is contingent upon several factors, including; the Curie content of the container, its classification under DOT regulations, the ability of the container to reduce external dose rate, and the acceptance of the container by the Nevada Test Site.

(b) Demonstration of compliance with regulations is the basis for the sampling and analysis program to be developed for Operable Unit 4 remediation. Sampling and analysis will be performed on the vitrified gems 1) to assure compliance with waste disposal requirements, 2) to demonstrate success of waste treatment, 3) to assure compliance with DOT requirements, 4) and to complete waste characterization of the vitrified materials. Specific parameters for testing will be determined in the Project Specific Sampling and Analysis Plans to be prepared during Remedial Action. The selection of parameters for analysis will include those which will demonstrate compliance with the activity limitations for containers per DOT regulations.

Issue 14 - Consideration of Disposal Sites for the K-65 Material

On June 24, 1994, DOE received significant comments from a member of the Nevada Test Site Citizens Advisory Board (CAB). The CAB stated that the Operable Unit 4 FS/PP-DEIS documents did not discuss the full range of possible alternatives (e.g., disposal at Hanford, reprocess to recover materials, dispose of all material at the NTS). The member of the CAB further questioned "...Why were these options rejected? What is the full list of options initially considered and why was each option rejected?"

(Commentor: O)

Response: Identification, screening, and evaluation of potentially applicable technologies and process options are key steps early in the FS process. The primary objective of this phase of the FS is to develop an appropriate range of remedial technologies and process options that will be developed into preliminary remedial alternatives. The criteria for identifying potentially applicable technologies are provided in EPA guidance and in the NCP. There is strong statutory preference for remedies that will result in a permanent solution; a significant decrease in toxicity, mobility, or volume; and provide long-term protection as identified in Section 121 of CERCLA, as amended. The primary requirements for the final remedy are that it be both protective of human health and the environment and comply with applicable or relevant and appropriate regulatory requirements.

The Operable Unit 4 FS/PP-DEIS presented information to support the selection of the most appropriate remedial alternative. The broad range of alternatives considered for remediation in the FS/PP-DEIS were developed in accordance with EPA guidance by following a series of logical steps that involved developing, in succession, more specific definitions of potential remedial alternatives. The steps included the following:

- Development of contaminant- and media-specific remedial action objectives (RAOs) and preliminary remediation goals (PRGs).
- Identification of general response actions (GRAs).
- Identification of volumes and/or areas of waste media to be addressed.
- Identification and screening of remedial technologies and process options.
- Evaluation and screening of process options within each technology.
- Assemblage of a wide range of remedial alternatives using the selected process options within each remedial technology.
- Evaluation of initial screening to determine which alternatives will be analyzed more fully in the detailed analysis phase of the FS.

The detailed analysis of alternatives was performed in Section 4 of the FS on those alternatives which were retained through the preliminary screening of alternatives step described above. The detailed and comparative analysis consisted of the analysis and presentation of the relevant information needed to allow decision makers to select a remedial alternative.

The Operable Unit 4 FS/PP-DEIS considered several disposal options for each of the on-property and off-site disposal technologies evaluated for the K-65 material as follows:

On-Property Disposal Technology

- Engineered Disposal Facility (Below-grade)
- Above-grade Disposal Vault

Off-Site Disposal Technology

- New Facility within 483 km (300 mi) of the FEMP site
- New Facility Adjacent to the Site
- Permitted Commercial Disposal Site
- Nevada Test Site

In addition, in-situ and no-action alternatives were considered and evaluated as potential disposal alternatives. Sections 2.6.7.2 and 2.6.7.3 of the Operable Unit 4 FS discuss these representative options and the results of their preliminary screenings. Subsequently, repromulgation of 40 CFR Part 191 led to changes in the list of relevant and appropriate requirements affecting on-property disposal as discussed in Attachment C.II.

It is the DOE Defense Waste Management Policy at the Nevada Test Site, "...to approve generators and to receive, store and dispose of radioactive wastes generated by DOE defense programs in a manner consistent with DOE Order 5820.2A, "Radioactive Waste Management," and applicable federal, state, and local regulations and requirements."[1] Chapter III of DOE Order 5820.2A provides that low-level waste should go to a DOE low-level waste disposal site, such as the NTS. This policy ensures that low-level wastes will be handled properly in accordance with applicable standards and DOE guidelines. Exemptions from the DOE Order to allow shipments to commercial disposal facilities can be granted by the U.S. Department of Energy Assistant Secretary for Environmental Management on an ad hoc basis. Fernald has made shipments of waste in the past to the Nevada Test Site and to the commercial facility operated by Envirocare, Inc. in Clive, Utah.

[1]U.S. Department - Nevada Field Office, June 1992, Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements, Publication NVO-325, Rev. 1, Page 1.

In this case, however, the Operable Unit 4 vitrified silo wastes from Fernald do not meet the waste acceptance criteria for existing commercial facilities. The U.S. Department of Energy Office of Environmental Restoration asked for and is in the process of receiving a determination by the U.S. Department of Energy Office of Waste Management that the silo wastes constituted a small quantity of by-product material under Chapter III of DOE Order 5820.2A and therefore, may be disposed at a DOE low-level waste disposal site, such as the Nevada Test Site. Also, it has been a long-standing DOE policy that "defense related wastes" would be disposed at the Nevada Test Site and non-defense related waste disposed at Hanford.

That option, which is the preferred alternative, has been evaluated in this environmental impact statement as a potential alternative for waste disposal, along with a potential option for commercial disposal. Disposal at another DOE site, such as Hanford, was considered by DOE to be less feasible than shipment to the NTS, given past experience with shipping legacy wastes from Fernald to the NTS, which has been ongoing since 1985. In addition, an appropriate disposal facility is not currently available at Hanford to receive the Operable Unit 4 waste.

The reprocessing of silo wastes to recover radiological or inorganic constituents was determined not to be feasible due to poor treatability test results involving chemical separation techniques.

It should be noted that all of the Operable Unit 4 remedial wastes (i.e., Silos 1, 2 and 3 residues, contaminated soil and debris) were considered for disposal at the NTS. However, it was determined that only treated silo residues should be disposed at the NTS under the Operable Unit 4 FS/PP-DEIS (although disposal of contaminated soil and debris is to be determined in subsequent RODs).

The selection of the NTS for disposal of Operable Unit 4 waste is supported by a process option evaluation presented in Appendix B (Description of Technologies and Process Options) of the FS/PP-DEIS. This evaluation concluded that based on considerations such as geology, demographics, levels of precipitation, and depth to groundwater the NTS provided the best location for disposal. Also, the results of treatability studies conducted on the vitrified waste form indicate that the vitrified waste fully satisfies current NTS waste acceptance criteria and in general would provide a high level of long-term protectiveness when disposed at the NTS.

Issue 15 - FEMP Waste Disposal Program

On June 21, 1994, DOE received a package of 174 postcards from Citizen Alert. Three additional postcards were received on July 5, 1994. The majority of the postcards were from concerned citizens of Nevada expressing their comments related to the shipment and disposal of Fernald waste at the NTS. One of their comments stated that, "...the more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site." (Commentors: P1-P177)

Response: As part of the FEMP Waste Disposal Program, disposal of waste at the NTS is only one of several disposal locations being considered for waste resulting from the remediation of the Fernald site. Other disposal locations include both on-site disposal and commercial facilities.

The overall remediation of Fernald is expected to generate over 2.6 million cubic yards of waste requiring treatment and/or disposal. Of the estimated 2.6 million cubic yards, 1.4 million cubic yards are to be managed at the Fernald site, 900,000 cubic yards are to be shipped to commercial facilities, and 300,000 cubic yards may be shipped to the NTS (including approximately 5580 cubic yards of the Operable Unit 4 remedial wastes). Therefore, only about 10 percent of the waste from the remediation of Fernald might be shipped to the NTS. Additionally, these shipments would occur over a projected 30-year period.

Currently, Fernald is shipping low-level waste to the NTS at a rate of about 18,000 cubic yards of waste per year (based on the most recent 6 year average). The projected rate for disposal of the Fernald remedial waste at the NTS is estimated at a rate of approximately 10,000 cubic yards per year, with the highest estimate for a single year being approximately 16,000 cubic yards for 1995.

Furthermore, the 300,000 cubic yard estimate is a highest case estimate which, in reality, may not happen. Fernald is making an effort to minimize waste generation and to explore other disposal options, thereby minimizing waste requiring shipment to the NTS, as well as other locations. Disposal of waste at the NTS is utilized only when these options have been evaluated and determined unfeasible. These minimization efforts include recycling, decontamination for free-release of material, volume reduction through treatment, disposal of the waste on-site, and use of commercial disposal facilities.

Despite these efforts, the Operable Unit 4 FS/PP-DEIS has concluded after a detailed evaluation that approximately 5580 cubic yards of silo residues are more appropriately disposed at the NTS. This is driven by several factors, including the location of the Fernald site over a sole-source aquifer (State of Ohio regulations prevent the establishment of a disposal facility over a sole source aquifer); the close proximity of the site to large populations and agricultural land; and the lack of commercial disposal facilities which may accept these wastes. As discussed in the Operable Unit 4 FS/PP-DEIS, these wastes include the treated residues from Silos 1, 2, and 3.

The State of Ohio recognizes that the final disposition of some Fernald wastes may be on site. In a letter written to the U.S. EPA, the State of Ohio said: "Large volumes of contaminated construction and demolition debris, soil, fly ash and bottom ash, and possibly some solid waste will have to be disposed onsite at Fernald."

The disposal of some wastes at the NTS is one part of a balanced waste management effort for the Fernald remedial activities. Although Fernald is committed to the minimization of wastes and finding alternative disposal options for its wastes, Fernald proposes to rely on the NTS for disposal of certain wastes.

Issue 16 - Evaluation of Transportation Risks

On June 21, 1994, DOE received a package of 174 postcards from Citizen Alert. Three additional postcards were received on July 5, 1994. The majority of the postcards were from concerned citizens of Nevada expressing their comments related to the shipment and disposal of Fernald waste at the NTS. One of their comments stated that, "Transportation risks need to be thoroughly evaluated". (Commentors: P1-P177)

Response: The FS/PP-DEIS for Operable Unit 4, Section 4, contains a complete detailed analysis of all the remedial alternatives evaluated for off-site transportation of wastes, which included both long-term and short-term risks. The preferred remedy for Operable Unit 4 involves the transportation of the treated silo residues to the NTS by a combination of rail and truck. The material would be shipped exclusively by use of rail from the FEMP to Las Vegas, Nevada [a distance of 3562 km (2270 mi)], then by truck from Las Vegas to the NTS [179 km (111 mi)].

The FS/PP-DEIS for Operable Unit 4, Appendix D, contains a detailed discussion of the long-term and short-term risks associated with each remedial alternative which underwent detailed analysis. The

RADTRAN IV computer code was used to evaluate potential short-term risks, including risks to the public during the transportation of the vitrified Silos 1, 2 and 3 material to the Nevada Test Site.

Through Sandia National Laboratory's TRANSNET system, RADTRAN IV simulates the transportation route, the length of time members of the public are exposed to radiation, and the dose equivalent delivered for the trip. This exposure is to members of the public sharing the road with the truck, people living along the rail and truck route, and people encountering the truck at truck stops. The alternatives call for packaging the treated material in metal boxes meeting U.S. Department of Transportation packaging requirements of 49 CFR Part 173. The radiological impacts associated with the transportation of the waste to the NTS for disposal are summarized in Table C.4-2.

TABLE C.4-2

IMPACTS TO THE PUBLIC DURING TRANSPORTATION OF VITRIFIED SILOS 1, 2 AND 3 WASTE TO THE NTS

ESTIMATED IMPACT	Transportation to the Nevada Test Site	
	Vitrified Silos 1 and 2 Material	Vitrified Silo 3 Material
Routine Transport		
RME Individual dose (mrem)	0.0085	0.00014
Risk -ILCR[b]	8.32×10^{-10}	1.71×10^{-11}
Transportation Accidents		
Public dose from radioactive material releases following truck accident, (person - rem)	1.9×10^{-5}	3.8×10^{-6}
Public dose from radioactive material releases following train accident, (person - rem)	0.026	0.0053
Truck Associated Injuries[a]	0.013	0.0068
Truck Associated Fatalities[a]	0.0014	0.00074
Train Associated Injuries[a]	0.15	0.077
Train Associated Fatalities[a]	0.038	0.020

[a]Nonradiological impacts.
[b]ILCR - Incremental Lifetime Cancer Risk Above Background.

The estimated dose exposure and subsequent risks were calculated and reported as an incremental lifetime cancer risk (ILCR) to the public from the transportation of the vitrified Silos 1, 2 and 3 material to the Nevada Test Site. Consistent with the goals of CERCLA, it is desirable to have the risks resulting from remediation to fall within all ILCR range of 1×10^{-6} to 1×10^{-4} above background. For example, if a member of the public has an additional 1 chance in 1,000,000 of contracting cancer due to exposure to radiation during transportation, the probability of developing cancer is expressed as a 1×10^{-6} (1 in 1,000,000) risk. As presented in Table C.4-2, all short-term risks from exposure to radiation meet these criteria.

In addition to risks from the radiological exposure from the transportation of Silos 1, 2 and 3 material to the NTS, accidental injuries and fatalities are predicted to occur because trucks and/or trains would be used for material transportation to the Nevada Test Site. The following risk coefficients below were used to evaluate non-radiological risks to truck drivers and rail crews:

Driver/Crew	Truck	Rail
injury/mile	4.1×10^{-8}	4.6×10^{-6}
death/mile	2.1×10^{-9}	4.6×10^{-8}

Likewise, the following risk coefficients presented below were used to evaluate non-radiological risks to the public:

Public	Truck	Rail
injury/mile	1.2×10^{-7}	6.8×10^{-6}
death/mile	1.3×10^{-8}	1.8×10^{-6}

It should be noted that the risk coefficients for truck and rail transport are not strictly comparable, since far more waste is transported per mile of rail transport than per mile of truck transport. These risks parameters were used consistent with standard risk calculation methodologies as identified in the Final Risk Assessment Work Plan Addendum, (June 1992),[2] which referenced the forementioned

[2]U.S. Department of Energy, June 1992, "Risk Assessment Work Plan Addendum," U.S. Department of Energy - Fernald Field Office, Fernald, Ohio.

published statistics by the U.S. Department of Transportation Federal Highway Administration[3] and U.S. Department of Transportation Federal Railroad Administration.[4]

As before, RADTRAN IV computer code was utilized to calculate the short-term impacts of injuries and fatalities. These impacts are also presented in Table C.4-2 for the transportation of Silos 1, 2 and 3 to the Nevada Test Site.

RADTRAN IV also assesses the impacts from accidental releases of the radioactive material in the transport containers. The code assesses the total impacts for eight accident severity categories. It assesses collective radiological impacts to the public from direct radiation exposure from contamination on the ground, inhalation of contaminants in a plume and resuspended from the ground, direct radiation exposure from contaminants in a plume, and ingestion of food grown in the contaminated area. The impacts from a single truck and train accident are included in Table C.4-2.

Issue 17 - Socioeconomic Impacts to the Waste Receptor Community

On June 21, 1994, DOE received a package of 174 postcards from Citizen Alert. Three additional postcards were received on July 5, 1994. The majority of the postcards were from concerned citizens of Nevada expressing their comments related to the shipment and disposal of Fernald waste at the NTS. One of their comments stated that, "Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste." (Commentors: P1-P177)

Response: The importance of evaluating the socioeconomic impacts of the Operable Unit 4 Remedial Action Alternatives on affected off-site locations is recognized by DOE. It is DOE's view that this issue has been adequately evaluated in the Operable Unit 4 FS/PP-DEIS. However, a supplemental analysis will be performed by DOE, to ensure that the socioeconomic impacts to the Nevada Test Site receptor community have thoroughly evaluated, as part of the planned site-wide environmental impact statement for the Nevada Test Site.

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[3]U.S. Dept. of Transportation Federal Highway Administration, Office of Motor Carriers, 1986, Accidents of Motor Carriers of Property, Publication No. FHWA-MC-88-008, DOT, Washington, DC.

[4]U.S. Dept. of Transportation Federal Railroad Administration, Office of Safety, 1988, Accident/Incident Bulletin, Publication No. 157, DOT, Washington, DC.

Section 4.0 of the Operable Unit 4 FS/PP-DEIS provides a thorough discussion of the alternatives. For the alternatives that consider disposal at the NTS, impacts on socioeconomics were evaluated. Population demographics, land use of areas adjacent to the site, and potential risks to the surrounding population are discussed. In addition, impacts on groundwater, soil and geology, biotic resources, etc., are also presented.

Additional discussion of the NTS is also provided in Appendix B of the Operable Unit 4 FS/PP-DEIS, Description of Process Options and Technologies. This discussion provides additional detail on the natural and socioeconomic characteristics of the NTS and the surrounding area. This information formed the basis for the impacts presented in Section 4.0 of the Operable Unit 4 FS/PP-DEIS.

Issue 18 - Disposal of DOE Waste at the Nevada Test Site

On June 24, 1994, DOE received comments from a member of the Citizens Advisory Board for Nevada Test Site Programs which expressed concerns over the current decision process for considering DOE waste for disposal at the NTS. More specifically, the comment stated as follows:

"The shipments of waste from Fernald are the first of potentially many other shipments to the NTS. Rather than making decisions on a piecemeal basis, we want to see the full picture before we are asked to make decisions on individual pieces. That is, we want to first consider the total impact of all of the waste that is being considered for disposal at the NTS. Following that, we want to consider each individual piece." (Commentor: O)

Response: DOE recognizes that the Operable Unit 4 FS/PP-DEIS is not the appropriate mechanism for evaluating the overall picture for waste disposal at the NTS. The appropriate place for this evaluation is the site-wide EIS currently planned for the NTS. A Notice of Intent to prepare a site-wide EIS for the NTS is expected to be published in the summer of 1994. The purpose of this Notice is to invite the participation of federal, state and local agencies, affected Indian tribes, and other interested persons in the process DOE will follow to solicit public comments on the proposed scope and content of the NTS EIS. The site-wide EIS will address the impacts of all waste disposal activities at the NTS and therefore may affect this ROD. Shipments of waste generated from the cleanup of Operable Unit 4 are not proposed to begin until after the expected completion of the NTS site-wide EIS.

Issue 19 - Funding for Technical Oversight and Impact Mitigation

On June 24, 1994, DOE received comments from the Citizens Advisory Board for Nevada Test Site Programs which expressed their belief that:

(a) funds should be provided for technical oversight of waste management activities.

(b) the State of Nevada and affected Counties are entitled to impact mitigation payments as compensation for costs arising from management of this material.

(Commentor: O)

Response: (a) The first issue regards funding for technical oversight. DOE currently has a program established for providing such funds. This program is detailed in an "Agreement in Principle, with the State of Nevada, one of several such agreements between DOE and the states in which DOE facilities are located. This agreement includes the provision of funding for technical oversight by the State of Nevada for waste management activities at the NTS.

(b) The second issue is related to providing impact mitigation payments for management of waste in Nevada to the State of Nevada and affected counties. Mitigation payments are associated with actions whose implementation will have significant impact on human health and the environment. Since no significant impacts are expected to result from the transportation and disposal of the vitrified Operable Unit 4 waste at the Nevada Test Site, no mitigation payments for management of the waste in Nevada are anticipated at this time.

C.5.0 SUMMARY OF COMMENTS NOT RESULTING IN ISSUES

Commentors A, B, D, G, H, and J inquired as to the possibility of covering the silos and ensuring pollution prevention measures are implemented during remediation. Through the remedial design process, appropriate measures will be evaluated, utilized, and monitored to maintain air emissions resulting from all remedial actions at or below the regulatory requirements.

Commentors A and H wanted assurance that waste from other sites would not be brought to Fernald's vitrification facility to be treated nor stored at the FEMP for future disposition. At this time, no plans have been made to treat waste from other DOE sites through the Operable Unit 4 Vitrification Facility or store materials at the FEMP. However, as part of a treatability study under the Uranium Soils Integrated Demonstration program, DOE is considering a program that would involve importation of uranium-contaminated soil samples from Portsmouth, Ohio to be tested at Fernald and returned to the point of origin. This study would be conducted as an extension of the current Minimum Additive Waste Stabilization (MAWS) program, which is part of Operable Unit 4 remediation program. These tests are an essential component of FEMP's ability to conduct necessary research in support of DOE technology development.

The purpose of doing this test work is to make use of the investment which DOE has already made in equipment and experience at Fernald; to produce valuable remediation information for a nearby Ohio site; and to avoid duplication of the resources already available at Fernald.

The pilot-scale soil decontamination work at the FEMP is part of DOE's Uranium Soils Integrated Demonstration, a DOE Office of Technology Development program aimed at developing and applying new and enhanced technologies by demonstrating them at one test site.

Currently, a proposed test plan is being circulated for review within DOE and FERMCO management to solicit comments on approach, feasibility and acceptability. <u>No action has been taken or will be taken without stakeholder input.</u>

Commentors D and G wanted to suggest the possibility of setting up a trust fund for monitoring and maintenance of the on-property disposal facilities. A trust fund would not be a viable option due to the manner in which money is budgeted and allocated to the FEMP cleanup. The United States Congress annually reviews and approves the funding that the FEMP will receive through the DOE for

remediation activities. A trust fund which would cover the cost of future routine operations and maintenance would not be viable under the current budgetary process.

Commentor A asked how the vitrified silo residue waste form could emanate radon at the same rate as building materials, when the waste itself is much more radioactive. She also requested clarification on the interim storage process. The glass matrix of the vitrified Operable Unit 4 waste form retains radon much more efficiently than porous building materials such as concrete and masonry. Therefore, the Operable Unit 4 vitrified material releases radon at a similar rate of building materials despite the greater quantity of radon emanating radionuclides contained within the vitrified waste form.

Contaminated soil and debris would either be processed in accordance with the selected Operable Unit 5 (Environmental Media) and Operable Unit 3 (Production Area) remedy identified in the Operable Unit 5 and Operable Unit 3 ROD or placed in an interim storage facility to await the finalization of the disposal decisions for soils and debris under Operable Unit 5 and Operable Unit 3. The interim storage would be managed pursuant to the approved work plan for Removal Action 17 - (Improved Storage of Soil and Debris).

The decision regarding the final disposition of the remaining Operable Unit 4 contaminated soil and debris has been placed in abeyance to take full advantage of planned and in-progress waste minimization treatment processes. Further, this FEMP remedial management strategy enables the proper integration of disposal decisions on a sitewide basis. As planned treatment facilities become available under Operable Units 3 and 5 remedial actions, full consideration would be given to applying these systems to the inventoried contaminated materials from Operable Unit 4. Following the application of available waste minimization processes, the remaining Operable Unit 4 contaminated soil and debris would be disposed consistent with the selected remedies for Operable Units 5 and 3, respectively.

Commentor D wanted to know if the 250 acres calculated to be disturbed during the implementation of the preferred alternative for Subunit 2C included loss of habitat. The 250 acres discussed in the *Feasibility Study Report for Operable Unit 4* represents the cumulative sitewide acreage of land that will be disturbed as a result of the implementation of all five operable unit's preferred remedial actions. An estimated 220 acres out of the total 250 acres would be lost in the long term, with the remaining 30 acres only rendered temporarily unusable during the implementation of the sitewide

remedial actions. Therefore, only 220 acres would be permanently committed as a result of implementing these remedial alternatives.

The State of Nevada (Commentor E) noted that, ". . . the cost estimates of long-term storage/disposal of mixed waste at the NTS were not properly accounted for in the Draft EIS. The assumptions, for example, under which storage/disposal of mixed waste at the NTS could be considered "free" when compared to a commercial facility, were not presented in the document." The cost for disposal of FEMP waste at the NTS are incurred by the FEMP. NVO-325 (Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements), Section 3.5 discusses the methods of payment which generators will use to cover the cost of disposal operations for their waste at the NTS. Specifically, NVO-325 states ". . .disposal charges are based upon the estimated volumes listed on their (generator's) 'Three-Year Waste Shipment Forecast' multiplied by the corresponding disposal charge per cubic foot. . ."

The "Three-Year Waste Shipment Forecast" is prepared annually by the generator and it estimates the quantity of waste to be shipped to NTS by that generator each year for the next three years. These forecasts are then used by the NTS to project operating costs for operations related to disposal of the waste for the upcoming years. Therefore, although the NTS disposal site is a non-commercial, non-profit government facility, the cost for operations is funded by the generators and is not provided "free-of-charge." It should be noted that, as stated in the response to Issue 4, the Operable Unit 4 by-product material for disposal at the NTS is not mixed waste.

Commentor B questioned how NEPA was being addressed within these documents. More specifically, how NEPA values were being integrated into the CERCLA process for the Operable Unit 4 FS/PP-DEIS. It is DOE's policy to integrate the NEPA requirements into the procedural and documentation requirements of CERCLA whenever practicable. In accordance with this policy, the RI/FS documents prepared to support the Operable Unit 4 decision process include information on the evaluation elements and criteria employed in the development of an EIS under NEPA.

Separate RI/FS documentation including RI Reports, Initial Screening of Alternatives (ISA) Reports, FS Reports, PPs, and RODs are being issued on varied time schedules for each of the five operable units as established by the Amended Consent Agreement. The lead operable unit (i.e., chronologically, the first operable unit issuing RI/FS documents) for the FEMP site is Operable Unit 4. The integrated CERCLA/NEPA documents for Operable Units 1, 2, 3, and 5 will tier from the

lead Operable Unit 4 FS/PP-DEIS. the Operable Unit 4 FS/PP-DEIS functions as the lead CERCLA/NEPA integrated document and addresses the cumulative impacts of the leading remedial alternatives (LRAs) for each operable unit. The CERCLA/NEPA integrated documents prepared subsequent to Operable Unit 4 will be derived from or be fully encompassed by the impact analysis presented in the Operable Unit 4 FS/PP-DEIS. If the LRAs for any of the operable units change, additional NEPA review will be performed and documented as appropriate to evaluate the impacts to human health and the environment. This additional analysis will be presented in the integrated CERCLA/NEPA documents for the remaining operable units where appropriate.

In accordance with both CERCLA and NEPA processes, these documents are made available to the public for comment. Public involvement is an important factor in the decision-making process for site remediation. Public comments will be considered in the selection of remedy for each operable unit, which will be presented in a ROD. Applying the integrated approach for CERCLA and NEPA, DOE plans to prepare and issue a single ROD to be signed by both DOE and EPA. The contents of the documents prepared for the remedial actions at the FEMP are not intended to represent a statement on the legal applicability of NEPA to remedial actions conducted under CERCLA.

Commentor Q provided twenty comments on the Proposed Plan. Some of these comments were addressed in the issue discussions presented in Section C.4.0 of this document. The remaining comments were basically requests for clarification of the technical content of the document and did not have significant impact on the document. The comments are distinguished by the letter and the response to the comments immediately follows.

(a,l) Comment: The responses to Comments "a" and "l" were similar in content and, therefore, have been combined. The comments are related to the differences in cost and implementation between alternatives with the same treatment technologies. The commentor stated that "...there are variances in the capital cost for the same treatment alternatives with the only difference being on-site versus off-site disposal. What is the source of this variance?" Furthermore the commentor stated: "...comparison of remedial alternatives, state differences in implementing identical treatments with different disposal options. Is this difference related to transportation issues for off-site rather than on-site? Please explain these differences. Also Subunit C lists no treatment for all alternatives; please demonstrate why no treatment is acceptable."

Response: The variances of the capital costs are primarily due to the difference in the disposal methods. The on-site disposal alternative includes the capital costs associated with the construction of a disposal vault. The off-site alternative has no capital cost associated with the construction of the disposal vault, but does include capital costs associated with the transportation and disposal of the waste at the off-site disposal facility. The implementation of these alternatives is also affected by the same factors.

No treatment response actions were utilized in the development of alternatives for Subunit C waste (i.e., soils and debris). This decision is consistent with the FEMP site-wide waste management strategy. This strategy is designed to coordinate the disposal of similar waste between operable units. From a site-wide perspective, the estimated quantity of soils and debris requiring management by Operable Unit 4 in comparison with the total estimated quantity of soils and debris to be managed by Operable Units 5 and 3 respectively, is quite small. Therefore, as opposed to Operable Unit 4 developing its own treatments methods for soils and debris, the disposition of these wastes will be integrated with the disposal methods and any treatment methods developed by Operable Units 3 and 5.

(b,d) Comment: The responses to Comments "b" and "d" were similar in content and, therefore, have been combined. These comments are related to post-remediation monitoring and site reviews for alternatives which include on-property disposal. The commentor asked: "...EPA would review on-property disposal every five years in accordance with CERCLA requirements. Who and how often would a review be performed in other years?" and also asked: "Post remediation O&M cost are estimated over a thirty year period. What about the remaining years for which this material will require monitoring?"

Response: The EPA requires a five-year review under the CERCLA as follows "...if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action." The on-property disposal alternatives for Operable Unit 4 include the five-year reviews. The on-property disposal facility for the Operable Unit 4 materials would be designed to preclude the need for active operation, maintenance, and

monitoring. However, during the active operational phase of the overall FEMP site remedial activities (approximately 30 years), the disposal facility will be monitored. It is anticipated that such operations, maintenance, and monitoring and associated costs would not be warranted (i.e., no water infiltration will have been observed) beyond that timeframe. Therefore, after remediation of the entire site has been completed, active operation, maintenance, and monitoring of the disposal facility would cease and only the five-year reviews will be performed.

(c) Comment: "There is no mention of retri[e]vability of the materials which would be disposed of in the on-site disposal vault. Is this option being considered, and if not, why?"

Response: The on-property disposal facility is designed with an intruder barrier and permanent markings to inhibit purposeful or inadvertent human intrusion of the facility's engineered protective features and to eliminate water infiltration. This design is utilized to provide permanent disposal of the wastes and does not include a means to readily retrieve the waste. Designing a means to easily retrieve the waste would compromise the integrity of the cap and would present an easier access for intrusion into the disposal facility.

(e) Comment: "Alternative 2B and 4B have an identical post remediation cost, with Alternative 4B being untreated. Please explain how cost can be the same for treated versus untreated materials disposed in an on-site vault?"

Response: Post-remediation cost cover the costs associated with the monitoring and maintenance of the disposal facility. The monitoring and maintenance requirements and the disposal facilities for both alternatives are the same. Therefore, the post-remediation cost associated with these activities are also the same.

(f) Comment: "There is discussions of interim storage. What is the estimated time for this interim storage?"

Response: The use of interim storage is identified for Subunit C alternatives waste only. Interim storage would be utilized only if the waste could not immediately be managed by the remedial alternatives selected for Operable Units 3 and 5. If interim storage is required, the duration of the storage would be contingent upon the schedule for

implementation of the preferred remedy identified in the Operable Units 3 and 5 ROD. The interim storage would not exceed the date for final remediation of the FEMP site which is currently estimated to be completed in 30 years.

(g) Comment: "Alternative 2C states that the contaminated materials would be placed in bulk (without packaging) into the on-site disposal vault. Please expand on why this material would not be packaged and state the advantages/disadvantages of packaged versus unpackaged."

Response: The soils and debris considered for disposal into the disposal vault would be contaminated with relatively low levels of contamination. The disposal facility for the contaminated material from Alternative 2C would be designed to be protective of the environment without the use of packaging. The use of bulk disposal eliminates the unnecessary cost of the packaging and also reduces the cost of construction by requiring a much smaller disposal facility.

(h) Comment: "It is stated that non-porous materials will be released from the site as uncontaminated per DOE Order 5400.5. Will this material be checked for contamination prior to release or just assumed to be uncontaminated and release?"

Response: As per DOE Order 5400.5, any material which has been used or stored in a radiation area is to be considered potentially contaminated. Prior to free-release of any potentially contaminated material, the material will be surveyed to determine whether the removable or total surface contamination is within specific limits as established in DOE Order 5400.5, NRC Regulatory Guide 1.86, and FEMP site procedures. The establishment of these limits is based on the primary objective to prevent an effective dose equivalent to the public in excess of 100 mrem per year. This standard is considered protective of public health and the environment.

(i) Comment: "Will wastewater generated during remediation be treated for non-radioactive contaminates prior to discharge in the Great Miami River? To what extent will radioactive and non-radioactive elements be removed prior to discharge?"

Response: All waste water generated at the FEMP, including waste water generated during Operable Unit 4 remedial activities, is subject to compliance with the FEMP National Pollution Discharge Elimination System (NPDES) permit. The NPDES permit limits the amount of contaminants, both radioactive and non-radioactive, which may be discharged through waste water effluent into the environment. In compliance with the NPDES permit, all waste water generated from the remedial activities for Operable Unit 4 will be treated to comply with the FEMP NPDES permit standards.

(j) Comment: "A material variance in the cost associated with Subunit C exist between 3C.1 and 3C.2 with the only apparent difference being 3C.1 disposal at NTS and 3C.2 at Envirocare in Utah. Please explain this variance and if this is partially due to more stringent requirements at NTS, should these more stringent requirements also be required at a commercial facility? Which requirements is more protective? It is also stated that an exemption from DOE Order 5820.2A (this is transposed as 5280.2A in document, page 56) is needed to dispose at a commercial facility; has this been granted?"

Response: The variance in the cost between Alternative 3C.1 and 3C.2 is primarily due to the elimination of packaging for the Permitted Commercial Disposal Facility as opposed to the use of packaging for the NTS. The elimination of the purchase cost of the packaging and the reduction of required transportation significantly decreases the costs of Alternative 3C.2 as opposed to 3C.1. The NTS currently does not accept waste in bulk form (i.e., unpackaged railcar) and therefore, the disposal alternative for the NTS does not recognize the same cost savings. Because both disposal facilities operate within their permits, and the environments in which they are located are similar, both disposal facilities are considered equally protective.

An exemption from DOE Order 5820.2A, which excludes the use of commercial disposal facilities for DOE waste, has not been specifically pursued for the disposal of Operable Unit 4 remedial wastes. The evaluation of the alternatives in the FS/PP-DEIS, indicated that other alternatives were preferred over the alternatives which included the Permitted Commercial Disposal Facility. Therefore, a request to grant an exemption from this DOE Order was not required. However, exemptions from this order have been granted and commercial disposal facilities have been utilized for other FEMP wastes.

(k) Comment: "Will notification of these shipments be given to the areas involved in the transportation routes for both rail and truck, and what precautions for protection will be employed?"

Response: Response to this comment is provided in Issue 5 on page C-4-20.

(m) Comment: "Is there a potential for failure of the vitrified material has the radionuclides trap[p]ed continue to decay, and if so, what is that risk?"

Response: The weathering behavior of volcanic glass (a natural analog to the Operable Unit 4 vitrified product) can provide some measure of the long-term stability and durability of the vitrified product. Only very thin weathering rinds develop on volcanic glass over a period of several million years. The slowness in the overall degradation of a glass grain suggests that the diffusion coefficient or leachability index would remain relatively unchanged over time. Data on the long-term stability of vitrified material are not available, and the life expectancy of the vitrified product is difficult to estimate from short-term leach rates. However, on the basis of the longevity of volcanic glass and diffusion calculations, the vitrified product would be expected to withstand direct environmental exposure for thousands of years. Furthermore, past studies have shown that the decay of radioactive materials do not affect the durability of the vitrified product.

(n) Comment: "It states that the capital cost associated with the on-site disposal facility has been removed. Where is (will) this cost be accounted for?"

Response: This comment refers to a sentence in the Proposed Plan (page 67, line 6) which was erroneous and scheduled to be deleted from the text. However, this deletion was inadvertently overlooked and the sentence was left in the text. The capitol cost of the on-site disposal facility is included in the total estimated cost of the preferred remedy. This cost is identified in Table 9-1 of this document.

(o) Comment: "Line 14, page 67 reads ". . . results in significant a reduction in the volume...," this would read better if the "a", preceded significant/rather than follow."

Response: This comment is duly noted. However, it has no significant impact on the document.

(p) Comment: "Please define the following statement (line 16, page 67) utilize permanent solutions to the maximum extent practical. What viable permanent solutions presently exist?"

Response: The intent of the statement "... permanent solutions to the maximum extent practical..." alludes to the fact that, based on available technology, this remedy provides the most feasible and permanent solution for the remediation of Operable Unit 4. A potential remedial alternative's ability to achieve long term permanence is one of nine criteria used to evaluate a remedy in terms of the risk remaining at the site after response objectives have been met. The primary focus of this evaluation is the extent and effectiveness of the controls that may be required to manage the risk posed by treatment wastes.

As discussed in the Operable Unit 4 Feasibility Study and Proposed Plan, the preferred remedy (removal, vitrification of the waste and offsite disposal at the Nevada Test Site) would be the most effective based on treatability studies conducted on the silo residues which demonstrated that vitrification would be effective in reducing radon emanation, radionuclide leachability, and significantly reducing the residue volume by approximately 50 percent. Off-site disposal at the NTS would provide a greater certainty than on-property disposal over the long term that the treated residues would not affect human health and the environment.

(q) Comment: "Basis for stating long-term environmental impacts of permanent disposal at NTS are minor and no long-term impacts of biota expected from disposal activities at NTS. It is stated that to reduce U-238 to essentially background is not feasible; it also states that it is assumed that the federal government retain ownership of the FEMP site to consider clean-up protective. While I do not have a problem with these statements, it does bother me that no formal statement has been made publicly concerning this. These two statements present future land use constraints which must be addressed. Why hasn't the DOE adopted a formal position concerning this issue and communicated this to both the Fernald Citizens Task Force and the community?"

Response: The DOE and the EPA recognize that future land use for the FEMP site is currently under consideration by the Fernald Citizens Task Force and is actively involved in and supports this effort. However, due to the stipulations of the Amended Consent Agreement, Operable Unit 4 is required to put forth a remedy for cleanup of soils within the operable unit boundary prior to completion of the Fernald Citizens Task Force effort.

As discussed in the Proposed Plan, Section 5.4.1, the preferred remedy for Operable Unit 4 requires cleanup of contaminated soils to the proposed remediation levels presented in Table 5-2. In addition to this, it is indicated that these cleanup levels for soils may be adjusted to lower values, if necessary, to insure protectiveness of human health and the environment. The level of protectiveness required by the soils will be dictated by the final land use selected for the entire FEMP site, including that for Operable Unit 4, by the Citizens Task Force, and the ongoing feasibility study modelling efforts being performed by Operable Unit 5. Factoring in the Fernald Citizens Task Force recommendations, Operable Unit 5 will evaluate and determine the final cleanup levels required for soils on a site-wide basis. Accordingly, the Operable Unit 4 FS/PP-DEIS recommends that the decision for final disposition of the contaminated soils be put in abeyance until the Record of Decision for Operable Unit 5 is issued, at which time the final soils cleanup levels will be established.

(r) Comment: "Line 13, page 76 reads"...would bot be...", should that read "...would not be..."?

Response: This comment is duly noted. However, it has no significant impact on the document.

(s) Comment: "It states the on-site, above-grade disposal facility would be designed for a 1000 year life with no active maintenance. What is the half-lives or duration for which the radionuclide and chemical contaminants are a threat to the environment; do they exceed 1000 years? Also explain why no active maintenance is assumed for 1000 years?

Response: The half-lives of the radioactive constituents in the Operable Unit 4 waste range from 3 to 4 days for Radon-222 to over 1.4×10^{10} years for Thorium-232 well in excess of 1000 years.

On-site disposal of contaminated soils and debris in an above-grade disposal facility was evaluated in the Operable Unit 4 Feasibility Study (FS) and also presented in the Proposed Plan (PP). For purposes of the FS/PP, this disposal facility would be designed for a life of 1000 years. This vault would be designed to preclude the need for long-term active maintenance for the duration of its design life of 1000 years. An assessment of the risks to human health, presented in Appendix D of the Operable Unit 4 FS, indicates that for the extended trespasser the residual risk from soil remaining in Operable Unit 4 in addition to risks posed by disposal of contaminated soils and debris in this facility would be well within the required risk range of 1×10^{-4} to 1×10^{-6}. However, it should be noted that the final disposition of soil and debris will be determined by the Records of Decision (RODs) for Operable Units 3 and 5. In accordance with the requirements of CERCLA, the Operable Units 3 and 5 RODs will define the appropriate level of protectiveness required for final disposition of Operable Unit 4 debris and contaminated soil respectively.

(t) Comment: "Has an exemption to the Ohio solid waste facility requirement been requested, and if not when will such a request be made? Also line 28, page 79, would read better if "the" or "a" were added to precede disposal. (For disposal facility on the FEMP site.)

Response: Operable Unit 4 will not be creating a new solid waste disposal unit for management of Operable Unit 4 remediation waste as part of the Operable Unit 4 preferred remedy. Rather, the decision to treat/dispose of Operable Unit 4 wastes on site will be part of the Operable Units 3 and 5 RODs, since the disposition of Operable Unit 4 demolition debris and soils for remediation will be deferred to those respective operable units. Therefore, compliance with the Ohio siting requirement is not germane to the Operable Unit 4 FS/PP-DEIS.

Discussions with the EPA and OEPA have taken place regarding exemptions and possible waiver to this requirement. At this time, the issue of technical exemption under Ohio statute, versus ARAR waiver by EPA has not been resolved.

The editorial comment on the text contained in Line 28, Page 79, has been noted. However, it does not have any impact on the document.

ATTACHMENT C.I

WRITTEN AND ORAL COMMENTS

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C.I WRITTEN AND ORAL COMMENTS

C.I.1 INTRODUCTION

The written comments received on the Operable Unit 4 FS/PP-DEIS during the March 7, 1994 - June 19, 1994 comment period and the verbal comments received during the March 21, 1994 public meeting at The Plantation in Harrison, Ohio are contained in this appendix. In addition, all late comments received as of July 5, 1994 are included in this appendix. Each specific comment letter, oral statement, and submitted attachments are referenced by an alphabetic identifier as noted in Table C.I.1-1. These comments are a formal part of the Administrative Record for this action.

TABLE C.I.1-1

FORMAL ORAL AND WRITTEN COMMENTS RECEIVED

ITEM	COMMENTOR	PAGE NUMBER
	FORMAL ORAL COMMENTS	
A	Norma Nungester, resident and FRESH member	C-I-8
B	Vicky Dastillung, resident and FRESH Vice President	C-I-19
C	Lou Bogar, resident, Hamilton, Ohio	C-I-20
D	Edwa Yocum, resident and FRESH Secretary	C-I-28
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E	Maud Naroll, State of Nevada, State Clearinghouse (April 18, 1994)	C-I-31
F	Jack and Roberta Warndorf, resident, Okeana, Ohio	C-I-34
G	Edwa Yocum, resident and FRESH Secretary, Harrison, Ohio	C-I-35
H	J. E. Walther, resident, Hamilton, Ohio	C-I-36
I	Martha J. Raymond, Department Head, Technical Review Services, Ohio Historic Preservation Office	C-I-38
J	Lisa Crawford, resident and FRESH President	C-I-40
K	Lawrence L. Stebbins, resident, Hamilton, Ohio	C-I-41
L	Maud Naroll, State of Nevada, State Clearinghouse (April 5, 1994)	C-I-43
M	James K. O'Steen, Director, Office of Hazardous Materials Technology, U.S. Department of Transportation	C-I-45
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O	Nevada Test Site Citizens Advisory Board	C-I-48
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P-2	Shellie Michael, [redacted]	C-I-49
P-3	Lynn Rohl, [redacted]	C-I-50
P-4	Ted Mucha, [redacted]	C-I-50
P-5	Mark Michael, [redacted]	C-I-51
P-6	Kathleen Guise, [redacted]	C-I-51
P-7	Jo Anne Moran, [redacted]	C-I-52
P-8	Catherine A. McLaughlin, [redacted]	C-I-52
P-9	Nancy Gott, [redacted]	C-I-53
P-10	Rebecca Webber, [redacted]	C-I-53
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P-12	Jim Macklin, [redacted]	C-I-54
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P-15	Troy Weatherby, [redacted]	C-I-56
P-16	Abraham Hartman, [redacted]	C-I-56
P-17	Vicki Cassman, [redacted]	C-I-57
P-18	Art Goldberg, [redacted]	C-I-57
P-19	Jillian Beth Wright, [redacted]	C-I-58
P-20	Linda Strange, [redacted]	C-I-58
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P-22	Mindy Brummett, [redacted]	C-I-59
P-23	LaLori Rossi, [redacted]	C-I-60
P-24	Taryn Cunningham, [redacted]	C-I-60
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P-28	Patricia Bishop, [redacted]	C-I-62
P-29	Daniel J. Fedor, [redacted]	C-I-63
P-30	Michael Carrigan, [redacted]	C-I-63
P-31	Renee Halm, [redacted]	C-I-64
P-32	Tubiola Lopez, [redacted]	C-I-64
P-33	Doreina Saenz, [redacted]	C-I-65
P-34	Jerome Brenberg, [redacted]	C-I-65
P-35	Ravon Rodriguez, [redacted]	C-I-66
P-36	Carmen E. Rodriguez, [redacted]	C-I-66
P-37	Kimba Rutledge, [redacted]	C-I-67
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P-40	Michelle Lynn Berry, [redacted]	C-I-68
P-41	L. Jean McCoy, [redacted]	C-I-69
P-42	Tammy Smith, [redacted]	C-I-69
P-43	Henry B. (?), [redacted] (name unreadable)	C-I-70
P-44	Stan Greene, [redacted]	C-I-70
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P-54	Ron Schaefer, [redacted]	C-I-75
P-55	Victoria Pinkston, [redacted]	C-I-76
P-56	Kathy Granousky, [redacted]	C-I-76
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P-58	Michael LoCorriere, [redacted]	C-I-77
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P-60	Breck Nester, [redacted]	C-I-78
P-61	Dana Robbins, [redacted]	C-I-79
P-62	Huy Phan, [redacted]	C-I-79
P-63	Sandra Travez, [redacted]	C-I-80
P-64	Steve Zahn, [redacted]	C-I-80
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P-67	Shelli McKenney, [redacted] (no zipcode provided)	C-I-82
P-68	Carmen Davis, [redacted]	C-I-82
P-69	Nasreen Bakhtary, [redacted]	C-I-83
P-70	Maribel McAdory, [redacted]	C-I-83
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P-72	Chad Hunt, [redacted]	C-I-84
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P-75	James Min, [redacted]	C-I-86
P-76	David Johnson, [redacted]	C-I-86
P-77	Laura Yada, [redacted]	C-I-87
P-78	Shannon Conners, [redacted]	C-I-87
P-78	Sherri Caron, [redacted]	C-I-88
P-80	Stevi Carroll, [redacted]	C-I-88
P-81	Margaret Bean, [redacted]	C-I-89

P-82	Patrice L. Harvey, [redacted]	C-I-89
P-83	Robin Wayne, [redacted]	C-I-90
P-84	George A Bean, [redacted]	C-I-90
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P-87	Selma and Chuck Umnuss, [redacted]	C-I-92
P-88	Rob Marchant, [redacted]	C-I-92
P-89	Jeff Van Ee, [redacted]	C-I-93
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P-91	Jeffrey M. Steinbeck, [redacted]	C-I-94
P-92	Catherine Tillman, [redacted]	C-I-94
P-93	Madelaine Dayton, [redacted]	C-I-95
P-94	Lori Johnson, [redacted]	C-I-95
P-95	Sharlyn Anderson, [redacted]	C-I-96
P-96	Kathleen Womack, [redacted]	C-I-96
P-97	S. Gomez, [redacted]	C-I-97
P-98	Melony Haynes, [redacted]	C-I-97
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P-101	Grace K. Tao, [redacted]	C-I-99
P-102	Julia L. Winkler, [redacted]	C-I-99
P-103	John Heormey, [redacted] (address provided incomplete and last name hard to read)	C-I-100
P-104	James Holmes, [redacted]	C-I-100
P-105	Merlyn Huguet, [redacted]	C-I-101
P-106	Barbara Roth, [redacted]	C-I-101
P-107	John Wells, [redacted]	C-I-102
P-108	Al Roth, [redacted]	C-I-102
P-109	Louis Lavietes, [redacted]	C-I-103
P-110	Jeff Cooley, [redacted]	C-I-103
P-111	James P. Foster, [redacted]	C-I-104
P-112	Giovanni Duley, [redacted]	C-I-104
P-113	Trisa Higgins, [redacted]	C-I-105
P-114	Maggie Breki, [redacted] (last name hard to read)	C-I-105

P-115	Joel Delmendo, [redacted] (zip code hard to read)	C-I-106
P-116	Katherine Garder, [redacted]	C-I-106
P-117	Jason Benatz, [redacted]	C-I-107
P-118	Ebony Samerkand, [redacted]	C-I-107
P-119	Stacy Smith, [redacted]	C-I-108
P-120	Sanena Shelling, [redacted]	C-I-108
P-121	Gerald F. Cuetkovic, [redacted]	C-I-109
P-122	Judy Cuetkovic, [redacted]	C-I-109
P-123	Michael Cuetkovic, [redacted]	C-I-110
P-124	Mrs. G. Michakel, [redacted]	C-I-110
P-125	Willene De Langis, [redacted]	C-I-111
P-126	Donald A. De Langis, [redacted]	C-I-111
P-127	Robert Tonelli, [redacted]	C-I-112
P-128	Ruth Lindahl, [redacted]	C-I-112
P-129	Melody Derrick, [redacted]	C-I-113
P-130	Doug Jablin, [redacted]	C-I-113
P-131	Anthony Bondi, [redacted] (no zipcode provided)	C-I-114
P-132	T. Jones, [redacted]	C-I-114
P-133	John A. Loeffler, [redacted]	C-I-115
P-134	Christopher Mercer, [redacted]	C-I-115
P-135	Kurt Buchida, [redacted]	C-I-116
P-136	Liz Marion, [redacted]	C-I-116
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P-138	Brenda Weksler, [redacted]	C-I-117
P-139	Cheryl Frossa, [redacted]	C-I-118
P-140	Harriet R. Gagliano, [redacted]	C-I-118
P-141	Kathy Poma, [redacted]	C-I-119
P-142	Stacey Hallenberg, [redacted]	C-I-119
P-143	Kelli Koerwitz, [redacted]	C-I-120
P-144	Trish Taylor, [redacted]	C-I-120
P-145	Heather Davis, [redacted]	C-I-121
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P-147	Richard Lewnau, [redacted]	C-I-122
P-148	Susan Thornton, [redacted]	C-I-122
P-149	Lee Dazey, [redacted]	C-I-123

P-150	Pete Mastin, [redacted]	C-I-123
P-151	Tracie K. Lindeman, [redacted]	C-I-124
P-152	David L. Platerio/Tosa-wi-e, [redacted]	C-I-124
P-153	Jo Ana Garrett, [redacted]	C-I-125
P-154	Margaret Norman, [redacted]	C-I-125
P-155	Judy Treichel, [redacted]	C-I-126
P-156	Lorry C. Johns, [redacted]	C-I-126
P-157	Steve Frishman, [redacted]	C-I-127
P-158	William Rosse Sr., [redacted]	C-I-127
P-159	Corbin Hanuf (?), [redacted] (name was hard to read)	C-I-128
P-160	Shawn Black, [redacted] (no zipcode provided)	C-I-128
P-161	Lawrence Skinner, [redacted]	C-I-129
P-162	Mary L. Johns, [redacted]	C-I-129
P-163	Bob Fulkerson, [redacted]	C-I-130
P-164	Carla Baker Wallace, [redacted]	C-I-130
P-165	Louise (?), [redacted] (name was hard to read)	C-I-131
P-166	Margaret (?), [redacted]	C-I-131
P-167	(?), 1526 Darryl Avenue, Las Vegas, NV 89123 (name unreadable)	C-I-132
P-168	(?), 1381 E. University Avenue (address incomplete and name unreadable)	C-I-132
P-169	(?), 4801 Spencer #56, Las Vegas, NV 89119 (name unreadable)	C-I-133
P-170	(?), 1431 E. Charleston, Las Vegas, NV 89104 (name unreadable)	C-I-133
P-171	Jamie B. (?), [redacted] (name unreadable)	C-I-134
P-172	(name and address unreadable)	C-I-134
P-173	(name and address unreadable)	C-I-135
P-174	(left blank)	C-I-135
P-175[a]	Geoff Holton, [redacted]	C-I-136
P-176[a]	Richard Glasman, [redacted]	C-I-136
P-177[a]	Kathleen Glasman, [redacted]	C-I-137
Q	Pam Dunn, Harrison, OH	C-I-138

[a]Postcards were received on July 5, 1994.

Commentor A

Norma Nungester: (Questions & formal oral, March 21, 1994)

a few more of us from Ohio EPA. We're hiring some more staff, so hopefully that will be a little more proactive to your needs and help you out as far as information you might need. So like I said, feel free to contact me outside of this at the office or wherever. Thanks.

MR. STEGNER: Thank you. What we'll do now is, we'll have an informal question and answer session. It might be best if you use a microphone back there. If you don't feel comfortable, just stand up and shout it. We have a recorder here tonight. Please just state your name and the question, and we'll let the panel pick it up. So whoever wants to be first, feel free.

MS. NUNGESTER: I'm Norma Nungester. I'm a Fernald resident, and a member of Fresh. I have a question of Dennis Nixon. He made the statement that I don't agree with, and I wondered if he could clarify for me. He said that when you vitrify waste, it reduces radon emanation to that of building materials. To my understanding, when you vitrify radionuclides, that they still are very, very hot.

MR. NIXON: That's correct. The

Commentor A (Cont.)

concentrate, due that reduction, is the radon generation from the treated waste itself that is significantly reduce. The radon is actually held up, and the surface area is significantly reduced. Did you get every other word?

You're exactly right, that due to that fact that there's a significant volume reduction, you actually concentrate the radionuclides, so you have a higher concentration of say uranium in a set volume, but the radon itself is much less. The generation or the emanation from the vitrified waste is much less than in its natural form.

MS. NUNGESTER: Okay, thank you.

MS. YOCUM: Edwa Yocum, Fresh member and a resident of the Fernald area. I was asking a question, this concerns Subunit C2 on your preferred alternative demolition removal on property disposal. When you were talking about the OU4 NEPA compliance with the substantive cumulative impact up to 250 acres of surface disturbance, does that mean that would be what would be part of where the waste will be put?

MR. WOODS: Yeah. Again, we looked

Commentor A (Cont.)

at an LRA and assumed on-site disposal.

MS. YOCUM: Okay.

MR. WOODS: And that acreage would incur areas where waste would be disposed of.

MS. YOCUM: Okay. Then, you also are talking about the loss of 220 acres of habitat. Is that included in the 250 acres?

MR. WOODS: Yeah. That 250 would be a total that would occur during the short term, in other words, during excavation activities. Once remediation is completed, we would look at approximately 220 acres being permanently committed, so yes, that's correct.

MS. YOCUM: Okay, all right, that's what I wanted to know.

MS. NUNGESTER: Can you expand on that permanently committed? I missed something. Permanently committed for what, waste disposal facility?

MR. WOODS: Yeah, correct.

MS. NUNGESTER: Not for the waste itself but for the --

MR. WOODS: For the facilities that would house the waste.

Commentor A (Cont.)

MS. NUNGESTER: That's the inground facility, the upgrade vault, as you so say?

MR. WOODS: Correct.

MS. NUNGESTER: Now can you give me an explanation of what is in an upgrade vault?

MR. WOODS: The alternatives that we used for the evaluation utilized the vault concept, which would be a portion of the waste being disposed of below grade, and, you know, basically a portion above. There would be facilities that the waste could be retrieved from, and what we used was the calculation of the area.

MS. NUNGESTER: Disposal means permanent?

MR. WOODS: Yes.

MS. NUNGESTER: But now you're talking interim?

MR. WOODS: Well, what I'm saying is the design of the facility wasn't as important as the area that the facility could include. Designs are going to be finalized as we go through the remedial process.

MS. NUNGESTER: Well, this is another thing, when you go through the RA and

Commentor A (Cont.)

that's where the final decision and designs are actually made --

MR. WOODS: Correct.

MS. NUNGESTER: -- how can you come out with a Record of Decision before you actually know what the vault is going to look like and if it is really going to do the job?

MR. WOODS: No, you cannot reach a Record of Decision until, you know, we've gone through the full analysis of what the vault will be designed like and how it will work. What we did is utilize the alternatives that were available at that time for the purpose of the evaluation, which is really the best we can do. We can't foresee.

MS. NUNGESTER: Okay. As of today?

MR. WOODS: That's correct, that's correct. As we go through the various operable units and decisions are made as to the final design of the vaults and changes are made to the area, that may be required. We'll update the analysis and provide it in the future integrated documents for the other operable units.

MS. NUNGESTER: Okay. So then our decisions of the -- So your alternatives for the

Commentor A (Cont.)

Unit 4 can change by the time after arriving at a decision?

MR. NIXON: We were specific with the subunit wastes the Record of Decision. For Operable Unit 4, specifically the Record of Decision, the proposed plan in the future Record of Decision will be that the Subunit C waste is -- you remember us talking about being held in abeyance or delayed operable units, the Subunit C waste will be handled in accordance with the Records of Decisions for Operable Unit 3 and Operable Unit 5, respectively. Okay.

So as far as our Record of Decision, essentially we carry it through the removal of the soil, interim storage of that soil in accordance with Removal Action 17, which is the management of those soils, demolition of the structures and storage of that debris in interim until OU3 comes up with a final decision for the debris.

OU5 will have a final decision on how the soils will be treated, and those all integrate very well. When we start that remediation process, when we have those soils excavated and stored, at that time Operable Unit 3 and 5 Records Of

Commentor A (Cont.)

1 Decisions will be in place, and we'll have very
2 good integration.
3 At that point we'll be able to
4 deliver -- Theoretically, we'll be able to take the
5 soils out and take those to a Operable Unit 5
6 facility for treatment. They'll be disposed of in
7 accordance with their Record of Decision, and that
8 may or may not be on-site disposal.
9 MS. NUNGESTER: Okay. You're
10 saying, you're taking the debris, the structure,
11 the equipment, the surface soil, you're putting
12 them all in the underground vaults?
13 MR. NIXON: Operable Unit 4 is
14 delaying that decision. That's going to be
15 actually be stored in an interim fashion --
16 MS. NUNGESTER: Okay
17 MR. NIXON: -- until OU5 and OU3
18 have records of decision. Now, their Record of
19 Decision may very well be that we will treat soil
20 by washing it and disposing of that on site.
21 MS. NUNGESTER: Right, but it
22 doesn't say that, that it's going to be interim
23 until Unit 5 is considered.
24 MR. NIXON: The proposed plan does

Commentor A (Cont.)

clearly state, as well as the Record of Decision will clearly state those, that integration.

MS. NUNGESTER: It does?

MR. NIXON: Yes, it does.

MS. NUNGESTER: Okay. Well, I know on the proposed plan booklet on page 43 talks about that specific issue.

MR. NIXON: Right.

MS. NUNGESTER: If anybody has that book, and they want to look at it, they can, but I don't believe it says -- It says something about that it will be combined with 5, Unit 5, but it does not say that would be interim disposal until 5.

MR. NIXON: Disposal, it is interim storage.

MS. NUNGESTER: Or storage, but they use "disposal" as the word throughout the whole --

MR. NIXON: In the proposed plan, the proposed plan has, for Subunit C waste, it has a selected or preferred alternative which is on-site disposal identified, and the reason that's in there is because on-site and off-site disposal was so close we had to select the one for the sake

Commentor A (Cont.)

evaluating the full alternative from start to finish. Okay.

Later in the document it talks about the integration effort that will occur with OU3 and OU5, and puts -- holds that decision in abeyance for final disposal of those debris and soil until OU3 and OU5 have their Records of Decision.

MS. ALLEN: The confusion could be the fact sheet on page 12 states that the soil debris will be disposed of on site.

MR. NIXON: There is an ~~area~~ error in the fact sheet on page 12, the last paragraph I believe.

MS. NUNGESTER: Then, this shows more of a reason why the public should have a comment period before -- after -- in between the ROD's and even during the remedial, the RA, then, to understand it. Thank you.

MR. STEGNER: Other questions?

UNIDENTIFIED SPEAKER: I have one, and it goes to back to when you were talking about, Randi about, the community and stake holders or public or whatever we're called these days, plays a part in this process. I'll echo what Edwa just

Commentor A (Cont.)

MR. STEGNER: Is Lee Bolver still here?

UNIDENTIFIED SPEAKER: He left.

MR. STEGNER: Bob, do you have something to say?

UNIDENTIFIED SPEAKER: I'll turn it in later.

MR. STEGNER: Bob Gessel -- Godsel, I'm sorry? Going very well so far. Tom Wagner, Citizens Task Force? Okay. We have an open mike, folks, if anyone wants to make a comment.

MS. NUNGESTER: You want my address, too?

MR. STEGNER: Not necessary, as long as we have your name.

MS. NUNGESTER: Norma Nungester, Fernald resident and Fresh group. I have several comments. First of all, I want to cover again what was stated in the question and answer period. I think between the draft ROD and the final ROD we need a public comment official time, and you need to formalize this. On down here below you say the public involvement, public involvement, that means nothing to us. You need to formalize that.

Commentor A (Cont.)

And you also need more details on your RD/RA work plan. We want to know more details on transportation. We want to be notified when you're transporting this stuff and talk about the materials that are actually in the K-65 when they're vitrified and when you start to ship them out to Nevada.

Also this stuff that stays on site, I'd like to know how they will be monitored, and for how long of a period they're going to be monitored. I guess I just want to express that we want a guarantee that real-time monitoring will be used.

Also a suggestion, how about covering those silos when you start working on them? I think this is one of the most important things you could do for the community. I think that's about it. I'm trying to read my notes that are chicken scratch here.

Oh, one more thing. I'd like to be diligent on referring large quantities of waste from other sites. We don't want anything brought in here from other plants to vitrify with our material or to be put under the storage areas.

Commentor B

Vicky Dastillung: (Formal oral, documented by Johnny Reising, DOE, March 4,1994)

What capabilities do we have to do "real-time monitoring?"

Who has the authority to "shut down" the operation if the "monitoring" levels are high?

FRESH wants more public input on the RD/RA process (real "nitty gritty" of how things will be done).

How has NEPA been addressed? Where and how do we bring this out in the document (Proposed Plan)?

Vicky does not believe the last bullet on page 12 of the Proposed Plan fact sheet is correct. (Her point is that we cannot pre-suppose that on-property disposal will be the result; it must be evaluated with Operable Units 3 and 5.)

Commentor C

Lou Bogar: (Formal oral, March 21, 1994)

unit, then.

UNIDENTIFIED SPEAKER: Okay. I'll discuss it with you.

UNIDENTIFIED SPEAKER: I'm Lou Bogart. I'm a resident of Ross. I have some technical questions. In looking at data tables for Operable Unit 4, one of the things that strikes me is that you always report uranium 254/236. Does that mean there's U-236 there? If so, I don't believe it because U-236 doesn't exist in nature.

Secondly, the ratio of U-234 to U-238 in many cases look very odd, odd in the sense that in nature and in this ore and in the raffinate the 234, 238 ratio ought to be very close to unit. For example, when in the table that you've given a handout, the Silo 1 number looks pretty wrong. The Silo 2 number is more acceptable.

And the reason I think that's important is because you're going to focus the clean-up levels on U-238. I don't quite know how you're going to do that without doing some very sophisticated isotopic analysis. But in any case those numbers don't look right, and you see that in many, many tables.

Commentor C (Cont.)

On the inorganic chemicals, is there somewhere in all the OU4 documentation a list of all of the inorganic constituents? For example, I note that in most of the recent documents you don't list gold. Now you can. There is about, about four times as much gold in this material as silver.

Just as a side light for my own amusement, I calculated this afternoon. There's about $2.3 million worth of gold in those two silos, and that may not be important, but what other elements are not reported which may have some impact on the processing of the material by vitrification?

For example, there should be a fair burden of rare earths, the whole lamprophyllite series should be in these ores, and I don't see any of that being reported. Anybody have an answer for that one?

MR. NIXON: Well, you had about five questions, so I'll start in the beginning. One was 235 to 236, those are analyzed and reported the same. You are correct. We don't feel there is any uranium-236 in the residues. It's a good point.

Commentor C (Cont.)

Whether the ratio between U-234 and U-238 is correct, I do not have the answer to that, but we can discuss that and get back with you within the next couple of days.

MR. BOGART: How about a complete list of --

MR. NIXON: Complete list, the remedial investigation did do a complete list of the organics, inorganics. Whether gold was evaluated, I'm not sure. I'm looking at my team.

MR. BOGART: You were supplied gold by TLCP.

MR. NIXON: But we also do a full HSL, Hazardous Substance List, which gold would not be part of. So I'm not sure whether gold was particularly reported in the RI.

MR. BOGART: How about rare earths?

MR. NIXON: I couldn't answer that, either. We've got a copy of the remedial investigation here. Whether these fellows can quickly find answers to those questions or again we can get back with you.

Amy Engler I know is sitting out here somewhere taking very good notes, and we'll respond

Commentor C (Cont.)

to any of the questions which we don't have answers to tonight. We've committed to have answers back within 48 hours from this evening.

MR. BOGART: Well, I -- not so much for myself, but I think for the general public.

MR. NIXON: Any question that is raised even in the informal conference will be addressed in the responsiveness.

UNIDENTIFIED SPEAKER: Can we use that gold as collateral, can we use that? You said there's like $2 million worth of gold. Can we use that as collateral somehow?

MR. BOGART: It's going to cost 90 million bucks, maybe we can make it 88 million bucks. On page 21 or whatever this thing is called, the proposed plan, the spiral-bound thing, on page 12 about the middle of the page is an initiation of a discussion about risk.

And this is the area that concerns me the greatest, because although you point out that -- And I presume in all cases you're talking about fatal cancers because there are, of course, nonfatal cancers also. And that's not terribly clear in anything that's written.

Commentor C (Cont.)

1 Risk from exposure, the radiation
2 naturally occurring in the environment is about 1
3 in 100 primarily from radon; however, incremental
4 risks targeted by the upper end of EPA range means
5 if all persons within a population of 10,000, 1
6 person might get cancer from the exposure, and
7 cancer is expected from all other causes. I think
8 the whole business of risk assessment needs to be
9 put into some kind of context.
10 If you look at the latest NCRP
11 guidance, 115 and I guess 116, you can talk about
12 risk in terms of about 4 or 5 times 10 to the minus
13 10 and you do the hocus-pocus chemists like to do.
14 And that turns out the average resident from
15 natural radon, that risk becomes about one half
16 times 10 to the minus 2 and the range is 0 to 90
17 years old. And when 90 years old, I guess cancer
18 is the last thing I'm going to worry about.
19 But in any event, you make the
20 statement that the normal cancer risk is about 10
21 to the minus 2, and then you proceed to march down
22 the road of things that are 2 to 4 to 5 orders of
23 magnitude smaller, and it's never put in context.
24 And I think these documents need to discuss what

Commentor C (Cont.)

55

are we paying for, and that becomes a real problem. I don't know how many people feel comfortable with a 10 to the minus 6 risk, and I'm not real sure that that's a fatal cancer risk.

There is a problem with the methodology of using the health effect summary table slope factor thing as opposed to methodology that's used by people who do the beer studies and the NCRP studies because we're talking about vast orders of magnitude differences.

Now, the last comment I guess, I'd like to see something in these documents that more clearly explains why the CERCLA process has elected to use such abominably small risk estimates.

My last comment perhaps goes to EPA back in 1986, was a bad year for me, EPA published a notice of intent that they were going to promulgate residual regulation standards. It is now 1994, and, to the best of my knowledge, residual radiation level standards have not been promulgated.

In 1993 in a GAO report to Congress somebody in EPA said that in March of 1994 they were going to finally publish residual radiation

Commentor C (Cont.)

1 standards, not publish them, but they would take
2 them to OMB, which would be the fist step in
3 getting them published -- well, not the first step,
4 but a key step in getting them published in the
5 Federal Register.
6 March 1994 is now. My concern is, is
7 there one part of EPA working on residual radiation
8 level standards which may very well impact on the
9 clean-up levels that are being talked about here
10 for the clean-up of OU4?
11 MR. NIXON: Was there any response?
12 MR. SARCA: Yeah, I can answer that
13 from my understanding. One of the people involved
14 from the EPA perspective that works with me, he's
15 been commenting that he's involved in working on
16 some of those standards. Will they directly impact
17 this investigation, I don't know. I don't think
18 so. Hearing some of the numbers, I think they may
19 even be moving towards the side of being equally as
20 conservative, could be more conservative.
21 I don't know what the final will come
22 out with. When they do come out of the numbers,
23 they'll go to budget and move forward from there.
24 I do know that they are being worked on. One of

Commentor C (Cont.)

the people from my office is doing that right now. I don't know the exact state.

UNIDENTIFIED SPEAKER: If memory serves, I think that the gold Lou was talking about was contained in the pitch blend or whatever it was that came over from Africa that the United States bought and dumped into the K-65 silos. I heard or read that somewhere. You might want to check that out.

MR. NIXON: It is in the K-65 material, yes.

MR. BOGART: It all came from one mine.

UNIDENTIFIED SPEAKER: The reason they took that pitch was they wanted to strike gold?

MR. BOGART: No, radium and gold.

UNIDENTIFIED SPEAKER: As far as I'm concerned, it can be vitrified.

MR. BOGART: The question was, what else is there?

UNIDENTIFIED SPEAKER: Okay. I just have another question. When you said they were filling the silos, especially 1 and 2, did they

Commentor D

Edwa Yocum: (Formal oral, March 21, 1994)

concentrate, due that reduction, is the radon generation from the treated waste itself that is significantly reduce. The radon is actually held up, and the surface area is significantly reduced. Did you get every other word?

You're exactly right, that due to that fact that there's a significant volume reduction, you actually concentrate the radionuclides, so you have a higher concentration of say uranium in a set volume, but the radon itself is much less. The generation or the emanation from the vitrified waste is much less than in its natural form.

MS. NUNGESTER: Okay, thank you.

MS. YOCUM: Edwa Yocum, Fresh member and a resident of the Fernald area. I was asking a question, this concerns Subunit C2 on your preferred alternative demolition removal on property disposal. When you were talking about the OU4 NEPA compliance with the substantive cumulative impact up to 250 acres of surface disturbance, does that mean that would be what would be part of where the waste will be put?

MR. WOODS: Yeah. Again, we looked

Commentor D (Cont.)

at an LRA and assumed on-site disposal.

MS. YOCUM: Okay.

MR. WOODS: And that acreage would incur areas where waste would be disposed of.

MS. YOCUM: Okay. Then, you also are talking about the loss of 220 acres of habitat. Is that included in the 250 acres?

MR. WOODS: Yeah. That 250 would be a total that would occur during the short term, in other words, during excavation activities. Once remediation is completed, we would look at approximately 220 acres being permanently committed, so yes, that's correct.

MS. YOCUM: Okay, all right, that's what I wanted to know.

MS. NUNGESTER: Can you expand on that permanently committed? I missed something. Permanently committed for what, waste disposal facility?

MR. WOODS: Yeah, correct.

MS. NUNGESTER: Not for the waste itself but for the --

MR. WOODS: For the facilities that would house the waste.

Commentor D (Cont.)

1 Thank you.
2 MR. STEGNER: Thank you, Norma.
3 Edwa?
4 MS. YOCUM: Edwa Yocum. Some of
5 this will sound repetitious, but I'm asking for a
6 public comment period between the ROD's, the draft
7 and final; and we need an official public comment
8 period after the RA process. And also I'm asking
9 for a public comment period between the beginning
10 and completion of remediation. And then, too, when
11 dismantling the K-65 silos and also the 3 and 4,
12 I'd like to have a protective cover be used around
13 the silos.
14 And as far as I read in there, that
15 EPA would be reviewing the vault or the disposal
16 sites every five years, I'd like to know the
17 definition of "reviewing," and I would like
18 continuous monitoring and maintenance of on-site
19 disposal vaults or at least one time a year as long
20 as they're on site. And also, who would be paying
21 for this monitoring and maintenance? And this way
22 I recommend a trust fund for monitoring and
23 maintenance of the disposals.
24 MR. STEGNER: Thank you, Edwa. Open

5812

BOB MILLER
Governor

STATE OF NEVADA

JOHN P. COMEAUX
Director

Commentor E

DEPARTMENT OF ADMINISTRATION
Capitol Complex
Carson City, Nevada 89710
Fax (702) 687-3983
(702) 687-4065

April 18, 1994

Mr. Ken Morgan
Public Information Director
ATTN: FS/PP-DEIS Comments
Fernald Field Office
U.S. Department of Energy
Post Office Box 398705
Cincinnati, Ohio 45239-8705

RE: Fernald Environmental Impact Statement, Operable Unit 4
Fernald, Ohio

Dear Mr. Morgan:

Thank you for providing the State of Nevada the opportunity to review the Department of Energy's Feasibility Study/Proposed Plan Draft Environmental Impact Statement (EIS) for Remedial Action at Operable Unit (OU) 4 of the Fernald Environmental Management Project (FEMP). As you know, the draft EIS assesses the potential environmental impacts of removing and treating silo materials and surrounding environmental media at DOE's Fernald plant in Ohio and sending these treated materials to the Nevada Test Site (NTS) for final disposal. Following are the state's comments on this proposal.

As we understand the proposed action, DOE is taking the position that the thorium mill tailing waste, which is admitted to be mixed waste, is not subject to Environmental Protection Agency (EPA) or State of Nevada regulatory control. For the reasons specified below, we believe this position is not correct.

Commentor E

- In 1987 DOE promulgated regulations (10 CFR 962.1) stating that RCRA hazardous waste, mixed with byproduct material falling under the category defined in the Atomic Energy Act (42 USC 2014(e)(1), would be subject to regulation (i.e. the hazardous components of the mixed waste) by EPA and EPA-delegated States. However, the byproduct material falling under the category given in 42 USC 2014(e)(2) that was mixed with RCRA hazardous waste, while constituting a mixed waste, would not be subject to regulations by EPA and or EPA-delegated States. We note promulgation of these regulations and associated restrictions were carried out prior to the passage of the Federal Facility Compliance Act of 1992 (FFCAct).

- As you know, under the FFCAct, Congress defined mixed waste to mean "waste that contains both hazardous waste and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954." This definition shows no distinction between the two categories of byproduct material mentioned above. Hence, the attempted exemption from hazardous waste regulations of the hazardous components of mixed waste containing byproduct material from EPA\State regulatory control, has been invalidated.

- We also note that EPA has delegated to the states regulatory control over all mixed wastes without regard to specific radionuclide content, which is consistent with the expression of Congressional intent in defining mixed waste under the FFCAct (See 51 FR, July 3, 1986, 24504-24505).

Based on these points, it is the State of Nevada's position that the regulatory issues described in the above mentioned Draft EIS have not been adequately addressed.

We also note that the cost estimates of long-term storage/disposal of mixed waste at the NTS were not properly accounted for in the Draft EIS. The assumptions, for example, under which storage/disposal of mixed waste at the NTS could be considered "free" when compared to a commercial facility, were not presented in the document.

Commentor E

5812

In a related matter, we are still waiting for a response concerning our request for an extension of the comment period for the subject Draft EIS. As you may recall, we recently requested the extension to facilitate stakeholder involvement activities in southern Nevada.

Thank you for the opportunity to comment on the above mentioned Draft EIS.

Sincerely,

Maud Naroll

Maud Naroll
State Clearinghouse

MN/jbw
cc: Governors Office
Affected State Agencies
Nevada Congressional Delegation
Carol M. Borgstrom DOEHQ\NEPA
Joseph Fiore, DOE/NV
Donald R. Elle, DOE/NV

Commentor F

S183

COMMENT SHEET

DOE is interested in your comments on the cleanup alternatives being considered in the Feasibility Study/Proposed Plan-Draft Environmental Impact Statement for Remedial Action at Operable Unit 4. 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 April 20, 1994. If you have questions about the comment period, please contact Ken Morgan, the DOE Public Information Officer at Fernald, at (513) 648-3131.

Due to its proximity to the Great Miami River, this land is part of the migratory flyway. Ducks, geese and other migratory birds fly over this area or use it as their residence many months of the year.

Presently, technology exists in landfill management using rubber (neoprene) liners to minimize water seepage. This technology could be incorporated into the Fernald area to create ponds and wetlands. Controlled water levels in ponds, reservoirs and wetlands could be regulated by the pumps and wells that are now in place and being used in the aquifer clean-up.

Hazardous waste should be taken out by rail since the tracks are in place. Handling this waste by transporting it by truck is much more dangerous.

I would discourage industrial development or development that would attract large concentrations of humans in case problems would happen to develop in the future. We cannot afford to have another Love Canal. Our area has had its fair share of negative press and peace of mind and good health is our wish for all.

Name: JACK & Roberta Warndorf

Address: [redacted]

City/State/Z

Phone:

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 X NO__

Commentor G

5812

COMMENT SHEET

DOE is interested in your comments on the cleanup alternatives being considered in the Feasibility Study/Proposed Plan-Draft Environmental Impact Statement for Remedial Action at Operable Unit 4. 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 April 20, 1994. If you have questions about the comment period, please contact Ken Morgan, the DOE Public Information Officer at Fernald, at (513) 648-3131.

I'm asking for a public comment period between the ROD's (Draft & final)

- Need an official public comment period in the RD/RA process. This is when the actural design & remediation occurs.
- I ask for a public comment period between the beginning and completion of remediation.

When dismantling the K 65 silos that a protective cover be used around the silos

Continuous monitoring & maintanace of on site disposal vaults - Or at least one time a year as long as on site.

+ Recommend a Trust fund for Monitoring & maintance.

Name: Edwa Yocum

Address [redacted]

City/Sta

Phone:

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___

Commentor H

3686 Cincinnati-Brookville Road
Hamilton, Ohio 45013

March 25, 1994

Mr. Ken Morgan
Director, Public Information
U.S. Department of Energy Field Office
P. O. Box 398705
Cincinnati, Ohio 45239-8705

SUBJECT: PUBLIC COMMENTS ON PROPOSED PLAN FOR REMEDIAL ACTION OPERABLE UNIT 4 FEMP SILOS 1, 2 AND 3 CONCERNING PREVENTION OF OFFSITE MIGRATION OF AIR POLLUTION AND NOISE

Dear Mr. Morgan:

In order to prevent offsite contamination with respirable airborne cancer producing toxic gases, vapors, fumes and particulate matter from Remedial Actions at Operable Unit 4, it is suggested that at a minimum the following recommendations be adhered to regardless of which cleanup alternative is selected:

1. Construction of a fail safe containment facility maintained at negative air pressure (similar to a glove box) to house all vitrification, bulk reduction and/or cement stabilization equipment and associated HEPA filters, scrubbers, and gas treatment, etc. as well as all packaging operations.

2. Use of real time alarm system with backup must be used to detect failure of equipment including each and every filter and scrubber unit. Air returned to the environment must be cleaned.

3. Use of real time alarm system with backup to detect any toxic chemical contaminated air leaking into the total containment facility from malfunctioning equipment and packaging operations. Contaminated air must be cleaned before being released into the environment. Dilution of highly toxic chemicals into the environment can not be tolerated as a solution.

4. All alarm systems must be checked and calibrated daily and back up alarm systems in place and operative at all times. Preventive maintenance of all equipment must be done at required scheduled intervals and checked by management.

5. To properly oversee the vitrification, bulk reduction, cement stabilization and packaging remediation operations, a member of management from Fluor Daniel, D.O.E. and US EPA must all be present at all times to quickly resolve any problems that are certain to come up, and to make certain that established safety procedures are followed to the letter.

6. Should contaminated air be detected entering the environment from whatever source, a complete shut down of the offending operation would be in order until corrected and Fernald neighbors be immediately notified through site perimeter public address speakers and news media.

Commentor H

5812

7. Toxic chemicals or mixed toxic waste by any other name must not be brought into the Fernald Site to further contaminate it from anywhere else for any purpose whatsoever be it for testing, pilot runs, temporary or permanent storage, decontamination vitrification, bulk reduction or cement stabilization, etc.

8. State-of-the-art engineering noise controls should be incorporated in the design of facilities and equipment used so that no noise from remedial actions is heard downwind offsite. Noise resulting from the release of high pressure air or steam into the atmosphere must be attenuated through appropriate engineering controls.

9. Shipment of toxic wastes should be made to Nevada Test Site as soon as possible. Temporary storage of safely encapsulated toxic waste, contaminated soil and debris should be south of the production area as far from the heavily traveled Route 126 (Cincinnati-Brookville Road) as is feasible.

Please include the above as part of the formal Public Comment for Remediation of Operable Unit 4 FEMP Silos 1, 2 and 3.

Thank you for your help.

Sincerely,

J. E. Walther

J. E. Walther

FEMP1

Ohio Historic Preservation Office

Ohio Historical Center
1982 Velma Avenue
Columbus, Ohio 43211-2497
614/297-2470
Fax: 297-2546

Commentor I

OHIO HISTORICAL SOCIETY
SINCE 1885

March 24, 1994

Mr. Ken Morgan
Public Information Director
ATTN: FS/PP-DEIS Comments
Fernald Field Office
U.S. Department of Energy
Post Office Box 398705
Cincinnati, OH 45239-8705

Re: Fernald Environmental Management Plan
Butler and Hamilton Counties, Ohio

Dear Mr. Morgan,

This is in response to correspondence from Carol M. Borgstrom of the Department of Energy dated February 24, 1994 (received March 1) regarding the above referenced project (a copy of the correspondence was also submitted through the State Clearinghouse and received March 7, 1994). The comments of the Ohio Historic Preservation Office (OHPO) are submitted in accordance with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]); the U.S. Department of Energy serves as the lead federal agency. My staff has reviewed this project, and I offer the following comments.

OHPO has two areas of concern for the proposed clean-up at the Fernald facility. This particular part of the clean-up involves proposed demolition of storage silos in Operable Unit 4. Additional actions are under consideration for several other operable units in the waste storage area. The first area of concern is the potential for impacts to archaeological sites. The Fernald facility is located in an archaeologically sensitive area and several archaeological studies have been completed for other actions related to the clean-up in and around the Fernald facility. Until a programmatic agreement has been developed, each project will require coordination with this office for archaeological resources. Coordination is anticipated regarding the proposed demolition of the silos providing us sufficient information to make a recommendation for archaeological investigations. At this time we have not determined that any archaeological work is needed for any of the proposed or future actions in the waste storage area. The coordination should provide detailed mapping, descriptions of the soils (to determine if any areas within the project area are relatively undisturbed), descriptions of the proposed actions including ancillary work areas and any temporary storage areas, and photographs of the facilities.

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Mr. Ken Morgan
March 24, 1994
Page 2

Commentor I

The second area of concern relates to the Fernald facility as an integrated series of architectural structures and facilities. It is our position, under guidelines provided by the Advisory Council on Historic Preservation, the National Council of State Historic Preservation Officers, and the Department of Defense, that the Fernald Facility is eligible for inclusion in the National Register of Historic Places. It is our position that the facility includes all of the structures and facilities within the 1000 plus acre tract. The Fernald facility is eligible because of the important role it played in support of United States defense programs during the Cold War, thus, the facility is a significant part of one of the most important aspects of our history.

The proposed demolition of the silos, or any other structure or facility, could have an adverse effect on the Fernald facility. Coordination with this office is required prior to the implementation of any plan or action resulting in demolition or changes to any structure or facility. OHPO recommends the development of a programmatic agreement to address historic preservation concerns. Once we have established the context for the Fernald facility and the limits of the contributing structures and facilities, then specific recommendations can be made regarding proposed actions such as the proposed demolition of the silos. In the interim, it is our recommendation that the silos should be regarded as contributing structures and we should proceed under the assumption that the proposed demolition will have an adverse effect on a district eligible for inclusion in the National Register of Historic Places. Coordination with this office is recommended to begin preparing the necessary documentation for this action.

In summary, OHPO recommends changes to the Draft Environmental Impact Statement to include coordination with this office under provisions of the National Historic Preservation Act.

Any questions concerning this matter should be addressed to David Snyder or Julie Quinlan at (614) 297-2470, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,

Martha J. Raymond

Martha J. Raymond, Department Head
Technical and Review Services

MJR/DMS:ds

xc: Carol M. Borgstrom, Department of Energy
State Clearinghouse (OH940225-X763-36.471)

Commentor J

April 17, 1994

TO: Ken Morgan, Public Relations, U.S. DOE, FEMP

FROM: Lisa Crawford, President, F.R.E.S.H., INC.

SUBJECT: O.U. 4 Comments on Proposed Plan

Listed below are my comments on the O.U. 4 Proposed Plan:

1.) DOE should include and or develop real-time monitoring for discharges to the environment resulting from remedial actions.

2.) Information obtained from real-time monitoring and any other monitoring activities should be provided to the public.

3.) DOE should incorporate pollution prevention activities whenever possible during the design and operation of the OU 4 remedial action system.

4.) DOE must make certain that the public has involvement and it will continue during the RD/RA. DOE must commit to continued public involvement during this period.

5.) DOE must revise the site community relations plan to meet the need for continued public involvement during the RD/RA.

6.) DOE must and will keep the public abreast of all decisions and any changes that occur during this period.

If you have questions, please feel free to contact me. Thank you.

LC:eac

cc: files

Commentor K

5812

3944 Silax Dr.
Hamilton, OH 45013
April 20, 1994

Mr. K. L. Morgan
Public Information Officer
DOE Field Office,Fernald
U. S. Department of Energy
P. O. Box 398705
Cincinnati, Ohio 45239-8705

After reviewing the Proposed Plan for Remedial Actions at Operable Unit 4 at Fernald, I would like voice to you some of my concerns as a resident who lives downwind of the proposed activity.

I would like to know if there have been any air pollution models run which show the distribution of the contamination that will be caused as a result of these activities. Not screening types models, but specifically, comprehensive models which take into consideration terrain, wind speed, weather conditions, mixing height and the deposition patterns.

My major concern is the emission of radium (not radon) in the exhaust gases and fugitive gases from the proposed vitrification facility.

One of the important considerations for risk based calculations is that Elda Elementary School, the Ross Middle School, and the Ross Senior High School are all in the direction of the prevailing wind pattern.
I would like to recommend that comprehensive air pollution modeling be done on the facility's impact to the area's air quality. I would like to see the vitrification unit's risk from fugitive and exhaust emissions quantified. I would like to see how the vitrification unit will impact the site's overall risk to the community. Lastly, I would like to see the impact that this will have on the site's radionuclide air emissions specifically with respect to radium emissions into the air.

I make these comments in good faith, and trust they will be received as a good faith effort to improve the implementation of the proposed.

Commentor K

action. and that no effort will be made by any party to affect my employment at the FEMP.

Respectfully yours.

Lawrence L. Stebbins

BOB MILLER
Governor

STATE OF NEVADA

5812

Commentor L

DEPARTMENT OF ADMINISTRATION
Capitol Complex
Carson City, Nevada 89710
Fax (702) 687-3983
(702) 687-4065

April 5, 1994

Mr. Ken Morgan
Public Information Director
ATTN: FS/PP-DEIS Comments
Fernald Field Office
U.S. Department of Energy
P.O. Box 398705
Cincinnati, Ohio 45239-8705

RE: Fernald Environmental Impact Statement, Operable Unit 4 Fernald , Ohio

Dear Mr. Morgan:

Thank you for providing the State of Nevada the opportunity to review the Department of Energy's Feasibility Study/Proposed Plan Draft Environmental Impact Statement (EIS) for Remedial Action at Operable Unit (OU) 4 of the Fernald Environmental Management Project (FEMP). As you know, this "Draft EIS" assesses alternatives for the removal, treatment, and disposal of radioactive material at DOE's Fernald site near Cincinnati, Ohio.

The proposed action analyzed in the Draft EIS is to assess the potential environmental impacts of DOE's preferred alternative, which is to remove silo materials and surrounding environmental media, stabilize the product through vitrification, and send the treated material to the Nevada Test Site (NTS) for final disposal. According to information provided to officials from DOE's Nevada Operations Office (DOE/NV), if the proposed action is implemented, over 300,000 cubic yards of radioactive waste would be disposed of at NTS. Disposal activities would cover a period of approximately thirty years.

Commentor L

As you know, comments on the Draft EIS are due on April 20, 1994. However, for the reason discussed below, we believe the comment due date should be extended to facilitate a more comprehensive stakeholder involvement process for the citizens of Nevada.

Recently, a group of concerned Nevadans, affected Indian Tribes, and local government officials along with officials from the State and DOE jointly participated in the establishment of a Site Specific Advisory Board for DOE/NV's Environmental Restoration and Waste Management Program at the NTS. The group is officially titled The Citizens Advisory Board for NTS Programs (CAB). This new CAB for NTS programs held its first organizational meeting on March 8th, 1994.

Because the CAB will likely play a key role in advising DOE/NV about stakeholder concerns involving major program decisions such as those proposed in the above mentioned document, we believe it is of paramount importance that the CAB be given the opportunity to discuss the possibility of requesting a briefing on the proposed action and alternatives discussed in the Draft EIS.

You might recall that such a briefing was provided by DOE officials and contractors from FEMP to officials from DOE/NV and the State of Nevada. Granting our request for an extended comments period of at least 60 days would allow the CAB to address this issue at its next meeting, which is scheduled for April 20, 1994.

We await your prompt decision concerning this request.

Sincerely,

Maud Naroll

Maud Naroll
State Clearinghouse

MN/jbw
cc: Members, Citizens Advisory Board NTS Programs
Governors Office and Affected State Agencies
Nevada Congressional Delegation
Carol M. Borgstrom DOEHQ\NEPA
Nick C. Aquilina, DOE/NV
Joseph Fiore, DOE/NV
Donald R. Elle, DOE/NV

000293

Commentor M

5812

U.S. Department of Transportation
Research and Special Programs Administration

APR 21 1994

Mr. Ken Morgan
Public Information Director
ATTN: FS/PP-DEIS Comments
Fernald Field Office
U.S. Department of Energy
P.O. Box 398705
Cincinnati, OH 45239-8705

Dear Mr. Morgan:

This letter is in response to the February 24, 1994 letter from Ms. Carol M. Borgstrom, Director, Office of NEPA Oversight, Department of Energy to Ms. Kathleen C. DeMeter, Assistant Chief Council, National Highway Traffic Safety Administration, Department of Transportation (DOT). Ms. DeMeter forwarded that letter to the Research and Special Programs Administration (RSPA), the Federal agency primarily responsible for hazardous materials transportation regulations. That letter solicited review and comments on the Feasibility Study (FS), the Proposed Plan (PP), and the Draft Environmental Impact Statement (DEIS) documents for remediation of Operable Unit 4 of the Fernald Environmental Management Project (FEMP). Our review has focused on elements associated with the transportation of radioactive materials resulting from the remediation activities.

The reviewed documents are clearly of a general nature at this early phase of the program, and do not reflect all details such as radioassay methods, materials classification, and packaging required for compliance with the transportation regulations. There were no statements about any expected need for exemptions from the requirements of DOT regulations which are authorized under Title 49, Code of Federal Regulations (CFR), Part 107; rather, it is stated that all shipments will be made in full compliance with DOT regulations.

In the development of future documentation for the FEMP, it is suggested that technical attention be given to two minor concerns we saw in the FS/DEIS. First, in Volume One, Section 2.5.7.1, Page 2-78, it was stated that all materials transported would meet the definition of Low Specific Activity (LSA) radioactive materials as defined in 49 CFR 173.403(n). We believe the expected physical form of the material transported will result in the radiological risk to the public

Commentor M

being equal to or less than most LSA shipments transported in the Country. However, from Volume Two, Appendix A, Table A.1-1, it appears that the activity per gram of material for some of the package contents might exceed the limits for LSA materials in 49 CFR 173.403(n). The second concern is somewhat related to the activity per gram issue. In Volume One, Section 4.2.2, Page 4-25, it is noted that "sampling of the vitrified waste form would be limited to measurement of dose rate". After material vitrification, the external radiation dose rates will clearly be the indications of the most significant radiological hazards of the materials during transportation. However, since the identity of the radionuclides and the activity of the content in each package is required by the regulations, documentation with technical reasoning will be needed to relate the results of pre-vitrification radioassays to the contents of the packages.

From our limited review of the early phase planning documents, it appeared that there was not much information about non-radioactive hazardous materials transportation compliance issues, or about hazardous wastes subject to both DOT and Environmental Protection Agency regulations. Compliance with those regulations should not be difficult; the radiological hazards appear to be of greatest concern.

Except for the two minor concerns mentioned above, the reviewed documents appear to be satisfactory with respect to hazardous materials transportation.

Sincerely,

for James K. O'Steen, Director
Office of Hazardous Materials
Technology

cc: Carol M. Borgstrom

Commentor N

FEMP-OU4ROD-6 PROPOSED DRAFT
July 1994

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May 17, 1994

Mr. Ken Morgan
Director, Public Information
U.S. Department of Energy, Fernald Field Office
P.O. Box 39705
Cincinnati, Ohio 45239-8705

SUBJECT: DOCUMENTS COMPRISING THE FINAL FEASIBILITY STUDY/PROPOSED PLAN - ENVIRONMENTAL IMPACT STATEMENT FOR REMEDIAL ACTIONS AT OPERABLE UNIT 4, THE FERNALD ENVIRONMENTAL PROJECT (DOE/EIS-0195d)

Dear Mr. Morgan:

The Nevada Test Site (NTS) Citizens Advisory Board (CAB) had the opportunity to meet with representatives of the Fernald Environmental Project at our May 11, 1994 meeting. The CAB is comprised of representatives from the public, citizens groups, Native Americans, local governments and others. Fernald staff provided a useful brief describing proposed shipments of radioactive material to the NTS. They and NTS Department of Energy (DOE) personnel at the meeting noted, however, that the deadline for comments to the EIS is May 20, 1994.

The May 11, 1994 meeting was the first time that the CAB had an opportunity to receive any information about the proposed shipments. The CAB has still not reviewed the documents. We would, therefore, have less than a week to review the EIS. The CAB is, therefore, requesting an extension of time to review the documents and provide substantive input to the process.

The shipments of radioactive waste from Fernald are the first of potentially many other shipments to the NTS. It is important, therefore, for the CAB to review the Fernald EIS proposal.

The CAB and citizens of Nevada trust that you will grant an extension of time for the review of the EIS documents.

Sincerely,

William L. Vasconi, Acting Chairman
Citizens Advisory Board
m583.vis

cc: James Sarit, Region V
Environmental Protection Agency

Commentor O

On June 24, 1994, the DOE received by facsimile transmission, the following four comments/issue statements on the behalf of the Nevada Test Site Citizens Advisory Board (CAB), from an individual who identified herself by telephone as Katherine Yuracko, a member of the CAB. As directed by Katherine Yuracko during the telephone conversation, the facsimile was redacted by DOE to only include verbatim the substantive comments/issue statements pertinent to the Operable Unit 4 FS/PP-DEIS.

06-24-1994 14:30 513 738 6650 US DEPT of ENERGY P.02
06-24-1994 11:23 702 2951113 DOE/ERO P.02
YURACKO & ASSOCIATES 702 647 6060

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To Bobbie McClure	From Kathy Yuracko
Co.	Co.
Dept.	Phone #
Fax # 295-1113	Fax #

Fern

Issues

1. The shipments of waste from Fernald are the first of potentially many other shipments to the NTS. Rather than making decisions on a piecemeal basis, we want to see the full picture before we are asked to make decisions on individual pieces. That is, we want to first consider the total impact of all of the waste that is being considered for disposal at the NTS. Following that, we want to consider each individual piece.

2. The documents reviewed do not discuss the full range of possible alternatives. E.g.:
   - disposal at Hanford
   - reprocess to recover materials
   - dispose of all material at the NTS

   Why were these options rejected? What is the full list of options initially considered and why was each option rejected?

3. We believe that:

   - funds should be provided for technical oversight of waste management activities

   - the State of Nevada and affected Counties are entitled to impact mitigation payments as compensation for costs arising from management of this material

4. Based on the presence of RCRA regulated metals and organics in the waste, we are concerned that the waste contains both hazardous and radioactive constituents.

   a. Please list the radionuclide and inorganic and organic chemical constituents of the waste.

   b. Please identify the concentration of each consituent.

   c. Please identify the risk resulting from each constituent.

   d. Please describe how the proposed treatment and disposal mechanisms address both the radionuclide and chemical constituents of the waste.

Commentor P (1-177)

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Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(1)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Nichole Davis

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(2)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Shellie Michael

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(3)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Lynn Rohl

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(4)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name TED [illegible]

Address [redacted]

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Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(5)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Mark Michael

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(6)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Kathleen Guise

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(7)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Jo Anne Moran

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(8)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Catherine A. McLaughlin

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(9)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Nancy Gott

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(10)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name REBECCA WEBBER

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(11)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Tanya Carr

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(12)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Jim Macklin

Address [redacted]

5812

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(13)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Cindy Weatherby

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(14)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Rebecca Heider

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(15)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name TROY WEATHERBY

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(16)

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Name ABRAHAM HARTMAN

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(17)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Vicki Cassman

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(18)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Art Goldberg

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(19)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Jillian Beth Wright

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(20)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Linda Strange

Address [redacted]

Commentor P (1-177 Cont.)

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Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(21)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Konnie Strange

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(22)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Mindy Brummett

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(23)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name LaLoi Rossi

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(24)

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Name TARVN CUNNINGHAM

Addres [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(25)

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Name Tiffany Brummett

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(26)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Janet Zimmerman

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(27)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Janene Zimmerman

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(28)

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Name Mrs Patricia Jenkins [redacted]

Address [redacted]

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Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(29)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Daniel J Fedor

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(30)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Michael Carragan

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(31)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name RENÉE HALM

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(32)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Julieta Lopez

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(33)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Orlina Saenz

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(34)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name [illegible]

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(35)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Karen Radayne

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(36)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Carmen E Rodriguez

Address [redacted]

000315

Commentor P (1-177 Cont.)

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Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(37)

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Name [illegible]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(38)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Sheila Rutledge

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(39)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name [redacted]

Addres [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(40)

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Name Michelle Lynn Berry

Address [redacted]

Commentor P (1-177 Cont.)

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Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(41)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name L. JEAN McCoy

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(42)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Tammy Smith

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(43)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(44)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name STAN GREENE

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(45)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Frances Bruno

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(46)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Betty Hax

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(47)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name DAVID GEERTS

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(48)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name John Eyle John Eyle

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(49)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Alison Orr

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(50)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Tand Zohar

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(51)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Finn Norris-Covey

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(52)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Elizabeth Petit [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(53)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Sonia Swenson

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(54)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Ron Schaefer

Address [redacted]

Commentor P (1-177 Cont.)

S 1 8 3

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(55)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Victoria Pinkston

Addre[redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(56)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Kathy Gromowski

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(57)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Smile Rogers

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(58)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name MICHAEL LOCORRIERE

Address [redacted]

000326

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(59)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Sheri LaCorriere

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(60)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Buck Nester

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(61)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name [illegible]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(62)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Huy Phan

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(63)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(64)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(65) ● The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(66) ● The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Jim JAQUA

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(67)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Shelli McKenney

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(68)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Carmen Davis

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-
Comments on the Fernald C

P(69) ● The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Nadreen Bakhtary

Address [redacted]

Keep Fernald Waste On-site in Ohio..
Comments on the Fernald Cleanup EIS.

P(70) ● The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Maribel McAdory

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(71)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Merlinda Gallegos

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(72)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Chad Hunt

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(73)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Barb Brent

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(74)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name MAYTE VILLANUEVA

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(75)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name James Mio

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(76)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name David Johnson

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(77)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Laura Yada

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(78)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name [illegible]

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(79)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Sherri Carox

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(80)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Steri Carroll

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(81)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name MARGARET BEAN Margaret Bean

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(82)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Patrice L. Harper

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(83)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Robin Warner

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(84)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name George A Brown

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(85)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name ROBERT PIERSON [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(86)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Tim Bartlett

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(87)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name SELMA UMNUSS + CHUCK UMNUSS

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(88)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Rob MASCHAUT

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(89)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Jeff Van Fe

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(90)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Tiffany Brown

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(91) ● The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Jeffrey M Steinbeck

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(92) ● The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

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Name Catherine Tillman

Address [redacted]

5812

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(93)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name MADELAINE DAYTON 702-452-1885

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(94)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Lori Johnson

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(95)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Sharlin Anderson

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(96)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name KATHLEEN WOMACK

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(97)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name S. Gomez

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(98)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Melony Harris

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(99)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name MICHELE GILBRETH

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(100)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

5212

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(101)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.
- Transportation risks need to be thoroughly evaluated.
- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Grace K. Tao

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(102)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.
- Transportation risks need to be thoroughly evaluated.
- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Julia L. Winkler 89119

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(103)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name John Harmer

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(104)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name James Holmes

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(105)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Merlyn Huguet

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(106)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Barbara Roth

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(107)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(108)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(109)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Louis Lavietes

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(110)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Jeff Cooley

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(111)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name James P. Foster

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(112)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [illegible]

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(113)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Tusa Higgins

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(114)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Maggie Kiel

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(115)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Joel Delmendo

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(116)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Katherine Garder

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(117)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Jason Benatz

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(118)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Ebony Samarkand

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(119)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Stacy Smith

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(120)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Sandra Shelling

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(121)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(122)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Judy Cuetkovic

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(123)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Michael Cuttrone

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(124)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Mrs. L. McCracken

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(125)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Willene De Fangis

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(126)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Donald A. De Fangis

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(127)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Robert Tonelli

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(128)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Ruth Lindahl

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(129)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Melody Demch

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(130)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Paul Robin

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(131)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name ANTHONY BONDI

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(132)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name T. J. JONES

Ad[redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(133)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name John A. Loeffler

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(134)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name CHRISTOPHER MERCER

Address [redacted]

Commentor P (1-177 Cont.)

S185 ⁿ⁸

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(135)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name LAURT BUCHANAN

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(136)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name LIZ MAHON

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(137)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [illegible]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(138)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name BRENDA WEKSLER

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(139)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Cheryl Frosa

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(140)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Harriet R. Magliano

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(141)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Kathy Porna

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(142)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Jacen Hallenberg

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(143)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Kelli Kennedy

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(144)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Trish Taylor [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(145)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Heather Davis

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(146)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Marilyn Benoit

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(147)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Richard Lawson

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(148)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Susan Thornton

Address [redacted]

5812

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(149)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [illegible]

Addre[redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(150)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Pete Martin

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(151)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name IRACE K. LINDEMAN

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(152)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name DAVID L. PLATERIO/TOSA-WI-E

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(153)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Jo Ann Garrett

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(154)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Margaret Norman Margaret Norman

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(155)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Judy Treichel

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(156)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Larry C. Johns

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(157)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Steve Frishman

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(158)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name William Rose Sr.

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(159)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Carlin Hanner

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(160)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Shawn Black

Address [redacted]

000377

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(161)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name LAWRENCE SKINNER Lawrence W. Skinner

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(162)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Mary L Jones

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(163)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Bob Fulkerson

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(164)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name CARLA BAKER-WALLACE

Address [redacted]

000379

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(165)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(166)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(167)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(168)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

000381

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(169)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(170)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(171)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(172)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(173)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name [redacted]

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(174)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name _____

Address _____

Commentor P (1-177 Cont.)

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(175)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name GEOFF HOLTON

Address [redacted]

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(176)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Richard Glassman

Address [redacted]

Commentor P (1-177 Cont.)

5812

Keep Fernald Waste On-site in Ohio.. Comments on the Fernald Cleanup EIS.

P(177)

- The more than 300,000 cubic yards of radioactive waste consisting of uranium, thorium and radium among other radionuclides, should be kept on-site in containers adequate to protect the local populace. Nevadans should not be required to accept additional risk on top of that already present at the Nevada Test Site.

- Transportation risks need to be thoroughly evaluated.

- Socioeconomic impacts on the receptor community should be thoroughly evaluated and balanced against the desires of Ohio to move Fernald waste.

Name Kathleen Glasman

Address [redacted]

Commentor Q

The following comments/issues were submitted by Pam Dunn, Harrison, Ohio. The comments/issues were retyped and alphabetically identified by DOE in order to facilitate developing comment responses. The original hand written comments have also been included as matter for the record.

June 20, 1994

Mr. Ken Morgan
U.S. Dept. of Energy Fernald Field Office
P.O. Box 398705
Cincinnati, OH 45239-8705

RE: Comments Proposed Plan For Remedial Action OU4.

(a) • In reviewing the Proposed Plan for OU4 there are variances in the capital cost for the same treatment alternatives with the only difference being on-site versus off-site disposal. What is the source of this variance?

(b) • It is stated that EPA would review on-property disposal every five years in accordance with CERCLA requirements. Who and how often would a review be performed in the other years?

(c) • There is no mention of retri[e]vability of the materials which would be disposed of in the on-site disposal vault. Is this option being considered, and, if not, why?

(d) • Post-remediation O&M cost are estimated over a thirty-year period. What about the remaining years for which this material will require monitoring?

(e) • Alternatives 2B and 4B have identical post-remediation cost, with Alternative 4B being untreated. Please explain how cost can be the same for treated versus untreated materials disposed in an on-site vault.

(f) • There is discussions on interim storage. What is the estimated time for this interim storage?

Commentor Q (Cont.)

5812

(g) • Alternative 2C states that the contaminated materials would be place in bulk (without packaging) into the on-site disposal vault. Please expand on why this material would not be packaged and state the advantages/disadvantages of packaged versus non-packaged.

(h) • It is stated that non-porous material will be released from the site as uncontaminated per DOE Order 5400.5. Will this material be checked for contamination prior to release or just assumed to be uncontaminated and released?

(i) • Will the wastewater generated during remediation be treated for non-radioactive contaminates prior to discharge in the Great Miami River? To what extent will radioactive and non-radioactive elements be removed prior to discharge?

(j) • A material variance in the cost associated with Subunit C exist between 3C.1 and 3C.2 with the only apparent difference being 3C.1 Disposal at NTS and 3C.2 at Envirocare in Utah. Please explain this variance and if this is partially due to more stringent requirements at NTS, should these more stringent requirements also be required at a commercial facility? Which requirements is more protective? It is also stated that an exemption from DOE Order 5820.2A (this is transposed as 5280.2A in document, Page 56) is needed to dispose at a commercial facility; has this been granted?

(k) • Will notification of these shipments be given to the areas involved in the transportation routed for rail and truck, and what precautions for protection will be employed?

(l) • Table 6-1 comparison of remedial alternatives, state differences in implementing identical treatments with different disposal options. Is this difference related to transportation issues for off-site rather than on-site? Please explain these differences. Also, Subunit C lists no treatment for all alternatives; please demonstrate why no treatment is acceptable.

(m) • Is there potential for failure of the vitrified material has the radionuclides trap[p]ed continue to delay, and if so, what is that risk?

(n) • It states that the capital cost associated with the on-site disposal facility has been removed. Where is (will) this cost be accounted for?

(o) • Line 14, Page 67 reads results in significant reduction in the volume...This would read better if the "a" preceded significant/rather than follow.

Commentor Q (Cont.)

(p) • Please define the following statement (Line 16, Page 67) utilize permanent solutions to the maximum extent practical. What viable, permanent solutions presently exist?

(q) • Basis for stating long-term environmental impacts of permanent disposal at NTS are minor and no long-term impacts of biota expected from disposal activities at NTS. It is stated that to reduce U-238 to essentially background is not feasible; it also states that it is assumed that the federal government retain ownership of the FEMP site to consider clean-up protective. While I do not have a problem with these statements, it does bother me that no formal statement has been made publicly concerning this. These two statements present future land use constraints which must be addressed. Why hasn't the DOE adopted a formal position concerning this issue and communicated this to both the Fernald Citizens Task Force and the community?

(r) • Line 13, Page 76, reads "... would bot be ...", should that read "... would not be ..." ?

(s) • It states the on-site, above-grade disposal facility would be designed for a 1000 year life with no active maintenance. What is the half-lives or duration for which the radionuclei and chemical contaminants are a threat to the environment; do they exceed 1000 years? Also, explain why no active maintenance is assumed for 1000 years.

(t) • Has an exemption to the Ohio Solid Waste Facility requirement been requested, and if not, when will such a request be made? Also, Line 28, Page 79 would read better if "the" or "a" were added to precede disposal. (For disposal facility on the FEMP site.)

Should you have any questions concerning these comments, feel free to contact me at the address given below:

Submitted by
Pam Dunn
[redacted]

cc:
Mr. John Applegate
F.R.E.S.H., Inc.
File

Commentor Q (Cont.)

5812

JUNE 20, 1994

MR. KEN MORGAN
U.S. DEPT. OF ENERGY FERNALD FIELD OFFICE
P.O. BOX 398705
CINCINNATI, OHIO 45239-8705

RE. COMMENTS PROPOSED PLAN FOR REMEDIAL ACTION OU4

- IN REVIEWING THE PROPOSED PLAN FOR OU4 THERE ARE VARIANCES IN THE CAPITAL COST FOR THE SAME TREATMENT ALTERNATIVES WITH THE ONLY DIFFERENCE BEING ON-SITE VERSUS OFF-SITE DISPOSAL. WHAT IS THE SOURCE OF THIS VARIANCE?
- IT IS STATED THAT EPA WOULD REVIEW ON-PROPERTY DISPOSAL EVERY FIVE YEARS IN ACCORDANCE WITH CERCLA REQUIREMENTS. WHO AND HOW OFTEN WOULD A REVIEW BE PERFORMED IN THE OTHER YEARS?
- THERE IS NO MENTION OF RETRIVABILITY OF THE MATERIALS WHICH WOULD BE DISPOSED OF IN THE ON-SITE DISPOSAL VAULT. IS THIS OPTION BEING CONSIDERED, AND IF NOT, WHY?
- POST REMEDIATION O&M COST ARE ESTIMATED OVER A THIRTY YEAR PERIOD. WHAT ABOUT THE REMAINING YEARS FOR WHICH THIS MATERIAL WILL REQUIRE MONITORING?
- ALTERNATIVE 2B AND 4B HAVE IDENTICAL POST-REMEDIATION COST, WITH ALTERNATIVE 4B BEING UNTREATED. PLEASE EXPLAIN HOW COST CAN BE THE SAME FOR TREATED VERSUS UNTREATED MATERIALS DISPOSED IN AN ON-SITE VAULT?
- THERE IS DISCUSSIONS OF INTERIM STORAGE. WHAT IS THE ESTIMATED TIME FOR THIS INTERIM STORAGE?
- ALTERNATIVE 2C STATES THAT THE CONTAMINATED MATERIALS WOULD BE

Commentor Q (Cont.)
-PAGE 2-

PLACED IN BULK (WITHOUT PACKAGING) INTO THE ON-SITE DISPOSAL VAULT. PLEASE EXPAND ON WHY THIS MATERIAL WOULD NOT BE PACKAGED AND STATE THE ADVANTAGES / DISADVANTAGES OF PACKAGED VERSUS NON-PACKAGED.

- IT IS STATED THAT NON-POROUS MATERIALS WILL BE RELEASED FROM THE SITE AS UNCONTAMINATED PER DOE ORDER 5400.5. WILL THIS MATERIAL BE CHECKED FOR CONTAMINATION ~~BE~~ PRIOR TO RELEASE OR JUST ASSUMED TO BE UNCONTAMINATED AND RELEASED?
- WILL THE WASTEWATER GENERATED DURING REMEDIATION BE TREATED FOR NON-RADIOACTIVE CONTAMINATES PRIOR TO DISCHARGE IN THE GREAT MIAMI RIVER? TO WHAT EXTENT WILL RADIOACTIVE AND NON-RADIOACTIVE ELEMENTS BE REMOVED PRIOR TO DISCHARGE?
- A MATERIAL VARIANCE IN THE COST ASSOCIATED WITH SUBUNIT C EXISTS BETWEEN 3C.1 AND 3C.2 WITH THE ONLY APPARENT DIFFERENCE BEING 3C DISPOSAL AT NTS AND 3C.2 ~~AT~~ ENVIROCARE IN UTAH. PLEASE EXPLAIN THIS VARIANCE AND IF THIS IS PARTIALLY DUE TO MORE STRINGENT REQUIREMENTS AT NTS, SHOULD THESE MORE STRINGENT REQUIREMENTS ALSO BE REQUIRED AT A COMMERCIAL FACILITY? WHICH REQUIREMENTS ARE MORE PROTECTIVE?
  IT IS ALSO STATED THAT AN EXEMPTION FROM DOE ORDER 5820.2A (THIS IS TRANSPOSED AS 5280.2A IN DOCUMENT, PAGE 56) IS NEEDED TO DISPOSE AT A COMMERCIAL FACILITY; HAS THIS BEEN GRANTED?
- WILL NOTIFICATION OF THESE SHIPMENTS BE GIVEN TO THE AREAS INVOLVED IN THE TRANSPORTATION ROUTES FOR BOTH RAIL AND TRUCK, AND WHAT PRECAUTIONS FOR PROTECTION WILL BE EMPLOYED?
- TABLE 6-1, COMPARISON OF REMEDIAL ALTERNATIVES, STATE DIFFERENCES IMPLEMENTING IDENTICAL TREATMENTS WITH DIFFERENT DISPOSAL OPTIONS.

Commentor Q (Cont.)

5812

PAGE 3 -

IS THIS DIFFERENCE RELATED TO TRANSPORTATION ISSUES FOR OFF-SITE RATHER THAN ON-SITE? PLEASE EXPLAIN THESE DIFFERENCES.
ALSO SUBUNIT C LISTS NO TREATMENT FOR ALL ALTERNATIVES; PLEASE DEMONSTRATE WHY NO TREATMENT IS ACCEPTABLE.

- IS THERE POTENTIAL FOR FAILURE OF THE VITRIFIED MATERIAL HAS THE RADIONUCLEIDS TRAPED CONTINUE TO DECAY, AND IF SO, WHAT IS THAT RISK?
- IT STATES THAT THE CAPITAL COST ASSOCIATED WITH THE ON-SITE DISPOSAL FACILITY HAS BEEN REMOVED. WHERE IS (WILL) THIS COST BE ACCOUNTED FOR?
- LINE 14, PAGE 67 READS RESULTS IN SIGNIFICANT A REDUCTION IN THE VOLUME.... THIS WOULD READ BETTER IF THE A PRECEDED SIGNIFICANT RATHER THAN FOLLOW.
- PLEASE DEFINE THE FOLLOWING STATEMENT (LINE 16, PAGE 67) UTILIZE PERMANENT SOLUTIONS TO THE MAXIMUM EXTENT ~~PRACTICAL~~ PRACTICAL. WHAT VIABLE PERMANENT SOLUTIONS PRESENTLY EXIST?
- BASIS FOR STATING LONG-TERM ENVIRONMENTAL IMPACTS OF PERMANENT DISPOSAL AT NTS ARE MINOR AND NO LONG-TERM IMPACTS OF BIOTA EXPECTED FROM DISPOSAL ACTIVITIES AT NTS.

IT IS STATED THAT TO REDUCE U-238 TO ESSENTIALLY BACKGROUND IS NOT FEASIABLE; IT ALSO STATES THAT IT IS ASSUMED THAT THE FEDERAL GOVERNMENT RETAIN OWNERSHIP OF THE FEMP SITE TO CONSIDER CLEAN-UP PROTECTIVE. WHILE I DO NOT HAVE A PROBLEM WITH THESE STATEMENTS, IT DOES BOTHER ME THAT NO FORMAL STATEMENT HAS BEEN MADE PUBLICLY CONCERNING THIS. THESE TWO STATEMENTS PRESENT FUTURE LAND USE CONSTRAINTS WHICH MUST BE ADDRESSED. WHY HASN'T THE DOE ADOPTED A FORMAL POSITION CONCERNING THIS ISSUE AND COMMUNICATED THIS TO BOTH THE FERNALD CITIZENS TASK FORCE AND THE COMMUNITY?

Commentor Q (Cont.)

PAGE 4 -

- LINE 13, PAGE 76, READS WOULD BOT BE, SHOULD THAT READ WOULD NOT BE?
- IT STATES THE ON-SITE, ABOVE-GRADE DISPOSAL FACILITY WOULD BE DESIGNED FOR A 1000 YEAR LIFE WITH NO ACTIVE MAINTENANCE. WHAT IS THE HALF-LIVES OR DURATION FOR WHICH THE RADIONUCLIDES AND CHEMICAL CONTAMINANTS ARE A THREAT TO THE ENVIRONMENT; DO THEY EXCEED 1000 YEARS? ALSO EXPLAIN WHY NO ACTIVE MAINTENANCE IS ASSUMED FOR 1000 YEARS?
- HAS AN EXEMPTION TO THE OHIO SOLID WASTE FACILITY REQUIREMENT BEEN REQUESTED, AND IF NOT WHEN WILL SUCH A REQUEST BE MADE? ALSO LINE 28, PAGE 79, WOULD READ BETTER IF THE OR A WERE ADDED TO PRECEDE DISPOSAL. (FOR DISPOSAL FACILITY ON THE FEMP SITE.)

SHOULD YOU HAVE ANY QUESTIONS CONCERNING THESE COMMENTS, FEEL FREE TO CONTACT ME AT THE ADDRESS GIVEN BELOW.

SUBMITTED BY
PAM DUNN
Pam Dunn
[redacted]

C:
MR. JOHN APPLEGATE
F.R.E.S.H. INC
FILE

ATTACHMENT C.II

ERRATA SHEETS AND CHANGES TO THE FEASIBILITY STUDY/PROPOSED PLAN-DRAFT ENVIRONMENTAL IMPACT STATEMENT

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C.II ERRATA SHEETS AND CHANGES TO THE FEASIBILITY STUDY/PROPOSED PLAN-DRAFT ENVIRONMENTAL IMPACT STATEMENT

The FS/PP-DEIS for Operable Unit 4 was released for public comment in March 1994. The DOE reviewed all written and oral comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as was originally identified in the FS/PP-DEIS, were necessary. However, it should be noted that the repromulgation of 40 CFR §191 by the EPA, did result in minor changes in the comparative analysis of alternatives presented in the FS/PP-DEIS. Likewise, in May 1994 five final concerns were received from the EPA on the Operable Unit 4 FS/PP-DEIS. In responding to these five concerns, Table D.3-5 in Appendix D of the Operable Unit 4 FS/PP-DEIS was revised. The revised table is included in this Attachment. The following discussion addresses the nature and extent of these changes.

C.II.1 REPROMULGATION OF 40 CFR §191

Repromulgation of the 40 CFR §191 requirements for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Wastes has caused changes to be made to the ARARs as described in the Draft Final FS/PP-DEIS, conditionally approved by the EPA on February 9, 1994. DOE chooses not to submit revision pages to the FS/PP-DEIS; all changes to the ARARs for that document and any impacts from the repromulgation are discussed in this section of the Draft ROD. Since the repromulgation resulted in relevant and appropriate, rather than applicable requirements, the repromulgation of 40 CFR §191 will not impact the proposed off-site alternative for disposition of the K-65 material. However, the on-property disposal alternatives (Alternatives 2A/Vit and 2A/Cem) that were previously retained, having passed the threshold criteria of the detailed analysis, are no longer able to meet the threshold criteria of compliance with ARARs, and are consequently dropped from further consideration. Subsequently, all references to Alternative 2A are therefore deleted from reference in the text of the ROD, and in the Appendix A.

The only relevant and appropriate requirement from 40 CFR §191 that is retained as an ARAR in this ROD (Appendices A and B) for the proposed alternative is 40 CFR §191.03(b), which establishes dose limits for management and storage of the K-65 material. However, since this ARAR is relevant and appropriate, rather than applicable, it will pertain only to the on-property portions of the remediation.

Background

The United States Department of Energy - Fernald Field Office (DOE-FN) received conditional approval

of the Draft Final FS/PP-DEIS for Operable Unit 4 from USEPA on February 9, 1994. Included in the FS/PP-DEIS applicable or relevant and appropriate requirements (ARARs) was a reference to 40 CFR §191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Wastes". This reference to 40 CFR §191 was modified in the Operable Unit 4 FS/PP-DEIS, submitted in February 1994 in response to the conditional approval letter, to reflect the changes to the regulation that occurred upon its repromulgation on December 20, 1993. It still accommodates the specific direction previously provided by the USEPA regarding incorporation of the 40 CFR §191 requirements as an ARAR/TBC ("Operable Unit 4 Screening Dispute Resolution U.S. DOE Fernald", Catherine McCord, USEPA, to Andy Avel, DOE, dated October 18, 1990). The final rule became effective on January 19, 1994, during final revision of the Operable Unit 4 FS/PP-DEIS, and agency comments did not address the repromulgation of the rule. This fact was discussed with the USEPA, and a DOE position paper on the incorporation of 40 CFR §191 as an ARAR for Operable Unit 4 remediation was submitted to the USEPA for concurrence. The USEPA disagreed with the draft position proposed by DOE, and responded with a directive to incorporate the substantive elements of the repromulgated rule into the ROD, with an option to resubmit change pages to the FS/PP-DEIS ("Application of 40 CFR §191 to OU #4", Jim Saric, USEPA, to Jack Craig, DOE, dated April 25, 1994). DOE elected not to revise the FS/PP-DEIS, but rather to describe in this section of the ROD changes to the table of ARARs and associated impacts on selection or implementation of remedial alternatives that have occurred between the time the Draft Final FS/PP-DEIS was conditionally approved, and the submittal of the ROD to the USEPA and OEPA. The list of ARARs in the Draft ROD, and proposed approach to compliance with the substantive elements thereof, once approval by the USEPA is obtained, will be the final approved list of applicable or relevant and appropriate requirements for final remediation of Operable Unit 4.

Impacts of Repromulgation

Since 40 CFR §191 cannot be considered a legally "applicable" class of ARAR for this CERCLA remediation, §191 is not applicable to any Operable Unit 4 waste streams. Since compliance with only applicable requirements is required to be demonstrated for off-site remedial alternatives proposed under CERCLA, these requirements will not impact the proposed off-site alternative for disposal of the treated K-65 material at the NTS.

DOE previously included 40 CFR §191 Subpart A as a relevant and appropriate requirement, and Subpart B as to be considered (TBC) criteria for management of K-65 material in accordance with guidance received from the USEPA. Subpart A of §191, entitled "Environmental Standards for Management and

Storage" includes public dose rate standards for protection of the public from radiation hazards posed by spent nuclear fuel, high-level, or transuranic waste material. The repromulgation of the Final Rule did not materially affect the sections of Subpart A referenced in the Operable Unit 4 FS/PP-DEIS; the Subpart A requirement referenced in the Operable Unit 4 FS/PP-DEIS remains unchanged in the table of ARARs as a relevant and appropriate requirement for the on-property portion of the remedial activities to be conducted on the K-65 material.

Prior to repromulgation, Subpart B requirements were in remand, and were therefore considered TBCs in the FS/PP-DEIS submitted to the agencies. Since Subpart B of §191, entitled "Environmental Standards for Disposal", has been repromulgated, the USEPA has directed that sections must now be considered as relevant and appropriate requirements for any on-property disposal alternatives. Since it could not be demonstrated that the on-property disposal of treated K-65 material would comply with specific requirements of this Subpart, those alternatives involving on-property disposal (Alternatives 2A/Vit and 2A/Cem) were no longer able to meet the threshold criteria of compliance with these ARARs, and were consequently dropped from further consideration. All descriptions to Alternative 2A are therefore deleted from reference in the text of the ROD, and in the Appendix A.

A new Subpart C of §191 "Environmental Standards for Groundwater Protection", was created by the repromulgated rule. As with Subpart B, this new Subpart pertains only to disposal systems. The elements of this Subpart must now be considered as relevant and appropriate requirements; however, since the on-property disposal alternatives to which this Subpart pertains were dropped from further consideration on the basis of non-compliance with Subpart B requirements, and since Subpart C will not pertain to any off-site disposal alternatives, these requirements will not be included in the Appendix A or B tables of ARARs. Subpart C will have no effect on the selected alternative, which includes off-site disposal.

C.II.2 ERRATA SHEETS TO THE OPERABLE UNIT 4 FEASIBILITY STUDY/PROPOSED PLAN-DRAFT ENVIRONMENTAL IMPACT STATEMENT

In the course of obtaining EPA's approval of the Operable Unit 4 Feasibility Study/Proposed Plan-Draft Environmental Impact Statement, several iterations of specific comment responses were required to fully address five remaining EPA concerns.

On May 9, 1994 the EPA approved the Final Operable Unit 4 Feasibility Study Report and Proposed Plan based upon the satisfactory resolution of five remaining concerns. Only the resolution of one of the five

remaining concerns resulted in an action by the DOE, which involved the revision of two pages to the Operable Unit 4 Feasibility Study Report/Proposed Plan-Draft Environmental Impact Statement.

In the May 9, 1994 approval letter, the EPA noted that previously agreed upon changes related to the Operable Unit 4 FS, Appendix D, Table D.3-5 were not made in the revised final document per resolution. Specifically, the surface area (SA) values presented for the Dermal Contact While Bathing pathway in Table D.3-5, were not reflected in the Final Operable Unit 4 Feasibility Study/Proposed Plan-Draft Environmental Impact Statement document. In addition, the EPA noted that footnote "h" of Table D.3-5 was incorrect; the referenced pages were not consistent with the cited EPA document.

The following DOE response was accepted by the EPA on this matter:

> "This table (D.3-5) was derived from the OU4 Baseline Risk Assessment, but the latest change for this dermal exposure pathway was not made for this table. This will have no impact on the OU4 FS risk assessment as the only contaminant which was considered for the groundwater pathway was U-238. Since radionuclides are not evaluated for dermal absorption pathways, this parameter change will not change the risk values."

In accordance with this resolution the DOE issued the following revised pages to Table D.3-5, which included the corrected surface area value of 23,000 cm^3 and the corrected footnote "h".

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
Inhalation of Volatiles Released from Household Water Uses							
IR (m^3/hr)	N/A	N/A	N/A	0.63	0.63	0.63	0.63
ET (hr/d)	N/A	N/A	N/A	0.25[h]	0.17[h]	0.33[h]	0.25[h]
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Incidental Ingestion of Soil/Sediment							
IR (g/hr)	0.1	0.1	0.1	0.18	0.122	0.2	N/A
FI (unitless)	0.25	0.1	0.05	1	1	1	1
EF (d/yr)	52	110	40	350[d]	275[b]	350[d]	350[d]
ED (yr)	12	12	32	70	9[e]	6	70
BW (kg)	43	43	70	70	70	15	70
AT-Noncancer (d)[f]	4380	4380	11680	25550	3285	2190	25550
AT-Cancer (d)[g]	25550	25550	25550	25550	25550	25550	25550

See footnotes at end of table.

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
Dermal Contact While Bathing							
SA (m^2)	N/A	N/A	N/A	2.3[h]	2.3[h]	0.8[h]	2.3[h]
PC (cm/hr)	N/A	N/A	N/A	csv	csv	csv	csv
ET (hr/d)	N/A	N/A	N/A	0.25[h]	0.17[h]	0.33[h]	0.25[h]
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Dermal Contact With Soil/Sediment							
SA (m^2)	0.41	0.41	0.57	0.57	0.5	0.2	0.57
DA (cm/m^2)	1	1	1	csv	csv	csv	csv
ABS	csv	csv	csv	csv	csv	csv	csv
EF (d/yr)	52	110	40	350[d]	275[b]	350[d]	350[d]
ED (yr)	12	12	32	70	9[e]	6	70
BW (kg)	43	43	70	70	70	15	70
AT-Noncancer (d)[f]	4180	4180	11680	25550	3285	2190	25550
AT-Cancer (d)[g]	25550	25550	25550	25550	25550	25550	25550

See footnotes at end of table.

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
Inhalation of Dusts, Volatiles, and Radon							
DR (mrem/hr)	csv	csv	csv	csv	csv	csv	N/A
ET Indoors (hr/d)	N/A	N/A	N/A	18.3	19.8	22	N/A
ET Outdoors (hr/d)	4	2	1	5.7	4.2	2	N/A
EF (d/yr)	52	110	40	350	275	350	N/A
ED (yr)	12	12	32	70	9	6	N/A
BW (kg)	43	43	70	70	70	15	N/A
Ingestion of Vegetables and Fruit							
IR (g/d)	N/A	N/A	N/A	122	78[b]	101.5[i]	122
FI (unitless)	N/A	N/A	N/A	1	1	1	1
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Ingestion of Meat							
IR (g/d)	N/A	N/A	N/A	75	50[b]	29	75
FI (unitless)	N/A	N/A	N/A	1	1	1	1
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70

See footnotes at end of table.

TABLE D.3-5
(Continued)

Pathway Parameters	Trespassing Child Age 6-18	Expanded Trespasser Child Age 6-18	Expanded Trespasser Adult 18-50	RME On-Property Farmer Age 1-70	CT On-Property Resident Farmer Age 1-70	On-Property Resident Child Age 1-6	Off-Property Resident Farmer Age 1-70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncnacer (d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer (d)[g]	N/A	N/A	N/A	25550	25550	25550	25550
Ingestion of Milk							
IR (L/d)	N/A	N/A	N/A	0.3	0.2[b]	0.9	0.3
FI (unitless)	N/A	N/A	N/A	1	1	1	1
EF (d/yr)	N/A	N/A	N/A	350[d]	275[b]	350[d]	350[d]
ED (yr)	N/A	N/A	N/A	70	9[e]	6	70
BW (kg)	N/A	N/A	N/A	70	70	15	70
AT-Noncancer(d)[f]	N/A	N/A	N/A	25550	3285	2190	25550
AT-Cancer(d)[g]	N/A	N/A	N/A	25550	25550	25550	25550

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[a]Parameter values obtained from Final RI Report for Operable Unit 4 (November 1993), Table D.3-12.
[b]Special guidance from EPA Region V.
[c]Drinking water consumption rate of 1.4 L/day from NRC (Nuclear Regulatory Commission), 1977, U.S. Nuclear Regulatory Commission Regulatory Guide 1.109; NCRP (National Council on Radiation Protection) Report No. 76.
[d]Guidance from EPA (1991a), OSWER Directive: 9285.7-01B.
[e]Guidance from EPA (1991b), Interim Final, OSWER Directive: 9285.6-03.
[f]Calculated as the product of ED (years) x 365 days/year.
[g]Averaging time for carcinogens calculated as the product of 70 years x 365 days/year.
[h]EPA (1992a), "Dermal Exposure Assessment: Principles and Applications, EPA/600/8-91/011B.
[i]Guidance from EPA (1989), Interim Final, p. 6-36.

See footnotes at end of table.

ATTACHMENT C.III

FINAL ENVIRONMENTAL IMPACT STATEMENT DISTRIBUTION LIST

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FINAL ENVIRONMENTAL IMPACT STATEMENT
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ATTACHMENT C.IV

PUBLIC MEETING TRANSCRIPT

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US DEPARTMENT OF ENERGY

PUBLIC MEETING

MONDAY, MARCH 21, 1994

THE PLANTATIONS, HARRISON, OHIO

1 MR. STEGNER: Good evening. Thank
2 you for coming. My name is Gary Stegner. I work
3 at the Department of Energy at Fernald. Tonight
4 we're going to be discussing Operable Unit 4, which
5 are the silos, Silos 1 through 4 including the
6 basic five silos.
7 Briefly, very briefly, the way we're
8 going to set the evening up is, if you look at the
9 agendas on your chair, we'll start off with a
10 series of presentations which should last about a
11 total of about 45 minutes.
12 Following the presentations we'll
13 have an informal question and answer section. This
14 is informal as distinguished from the formal
15 comment period that will follow. During the
16 informal session, it will be a give and take with
17 the panel and any of the other experts who we might
18 have out there in the audience to answer your
19 questions regarding Operable Unit 4. We do want to
20 keep focused as much as possible on Operable Unit
21 4.
22 Following the informal questions and
23 answers, what we'll do is take a break for about 10
24 or 15 minutes. Then we'll come back, and then

1 we'll have the formal comment period. The formal
2 comment period is for the record. You know, it is
3 something that will be included in our
4 Responsiveness Summary, and it will be included in
5 the Record of Decision for Operable Unit 4.
6 Before I introduce the panel tonight,
7 a few logistical announcements. People will
8 remind, I think everyone is registering at the door
9 as they come in. If you want to make a formal on
10 the record comment, please designate that when you
11 sign in. The way I will do that is, following the
12 break when we begin that, I will go through there
13 and find out the number of people who want to and I
14 will call them up.
15 Don't think that you have to come up
16 here to the microphone tonight to make your formal
17 comments because there are comment cards on your
18 chairs. Also you can give those to me after the
19 meeting. You can send them to Amy at the
20 Department of Energy at Fernald, and you can also
21 just write out your comments and send them to us at
22 the Department of Energy at Fernald. We ask that
23 you have those to us by April 20th, however.
24 I think there is ice water someplace

in this room. Rest rooms are out the door there. There's also a pop machine if you want to get something to drink during the break. We encourage you to take the handouts that we have scattered throughout the room, if you want to find out more about Operable Unit 4.

So let me get on with introducing our panel tonight. We have Randi Allen, who is the Operable Unit Four Manager for the Department of Energy here tonight. Wilf Pickles, her counterpart with FERMCO, the manager there. We have Ed Skintik, Regulatory Compliance for the Department of Energy. His counterpart, Eric Woods, FERMCO reformatory programs; and also Dennis Nixon, the Assistant Unit 4 Director. So without further ado, I will turn it over to Randi Allen.

MS. ALLEN: We also have Eric Woods who works for FERMCO. All I'm going to do here real quick is, in case there's anybody in the audience that is not that familiar with Fernald, I'm just going to introduce you to the operable units, and then turn it over to Dennis Nixon. He's going to go through some details on Operable Unit 4.

1 Sure everybody has seen this before.
2 This is just to show you the location of the
3 Fernald. It's a 1,050 acre site located about 17
4 or 18 miles northwest of Cincinnati. What I'd like
5 to do here real quick is just run through the other
6 operable units to you, and then I'd like to present
7 a schedule. We're going to have a similar meeting
8 for all the other operable units in a little bit of
9 a later time scale here. I'll show that to you in
10 a minute.
11 Operable Unit 1, which you see in the
12 orange, is the waste pits, and Operable Unit 2 is
13 called other waste units. That's the flyash piles,
14 the south field, the sanitary field, and lime and
15 sludge fields. Operable 3, that's a bigger
16 operable unit. That's all the facilities located
17 on the site. Operable Unit 4 is obviously the
18 silos, one of the smaller units. And Operable Unit
19 5 is everything else not shown on the grid,
20 environmental media, the soils, and the ground
21 well.
22 Here's a schedule for the other
23 operable units. As you can see, in the yellow is
24 the period between like whenever you see the

1 remedial investigation report, that's when the
2 documents are beginning to become available for
3 review by the public. Operable Unit 4 down there,
4 we're right now between the feasibility stage,
5 proposed plan. We've initiated preparation of a
6 Record of Decision.
7 Some places you see the feasibility
8 study, and shortly thereafter the US EPA, the DOE
9 headquarters, and the Ohio EPA will review and
10 comment on the document and approve the document.
11 It becomes available for the public to review, and
12 they'll have this type of evening for each one of
13 the other operable units.
14 This is the process we go through to
15 get in the file remediation. Actually, this is a
16 pretty simple version of it, if you can believe
17 it. Right now in Operable Unit 4 we are right here
18 in beginning preparation of the Record of
19 Decision. So we're getting ready in the near term
20 to issue the Record of Decision of Operable Unit 4
21 that gets submitted to the US EPA and Ohio EPA in
22 June of this year.
23 After that, once we have reached an
24 agreement on what that Record of Decision should

1 say, the comments you provide on this proposed plan
2 are incorporated into that document. So once we
3 issue that Record of Decision, we will begin final
4 remediation.
5 At this time what I'd like to do is
6 introduce Dennis Nixon, and he is going to run
7 through the documents you guys have been asked to
8 review.
9 MR. NIXON: Good evening. What I'm
10 going to do, present this evening, is a brief
11 history of Operable Unit 4 and how we got to where
12 we're at today. As Randi said, Operable Unit 4 is
13 one of five operable units at Fernald. It's
14 located on the western portion of the site next to
15 Paddy's Run Creek. This is an areal shot of the
16 operable unit area.
17 There's a geographic area
18 encompassing the four waste storage silos. K-65
19 silos, which you'll see to the south, here Silos 1
20 and 2 contain the K-65 residues. Silo 3 is --
21 contains the cold metal oxide material. Silo 4 is
22 empty and was never used.
23 The operable unit also consists of a
24 radon treatment system and underground decant sump

1 tank that was used in the process of filling the
2 silos, the surfaces soils, subsurface soils, and
3 the berm soils, as well as any perched water that
4 may be encountered during the final remediation.
5 The silos were constructed in 1951
6 and 1952 for use as interim storage vessels for
7 defensive program waste that was being produced at
8 that time at the Melloncrock Chemical Works in St.
9 Louis.
10 I have a group of shots on the
11 construction I'll just run through. This is a -- I
12 believe the foundation being prepared for Silos 4,
13 3, 2, looking south. The silos were constructed --
14 Silos 1 and 2 were constructed in the winter
15 months, which caused some problems within the
16 construction, causing problems with shutting down
17 the concrete pours which resulted later in cold
18 joints, which when they stopped pouring the
19 concrete, which we'll show you in later pictures,
20 that later would form cracks in the sides of the
21 silos.
22 Silos 1 and 2 during the construction
23 phases, shot looking to the west during
24 construction. The silos were filled during up till

1958. If you'll notice the cracks on the south face where those cold joints in the construction occurred. Essentially due to those cracks, there later was an asphaltic cover. Here again the cracks in the sides of the silos looking to the north, Silo 1, 2, and 3.

In 1964 those cracks were sealed with a Gunite material, and then an asphaltic sealant was placed on that, and the first of two berms were added. The berms were added not only for -- They were mainly added for structural stability. They were also there to provide some shielding due to the radiation that was given off by the silo material. The decant sump tank, which was a buried tank, this is the -- an access way, a corrugated pipe that was used to access that tank after the berm was added.

And this is an areal shot of the original berm. Again, the K-65 silo is here. In 1983 that berm, the original berm, had resided, and we had another berm added in 1983 due to the erosion problems. Furthermore, in 1987 these dome caps were placed on the K-65 silos to enhance the structural integrity of the dome itself. The foam

1 was added to insulate the silos and to assist in
2 the radon problem, which we'll talk about a little
3 later.
4 Again, in 1991 -- I'll talk about the
5 history, is the clay that was added. We had a
6 removal action in 1991. Due to the radon concerns,
7 the chronic radon emissions, as well as concerns of
8 the silos collapsing and releasing material, we
9 added a one-foot layer of bentonite clay to the
10 residues.
11 As I said, the material was added up
12 until 1958 in the silos. The majority of the
13 material, as I said, was processed at -- the K-65
14 material was processed at the Melloncrock Chemical
15 Works in St. Louis. Essentially, they had a
16 problem in St. Louis with storage. So we
17 constructed the silos at Fernald for storage of
18 that material. It was shipped from Melloncrock as
19 well as Lake Ontario Ordinance Works to the Fernald
20 site.
21 You can see here the incoming drums
22 that were received at the site. Those drums were
23 slurried in the drum handling building. They were
24 reslurried, pumped in the silo. That material was

1 allowed to sit over night, essentially, and the
2 liquid was decanted off into the decant sump tank
3 that I spoke of earlier.
4 As well, some K-65 material was
5 processed at Fernald in our refinery. Those
6 raffinates were pumped in a liquid form through the
7 trench that you see here running east west to Silo
8 2.
9 The Silo 3 material was all processed
10 on site here in our refinery at Fernald. Those
11 raffinates were unlike the K-65 material, would
12 calcine at a very high temperature and would rot,
13 and would pneumatically convey through the same
14 trench to the pipe in Silo 3.
15 The K-65 material generally takes the
16 form of a wet clay material ranging from gray to
17 brown. It is defined as technically as 11E2
18 by-product material under the Atomic Energy Act,
19 which makes that an exception from the RECRA
20 regulations, even though we do consider RECRA as a
21 helpful and appropriate requirement.
22 The material in K-65 silos generally
23 the contaminates of concern are radium, thorium,
24 and lead-210. Due to that radium content, the

1 residues give off a considerable amount of radon
2 gas, which again was the reason for the removal
3 action to add the one-foot layer of bentonite clay
4 in 1991.
5 There are elevated concentrations in
6 the residues, the untreated residues, of barium and
7 lead. There are very low concentrations of PCB and
8 tributyl phosphate used that probably occurred
9 during the processing at the refinery or at the
10 Melloncrock Chemical Works.
11 Total volume of material, including
12 Silos 1 and 2, including the bentonite clay is
13 roughly 8,900 cubic yards. In your packets you
14 have tables from the remedial investigation, the
15 actual characteristics of the residues themselves.
16 I won't go over those tonight.
17 The Silo 3 material is called cold
18 metal oxides. As I said, those are a dry powdery
19 material like a talcum powder, again defined
20 technically as 11E2 by-product material, the much
21 lower concentrations of radium nuclides in the Silo
22 3 materials.
23 The predominant contaminates of
24 concern here are the thorium-230, uranium, and

1 lead-210 again. The Silo 3 material also leaches
2 rare earth metals listed here. Little to no
3 organics in the Silo 3 material due to that high
4 temperature calcine process.
5 And here the total volume of Silo 3
6 material, approximately 5,000 cubic yards, for a
7 total residue volume of roughly 13,000 cubic yards
8 to be processed in our final remediation. Again, I
9 have the tables of the characteristics of that
10 waste.
11 In addition to the residues, Operable
12 Unit 4 will remediate surface soils, contaminated
13 surface soils, contaminated berm soils, the
14 subsurface soils below and surrounding the silos,
15 and again any perched water that is encountered
16 during the final remediation.
17 As Randi said, we are in the process
18 of a remedial investigation feasibility study. We
19 currently have completed our remedial
20 investigation. It is conditionally approved by the
21 US EPA. The feasibility study and the proposed
22 plan have been completed, and again are
23 conditionally approved by the US EPA.
24 We are at the phase that we are

1 getting the public comments, public involvement in
2 our proposed plan, and responding to the comments.
3 We are making progress with our Record of Decision
4 based on this proposed plan. It's due to the
5 agency in June of this year. That will include a
6 Responsiveness Summary which will respond to the
7 questions and comments that are raised tonight and
8 in other meetings or other discussions, formal
9 comments.
10 And then after that Record of
11 Decision, hopefully by October, November time frame
12 of this year, we'll have a Record of Decision.
13 We'll be moving forward into the remedial design
14 and remedial action phases of the project.
15 All of the points are important that
16 we make and go into detail with later. The
17 documents that have been prepared today are fully
18 integrated with the NEPA process and act as the
19 site's draft of the Environmental Impact
20 Statement.
21 In the feasibility study, we
22 evaluated a full range of alternatives, you know,
23 alternatives that included on-site and off-site
24 disposal, various treatment options, and the DOE

1 proposed alternative, preferred alternative, is as
2 follows:
3 Essentially, the major components of
4 that preferred alternative are to remove the
5 residues from the silos, stabilize those residues
6 by the use of vitrification and dispose of those --
7 that vitrified waste off site at the Nevada test
8 site.
9 Again, we evaluated a full range of
10 alternatives, and those alternatives were evaluated
11 under the nine criteria which were provided by
12 CERCLA. We're currently involved with the
13 modifying criteria, which is to get the public
14 involved. Again, the major components, to remove,
15 treat, and dispose of the materials in the silos;
16 but in addition to that, we're going to be
17 demolishing. After the residues are removed and
18 treated, we'll be demolishing and decontaminating
19 the silos themselves, the remediation facilities
20 required.
21 We'll be excavating any contaminated
22 soils, that's surface and subsurface soils, the
23 perched ground water. And then, of course, the
24 disposal of the soils and debris will be consistent

1 with the Operable Unit 3 and Operable Unit 5
2 Records of Decision, respectively. They will not
3 be finally disposed of with this operable unit.
4 As for the cost of this action, the
5 cost is roughly $90 million from start to finish,
6 which is made up of the capital cost for the
7 facility as well as various remediation costs and
8 operations and maintenance costs.
9 This is the schedule. Essentially,
10 we are at the end of the proposed plan period. We
11 are entering into the Record of Decision. We have
12 a draft Record Decision right now at the DOE
13 headquarters that's being reviewed. We have
14 initiated some work on the remedial design work
15 plan based on this proposed plan.
16 Following the Record of Decision, we
17 will go into full-blown remedial design, and then,
18 of course, remedial action will follow. The
19 construction you see here, the construction phase,
20 will be roughly through March of 1997.
21 We'll initiate the remedial
22 operations shortly thereafter, and the facilities
23 will operate roughly until the year 2,000. After
24 the operations are complete, this is the period in

1 which we demolish and decontaminate the facilities
2 that were used to treat and stabilize the
3 materials.
4 There are a couple of key questions,
5 my last couple of slides here, that need to be
6 answered. Why remove the silo waste at all? I
7 think everyone that's involved with this, this
8 project, will agree that the silo materials need to
9 be taken out of the silos and put into a safe
10 configuration.
11 The silos have questionable
12 structural integrity. There is the potential,
13 always the potential, for a continued leakage from
14 the silos, proposes an unacceptable risk to both
15 the off-site residents as well as any future
16 trespassers for the site.
17 After they've been removed, why
18 vitrify these wastes? Vitrification is a very --
19 it's a proven technology, and due to our extensive
20 rehabilitative studies, we found it to be a very
21 good treatment technology for the K-65 silo
22 materials. The silo K-65 materials have high
23 silica contents which is very conducive to this
24 process.

1 There is significant volume
2 reduction. There is up to a 60 percent reduction
3 when vitrifying the K-65 materials. We have
4 significant reduction of radon emanation rate.
5 Essentially, once the material has been vitrified,
6 it has the radon flux of the common building
7 materials like bricks and wood.
8 It also reduces the leachability of
9 metals that are in the material. For example,
10 those metals we are concerned with listed here, the
11 untreated waste, the leaches in excess of the RECRA
12 maximum allowable concentration; after
13 vitrification all well below the regulatory
14 limits. Radon emanation rate, very high for the
15 untreated waste, and it is obviously a significant
16 reduction there.
17 That's all I have for you this
18 evening. I'd like to introduce Eric Woods, who's
19 going to talk in detail on the process in which we
20 integrated the CERCLA and NEPA in these documents.
21 MR. WOODS: Good evening. What I'd
22 like to do is provide a short presentation on
23 CERCLA/NEPA integration, basically focusing on
24 three things: a little bit about the history of

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1 NEPA compliance at the site, and then look at the
2 Operable Unit 4 feasibility study and proposed
3 plans specifically and kind of walk through how we
4 are integrating NEPA into these documents, and
5 then, lastly, provide a summary of the Operable
6 Unit 4 environmental impacts and the cumulative
7 environmental impacts.
8 So we're all on the same page with
9 respect to NEPA, NEPA is the National Environmental
10 Policy Act signed into law in January of 1970. The
11 goal of NEPA was to provide a national policy on
12 protection of the environment, and one of the
13 specific aspects of NEPA in order to accomplish
14 this goal is that it established a process by which
15 federal agencies, such as the Department of Energy,
16 will need to consider environmental impacts when
17 they made decisions.
18 This is formally known as the
19 Environmental Impact Statement Process, what we're
20 going through here for Operable Unit 4, and a very
21 important aspect of that is the public involvement
22 aspect.
23 The first Environmental Impact
24 Statement proposed at the Fernald site was a

1 renovation EIS. When the site mission changed from
2 production to remediation, the need for this
3 document went away, and the Department of Energy
4 subsequently canceled the renovation EIS.
5 As I said, the mission was changing
6 at that point from production to remediation, and
7 there was still the need to address NEPA for the
8 clean-up activities that were being planned at that
9 time. Therefore, the Department of Energy issued a
10 second notice of intent in May of 1990. This was
11 followed by scoping meetings in June, and this
12 basically announced that it intended to prepare an
13 Environmental Impact Statement for the Operable
14 Unit 4 remedial activities.
15 This document was designed or was
16 planned to do a couple of things. Mainly, it was
17 to look at the environmental impacts of the
18 Operable Unit 4 alternatives, specifically, and
19 reach a decision for OU4 and OU4 only.
20 However, because it was the lead EIS
21 or the first of five integrated documents to be
22 prepared at the site, it was also to address
23 cumulative impacts, and we'll walk through the
24 document and I'll show where and how we've done

1 that.

2 I'll mention that the remaining

3 operable units, 1, 2, 3, and 5, will also be

4 prepared as documents at a lower level, and we'll

5 make decisions for those operable units

6 specifically.

7 I think a key question is, why did we

8 integrate, why not do an individual EIS process and

9 an individual RI/FS process? The main reason is

10 there's a similarity between the two. The RI/FS

11 process under CERCLA, there's an awful lot of the

12 same things we need to do with the EIS under NEPA.

13 Primarily, NEPA evaluates the site, the

14 alternatives to reach an end goal, and it does

15 mention some of the criteria we look at. In the

16 end it identifies preferred alternatives. These

17 are similarities in the two.

18 There are some differences, primarily

19 in the way the alternatives are evaluated, and

20 where these differences occur is where we simply

21 utilize the CERCLA framework and infuse or

22 integrate NEPA into the documentation.

23 This does several things for us. It

24 avoids duplications, the duplications of preparing

1 two separate documents. It also minimizes the
2 potential for inconsistencies, and it's consistent
3 with DOE policy.
4 Looking specifically at the Operable
5 Unit 4 documentation, I want to point out the
6 various parts of the document where NEPA has been
7 infused or integrated. The first place is right up
8 front in the Executive Summary in the introduction
9 in Chapter 1.
10 We provided a discussion of
11 CERCLA/NEPA or NEPA/CERCLA integration, basically
12 what role the various documents play, why we do
13 this, how the remaining operable units will
14 follow. This just gives an overview of the
15 process.
16 The next place where we have
17 integrated NEPA is in Chapter 4. This is really
18 the most important part of the document from the
19 NEPA perspective. This is where we identify
20 environmental impacts that we anticipate for the
21 alternatives that have been identified.
22 Basically, as you go through the
23 alternatives, there is a short-term effectiveness
24 discussion and a long-term effectiveness discussion

1 for each alternative. Under short-term we provided
2 an analysis of the environmental impacts
3 anticipated during remedial activities. And then
4 in the long-term effectiveness section, we provided
5 an analysis of environmental impacts that are
6 anticipated after remedial activities are
7 complete.
8 When we evaluate environmental
9 impacts, these are some of the criteria we look
10 at. As you go through the document, you will see
11 short-term environmental impacts, just this is a
12 format of the evaluation you will see. Rather than
13 talk through these, I thought I would provide some
14 photographs to kind of illustrate what we're
15 talking about.
16 This slide illustrates several
17 things. This is Paddy's Run. Obviously, water
18 quality is related to Paddy's Run. Also the belton
19 king fisher and the various habitats of biotic
20 resources which evaluate wildlife, wildlife
21 habitat, any species that may be listed at the
22 state or federal level protected.
23 Also flood planes, there are flood
24 planes we must deal with along the Great Miami

1 River. There's also flood planes along Paddy's
2 Run. Flood planes extend to various points on the
3 banks of Paddy's Run depending on what the
4 topography is like in that area.
5 Another example of biotic resources
6 is this overhead. This is along the eastern
7 portion of the site, and this basically shows a
8 typical field or pasture type habitat we have, and
9 as we went through the cumulative impact analysis
10 and for the purposes of that analysis looked at the
11 possibility of on-site disposal, this was typically
12 the kind of habitat that we identified being
13 disturbed.
14 Another important aspect is cultural
15 resources. Cultural resources could be historic or
16 prehistoric artifacts, such as projectiles or some
17 of the ceremonial pieces that are identified on
18 this overhead. They also could be structures such
19 as homes that this area is very rich in cultural
20 resources, and we have an active program to insure
21 that we don't impact these types of things.
22 This is another shot of the flood
23 plane area. This is along the Great Miami River.
24 You can see the site in the distance. It's upside

1 down. The flood planes obviously extend in the
2 flat, cultivated fields adjacent to the Great Miami
3 River, and what we're concerned about when we look
4 at flood planes is basically changing elevations.
5 A flood, if it were to occur, either
6 a hundred-year flood or a 500-year flood, it's
7 typically accustom to proceeding a certain distance
8 from the river, in the case of Paddy's Run from the
9 stream. If we change elevations significantly, the
10 water can no longer go where it was accustomed to
11 going and will magnify down stream floods.
12 Kind of hand in hand with the flood
13 planes are wetlands. This is a typical wetland
14 that we have on site, basically this drainage ditch
15 with the cat tails. We have about 35 acres of
16 wetland on the Fernald site, and approximately 10
17 to 15 fall under this category of drainage ditch
18 wetlands. There's a larger area of forested
19 wetlands in the northern part of the site, which
20 are a little bit higher quality than this.
21 When we look at impacts in the
22 Operable Unit 4 document, both specific and
23 cumulative related to all of the operable units,
24 drainage ditch wetlands are primarily wetlands that

1 could be impacted. Wetlands on site are shown in
2 red. This is a large area of forested wetlands I
3 was speaking about.
4 We're taking steps, as we did very
5 early on in the process, to avoid this wetland
6 area. However, if we cannot avoid this area, we're
7 developing a strategy to compensate for the loss of
8 wetlands. We're going to be negotiating that with
9 the Army Corps of Engineers and various other
10 agencies. So those are just some of the kinds of
11 things we look at as we go through our impact
12 analysis.
13 Back to the document itself, also in
14 Chapter 4, at the end of Chapter 4, we have several
15 short sections that we've added to comply with NEPA
16 guidelines. These are irreversible, irretrievable
17 commitment of resources and several others. So
18 that essentially takes care of the body of the
19 feasibility study.
20 As I said, this document is
21 functioning for the Environmental Impact Statement
22 at the site. So the other aspect of it is
23 cumulative aspects that occur in Appendix I in the
24 feasibility study. We've taken remedial

1 alternatives, the latest information we had
2 available, and provided an analysis of the impacts
3 related to the overall remediation of the site.
4 Obviously, we're going to be
5 proceeding through the RI/FS process for the other
6 operable units. Decisions will be made for those
7 other operable units, and that -- the decisions
8 that are made at the very -- from the LRA's that
9 we've utilized for our evaluation in Appendix I.
10 If that happens, we'll update this analysis and
11 provide it for future feasibility studies for
12 submittance for other operable units.
13 Looking at some of the impacts we
14 anticipate for OU4 specifically, alternative, as
15 Dennis discussed, was removal, vitrification of the
16 contents of the silos, removal and on-property
17 disposal contingent upon decisions in OU3 and 5 for
18 storage.
19 Basically, there's an overall
20 beneficial impact for eliminating or controlling
21 the source or potential source of contamination of
22 the silo, contents in the silos. On the negative
23 side, the excavation of the Operable Unit 4 area
24 and the potential excavation for on-site disposal

1 facility will result in less than 15 acres of the
2 site being disturbed in the short term. Depending
3 on the decisions that are made in Operable Unit 3
4 and 4, a portion of these could be committed in the
5 long-term for disposal. Also potential for a small
6 area of wetlands to be disturbed as a result of the
7 excavation activities. Again, we're looking into
8 compensating for the loss of these wetland areas.
9 And minor increases in traffic due to
10 goods and materials, fill material, being brought
11 on to the site. This is on the order of ten trips
12 per day for the life of the remedial activity. And
13 those we've identified as substantive. There are
14 others, some of the other categories are evaluated
15 and discussed in the document as well.
16 As far as cumulative impacts go,
17 again, an overall beneficial impact due to the
18 elimination of sources of contamination. Due to
19 the potential sources to the air, water, and soil,
20 again, we're looking at all five operable units
21 being remediated.
22 So we've got a larger area that will
23 be disturbed during that activity up to 250 acres.
24 And, again, the LRA's that we use for this

1 evaluation primarily looked at on-site disposal.
2 So this is somewhat of a worst case scenario.
3 Hand in hand with the disturbances at
4 the site, a portion of habitat, such as the field
5 habitat I showed in the overhead previously, and
6 some forested areas in the northern part of the
7 site would be disturbed.
8 We do have -- Probably the most
9 important impact we need to identify is, we do have
10 the potential to lose most of the wetland areas on
11 the site. We are trying to work with the various
12 crews to insure or to the extent possible avoid the
13 wetland areas. Wetlands that we do lose due to
14 excavation or commitment of land, we will begin to
15 compensate or mitigate the loss of those areas.
16 In the area of socioeconomics, which
17 looks at impacts from the action to the local or
18 area economy infrastructure such as public
19 services, we do expect a significant amount of
20 material to be purchased in the area.
21 And in addition, we've done a lot of
22 evaluation as to the level of work force at the
23 site, and we expect the level to stay fairly
24 consistent through the life of the remedial

activities. Therefore, socioeconomics in the short term should be primarily beneficial. And as we complete remedial activities, the need for a lot of the work force will decline, which could result in minor socioeconomics after the activities are complete.

That concludes my presentation, and I'll turn it over to Randi Allen.

MS. ALLEN: I just have a couple slides here. These are the last three slides in your package, and I promise I'm not going to go through all of those. Sitting up there looking out at you guys, looks like not a moment too soon I'm winding up this packet here.

This is really what we've gone through in Operable Unit 4 so that we could relate what we are intending to do with the residue to advise you out there. Initially starts back when we submitted the document to US EPA and Ohio EPA, the document and the EIC.

Essentially, what we've gone through here is beginning really in October, we have tried to meet with the public to tell them what is in the proposed plan and the feasibility study, and have

1 gone through really risk assessment, ground water,
2 and different little round tables I guess.
3 And when we get down to the bottom of
4 this first slide, this is pretty much when we
5 started the distribution of this document. Because
6 it's an EIS the distribution of this document was
7 2,500 copies or something along that. This takes
8 us pretty much to where we are now. This is March
9 7th, this is just notifying this is an EIS
10 feasibility study.
11 The last sheet here will take us to
12 where we are now, to March 21st. And as I think
13 Dennis has told you, April 20th is the date that we
14 are asking for everybody's comments. You can give
15 us some comments this evening if you'd like to,
16 written or verbal comments. And I think the last
17 chapter in the proposed plan, there's -- also you
18 can send it, there's the address for submitting
19 your comments to the US DOE, Ken or Gary, or you
20 can send them out to Jim Saric.
21 What we're going to do at that point
22 in time is prepare a responsiveness study. When we
23 submit our Record of Decision down here on June
24 10th to US EPA, that Responsiveness Summary will be

1 part of that document. So that's your opportunity
2 to see how we responded to your comments.
3 This last one down here, there's been
4 quite a few questions on what kind of public
5 involvement do we have from this point on. Now,
6 they have revised the Community Relation Plan in
7 1986 and 1989. And it takes us pretty much up to
8 the Record of Decision point; is that right, Gary?
9 MR. NIXON: That's right.
10 MS. ALLEN: So what we need to do,
11 in the next three months I think the Public
12 Relations Department will be sending out some
13 questionnaires and folders to members of the
14 community to get some communication, when we get
15 into remedial design what part do you want to play,
16 how involved do you want to be to, do you want to
17 continue to have round tables.
18 We need to get some communication and
19 revise that plan. I think this is a pretty
20 standard format for all of the operable units once
21 they get to the feasibility study point as we go
22 through the round tables and have a public
23 meeting.
24 At this time what I'd like to do is

1 ask Jim Saric from US EPA and Tom Schneider from
2 the Ohio EPA if they'd like to make some comments.
3 MR. SARIC: I guess when I look at
4 the meeting we're having here tonight, the proposed
5 plan for Operable Unit 4 silos, I kind of sat back
6 and started thinking about some of the first times
7 I was involved in this project in 1987 for a few
8 months. And then I went and was working for EPA on
9 another Department of Energy project and came back
10 several years ago in '91, and the K-65 silos were
11 an issue of a very heated debate. They were a very
12 strong public concern.
13 I think if it was the one symbol of
14 the Fernald site that was representative, it was
15 the K-65 silos, and a very significant source of
16 contamination, a very significant source of concern
17 for all of us involved.
18 And I think today we're really at a
19 key pivotal point, a crossroad, where DOE is
20 proposing a remedy, one which we've looked at and
21 reviewed several times as well as Ohio EPA. And
22 we've looked at various options, and we think we've
23 got one that's very reliable, a very good option
24 for handling this material.

1 And, you know, we're hopefully going
2 to be able to move forward. We're encouraging you
3 to come forward with comments on this thing, and
4 then you'll have the Record of Decision coming in
5 in June which will basically begin finalizing this
6 decision. Obviously, if you look at some of the
7 earlier slides, there's still a lot more work to be
8 going on.
9 I mean, this is a decision on what
10 we're going to do, and now it's actually let's go
11 out and do it, remove the silo waste or whatever
12 the action. This will continue, and there's a lot
13 of work to be done, and I think the dates in 2,000
14 are, you know, ongoing as far as when activities
15 will be completed in 2,000 or 2,002.
16 So I guess, personally, I think we're
17 at a big crossroad here, and I guess it's important
18 really to understand what action is being taken,
19 and I encourage all your comments to give. If
20 you've got any questions, please ask any of us,
21 myself or Tom Schneider, and we can go over those
22 things with you. Thanks.
23 MR. MITCHELL: At the last meeting I
24 showed a new table of organization for the new

1 officers for the facility over the site, and Tom
2 Schneider has been selected as the Fernald
3 Coordinator, and this is his first meeting.
4 MR. SCHNEIDER: Well, I just want to
5 reiterate what Jim said. I think he said it very
6 clearly. We're at a very significant point in the
7 process. You know, we've all came a long way, and
8 you're all to be congratulated for having stuck it
9 out so long.
10 We're finally at the decision point.
11 We've spent all this time investigating this site,
12 now we're making the decision. Now is not the time
13 to give up on your involvement, and now is probably
14 the time to make your comments count the most.
15 Your comments on this plan and the future proposed
16 plans is really where you have a chance to make a
17 substantial difference.
18 We along with US EPA participated in
19 the review of these documents and the proposed
20 remediation, but we're always open to your
21 suggestions and comments. So like I said, we look
22 forward to your comments on this document. If you
23 have questions, we'll be here to answer them.
24 In the future there will be probably

1 a few more of us from Ohio EPA. We're hiring some
2 more staff, so hopefully that will be a little more
3 proactive to your needs and help you out as far as
4 information you might need. So like I said, feel
5 free to contact me outside of this at the office or
6 wherever. Thanks.
7 MR. STEGNER: Thank you. What we'll
8 do now is, we'll have an informal question and
9 answer session. It might be best if you use a
10 microphone back there. If you don't feel
11 comfortable, just stand up and shout it. We have a
12 recorder here tonight. Please just state your name
13 and the question, and we'll let the panel pick it
14 up. So whoever wants to be first, feel free.
15 MS. NUNGESTER: I'm Norma
16 Nungester. I'm a Fernald resident, and a member of
17 Fresh. I have a question of Dennis Nixon. He made
18 the statement that I don't agree with, and I
19 wondered if he could clarify for me. He said that
20 when you vitrify waste, it reduces radon emanation
21 to that of building materials. To my
22 understanding, when you vitrify radionuclides, that
23 they still are very, very hot.
24 MR. NIXON: That's correct. The

1 concentrate, due that reduction, is the radon
2 generation from the treated waste itself that is
3 significantly reduce. The radon is actually held
4 up, and the surface area is significantly reduced.
5 Did you get every other word?
6 You're exactly right, that due to
7 that fact that there's a significant volume
8 reduction, you actually concentrate the
9 radionuclides, so you have a higher concentration
10 of say uranium in a set volume, but the radon
11 itself is much less. The generation or the
12 emanation from the vitrified waste is much less
13 than in its natural form.
14 MS. NUNGESTER: Okay, thank you.
15 MS. YOCUM: Edwa Yocum, Fresh member
16 and a resident of the Fernald area. I was asking a
17 question, this concerns Subunit C2 on your
18 preferred alternative demolition removal on
19 property disposal. When you were talking about the
20 OU4 NEPA compliance with the substantive cumulative
21 impact up to 250 acres of surface disturbance, does
22 that mean that would be what would be part of where
23 the waste will be put?
24 MR. WOODS: Yeah. Again, we looked

at an LRA and assumed on-site disposal.

MS. YOCUM: Okay.

MR. WOODS: And that acreage would incur areas where waste would be disposed of.

MS. YOCUM: Okay. Then, you also are talking about the loss of 220 acres of habitat. Is that included in the 250 acres?

MR. WOODS: Yeah. That 250 would be a total that would occur during the short term, in other words, during excavation activities. Once remediation is completed, we would look at approximately 220 acres being permanently committed, so yes, that's correct.

MS. YOCUM: Okay, all right, that's what I wanted to know.

MS. NUNGESTER: Can you expand on that permanently committed? I missed something. Permanently committed for what, waste disposal facility?

MR. WOODS: Yeah, correct.

MS. NUNGESTER: Not for the waste itself but for the --

MR. WOODS: For the facilities that would house the waste.

1 MS. NUNGESTER: That's the inground
2 facility, the upgrade vault, as you so say?
3 MR. WOODS: Correct.
4 MS. NUNGESTER: Now can you give me
5 an explanation of what is in an upgrade vault?
6 MR. WOODS: The alternatives that we
7 used for the evaluation utilized the vault concept,
8 which would be a portion of the waste being
9 disposed of below grade, and, you know, basically a
10 portion above. There would be facilities that the
11 waste could be retrieved from, and what we used was
12 the calculation of the area.
13 MS. NUNGESTER: Disposal means
14 permanent?
15 MR. WOODS: Yes.
16 MS. NUNGESTER: But now you're
17 talking interim?
18 MR. WOODS: Well, what I'm saying is
19 the design of the facility wasn't as important as
20 the area that the facility could include. Designs
21 are going to be finalized as we go through the
22 remedial process.
23 MS. NUNGESTER: Well, this is
24 another thing, when you go through the RA and

1 that's where the final decision and designs are
2 actually made --
3 MR. WOODS: Correct.
4 MS. NUNGESTER: -- how can you come
5 out with a Record of Decision before you actually
6 know what the vault is going to look like and if it
7 is really going to do the job?
8 MR. WOODS: No, you cannot reach a
9 Record of Decision until, you know, we've gone
10 through the full analysis of what the vault will be
11 designed like and how it will work. What we did is
12 utilize the alternatives that were available at
13 that time for the purpose of the evaluation, which
14 is really the best we can do. We can't foresee.
15 MS. NUNGESTER: Okay. As of today?
16 MR. WOODS: That's correct, that's
17 correct. As we go through the various operable
18 units and decisions are made as to the final design
19 of the vaults and changes are made to the area,
20 that may be required. We'll update the analysis
21 and provide it in the future integrated documents
22 for the other operable units.
23 MS. NUNGESTER: Okay. So then our
24 decisions of the -- So your alternatives for the

1 Unit 4 can change by the time after arriving at a
2 decision?
3 MR. NIXON: We were specific with
4 the subunit wastes the Record of Decision. For
5 Operable Unit 4, specifically the Record of
6 Decision, the proposed plan in the future Record of
7 Decision will be that the Subunit C waste is -- you
8 remember us talking about being held in abeyance or
9 delayed operable units, the Subunit C waste will be
10 handled in accordance with the Records of Decisions
11 for Operable Unit 3 and Operable Unit 5,
12 respectively. Okay.
13 So as far as our Record of Decision,
14 essentially we carry it through the removal of the
15 soil, interim storage of that soil in accordance
16 with Removal Action 17, which is the management of
17 those soils, demolition of the structures and
18 storage of that debris in interim until OU3 comes
19 up with a final decision for the debris.
20 OU5 will have a final decision on how
21 the soils will be treated, and those all integrate
22 very well. When we start that remediation process,
23 when we have those soils excavated and stored, at
24 that time Operable Unit 3 and 5 Records Of

1 Decisions will be in place, and we'll have very
2 good integration.
3 At that point we'll be able to
4 deliver -- Theoretically, we'll be able to take the
5 soils out and take those to a Operable Unit 5
6 facility for treatment. They'll be disposed of in
7 accordance with their Record of Decision, and that
8 may or may not be on-site disposal.
9 MS. NUNGESTER: Okay. You're
10 saying, you're taking the debris, the structure,
11 the equipment, the surface soil, you're putting
12 them all in the underground vaults?
13 MR. NIXON: Operable Unit 4 is
14 delaying that decision. That's going to be
15 actually be stored in an interim fashion --
16 MS. NUNGESTER: Okay
17 MR. NIXON: -- until OU5 and OU3
18 have records of decision. Now, their Record of
19 Decision may very well be that we will treat soil
20 by washing it and disposing of that on site.
21 MS. NUNGESTER: Right, but it
22 doesn't say that, that it's going to be interim
23 until Unit 5 is considered.
24 MR. NIXON: The proposed plan does

1 clearly state, as well as the Record of Decision
2 will clearly state those, that integration.
3 MS. NUNGESTER: It does?
4 MR. NIXON: Yes, it does.
5 MS. NUNGESTER: Okay. Well, I know
6 on the proposed plan booklet on page 43 talks about
7 that specific issue.
8 MR. NIXON: Right.
9 MS. NUNGESTER: If anybody has that
10 book, and they want to look at it, they can, but I
11 don't believe it says -- It says something about
12 that it will be combined with 5, Unit 5, but it
13 does not say that would be interim disposal until
14 5.
15 MR. NIXON: Disposal, it is interim
16 storage.
17 MS. NUNGESTER: Or storage, but they
18 use "disposal" as the word throughout the whole --
19 MR. NIXON: In the proposed plan,
20 the proposed plan has, for Subunit C waste, it has
21 a selected or preferred alternative which is
22 on-site disposal identified, and the reason that's
23 in there is because on-site and off-site disposal
24 was so close we had to select the one for the sake

1 evaluating the full alternative from start to
2 finish. Okay.
3 Later in the document it talks about
4 the integration effort that will occur with OU3 and
5 OU5, and puts -- holds that decision in abeyance
6 for final disposal of those debris and soil until
7 OU3 and OU5 have their Records of Decision.
8 MS. ALLEN: The confusion could be
9 the fact sheet on page 12 states that the soil
10 debris will be disposed of on site.
11 MR. NIXON: There is an ~~area~~ error in the
12 fact sheet on page 12, the last paragraph I
13 believe.
14 MS. NUNGESTER: Then, this shows
15 more of a reason why the public should have a
16 comment period before -- after -- in between the
17 ROD's and even during the remedial, the RA, then,
18 to understand it. Thank you.
19 MR. STEGNER: Other questions?
20 UNIDENTIFIED SPEAKER: I have one,
21 and it goes to back to when you were talking about,
22 Randi about, the community and stake holders or
23 public or whatever we're called these days, plays a
24 part in this process. I'll echo what Edwa just

1 said. We give our comments, then there's a Record
2 of Decision. You respond to our comments, and you
3 follow this thing down.
4 But what if we don't like your
5 responses, you know, I don't see another -- I guess
6 as a stakeholder, which is kind of an okay word
7 these days, I guess I have a little bit of a
8 problem with that because once I give you my
9 comments on this as of April 20th, I don't get to
10 say nothing else, and if you don't like what you
11 choose or I don't like the way you responded to my
12 comments, you know, how am I going to be able to
13 come back and say I don't like this?
14 MS. ALLEN: Just like with any other
15 primary document, we submit them to US EPA, and
16 that same document also goes over to the PEIC, and
17 I'm assuming that the Record of Decision will be
18 like any other document in that once it hits the
19 PEIC, you guys are invited and welcome to comment
20 on the document and provide comments over to Gary
21 and Ken.
22 UNIDENTIFIED SPEAKER: And they
23 would be considered as official comments? Because
24 as I read this thing here, it doesn't indicate that

1 at all.

2 MS. ALLEN: It also doesn't in the

3 remedial investigation report, but if you can

4 remember --

5 UNIDENTIFIED SPEAKER: I guess what

6 we're asking for is that we need to be walked

7 through this process, you know. Once the Record of

8 Decision is made, we need to be talked to before

9 your remedial design stuff. We need to be involved

10 in that remedial design stuff.

11 Then we need to talk about the

12 remedial action stuff, and it's going to create a

13 lot of work for people, but we're afraid if we're

14 not walked through that process that we're going to

15 end up at the end with an alternative that people

16 in this community are really going to be upset

17 with.

18 MS. ALLEN: I think that's where the

19 input on the edition that's coming out of the

20 public relations group is going to be critical

21 because it doesn't take us past the point we are

22 right now, and I think we need to get some kind of

23 idea of what kind of part you guys want to play in

24 that.

1 MR. PICKLES: Really the FS and
2 proposed plans for Unit 5 is coming out, you do
3 have a comment period. I assume from your comments
4 about what we're doing in the -- are you satisfied
5 with the issue; is that right?
6 UNIDENTIFIED SPEAKER: Well, I mean
7 some of us might be. I can't speak for everyone in
8 this room, but, you know, at the same time we're
9 going to walk through this process of designing how
10 we're going to do this, I want to know what's going
11 on and what's happening so I can verbally say I
12 don't like this or I like this or this isn't right
13 or whatever.
14 You know, I don't want to say, yeah,
15 yeah, I'm all for your alternative here, this
16 sounds great, let's do it, and then you don't talk
17 to me until the year 2,000, and I don't like what
18 you did.
19 You know, I think, you know, if we're
20 going to stick through this process as we've done
21 for ten years, and I guess we'll do it for the next
22 how many ever, we want to make sure that we're
23 making good and tough decisions as we move along
24 here so when we get done, we have a cohesive

1 decision in this community that we can live with
2 what is left here.
3 MR. STEGNER: I think it's safe to
4 say that we'll be involving you throughout the
5 whole entire process, walking you through the
6 process, you and the Citizens Task Force.
7 UNIDENTIFIED SPEAKER: We need to
8 see that as being a real life thing. Somewhere on
9 here it needs to be written in here we'll talk to
10 the public, we'll seek public input, we'll
11 whatever. That needs to be added in here somewhere
12 because we don't see that in here right now.
13 MS. ALLEN: Well, we almost have to
14 because I'm already getting asked questions right
15 now that I can't answer until remedial design. As
16 far as long term during final remediation, I don't
17 have the answers right now. So I mean, this
18 process going to have to continue through final
19 clean-up because I just can't answer the questions
20 right now.
21 UNIDENTIFIED SPEAKER: On February
22 1st the Ohio EPA issued a notice of deficiency and
23 closure. Were those deficiencies ever corrected?
24 MR. NIXON: Which closure plan?

1 UNIDENTIFIED SPEAKER: On Unit 4,
2 the one you just gave us an elaborate presentation
3 on.
4 MR. NIXON: I believe there might be
5 some confusion there. Can the State of Ohio clear
6 that up? RECRA Unit 4 Solid Waste Unit possibly,
7 it is not this operable unit.
8 UNIDENTIFIED SPEAKER: Not this
9 operable unit?
10 MR. SCHNEIDER: That's correct.
11 UNIDENTIFIED SPEAKER: So two
12 different hazardous waste units on this facility?
13 MR. SCHNEIDER: This isn't a
14 hazardous waste unit.
15 UNIDENTIFIED SPEAKER: Could we ask
16 them to stand when they speak?
17 MR. SCHNEIDER: We're saying
18 Operable Unit 4 is it not a hazardous operable
19 waste unit, not Operable Unit 4. I don't know what
20 exact letter you may have there, but we can talk
21 about it. I think it's probably a RECRA unit.
22 UNIDENTIFIED SPEAKER: It was issued
23 February 1st out of your office, 1994.
24 MR. SCHNIEDER: Must be a RECRA

1 unit, then.

2 UNIDENTIFIED SPEAKER: Okay. I'll

3 discuss it with you.

4 UNIDENTIFIED SPEAKER: I'm Lou

5 Bogart. I'm a resident of Ross. I have some

6 technical questions. In looking at data tables for

7 Operable Unit 4, one of the things that strikes me

8 is that you always report uranium 254/236. Does

9 that mean there's U-236 there? If so, I don't

10 believe it because U-236 doesn't exist in nature.

11 Secondly, the ratio of U-234 to U-238

12 in many cases look very odd, odd in the sense that

13 in nature and in this ore and in the raffinate the

14 234, 238 ratio ought to be very close to unit. For

15 example, when in the table that you've given a

16 handout, the Silo 1 number looks pretty wrong. The

17 Silo 2 number is more acceptable.

18 And the reason I think that's

19 important is because you're going to focus the

20 clean-up levels on U-238. I don't quite know how

21 you're going to do that without doing some very

22 sophisticated isotopic analysis. But in any case

23 those numbers don't look right, and you see that in

24 many, many tables.

1 On the inorganic chemicals, is there
2 somewhere in all the OU4 documentation a list of
3 all of the inorganic constituents? For example, I
4 note that in most of the recent documents you don't
5 list gold. Now you can. There is about, about
6 four times as much gold in this material as
7 silver.
8 Just as a side light for my own
9 amusement, I calculated this afternoon. There's
10 about $2.3 million worth of gold in those two
11 silos, and that may not be important, but what
12 other elements are not reported which may have some
13 impact on the processing of the material by
14 vitrification?
15 For example, there should be a fair
16 burden of rare earths, the whole lamprophyllite
17 series should be in these ores, and I don't see any
18 of that being reported. Anybody have an answer for
19 that one?
20 MR. NIXON: Well, you had about five
21 questions, so I'll start in the beginning. One was
22 235 to 236, those are analyzed and reported the
23 same. You are correct. We don't feel there is any
24 uranium-236 in the residues. It's a good point.

1 Whether the ratio between U-234 and U-238 is
2 correct, I do not have the answer to that, but we
3 can discuss that and get back with you within the
4 next couple of days.
5 MR. BOGART: How about a complete
6 list of --
7 MR. NIXON: Complete list, the
8 remedial investigation did do a complete list of
9 the organics, inorganics. Whether gold was
10 evaluated, I'm not sure. I'm looking at my team.
11 MR. BOGART: You were supplied gold
12 by TLCP.
13 MR. NIXON: But we also do a full
14 HSL, Hazardous Substance List, which gold would not
15 be part of. So I'm not sure whether gold was
16 particularly reported in the RI.
17 MR. BOGART: How about rare earths?
18 MR. NIXON: I couldn't answer that,
19 either. We've got a copy of the remedial
20 investigation here. Whether these fellows can
21 quickly find answers to those questions or again we
22 can get back with you.
23 Amy Engler I know is sitting out here
24 somewhere taking very good notes, and we'll respond

1 to any of the questions which we don't have answers
2 to tonight. We've committed to have answers back
3 within 48 hours from this evening.
4 MR. BOGART: Well, I -- not so much
5 for myself, but I think for the general public.
6 MR. NIXON: Any question that is
7 raised even in the informal conference will be
8 addressed in the responsiveness.
9 UNIDENTIFIED SPEAKER: Can we use
10 that gold as collateral, can we use that? You said
11 there's like $2 million worth of gold. Can we use
12 that as collateral somehow?
13 MR. BOGART: It's going to cost 90
14 million bucks, maybe we can make it 88 million
15 bucks. On page 21 or whatever this thing is
16 called, the proposed plan, the spiral-bound thing,
17 on page 12 about the middle of the page is an
18 initiation of a discussion about risk.
19 And this is the area that concerns me
20 the greatest, because although you point out
21 that -- And I presume in all cases you're talking
22 about fatal cancers because there are, of course,
23 nonfatal cancers also. And that's not terribly
24 clear in anything that's written.

1 Risk from exposure, the radiation
2 naturally occurring in the environment is about 1
3 in 100 primarily from radon; however, incremental
4 risks targeted by the upper end of EPA range means
5 if all persons within a population of 10,000, 1
6 person might get cancer from the exposure, and
7 cancer is expected from all other causes. I think
8 the whole business of risk assessment needs to be
9 put into some kind of context.
10 If you look at the latest NCRP
11 guidance, 115 and I guess 116, you can talk about
12 risk in terms of about 4 or 5 times 10 to the minus
13 10 and you do the hocus-pocus chemists like to do.
14 And that turns out the average resident from
15 natural radon, that risk becomes about one half
16 times 10 to the minus 2 and the range is 0 to 90
17 years old. And when 90 years old, I guess cancer
18 is the last thing I'm going to worry about.
19 But in any event, you make the
20 statement that the normal cancer risk is about 10
21 to the minus 2, and then you proceed to march down
22 the road of things that are 2 to 4 to 5 orders of
23 magnitude smaller, and it's never put in context.
24 And I think these documents need to discuss what

1 are we paying for, and that becomes a real
2 problem. I don't know how many people feel
3 comfortable with a 10 to the minus 6 risk, and I'm
4 not real sure that that's a fatal cancer risk.
5 There is a problem with the
6 methodology of using the health effect summary
7 table slope factor thing as opposed to methodology
8 that's used by people who do the beer studies and
9 the NCRP studies because we're talking about vast
10 orders of magnitude differences.
11 Now, the last comment I guess, I'd
12 like to see something in these documents that more
13 clearly explains why the CERCLA process has elected
14 to use such abominably small risk estimates.
15 My last comment perhaps goes to EPA
16 back in 1986, was a bad year for me, EPA published
17 a notice of intent that they were going to
18 promulgate residual regulation standards. It is
19 now 1994, and, to the best of my knowledge,
20 residual radiation level standards have not been
21 promulgated.
22 In 1993 in a GAO report to Congress
23 somebody in EPA said that in March of 1994 they
24 were going to finally publish residual radiation

1 standards, not publish them, but they would take
2 them to OMB, which would be the fist step in
3 getting them published -- well, not the first step,
4 but a key step in getting them published in the
5 Federal Register.
6 March 1994 is now. My concern is, is
7 there one part of EPA working on residual radiation
8 level standards which may very well impact on the
9 clean-up levels that are being talked about here
10 for the clean-up of OU4?
11 MR. NIXON: Was there any response?
12 MR. SARCA: Yeah, I can answer that
13 from my understanding. One of the people involved
14 from the EPA perspective that works with me, he's
15 been commenting that he's involved in working on
16 some of those standards. Will they directly impact
17 this investigation, I don't know. I don't think
18 so. Hearing some of the numbers, I think they may
19 even be moving towards the side of being equally as
20 conservative, could be more conservative.
21 I don't know what the final will come
22 out with. When they do come out of the numbers,
23 they'll go to budget and move forward from there.
24 I do know that they are being worked on. One of

1 the people from my office is doing that right now.
2 I don't know the exact state.
3 UNIDENTIFIED SPEAKER: If memory
4 serves, I think that the gold Lou was talking about
5 was contained in the pitch blend or whatever it was
6 that came over from Africa that the United States
7 bought and dumped into the K-65 silos. I heard or
8 read that somewhere. You might want to check that
9 out.
10 MR. NIXON: It is in the K-65
11 material, yes.
12 MR. BOGART: It all came from one
13 mine.
14 UNIDENTIFIED SPEAKER: The reason
15 they took that pitch was they wanted to strike
16 gold?
17 MR. BOGART: No, radium and gold.
18 UNIDENTIFIED SPEAKER: As far as I'm
19 concerned, it can be vitrified.
20 MR. BOGART: The question was, what
21 else is there?
22 UNIDENTIFIED SPEAKER: Okay. I just
23 have another question. When you said they were
24 filling the silos, especially 1 and 2, did they

1 transport it through a pipe?

2 MR. PICKLES: Yes, ma'am.

3 UNIDENTIFIED SPEAKER: That's not

4 what I recall. If my memory serves me correctly,

5 some of that material may have been put in that

6 way, but I remember the workers saying at different

7 times that they also carted barrels out there from

8 the silos.

9 MR. NIXON: Most of the material in

10 Silos 1 and 2 were in a drum form that came from

11 Melloncrock Chemical Works in St. Louis. Those

12 drums were taken to the drum handling building

13 between Silos 2 and 3. The drums were dumped and

14 then mixed into a slurry with water and pumped into

15 the silo and then allowed to settle. The water was

16 decanted off into the decant sump tank, and then

17 that water was used to reslurry additional material

18 coming from off site.

19 The material -- The majority of the

20 material, that was processed here on site, because

21 we did process both at the Melloncrock Chemical

22 Works as well as some of the material being

23 processed here, K-65 material being processed at

24 the site in our Refinery Plant 2 and 3.

1 That material as it was processed
2 from the production area at Fernald, it was
3 transported hydraulically in a slurry through that
4 underground trench, through the pipe back to Silo
5 2. But the majority of the material was in drum
6 form and reslurried at the silos.
7 UNIDENTIFIED SPEAKER: I think that
8 should have been mentioned in your report there,
9 you know. It says, from the way I read it,
10 everything went through that pipe and everything,
11 which it wasn't really.
12 MR. NIXON: I tried to talk to that
13 point in showing that one areal shot where you can
14 see all of the large numbers of drums that were
15 being stored by the silos. That is the incoming
16 material that was coming in from Melloncrock in St.
17 Louis and then reslurried at the site.
18 MR. STEGNER: Thank you. Let's take
19 our break now and reconvene for the formal comment
20 period.
21 (A brief recess was taken.)
22 (All panel members except Mr. Stegner stepped
23 down.)
24 MR. STEGNER: This is the beginning

of the formal comment section where your comments will be entered to the Responsiveness Summary in the Record of Decision. We will do this as we have some folks who have signed up to make comments. You do not have to sign up to make comments. You can have an open mike at the end. There's only about four or five folks here that indicated they wanted to make comments.

Again, you do not have to use this forum to make the official comments. You can submit comments on one of these cards and leave them here at the end of the meeting or you can submit comments to the Department of Energy at the Public Affairs office. We also ask before you leave, if you don't mind, to fill out the evaluation forms we have sitting on all of the chairs.

The first person we have is Kevin Sorrel. I guess can Kevin's not here.

UNIDENTIFIED SPEAKER: There's some folks still out here in the hallway.

MR. STEGNER: You want to check out there.

UNIDENTIFIED SPEAKER: Not there.

1 MR. STEGNER: Is Lee Bolver still
2 here?
3 UNIDENTIFIED SPEAKER: He left.
4 MR. STEGNER: Bob, do you have
5 something to say?
6 UNIDENTIFIED SPEAKER: I'll turn it
7 in later.
8 MR. STEGNER: Bob Gessel -- Godsel,
9 I'm sorry? Going very well so far. Tom Wagner,
10 Citizens Task Force? Okay. We have an open mike,
11 folks, if anyone wants to make a comment.
12 MS. NUNGESTER: You want my address,
13 too?
14 MR. STEGNER: Not necessary, as long
15 as we have your name.
16 MS. NUNGESTER: Norma Nungester,
17 Fernald resident and Fresh group. I have several
18 comments. First of all, I want to cover again what
19 was stated in the question and answer period. I
20 think between the draft ROD and the final ROD we
21 need a public comment official time, and you need
22 to formalize this. On down here below you say the
23 public involvement, public involvement, that means
24 nothing to us. You need to formalize that.

And you also need more details on your RD/RA work plan. We want to know more details on transportation. We want to be notified when you're transporting this stuff and talk about the materials that are actually in the K-65 when they're vitrified and when you start to ship them out to Nevada.

Also this stuff that stays on site, I'd like to know how they will be monitored, and for how long of a period they're going to be monitored. I guess I just want to express that we want a guarantee that real-time monitoring will be used.

Also a suggestion, how about covering those silos when you start working on them? I think this is one of the most important things you could do for the community. I think that's about it. I'm trying to read my notes that are chicken scratch here.

Oh, one more thing. I'd like to be diligent on referring large quantities of waste from other sites. We don't want anything brought in here from other plants to vitrify with our material or to be put under the storage areas.

1 Thank you.

2 MR. STEGNER: Thank you, Norma.

3 Edwa?

4 MS. YOCUM: Edwa Yocum. Some of

5 this will sound repetitious, but I'm asking for a

6 public comment period between the ROD's, the draft

7 and final; and we need an official public comment

8 period after the RA process. And also I'm asking

9 for a public comment period between the beginning

10 and completion of remediation. And then, too, when

11 dismantling the K-65 silos and also the 3 and 4,

12 I'd like to have a protective cover be used around

13 the silos.

14 And as far as I read in there, that

15 EPA would be reviewing the vault or the disposal

16 sites every five years, I'd like to know the

17 definition of "reviewing," and I would like

18 continuous monitoring and maintenance of on-site

19 disposal vaults or at least one time a year as long

20 as they're on site. And also, who would be paying

21 for this monitoring and maintenance? And this way

22 I recommend a trust fund for monitoring and

23 maintenance of the disposals.

24 MR. STEGNER: Thank you, Edwa. Open

1 microphone still, folks. Thank you all very much.

2 - - -

3 MEETING CONCLUDED AT 8:45 P.M.

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1 C E R T I F I C A T E

2 I, LISA CONLEY, RPR, the undersigned, a notary
3 public-court reporter, do hereby certify that at
4 the time and place stated herein, I recorded in
5 stenotypy and thereafter had transcribed with
6 computer-aided transcription the within (65),
7 sixty-five pages, and that the foregoing transcript
8 of proceedings is a complete and accurate report of
9 my said stenotypy notes.
10
11
12
13 MY COMMISSION EXPIRES: LISA CONLEY, RPR
14 JULY 28, 1994. NOTARY PUBLIC-STATE OF OHIO
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SUMMARY OF MEETING MINUTES COMMUNITY ADVISORY BOARD FOR THE NEVADA TEST SITE

DATE: May 11, 1994
TIME: 7:00 P.M. - 9:30 P.M.
PLACE: THE ALEXIS PARK RESORT
LAS VEGAS, NEVADA
SUBJECT: PROPOSED SHIPMENT OF FERNALD, OHIO LOW-LEVEL RADIOACTIVE WASTE TO THE NEVADA TEST SITE

SPEAKERS:		Page
For the Government:		
	Jack Craig	9
	Joe Fiore	7
	Dennis Nixon	9
	Layton O'Neill	13
	David Rast	6
For the CAB Members:		
	William Vasconi, Chairperson	18
	Dennis Bechtel	5
	Chris Brown	8
	Lathia McDaniels	7
	Richard Nicolla	8
	E. Paul Richitt, Jr.	11
	Joanne Stockill	6
	Katherine Yuracko	11
Ex Officio Members:		
	Joe Fiore	7
	Paul Liebendorfer	7
For the Public:	Don Hendricks	12
	Jerry Sieren	15
	Michael Verrilli	15
	John Walker	10

ATTENDEES:

DOE AFFILIATES:

Jack Craig, USDOE/FN
Leah Dever, DOE/NV
B. Dozier, REECO
J. E. Evered, FERMCO
Sharon Faurer, DOE/HQ
Joe Fiore, DOE/NV
Wendy A. Griffin, DOE/NV
Patricia Herrin, REECO
Warren Hooper, FERMCO
Steve Housen, FERMCO
Allene Kitchen, DOE
Joe Kitchen, DOE/NV
David Lojek, DOE/FN
Darwin J. Morgan, DOE/NV
Dennis A. Nixon, FERMCO
Don Ofte, FERMCO
Layton O'Neill, DOE/NV
Brian Perkins, REECO
David Rast, DOE/FN
Myrle Rice, IT Corp.
Kevin Rohrer, IT Corp.
James Saric, USEPA/Region V
Bonnie Thompson, DOE/NV
Pam West-Thompson, RSN
Donald Wruble, PAI
Runore Wycoff, DOE/NV

CAB MEMBERS:

Name	Address
Richard Arnold	[redacted]
Dennis Bechtel	
Chris Brown	

James Henderson

Marilyn Littlepage

Lathia McDaniels

Richard Nocilla

E. Paul Richitt, Jr.

Joanne Stockill

Bill Vasconi
(Chairperson)

Katherine Yuracko

[redacted]

EX-OFFICIO MEMBERS

Paul Liebendorfer

Joseph N. Fiore

[redacted]

PUBLIC CITIZENS: **Name** **Address**

George Blankenship

Jim Buchanan

[redacted]

Sydney Gordon

Don Hendricks

Rob Santa Maria

Tom Schneider

Gerald Sieren

Michael Verrilla

John B. Walker

[redacted]

REPORTED BY: Wendy J. Pullium, PAI
Transcriber

CALL TO ORDER:

The meeting was called to order at 6:10 p.m.

The purpose of the evening's meeting was for two presentations. The first presentation was furnished by representatives of the U.S. Department of Energy Fernald Field Office located in Cincinnati, Ohio. The second presentation was presented by the Waste Management Division, U.S. Department of Energy, Nevada Opertations Office.

Each presentation was followed by a question and answer session from the NV/CAB and the public.

Joe Fiore announced that the state of Nevada had made a request in response to a draft Envioronmental Impact Statement issued by Fernald which described the activities which result in waste being transported to the Test Site, and the request involved extending the public comment period on that document for 60 days to give the Community Advisory Board of the Nevada Test Site Programs (NV/CAB) an opportunity to understand the situation better. In response to that, Fernald agreed to extend the comment period by 30 days. The original closing date for comments was April 20th; it is now May 20th. This meeting was being held in time for comments to be put together in the next nine days.

FERNALD'S PRESENTATION:

Dave Rast from the Fernald Field Office gave a summary on the proposal to transport and dispose of low-level radioactive waste at the Nevada Test Site's radioactive waste management site. The waste will be generated in the cleanup and environmental restoration of the DOE's closed uranium production facility near Fernald, Ohio. If the proposed and subsequent actions are implemented, approximately 300,000 cubic yards of radioactive waste will be disposed of at the NTS. Disposal activities would cover a period of approximately 30 years. Copies of the slides presented are attached.

QUESTIONS AND ANSWERS:

At this time, each Board member introduced him/herself and then proceeded with their individual questions and/or comments.

DENNIS BECHTEL: First, I would like to thank you for sharing information about the site. I had the opportunity to visit Fernald several years ago as a member

of the EMAC board. Could you possibly translate your numbers, your 300,000 cubic yards and your annual figures in numbers of shipments, and what they might mean?

DAVE RAST: We get approximately 18 cubic yards of waste on the average on a shipment. If I do the simple math and just divide it by 20, that is 15,000.

DENNIS BECHTEL: So that's potentially what? Three thousand trips a year, and you are looking at FY96 here? (No response given.)

JOANNE STOCKILL: What kind of shipments are you talking, rail or truck?

DAVE RAST: Truck. Currently the only mode of transportation we have off site is truck shipments. We have been looking at rail shipments. Currently, the rail at Fernald is light gauge rail and cannot support heavy shipments, and we have some local rail in the area that is in need of repair before I would attempt to effect any shipments by rail.

JOANNE STOCKILL: Is that true of the 600,000, you are going to put in commercial sites?

DAVE RAST: Yes.

DENNIS BECHTEL: Follow up on the question I had. When you plan your shipping campaign, what sort of coordination do you do with state and governments and particularly the state of Nevada? How do you handle that?

DAVE RAST: Currently, we haven't done any coordination from Fernald in emergency preparedness. DOE established a radiological response team and divides the contaminant into areas for response in a case of a transportation emergency. We also effect training for our shippers. We also have a designated route for which drivers are to transport shipments. They also have a designated call-in time; they have to report at least once every 24 hours. Many of the trucks are being equipped with satellite tracking equipment. The drivers also have all the emergency contact information in their transportation file within a packet and the bill of lading transportation documents.

DENNIS BECHTEL: Where would those designated routes be in Nevada? Would they be interstates?

DAVE RAST: Interstates where possible. You can't get to the Nevada Test Site via interstates. They usually come across 95 over 15, up 15 and back out 95.

DENNIS BECHTEL: So right through Las Vegas?

DAVE RAST: Yes, sir.

LATHIA MCDANIELS: Can you tell me what steps are implemented to insure that we don't accidently get mixed low-level waste shipped to us?

DAVE RASP: To insure that we don't get mixed waste transported to the Nevada Test Site, there is an extensive characterization and certification program established by the Nevada Field Office. That certification program is defined in their Waste Acceptance Criteria Document, NVO-325. We adhere to the conditions established in that document.

We perform a review of our waste on a waste stream by waste stream basis. We also maintain control of containers; maintain control of who has access to waste disposal facilities such as our dumpsters on site have locks on them. Only designated personal have the ability to put trash into a dumpster, or to put any kind of material into a waste container. We are implementing even tighter controls now on waste containers.

We do do sampling analysis of some materials, characterizing them under the RCRA regulations to check for hazardous constituents, to make sure they are not a mixed waste. We maintain those characterization files at the site. They have been reviewed by the representatives from the Nevada Field Office and also from the Nevada Department of Environmental Protection on some of our waste streams.

LATHIA MCDANIELS: But there is no outside agency that has the hands-on ability to review while you are doing it?

DAVE RAST: Before we are allowed to ship to Nevada Test Site, they review the characterization files for the waste streams. Before that waste stream is approved for acceptance, they review it.

LATHIA MCDANIELS: When you say "they," who?

DAVE RAST: Nevada DOE field office.

JOE FIORE: We adhere to a very rigorous waste acceptance process. That includes formal submittal of applications from waste generators. But to specifically answer your question, part of that process involves oversight by the State of Nevada, Division of Environmental Protection. So that's the independent non-DOE part of the thing.

PAUL LIEBENDORFER: I will say, we probably made a significant impact on all the waste that is shipped out here from--not just Fernald but the other places as well--on the level of quality of the waste.

LATHIA MCDANIELS: Are you satisfied (Paul Liebendorfer) that we are not and we will not be getting any mixed low-level waste?

PAUL LIEBENDORFER: Within the documents we have seen so far.

LATHIA MCDANIELS: Outside of the documents; your personal feelings?

PAUL LIEBENDORFER: I think at this point in time, there has been nothing raised. Maybe I should take a step back. There was a shipment that came in a couple years ago of thorium waste that we had great concerns about because of what we perceived to be a lot of inadequate documentation to support the position. We went around for about eight or ten months on that.

I actually went back, and they did some resampling of some containers that were left there, and observed the days worth of sampling and the evaluation, and insisted on additional information to be presented to be included in the waste package to support their position. After conclusion of that particular round, we felt that they, at that point in time, did have the ability to demonstrate that those documents coming back in, that, thorium waste, were in fact, not a mixed waste. They have implemented a process that we don't look at every waste stream. We are able to audit any waste stream we request.

Obviously, we cannot go to every site and look at every package, so we have got to the point where DOE conducts an audit and we audit DOE.

RICHARD NOCILLA: I have been wondering if apart from the tradition of bringing your waste to the NTS, is there another disposal site?

DAVE RAST: We have disposed of waste at the Envirocare Facility in Utah and recently made some additional shipments to a facility. Currently, under the current DOE regulations, the Nevada Test Site is the assigned disposal site for Fernald. Now, we are working on petitions to get the exemptions to dispose of low-level waste at commercial disposal sites.

CHRIS BROWN: What kind of half lives do the various radionuclides that you mentioned have?

DAVE RAST: The primary radionuclides that we have on site are uranium and thorium. I think the uranium is ten million years and thorium is a billion.

CHRIS BROWN: And do you all make highly enriched or low enriched?

DAVE RAST: We only made low enriched uranium. We have some material that is for sale that is approximately 20-percent enrichment. We have limited quantities of that. Approximately, I think 50 pounds of the 20-percent enrichment material which is currently on the block for sale, and more than likely it will be sold.

The highest enrichment we typically dealt with was 1.25 percent, which is about half a percent over normal.

CHRIS BROWN: The relation of this process of choosing the NTS and being designated to the PEIS process, I am curious because, it has up to six possible sites for low-level waste to be sent throughout the complex. I'm wondering if Fernald would give consideration to a site more proximate to it through the PEIS process?

DENNIS NIXON: I believe he is referring to potential sites that could be constructed in close proximity to the Fernald site, and we have essentially found that not to be implementable at this time and cost effective for the small quantity of waste.

CHRIS BROWN: Three hundred thousand cubic yards is not a small amount.

DENNIS NIXON: The proposed action is only 13,000 cubic yards. The 300,000 is the total volume for the site.

CHRIS BROWN: Well, out of all the numbers you threw out at us, which 13,000 cubic yards?

DAVE RAST: Operable Unit 4 residues is the proposed action right now.

CHRIS BROWN: So, are you going to tier following EIS's on each of the operable units, and if so when will we be seeing those?

DENNIS NIXON: This is the 13,000 for this action with Operable Unit 4, and we talked about reducing that to 6,000.

DAVE RAST: Each of the follow-up operable units has an accumulative effect. As you get to the decision point in each of the other operable units, they will tier that effect into environmental assessment for each of the operable units, and those will be coming out at the dates that you see the arrow pointed to at this time.

CHRIS BROWN: So, if your presentation talks about the accumulative impact, the answer, we are only dealing with 13,000, which really isn't relevant. We are dealing with the whole thing. These things are coming out one after the other in the space of a year here, except for Operable Unit 3 which is going to take a few more. We are basically talking about the whole volume, not just the 13,000.

JACK CRAIG: The document you have now is for Operable Unit 4. It is only making a decision on the 13,000 cubic yards. Like you said, there will be follow-up documents that will also finalize the decision on the other operable units.

If, through this process, all the leading alternatives are selected, you will get a chance to look at each one of those individually. And, those will add up to 300,000 if

the leading alternatives are selected, but you will get a chance to comment on each one of those as they come out. But this document you are looking at now is only making a decision on the 13,000 cubic yards.

The other number that leads up to the 300,000, you will be able to comment on that later through the submittal of the following-up documents.

JOHN WALKER: I haven't heard any discussion about the alternatives for on-site disposal. Even though it is not the preferred alternative, it is an alternative that you did examine. Would you like to discuss those alternatives? The alternatives for keeping it all at Fernald on site.

DENNIS NIXON: I think that what I'm addressing here is just the proposed action, which is again the 13,000 cubic yards which is Operable Unit 4. There are various reasons why. We evaluated a full range of options and alternatives for both on-site and off-site disposal, various treatment options, etc. We chose the NTS because it performed the best out of all the alternatives that we evaluated, and these are the reasons why the NTS was rated better over on-site disposal.

Also there are some real show stoppers when it comes to on-site disposal with this waste whether it's hydrology which Dave has covered; the climate, we have a lot of rainfall compared to what we would get in the desert here; the demographics of the area, there is a large population in close proximity of the site; the land use scenario is an agricultural land use, so there is a greater possibility of intrusion on the waste that was disposed of on site.

These things are resolved at the NTS. It is an arid climate; there is a very low population; there is very low probability of future intrusion on the waste; it's probably not going to be farmed in the future; the hydrology, geology, all that is very favorable to disposal of this waste at NTS.

JOHN WALKER: But there are some doable engineering systems where you can keep the waste on site a long period of time; is that correct?

DENNIS NIXON: That is correct. However, it does not completely pass the threshold criteria which we look at in the evaluation of the alternative. For one, it does not comply with all applicable, relevant, and appropriate requirements which are essentially the regulations that are applied to our site.

JOHN WALKER: I just want to make the point that there are alternatives to the preferred action that just didn't seem discussed at all.

DENNIS NIXON: We fully evaluated on-site disposal. This is the list of alternatives we evaluated in the Feasibility Study. For the Silo 1 and 2 material, or K-65 material, we have to evaluate no action, which obviously is a good solution for this particular operable unit.

We evaluated on-property disposal with various treatments, stabilization options as well as off-site disposal here and the NTS. We have not identified another off-site disposal facility that was available to this waste stream.

For the Silo 3 contents, essentially the same alternatives were evaluated. Subunit C, being the debris and soils on other structures, etc., was review and evaluated and that will be disposed of on site most probably assuming that the Operable Unit 5 waste is selected for on-site disposal.

KATHERINE YURACKO: Well, this is what I wanted to see, but now I want to know why are the only possibilities on site in Nevada?

DENNIS NIXON: Well, these are the alternatives. We listed and reviewed and evaluated a lot more alternatives than this, but not all alternatives passed the threshold criteria, which was to be protective and to be able to comply with all the applicable, relevant, and appropriate requirements such as disposal at another commercial site. We cannot identify a commercial site such as the Envirocare Site. We cannot meet their acceptance criteria.

DENNIS BECHTEL: How much does cost effectiveness enter into it?

DENNIS NIXON: Well, I don't want to say it's low on the totem pole, but it is certainly less important than the threshold criteria and being protective of the human health and the environment. It is also the most cost-effective alternative.

PAUL RICHITT: With respect to the on site, what is the alternate plan used for Fernald Site after you finish remediation?

DENNIS NIXON: We have a citizen's advisory board at Fernald that is determining that very issue. We have not determined what the final land use for Fernald is.

PAUL RICHITT: Because you vitrify the waste, you reduce volume, you are going to stabilize it so it can't migrate. You are going to bring it to the Test Site; the whole premise is to say the waste materials will be held and stable. If that is the case, depending on what you are going to put the Fernald Site to, you may have the same benefit by leaving it on site and not have to worry about transportation where you may introduce additional problems. So, is your basis for decision made before you have an alternate-use determination on the Fernald Site?

DENNIS NIXON: We don't believe so. Again, on-site disposal does not pass the threshold criteria, and we cannot meet all the applicable, relevant, and appropriate areas. We cannot insure that we--in the long term over a thousand-year period--that we would not have intrusion due to the land use and the demographics of the area.

JOANNE STOCKILL: Is there any assurance there would not be intrusion at the Nevada Test Site in a thousand years?

DENNIS NIXON: No, there is not. However, it is less likely.

BILL VASCONI: Are there any questions to be addressed from the audience?

DON HENDRICKS: Several months ago EPA took the position to DOE that the K-65 waste as well as some other high-thorium waste should be classed as greater than Class C waste. If by definition, you take that at face value, that means you should not dispose of those wastes in near-surface repositories. This doesn't quite seem to go along with that.

I would also assume that because you have reduced the volume and you have upped the concentration, which makes it even more significant.

DENNIS NIXON: That is true. The vitrification reducing the volume makes a more dense waste form. It does concentrate the radionuclides. I would just say that this waste is not high-level waste. It is not transuranic waste. It's categorized as 11e(2) by-product material. Even though the EPA Region V has applied 40 CFR 191, which is the regulation which controls high-level and transuranic waste, that was felt to be that our waste was enough like--due to the long-lived content and long lived alpha emitters--like the radium and thorium and uranium series, that we should consider that in our decision for the waste stream, and which we did in the document.

CHRIS BROWN: In terms of projected disposition at varies places, some on site, some commercial and some NTS, how does that work out in terms of radioactive hazardous materials, etc.

DENNIS NIXON: I think that all the waste that Dave spoke of was low-level radioactive waste.

DAVE RAST: All the waste that is projected in that is low-level radioactive.

CHRIS BROWN: The commercial stuff, is there any chance it will be sent to an incinerator?

DAVE RAST: Most of the material that we are looking at disposing of commercially is not amiable to incineration. It's soils, it's a sludge material out of our waste pits; it will need some drying. Most of the drying technique that we are looking at is either a (unintelligible) drier or we found compaction and super compaction is a much more effective drying technique than incineration. Incineration

is very expensive. Any kind of thermal treatment chews up massive amounts of energy, and you can run a 5,000-ton press a lot more energy effectively than you can an incinerator.

JOANNE STOCKILL: I wanted to ask Joe, should this shipment go to the Test Site, where would it be and how would it be stored? Would it be in Area 5?

JOE FIORE: Yes. It would be treated as low-level waste as it is defined by our current DOE Orders, and the bulk of it would go to Area 5 or Area 3 which is nearby.

KATHERINE YURACKO: I'm now confused as to what this stuff is we are talking about. Did you say this stuff was regulated under the 40 CFR 191?

DAVE RAST: No. 40 CFR 191 was applied as a relevant and appropriate regulation to be considered. It is not a high-level waste product. It is a by-product from a leaching operation. The US/EPA Region V felt that if we wanted to dispose of that material on site, in our management of that material, we would have to follow the 191 guidelines.

KATHERINE YURACKO: Knowing nothing more than EPA Region V, that sounds reasonable to me. How does the facility you're talking about putting it in at the Test Site compare with a 40 CFR 191 facility?

JOE FIORE: We have done some performance assessments, Kathy, consistent with both 40 CFR 191 and the DOE Order, and I think we have some preliminary results. I'm not certain I know them or I can explain them very well. Layton, do you know what the preliminary results are?

LAYTON O'NEILL: Yes. They showed that the situation that we have will satisfy the 40 CFR 191, and we need more data to affirm that.

JOE FIORE: Let me explain. The Order we are applying for our low-level waste disposal, the Order that we must meet is that for low-level radioactive waste performance assessments described in a DOE Order, but that is the prescriptive role to meet. The consideration of 40 CFR 191, I believe, is a more rigorous requirement and I think we are trying to demonstrate that we also meet that, but it is not a requirement that we do meet that for disposal of low-level waste.

KATHERINE YURACKO: But it sounds like the only reason it can't go is at Fernald is because they require that they comply with 40 CFR 191, and so it is coming here because there is no requirement in Nevada to comply with 40 CFR 191. Have I understood that right?

DENNIS NIXON: That is not entirely true. There is another regulation, an OAC (Ohio Administrative Code) regulation, which would prohibit the location of a disposal cell over a sole source aquifer, which we would not comply with as well with this particular sighting of a disposal cell for this type of waste.

KATHERINE YURACKO: Let's say this is 40 CFR 191 waste. We have got 40 CFR 191 facilities all over this country. Can't we put this in one of them?

DENNIS NIXON: I'm not familiar with the locations of those facilities.

KATHERINE YURACKO: Well, there is this kind of waste elsewhere; right? Isn't this similar to mill tailing waste we have got all over the country?

DENNIS NIXON: No, I don't believe so.

KATHERINE YURACKO: It's originated under the same regulations.

DENNIS NIXON: Right.

KATHERINE YURACKO: We have facilities constructed around this country under this regulation. But you are saying that none of those can take this waste?

DENNIS NIXON: Right.

JOHN WALKER: I don't think there are any facilities under 191. I think WIPP is the only facility that they are looking at for 191. I think 191 was thrown out or set aside on Yucca Mountain. They are trying to fix a standard for Yucca Mountain, but 191 is only being applied to WIPP at this point, which is transuranic waste, which is long-lived much like uranium.

KATHERINE YURACKO: Then WIPP is an alternative for this?

JOHN WALKER: No.

KATHERINE YURACKO: I am not getting what this waste is.

DENNIS NIXON: I think this is a very important issue that we have discussed hundreds of times over the last two years. The reality of the matter is that this waste is not 40 CFR 191 waste even though the US/EPA Region V has told us to consider it as relevant and appropriate. The DOE does not agree with that position and has put forward a position paper that would identify that they do not concur with that position. However, the ARARs (Applicable, Relevant and Appropriate Requirements) that we are required to work on under CERCLA, they are addressed by the Agency. We cannot negotiate those. Those are not subject to any kind of negotiation. We do not

consider this 191 waste. It is clearly not high level, it is clearly not transuranic, which is the intent of that regulation.

The reason why it was applied to this waste is because it has greater than 100 nanocuries per gram of long-lived alpha-emitting radionuclides like uranium, radium, and thorium series. Those are enough like what is governed in 40 CFR 191 for Region V to make it relevant and appropriate in their minds.

MICHAEL VERRILLI: I have some questions about containerization of the material. How is that done? Is the material containerized there and then placed at the Test Site in the containers, or is it removed and then placed in other containers? The current shipments.

DENNIS NIXON: It is all containerized at the Fernald Site. It is not removed from the container before it is disposed.

MICHAEL VERRILLI: What kind of health hazards would those pose in the event of a breach of a container on a public highway?

DENNIS NIXON: Not being a health physicist, I'm not going try to take a guess on the health hazards. Most of the material we ship and most of the material that is transported to the Nevada Test Site has material that has fixed contamination or it's a nonsmearable, nonreleasable contaminant.

MICHAEL VERRILLI: So it is a contaminant that you would have to have long exposure to be damaged?

DENNIS NIXON: Right. And uranium, itself, is not a high radiological risk.

MICHAEL VERRILLI: The disposal at the Test Site itself, is it buried, is it above ground?

DENNIS NIXON: It is shallow-land burial.

JERRY SIEREN: A private citizen. One of the major news services this morning reported, I think it was the Review Journal, that the State of Ohio has become the leading candidate to host a commercial low-level radioactive waste disposal site. And the reason they have become the leading candidate is because the state of Michigan has been thrown out of the Midwest States Compact, because it refused to host the low-level radioactive waste site, and Ohio is the next largest producer of low-level radioactive waste in that Compact. A representative from the State of Ohio Environmental Protection Agency was quoted in the newspaper article, stating that the site would be located in Southern Ohio farm country due to lack of political clout in that area.

That was just introductory. My question: Was this site that is being considered now be located in the state of Ohio and presumably deemed acceptable for low-level rad waste, was it considered for the OU4 waste? And if not, why not, and could it be considered for that rad waste?

DENNIS NIXON: We considered a regional disposal alternative. If you look at the OU4 documents, that was one of the unsighted low-level waste disposal cells within 300 miles of Fernald and was evaluated as an option. The current low-level waste repository for Ohio has gotten the honor to site within their state is part of the Compacts' low-level waste disposal sites under the Low-Level Waste Policy Act. And just by virtue of that Act and within the terms of that Act, DOE is prohibited from using those sites.

JERRY SIEREN: Is the site in Utah? Envirocare?

DENNIS NIXON: It's not a Compact site.

JERRY SIEREN: It does accept commercial low-level rad waste?

DENNIS NIXON: Yes, it does. But it's a private site.

A 10-minute break was called for after the Fernald segment and the group reconvened at 8:30 p.m.

WASTE MANAGEMENT DIVISION'S PRESENTATION:

Layton O'neill gave a slide presentation on the DOE Nevada Operations Office, Waste Management Division's current low-level radioactive waste management program. Photographs of Nevada Test Site Area 5 and Area 3 waste disposal facilities and practices, and subsurface monitoring wells and holes, were shown and described. Research results showing surface water does not seep below 20 feet down from the surface, and so does not travel down to the 800-foot deep water table, were described.

QUESTIONS AND ANSWERS:

KATHERINE YURACKO: First of all, I have a lot of questions, and I frankly don't think we are going to get through all of this tonight. I'd like to start off with one if I can. I heard that Ohio thinks this is 11e(2) material, and my comment earlier was DOE has lots of 11e(2) material, has lots of 11e(2) disposal sites around the country. Now, Layton was kind enough to direct our attention to Chapter IV of 5820.2A which

addresses 11e(2) material, and I'd like to read--I was skimming that--and in Chapter IV, Section 3a(1), it states right here, "disposal sites should be identified and developed as needed in support of DOE remedial actions, and will normally be located in the state in which the wastes were generated." So, I still don't understand what's going on here.

LAYTON O'NEILL: Well, I will tell you what we did. When we started getting into this 11e(2) waste proposals to come to Nevada Test Site, we wrote a letter to Headquarters and said, provide us guidance because there is not enough in the document on that Chapter. So we are waiting to hear from Headquarters on further guidance on what they want us to do. That's all I can answer you. We don't have proper guidance from Headquarters on what to do with that material.

KATHERINE YURACKO: I guess one of the things I am still hung up on is this notion that the only two possibilities were on site and Nevada, and then it couldn't go on site because this was 11e(2) material, and so Nevada was the only alternative. But how about doing an evaluation of other 11e(2) disposal sites?

11e(2) is CFR 192. There are a number of facilities in this country that are regulated under the 40 CFR 192 that are taking DOE material, and so I'm just confused on this.

DENNIS NIXON: I'm not sure which sites you are particularly referring to. We have identified no other sites that could accept this material now. Not because it's 11E2. Just being a low-level waste, it is not a mill tailing.

KATHERINE YURACKO: Well, that's what I'm confused about. I mean, I was told it's 11e(2), and now you are saying it's not really so, and it can't go into an 11e(2) facility. Have you done an examination? There are lots of those facilities. Let's take Grand Junction. Have you done an examination of putting this material in the Grand Junction facility?

DENNIS NIXON: No, we have not. However, Dave can address those other disposal sites.

DAVE RAST: Most of the other sites and everything for UMTRA disposal are for native North American mill tailings; and in particular, once you look at mill tailings that came off of those sites, and they were taken out and used throughout the country verses the leachate from the K-65 materials. In that process there is a higher concentration of radium in those products than we find within the UMTRA mill tailings. So, all the performance assessments done for the UMTRA disposal sites are not driven to the levels of the material that we have in the silos.

KATHERINE YURACKO: So this facility on the Nevada Test Site is more protective than a 40 CFR 192 facility?

DAVE RAST: Yes. Given the information of the performance of the cells that we have and we have looked at the NTS, yes.

DENNIS BECHTEL: I do have a general question for Layton. How did you happen to pick the sites? It seems like they are right on the boundary of the Test Site; Area 3 and Area 5, the low-level sites.

LAYTON O'NEILL: It was picked in 1953. It is fortuitous, according to my knowledge and information, about what happened to the NTS. They searched around in the United States for a number of years to find a place to test weapons, and they finally settled on the Nevada Test Site, and they said this is a good place to test weapons.

I understand about five years ago, or maybe ten, they reinitiated that investigation, and went out again and looked all over the United States to find out where the best place would be to test nuclear weapons, and they ended up with the Nevada Test Site again. Now, we were fortuitous in picking the location we did, because, it is a long ways to the ground table, and I think the early guys knew a little something about that. So, we just bought into that. As I told you, we knew something about the depth to water from the other wells.

Area 5 is 800 feet to the water table. And there are a couple of studies that were done right near to us, radiation migrations studies, that were done where we pumped water out of a well 100 feet from an original detonation, and we pumped on it for 14 years. And the first thing we saw was at the end of two years of continuous pumping day and night on that well, we saw tritium coming across, and we pumped on it again and the tritium got to its maximum concentration at five years, and then it started to decay away again.

The people that studied the ground water at NTS say that it moves something like 11 feet a year, and that's all it moves. We forced moving it by pumping down on it and keeping that pumping going for 14 years. So, it is absolutely a good place, and it's very dry underneath us.

In the Area 3 area, the water table is at 1300 or 1500 feet below the surface of the land. So, we think fortuitously they are both good locations, and we looked into that when we started Area 3. I told you we picked an area where the detonation was at least 500 feet above the ground water table, and so we know we have got 500 feet of basically unbothered soil beneath; if nothing else, it is probably compressed by the weapons tests.

BILL VASCONI: Realizing the site characteristic studies and the fact that it is bound to be a better place than along the Miami River back in Ohio, my question would be, you do have an ample supply of holes at the Test Site to have your dumps, and I'm sure it can get shipped here. Is there any benefit to be derived from the state of Nevada for bringing in the waste?

LAYTON O'NEILL: Well, I think that depends on who you talk to. For mixed waste, the state of Nevada was gaining $20 a ton for the cement blocks we were putting in the ground. That's pretty good business for the state of Nevada. They could also do that for other waste, I believe. They could charge a tariff on the DOE if they so chose to.

BILL VASCONI: Yes, accepting that it's a federal land and you are bringing in federal waste; is that not true?

LAYTON O'NEILL: Yes, sir.

BILL VASCONI: So the benefits to be derived for Nevada would be negotiating for the waste in tonnage and/or condition of; right?

LAYTON O'NEILL: I believe so, and we think that the waste is not going to get into the ground water table, so we think they are not going to be harmed any.

JOHN WALKER: Just on the question of money and benefits, it seems to me that DOE receives the disposal funds from its off-site generators. Isn't that the case that derives some of the waste management budget?

JOE FIORE: Yes. DOE takes out of the one pocket and puts it into another. We provide a budget for the generator site and as we receive it, they pay us so much per cubic foot. So overall, the DOE, the disposal of it, is funded by the Department.

LAYTON O'NEILL: Last year we had excess money and Reynolds Electrical and Engineering Company was forced to return two million dollars; I think it was, to Headquarters, because we had more money than we were suppose to spend. So it was returned to the Treasury.

JOE FIORE: And to the extent that those funds support workers at the Test Site and their jobs, that's the extent of the benefit to the economy of the state.

JOHN WALKER: It's a federal activity, clearly not a state activity.

JOE FIORE: Correct.

JOANNE STOCKILL: Many years ago there were discussions about the state charging a fee for use of Nevada roads and transportation. Has there been any recent discussions on that, for Nevada to gain some money from shipments that are going to the Test Site?

PAUL LIEBENDORFER: I can speak to recently. I believe it is Nye County that has looked into some of those situations. I would believe a separate tax to use the roads, within a road use, would be Department of Transportation, typical to any trucking activity that went over it. I do know a couple of counties that are actually looking at determining whether or not they could assess waste shipments that come back in to support county emergency response activities. And I do know one of the counties is actually looking at that to support their emergency response if something would happen on a road, but just a separate assessment that is specific to low-level waste or hazardous waste or something else, I don't think. Any interstate transport would have to be equal no matter what the material was.

LAYTON O'NEILL: I was involved, in my early days before I got into the waste management field, in the training. My bosses went to the speak to the Governor, and it was at the time we had been asked by Headquarters to start to receive off-site waste from the other locations in the United States. We made some concessions to the state of Nevada, and we promised to train every patrolman in response to radiological accidents and to provide them a radiation kit that was calibrated on a regular basis so they could depend on it. We never did provide them with instruments, but we made a deal with the state emergency management group to use civil defense instruments, and we calibrated them for about seven or ten years until the state asked us to cease that program of calibrating.

We still are training highway patrolmen at this time. We still are training fire fighters in the state of Nevada. We provided monitoring gear for the stop-stations for registering trucks coming in and out of the state of Nevada, and we set them up with a monitoring device and an alarm that would detect radiation if the truck had any that they weren't admitting or didn't know about. They were able to check and make sure they were within limits.

We were providing training for emergency medical people, and we are still doing that today underneath the waste management program. I'm paying REECo a yearly amount to go out and do this training. And we have trained most all of the fire fighters in the city of Las Vegas and all the cities that have fire departments; we train a few of the volunteer fire departments.

We are doing these programs today underneath the waste management money.

JOE FIORE: I would just like to make a comment and maybe get an answer to a question to put this transportation thing in perspective. We did some back-of-the-envelope calculations that said 15,000 shipments over 30 years. That's 500 shipments a year. How does that relate to what we receive now? Don't we receive about 800 or a 1,000 a year today?

LAYTON O'NEILL: We are getting about three or four a week now. This isn't our heavy time now, because they are just getting out of the snow up there. So I guess, a couple hundred a year.

KATHERINE YURACKO: I have three concerns on this. One, is that, from what I can tell, this appears to be inconsistent with the Departments' own policy on 11e(2) material; two, I haven't been convinced that this is the only place that this material can go; and three, I'm concerned that Nevada gets nothing for this.

PROPOSAL NO. 1

At this point Katherine Yuracko proposed that the Board request a 30-day extension (for comments on the Draft EIS) in order to prepare an appropriate response, and in the meantime be provided with the Draft EIS and the four volumes of supporting documentation.

1. Dennis Bechtel concurred and requested that the Board ask for an extension.

2. Joe Fiore stated that this being the first procedural request that has been made by the Board, that he would abide by the consensus of the Board.

3. Jim Henderson also felt there was not enough information at the present time to make comments.

4. Bill Vasconi inquired if the Board's request for an extension would be adhered to by Fernald. In response, Jack Craig (a Fernald representative) said yes, they would.

5. DECISION: The Board voted on the proposal, and the proposal carried unanimously.

6. ACTION: Dennis Bechtel agreed to write a letter of request for a 30-day extension. The Board agreed that each Board member would need a copy of the summary DEIS, and the Board as a whole would request one copy of the four volumes of the supporting documentation therefrom.

7. The suggestion was made that the Feasibility Study and the EIS could be made available through Joe Fiore. There were four copies of the proposed plan, or summary document made available at the meeting through Fernald representatives. A request for any additional copies would need to go through Joe Fiore in order for Fernald to send them.

PROPOSAL NO. 2

Katherine Yuracko proposed that at future briefings, the Board needs to receive the summary documents in advance in order to review them before the presentation.

1. Bill Vasconi concurred with Kathy that the Board needed the summary information in advance.

2. ACTION: Joe Fiore recognized the need for the Board to be better informed in advance of any briefing or presentation and agreed to get information to the Board in advance at future briefings.

DISCUSSION ON THE CLASSIFICATION OF 11e(2)

1. Richard Nicolla asked for direction from DOE on why the proposed Fernald waste is classed as 11e(2) waste.

2. It was determined that Fernald asked DOE/NV to identify the proposed waste as 11E2. In turn DOE/NV requested Headquarters to give them policy and call back on it, because it wasn't clear to DOE/NV what it was.

3. Dennis Nixon made the point that in the DOE Orders, it refers to 11e(2) material being received at NTS in small quantities. The concern and question being can 6,000 cubic yards of the treated waste form be considered a small quantity? Thus leaving the question: What was the intent when "small quantities" was written in the DOE Orders?

4. The question was raised that there are other disposal facilities in the United States that can receive 11e(2) material. Why can't this waste go to these facilities?

5. ACTION: Joe Fiore agreed to pursue the intent of the words "small quantities" as written in the DOE Orders, but wanted to make sure everyone knew that it would take DOE longer than 30 days to get that answered.

6. ACTION: Fernald representatives agreed to respond and answer the question on why the other disposal facilities were not receiving this waste.

ANNOUNCEMENTS

1. Bill Vasconi announced that there was another CAB north of Las Vegas (SNFCAB). The SNFCAB is a cooperative agreement between Nye County and Lincoln County and Esmeralda County. They have elected a representative to attend and monitor this CAB's meetings for their benefit, and when appropriate this tri-county CAB would be prepared to give a presentation to this CAB on the group's activities.

2. Joe Fiore expressed his appreciation to the DOE and contractors representatives from Fernald for responding promptly to this Board's request for a presentation.

3. Joe Fiore also brought to everyone's attention that the Fernald representatives supplied copies of a public-information package which has their charter and fact sheets for each member of the Nevada CAB to review.

4. Dave Rast expressed the importance of follow-up in the formal documentation process in the comment resolution. The written portion of the process is very important.

Meeting adjourned at 9:50 p.m.

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APPENDIX D

ADMINISTRATIVE RECORD FILE INDEX

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U-006-101.28 4412	KLX-1222	SUMMATION REPORT RECOVERY OF RADIUM FROM K-65 RESIDUE	02/12/1952	VITROCORP USAEC (DOE)	50	Report
U-006.101.29 4443		PRELIMINARY ASSESSMENT OF ALTERNATIVES FOR PROCESSING AND DISPOSAL OF THE AFRIMENT RESIDUES	05/15/1981	BATTELLE DOE	59	Report
U-006-104.1 1776	WMCO:EC:90-0204	PRMIT TO INSTALL/PERMIT TO OPERATE DETERMINATION ON GLOVE BOX	06/14/1990	WMCO DOE-FMPC	2	Letter
U-006-104.2 1777	DOE-1372-90	PERMIT REQUIREMENTS FOR GLOVE BOX USE IN TREATABILITY TESTING FOR K-65 SILO RESIDUES	07/06/1990	DOE-FMPC WMCO	2	Letter
U-006-104.4 2428	DOE-23-91	RESPONSE TO OEPA STIPULATIONS FOR INSTALLATION AND OPERATION OF THE GLOVE BOX FOR TREATABILITY TESTING	11/06/1991	DOE OEPA	2	Letter
U-006-104.10 2450		OEPA MAKES THE FOLLOWING STIPULATION REGARDING THE INSTALLATION AND OPERATION OF THE GLOVE BOX	09/27/1990	OEPA DOE	2	Letter
U-006-105.1 695		CALCULATION OF RADON EMISSION, DISPERSION AND DOSIMETRY FROM K-65 STORAGE TANKS AT THE FEED MATERIALS PRODUCTION CENTER	10/01/85	COLORADO STATE UNIV WMCO	14	Letter
U-006-105.2 786		K-65 SILOS STUDY & EVALUATION REPORT	02/25/1986	CAMARGO DOE	45	Report
U-006-105.3 3666		K-65 SILOS STUDY & EVALUATION CAMARGO REPORT APPENDIX A & B FEBRUARY 1986	02/01/1986	CAMARGO DOE	500	Report
U-006-105.4 3667		K-65 SILOS STUDY & EVALUATION CAMARGO REPORT APPENDIX C, D & E FEBRUARY 1986	02/01/1986	CAMARGO DOE	500	Report
U-006-105.5 3703		K-65 SILOS STUDY & EVALUATION CAMARGO REPORT APPENDIX F 1 OF 2 FEBRUARY 1986	02/01/1986	CAMARGO DOE	500	Report

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U-006-105.7 167	DE-AC05-81OR20722	STUDY AND EVALUATION OF K-65 SILOS FOR THE FEED MATERIALS PRODUCTION FACILITY AT FERNALD, OHIO	01/01/1990	BNI DOE-FMPC	50	Report
U-006-105.8 168	DE-AC05-81OR20722	APPENDICES A THROUGH H: STUDY AND EVALUATION OF K-65 SILOS FOR THE FMPC	01/01/1990	BNI DOE	90	Report
U-006-105.9 169	DE-AC05-81OR20722	APPENDIX I: STUDY AND EVALUATION OF K-65 SILOS FOR THE FEED MATERIALS PRODUCTION CENTER AT FERNALD, OH	01/01/1990	BNI DOE	482	Report
U-006-105.10 555	FMPC/SUB-20A UC	A PROBABLISTIC RISK ASSESSMENT FOR THE K-65 SILOS AT THE FMPC, REVISION 1	10/01/1990	UC DOE-FMPC	194	Report
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U-006-108.1 4476	NEPA DOC. 19	K-65 SILO CLOSED CIRCUIT TELEVISION (CCTV) MONITORING SYSTEM NEPA DOC. 19	05/19/1987	DOE DOE	9	Report
U-006-108.2 4477	NEPA DOC. 38	K-65 SILO RADON MITIGATION AND DOME REINFORCEMENT NEPA DOC NO. 38	09/14/1987	DOE DOE	18	Report
U-006-108.3 4478	NEPA DOC. 118	K-65 AND METAL OXIDE RESIDUE SAMPLING DOC NO. 118	08/10/1988	DOE DOE	17	Report
U-006-108.4 4480	NEPA DOC 373	CATEGORICAL EXCLUSION DETERMINATION K-65 EMERGENCY POWER SUPPLY NEPA DOC NO 373	03/03/1992	DOE DOE	3	Report
U-006-108.5 4482	NEPA DOC 412	CATEGORICAL EXCLUSION DETERMINATION OPERABLE UNIT 4 PILOT PLANT PHASE I NEPA DOC NO 412	04/02/1993	DOE DOE	5	Report
U-006-201.1 2821	DOE-697-92	ACTION MEMORANDUM: K-65 SILOS RADON TREATMENT SYSTEM	02/18/1992	DOE WEMCO	2	Letter

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U-006-209.3 4180	ORNL/TM-12185	WASTE-SURFACE MAPPING OF THE FERNALD K-65 SILOS USING A STRUCTURED LIGHT MEASUREMENT SYSTEM	10/01/1992	ORNL DOE-FN	85	Report
U-006-301.1 91	PRE1256COV	SAMPLING AND ANALYSIS PLAN FOR STORAGE SILOS 1,2 AND 3 AT THE U.S. DEPARTMENT OF ENVERGY'S FMPC	04/01/1988	ASI WEMCO	215	Report
U-006-301.2 394		IMPLEMENTATION PLAN FOR THE K-65 AND METAL OXIDE RESIDUE SAMPLING PROJECT AT THE FMPC REV. 5	12/01/1988	WMCO DOE	532	Report
U-006-301.3 1693		RI/FS WORK PLAN ADDENDUM: OPERABLE UNIT 4 K-65 AND METAL OXIDES SILOS AND SUBSOILS SAMPLING AND ANALYSIS PLAN (WITH TREATABILITY PLAN) JANUARY 1990	01/17/1990		29	Addendum
U-006-301.4 270	DOE-745-90	TASK 9.33 K 65 SILO SAMPLING	05/08/1990	DOE ASI	1	Letter
U-006-301.5 829		SITE SPECIFIC HAZARD ASSESSMENT FOR BORINGS 2028 AND 2033 LOCATED IN THE K-65 CONTROL AREA MARCH 27, 1990	03/27/1990	ASI DOE-FMPC	40	Report
U-006-301.6 276	90L02298.HLW	K-65 SILO RE-SAMPLING OPERATING PROCEDURES	03/29/1990	ASI DOE-FMPC	52	Work Plan
U-006-301.7 1276	DOE-1758-90	K-65 SAMPLING PROJECT	08/24/1990	DOE-FMPC ASI	1	Letter
U-006-301.8 1831	DOE-277-91	K-65 SILOS SAMPLING AND ANALYSIS	11/15/1990	DOE-FSO USEPA	2	Letter
U-006-301.9 1995	DOE-285-91	REVISED K-65 SILO SUBSOILS SAMPLING AND ANALYSIS PLAN	11/16/1990	DOE-FSO USEPA	2	Letter
U-006-301.10 1996		RI/FS WORK PLAN ADDENDUM: K-65 SILO SUBSOILS SAMPLING AND ANALYSIS PLAN NOVEMBER 13, 1990	11/13/1990	DOE-FSO EPA	14	Report

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U-006-301.12 1374	DOE-1511-91	ADDITIONAL REVISIONS TO THE K-65 RESIDUE SAMPLING AND ANALYSIS PLAN	06/13/1991	DOE EPA	12	Letter
U-006-301.13 1300		RESIDUE SAMPLING FOR K-65 SILOS SAMPLING AND ANALYSIS PLAN U.S. DEPARTMENT OF ENERGY FEED MATERIALS PRODUCTION CENTER FERNALD, OHIO MAY 28, 1991	05/28/1991	DOE EPA	180	Report
U-006-301.14 1865	DOE-1802-91	REVISIONS TO K-65 SILOS SUBSOILS SAMPLING AND ANALYSIS PLAN	07/10/1991	DOE EPA	2	Letter
U-006-301.15 1866		RI/FS WORK PLAN ADDENDUM K-65 SI[illegible]IED GROUNDWATER SAMPLING AND ANALYSIS PLAN JUNE 27, 1991	06/27/1991	DOE EPA	30	ADDENDUM
U-006-301.16 1744	DO[illegible]82-91	REVISED SAMPLING AND ANALYSIS PLAN FOR THE K-65 SILOS RESIDUE SAMPLING PROJECT	07/25/1991	DOE EPA	2	Letter
U-006-301.17 1745		RESIDUE SAMPLING FOR K-65 SILOS SAMPLING AND ANALYSIS PLAN JULY 15, 1991	07/15/1991	DOE EPA	400	Report
U-006-301.18 3016	WEMCO:ER:92-191	K-65 SILOS DATA VALIDATION AND CHARACTERIZATION	03/17/1992	WEMCO DOE	2	Letter
U-006-301.19 5196	DOE-244-91	REVISED K-65 RESIDUE SAMPLING PROCEDURES	11/09/1990	DOE-FSO USEPA	2	LETTER
U-006-301.20 5197		K-65 SILOS SAMPLING AND ANALYSIS PLAN ADDENDUM TO THE FMPC RI/FS WORK PLAN	11/09/1990	DOE-FSO USEPA	204	ADDENDUM
U-006-301.21 5345	WMCO:R:AEC:90-0032	OPERATIONAL SAFETY REQUIREMENTS FOR THE SAMPLING AND ANALYSIS OF THE MATERIALS IN K-65 SILOS 1 AND 2	09/05/1990	DOE	48	REPORT

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U-006-302.2 344		TRANSMITTAL OF ANALYTICAL DATA	05/18/1990	ASI DOE	173	Data
U-006-302.3 246		CERTIFICATE OF ANALYSIS - PROJECT NUMBER 482331 JOB NUMBER 303317.24.05.20 - SILO MATERIAL	03/22/1990	IT WMCO	33	Certificate
U-006-302.4 3101	WEMCO:ER:92-191	CHARACTERIZATION OF K-65 SILO CONTENTS	03/31/1992	WEMCO DOE	2	Letter
U-006-303.1 1717	DOE-1892-91	OPERABLE UNIT (OU) 4 TREATABILITY STUDY WORK PLAN	07/23/1991	DOE EPA	2	Letter
U-006-303.2 1718		TREATABILITY STUDY WORK PLAN FOR OPERABLE UNIT 4 TASK 5 WORK PLAN JULY 1991	07/01/1991	DOE EPA	167	Work Plan
U-006-303.3 2246	DOE-017-92	OPERABLE UNIT 4 TREATABILITY WORK PLAN	10/03/1991	DOE EPA	2	Letter
U-006-303.4 2247		TREATABILITY STUDY WORK PLAN FOR OPERABLE UNIT 4 OCTOBER 1991	10/01/1991	DOE EPA	251	Report
U-006-303.5 2311		ADDENDUM TO OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN OCTOBER 1991	11/01/1991	DOE EPA	4	Addendum
U-006-303.6 2506		OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF RESIDUES FORM SILOS 1, 2, AND 3 DRAFT NOVEMBER 1991	11/01/1991	DOE EPA	70	Work Plan
U-006-303.7 2470	DOE-605-92	REVISED OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR STABILIZATION AND CHEMICAL SEPARATION	01/02/1992	DOE EPA	2	Letter
U-006-303.8 2471		TREATABILITY STUDY WORK PLAN FOR OPERABLE UNIT 4 JANUARY 1992	01/01/1992	DOE EPA	250	Report

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U-006-303.10 2713		OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF RESIDUES FROM SILOS 1, 2, AND 3 JANUARY 1992	01/01/1992	DOE EPA	75	Work Plan
U-006-303.11 2920	DOE-1017-92	PROCEDURES FOR VITRIFICATION OF OPERABLE UNIT (OU) 4 WASTE	03/05/1992	DOE EPA	2	Letter
U-006-303.12 2921		PROCEDURES FOR THE OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF RESIDUES FROM SILOS 1, 2, AND 3	03/05/1992	DOE EPA	50	Work Plan
U-006-303.13 3003	DOE-1174-92	REVISED OPERABLE UNIT 4 VITRIFICATION TREATABILITY STUDY WORK PLAN	03/24/1992	DOE EPA	2	Letter
U-006-303.14 3006		OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF RESIDUES FROM SILOS 1, 2, AND 3 MARCH 1992	03/01/1992	DOE EPA	145	Work Plan
U-006-303.15 3088	DOE-1352-92	DOCUMENT CHANGE REQUESTS (DCRS) FOR OPERABLE UNIT 4 TREATABILITY WORK PLAN FOR STABILIZATION AND CHEMICAL EXTRACTION	04/13/1992	DOE EPA	2	Letter
U-006-303.16 3161		OPERALBE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF RESIDUES FROM SILOS 1, 2, AND 3 APPENDIX D PROCEDURES AND METHODS REVISED APRIL 1992	04/24/1992	DOE EPA	40	Work Plan
U-006-303.17 3804	DC[illegible]-93	DOCUMENT CHANGE REQUEST (DCR) FOR OPERALBE UNTI 4 TREATABILITY WORK PLAN FOR STABILIZATION AND CHEMICAL EXTRA[illegible]ION	10/08/1992	DOE EPA	6	Letter
U-006-303.18 4098	DOE-0156-93	DOCUMENT CHANGE REQUEST (DCR) FOR OPERABLE UNI[illegible] 1 AND OPERABLE UNIT 4 TREATABILITY STUDY WORK PLANS FOR CEMENTATION (OU4)	0/20/1992	DOE-FN EPA	7	Letter

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U-006-303.20 2027		TREATABILITY WORK PLAN (LABORATORY SCREENING) FOR SILOS 1 AND 2 SEPTEMBER 1990	09/01/1990		66	Report
U-006-303.21 1433		SITE SPECIFIC SAFETY PLAN FOR THE K-65 VERTICAL BORING OPERATIONS	03/01/1991		67	Report
U-006-303.22 5233		OPERABLE UNIT 4 REMEDIAL ACTION SAFETY ASSESSMENT REVISION 0 FEBRUARY 1993	02/01/1993	DOE-FN	65	REPORT
U-006-303.23 5212	DOE-1009-94	OPERABLE UNIT 4 PILOT PLANT PHASE I TREATABILITY STUDY WORK PLAN	02/25/1994	DOE-FN EPA	2	LETTER
U-006-303.24 5213	WP-18-0007	OPERABLE UNIT 4 PILOT PLANT PHASE I TREATABILITY STUDY WORK PLAN REVISION 0 FEBRUARY 1994	02/25/1994	DOE-FN EPA	123	WORK PLAN
U-006-304.1 1274	DOE-1763-90	TRANSMITTAL OF THE REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 - FMPC	08/20/1990	DOE-FN DOE-HQ	1	Memorandum
U-006-304.2 1024	DOE-1774-90	REMEDIAL INVESTIGATION REPORT FOR OEPRABLE UNIT 4	08/24/1990	DOE EPA	5	Letter
U-006-304.3 510	FMPC-0406-4	REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 TASK 6 REPORT AUGUST 1990	08/20/1990	DOE EPA	535	Report
U-006-304.4 583	DOE-215-91	OPERABLE UNIT 4 - REMEDIAL INVESTIGATION (RI) REPORT	11/06/1990	DOE USEPA	3	Letter
U-006-304.5 584	FMPC-0406-5	REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 TASK 6 REPORT OCTOBER 1990	10/29/1990	DOE EPA	567	Report
U-006-304.6 4258	DOE-1261-93	EXPOSURE FACTORS USED IN THE REMEDIAL INVESTIGATION AND BASELINE RISK ASSESSMENT FOR OPERABLE UNIT 4	03/05/1993	DOE EPA	10	Letter

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U-006-304.8 4290		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 VOLUME 1 OF 3 APRIL 1993 DRAFT	04/16/1993	DOE EPA	450	Report
U-006-304.9 4291		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 VOLUME 2 OF 3 APRIL 1993 DRAFT	04/16/1993	DOE EPA	500	Report
U-006-304.10 4292		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 VOLUME 3 OF 3 APRIL 1993 DRAFT	04/16/1993	DOE EPA	450	Report
U-006-304.11 4698		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 VOLUME 1 OF 3 AUGUST 1993	08/20/1993	DOE-FN EPA	600	Report
U-006-304.12 4699		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 VOLUME 2 OF 3 AUGUST 1993	08/20/1993	DOE-FN EPA	600	Report
U-006-304.13 4700		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 VOLUME 3 OF 3 AUGUST 1993	08/20/1993	DOE-FN EPA	600	Report
U-006-304.14 4946	DOE-0238-94	OPERABLE UNIT 4 FINAL REMEDIAL INVESTIGATION REPORT/BASELINE RISK ASSESSMENT	11/02/1993	DOE-FN EPA	1	LETTER
U-006-304.15 4947		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 FINAL VOLUME 1 OF 3 NOVEMBER 1993	11/02/1993	DOE-FN EPA	550	REPORT
U-006-304.16 4948		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 FINAL VOLUME 2 OF 3 NOVEMBER 1993	11/02/1993	DOE-FN EPA	550	REPORT
U-006-304.17 4949		REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4 FINAL VOLUME 3 OF 3 NOVEMBER 1993	11/02/1993	DOE-FN EPA	550	REPORT
U-006-304.18 5357	DOE-1282-94	REVISIONS TO THE OPERABLE UNIT 4 REMEDIAL INVESTIGATION FINAL REPORT	03/18/1994	DOE-FN EPA	22	LETTER

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U-006-305.2 2146		RI/FS WORK PLAN ADDENDUM TREATABILITY STUDY OPERABLE UNTI 4 U.S. DOE FERNALD	09/07/1990	USEPA DOE	3	Letter
U-006-305.3 1925		OU#4 RI DISAPPROVAL U.S. DOE - FERNALD OH6 890 008 976	09/27/1990	USEPA DOE-FSO	9	Letter
U-006-305.4 2457		RI - OU #4 SAMPLING U.S. DOE - FERNALD OH6 890 008 976	10/18/1990	USEPA DOE	2	Letter
U-006-305.5 1767		RI/RISK ASSESSMENT O.U. 4	10/02/1990	OEPA DOE	1	Letter
U-006-305.6 2147		OU#4 - TREATABILITY STUDY U.S. DOE - FERNALD OH6 890 008 976	11/21/1990	USEPA DOE-FSO	4	Letter
U-006-305.7 1172		NOTICE OF VIOLATION OU#4 RI/RISK ASSESSMENT U.S. DOE - FERNALD OH6 890 008 976	12/07/1990	USEPA DOE-ORO	4	Letter
U-006-305.8 2459		OU#4 RI DISAPPROVAL U.S. DOE - FERNALD OH6 890 008 976	12/07/1990	USEPA DOE	30	Letter
U-006-305.9 1817		REVISED RI-RISK ASSESSMENT O.U. 4	12/07/1990	OEPA DOE	1	Letter
U-006-305.10 1175		OU#4 RI DISPUTE U.S. DOE - FERNALD OH6 890 008 976	01/04/1991	USEPA DOE	1	Letter
U-006-305.11 1176		OU#4 RI DISPUTE U.S. DOE - FERNALD OH6 890 008 976	01/04/1991	USEPA DOE	2	Letter
U-006-305.12 1179		DISPUTE OU #4 RI U.S. DOE - FERNALD OH6 890 008 976	01/10/1991	USEPA DOE	2	Letter

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U-006-305.14 1205		OU#4 EPA RI DISPUTE U.S. DOE - FERNALD OH6 890 006 976	01/30/1991	USEPA DOE	2	Letter
U-006-305.15 2390		OU#4 EPA RI DISPUTE U.S. DOE - FERNALD OH6 890 008 976	02/22/1991	USEPA DOE	2	Letter
U-006-305.16 2159		OHIO EPA COMMENTS CONCERNING: THE TREATABILITY STUDY WORK PLAN FOR OERPABLE UNIT 4	08/22/1991	OEPA DOE	7	Comment
U-006-305.17 2154		DISAPPROVAL OF TREATABILITY STUDY WORK PLAN FOR OU#4	09/03/1991	USEPA DOE-FSO	2	Letter
U-006-305.18 2340		U.S. EPA COMMENTS ON TREATABILITY STUDY WORK PLAN FOR OU4	10/01/1991	DOE-FSO EPA	36	Response
U-006-305.19 2421		CONDITIONAL APPROVAL O.U. 4 TREATABILITY STUDY W.P.	11/01/1991	OEPA DOE	1	Letter
U-006-305.20 2844		ADDENDUM AND REVISED TREATABILITY STUDY WORK PLAN FOR OU #4	12/02/1991	USEPA DOE	1	Letter
U-006-305.21 2612		DISAPPROVAL OF THE OU #4 VITRIFICATION TREATABILITY STUDY WORK PLAN	12/24/1991	USEPA DOE	1	Letter
U-006-305.22 2589		OHIO EPA COMMENTS ON OU4 VITRIFICATION TREATABILITY STUDY WORK PLAN		OEPA DOE	1	Letter
U-006-305.23 2738		APPROVAL O.U. 4 TREATABILITY WORK PLAN	01/27/1992	OEPA DOE	1	Letter
U-006-305.24 2923		OHIO EPA COMMENTS OU4 VITRIFICATION TREATABILITY STUDY WORK PLAN		OEPA DOE	2	Enclosure

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U-006-305.26 3097		CONDITIONAL APPROVAL OF THE SECOND REVISION OU #4 VITRIFICATION TREATABILITY STUDY WORK PLAN	04/01/1992	USEPA DOE	1	Letter
U-006-305.27 3264		OU4 VITRIFICATION STUDY CONDITIONAL APPROVAL	05/14/1992	OEPA DOE	1	Letter
U-006-305.28 3545		REVISED PROCEDURES FOR OU #4 VITRIFICATION TREATABILITY STUDY	06/22/1992	USEPA DOE	2	Letter
U-006-305.29 4211		DOCUMENT CHANGE REQUEST FOR OU4 VITRIFICATION TREATABILITY STUDY	03/05/1993	USEPA DOE-FN	1	Letter
U-006-305.30 4533		OHIO EPA COMMENTS ON THE OU4 RI REPORT	06/17/1993	OEPA DOE	26	Comment
U-006-305.31 4718		U.S DOE EXTENSION REQUEST FOR SUBMITTAL OF OU4 DRAFT FINAL RI REPORT	08/24/1993	USEPA DOE-FN	1	Letter
U-006-305.32 4752		DISAPPROVAL OF THE OU 4 REMEDIAL INVESTIGATION REPORT	06/23/1993	USEPA DOE-FN	72	COMMENTS
U-006-305.33 4766		CONDITIONAL APPROVAL OF REVISED OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT	09/22/1993	OEPA DOE-FN	3	COMMENTS
U-006-305.34 4808		CONDITIONAL APPROVAL OF THE OU 4 REMEDIAL INVESTIGATION REPORT	10/06/1993	USEPA DOE-FN	13	COMMENTS
U-006-305.35 4938		OHIO EPA APPROVAL OF THE FINAL OU 4 RI REPORT	19	OEPA DOE-FN	1	LETTER
U-006-305.36 469		SILO SAMPLING U.S. DOE-FERNALD OH6 890 008 976	05/25/1989	OEPA DOE	1	Letter

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U-006-305.38 1755		K-65 SAMPLING	07/26/1990	OEPA DOE	1	Letter
U-006-305.39 1277		K-65 SAMPLING OU#4 U.S. DOE-FERNALD OH6 890 008 976	08/15/1990	USEPA DOE	8	Letter
U-006-305.40 2460		OU#4 EXTERNAL SAMPLING U.S. DOE FERNALD OH6 890 008 976	/13/1990	USEP' DOE	2	Letter
U-006-305.41 3345		FURTHER CLARIFICATION RELATIVE TO DISPOSAL OF THE K-65 RESIDUES AT THE FMPC	01/10/1991	USEPA USEPA	5	Memorandum
U-006-305.42 1816		CONDITIONAL APPROVAL K-65 SILO VERTICAL BORING SAMPLING PLAN	02/07/1991	OEPA DOE	2	Letter
U-006-305.43 1743		OU #4: K-65 SILO RESIDUE SAMPLING AND ANALYSIS PLAN	07/01/1991	USEPA DOE	3	Letter
U-006-305.44 2121		APPROVAL OF K-65 SILO CONTENT SAMPLING PLAN	09/10/1991	USEPA DOE	2	Letter
U-006-305.45 5051		CONDITIONAL APPROVAL OF THE OU 4 REMEDIAL INVESTIGATION FINAL REPORT	01/06/1994	USEPA DOE-FN	6	COMMENTS
U-006-306.1 1924	DOE-40-91	OPERABLE UNIT 4 - REMEDIAL INVESTIGATION (RI) REPORT	10/26/1990	DOE USEPA	2	Letter
U-006-306.2 585		RESPONSE TO U.S. EPA & OEPA COM TS ON THE REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4	10/29/1990	DOE EPA	50	Report
U-006-306.3 1843	DOE-336-91	OPERABLE UNIT 4 - RI/FS SCHEDULE	11/30/1990	DOE EPA	2	Letter

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U-006-306.4 1835	DOE-429-91	OPERABLE UNIT 4 - FEASIBILITY STUDY (FS) REPORT	12/13/1990	DOE-FSO USEPA	2	Letter
U-006-306.5 948	DOE-452-91	NOTICE OF DISPUTE - U.S. EPA DISAPPROVAL - OEPRABLE UNIT 4 REMEDIAL INVESTIGATION (RI) REPORT AND U.S. EPA NOTICE OF VIOLATION (NOV)	12/20/1990	DOE USEPA	3	Enclosure
U-006-306.6 984	DOE-463-91	PHASE I TREATABILITY STUDY FOR OPERABLE UNIT 4	12/20/1990	DOE USEPA	2	Letter
U-006-306.7 1174	DOE-499-91	SUPPLEMENT TO NOTICE OF DISPUTE - OPERABLE UNIT 4 REMEDIAL INVESTIGATION (RI) REPORT	12/26/1990	DOE USEPA	3	Letter
U-006-306.8 998	DOE-663-91	OPERABLE UNIT 4 - DISPUTE RESOLUTION	01/28/1991	DOE USEPA	3	Letter
U-006-306.9 1206	DOE-748-91	DISPUTE RESOLUTION - OEPRABLE UNTI 4 REMEDIAL INVESTIGATION REPORT	02/13/1991	DOE USEPA	2	Letter
U-006-306.10 947	DOE-537-91	DISPUTE RESOLUTION - OPERABLE UNIT 4 REMEDIAL INVESTIGATION (RI) REPORT	01/07/91	DOE USEPA	2	Letter
U-006-306.11 2252		RESPONSE TO COMMENTS TREATABILITY STUDY WORK PLAN FOR OPERABLE UNIT 4 JULY 1991 OCTOBER 1991	10/01/1991	DOE EPA	50	Response
U-006-306.12 2472		RESPONSE TO COMMENTS RECEIVED ON THE OPERABLE UNIT 4 DRAFT TREATABILITY STUDY WORK PLAN DOCUMENT DATE - OCTOBER 1991 JANUARY 1992	01/01/1992	DOE EPA	25	Response
U-006-306.13 2712		RESPONSE TO THE U.S. EPA COMMENTS OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF THE RESIDUES FROM SILOS 1, 2, AND 3		DOE EPA	16	Response
U-006-306.14 2883		RESPONSE TO THE OEPA COMMENTS OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF THE RESIDUES FROM SILOS 1, 2, AND 3		DOE EPA	9	Response

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U-006-306.15 3004		RESPONSE TO THE OHIO EPA COMMENTS OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF THE RESIDUES FROM SILOS 1, 2, AND 3	03/24/1992	DOE EPA	3	Response
U-006-306.16 3005		RESPONSE TO THE U.S. EPA COMMENTS OPERABLE UNIT 4 TREATABILITY STUDY WORK PLAN FOR THE VITRIFICATION OF THE RESIDUES FROM SILOS 1,2, AND 3	03/24/1992	DOE EPA	3	Response
U-006-306.17 3159	DOE-1434-92	REVISED PROCEDURES FOR OPERABLE UNIT 4 (OU 4) VITRIFICATION TREATABILITY STUDY	04/24/1992	DOE EPA	2	Letter
U-006-306.18 3475	DOE-1773-92	RESPONSES TO THE OPERABLE UNIT (OU) 4 VITIRIFICATION STUDY CONDITIONAL APPROVAL	05/27/1992	DOE OEPA	6	Letter
U-006-306.19 3693	DOE-2561-92	REVISED PROCEDURES FOR OPERABLE UNIT 4 VITRIFICATION TREATABILITY STUDY	08/31/1992	DOE USEPA	3	Letter
U-006-306.20 4097	DOE-2245-92	REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) - USE OF BLAST FURNACE SLAG IN OPERABLE UNITS 1 AND 4 FORMULATIONS	07/29/1992	DOE-FN EPA	2	Letter
U-006-306.21 4592	DOE-2416-93	REQUEST FOR EXTENSION FOR RESUBMITTAL OF THE OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT	07/13/1993	DOE-FN EPA	2	Letter
U-006-306.22 4658	DOE-2594-93	OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT - DRAFT COMMENT RESPONSE DOCUMENT	07/29/1993	DOE-FN EPA	142	Response
U-006-306.23 4697	DOE-2789-93	OPERABLE UNIT 4 DRAFT FINAL REMEDIAL INVESTIGATION, BASELINE RISK ASSESSMENT REPORT	08/20/1993	DOE-FN EPA	52	Response
U-006-306.24 4835	DOE-0182-94	RESPONSES TO OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT ORIGINAL COMMENTS #12, #13 AND #19	10/28/1993	DOE-FN EPA	4	RESPONSES
U-006-306.25 4945		RESPONSES TO USEPA AND OHIO EPA COMMENTS ON THE REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 4, AUGUST 1993	11/02/1993	DOE-FN EPA	23	RESPONSES

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U-006-306.26 3358	DOE-873-89	NOTIFICATION OF SAMPLING OF K-65 SILOS AT THE U.S. DOE FMPC	04/06/1989	DOE SOAPCA	2	Letter
U-006-306.27 1997		COMMENT RESPONSE TO U.S. EPA COMMENTS ON: THE RI/FS WORK PLAN ADDENDUM: K-65 SILO EMBANKMENT AND SUBSOILS SAMPLING AND ANALYSIS PLAN JULY 1990	07/01/1990	DOE EPA	8	Response
U-006-306.28 1275	DOE-1711-90	K-65 SAMPLING PROCEDURES	08/10/1990	DOE USEPA	4	Letter
U-006-306.29 1805	DOE-1722-90	INFORMATION SUBMITTAL UNDER PARAGRAPH XIII (B) OF THE 1990 CERCLA CONSENT AGREEMENT - GLOVE BOX TREATABILITY TESTING	08/14/1990	DOE EPA	4	Letter
U-006-306.30 2028		FMPC RI/FS REPORT OPERABLE UNIT 4 LABORATORY SCREENING WORK PLAN	09/01/1990	DOE EPA	11	Comment
U-006-306.31 1921	DOE-1937-90	K-65 RESIDUE SAMPLING - RESPONSE TO U.S. EPA COMMENTS ON SAMPLING PROCEDURES	09/19/1990	DOE USEPA	2	Letter
U-006-306.32 2426		FMPC RI/FS PROJECT K-65 SILOS SAMPLING AND ANALYSIS PLAN RESPONSE TO OEPA COMMENTS	10/02/1990	DOE OEPA	2	Response
U-006-306.33 1842	DOE-60-91	K-65 SAMPLING	10/11/1990	DOE USEPA	2	Letter
U-006-306.34 911	DOE-413-91	INFORMATION SUBMITTAL UNDER PARAGRAPH XIII (B) OF THE 1990 CONSENT AGREEMENT - ORGANIC EXTRACTION - K-65 SILO RESIDUE SAMPLE ANALYSES	12/11/1990	DOE EPA	3	Letter
U-006-306.35 1836	DOE-579-91	K-65 SILOS BERM SAMPLING WORK PLAN	01/14/1991	DOE USEPA	1	Letter
U-006-306.36 1157		RESPONSES TO OEPA COMMENTS ON THE K-65 SILO BERM VERTICAL BORING SAMPLING PLAN	01/01/1991	DOE OEPA	2	Response

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U-006-306.37 1874	DOE-1803-91	K-65 CONTENTS RESAMPLING	07/10/1991	DOE EPA	2	Letter
U-006-306.38 1871	DOE-1886-91	K-65 SLANT BORING #2	07/24/1991	DOE EPA	2	Letter
U-006-306.39 2069	DOE-2195-91	COMPLETION OF OPERABLE UNIT 4 SAMPLING ACTIVITIES	09/10/1991	DOE EPA	2	Letter
U-006-306.40 3344		REQUESTING A MEETING CONCERNING THE APPLICATION OF EPA STANDARDS FOR THE MANAGEMENT AND DISPOSAL OF HIGH-LEVEL AND TRANSURANIC NUCLEAR WASTE	03/23/1992	DOE-HQ USEPA	3	Letter
U-006-306.41 5338	DOE-82-89	K-65 AND METAL OXIDE SILO SAMPLING SCHEDULE	11/10/1988	DOE-FMPC USEPA	2	LETTER
U-006-306.42 5469	DOE-1564-89	STORAGE OF K-65 AND METAL OXIDE SAMPLE MATERIAL	08/30/1989	DOE-FMPC USEPA	1	LETTER
U-006-306.43 5442	DOE-1806-91	CONFIRMATION OF VERBAL APPROVAL TO PROCEED ON CONTENT RESAMPLING	07/12/1991	DOE-FSO EPA	2	LETTER
U-006-306.44 5350 d6	DOE-067-92	OPERABLE UNIT 4 TREATABILITY WORK PLAN ADDENDUM	10/08/1991	DOE-FN EPA	2	LETTER
U-006-307.1 4635		GEOLOGY OF CINCINNATI AND VICINITY 1916			217	Report
U-006-307.2 4612		RAINFALL AND RUNOFF IN THE MIAMI VALLEY STATE OF OHIO MIAMI CONSERVANCY DISTRICT 1921	01/01/1921		235	Report
U-006-307.3 4637		PROCESS ENGINEERING REPORT OPERATING MANUAL FOR K-65 STORAGE AREA FEED MATERIAL PRODUCTION CENTER, FERNALD, OHIO		CCC, INC. USAEC	50	Report

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U-006-307.4 4702		K-65 STORAGE TANK NO. 1	11/25/1953	NLO	1	Memorandum
U-006-307.5 4703		K-65 STORAGE TANKS	12/01/1953	USAEC NLO	1	Letter
U-006-307.6 4704		LEASE OF FACILITIES TO AFRICAN METALS	07/15/1958	USAEC NLO	1	Letter
U-006-307.7 4705		LEASE OF K-65 TANK AREA	08/28/1958	USAEC NLO	1	Letter
U-006-307.8 4611		RAINFALL FREQUENCY ATLAS OF THE UNITED STATES FOR DURATIONS FROM 30 MINUTES TO 24 HOURS AND RETURN PERIODS FROM 1 TO 100 YEARS TECHNICAL PAPER NO.40	05/01/1961	US COMMERCE	65	Report
U-006-307.9 4636		SCOPING INVESTIGATION OF SHORT-TERM STORAGE COSTS FOR AFRIMET RESIDUES - NFSS AND FMPC SEPTEMBER 29, 1980	09/29/1980	NLO DOE-FN	49	Report
U-006-307.10 4613		SOIL SURVEY OF BUTLER COUNTY, OHIO	01/01/1980	USAG	259	Report
U-006-307.11 4681	BMI-2083 UC-11	PRELIMINARY ASSESSMENT OF ALTERNATIVES FOR PROCESSING AND DISPOSAL OF THE AFRIMET RESIDUES FINAL REPORT 1981	05/15/1981	BATELLE DOE	64	Report
U-006-307.12 4614		SOIL SURVEY OF HAMILTON COUNTY, OHIO	08/01/1982	USAG	286	Report
U-006-307.13 4610		FIRM FLOOD INSURANCE RATE MAP COUNTY OF HAMILTON OHIO	06/01/1982	FEMA	1	Map
U-006-307.14 4440		FEASIBILITY INVESTIGATION FOR CONTROL OF RADON EMISSION FROM THE K-65 SILOS	07/30/1987	WEMCO DOE	100	Report

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U-006-307.16 4603	FMPC-2142	THE K-65 WASTE STORAGE SILOS AT THE FEED MATERIALS PRODUCTION CENTER SEPTEMBER 1988	09/01/1988	WEMCO DOE-ORO	12	Report
U-006-307.17 4445		SAMPLING AND RADIOLOGICAL ANALYSES OF SEDIMENT FROM PADDY'S RUN AND THE STORM SEWER OUTFALL DITCH	09/07/1989	IT ASI	3	Memorandum
U-006-307.18 4770		TOPOGRAPHIC SURVEY AND GEOTECHNICAL INVESTIGATION FMPC WATER POLLUTION CONTROL FERNALD, OHIO	10/05/1982	ATEC ASSOC. NLO	75	REPORT
U-006-307.19 4942		EFFECT OF INCREASED PUMPING OF GROUND WATER IN THE FAIRFIELD-NEW BALTIMORE AREA, OHIO - A PREDICTION BY ANALOG-MODEL STUDY GEOLOGICAL SURVEY PROFESSIONAL PAPER 605-C (ANDREW M. SPEIKER)	19	USGS	50	REPORT
U-006-307.20 4943		TREATMENT OF P[illegible]NDE RESIDUES FOR RECOVERY OF METAL VALUES (JOHN E. LITZ)	05/30/1974	HAZEN RESEARCH COTTER CORP	30	REPORT
U-006-307.21 4944		WASTE WATER QUALITY REPORTS, NPDES PERMIT PARAMETERS AND DATA SUMMARIES 1979 TO 1983	19	NLO	250	REPORTS
U-006-307.22 5030		"ECOREGIONS OF THE UNITED STATES" BY ROBERT G. BAILEY U.S. FOREST SERVICE 1976	01/01/1976		1	MAP
U-006-307.23 5031		"GLACIAL GEOLOGIC MAPPING IN HAMILTON COUNTY, OHIO (REPORT OF PROGRESS ON THE FIRST PHASE)" BY C. SCOTT BROCKMAN SEPTEMBER 1986 OHIO DEPT. NATURAL RESOURCES, DIV. GEOLOGICAL SURVEY	09/01/1986		17	REPORT
U-006-307.24 5032		RADIOLOGICAL AND CHEMICAL BASELINE RISK ASSESSMENT OPERABLE UNIT 4 APRIL 2, 1990 PELIMINARY DRAFT	04/02/1990	IT CORP DOE-ORO	150	REPORT
U-006-307.25 5033		"BEDROCK TOPOGRAPHY OF BUTLER COUNTY, OHIO" BY JACK A. LEOW JULY 1985 OHIO DEPT. NATURAL RESOURCES, DIV. GEOLOGICAL SURVEY	07/01/1985		1	MAP

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U-006-307.26 5034		"GROUND-WATER HYDROLOGY AND GEOLOGY OF THE LOWER GREAT MIAMI RIVER VALLEY, OHIO" BY ANDREW M. SPIEKER 1968 U.S. GEOLOGICAL SURVEY PROFESSIONL PAPER 605-A	01/01/1968		40	REPORT
U-006-307.27 5035		"FUTURE DEVELOPMENT OF THE GROUND-WATER RESOURCE IN THE LOWER GREAT MIAMI RIVER VALLEY, OHIO - PROBLEMS AND SOLUTIONS" BY ANDREW M. SPIEKER 1968 U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 605-D	01/01/1968		50	REPORT
U-006-307.28 5036		"BEDROCK TOPOGRAPHY OF HAMILTON COUNTY, OHIO" BY JOEL VORMELKER JULY 1985 OHIO DEPT. NATURAL RESOURCES, DIV. GEOLOGICAL SURVEY	07/01/1985		1	MAP
U-006-307.29 5450		BEDROCK GEOLOGY OF THE CINCINNATI WEST QUADRANGLE AND PART OF THE COVINGTON QUADRANGLE, HAMILTON COUNTY, OHIO BY JOHN P. FORD 1974 OHIO DIV. GEOLOGICAL SURVEY (USED AS A REFERENCE IN THE OU 1 RI, OU 2 RI, OU 2 FS, OU 4 RI, AND OU 5 RI)	01/01/1974		2	REPORT
U-006-307.30 5451		BEDROCK GEOLOGY OF HAMILTON COUNTY, OHIO BY M. SWINFORD (IN PREPARATION) OHIO DIV GEOLOGICAL SURVEY (USED AS A REFERENCE IN THE OU 2 RI, OU 2 FS, OU 4 RI AND OU 5 RI)	11/10/1992		21	REPORT
U-006-401.1 576		ARAR IDENTIFICATION FOR OU4 FMPC RI/FS	04/30/1990	ASI DOE	25	Letter
U-006-401.2 337	DOE-1265-90	POTENTIAL STATE ARARS FOR OPERABLE UNIT 4	06/11/90	DOE OEPA	1	Letter
U-006-401.3 417	DOE-1317-90	APPLICABLE RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) FOR OPERABLE UNIT 4	06/27/1990	DOE USEPA	64	Letter
U-006-401.4 1746		ASSESSMENT OF IMPACTS OF ADDITIONAL ARAR,40CFR191 AUGUST 14, 1990	08/14/1990		70	Report

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U-006-401.5 1747		ASSESSMENT OF IMPACTS OF ADDITIONAL ARAR, 40CFR191 AUGUST 24, 1990	08/24/1990		25	Report
U-006-401.6 1670	DOE-02-91	POTENTIAL ARARS FOR OPERABLE UNIT 4 - REVISION 1	10/22/1990	DOE EPA	83	Letter
U-006-402.1 336	DOE-1166-90	INITIAL SCREENING OF ALTERNAT. UR OPERABLE UNIT 4	06/01/1990	DOE EPA	2	Letter
U-006-402.2 299	FMPC-0412-4	INITIAL SCREENING OF ALTERNATIVES FOR OPERABLE UNIT 4 TASK 12 REPORT MAY 1990	05/01/1990	DOE EPA	132	Report
U-006-402.3 1804	FMPC-0412-5	INITIAL SCREENING OF ALTERNATIVES FOR OPERABLE UNIT 4 TASK 12 REPORT AUGUST 1990	08/03/1990	DOE EPA	200	Report
U-006-402.4 1846	DOE-137-91	INITIAL SCREENING OF ALTERNATIVES FOR OPERABLE UNIT 4 - FINAL REPORT	10/29/1990	DOE USEPA	2	Letter
U-006-402.5 560	FMI .12-6	INITIAL SCREENING OF ALTERNATIVES FOR OPERABLE UNIT 4 TASK 12 REPORT OCTOBER 1990	10/01/1990	DOE EPA	235	Report
U-006-403.1 416	FMPC-0413-2	DETAILED ANALYSIS OF ALTERNATIVES FOR OPERABLE UNIT 4 TASK 13 PRESENTATION JUNE 1990	06/01/1990	ASI DOE	53	Handout
U-006-403.2 1586		DETAILED ANALYSIS OF ALTERNATIVES FOR OPERABLE UNIT 4 TASK 13 PRESENTATION JULY 1990	07/01/1990		106	Handout
U-006-404.1 4737	DOE-2954-93	OPERABLE UNIT 4 DRAFT FEASIBILITY STUDY REPORT/PROPOSED PLAN	09/08/1993	DOE-FN EPA	3	Letter
U-006-404.2 4738		FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 REMEDIAL INVESTIGATION AND FEASIBILITY STUDY VOLUME 1 OF 4 DRAFT SEPTEMBER 1993	09/08/1993	DOE-FN EPA	600	Report
U-006-404.3 4739		FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 REMEDIAL INVESTIGATION AND FEASIBILITY STUDY VOLUME 2 OF 4 DRAFT SEPTEMBER 1993	09/08/1993	DOE-FN EPA	600	Report

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U-006-404.5 4741		FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 REMEDIAL INVESTIGATION AND FEASIBILITY STUDY VOLUME 4 OF 4 DRAFT SEPTEMBER 1993	09/08/1993	DOE-FN EPA	600	Report
U-006-404.6 4924	DOE-0383-94	REQUEST FOR EXTENSION ON SUBMITTAL OF THE OPERABLE UNIT 4 DRAFT FINAL FEASIBILITY STUDY REPORT AND PROPOSED PLAN	11/22/1993	DOE-FN EPA	2	LETTER
U-006-404.7 5037	DOE-0636-94	OPERABLE UNIT 4 DRAFT FINAL FEASIBILITY STUDY REPORT/PROPOSED PLAN	12/21/1993	DOE EPA	2	LETTER
U-006-404.8 5038	DOE/EIS-0195D	FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 VOLUME 1 OF 4 DECEMBER 1993 DRAFT FINAL	12/21/1993	DOE EPA	700	REPORT
U-006-404.9 5039	DOE/EIS-0195D	FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 VOLUME 2 OF 4 DECEMBER 1993 DRAFT FINAL	12/21/1993	DOE EPA	700	REPORT
U-006-404.10 5040	DOE/EIS-0195D	FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 VOLUME 3 OF 4 DECEMBER 1993 DRAFT FINAL	12/21/1993	DOE OEPA	700	REPORT
U-006-404.11 5041	DOE/EIS-0195D	FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 VOLUME 4 OF 4 DECEMBER 1993 DRAFT FINAL	12/21/1993	DOE OEPA	700	REPORT
U-006-404.12 5204	DOE-1008-94	OPERABLE UNIT 4 FINAL FEASIBILITY STUDY REPORT/PROPOSED PLAN	02/22/1994	DOE-FN EPA	2	LETTER
U-006-404.13 5205	DOE/EIS-0195D	FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 VOLUME 1 OF 4 FINAL FEBRUARY 1994	02/22/1994	DOE-FN EPA	683	REPORT
U-006-404.14 5206	DOE/EIS-0195D	FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 VOLUME 2 OF 4 FINAL FEBRUARY 1994	02/22/1994	DOE-FN EPA	773	REPORT

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U-006-404.16 5208	DOE/EIS-0195D	FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 4 VOLUME 4 OF 4 FINAL FEBRUARY 1994	02/22/1994	DOE-FN EPA	815	REPORT
U-006-405.1 4742	DOE/EIS-0195D	PROPOSED PLAN FOR OPERABLE UNIT 4 DRAFT AUGUST 1993	09/08/1993	DOE-FN EPA	100	Work Plan
U-006-405.2 5042	DOE/EIS-0195D	PROPOSED PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 4 DECEMBER 1993 DRAFT FINAL	12/21/1993	DOE OEPA	100	REPORT
U-006-405.3 5209	DOE/EIS-0195D	PROPOSED PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 4 FINAL FEBRUARY 1994	02/22/1994	DOE-FN EPA	105	REPORT
U-006-407.1 893		OU#4 ALTERNATIVES U.S. DOE FERNALD OH6 890 008 976	07/05/1990	USEPA DOE	15	Letter
U-006-407.2 894		OHIO EPA COMMENTS - OPERABLE UNIT 4 INITIAL SCREENING OF ALTERNATIVES REPORT	07/06/1990	OEPA DOE	6	Letter
U-006-407.3 1928		OU#4 - ALTERNATIVES U.S. DOE - FERNALD OH6 890 008 976	09/04/1990	USEPA DOE	5	Letter
U-006-407.4 2135		OU#4 DISPUTE RESOLUTION U.S. DOE FERNALD OH6 890 008 976	10/03/1990	USEPA DOE	2	Letter
U-006-407.5 2136		OU#4 ALT SCREENING DISPUTE RESOLUTION U.S. DOE FERNALD OH6 890 008 976	10/18/1990	USEPA DOE	2	Letter
U-006-407.6 1813		OU#4 ALT SCREENING DISPUTE RESOLUTION U.S. DOE FERNALD OH6 890 008 976	10/31/1990	USEPA DOE	1	Letter
U-006-407.7 1173		EXTENSION REQUEST OU #4 FS REPORT U.S. DOE FERNALD OH6 890 008 976	12/19/1990	USEPA DOE	2	Letter

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U-006-407.9 2962		OPERABLE UNIT #4 ARARS	03/04/1992	USEPA DOE	2	Letter
U-006-407.10 4907		OHIO EPA COMMENTS ON THE OU 4 FEASIBILITY STUDY REPORT AND PROPOSED PLAN	11/09/1993	OEPA DOE-FN	18	COMMENTS
U-006-407.11 4909		DISAPPROVAL OF THE O.U. 4 FEASIBILITY STUDY AND PROPOSED PLAN	11/09/1993	USEPA DOE-FN	66	COMMENTS
U-006-407.12 4930		APPROVAL OF THE CLARIFICATION TO THE OU 4 FEASIBILITY STUDY DOCUMENT CHANGE REQUEST	11/24/1993	USEPA DOE-FN	1	LETTER
U-006-407.13 5121		OHIO EPA COMMENTS ON THE REVISED O.U. 4 FS/PP	01/24/1994	OEPA DOE-FN	18	COMMENTS
U-006-407.14 5145		CONDITIONAL APPROVAL OF THE DRAFT FINAL OU 4 FEASIBILITY STUDY REPORT AND PROPOSED PLAN	02/09/1994	USEPA DOE-FN	18	COMMENTS
U-006-408.1 1946		OEPRABLE UNTI 4 INITIAL SCREENING OF ALTERNATIVES COMMENT-RESPONSE DOCUMENT		DOE EPA	60	Report
U-006-408.2 1927	DOE-1853-90	INFORMAL DISPUTE RESOLUTION MEETING	09/07/1990	DOE USEPA	2	Letter
U-006-408.3 1681	DOE-1772-90	OPERABLE UNIT 4	09/24/1990	DOE ASI	1	Letter
U-006-408.4 1672	DOE-46-91	OEPRABLE UNIT 4 - DISPUTE RESOLUTION	10/11/1990	DOE USEPA	3	Letter
U-006-408.5 2339		OPERABLE UNIT 4 INITIAL SCREENING OF ALTERNATIVES COMMENT - RESPONSE DOCUMENT	08/03/1990	DOE EPA	12	Enclosure

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U-006-408.6 1847	DOE-208-91	OPERABLE UNIT 4 - FEASIBILITY STUDY (FS) REPORT	11/06/1990	DOE-FSO USEPA	1	Letter
U-006-408.7 913	DOE-401-91	OPERABLE UNIT 4 - FEASIBILITY STUDY (FS) REPORT	12/13/1990	DOE USEPA	2	Letter
U-006-408.8 960	DOE-551-91	OPERABLE UNIT 4 - PROPOSED PLAN	01/10/1991	DOE USEPA	2	Letter
U-006-408.9 2507	DOE-333-92	OPERABLE UNIT 4 - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)	11/18/1991	DOE EPA	3	Letter
U-006-408.10 5043		FEASIBILITY STUDY REPORT AND PROPOSED PLAN FOR OPERABLE UNIT 4 RESPONSES TO COMMENTS DECEMBER 1993	12/21/1993	DOE EPA	100	RESPONSES
U-006-408.11 3343	DOE 1944-92	OPERABLE UNIT (OU) ARARS	06/18/1992	DOE USEPA	2	Letter
U-006-408.12 5210		RESPONSE TO COMMENTS ON THE DRAFT FINAL FEASIBILITY STUDY REPORT AND PROPOSED PLAN FOR OPERABLE UNIT 4 FEBRUARY 1994	02/22/1994	DOE-FN EPA	118	RESPONSES
U-006-408.13 5478	DOE-1514-94	OPERABLE UNIT 4 CONSENT AGREEMENT SCHEDULE - REQUEST FOR EXTENSION OF THE FEASIBILITY STUDY/PROPOSED PLAN-DRAFT ENVIRONMENTAL IMPACT STATEMENT PUBLIC REVIEW PERIOD AND THE SUBMITTAL OF THE DRAFT RECORD OF DECISION TO THE U.S. EPA	04/18/1994	DOE-FN EPA	4	LETTER
U-006-409.1 4796		OPERABLE UNIT 4 TREATABILITY STUDY REPORT FOR THE VITRIFICATION OF RESIDUES FROM SILOS 1, 2, AND 3 MAY 1993	05/01/1993	FERMCO DOE-FN	150	REPORT
U-006-409.2 5448		TREATABILITY STUDY REPORT FOR OPERABLE UNIT 4 DRAFT MARCH 31, 1993 (USED AS A REFERENCE IN THE OU 4 FS)	03/31/1993	DOE-FN	723	REPORT
U-006-409.3 5498	TECH REPORT Y-87-1	CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL, WETLANDS RESEARCH PROGRAM FINAL REPORT JANUARY 1987 BY ENVIRONMENTAL LABORATORY, DEPARTMENT OF THE ARMY,	01/02/1987	US ARMY	141	REPORT

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U-006-409.4 5449		FEED MATERIALS PRODUCTION CENTER, NEAR FERNALD, OHIO (USED AS A REFERENCE IN THE OU 2 RI, OU 2 FS, OU 4 FS, AND OU 5 RI)	05/05/1987	OHIO HIS SOC DOE-FMPC	1	LETTER
U-006-409.5 5309	55 FR 20183	DEPARTMENT OF ENERGY INTENT TO PREPARE A REMEDIAL INVESTIGATION/FEASIBILITY STUDY - ENVIRONMENTAL IMPACT STATEMENT FOR THE FIRST OF FIVE REMEDIAL ACTIONS AT THE FEED MATERIALS PRODUCTION CENTER NEAR FERNALD, OH (FEDERAL REGISTER NOTICE)	05/15/1990	DOE-HQ PUBLIC	8	NOTICE
U-006-409.6 5453	DOE/NV/10630-20	U.S. DEPARTMENT OF ENERGY NEVADA OPERATIONS OFFICE ANNUAL SITE ENVIRONMENTAL REPORT - 1990 VOLUME I SEPTEMBER 1991 (USED AS A REFERENCE IN THE OU 2 FS, OU 4 FS AND OU 3 PP/EA)	09/01/1991	DOE-NEVADA	319	REPORT
U-006-409.7 5497		A PHASE I CULTURAL RESOURCES RECONNAISSANCE OF THE FEED MATERIALS PRODUCTION CENTER ALTERNATE WATER SUPPLY SYSTEM, FERNALD, HAMILTON COUNTY, OHIO BY U.S. ARMY ENGINEER DISTRICT, LOUISVILLE, KY SEPTEMBER 1992	09/01/1992	US ARMY DOE-FN	74	REPORT
U-006-707.1 4855	DOE-0245-94	OPERABLE UNIT 4 REMEDIAL INVESTIGATION/FEASIBILITY STUDY SCHEDULE	11/03/1993	DOE-FN EPA	8	LETTER
U-006-707.2 5073		U.S. EPA/OHIO EPA MAJOR COMMENT RESOLUTION MEETING ON THE FEASIBILITY STUDY REPORT AND PROPOSED PLAN FOR REMEDIAL ACTION AT OPERABLE UNIT 4	11/22/1993	DOE-FN/FERMCO EPA	4	MINUTES
U-006-708.1 5139	DOE-0854-94	COMMENCEMENT OF OPERABLE UNIT 4 REMEDIAL ACTIONS WITHIN 15 MONTHS AFTER RECEIPT OF UNITED STATES ENVIRONMENTAL PROTECTION AGENCY APPROVED RECORD OF DECISION	02/09/1994	DOE-FN EPA	2	LETTER
U-006-1003.1 308		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW OF THE INITIAL SCREENING OF ALTERNATIVES FOR OPERABLE UNIT 4 (SILOS 1,2,3,& 4) AT THE DOE'S FMPC AT FERNALD, OHIO	06/04/1990	DOE PUBLIC	1	NOA

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U-006-1003.2 326		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW OF THE INITIAL SCREENING OF ALTERNATIVES FOR OPERABLE UNIT 4 (SILOS 1,2,3,4) AT THE DOE FMPC AT FERNALD, OHIO	05/30/1990	DOE PUBLIC	1	NOA
U-006-1003.8 4293	93-484	APPROVAL OF NOTICE OF AVAILABILITY (NOA) FOR OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT	04/06/1993	FERMCO DOE	1	Letter
U-006-1003.9 4294		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW AND COMMENT OF THE ADMINISTRATIVE RECORD FILE FOR THE OPERABLE UNTI 4 REMEDIAL INVESTIGATION REPORT AT THE DOE FEMP AT FERNALD, OHIO	04/19/1993	DOE PUBLIC	1	NOA
U-006-1003.10 4959	C:OP:93-484	APPROVAL OF NOTICE OF AVAILABILITY (NOA) FOR OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT	04/06/1993	FERMCO DOE	1	LETTER
U-006-1003.11 4960		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW AND COMMENT OF THE ADMINISTRATIVE RECORD FILE FOR THE OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT AT THE DOE FEMP, FERNALD, OHIO	04/06/1993	DOE PUBLIC	1	NOA
U-006-1003.12 4963	C:P:93-1343	APPROVAL FOR NOTICE OF AVAILABILITY (NOA) FOR THE OPERABLE UNIT 4 DRAFT FEASIBILITY STUDY REPORT AND DRAFT PROPOSED PLAN	09/13/1993	FERMCO DOE	1	LETTER
U-006-1003.13 4964		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC INSPECTION OF THE DRAFT FEASIBILITY STUDY REPORT AND DRAFT PROPOSED PLAN FOR OPERABLE UNIT 4 AT THE DOE FEMP, FERNALD, OHIO	09/13/1993	DOE PUBLIC	2	NOA
U-006-1003.14 5183	C:ENV:94-0006	APPROVAL FOR NOTICE OF AVAILABILITY (NOA) OF THE OPERABLE UNII 4 FEASIBILITY STUDY REPORT/PROPOSED PLAN - DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR FORMAL PUBLIC COMMNET	02/23/1994	FERMCO DOE-FN	3	LETTER
U-006-1003.15 5184		THE USDOE AT THE FEMP, FERNALD, OH[illegible]NOUNCES THE AVAILABILITY OF THE OPERABLE UNIT 4 [illegible]ASIBILITY STUDY REPORT/PROPOSED PLAN - DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR FORMAL PUBLIC COMMENT	03/02/1994	DOE-FN PUBLIC	2	NOA

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U-006-1003.16 5483	C:ENV:94-0016	APPROVAL FOR NOTICE OF AVAILABILITY (NOA) FOR EXTENDING THE PUBLIC COMMENT PERIOD FOR THE OPERABLE UNIT 4 FEASIBILITY STUDY/PROPOSED PLAN - DRAFT ENVIRONMENTAL IMPACT STATEMENT	04/19/1994	FERMCO DOE-FN	1	LETTER
U-006-1003.17 5484		THE UNITED STATES DEPARTMENT OF ENERGY FERNALD ENVIRONMENTAL MANAGEMENT PROJECT ANNOUNCES THE EXTENSION OF THE PUBLIC REVIEW AND COMMENT PERIOD ON THE OPERABLE UNIT 4 FEASIBILITY STUDY REPORT/PROPOSED PLAN-DRAFT ENVIRONMENTAL IMPACT STATEMENT	04/19/1994	DOE-FN PUBLIC	1	NOA
U-006-1004.2 5369		U.S. DEPARTMENT OF ENERGY PUBLIC MEETING MARCH 21 1994	03/21/1994	DOE-FN PUBLIC	65	TRANSCRIPT
U-006-1005.1 5417		PUBLIC HEARING AND FORMAL COMMENT SESSION ON THE OPERABLE UNIT 4 PROPOSED PLAN (PUBLICITY FLYER ABOUT HEARING)	03/14/1994	DOE-FN PUBLIC	1	NOTICE
U-006-1005.2 5418		AGENDA, OVERHEADS AND HANDOUTS FROM THE PUBLIC MEETING FOR OPERABLE UNIT 4 FEASIBILITY STUDY/PROPOSED PLAN-DRAFT ENVIRONMENTAL IMPACT STATEMENT HELD MARCH 21, 1994	03/21/1994	DOE-FN PUBLIC	65	HANDOUTS
U-006-1005.3 5419		PUBLIC HEARING SIGN-IN SHEETS FOR THE OPERABLE UNIT 4 FEASIBILITY STUDY/PROPOSED PLAN-DRAFT ENVIRONMENTAL IMPACT STATEMENT HELD MARCH 21, 1994 (CONFIDENTIAL)	03/21/1994	DOE-FN	27	ROSTER
U-006-1006.1 5189		FACT SHEET FOR THE PROPOSED PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 4 SILOS 1-4 FEBRUARY 1994	02/18/1994	DOE-FN PUBLIC	16	FACT SHEET

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R-008-101.2 1292		K-65 AREA WEEKLY REPORT MAY 30, 1991	05/31/1991	DOE USEPA	4	Report
R-008-101.3 1298		K-65 AREA WEEKLY REPORT JUNE 6, 1991	06/06/1991	DOE USEPA	4	Report
R-008-101.4 1369		K-65 AREA WEEKLY REPORT JUNE 14, 1991	06/14/1991	DOE USEPA	4	Report
R-008-101.5 1564		K-65 AREA WEEKLY REPORT JUNE 21, 1991	06/21/1991	DOE USEPA	7	Report
R-008-101.6 1620		K-65 WEEKLY REPORT JUNE 28, 1991	06/28/1991	DOE USEPA	12	Report
R-008-101.7 1867	DOE-1756-91	K-65 WEEKLY REPORT JULY 5, 1991	07/05/1991	DOE USEPA	2	Letter
R-008-101.8 1741		K-65 WEEKLY REPORT JULY 19, 1991	07/19/1991	DOE USEPA	10	Report
R-008-101.9 1906		K-65 WEEKLY REPORT JULY 26, 1991	07/26/1991	DOE USEPA	4	Report
R-008-101.10 1896		K-65 WEEKLY REPORT AUGUST 2, 1991	08/02/1991	DOE EPA	4	Report
R-008-101.11 2059		K-65 WEEKLY REPORT AUGUST 9, 1991	08/09/1991	DOE EPA	4	Report
R-008-101.12 1931		K-65 WEEKLY REPORT AUGUST 16, 1991	08/16/1991	DOE EPA	3	Report

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R-008-101.15 2236		K-65 WEEKLY REPORT SEPTEMBER 13, 1991	09/13/1991	DOE EPA	4	Report
R-008-101.16 2237		K-65 WEEKLY REPORT SEPTEMBER 20, 1991	09/20/1991	DOE EPA	4	Report
R-008-101.17 2209		K-65 WEEKLY REPORT SEPTEMBER 27, 1991	09/27/1991	DOE EPA	7	Report
R-008-101.18 2238		K-65 WEEKLY REPORT OCTOBER 4, 1991	10/04/1991	DOE EPA	4	Report
R-008-101.19 2239		K-65 WEEKLY REPORT OCTOBER 11, 1991	10/11/1991	DOE EPA	4	Report
R-008-101.20 2314		K-65 WEEKLY REPORT OCTOBER 18, 1991	10/18/1991	DOE EPA	6	Report
R-008-101.21 2359		K-65 WEEKLY REPORT OCTOBER 25, 1991	10/25/1991	DOE EPA	4	Report
R-008-101.22 2372		K-65 WEEKLY REPORT NOVEMBER 1, 1991	11/01/1991	DOE EPA	4	Report
R-008-101.23 2402		K-65 WEEKLY REPORT NOVEMBER 8, 1991	11/08/1991	DOE EPA	4	Report
R-008-101.24 2509		K-65 WEEKLY REPORT NOVEMBER 15, 1991	11/15/1991	DOE EPA	4	Report

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R-008-101.26 2521		K-65 WEEKLY REPORT NOVEMBER 29, 1991	11/29/1991	DOE EPA	4	Report
R-008-101.27 5347		K-65 WEEKLY REPORT JULY 12, 1991	07/12/1991	DOE EPA	4	REPORT
R-008-101.28 5348		K-65 WEEKLY REPORT SEPTEMBER 9, 1991	09/06/1991	DOE-FN EPA	4	REPORT
R-008-105.1 1432		REVIEW OF THE K-65 SILOS STUDIES FOR THE FMPC APRIL 1, 1991	04/01/1991	SANDIA NL DOE	27	Report
R-008-106.1 2703	DOE-745-92	SILOS 1 AND 2 REMOVAL ACTION BENTONITE EFFECTIVENESS ENVIRONMENTAL MONITORING PLAN	01/27/1992	DOE EPA	2	Letter
R-008-106.2 3030	DOE-1015-92	REVISED SILO 1 AND 2 REMOVAL ACTION BENTONITE EFFECTIVENESS ENVIRONMENTAL MONITORING PLAN	03/17/1992	DOE EPA	2	Letter
R-008-106.3 3184	DOE-1382-92	SILOS 1 & 2 REMOVAL ACTION BENTONITE EFFECTIVENESS ENVIRONMENTAL MONITORING PLAN	04/16/1992	DOE EPA	2	Letter
R-008-106.4 3290	DOE-1742-92	BENTONITE EFFECTIVENESS MODEL RESULT FOR JANUARY THROUGHT APRIL, 1992	05/22/1991	DOE EPA	2	Letter
R-008-106.5 3512	DOE-2022-92	BENTONITE EFFECTIVENESS MODEL RESULT FOR MAY 1992	06/30/1992	EPA DOE	3	Letter
R-008-108.1 4479	NEPA DOC 278	EVALUATION OF STRUCTURAL STABILITY OF THE K-65 SILOS AT FERNALD NEPA DOC 278	10/30/1989	DOE-FMPC DOE-HQ	2	Report
R-008-201.1 3047	DOE-1060-90	REMOVAL SITE EVALUATION K-65 SILOS	05/21/1990	DOE-FO WMCO	1	Letter

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R-008-202.1 294		REMOVAL SITE EVALUATION K-65 SILOS	05/21/1990	DOE-FMPC WMCO	5	RSE
R-008-203.1 444		A BASELINE RISK ASSESSMENT FOR THE K-65 SILOS USING EPA METHODOLOGY FOR APPLICABILITY TO THE EE/CA MAY 11, 1990	05/11/1990	UC DOE-FMPC	132	Report
R-008-203.2 1244	DOE-1537-90	TRANSMITTAL OF THE K-65 SILOS EE/CA - CONSENT AGREEMENT DELIVERABLE	07/31/1990	DOE-FMPC EPA	2	Letter
R-008-203.3 443		ENGINEERING EVALUATION/COST ANALYSIS (EE/CA) K-65 SILOS REMOVAL ACTION AT THE FMPC JULY 1990	07/31/1990	BNI DOE	135	Report
R-008-203.4 3270		ENGINEERING EVALUATION/COST ANALYSIS - ENVIRONMENTAL ASSESSMENT FOR THE K-65 SILOS REMOVAL ACTION, FEMP	11/14/1991	DOE DUFFY	2	Letter
R-008-203.5 3271		FINDING OF NO SIGNIFICA[illegible] ENGINEERING EVALUATION/COST ANALYSI[illegible] ENVIRONMENTAL ASSESSMENT K-65 SILOS REMOVAL ACTION FERNALD ENVIRONMENTAL	11/14/1991	DOE	9	Report
R-008-204.1 266	DOE-566-90	REVISED K-65 WORK PLAN	03/13/1990	DOE-ORO DOE-FMPC	9	Work Plan
R-008-204.2 5349	PM&A-PM4-91-406	RISK MANAGEMENT PLAN FOR OPERABLE UNIT 4 SILOS 1 & 2 (K-65) REMOVAL ACTION SEPTEMBER 11, 1991	09/11/1991	WEMCO DOE	19	REPORT
R-008-204.3 5444		SILOS 1 AND 2 OPERATIONAL SAFETY REQUIREMENTS REVISION NO. 4 NOVEMBER 1991	11/01/1991	PARSONS DOE-FSO	25	REPORT
R-008-204.4 2336	DOE-213-91	K-65 SILOS REMOVAL ACTION WORK PLAN	11/02/1990	DOE-FMPC EPA	2	Letter
R-008-204.5 1875		SILOS 1 AND 2 (K-65 SILOS) REMOVAL ACTION WORK PLAN NOVEMBER 1990	11/01/1990		25	Report

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R-008-204.8 1562		FERNALD SILO #4 REMOTE SURFACE MAPPING TECHNOLOGY SUPPORT DEMONSTRATION WORK PLAN MAY 1991	05/01/1991	DOE EPA	49	WORK PLAN
R-008-204.9 4009	DOE-0650-93	BENTONITE EFFECTIVENESS EVAUATION FOR OPERABLE UNTI 4 AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT	12/17/1992	DOE-FN EPA	2	Letter
R-008-204.10 4010		K-65 SILO REMOVAL ACTION - BENTONITE EFFECTIVENESS EVALUATION DECEMBER 17, 1992	12/17/1992	DOE-FN EPA	200	Report
R-008-204.11 4777	DOE-0021-94	OPERABLE UNIT 4 SILO 2 CAMERA INSTALLATION/BENTONITE INSPECTION WORK PLAN	10/05/1993	DOE-FN EPA	10	WORK PLAN
R-008-205.10 1006	WMCO:EMT:90-869	APPROVAL FOR RUST FORCE ACCOUNT TO COMPLETE THE SILOS 1 AND 2 REMOVAL ACTION	12/18/1990	WMCO DOE	3	Letter
R-008-205.18 3015	WEMCO:ER:92-158	TIGER TEAM COMMITMENT NO. TT:89:0243 (TTA#611) - INTERIM STABILIZATION (FFCA) AND COMPLETE CHARACTERIZATION REQUIRED (K-65 SILOS)	03/17/1992	WEMCO DOE	2	Letter
R-008-205.20 4452	DCR65A	K-65 SILO VERTICAL BORING SAMPLING AND ANALYSIS PLAN RI/FS WORK PLAN ADDEMDUM MARCH 1991	03/01/1991		4	Addendum
R-008-206.3 2830		CHARACTERISTICS OF FERNALD'S K-65 RESIDUE BEFORE, DURING AND AFTER VITRIFICATION FEBRUARY 1991	02/01/1991		60	Report
R-008-206.5 3601	DOE-2349-92	RESULTS OF GRAB SAMPLES AND CONTINUOUS PYLON MONITORS FOR SILOS 1 AND 2	08/07/1992	DOE EPA	2	Letter
R-008-206.6 4749	C:OP:93-1284	K-65 SILOS - HEADSPACE RADON CONCENTRATION	09/09/1993	FERMCO DOE-FN	4	LETTER
R-008-207.1 3329		COMMENTS ON K-65 INTERIM STABILIZATION PROJECT	10/09/1987	OEPA DOE	2	Letter

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R-008-207.7 2456		OU#4 - REMOVAL #4 K-65 BORINGS U.S. DOE FERNALD OH6 890 008 976	08/27/1990	USEPA DOE	3	Letter
R-008-207.8 547		EE/CA K-65 REMOVAL #4 U.S. DOE-FERNALD OH6 890 008 976	09/04/1990	USEPA DOE	3	Letter
R-008-207.9 1711		K-65 EE/CA	09/05/1990	OEPA DOE	2	Letter
R-008-207.11 1879		EE/CA K-65 REMOVAL #4 U.S. DOE-FERNALD OH6 890 008 976	10/18/1990	USEPA DOE	2	Letter
R-008-207.12 919		REMOVAL #4 WORK PLAN U.S. DOE-FERNALD OH6 890 008 976	11/30/1990	USEPA DOE	2	Letter
R-008-207.13 1794		CONDITIONAL APPROVAL OF K-65 REMOVAL WORK PLAN	12/05/1990	OEPA DOE	1	Letter
R-008-207.16 2804		BACKGROUND INFORMATION ON HOW TARGET RADON CONCENTRATION WAS DERIVED	01/29/1992	USEPA DOE	2	Letter
R-008-207.19 2453		APPROVAL - REMOTE SURFACE MAPPING TECHNOLOGY SUPPORT DEMONSTRATION ON FERNALD SILO 4 WORK PLAN	07/25/1991	OEPA DOE	1	Letter
R-008-207.21 2903		DISAPPROVAL OF THE SILO 1 AND 2 REMOVAL ACTION BENTONITE EFFECTIVENESS ENVIRONMENTAL MONITORING PLAN	02/19/1992	USEPA DOE	1	Letter
R-008-207.22 3168		APPROVAL OF THE REVISED SILO 1 AND 2 REMOVAL ACTION BENTONITE EFFECTIVENESS ENVIRONMENTAL MONITORING PLAN	04/21/1992	USEPA DOE	1	Letter
R-008-207.23 4129		DISAPPROVAL OF THE BENTONITE EFFECTIVENESS EVALUATION FOR OU4	02/12/1993	USEPA DOE-FN	25	Comment

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R-008-208.5 557		K-65 SILOS REMOVAL ACTION ENGINEERING EVALUATION/COST ANALYSIS RESPONSIVENESS SUMMARY	10/17/1990	DOE EPA	14	Response
R-008-208.7 1680	DOE-1904-90	EXTENSION OF PUBLIC COMMENT PERIOD FOR THE K-65 EE/CA	09/11/1990	DOE EPA	2	Letter
R-008-208.9 1732	DOE-1870-90	K-65 SILOS REMOVAL ACTION	09/27/1990	DOE EPA	2	Letter
R-008-208.11 1908	DOE-19-91	K-65 SILOS REMOVAL ACTION - INFORMAL DISPUTE RESOLUTION	10/04/1990	DOE USEPA	2	Letter
R-008-208.12 1933	DOE-35-91	K-65 REMOVAL ACTION - STATEMENT OF DISPUTE	10/11/1990	DOE USEPA	3	Letter
R-008-208.14 1932	DOE-131-91	K-65 REMOVAL ACTION	10/22/1990	DOE USEPA	3	Letter
R-008-208.15 5346	DOE-557-91	RESPONSE TO OHIO EPA COMMENTS ON THE SILOS 1 AND 2 REMOVAL ACTION WORK PLAN	01/11/1991	DOE-FMPC OEPA	19	RESPONSES
R-008-208.17 1910		RESPONSE TO U.S. EPA COMMENTS		DOE USEPA	4	Response
R-008-208.18 1911		RESPONSE TO OHIO EPA COMMENTS		DOE OEPA	12	Response
R-008-208.21 2182	DOE-1023-91	K-65 SILOS WORKING GROUP STATUS REPORT	03/28/1991	DOE K-65 SR. COMMITTEE	1	Letter
R-008-208.22 2979	DOE-1186-91	MAJOR POINTS AND ISSUES RESULTING FROM THE APRIL 10, 1991 MEETING	04/22/1991	DOE EPA	7	Letter

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R-008-208.24 1287	DOE-1359-91	MAJOR POINTS OF DISCUSSION	05/17/1991	DOE EPA	10	Letter
R-008-208.25 1366	DOE-1508-91	K-65 TABLETOP EXERCISE	06/11/1991	DOE EPA	4	Letter
R-008-208.29 2515	DOE-382-92	DELAY OF THE INITIATION OF THE INSTALLATION OF THE BENTONITE IN SILOS 1 AND 2	11/20/1991	DOE EPA	2	Letter
R-008-209.1 4374	DOE-871-88	COMPLETION REPORT FOR THE EXTERIOR FOAM APPLICATION/RADON TREATMENT SYSTEM OPERATION OF THE K-65 INTERIM STABILIZATION PROJECT - FEED MATERIALS PRODUCTION CENTER	05/23/1988	DOE USEPA	50	Report
R-008-1003.1 447		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW OF THE ENGINEERING EVALUATION/COST ANALYSIS FOR THE K-65 SILOS (SILOS 1 AND 2) REMOVAL ACTION AT THE DOE FMPC AT FERNALD, OHIO	08/01/1990	DOE PUBLIC	2	NOA
R-008-1003.2 305		THE USDOE ANNOUNCES THE AVAILABILITY OF THE ADMINISTRATIVE RECORD FILE FOR THE K-65 SILOS (SILOS 1 AND 2) REMOVAL ACTION AT THE DOE'S FMPC AT FERNALD, OHIO	05/07/1990	DOE PUBLIC	1	NOA
R-008-1004.1 4068		K-65 SILOS REMOVAL ACTION COMMUNITY WORKSHOP AND SITE SPECIFIC PLAN PRESENTATION AUGUST 16, 1990	08/16/1990	DOE-FN	150	Transcript

Index Number	Document Number	Document Title	Document Date	From To	# of Pages	Type of Documents
R-014-108.1 4461	NEPA DOC 312	CATEGORICAL EXCLUSION DETERMINATION K-65 DECANT SUMP TANK REMOVAL ACTION NEPA DOC. NO. 312	12/21/1990	DOE DOE	4	Report
R-014-201.1 901	DOE-1784-90	REMOVAL ACTION MEMORANDUM: K-65 DECANT SUMP TANK	08/23/1990	DOE WMCO	2	Letter
R-014-202.1 485	WMCO:EMT:90-539	REMOVAL SITE EVALUATION K-65 DECANT SUMP TANK WATER	08/17/1990	WMCO DOE	8	RSE
R-014-204.1 539		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FMPC DRAFT	09/01/1990	WMCO DOE-ORO	45	Work Plan
R-014-204.2 2187	DOE-76-91	K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN	10/17/1990	DOE EPA	2	Letter
R-014-204.3 546		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FMPC SEPTEMBER 1990	09/01/1990	DOE EPA	49	Work Plan
R-014-204.4 905		K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN FMPC DECEMBER 1990	12/01/1990	DOE EPA	71	Work Plan
R-014-204.5 5441		K-65 DECANT SUMP TANK REMOVAL ACTION RISK MANAGEMENT PLAN MARCH 1991	03/01/1991	WEMCO DOE-FSO	6	WORK PLAN
R-014-207.1 1994		REMOVAL #5 K-65 DECANT TANK U.S. DOE-FERNALD OH6 890 008 976	11/13/1990	USEPA DOE	4	Letter
R-014-207.2 1789		COMMENTS K-65 DECANT SUMP TANK REMOVAL W.P.	11/19/1990	OEPA DOE	1	Letter
R-014-207.3 1139		REMOVAL #5 - DECANT SUMP TANK U.S. DOE FERNALD OH6 890 008 976	01/10/1991	USEPA DOE	2	Letter
R-014-207.4 1989		CONDITIONAL APPROVAL K-65 DECANT SUMP REMOVAL WORK PLAN	01/11/1991	OEPA DOE	2	Letter

Index Number	Document Number	Document Title	Document Date	From To	# of Pages	Type of Documents
R-014-207.5 1098		K-65 DECANT SUMP REMOVAL	04/01/1991	OEPA DOE	1	Letter
R-014-207.6 3763		U.S. EPA COMMENTS ON REMOVAL ACTION 5: K-65 DECANT SUMP TANK FINAL REPORT	09/25/1992	USEPA DOE	1	Letter
R-014-207.7 3787		OHIO EPA COMMENTS ON THE OU 4 - DECANT SUMP TANK REMOVAL ACTION FINAL REPORT	10/01/1992	OEPA DOE	1	Letter
R-014-207.8 4024		APPROVAL OF THE OU4 DECANT SUMP TANK FINAL REPORT	12/14/1992	OEPA DOE-FN	1	Letter
R-014-207.9 4019		REMOVAL ACTION 5: K-65 DECANT SUMP TANK FINAL REPORT RESPONSE TO COMMENTS	12/29/1992	USEPA DOE-FN	1	Response
R-014-208.1 1140		WMCO TECHNICAL RECOMMENDATIONS FOR THE RESPONSE TO U.S. EPA MODIFICATIONS OF THE K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		WMCO DOE	7	Enclosure
R-014-208.2 1142	DOE-867-91	K-65 DECANT SUMP TANK REMOVAL ACTION	03/01/1991	DOE USEPA	2	Letter
R-014-208.3 903		RESPONSE TO THE U.S. EPA COMMENTS K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN	12/11/1990	DOE USEPA	8	Response
R-014-208.4 904		RESPONSE TO OHIO EPA COMMENTS K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN	12/11/1990	DOE OEPA	2	Response
R-014-208.5 1990		THE RESPONSE TO OHIO EPA GENERAL COMMENTS ON THE K-65 DECANT SUMP TANK REMOVAL ACTION WORK PLAN		DOE OEPA	2	Response
R-014-208.6 3895	DOE-0343-93	RESPONSES TO COMMENTS ON THE OPERABLE UNIT (OU) 4 DECANT SUMP TANK FINAL REPORT	11/19/1992	DOE EPA	30	Response
R-014-209.1 3611		FINAL REPORT K-65 DECANT SUMP TANK REMOVAL ACTION AUGUST 1992	08/01/1992	DOE EPA	40	Report

Index Number	Document Number	Document Title	Document Date	From / To	# of Pages	Type of Documents
R-014-209.2 4148	DOE-1282-93	DECANT SUMP TANK FINAL REPORT	03/05/1993	DOE-FN EPA	2	Letter
R-014-209.3 4149		REVISED FINAL REPORT K-65 DECANT SUMP REMOVAL ACTION FEBRUARY 1993	02/01/1993	DOE-FN EPA	30	Report
R-014-401.1 1141		POTENTIAL ARARS K-65 DECANT SUMP TANK REMOVAL ACTION		DOE EPA	5	Report
R-014-1003.1 1766		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW OF THE ADMINISTRATIVE RECORD FILE FOR THE K-65 DECANT SUMP TANK REMOVAL ACTION AT THE DOE FEMP, FERNALD, OHIO		DOE PUBLIC	1	NOA

FEMP ADMINISTRATIVE RECORD
REMOVAL ACTION # 21 - - SILO 3 EXPEDITED

Index Number	Document Number	Document Title	Document Date	From To	# of Pages	Type of Documents
R-025-104.1 5443	DOE-65-91	PERMIT TO OPERATE FOR FMPC SILO NO. 3	10/19/1990	DOE-FSO OEPA	8	LETTER
R-025-108.1 4462	NEPA DOC. 369	CATEGORICAL EXCLUSION DETERMINATION SILO 3 REMOVAL ACTION NEPA DOCUMENT 369	03/03/1992	DOE-FN DOE-HQ	5	Report
R-025-108.2 4481	NEPA DOC 386	CATEGORICAL EXCLUSION DETERMINATION SILO 3 BEST MANAGEMENT PRACTICES (BMP) WEATHERPROOFING NEPA DOC 386	07/02/1992	DOE-FN DOE-HQ	4	Report
R-025-201.1 2244	DOE-015-91	ACTION MEMORANDUM: SILO 3	10/03/1991	DOE WEMCO	2	Letter
R-025-201.2 2676	DOE-515-91	ACTION MEMORANDUM: SILO 3 REMOVAL ACTION	12/13/1991	DOE WEMCO	2	Letter
R-025-201.3 2538	DOE-523-92	SILO 3 REMOVAL ACTION	12/19/1991	DOE EPA	2	Letter
R-025-202.1 2245		REMOVAL SITE EVALUATION SILO 3	09/01/1991	DOE WEMCO	50	RSE
R-025-204.1 2677	WEMCO:P:91-957	SILO 3 REMOVAL ACTION SCOPE OF WORK	12/17/1991	WEMCO DOE	4	Letter
R-025-204.2 2780	WEMCO:P:92-008	SILO 3 BEST MANAGEMENT PRACTICE WORK PLAN	01/06/1992	WEMCO DOE	16	Work Plan
R-025-206.1 2211	DOE-016-92	CHAIN-OF-CUSTODY FOR SILO 3 MATERIAL	10/04/1991	DOE USEPA	2	Letter
R-025-209.1 2682	WEMCO:EVP:92-014	SILO 3 REMOVAL ACTION	01/23/1992	WEMCO DOE	1	Letter
R-025-209.2 4143	DOE-1215-93	SILO 3 EXPEDITED REMOVAL ACTION FINAL REPORT	02/24/1993	DOE-FN EPA	2	Letter

Index Number	Document Number	Document Title	Document Date	From To	# of Pages	Type of Documents
R-025-209.3 4144		FINAL REPORT SILO 3 REMOVAL ACTION FEBRUARY 1993	02/01/1993	DOE-FN EPA	40	Report
R-025-1003.1 2678	WEMCO:EM(AR):91-087	APPROVAL OF NOTICE OF AVAILABILITY (NOA) FOR THE SILO 3 EXPEDITED REMOVAL ACTION	01/09/1992	WEMCO DOE	1	Letter
R-025-1003.2 2679		THE USDOE ANNOUNCES THE AVAILABILITY FOR PUBLIC REVIEW OF THE ADMINISTRATIVE RECORD FILE FOR THE SILO 3 EXPEDITED REMOVAL ACTION AT THE DOE FMPC, FERNALD, OHIO		DOE PUBLIC	1	NOA

APPENDIX E

STATE OF OHIO CONCURRENCE

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State of Ohio Environmental Protection Agency
Southwest District Office
40 South Main Street
Dayton, Ohio 45402-2086
(513) 285-6357
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George V. Voinovich
Governor

February 11, 1994

Mr. Jack R. Craig
Project Manager
U.S. DOE - FEMP
Post Office Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Craig:

The purpose of this letter is to conditionally approve the revised O.U.4 FS/PP based on comment responses and conference calls that have occurred during the past several weeks. Conditional approval is given until we see the negotiated changes in the final document.

If you have any questions, please contact Tom Schneider or me.

Sincerely,

Graham E. Mitchell
Project Manager

GEM:nys

cc: Jenifer Kwasniewski, DERR
Tom Schneider, DERR
Mike Proffitt, DDAGW
Jim Saric, U.S. EPA
Ken Alkema, FERMCO
Lisa August, GeoTrans
Jean Michael, PRC
Robert Owen, ODH

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