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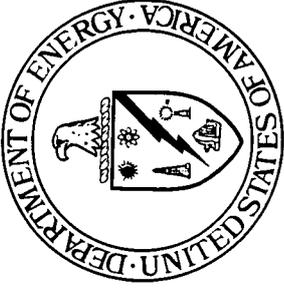
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HANDOUTS FROM AUGUST 8, 1995 COMMUNITY MEETING

08/08/95

DOE-FN PUBLIC
50
HANDOUTS

**Ohio Field Office
FY 1997 EM Budget Proposal**



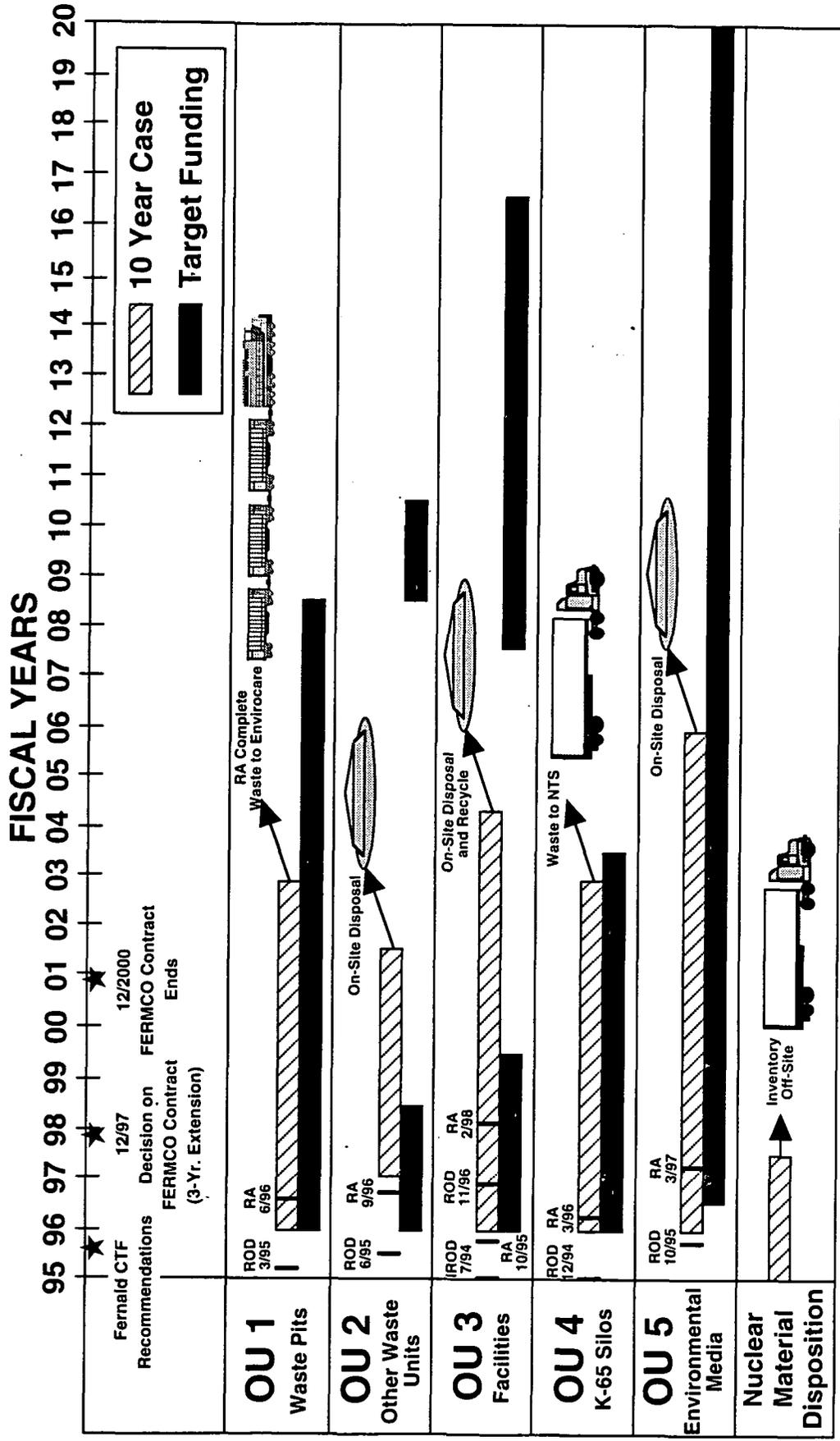
OHIO VISION

We will achieve for all of our sites an environmentally restored end state which serves the communities' needs and we will do this within a decade.

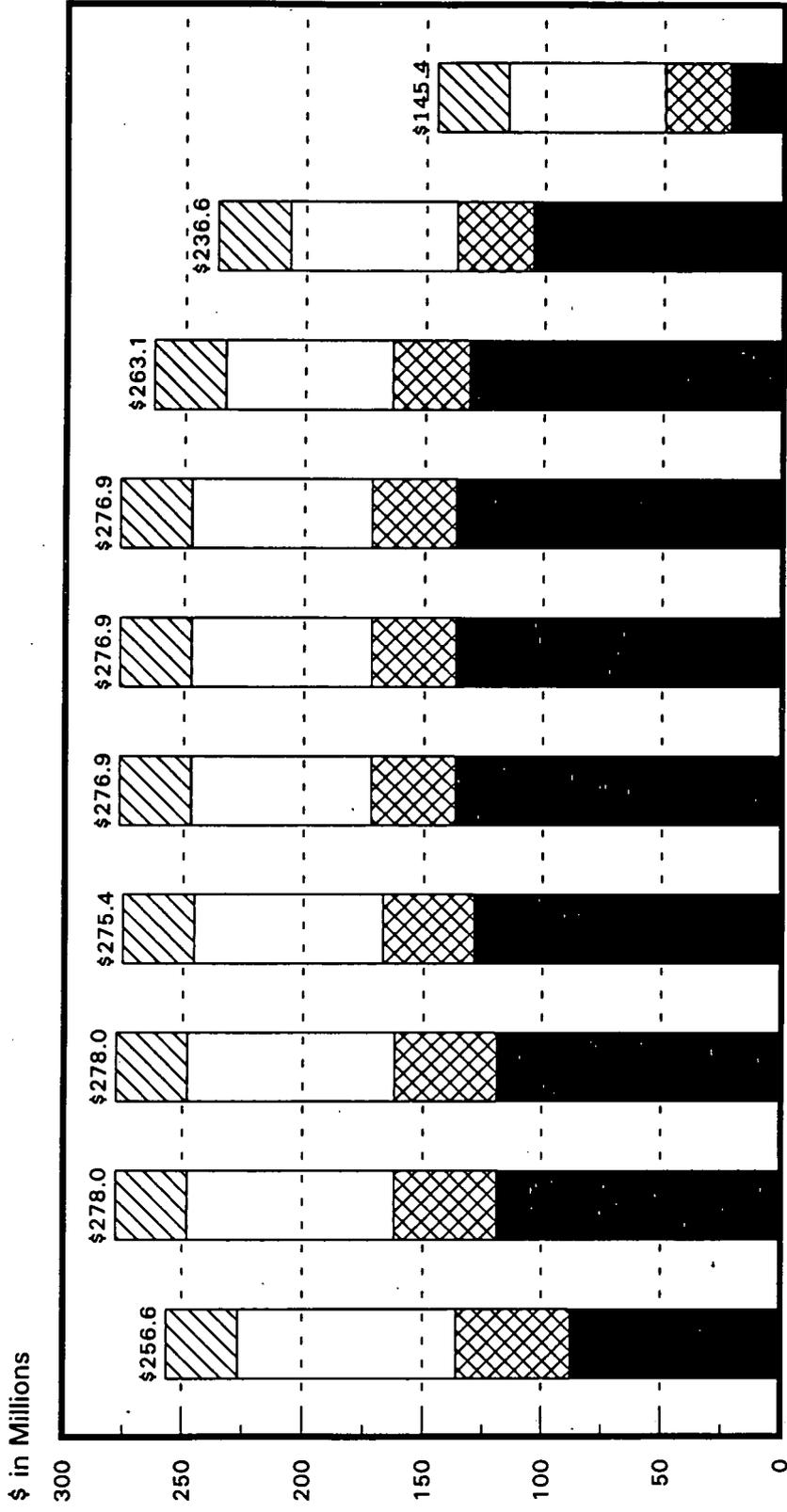


STRATEGIC PLAN

FERNALD



FERMCO \$276 Million Case

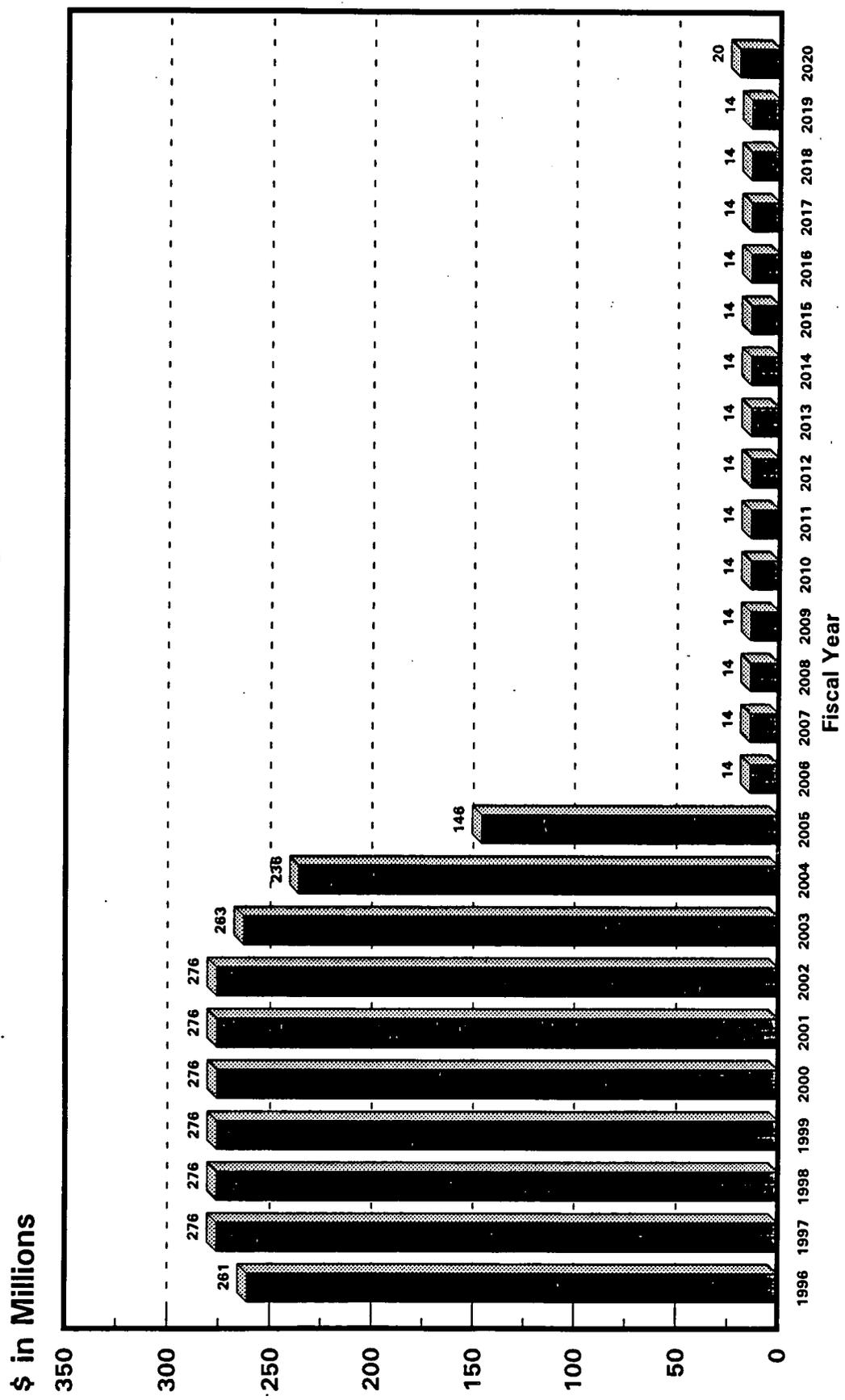


Fiscal Year	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05
Remediation Cost	\$ 88.0	119.0	119.0	129.0	137.0	137.0	137.0	131.7	105.2	22.5
Remediation Support	\$ 48.0	43.0	43.0	38.0	36.0	36.0	35.0	32.0	32.0	27.0
Admin./Landlord	\$ 90.6	86.0	86.0	78.4	74.9	74.9	74.9	69.4	69.4	66.9
Other Costs	\$ 30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Constant FY 1995 Dollars
Other Cost are for FEMP other than FERMCO BCWS.

0014

\$276 Million Case Unescalated Funding



FY 1995 Constant Dollars

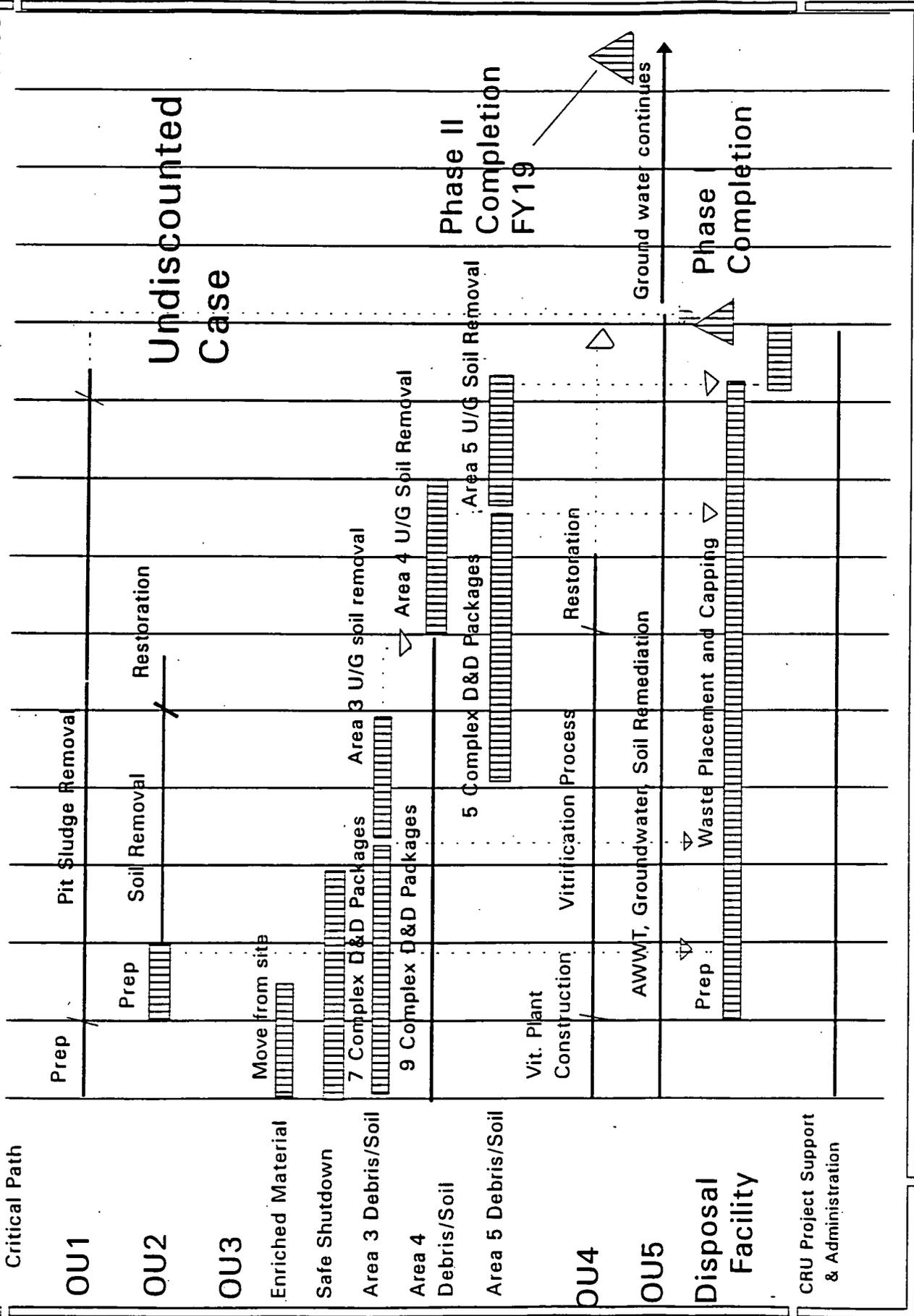
Figure 4

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\$ 276 Million Integrated Remediation Schedule

Rev. 0
5/25/95

FY96 FY97 FY98 FY99 FY00 FY01 FY02 FY03 FY04 FY05 FY06 FY07 FY08 FY09



Critical Path

OU1

OU2

OU3

Enriched Material

Safe Shutdown

Area 3 Debris/Soil

Area 4 Debris/Soil

Area 5 Debris/Soil

OU4

OU5

Disposal Facility

CRU Project Support & Administration

000005



OPERABLE UNIT 1

FERNALD

- **OU1 Remedial Design Work Plan Approved by U.S. EPA June 21, 1995**
- **Dewatering Excavation Evaluation Program (DEEP) Initiated October 1994**
 - Completed Wet Excavations
 - Completed Sampling of Pits 5 & 6
- **OU1 & OU4 held Public Workshop on Transportation Issues June 29, 1995**
- **Preparing to Award Design Contract to Upgrade 3 CSX Trestles September 1995**

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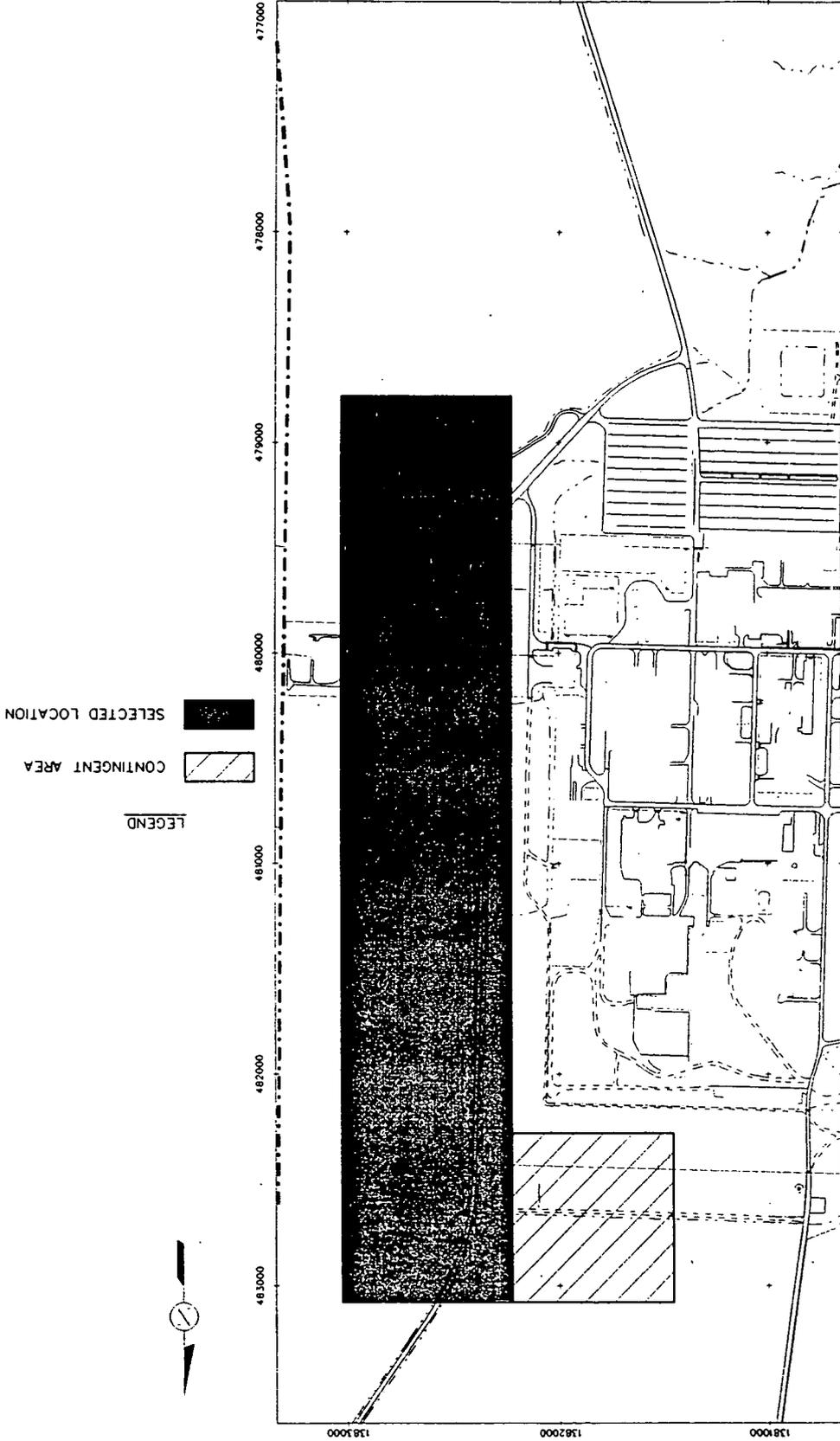
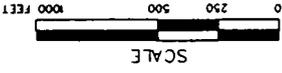


OPERABLE UNIT 2

FERNALD

- **OU2 Record of Decision (ROD)
Signed by U.S. EPA June 8, 1995**
- **Pre-Design Investigation & Site Selection
Report for the On-Site Disposal Facility
Submitted to U.S. EPA July 31, 1995**
- **Draft OU2 Remedial Design Work Plan
Submitted to U.S. EPA August 7, 1995**
- **RA #30 -- Seepage Control at the South Field &
Inactive Flyash Pile
..... Early September Completion**

NOTE: COORDINATES ARE STATE PLANNAR NAD 1927



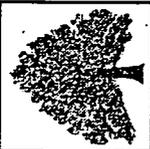
FERNALD ENVIRONMENTAL
RESTORATION MANAGEMENT
CORPORATION
FERNALD
Environmental Management Project
U.S. DEPARTMENT OF ENERGY




SELECTED LOCATION
FOR THE PROPOSED
ON-SITE DISPOSAL FACILITY

FIGURE 4-1

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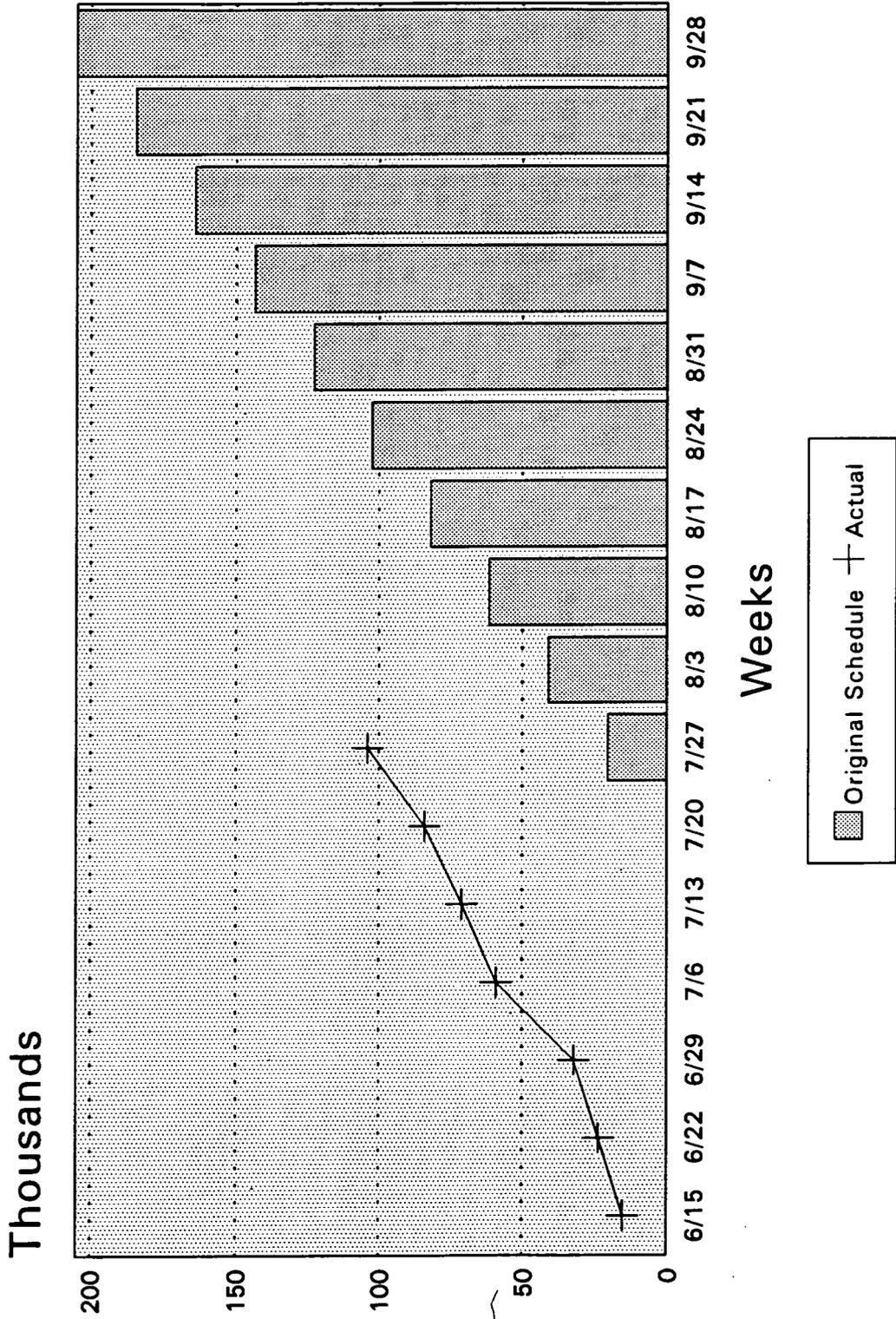
OPERABLE UNIT 3

FERNALD

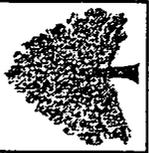
- HF Tank Car
 - Completed Neutralization and Field Work July 1995
- Remedial Design Prioritization Sequencing Report (PSR)
 - Conditionally Approved by U.S. EPA
 - Conditionally Approved by OEPA
- UNH Neutralization Project in Progress, on Schedule, Proceeding Smoothly
- Completed Safe Shutdown in Plant 4 March 1995
- Started D&D Activities in Plant 4 April 1995

UNH Neutralization Project

Progress Report - Gallons Neutralized
(includes "insitu" treated tanks)



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OPERABLE UNIT 3 (Cont'd)

FERNALD

- **Will Complete Safe Shutdown in Plant 1 August 1995**
- **Final Reports for Removal Actions Submitted in June 1995 to U.S. EPA and OEPA for:**
 - **Plant 7 (RA #19)**
 - **Fire Training Facility (RA #28)**
 - **Plant 1 Ore Silos (RA #13)**

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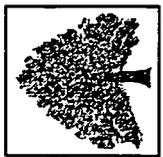
OPERABLE UNIT 4

FERNALD

- Remedial Design and Vitrification Pilot Plant
Plant Public Workshop June 13, 1995
- Remedial Design Work Plan Approved by
U.S. EPA June 15, 1995
- Construction on Vitrification Pilot Plant to
be Completed September, 1995
- Start-up of Phase 1 Operations of Vitrification
Pilot Plant October, 1995

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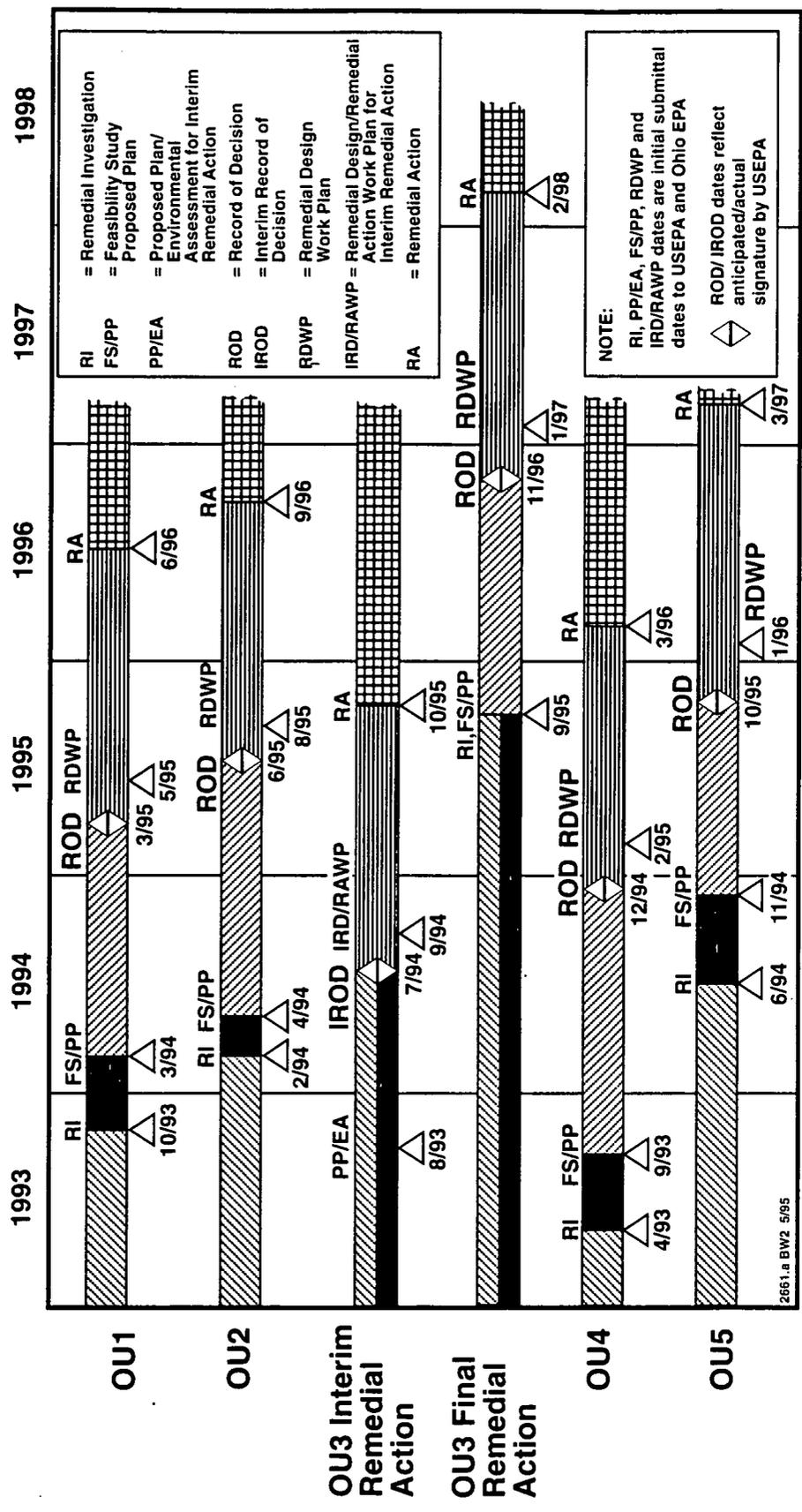
OPERABLE UNIT 5

FERNALD

- Issued Final Proposed Plan to U.S. EPA May 1, 1995
- Public Comment Period on Proposed Plan May 1 to June 30, 1995
- Public Meeting/Formal Comment on Proposed Plan May 23, 1995
- Issued Draft Record of Decision (ROD) to U.S. EPA August 2, 1995

FEMP REMEDIATION SCHEDULE

FERNALD



RI = Remedial Investigation
 FS/PP = Feasibility Study Proposed Plan
 PP/EA = Proposed Plan/ Environmental Assessment for Interim Remedial Action
 ROD = Record of Decision
 IROD = Interim Record of Decision
 RDWP = Remedial Design Work Plan
 IRD/RAWP = Remedial Design/Remedial Action Work Plan for Interim Remedial Action
 RA = Remedial Action

NOTE:
 RI, PP/EA, FS/PP, RDWP and IRD/RAWP dates are initial submittal dates to USEPA and Ohio EPA
 ROD/ IROD dates reflect anticipated/actual signature by USEPA

2661.a BW2 5/95

REMOVAL ACTION SUMMARY

NO.	TITLE	STATUS
1	Contaminated Water Beneath FEMP Buildings	Ongoing
2	Waste Pit Area Run-off Control	Completed
3	South Groundwater Contamination Plume	Ongoing
4	K-65 Silos 1 & 2	Completed
5	K-65 Silos Decant Sump Tank	Ongoing
6	Waste Pit 6 Residues	Completed
7	Plant 1 Pad Continuing Release	Completed
8	Inactive Flyash Pile Control	Completed
9	Removal of Waste Inventories	Ongoing
10	Active Flyash Pile Controls	Completed
11	Pit 5 - Experimental Treatment Facility	Completed
12	Safe Shutdown	Ongoing
13	Plant 1 Ore Silos	Completed
14	Contaminated Soil Adjacent to Sewage Treatment Plant Incinerator	Completed
15	Scrap Metal Piles	Ongoing
16	Collect Uncontrolled Production Area Run-off (Northeast)	Completed
17	Improved Storage of Soil and Debris	Ongoing
18	Control Exposed Material in Pit 5	Completed
19	Plant 7 Dismantling	Completed
20	Stabilization of UNH Inventories	Ongoing
21	Expedited Silo 3 Dust Collector	Completed
22	Waste Pit Area Containment Improvement	Completed
23	Inactive Flyash Pile	Completed
24	Pilot Plant Sump	Completed
25	Nitric Acid Tank Car and Surrounding Area	Completed
26	Asbestos Removal Program	Ongoing
27	Management of Contaminated Structures at FEMP	Incorporated into OU3 IROD
28	Contamination at the Fire Training Facility	Completed
29	Erosion Control at Inactive Flyash Pile	Completed
30	Seepage Control at the South Field and Inactive Flyash Pile	Ongoing

RECENT 1995 MEETINGS WITH REGULATORS		
Date	With	Topic
Mar. 14	OEPA & USEPA	OU3 RI/FS Issues; Draft OU5 FS
Mar. 16	OEPA	RCRA Closure-CERCLA Remediation Integration
Mar. 27	USEPA, OEPA, DOE-OH, DOE-Ports, DOE-Mound, WPAFB, NASA, et al.	Ohio Federal Facilities Forum
Apr. 5	OEPA & USEPA	Draft OU2 ROD; RvA#31 Work Plan; Disposal Facility Pre-Design Investigation
Apr. 20	Dept of the Interior/US Fish & Wildlife Service (DOI/USF&WS), USEPA, OEPA, Ohio Office of the Attorney General (OOAG), Ohio Dept of Natural Resources (ODNR)	Natural Resources Trusteeship
Apr. 20	Dept of Transportation (DOT)	Private Motor Carrier Program Audit
Apr. 25	OEPA	Threatened & Endangered Species Surveys
May 11	DOI/USF&WS, USEPA, OEPA, OOAG, ODNR	Natural Resources Trusteeship
May 17-18	Defense Nuclear Facilities Safety Board (DNFSB), USEPA & OEPA	OU4 Vitrification Pilot Plant Project; Thorium Overpack Project; HF Tank Car Project; Safe Shutdown; Low Level Waste Issues
May 23	Ohio Historic Preservation Office (OHPO)	Programmatic Agreements for (1) On-site Archaeological Resources and (2) On-site Historic Buildings & Structures
May 23	OEPA & USEPA	OU3 RI/FS Issues
June 7	OEPA	RCRA Closure-CERCLA Remediation Integration
June 8	OEPA & USEPA	Monthly Progress Conference Call

RECENT 1995 MEETINGS WITH REGULATORS		
Date	With	Topic
June 12	OEPA	Threatened & Endangered Species Survey
June 13	OEPA & USEPA	OU4 & OU5 Issues
June 19-28	DOE-NVO	Annual NVO-325 (Rev. 1) Audit
June 19	OEPA	FEMP's RCRA Part B Permit Application
June 20	DOI/USF&WS, USEPA, OEPA, ODNR	Wetlands Mitigation Approach
June 21-22	OEPA	Annual RCRA Compliance Evaluation Inspection
June 22	DOI/USF&WS, USEPA, OEPA, OOAG, ODNR	Natural Resources Trusteeship
June 28	OEPA & USEPA	OU3 RI/FS Issues
July 13	OHPO	FEMP's Historic Preservation Activities
July 14	OEPA	Observe Implementation of Liquid Mixed Waste & UNH Projects
July 17	OEPA	Propose an Alignment Meeting on Accelerated Remediation
July 18	OEPA & USEPA	Monthly Progress Conference Call
July 21	OEPA & USEPA	South Plume Extraction System Optimization Study; AWWT Treatment Capacity
July 28	OEPA	Thorium Nitrate Solidification Project Work Plan
July 31	OEPA & USEPA	OU3 Waste Acceptance Criteria Issues; Integrated Remedial Planning
Aug. 8	OEPA & USEPA	OU4 Issues
Aug. 10	DOI/USF&WS, USEPA, OEPA, OOAG, ODNR	Natural Resources Trusteeship

NUMBER OF DRUM EQUIVALENTS (DEs) SHIPPED OFF SITE THRU JULY 28, 1995

Year	DEs
1985	319
1986	8,877
1987	39,163*
1988	57,395
1989	55,029
1990	24,846
1991	43,522
1992	100,596
1993	110,743*
1994	77,962*
thru 7/28/95	83,198*
Total	601,650

* Include shipment to other locations than NTS:

1987 -- 16,615 DEs to Scientific Ecology Group (SEG) (metal)
-- 181 DEs to Toxic Substance Control Act (TSCA)

1993 -- 36,953 DEs to SEG (metal + compactible residue)
-- 4,326 DEs to TSCA

1994 -- 480 DEs to Envirocare (mixed waste debris)
-- 6,767 DEs to SEG (compactible residues)

1995 -- 250 DEs to Envirocare (mixed waste debris)
2,095 DEs to SEG (compactible residues)
12,040 DEs to ALARON (Plant 7 recyclable steel)

MATERIALS/PRODUCT SHIPPED:

296,624 pounds to Manufacturing Science Corp. for FY 1995



Economic Impact Study of the Fernald Environmental Management Project

This Fact Sheet Describes

- ◆ Economic impact study objectives
- ◆ How the data will be collected
- ◆ Community and local business participation in study
- ◆ The time line for completing the study

Focus of the study

The study will provide current economic data on local and regional geographic areas. Local areas include: Ross, Miamitown, Crosby, Morgan, and Harrison. The regional study area will cover the tri-state area (i.e., Cincinnati metro) and subdivide impact assessment to the extent possible by these jurisdictional areas: Hamilton County, Butler County, Indiana, Kentucky, and Ohio. The research findings will be used to communicate anticipated economic impacts to the local economy as the Fernald site transitions from cleanup to long-term monitoring.

INTRODUCTION

This summer, an independent research group will assist the Department of Energy (DOE) and the Fernald Environmental Restoration Management Corporation (FERMCO) in conducting an economic impact study. The objective of the study is to determine Fernald's economic impact on communities surrounding the site. It will serve as a basis for a community-led economic planning effort. The study will help DOE and the community grasp the extent to which Fernald influences the local economy now and will provide ideas on the future of the area after the cleanup is complete.

Who will conduct the study

The University of Cincinnati (UC) Department for Economic Education will conduct the study. Researchers began data generation in June and will issue a final report September 15. Community briefings will be held after the study is completed.

Community Role

As the Fernald site transitions from environmental restoration to long-term monitoring, its economic impact on the local economy will be reduced. This study will provide data the community can use to stimulate economic development planning, if desired.

The survey will include data on the overall extent of Fernald's economic involvement in the local and regional community; the number and types of businesses that rely on Fernald as a customer base; the impact of past downsizing on surrounding communities; and the nature of organizations which rely on Fernald subcontracts. The time frame for this assessment will include 1990 through 1995, with a trend projecting economic impacts through 1998. Emphasis will be on 1994 through 1995.

How data will be collected

The research effort will employ a combination of research techniques, including focus groups and telephone surveys. Three focus groups will be conducted with members of the following: business leaders, Fernald employees, and local residents. For local residents, groups of 10 to 12 participants will be recruited to discuss perceptions of Fernald's role in the local and regional economy. Focus groups will also seek input on the extent and diversity of economic relationships that exist due to the Fernald site. For the business owners focus group, 30 local businesses will be selected from a target list. From that list 15 will be recruited to attend a focus group. Fernald employees will be sought in both management and front line positions, and will consist of a group of 10-15 employees.

Telephone surveys will be conducted in a two-pronged approach. The local business survey will consist of a telephone survey with chief executive officers from a sample of 100 businesses in a 5-mile radius of the Fernald site, including Ross, Miamitown, Crosby, Morgan, and Harrison. The survey of area businesses will determine the extent businesses serve as suppliers to Fernald facility or serve Fernald employees.

The employee survey will consist of a telephone survey conducted with a sample of Fernald employees who live in local communities surrounding the facility. The purpose of this survey is to better understand employees' economic involvement in the area.

An economic analysis report will be developed after all research has been collected. This report will measure Fernald's total economic effect on the region. This approach requires understanding the nature and extent of a company's expenditures to calculate how they affect overall business sales, household earnings and employment in the larger region. When a company's direct expenditures are known, the indirect effects can be estimated through a series of multipliers. The RIMS II will be utilized to measure Fernald's economic impact on Hamilton and Butler counties.

July 1995

Regional Input-Output Modeling System (RIMS II)

RIMS II is a tool developed by the U.S. Department of Commerce, based on a set of multipliers derived from an input-output table for the Cincinnati Metropolitan Statistical Area (CMSA). The input-output table shows linkages among various industries in the economy for the CMSA and provides multipliers to measure the indirect and induced impacts of virtually any type of production on the local economy. These multipliers will model the effects of local expenditures on business sales, household earnings, and employment.

When the study will be complete

Research began in late June and early July. Completion of the study is targeted for September 15. The study will result in a final report which will include an executive summary of principal findings, including total economic impacts on the specified regions, (direct, indirect, and induced impacts), expenditures to households, and number of jobs created by the facility. This information will be presented this fall to the community at township trustee meetings, area merchant meetings, and public workshops.

Contact for Information

Gary Stegner
Public Information Director
DOE Fernald Area Office
513-648-3153

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UPCOMING PUBLIC PARTICIPATION ACTIVITIES

DATE/TIME	EVENT	PLACE	TOPIC
Second and fourth Monday each month 7:30 p.m.	Crosby Township Meeting	Crosby Township Civic Center	Fernald status report and updates given at each meeting.
First and third Thursday each month 7:00 p.m.	Ross Township Meeting	Ross Fire House	Fernald status report and updates given at each meeting.
First and third Monday each month 7:30 p.m.	Morgan Township Meeting	Morgan Township Civic Center	Fernald status report and updates given at each meeting.
Fourth Thursday each month 7:30 p.m. *No August Meeting	FRESH Meeting	Venice Presbyterian Church	Fernald status report and updates given at each meeting.
August 8, 1995 6:30 - 9:00 p.m.	DOE Community Meeting	The Plantation Harrison, Ohio	TF Recommendations and 10-year Cleanup Plan
Sept. 30, 1995 8:30 a.m. - 12:30	Fernald Citizens Task Force Meeting	Joint Information Center, 6025 Dixie Hwy. Fairfield, OH	Open to the public. Path Forward for Task Force
November Timeframe	Operable Unit 1 Remedial Design Public Briefing	TBD	Update the public on progress of Remedial Design



EXECUTIVE SUMMARY

The Fernald Environmental Management Project site is a 1,050-acre facility operated by the United States Department of Energy (DOE), and was once a major part of the nation's nuclear weapons complex. Located approximately 18 miles northwest of Cincinnati, Ohio, Fernald was in operation between 1951 and 1989. Over that period of time, more than 500 million pounds of high-purity uranium metals were produced. One significant consequence of this activity was the release of over 1 million pounds of uranium into the surrounding environment. Now that the plant is closed, efforts have turned to the environmental damage and human health risk resulting from nearly 40 years of production.

Over three million cubic yards of waste and contaminated material must be safely managed before the Fernald site can conclude its contribution to the Cold War. DOE established the Fernald Citizens Task Force in August 1993 as a site-specific citizens advisory board for the Fernald facility. The Task Force was chartered to provide DOE, the U.S. Environmental Protection Agency (EPA), and the Ohio Environmental Protection Agency (OEPA) with recommendations regarding four specific questions:

- 1) What should be the future use of the Fernald site?
- 2) What residual risk and remediation levels should remain following remediation?
- 3) Where should the waste be disposed?
- 4) What should be the priorities among remedial actions?

This report is the culmination of the effort of the Task Force to answer these four questions.

The Task Force began its work in September 1993 and developed and released its recommendations over a seven-month period from November 1994 through May 1995. Each recommendation is supported by a detailed discussion of issues and rationale. With the exception of waste disposition, all recommendations represent full consensus of the board.

***Recommendations
on Remediation
Levels***

The Task Force established remediation levels to protect the Great Miami Aquifer and to provide consistent protection of human health across all environmental media and land uses. The Task Force sought to balance the absolute requirement to protect human health and safety with the desire to minimize the impact on the environment resulting from remediation itself. To achieve background conditions would require surface soil excavation for five miles surrounding the site, a consequence the Task Force found unacceptable. Ultimately, the Task Force recommended remediation levels which were protective and required little off-site excavation. These levels were based on restoring and protecting the aquifer to conform with maximum contaminant levels under the Safe Drinking Water Act, keeping cancer risks within one in ten thousand, and keeping non-cancer risks below the EPA hazard index of one.

***Recommendations
on Waste
Disposition***

The Fernald Citizens Task Force evaluated the political and logistical considerations involved in disposing of over three million cubic yards of contaminated material and determined that a balanced approach in which less hazardous waste was disposed of on-site and more hazardous waste was disposed of off-site was most prudent. Of paramount importance was ensuring the removal of the highest level wastes off-site for safe disposal and that no new wastes come to Fernald for disposal. The Task Force, therefore, concurred with existing DOE, EPA and OEPA decisions that the most highly contaminated materials be disposed of off-site, and recommended that an on-site disposal facility be constructed to accept materials with low levels of contamination from the Fernald site only.

***Recommendations
on Priorities***

Originally, Task Force priority recommendations were envisioned as a sequencing of activities according to their importance to the concerns and goals of stakeholders. However, as dramatic cuts in the DOE budget began to occur, the nature of the problem shifted. Reduced annual budgets resulted in remediation time frames stretching to 25 years. At the same time, total projected costs

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of remediation were twice what could be achieved with more rapid remediation, due to the high costs of keeping the facility open. The Task Force concluded that such a lengthy approach to remediation would not remove the highest level contaminants from the site quickly, nor conduct remediation in a safe and cost-effective manner. Therefore, the Task Force recommended that Fernald accelerate remediation by achieving total source control within an approximately 10-year schedule. This schedule will both provide rapid protection of human health and the environment and greatly reduce the overall costs of remediation.

Recommendations on Future Use

The Fernald Citizens Task Force focused its future use recommendations on creating a broad understanding of how the Fernald site could best be used following remediation, rather than identifying specific land use plans for the property. The Task Force believes that specific uses of the property should be determined closer to the time of reuse by the people most impacted by that use, within the general guidelines established by the Task Force. As part of these general guidelines, the Task Force recommended that residential and agricultural uses be avoided on the property. However, it was also important to the Task Force that the land be used productively. Accordingly, remediation levels recommended by the Task Force allow for all other use, including recreation and industry. The Task Force also recommended that a substantial buffer area separate the on-site disposal cell and any other uses of the property.

Next Steps

The initial mission of the Fernald Citizen's Task Force has been completed with this presentation of its recommendations. Task Force members, DOE, EPA, and OEPA believe the Task Force's usefulness has not ended, however. Continuing Task Force activities are expected to include monitoring the implementation of its recommendations throughout the design and construction phases, evaluating closure, and long-term monitoring of the facility. The Task Force will reconvene in the fall of 1995 to evaluate these options and to plan future activities.

**OPERABLE UNIT 1
DEWATERING, EXCAVATION, EVALUATION PROGRAM (DEEP)
IMPLEMENTATION OF PHASE III
FACT SHEET**

The approved Record of Decision (ROD) for DOE's Operable Unit 1 calls for excavating the waste pits, treating the waste materials through thermal drying, and shipping the waste for disposal to a permitted commercial disposal facility.

Since excavation is such an important part of the OUI remediation, DOE proposed, and EPA has approved, the implementation of the Dewatering Excavation Evaluation Program (DEEP). DEEP is a multi-phased, short-term Treatability Study aimed at obtaining geotechnical data and excavation information to assist DOE in determining the best technique to use to excavate the waste pits. Additionally, DEEP Treatability Study information will be used to provide design information for the thermal dryer system.

Phase I of DEEP, which involved taking samples via borings to obtain engineering data on the geotechnical properties of the wastes in the pits, and soils in the area, was completed in November, 1994.

Phase II of field work, Trench Excavation for the DEEP project, began in February, 1995, and consisted of digging seven trenches (total) in Waste Pits 1, 2, and 3. Each trench was a maximum of 30 by 30 feet wide and 15 feet deep. Although the waste pits have soil covers, or caps, trenching revealed that the waste pits contain zones of water saturated wastes. This phase was completed in March, 1995.

In July, 1995, U.S. EPA approved expansion of the DEEP program to include the sampling of waste material from Waste Pits 5 and 6. The sampling project, performed in July, 1995, was necessary to provide critical thermal dryer design information necessary for successful remediation of waste from pits 5 and 6. A total of 40 waste samples were obtained by the use of a large crane which lowered an air powered sampling device into the waste pits. The project commenced and was completed in July, 1995.

Because "wet excavation" removal of the waste pit contents would present difficult excavation challenges, the DEEP field program also contains a phase designed to evaluate the horizontal and vertical location and extent of the waste pit water zones, plus a determination of the best method(s) to be used to remove the waste pits' water contents. This phase, Dewatering, Phase III, will provide information on the approximate amount of water in each pit, and the best way to recover and remove this water. The Dewatering phase began in July, 1995, and is expected to be completed sometime in the Fall, 1995.

Following Dewatering Phase III, the final phase, Ramp and Pad Excavation will commence. This phase will consist of the construction of two surface excavations and access ramps. These will be located where the prior Dewatering phase has already removed the pit water. During Ramp and Pad Excavation the soil cap material will be removed from a portion of the waste pits, temporarily stored on a pad adjacent to the excavation, and following this, excavation of the pit contents will begin. Information obtained during excavation will help identify the nature of the waste, the best waste excavation method(s) and equipment to be used during actual excavation of the pit waste. Ramp and Pad Excavation will begin in August, 1995, and is scheduled for completion in September, 1995.

Affected Waste Pit 1, 2, and 3 surfaces will be graded prior to excavation to control surface water runoff. In addition, dust controls will be in place, and perimeter monitors will be located to monitor for possible emissions which may be generated during excavation. Personnel performing the testing will wear appropriate personal protective clothing. Personnel will also be equipped with personal monitoring detectors to alert personnel to possible radiological constituents which may be released into the air during excavation. The integrity of the waste pit liners will not be compromised by this program.

The waste pits will be filled and returned to their original state as soon as all necessary field samples and other information are completed. All pit locations where vegetation has been disturbed will be revegetated to reduce cap erosion. No reclamation is necessary for Waste Pits 5 and 6.

If you have any questions about the testing that will occur as part of the DEEP Program, please call Gary Stegner with DOE's Public Information Office at (513) 648-3153.

Fernald Environmental Glossary

This fact sheet has been prepared as part of the effort to familiarize the public with the specific vocabulary used in discussions about environmental restoration and waste management at Fernald.

ALARA - As Low As Reasonably Achievable, or keeping radiation emissions and exposures to levels set as far below regulatory limits as is reasonably possible in order to protect public health and the environment.

alpha radiation - The most energetic but least penetrating form of radiation. It can be stopped by a sheet of paper and cannot penetrate human skin. However, if an alpha-emitting isotope is inhaled or ingested, it will cause highly concentrated local damage.

aquifer - A permeable body of rock capable of yielding quantities of groundwater to wells and springs.

AR - Administrative Record, a required, comprehensive file of documents that forms the basis of decisions made regarding cleanup at Fernald. It is available for public review and comment. (See PEIC).

ARARs - Applicable or relevant and appropriate requirements, a comprehensive set of laws and regulations that are relevant to guide the selection of cleanup activity at a particular site.

asbestos - A strong and incombustible fiber widely used in the past for fireproofing and insulation. The small, buoyant fibers are easily inhaled or swallowed, causing a number of serious diseases including: asbestosis, a chronic disease of the lungs that makes breathing more and more difficult; cancer; and mesothelioma, a cancer (specific to asbestos exposure) of the membranes that line the chest and abdomen.

atom - The smallest particle of an element having the chemical properties of that element; the fundamental building block of matter.

AWWT - Advanced waste water treatment

background radiation - The natural radioactivity in the environment. Natural radiation consists of cosmic rays, filtered through the atmosphere from outer space, and radiation from the naturally radioactive elements in the earth (primarily uranium, thorium, radium and potassium). Also known as natural radiation.

baseline risk assessment - (See BRA).

BDN - Bionitrification, the process of breaking down nitrates into harmless elements through the use of living bacteria.

beta radiation - High-energy electrons (beta particles) emitted from certain radioactive material. Can pass through 1 to 2 centimeters of water or human flesh and can be shielded by a thin sheet of aluminum. Beta particles are more deeply penetrating than alpha particles but, because of their smaller size, cause less localized damage.

biological effects - The early or delayed results of biological damage caused by nuclear radiation (alpha, beta gamma).

biosphere - The part of the earth and its atmosphere in which living things exist.

BRA - Baseline risk assessment, the study and estimation of risk from taking no activity. Involves estimates of probability and consequence.

carcinogen - A cancer-causing agent.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund), the federal law that guides cleanup of hazardous waste sites.

CFR - Code of Federal Regulations

characterization - Facility or site sampling, monitoring and analysis activities to determine the extent and nature of a release. Characterization provides the basis for acquiring the necessary technical information to develop, screen, analyze, and select appropriate cleanup techniques.

CIS - Characterization investigation study

cleanup - The general term for environmental restoration, the process designed to ensure that risks to the environment and to human health and safety from waste sites either are eliminated or reduced to prescribed, safe levels.

closure plan - Documentation prepared to guide the deactivation, stabilization and surveillance of a waste management unit or facility under the Resource Conservation and Recovery Act.

conservation - The preservation of resources through efficient and careful use.

contamination - The presence of foreign materials, chemicals or radioactive substances in the environment (soil, sediment, water or air) in significant concentrations.

CRARE - Comprehensive Response Action Risk Evaluation.

CRU - CERCLA/RCRA unit, another term for the operable units at Fernald.

cubic meters - A volume equal to the volume of a cube measuring one meter in each dimension.

comment period - Time provided for the public to review and comment formally on a proposed action or decision.

community relations - The effort to establish two-way communication with the public to ensure public input into the decision-making process related to Superfund.

curie - A unit of radioactivity that represents the amount of radioactivity associated with one gram of radium. To say that a sample of radioactive material exhibits one curie of radioactivity means that the element is emitting radiation at the rate of 3.7 million times a second. Named after Marie Curie, an early nuclear scientist.

consent decree - Signed agreement between DOE and OEPA that mandate specific environmental improvements at Fernald

daughter product - An element formed by the radioactive decay of another element; often daughter products are radioactive themselves

DEs - Drum equivalents

decay - The process whereby radioactive particles undergo a change from one form, or isotope, to another, releasing radioactive particles and/or energy.

decontamination - The removal of unwanted material (typically radioactive material) from facilities, soils, or equipment by washing, chemical action, mechanical cleansing or other techniques.

defense wastes - Radioactive wastes resulting from weapons research and development, the operation of naval reactors, the production of weapons materials, the reprocessing of defense spent fuel, and the decommissioning of nuclear-powered ships and submarines.

disposal - Waste emplacement designed to ensure isolation of waste from the biosphere, with no intention of retrieval for the foreseeable future.

dioxin - One of the most hazardous of all chemicals, can cause both acute and long-term effects ranging from chloracne, a skin disease, to cancer, reproductive failures, and reduced resistance to infectious disease.

DOE - U.S. Department of Energy

DOE-FN - U.S. Department of Energy Fernald Field Office

dose - Quantity of radiation or energy absorbed; measured in rads. (See rad).

dose equivalent - A term used to express the amount of effective radiation received by an individual. A dose equivalent considers the type of radiation, the amount of body exposed, and the risk of exposure. Measured in rems. (See rem).

dosimeter - An instrument that measures exposure to radiation.

EA - A written environmental analysis that is prepared under the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require preparation of a more detailed environmental impact statement.

effluent - A waste discharged as a liquid.

electron - An elementary particle with a unit negative charge and a mass 1/1837 that of the proton. Electrons surround the positively charged nucleus and determine the chemical properties of

the atom.

EE/CA - Engineering evaluation and cost analysis

EIS - Environmental impact statement, required by the National Environmental Policy Act. (See NEPA).

element - Any of the 109 substances that cannot be broken down further without changing its chemical properties. Singly or in combination, the elements constitute all matter.

EMR - Environmental monitoring report also called the Annual Site Environmental Report

environmental restoration - The process of environmental cleanup designed to ensure that risks to the environment and to human health and safety from waste sites either are eliminated or reduced to prescribed, safe levels.

ERMC - Environmental restoration and management contractor

erosion control - Methods to control land surface features to prevent erosion by surface water or precipitation runoff.

EWMF - An engineered waste management facility, designed to store low-level radioactive wastes.

exposure - A measurement of the displacement of electrons from atoms caused by x-rays or by gamma radiation. Acute exposure generally refers to a high level of exposure of short duration; chronic exposure is lower-level exposure of long duration.

FEMP - Fernald Environmental Management Project, the name given Fernald when its missions was transferred from weapons production to environmental restoration

FERMCO - Fernald Environmental Restoration Management Corporation, the contractor selected in August 1992 to clean up Fernald

FFCA - Federal Facility Compliance Agreement, an agreement signed in 1986 between DOE and U.S. EPA; predates the Consent Agreement and the Amended Consent Agreement.

final disposition - Methods for permanent disposal of waste or contaminated media residuals following excavation/treatment.

fission - The splitting of a heavy nucleus into two or more radioactive nuclei, accompanied by the emission of gamma rays, neutrons and a significant amount of energy. Fission usually is initiated by the heavy nucleus absorbing a neutron, but it also can occur spontaneously.

FMPC - Feed Materials Production Center, the name of Fernald until 1991

FR - Federal Register

FRESH - Fernald Residents for Environment, Safety and Health

friable asbestos - Asbestos insulation that is loose and capable of becoming airborne.

FS - Feasibility study, the Superfund study following a remedial investigation which identifies, develops, evaluates and selects remedial action alternatives.

gamma rays - Penetrating electromagnetic waves or rays emitted from nuclei during radioactive decay, similar to x-rays. Dense materials such as concrete and lead are used to provide shielding against gamma radiation.

geohydrologic - Pertaining to groundwater and its movements through the geologic environment.

geohydrology - The science dealing with underground water, often referred to as hydrogeology.

groundwater - Waste beneath the earth's surface that fills pores between materials such as sand, soil or gravel. Groundwater is a major source of water for agricultural and industrial purposes and is an important source of drinking water for about half of all Americans.

half-life - The time required for a radioactive substance to lose 50 percent of its activity by decay. The half-life of the radioisotope plutonium-239, for example, is about 24,000 years. Starting with a pound of plutonium-239, in 24,000 years there will be one-half pound of plutonium-239, in another 24,000 years there will be one-fourth pound, and so on. (A pound of material remains, but it gradually becomes a stable element.)

hazardous waste - A solid waste or combination of solid wastes that, because of quantity, concentration or physical, chemical or infectious characteristics, may cause or significantly contribute to an increase

in mortality or an increase in serious, irreversible, or incapacitating reversible illness or pose a substantial hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise managed. About 290 million tons of hazardous wastes are generated in the United States each year. A small percentage (about 4 percent) is recycled. The rest is treated, stored or disposed. Of the hazardous wastes disposed, most are injected as a liquid into the ground in specially designed injection wells. A large quantity is placed in surface impoundments (pits, ponds and lagoons). A small portion is placed directly on the land or buried.

heavy metals - Metals that are dense. Examples include mercury, lead, silver, gold and uranium.

HEPA - High-efficiency particulate air

high-level radioactive wastes - Highly radioactive material, containing fission products, traces of uranium and plutonium, and other transuranic elements, that results from chemical reprocessing of spent fuel. Originally produced in liquid form, high-level waste must be solidified before disposal.

ion - Atomic particle, atom or chemical radical bearing an electric charge, either negative or positive.

ionization - Removal of electrons from an atom, for example, by means of radiation, so that the atom becomes charged.

ionizing radiation - Radiation that has enough energy to remove electrons from substances it pass through, forming ions.

isotopes - Atoms of the same element that have equal numbers of protons, but different numbers of neutrons. Isotopes of an element have the same atomic number by different atomic mass. For example, uranium-238 and uranium-235.

leachate - The solution formed when soluble components have been removed from a material.

leaching - To remove a soluble substance from a material by dissolving it in a liquid, and then removing the liquid from what is left.

LLW - Low-level waste, discarded radioactive material such as rags, construction rubble, glass, etc., that is only slightly or moderately contaminated. This waste usually is disposed of by land burial.

MCL - maximum contaminant level

millirem - A unit of radiation dosage equal to one-thousandth of a rem. A member of the public can safely receive up to 500 millirems per year, according to federal standards, but the U.S. EPA ordinarily limits public exposure to 25 to 100 mrem/year.

mixed waste - Contains both radioactive and hazardous components.

mobility - The ability of radionuclides to move through food chains in the environment.

monitoring well - A hole drilled into the ground with a pipe inserted to allow for the collection of groundwater samples.

natural radiation - Radiation that is always present in the environment from such sources as cosmic rays and radioactive materials in rocks and soils. Also known as background radiation.

NCP - National Oil and Hazardous Substances Pollution Contingency Plan

NEPA - National Environmental Policy Act, requires a study of the impacts of activities at federal facilities.

neutron - A particle that appears in the nucleus of all atoms except hydrogen. Neutrons are one of three basic particles that make up the atom. Neutrons have no electrical charge.

NLO - National Lead of Ohio, Inc., the company that operated Fernald from 1951 until 1986

NOA - Notice of availability, published when a document on some aspect of Fernald cleanup is issued. Documents are available in the administrative record and public reading room.

NOV - Notice of violation

NPDES - National Pollutant Discharge Elimination System

NPL - National Priorities List, the list of the nation's worst Superfund sites. Fernald was added in 1989.

NRC - Nuclear Regulatory Commission

NTS - Nevada Test Site, a repository for radioactive wastes.

nuclear radiation - Ionizing radiation originating in the nuclei of atoms; alpha, beta, and gamma radiation.

nucleus - The central part of an atom that contains protons, neutrons and other particles.

OEPA - Ohio Environmental Protection Agency

OSHA - Occupational Health & Safety Act

OU - Operable unit, or area of study that contains similar characteristics or problems. There are five operable units at Fernald.

pathways - The means by which contaminants move. Possible pathways include air, surface water, groundwater, plants and animals.

PCB - Polychlorinated biphenyl, a synthetic, organic chemical once widely used in electrical equipment, specialized hydraulic systems, heat transfer systems, and other industrial products. Highly toxic and a potent carcinogen. Any hazardous wastes that contain more than 50 parts per million of PCBs are subject to regulation under the Toxic Substances Control Act.

PEIC - Public Environmental Information Center, 10845 Hamilton-Cleves Highway, Harrison, Ohio 45030, which houses the administrative record and the public reading room. The phone number is 513-738-0165.

PEIS - Programmatic environmental impact statement, being conducted nationally by DOE.

picocuries - Measurement of radioactivity. A picocurie is one million millionth, or a trillionth, of a curie, and represents about 2.2 radioactive particle disintegrations per minute.

plume - A defined area of groundwater containing contamination that originates from a particular source such as a waste unit.

plutonium - An artificially produced element that is fissile and radioactive. It is created when an atom of uranium-238 captures a slow neutron in its nucleus.

PP - Proposed plan, a CERCLA document on which the public comments that summarizes what cleanup remedy has been selected, and why.

RA - Risk assessment, the study and estimation of risk from a current or proposed activity. Involves

estimates of the probability and consequence of an action.

rad - Radiation absorbed dose, a measurement of ionizing radiation absorbed by any material. A rad measures the absorption of a specific amount of work (100 ergs) in a gram of matter.

radiation - Fast particles and electromagnetic waves emitted from the nucleus of an atom during radioactive disintegration.

radioactive - Giving off, or capable of giving off, radiant energy in the form of particles (alpha or beta radiation) or rays (gamma radiation) by the spontaneous disintegration of the nuclei of atoms. Radioisotopes of elements lose particles and energy through the process of radioactive decay. Elements may decay into different atoms or a different state of the same atom.

radioactive waste - A solid, liquid or gaseous material of negligible economic value that contains radionuclides in excess of threshold quantities except for radioactive material from post-weapons-test activities.

radioisotope - An unstable isotope of an element that eventually will undergo radioactive decay (i.e., disintegration). Radioisotopes with special properties are produced routinely for use in medical treatment and diagnosis, industrial tracers, and for general research.

radionuclide - A radioactive species of an atom.

radon - A radioactive gas produced by the decay of one of the daughters of radium. Radon is hazardous in unventilated areas because it can build up to high concentrations and, if inhaled for long periods of time, may cause lung cancer.

RCRA - Resource Conservation and Recovery Act, the federal environmental law designed to account for and ensure proper management of hazardous wastes, from creation to disposition

rem - Roentgen equivalent man, a unit used in radiation protection to measure the amount of damage to human tissue from a dose of ionizing radiation. Incorporates the health risks from radiation.

remedial action - Long-term cleanup activities

remedial design - A phase of remedial action that follows that remedial investigation/feasibility study

and includes development of engineering drawings and specifications for a site cleanup.

remediation - Those activities performed to remove or treat hazardous waste sites or to relieve their effects.

removal action - Interim cleanup activities that are identified as needed to protect public health and the environment

restoration - (See environmental restoration)

RI - Remedial investigation, the CERCLA process of determining the extent of hazardous substance contamination and, as appropriate, conducting treatability investigations.

RI/FS - Two distinct, but related studies, the remedial investigation and feasibility study. Together, they characterize environmental problems and outline remedial actions to solve those problems.

Risk assessment - (See RA)

risk communication - The exchange of information about health or environmental risks between risk assessors, risk managers, the general public, news media, interest groups, etc.

risk management - The process of evaluating alternative regulatory and non-regulatory responses to risk and selecting among them. The selection process necessarily requires the consideration of legal, economic and social factors.

ROD - Record of decision, a written decision that identifies the selected method for long-term cleanup of contamination at a site

SARA - Superfund Amendments and Reauthorization Act

scoping - In CERCLA, scoping is the initial planning phase of the cleanup process, when requirements are discussed and the projects defined. In the NEPA process, scoping relates to public involvement to help identify significant issues early so that efforts can be focused on those areas requiring resolution and to present a balanced environmental impact statement.

sludge - A semi-solid residue from any of a number of air or water treatment processes. Sludge can be a hazardous waste.

slurry - A watery mixture of insoluble matter that results from some pollution control techniques.

Superfund - The program operated under the legislative authority of CERCLA and SARA that funds and carries out the EPA solid waste emergency and long-term removal remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority level on the list, and conducting and/or supervising the ultimately determined cleanup and other remedial actions.

solidification - The conversion of either liquid or loose hazardous waste into a solid.

solubility - A measure of how much of a given substance will dissolve in a liquid. Usually measured in weight per unit volume.

somatic effects - Effects of radiation limited to the exposed individual, as distinguished from genetic effects, which also affect subsequent, unexposed generations.

stable isotope - An isotope of an element that is not radioactive.

SWCR - Site-wide characterization report

thorium - A naturally-occurring radioactive element

threshold dose - The minimum dose of radiation that will produce a detectable effect.

toxic - Relating to a harmful effect by a poisonous substance on the human body by physical contact, ingestion or inhalation.

toxicology - The science that deals with poisons and their effects on plant, animal and human life.

transuranic wastes - Waste materials contaminated with isotopes above uranium in the periodic table. Transuranic waste is long-lived, but only moderately radioactive.

treatment - Any activity that alters the chemical or physical nature of a waste to reduce its toxicity or prepare it for disposal.

uranium - The heaviest element found in nature. Approximately 997 out of every 1000 uranium atoms are uranium-238. The remaining 3 atoms are the fissile uranium-235. The uranium-235 atom

splits, or fissions, into lighter elements when its nucleus is struck by a neutron.

U.S. EPA - United States Environmental Protection Agency, sometimes referred to as EPA.

UST - Any underground storage tank or associated piping containing hazardous materials.

vitricification - A method of immobilizing waste that produces a glass-like solid that permanently captures the radioactive materials.

VOCs - Volatile organic compounds, chemicals that contain carbon and commonly also contain hydrogen, oxygen and other elements. The prefix "volatile" means that the compound evaporates rapidly. Most industrial solvents are volatile. Found in some liquid and air waste releases.

WAC - Waste Acceptance Criteria

waste minimization - Employing new techniques to reduce the amount of hazardous and radioactive wastes generated to as low a level as possible.

WEMCO - Westinghouse Environmental Management Company of Ohio, the contractor who ran Fernald from 1986 until December 1, 1992. Formerly WMCO, for Westinghouse Materials Company of Ohio.

x-rays - Electromagnetic radiations used in medical diagnosis; a penetrating electromagnetic radiation, usually generated by accelerating atoms to high velocity and suddenly stopping them by collision with a solid body.

Concentration Comparisons

Parts per million:

- One automobile in bumper-to-bumper traffic from Cleveland to San Francisco
- One drop of gasoline in a full-size car's tankful of gas
- One facial tissue in a stack taller than the Empire State Building
- One pancake in a stack four miles high

Parts per billion:

- One silver dollar in a roll of silver dollars

stretching from Detroit to Salt Lake City

- One kernel of corn in enough corn to fill a 45-foot-silo, 16 feet in diameter
- One sheet in a roll of toilet paper stretching from New York to London

Parts per trillion:

- One square foot of floor tile on a kitchen floor the size of Indiana
- One drop of detergent in enough dishwater to fill a train load of railroad tank cars 10 miles long
- One mile on a two-month journey at the speed of light

Parts per quadrillion:

- One postage stamp on a letter the size of California and Oregon combined
- The palm of one's hand resting on a table the size of the United States
- One human hair out of all the hair on all the heads of all the people in the world
- One mile in a journey of 170 light years

Sources:

- *Glossary of Environmental Restoration Terms and Acronym List* (EPA/OPA-87-017, August 1988)
- *Glossary of Environmental Restoration* (DOE, Office of Environmental Restorations and Waste Management, Oak Ridge Operations, October 1990 and October 1991)

The Federal Facility Compliance Act

The Federal Facility Compliance Act of 1992 (FFCA) requires the Secretary of Energy to develop and submit Site Treatment Plans for the development of capacity and technologies for treating mixed waste. A Plan is required for each facility at which DOE stores or generates these wastes. These Plans identify how DOE will provide the necessary mixed waste treatment capacity, including schedules for bringing new treatment facilities into operation.

The FFCA amends the Resource Conservation and Recovery Act (RCRA), the law that defines requirements for the management of hazardous waste. RCRA contains specific restrictions on the land disposal of hazardous waste, including treatment standards that must be met prior to disposal or storage. In general, DOE sites that store mixed waste are not in compliance with these land disposal restrictions because of the lack of capacity for treating mixed waste.

The FFCA also subjects Federal facilities to fines and penalties for violations of RCRA. However, DOE is not subject to fines and penalties for violations of the RCRA land disposal restrictions for mixed waste until after October 6, 1995.

DOE has followed a three-phased approach for developing its Site Treatment Plans. The National Governors' Association (NGA), through a cooperative agreement with DOE, has coordinated representatives from 20 States and the U. S. Environmental Protection Agency (EPA) to

assist the DOE sites in evaluating the candidate treatment options and developing mixed waste treatment plans.

In the first phase of this process, the Conceptual Site Treatment Plans were submitted by DOE sites to their State/Federal regulating agency in October 1993. They identified the broad range of options available to treat DOE's mixed waste.

In the second phase, the Draft Site Treatment Plans narrowed the range of treatment options and presented the individual sites' proposed options for their mixed waste. These Draft Site Treatment Plans were submitted to the States and EPA in August 1994.

DOE has now completed the third phase and submitted Proposed Site Treatment Plans to the State and Federal regulators in March 1995. DOE submitted these Plans to the state regulatory agency (or to the EPA, as appropriate) for approval, approval with modification, or disapproval. Approved Plans will be enforced through Compliance Orders, which are expected to be issued by the regulating agencies by October 6, 1995.

The Proposed Site Treatment Plans contain the treatment configuration that resulted from discussions among the States, EPA, Tribal governments and the public, and from DOE's evaluation of its treatment needs. Now that these Proposed Site Treatment Plans have been submitted, further discussions will take place to work toward the treatment configuration and schedules that will be enforced through the Compliance Orders.

Overview of the Proposed Site Treatment Plans

This Overview presents a summary of the complex-wide treatment configuration resulting from the options presented in the

Definitions

Mixed Waste: Mixed waste is waste that contains both hazardous waste and radioactive material (source, special nuclear, or by-product material as regulated by the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.]). Mixed waste is classified by DOE according to the type of radioactive waste that it contains as either mixed low-level waste (MLLW), or mixed transuranic waste (MTRU). DOE's high-level waste (HLW) is assumed to be mixed waste because it contains hazardous components or exhibits the characteristic of corrosivity.

Low-Level Waste: Low-level waste (LLW) is radioactive material that is not classified as high-level waste, TRU waste, spent fuel, or uranium or thorium mill tailings.

Transuranic Waste: Transuranic waste (TRU) refers to radioactive materials contaminated with greater than 100

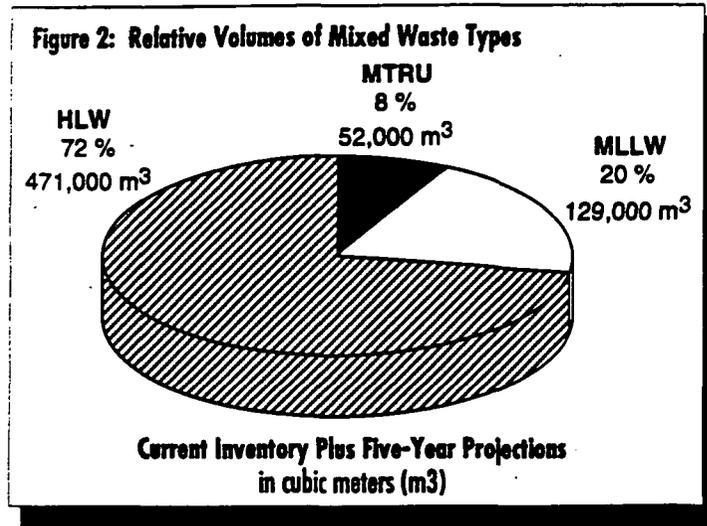
nanocuries per gram of alpha-emitting radionuclides with half-lives greater than 20 years.

High-Level Waste: High-level waste (HLW) is highly radioactive material containing fission products, traces of uranium and plutonium, and other transuranic elements, that result from chemical processing of spent nuclear fuel.

Life Cycle Cost: The life cycle cost is the sum total of costs estimated to be incurred in the design, development, production, operation, maintenance, support, and final disposition of a major system over its anticipated useful life span.

Constant Dollars: Constant dollars are a unit of cost measurement in which the current value of the dollar is assumed to remain unchanged in the future. Constant dollars in this Overview use fiscal year 1994 as the current dollar value.

Proposed Site Treatment Plans. As shown in Figure 2, 72 percent of DOE's mixed waste is high-level waste (HLW), 20 percent is mixed low-level waste (MLLW), and 8 percent is mixed transuranic (MTRU).



Although the majority of DOE's mixed waste (51 percent) is located at the Hanford site in Washington, the site did not prepare a Site Treatment Plan. Because the Hanford site had an agreement in place with its regulators for treating its mixed waste, it was not required by the FFCAct to prepare a Site Treatment Plan. Some sites preparing Site Treatment Plans are, however, proposing Hanford facilities for the treatment of their wastes. Therefore, Hanford wastes and facilities are included in this Overview.

The Proposed Site Treatment Plans are consistent with the current strategies being developed for the treatment of DOE's HLW. HLW is managed at four sites (the Hanford site in Washington, the Savannah River site in South Carolina, the West Valley Demonstration Project in New York, and the Idaho National Engineering Laboratory in Idaho). HLW will only be transported from these sites as a stable solid waste form ready for disposal.

The Proposed Site Treatment Plans are also consistent with DOE's current policy that defense related MTRU waste will be disposed at the Waste Isolation Pilot Plant (WIPP) using the No Migration Variance and will not require treatment to meet the land disposal restriction standards. The Proposed Site Treatment Plans identify the characterization and processing of MTRU waste required to meet the WIPP Waste Acceptance Criteria. The Proposed Site Treatment Plans also include options for treatment of non-defense MTRU waste to meet the land disposal restrictions. However, they recognize the need for modifications if there are variations in the WIPP disposal requirements.

The Draft Site Treatment Plans presented site-preferred MLLW treatment options and, when viewed from a national level, contained redundancies and inefficiencies. In developing the Proposed Site Treatment Plans, an evaluation was performed to determine what accommodations were necessary to blend the configuration presented in the Draft Site Treatment Plans into a national configuration of treatment systems. Because there are existing strategies to address HLW and MTRU, the focus of this evaluation was on identifying the facilities and locations to treat MLLW to land disposal restriction standards. However, specific treatment technologies have not been identified for some of those facilities. Treatment technologies are being evaluated and will be identified through implementation of the Plans and through further discussions with the States, EPA, Tribal governments, and the public.

To facilitate this evaluation, a team was established comprised of site representatives and members of the DOE Headquarters FFCAct Task Force. The team coordinated their efforts with the States through the National Governors' Association to ensure that both the States' and DOE's values were considered in developing the national mixed waste treatment configuration.

The resulting Proposed Site Treatment Plans (plus Hanford) identify on-site treatment for 95 percent of the total mixed waste volume. Over 76 percent of DOE's MLLW would be treated on site, with 98.4 percent of DOE's MLLW being treated in the State where it is stored or generated. Only 2,100 cubic meters of MLLW (1.6 percent of the total DOE MLLW volume) is proposed for treatment out-of-State. The majority of that waste (1,950 cubic meters) would be sent to Idaho and Tennessee. Approximately 22 percent of the total MLLW volume does not yet have a specified treatment location, primarily due to the examination of commercial treatment options, the locations of which have not yet been determined. An additional small volume of waste with an unspecified treatment location requires additional characterization before a treatment location can be identified. Table 1 presents the volumes of MLLW that would be treated in-State, in new or existing systems, and where wastes being shipped out of State would be treated.

The total life-cycle cost for treating mixed waste identified in the Proposed Site Treatment Plans, plus mixed waste treatment at the Hanford site, is estimated at \$50.3 billion in fiscal year 1994 constant dollars. Approximately 85 percent of the total cost (\$42.7 billion) is for the treatment of HLW. MTRU and MLLW account for 7 percent and 8 percent of the total cost, respectively. These cost estimates do not reflect anticipated savings achieved through improvements in operations. As the

sites identify specific opportunities for improvements, cost estimates will be refined.

The largest new costs resulting from the Proposed Site Treatment Plans are for 15 major new treatment facilities, each with an estimated life cycle cost of greater than \$50 million (constant dollars). The Hanford site is also proposing new major treatment facilities; however, these facilities are covered under an existing agreement and do not represent new funding commitments.

Excluding Hanford, the 15 major treatment facilities account for approximately 93 percent of the total cost of proposed new facilities and would treat 82 percent of the mixed waste proposed for treatment in new facilities. Large MLLW facilities are proposed at Idaho National Engineering Laboratory, Rocky

Flats, Savannah River, and Lawrence Livermore National Laboratory, plus new commercialized treatment facilities being examined by the Oak Ridge site. Major MTRU facilities are proposed at Oak Ridge, Savannah River, Idaho National Engineering Laboratory/Argonne-West, and Los Alamos National Laboratory. A HLW facility is proposed at the Idaho National Engineering Laboratory.

The current funding assumptions used to prepare the Proposed Site Treatment Plans differ from those used during the first two years of the Site Treatment Plan development process. Under the currently projected funding targets, schedules in the Proposed Site Treatment Plans for some facilities, particularly the largest and most costly facilities, are significantly delayed compared to schedules in the Draft Plans. Treatment schedules for small sites that rely on the capacity at these larger sites

Table 1. Mixed Low-Level Waste Treatment by State
Waste Volumes in Cubic Meters—Current Inventory Plus Five-Year Projections

STATE	DOE WASTE TREATED IN STATE		STATES RECEIVING WASTE FROM OUT-OF-STATE DOE SITES								TREATMENT LOCATION NOT SPECIFIED	TOTAL
	In Existing Systems	In New Systems	FL	ID	NM	SC	TN	TX	UT	WA		
California	1,990.2	83.1		179.3			0.7			33.2	33.3	2,319.8
Colorado	1,887.9	15,428.8		157.2			90.0				0.0*	17,563.9
Connecticut				5.1		3.6				4.3		13.0
Hawaii				0.1			16.0			4.5		20.6
Iowa							0.2			0.0*		0.2
Idaho	633.3	26,002.3									2.2	26,637.8
Illinois	16.2	131.2					3.1					150.5
Kentucky	8.4	85.7					320.5				617.7	1,032.3
Maine						0.0*				2.3		2.3
Missouri	1,960.5						61.5			1.8		2,023.8
New Mexico	56.2	197.4					18.4				401.1	673.1
Nevada			0.3								297.8	298.1
New York	6.0	0.6		30.7		9.3	9.0	1.7	5.7	8.9	95.0	166.9
Ohio	1,249.9	12,744.4		11.5			962.7		8.8	13.3	275.5	15,266.1
Pennsylvania				13.8		2.0						15.8
South Carolina	7,802.9	5,664.5		7.9	0.8						491.8	13,967.9
Tennessee	3,531.4	2,519.1									26,200.9	32,251.4
Texas	70.6	774.8										845.4
Virginia				9.8		2.1						11.9
Washington		15,904.6		19.0			36.0					15,959.6
STATE TOTALS	19,213.5	79,536.5	0.3	434.4	0.8	17.0	1,518.1	1.7	14.5	68.3	28,415.3	129,220.4

* Waste Volume < 0.05 m³

age also affected. DOE is providing its State and Federal regulators, as well as other interested parties, an opportunity to participate in prioritizing its Environmental Management activities, including mixed waste treatment, in support of fiscal year 1997 budget development. DOE expects that for some sites further discussion with the State and Federal regulators concerning priorities will result in modified schedules in the approved Plans. For example, schedules in the Proposed Site Treatment Plans for the MTRU treatment facilities are not currently integrated with the schedule for opening and closing WIPP, and discussions with the regulators and the public may result in changes to these schedules.

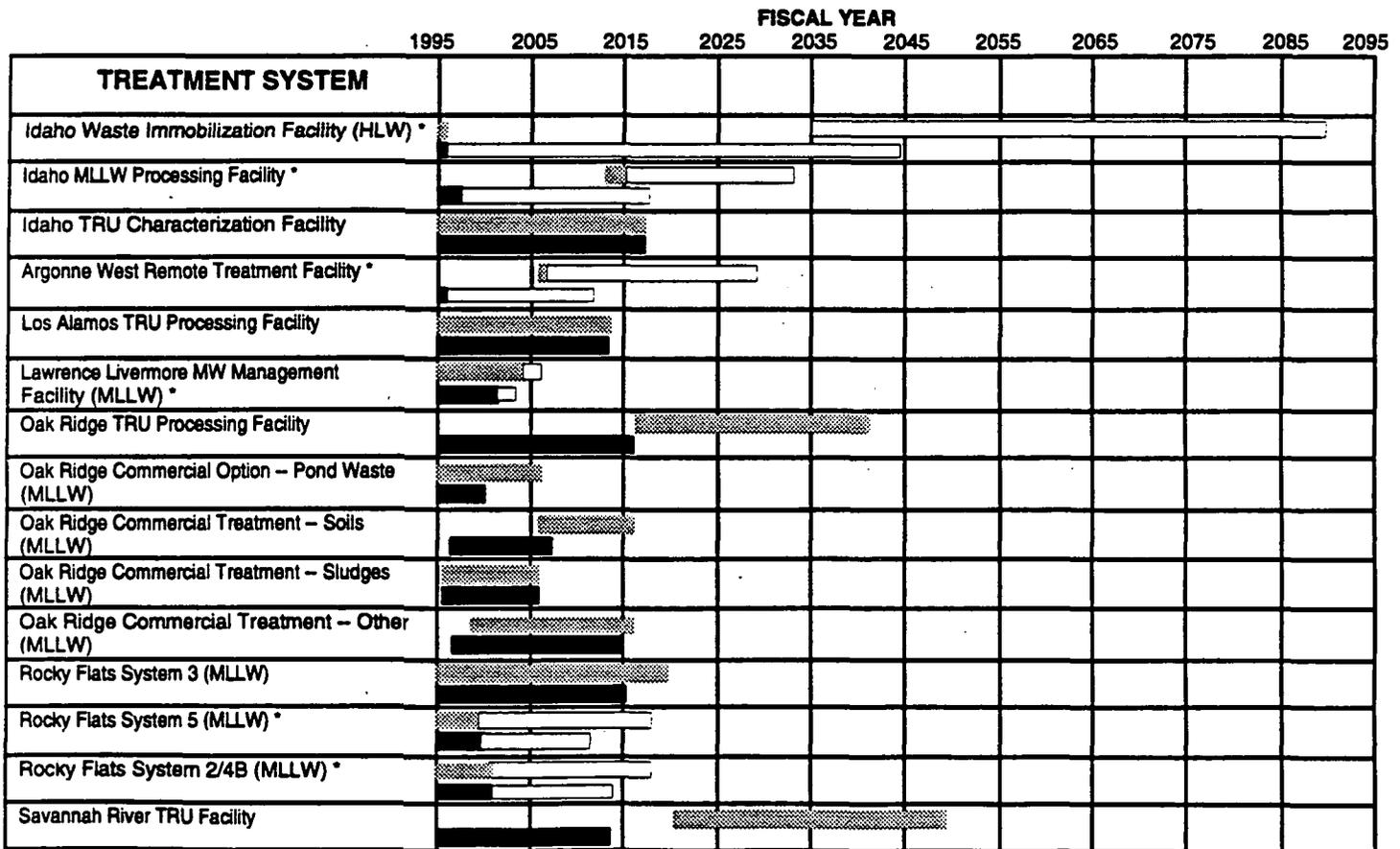
Figure 3 shows the schedules in the Proposed Site Treatment Plans, constrained by current Waste Management program funding targets, for the 15 major new treatment facilities and the schedules that the sites were considering prior to the projected funding limitations. Although the majority of the sched-

ule changes occur for the major new facilities, schedules for some of the smaller facilities have also been delayed. Excluding Idaho's Waste Immobilization Facility, which would not complete treatment until the year 2088, treatment in the 15 large facilities would be completed by 2050.

For waste for which treatment technology does not exist, the FFCAct requires schedules for research and development, rather than schedules for treatment, to be included in the Plans. Projected post-research and development schedules are shown in Figure 3 for comparison and planning purposes, but are not part of the Proposed Site Treatment Plans, and may change as a result of research and development activities. The Proposed Site Treatment Plans for the following facilities include only schedules for research and development activities:

- Idaho Waste Immobilization Facility
- Idaho MLLW Waste Processing Facility

Figure 3. Proposed Site Treatment Plan Schedules
Comparison of PSTP Schedules with Previous Draft Schedules



* Facilities to treat wastes needing technology development; schedules include R&D only. Other facility schedules include planning, design, construction, and operation.

▨ Proposed Site Treatment Plan Schedule ■ Previous Draft Schedule □ Projected Post-R&D Schedule

- Argonne-West Remote Treatment Facility
- Lawrence Livermore Mixed Waste Management Facility
- Two Rocky Flats Facilities: System 5 and System 2/4B

The Proposed Site Treatment Plans for some additional sites' new facilities will follow this same research and development scheduling approach, but are not among the 15 major new facilities.

Implementation of the Site Treatment Plans

Once the Site Treatment Plans are approved, the FFCAct requires the regulatory agencies to issue Orders requiring compliance with the Plans. In view of its significant funding limitations, DOE intends to seek a process for implementing the Plans that provides accountability, focuses resources on high priority activities, and recognizes fiscal and technical realities. One element of DOE's proposal is to establish enforceable "milestones" only for near-term activities when technical aspects and funding are more certain. The milestones would be reviewed annually with the regulatory agency to consider factors such as funding availability; the latest technical and cost information; site priorities identified through consultations among DOE, regulatory agencies, and stakeholders; new or emerging technologies; and other relevant factors, and would be revised as appropriate.

Relationship between the FFCAct and Other Initiatives

Concurrent with the FFCAct process, DOE has been pursuing two related major initiatives, the Waste Management Programmatic Environmental Impact Statement (PEIS) and the Baseline Environmental Management Report (BEMR).

DOE is undertaking a programmatic environmental impact analysis of alternative strategies for waste management activities in the Waste Management PEIS. The PEIS, being developed in accordance with the provisions of the National Environmental Policy Act, will include an evaluation of the potential environmental impacts of waste management activities at a broad level. The draft PEIS is scheduled to be released in May 1995 and finalized in late 1995.

The other related major initiative is the Baseline Environmental Management Report. The Report, developed in response to a Congressional requirement, will address the environmental liabilities of the DOE complex and provide an estimated cost for all DOE Environmental Management activities. The Report reflects the activities that DOE field offices currently ex-

pect to carry out and alternative cases developed by DOE showing the potential cost variations from four key factors: future land use, scheduling, technology development, and the waste management configuration. The Report was submitted to Congress at the end of March 1995.

The FFCAct efforts address only mixed waste treatment within the Waste Management program. The Programmatic Environmental Impact Statement, although also evaluating the Waste Management program, has a broader perspective in that it addresses five different waste types and treatment, storage, and disposal alternatives for those waste types. The Baseline Environmental Management Report is broader still, addressing all of the Environmental Management programs, including Compliance, Waste Management, Environmental Restoration, Technology Development, and Nuclear Material and Facility Stabilization. By estimating total life-cycle costs for Environmental Management programs, including costs of environmental liabilities and regulatory commitments, the Baseline Environmental Management Report highlights the challenges facing DOE in managing its wastes, cleaning up its contaminated property, considering future land use, and budgeting resources to meet these challenges.

Disposal

Established processes are being implemented by DOE for studying, designing, constructing, and ultimately operating disposal facilities for HLW and MTRU wastes (specifically the HLW repository in Nevada, and the Waste Isolation Pilot Plant in New Mexico).

Although the FFCAct does not require DOE to address disposal of treated mixed waste, both DOE and the States recognized that disposal issues are an integral part of mixed waste management activities. Currently there are no active permitted mixed waste disposal facilities operated by DOE for disposal of residuals from the treatment of MLLW. Through the Site Treatment Plan development process, DOE and State and Federal regulators have formed working groups to evaluate issues related to disposal of treated MLLW. These workgroups have defined criteria to evaluate the sites subject to the FFCAct in order to identify sites that may be suitable for disposal of these residuals. Evaluation of these facilities and determination of potential disposal locations is continuing. A description of the disposal process and its status is included in the individual site Proposed Site Treatment Plans.

Next Steps

The Proposed Site Treatment Plans have been submitted to the State/EPA regulators for their approval, approval with modification, or disapproval. The regulators are expected to issue Orders requiring compliance with the Plans by October 6, 1995. As discussions among DOE, its regulators, Tribal governments, and the public continue, it is expected that modifications and improvements will be made to the treatment configuration and schedules described in the Plans.

DOE intends to continue its dialogue with the State/EPA regulators in working to finalize the Plans, leading to issuance of the Compliance Orders. To ensure that the FFCAct process moves forward and that common goals are attained, DOE anticipates that the following steps will be taken in the near term:

- Determine, with the States, EPA, Tribes, and the public, the priorities of the Environmental Management program at each site.
- Revise facility schedules to reflect these priorities and funding limitations.
- Continue a cooperative process under the FFCAct beyond the release of the Proposed Site Treatment Plans to build on the progress that has been made to date.

In the long-term, the current process should evolve into a new way of doing business that consists of open communication with the regulators on both a local and national level, joint resolution of issues, and working toward common goals. Much work must still be done to address challenging issues such as implementation, funding, prioritization, and equity. However, there is a solid process in place to move forward through cooperation and regular communication between DOE, its regulators, and the public,

General information on a site's Proposed Site Treatment Plan, locations of DOE reading rooms where the Plans may be viewed, and addresses of regulators to whom comments on specific Plans should be sent, can be obtained from the Center for Environmental Management Information at 1-800-7EM-DATA (1-800-736-3282).

Additional information about the FFCAct may also be obtained electronically through the FFCAct Bulletin Board on the Internet at <http://eagle.haz.com.gov/ffcabb/ffcmain.html>.

Comments on DOE's Proposed Site Treatment Plans will be considered by the appropriate regulatory agency in reviewing the Plans. Written comments on the Plans should be sent to the State/Federal recipients by July 6, 1995.



OPERABLE UNIT 1

FERNALD

- **OU1 Remedial Design Work Plan
Approved by U.S. EPA June 21, 1995**
- **Dewatering Excavation Evaluation
Program (DEEP) Initiated October 1994**
 - Completed Wet Excavations
 - Completed Sampling of Pits 5 & 6
- **OU1 & OU4 held Public Workshop on
Transportation Issues June 29, 1995**
- **Preparing to Award Design Contract to Upgrade 3
CSX Trestles September 1995**

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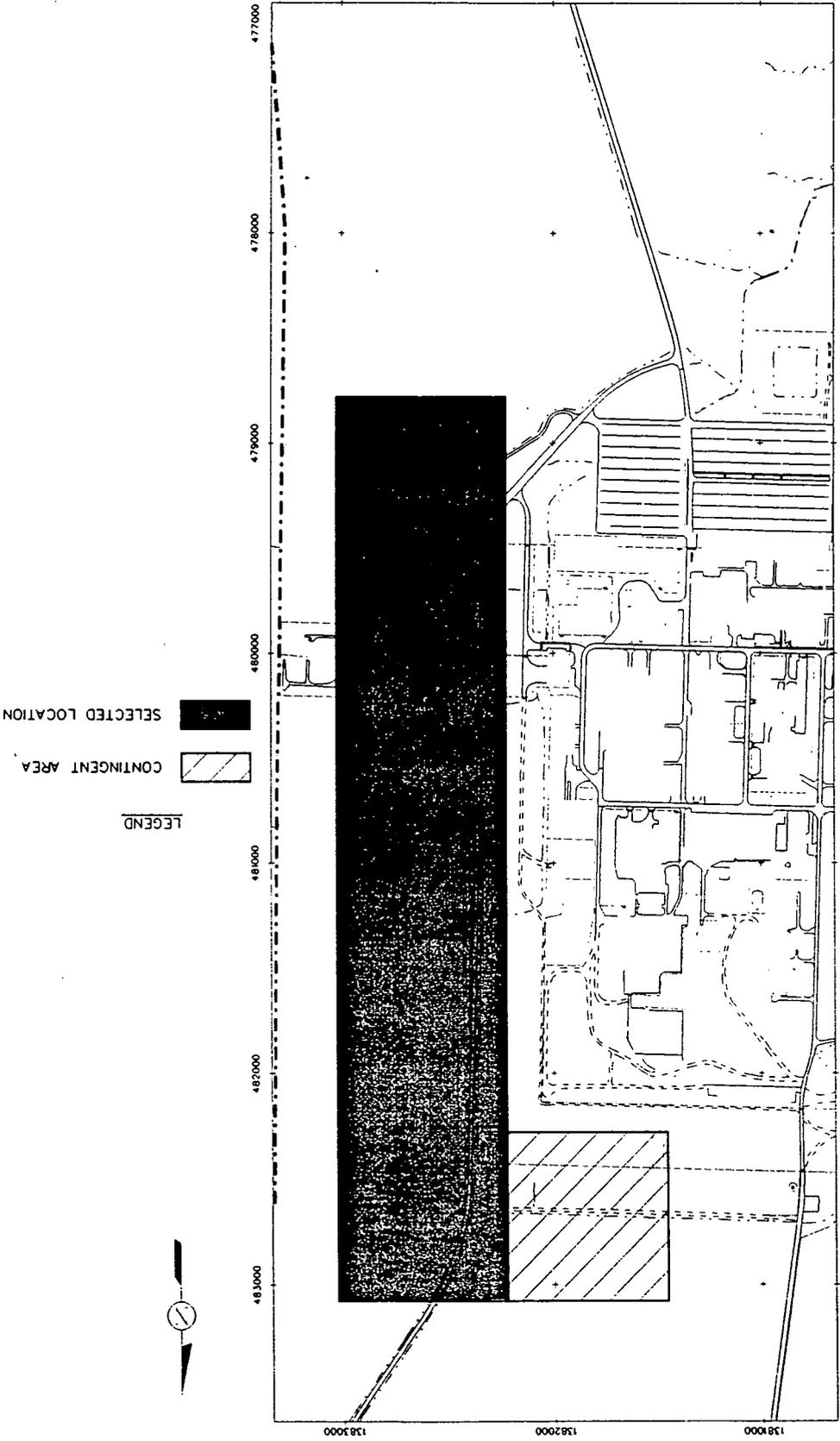
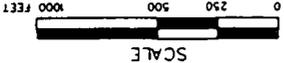


OPERABLE UNIT 2

FERNALD

- OU2 Record of Decision (ROD)
Signed by U.S. EPA June 8, 1995
- Pre-Design Investigation & Site Selection
Report for the On-Site Disposal Facility
Submitted to U.S. EPA July 31, 1995
- Draft OU2 Remedial Design Work Plan
Submitted to U.S. EPA August 7, 1995
- RA #30 -- Seepage Control at the South Field &
Inactive Flyash Pile
..... Early September Completion

NOTE: COORDINATES ARE STATE PLANNER NAD 1927



LEGEND

SELECTED LOCATION

CONTINGENT AREA



FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
 Environmental Management Project
 Fernald
 U.S. DEPARTMENT OF ENERGY

SELECTED LOCATION FOR THE PROPOSED ON-SITE DISPOSAL FACILITY

FIGURE 4-1

DATE: 3/1/83
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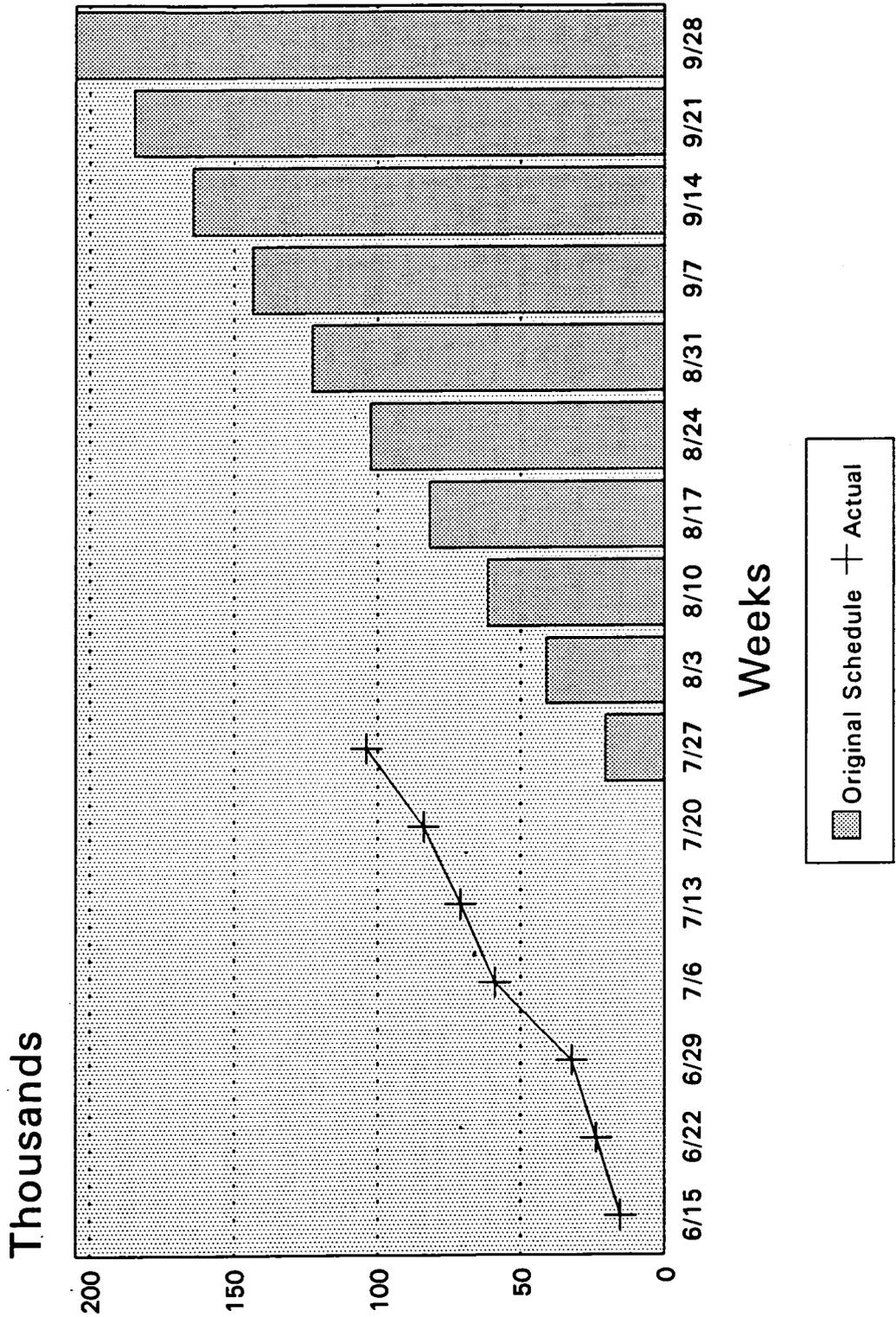
OPERABLE UNIT 3

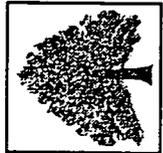
FERNALD

- HF Tank Car
 - Completed Neutralization and Field Work July 1995
- Remedial Design Prioritization Sequencing Report (PSR)
 - Conditionally Approved by U.S. EPA
 - Conditionally Approved by OEPA
- UNH Neutralization Project in Progress, on Schedule, Proceeding Smoothly
 - Completed Safe Shutdown in Plant 4 March 1995
 - Started D&D Activities in Plant 4 April 1995

UNH Neutralization Project

Progress Report - Gallons Neutralized
(includes "insitu" treated tanks)

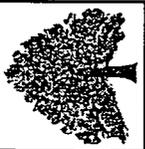




OPERABLE UNIT 3 (Cont'd)

FERNALD

- **Will Complete Safe Shutdown in Plant 1 August 1995**
- **Final Reports for Removal Actions Submitted in June 1995 to U.S. EPA and OEPA for:**
 - **Plant 7 (RA #19)**
 - **Fire Training Facility (RA #28)**
 - **Plant 1 Ore Silos (RA #13)**



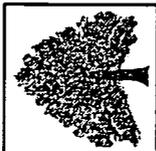
OPERABLE UNIT 4

FERNALD

- Remedial Design and Vitrification Pilot Plant Plant Public Workshop June 13, 1995
- Remedial Design Work Plan Approved by U.S. EPA June 15, 1995
- Construction on Vitrification Pilot Plant to be Completed September, 1995
- Start-up of Phase 1 Operations of Vitrification Pilot Plant October, 1995

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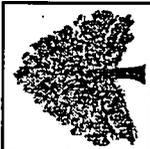
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OPERABLE UNIT 5

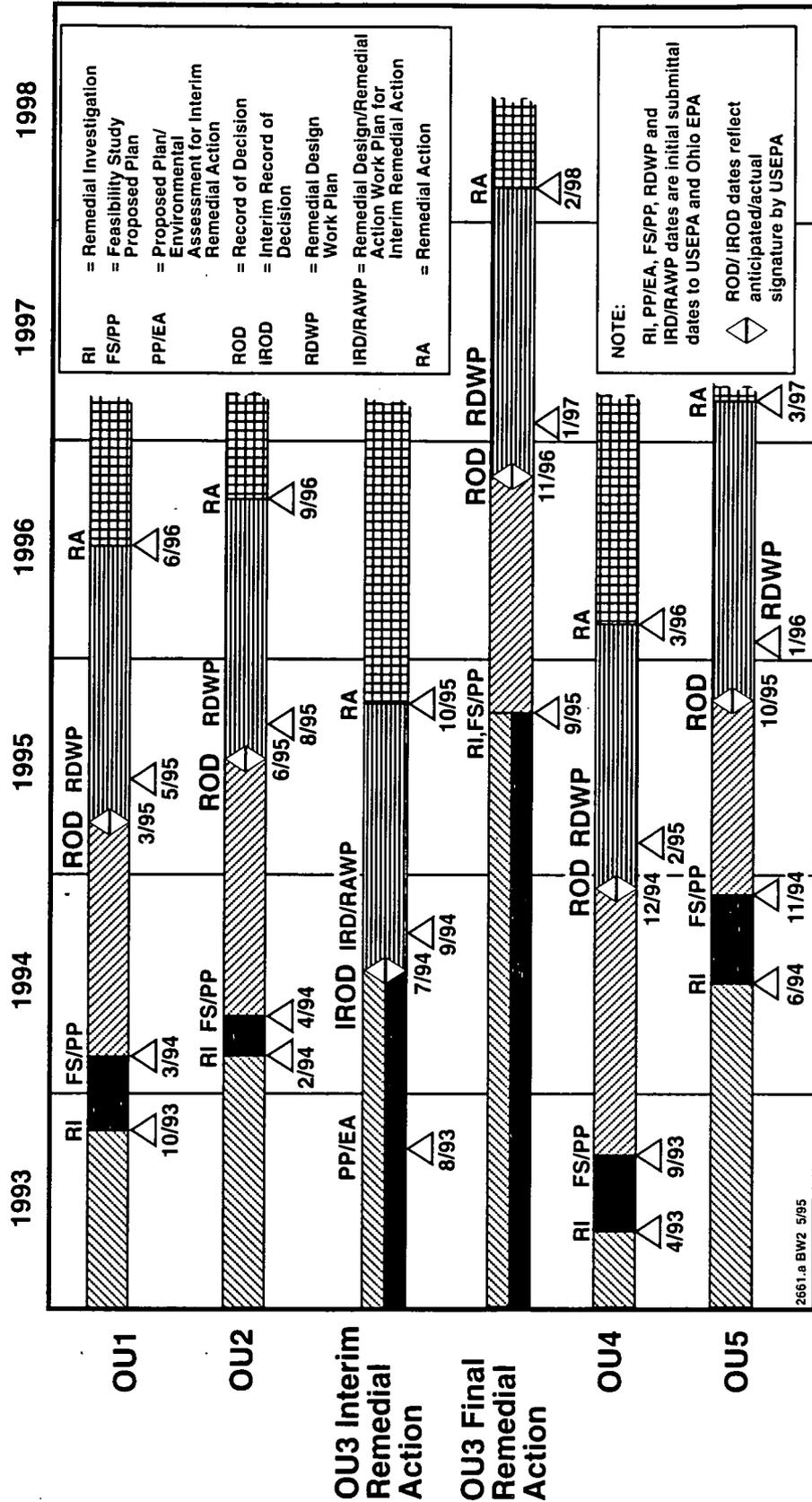
FERNALD

- Issued Final Proposed Plan to U.S. EPA May 1, 1995
- Public Comment Period on Proposed Plan May 1 to June 30, 1995
- Public Meeting/Formal Comment on Proposed Plan May 23, 1995
- Issued Draft Record of Decision (ROD) to U.S. EPA August 2, 1995



FEMP REMEDIATION SCHEDULE

FERNALD



RI = Remedial Investigation
 FS/PP = Feasibility Study Proposed Plan
 PP/EA = Proposed Plan/Environmental Assessment for Interim Remedial Action
 ROD = Record of Decision
 IROD = Interim Record of Decision
 RDWP = Remedial Design Work Plan
 IRD/RAWP = Remedial Design/Remedial Action Work Plan for Interim Remedial Action
 RA = Remedial Action

NOTE:
 RI, PP/EA, FS/PP, RDWP and IRD/RAWP dates are initial submittal dates to USEPA and Ohio EPA
 ROD/ IROD dates reflect anticipated/actual signature by USEPA

2661.a BW2 5/95

REMOVAL ACTION SUMMARY

NO.	TITLE	STATUS
1	Contaminated Water Beneath FEMP Buildings	Ongoing
2	Waste Pit Area Run-off Control	Completed
3	South Groundwater Contamination Plume	Ongoing
4	K-65 Silos 1 & 2	Completed
5	K-65 Silos Decant Sump Tank	Ongoing
6	Waste Pit 6 Residues	Completed
7	Plant 1 Pad Continuing Release	Completed
8	Inactive Flyash Pile Control	Completed
9	Removal of Waste Inventories	Ongoing
10	Active Flyash Pile Controls	Completed
11	Pit 5 - Experimental Treatment Facility	Completed
12	Safe Shutdown	Ongoing
13	Plant 1 Ore Silos	Completed
14	Contaminated Soil Adjacent to Sewage Treatment Plant Incinerator	Completed
15	Scrap Metal Piles	Ongoing
16	Collect Uncontrolled Production Area Run-off (Northeast)	Completed
17	Improved Storage of Soil and Debris	Ongoing
18	Control Exposed Material in Pit 5	Completed
19	Plant 7 Dismantling	Completed
20	Stabilization of UNH Inventories	Ongoing
21	Expedited Silo 3 Dust Collector	Completed
22	Waste Pit Area Containment Improvement	Completed
23	Inactive Flyash Pile	Completed
24	Pilot Plant Sump	Completed
25	Nitric Acid Tank Car and Surrounding Area	Completed
26	Asbestos Removal Program	Ongoing
27	Management of Contaminated Structures at FEMP	Incorporated into OU3 IROD
28	Contamination at the Fire Training Facility	Completed
29	Erosion Control at Inactive Flyash Pile	Completed
30	Seepage Control at the South Field and Inactive Flyash Pile	Ongoing

RECENT 1995 MEETINGS WITH REGULATORS		
Date	With	Topic
Mar. 14	OEPA & USEPA	OU3 RI/FS Issues; Draft OU5 FS
Mar. 16	OEPA	RCRA Closure-CERCLA Remediation Integration
Mar. 27	USEPA, OEPA, DOE-OH, DOE-Ports, DOE-Mound, WPAFB, NASA, et al.	Ohio Federal Facilities Forum
Apr. 5	OEPA & USEPA	Draft OU2 ROD; RvA#31 Work Plan; Disposal Facility Pre-Design Investigation
Apr. 20	Dept of the Interior/US Fish & Wildlife Service (DOI/USF&WS), USEPA, OEPA, Ohio Office of the Attorney General (OOAG), Ohio Dept of Natural Resources (ODNR)	Natural Resources Trusteeship
Apr. 20	Dept of Transportation (DOT)	Private Motor Carrier Program Audit
Apr. 25	OEPA	Threatened & Endangered Species Surveys
May 11	DOI/USF&WS, USEPA, OEPA, OOAG, ODNR	Natural Resources Trusteeship
May 17-18	Defense Nuclear Facilities Safety Board (DNFSB); USEPA & OEPA	OU4 Vitrification Pilot Plant Project; Thorium Overpack Project; HF Tank Car Project; Safe Shutdown; Low Level Waste Issues
May 23	Ohio Historic Preservation Office (OHPO)	Programmatic Agreements for (1) On-site Archaeological Resources and (2) On-site Historic Buildings & Structures
May 23	OEPA & USEPA	OU3 RI/FS Issues
June 7	OEPA	RCRA Closure-CERCLA Remediation Integration
June 8	OEPA & USEPA	Monthly Progress Conference Call

RECENT 1995 MEETINGS WITH REGULATORS		
Date	With	Topic
June 12	OEPA	Threatened & Endangered Species Survey
June 13	OEPA & USEPA	OU4 & OU5 Issues
June 19-28	DOE-NVO	Annual NVO-325 (Rev. 1) Audit
June 19	OEPA	FEMP's RCRA Part B Permit Application
June 20	DOI/USF&WS, USEPA, OEPA, ODNR	Wetlands Mitigation Approach
June 21-22	OEPA	Annual RCRA Compliance Evaluation Inspection
June 22	DOI/USF&WS, USEPA, OEPA, OOAG, ODNR	Natural Resources Trusteeship
June 28	OEPA & USEPA	OU3 RI/FS Issues
July 13	OHPO	FEMP's Historic Preservation Activities
July 14	OEPA	Observe Implementation of Liquid Mixed Waste & UNH Projects
July 17	OEPA	Propose an Alignment Meeting on Accelerated Remediation
July 18	OEPA & USEPA	Monthly Progress Conference Call
July 21	OEPA & USEPA	South Plume Extraction System Optimization Study; AWWT Treatment Capacity
July 28	OEPA	Thorium Nitrate Solidification Project Work Plan
July 31	OEPA & USEPA	OU3 Waste Acceptance Criteria Issues; Integrated Remedial Planning
Aug. 8	OEPA & USEPA	OU4 Issues
Aug. 10	DOI/USF&WS, USEPA, OEPA, OOAG, ODNR	Natural Resources Trusteeship.

000052

NUMBER OF DRUM EQUIVALENTS (DEs) SHIPPED OFF SITE THRU JULY 28, 1995

Year	DEs
1985	319
1986	8,877
1987	39,163*
1988	57,395
1989	55,029
1990	24,846
1991	43,522
1992	100,596
1993	110,743*
1994	77,962*
thru 7/28/95	83,198*
Total	601,650

* Include shipment to other locations than NTS:

1987 -- 16,615 DEs to Scientific Ecology Group (SEG) (metal)
-- 181 DEs to Toxic Substance Control Act (TSCA)

1993 -- 36,953 DEs to SEG (metal + compactible residue)
-- 4,326 DEs to TSCA

1994 -- 480 DEs to Envirocare (mixed waste debris)
-- 6,767 DEs to SEG (compactible residues)

1995 -- 250 DEs to Envirocare (mixed waste debris)
2,095 DEs to SEG (compactible residues)
12,040 DEs to ALARON (Plant 7 recyclable steel)

MATERIALS/PRODUCT SHIPPED:

296,624 pounds to Manufacturing Science Corp. for FY 1995



Economic Impact Study of the Fernald Environmental Management Project

This Fact Sheet Describes

- ◆ Economic impact study objectives
- ◆ How the data will be collected
- ◆ Community and local business participation in study
- ◆ The time line for completing the study

Focus of the study

The study will provide current economic data on local and regional geographic areas. Local areas include: Ross, Miamitown, Crosby, Morgan, and Harrison. The regional study area will cover the tri-state area (i.e., Cincinnati metro) and subdivide impact assessment to the extent possible by these jurisdictional areas: Hamilton County, Butler County, Indiana, Kentucky, and Ohio. The research findings will be used to communicate anticipated economic impacts to the local economy as the Fernald site transitions from cleanup to long-term monitoring.

INTRODUCTION

This summer, an independent research group will assist the Department of Energy (DOE) and the Fernald Environmental Restoration Management Corporation (FERMCO) in conducting an economic impact study. The objective of the study is to determine Fernald's economic impact on communities surrounding the site. It will serve as a basis for a community-led economic planning effort. The study will help DOE and the community grasp the extent to which Fernald influences the local economy now and will provide ideas on the future of the area after the cleanup is complete.

Who will conduct the study

The University of Cincinnati (UC) Department for Economic Education will conduct the study. Researchers began data generation in June and will issue a final report September 15. Community briefings will be held after the study is completed.

Community Role

As the Fernald site transitions from environmental restoration to long-term monitoring, its economic impact on the local economy will be reduced. This study will provide data the community can use to simulate economic development planning, if desired.

The survey will include data on the overall extent of Fernald's economic involvement in the local and regional community; the number and types of businesses that rely on Fernald as a customer base; the impact of past downsizing on surrounding communities; and the nature of organizations which rely on Fernald subcontracts. The time frame for this assessment will include 1990 through 1995, with a trend projecting economic impacts through 1998. Emphasis will be on 1994 through 1995.

How data will be collected

The research effort will employ a combination of research techniques, including focus groups and telephone surveys. Three focus groups will be conducted with members of the following: business leaders, Fernald employees, and local residents. For local residents, groups of 10 to 12 participants will be recruited to discuss perceptions of Fernald's role in the local and regional economy. Focus groups will also seek input on the extent and diversity of economic relationships that exist due to the Fernald site. For the business owners focus group, 30 local businesses will be selected from a target list. From that list 15 will be recruited to attend a focus group. Fernald employees will be sought in both management and front line positions, and will consist of a group of 10-15 employees.

Telephone surveys will be conducted in a two-pronged approach. The local business survey will consist of a telephone survey with chief executive officers from a sample of 100 businesses in a 5-mile radius of the Fernald site, including Ross, Miamitown, Crosby, Morgan, and Harrison. The survey of area businesses will determine the extent businesses serve as suppliers to Fernald facility or serve Fernald employees.

The employee survey will consist of a telephone survey conducted with a sample of Fernald employees who live in local communities surrounding the facility. The purpose of this survey is to better understand employees' economic involvement in the area.

An economic analysis report will be developed after all research has been collected. This report will measure Fernald's total economic effect on the region. This approach requires understanding the nature and extent of a company's expenditures to calculate how they affect overall business sales, household earnings and employment in the larger region. When a company's direct expenditures are known, the indirect effects can be estimated through a series of multipliers. The RIMS II will be utilized to measure Fernald's economic impact on Hamilton and Butler counties.

July 1995

Regional Input-Output Modeling System (RIMS II)

RIMS II is a tool developed by the U.S. Department of Commerce, based on a set of multipliers derived from an input-output table for the Cincinnati Metropolitan Statistical Area (CMSA). The input-output table shows linkages among various industries in the economy for the CMSA and provides multipliers to measure the indirect and induced impacts of virtually any type of production on the local economy. These multipliers will model the effects of local expenditures on business sales, household earnings, and employment.

When the study will be complete

Research began in late June and early July. Completion of the study is targeted for September 15. The study will result in a final report which will include an executive summary of principal findings, including total economic impacts on the specified regions, (direct, indirect, and induced impacts), expenditures to households, and number of jobs created by the facility. This information will be presented this fall to the community at township trustee meetings, area merchant meetings, and public workshops.

Contact for Information

Gary Stegner
Public Information Director
DOE Fernald Area Office
513-648-3153

000035



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Contact for Information

Gary Stegner
Public Information Director
DOE Fernald Area Office
513-648-3153

000037

UPCOMING PUBLIC PARTICIPATION ACTIVITIES

DATE/TIME	EVENT	PLACE	TOPIC
Second and fourth Monday each month 7:30 p.m.	Crosby Township Meeting	Crosby Township Civic Center	Fernald status report and updates given at each meeting.
First and third Thursday each month 7:00 p.m.	Ross Township Meeting	Ross Fire House	Fernald status report and updates given at each meeting.
First and third Monday each month 7:30 p.m.	Morgan Township Meeting	Morgan Township Civic Center	Fernald status report and updates given at each meeting.
Fourth Thursday each month 7:30 p.m. *No August Meeting	FRESH Meeting	Venice Presbyterian Church	Fernald status report and updates given at each meeting.
August 8, 1995 6:30 - 9:00 p.m.	DOE Community Meeting	The Plantation Harrison, Ohio	TF Recommendations and 10-year Cleanup Plan
Sept. 30, 1995 8:30 a.m. - 12:30	Fernald Citizens Task Force Meeting	Joint Information Center, 6025 Dixie Hwy. Fairfield, OH	Open to the public. Path Forward for Task Force
November Timeframe	Operable Unit 1 Remedial Design Public Briefing	TBD	Update the public on progress of Remedial Design



EXECUTIVE SUMMARY

The Fernald Environmental Management Project site is a 1,050-acre facility operated by the United States Department of Energy (DOE), and was once a major part of the nation's nuclear weapons complex. Located approximately 18 miles northwest of Cincinnati, Ohio, Fernald was in operation between 1951 and 1989. Over that period of time, more than 500 million pounds of high-purity uranium metals were produced. One significant consequence of this activity was the release of over 1 million pounds of uranium into the surrounding environment. Now that the plant is closed, efforts have turned to the environmental damage and human health risk resulting from nearly 40 years of production.

Over three million cubic yards of waste and contaminated material must be safely managed before the Fernald site can conclude its contribution to the Cold War. DOE established the Fernald Citizens Task Force in August 1993 as a site-specific citizens advisory board for the Fernald facility. The Task Force was chartered to provide DOE, the U.S. Environmental Protection Agency (EPA), and the Ohio Environmental Protection Agency (OEPA) with recommendations regarding four specific questions:

- 1) What should be the future use of the Fernald site?
- 2) What residual risk and remediation levels should remain following remediation?
- 3) Where should the waste be disposed?
- 4) What should be the priorities among remedial actions?

This report is the culmination of the effort of the Task Force to answer these four questions.

0017

The Task Force began its work in September 1993 and developed and released its recommendations over a seven-month period from November 1994 through May 1995. Each recommendation is supported by a detailed discussion of issues and rationale. With the exception of waste disposition, all recommendations represent full consensus of the board.

***Recommendations
on Remediation
Levels***

The Task Force established remediation levels to protect the Great Miami Aquifer and to provide consistent protection of human health across all environmental media and land uses. The Task Force sought to balance the absolute requirement to protect human health and safety with the desire to minimize the impact on the environment resulting from remediation itself. To achieve background conditions would require surface soil excavation for five miles surrounding the site, a consequence the Task Force found unacceptable. Ultimately, the Task Force recommended remediation levels which were protective and required little off-site excavation. These levels were based on restoring and protecting the aquifer to conform with maximum contaminant levels under the Safe Drinking Water Act, keeping cancer risks within one in ten thousand, and keeping non-cancer risks below the EPA hazard index of one.

***Recommendations
on Waste
Disposition***

The Fernald Citizens Task Force evaluated the political and logistical considerations involved in disposing of over three million cubic yards of contaminated material and determined that a balanced approach in which less hazardous waste was disposed of on-site and more hazardous waste was disposed of off-site was most prudent. Of paramount importance was ensuring the removal of the highest level wastes off-site for safe disposal and that no new wastes come to Fernald for disposal. The Task Force, therefore, concurred with existing DOE, EPA and OEPA decisions that the most highly contaminated materials be disposed of off-site, and recommended that an on-site disposal facility be constructed to accept materials with low levels of contamination from the Fernald site only.

***Recommendations
on Priorities***

Originally, Task Force priority recommendations were envisioned as a sequencing of activities according to their importance to the concerns and goals of stakeholders. However, as dramatic cuts in the DOE budget began to occur, the nature of the problem shifted. Reduced annual budgets resulted in remediation time frames stretching to 25 years. At the same time, total projected costs

of remediation were twice what could be achieved with more rapid remediation, due to the high costs of keeping the facility open. The Task Force concluded that such a lengthy approach to remediation would not remove the highest level contaminants from the site quickly, nor conduct remediation in a safe and cost-effective manner. Therefore, the Task Force recommended that Fernald accelerate remediation by achieving total source control within an approximately 10-year schedule. This schedule will both provide rapid protection of human health and the environment and greatly reduce the overall costs of remediation.

Recommendations on Future Use

The Fernald Citizens Task Force focused its future use recommendations on creating a broad understanding of how the Fernald site could best be used following remediation, rather than identifying specific land use plans for the property. The Task Force believes that specific uses of the property should be determined closer to the time of reuse by the people most impacted by that use, within the general guidelines established by the Task Force. As part of these general guidelines, the Task Force recommended that residential and agricultural uses be avoided on the property. However, it was also important to the Task Force that the land be used productively. Accordingly, remediation levels recommended by the Task Force allow for all other use, including recreation and industry. The Task Force also recommended that a substantial buffer area separate the on-site disposal cell and any other uses of the property.

Next Steps

The initial mission of the Fernald Citizen's Task Force has been completed with this presentation of its recommendations. Task Force members, DOE, EPA, and OEPA believe the Task Force's usefulness has not ended, however. Continuing Task Force activities are expected to include monitoring the implementation of its recommendations throughout the design and construction phases, evaluating closure, and long-term monitoring of the facility. The Task Force will reconvene in the fall of 1995 to evaluate these options and to plan future activities.

**OPERABLE UNIT 1
DEWATERING, EXCAVATION, EVALUATION PROGRAM (DEEP)
IMPLEMENTATION OF PHASE III
FACT SHEET**

The approved Record of Decision (ROD) for DOE's Operable Unit 1 calls for excavating the waste pits, treating the waste materials through thermal drying, and shipping the waste for disposal to a permitted commercial disposal facility.

Since excavation is such an important part of the OU1 remediation, DOE proposed, and EPA has approved, the implementation of the Dewatering Excavation Evaluation Program (DEEP). DEEP is a multi-phased, short-term Treatability Study aimed at obtaining geotechnical data and excavation information to assist DOE in determining the best technique to use to excavate the waste pits. Additionally, DEEP Treatability Study information will be used to provide design information for the thermal dryer system.

Phase I of DEEP, which involved taking samples via borings to obtain engineering data on the geotechnical properties of the wastes in the pits, and soils in the area, was completed in November, 1994.

Phase II of field work, Trench Excavation for the DEEP project, began in February, 1995, and consisted of digging seven trenches (total) in Waste Pits 1, 2, and 3. Each trench was a maximum of 30 by 30 feet wide and 15 feet deep. Although the waste pits have soil covers, or caps, trenching revealed that the waste pits contain zones of water saturated wastes. This phase was completed in March, 1995.

In July, 1995, U.S. EPA approved expansion of the DEEP program to include the sampling of waste material from Waste Pits 5 and 6. The sampling project, performed in July, 1995, was necessary to provide critical thermal dryer design information necessary for successful remediation of waste from pits 5 and 6. A total of 40 waste samples were obtained by the use of a large crane which lowered an air powered sampling device into the waste pits. The project commenced and was completed in July, 1995.

Because "wet excavation" removal of the waste pit contents would present difficult excavation challenges, the DEEP field program also contains a phase designed to evaluate the horizontal and vertical location and extent of the waste pit water zones, plus a determination of the best method(s) to be used to remove the waste pits' water contents. This phase, Dewatering, Phase III, will provide information on the approximate amount of water in each pit, and the best way to recover and remove this water. The Dewatering phase began in July, 1995, and is expected to be completed sometime in the Fall, 1995.

Following Dewatering Phase III, the final phase, Ramp and Pad Excavation will commence. This phase will consist of the construction of two surface excavations and access ramps. These will be located where the prior Dewatering phase has already removed the pit water. During Ramp and Pad Excavation the soil cap material will be removed from a portion of the waste pits, temporarily stored on a pad adjacent to the excavation, and following this, excavation of the pit contents will begin. Information obtained during excavation will help identify the nature of the waste, the best waste excavation method(s) and equipment to be used during actual excavation of the pit waste. Ramp and Pad Excavation will begin in August, 1995, and is scheduled for completion in September, 1995.

Affected Waste Pit 1, 2, and 3 surfaces will be graded prior to excavation to control surface water runoff. In addition, dust controls will be in place, and perimeter monitors will be located to monitor for possible emissions which may be generated during excavation. Personnel performing the testing will wear appropriate personal protective clothing. Personnel will also be equipped with personal monitoring detectors to alert personnel to possible radiological constituents which may be released into the air during excavation. The integrity of the waste pit liners will not be compromised by this program.

The waste pits will be filled and returned to their original state as soon as all necessary field samples and other information are completed. All pit locations where vegetation has been disturbed will be revegetated to reduce cap erosion. No reclamation is necessary for Waste Pits 5 and 6.

If you have any questions about the testing that will occur as part of the DEEP Program, please call Gary Stegner with DOE's Public Information Office at (513) 648-3153.

Fernald Environmental Glossary

This fact sheet has been prepared as part of the effort to familiarize the public with the specific vocabulary used in discussions about environmental restoration and waste management at Fernald.

ALARA - As Low As Reasonably Achievable, or keeping radiation emissions and exposures to levels set as far below regulatory limits as is reasonably possible in order to protect public health and the environment.

alpha radiation - The most energetic but least penetrating form of radiation. It can be stopped by a sheet of paper and cannot penetrate human skin. However, if an alpha-emitting isotope is inhaled or ingested, it will cause highly concentrated local damage.

aquifer - A permeable body of rock capable of yielding quantities of groundwater to wells and springs.

AR - Administrative Record, a required, comprehensive file of documents that forms the basis of decisions made regarding cleanup at Fernald. It is available for public review and comment. (See **PEIC**).

ARARs - Applicable or relevant and appropriate requirements, a comprehensive set of laws and regulations that are relevant to guide the selection of cleanup activity at a particular site.

asbestos - A strong and incombustible fiber widely used in the past for fireproofing and insulation. The small, buoyant fibers are easily inhaled or swallowed, causing a number of serious diseases including: asbestosis, a chronic disease of the lungs that makes breathing more and more difficult; cancer; and mesothelioma, a cancer (specific to asbestos exposure) of the membranes that line the chest and abdomen.

atom - The smallest particle of an element having the chemical properties of that element; the fundamental building block of matter.

AWWT - Advanced waste water treatment

background radiation - The natural radioactivity in the environment. Natural radiation consists of cosmic rays, filtered through the atmosphere from outer space, and radiation from the naturally radioactive elements in the earth (primarily uranium, thorium, radium and potassium). Also known as natural radiation.

baseline risk assessment - (See **BRA**).

BDN - Biodenitrification, the process of breaking down nitrates into harmless elements through the use of living bacteria.

beta radiation - High-energy electrons (beta particles) emitted from certain radioactive material. Can pass through 1 to 2 centimeters of water or human flesh and can be shielded by a thin sheet of aluminum. Beta particles are more deeply penetrating than alpha particles but, because of their smaller size, cause less localized damage.

biological effects - The early or delayed results of biological damage caused by nuclear radiation (alpha, beta gamma).

biosphere - The part of the earth and its atmosphere in which living things exist.

BRA - Baseline risk assessment, the study and estimation of risk from taking no activity. Involves estimates of probability and consequence.

carcinogen - A cancer-causing agent.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund), the federal law that guides cleanup of hazardous waste sites.

CFR - Code of Federal Regulations

characterization - Facility or site sampling, monitoring and analysis activities to determine the extent and nature of a release. Characterization provides the basis for acquiring the necessary technical information to develop, screen, analyze, and select appropriate cleanup techniques.

CIS - Characterization investigation study

cleanup - The general term for environmental restoration, the process designed to ensure that risks to the environment and to human health and safety from waste sites either are eliminated or reduced to prescribed, safe levels.

closure plan - Documentation prepared to guide the deactivation, stabilization and surveillance of a waste management unit or facility under the Resource Conservation and Recovery Act.

conservation - The preservation of resources through efficient and careful use.

contamination - The presence of foreign materials, chemicals or radioactive substances in the environment (soil, sediment, water or air) in significant concentrations.

CRARE - Comprehensive Response Action Risk Evaluation.

CRU - CERCLA/RCRA unit, another term for the operable units at Fernald.

cubic meters - A volume equal to the volume of a cube measuring one meter in each dimension.

comment period - Time provided for the public to review and comment formally on a proposed action or decision.

community relations - The effort to establish two-way communication with the public to ensure public input into the decision-making process related to Superfund.

curie - A unit of radioactivity that represents the amount of radioactivity associated with one gram of radium. To say that a sample of radioactive material exhibits one curie of radioactivity means that the element is emitting radiation at the rate of 3.7 million times a second. Named after Marie Curie, an early nuclear scientist.

consent decree - Signed agreement between DOE and OEPA that mandate specific environmental improvements at Fernald

daughter product - An element formed by the radioactive decay of another element; often daughter products are radioactive themselves

DEs - Drum equivalents

decay - The process whereby radioactive particles undergo a change from one form, or isotope, to another, releasing radioactive particles and/or energy.

decontamination - The removal of unwanted material (typically radioactive material) from facilities, soils, or equipment by washing, chemical action, mechanical cleansing or other techniques.

defense wastes - Radioactive wastes resulting from weapons research and development, the operation of naval reactors, the production of weapons materials, the reprocessing of defense spent fuel, and the decommissioning of nuclear-powered ships and submarines.

disposal - Waste emplacement designed to ensure isolation of waste from the biosphere, with no intention of retrieval for the foreseeable future.

dioxin - One of the most hazardous of all chemicals, can cause both acute and long-term effects ranging from chloracne, a skin disease, to cancer, reproductive failures, and reduced resistance to infectious disease.

DOE - U.S. Department of Energy

DOE-FN - U.S. Department of Energy Fernald Field Office

dose - Quantity of radiation or energy absorbed; measured in rads. (See rad).

dose equivalent - A term used to express the amount of effective radiation received by an individual. A dose equivalent considers the type of radiation, the amount of body exposed, and the risk of exposure. Measured in rems. (See rem).

dosimeter - An instrument that measures exposure to radiation.

EA - A written environmental analysis that is prepared under the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require preparation of a more detailed environmental impact statement.

effluent - A waste discharged as a liquid.

electron - An elementary particle with a unit negative charge and a mass 1/1837 that of the proton. Electrons surround the positively charged nucleus and determine the chemical properties of

the atom.

EE/CA - Engineering evaluation and cost analysis

EIS - Environmental impact statement, required by the National Environmental Policy Act. (See NEPA).

element - Any of the 109 substances that cannot be broken down further without changing its chemical properties. Singly or in combination, the elements constitute all matter.

EMR - Environmental monitoring report also called the Annual Site Environmental Report

environmental restoration - The process of environmental cleanup designed to ensure that risks to the environment and to human health and safety from waste sites either are eliminated or reduced to prescribed, safe levels.

ERMC - Environmental restoration and management contractor

erosion control - Methods to control land surface features to prevent erosion by surface water or precipitation runoff.

EWMF - An engineered waste management facility, designed to store low-level radioactive wastes.

exposure - A measurement of the displacement of electrons from atoms caused by x-rays or by gamma radiation. Acute exposure generally refers to a high level of exposure of short duration; chronic exposure is lower-level exposure of long duration.

FEMP - Fernald Environmental Management Project, the name given Fernald when its missions was transferred from weapons production to environmental restoration

FERMCO - Fernald Environmental Restoration Management Corporation, the contractor selected in August 1992 to clean up Fernald

FFCA - Federal Facility Compliance Agreement, an agreement signed in 1986 between DOE and U.S. EPA; predates the Consent Agreement and the Amended Consent Agreement.

final disposition - Methods for permanent disposal of waste or contaminated media residuals following excavation/treatment.

fission - The splitting of a heavy nucleus into two or more radioactive nuclei, accompanied by the emission of gamma rays, neutrons and a significant amount of energy. Fission usually is initiated by the heavy nucleus absorbing a neutron, but it also can occur spontaneously.

FMPC - Feed Materials Production Center, the name of Fernald until 1991

FR - Federal Register

FRESH - Fernald Residents for Environmental Safety and Health

friable asbestos - Asbestos insulation that is loose and capable of becoming airborne.

FS - Feasibility study, the Superfund study following a remedial investigation which identifies, develops, evaluates and selects remedial action alternatives.

gamma rays - Penetrating electromagnetic waves or rays emitted from nuclei during radioactive decay, similar to x-rays. Dense materials such as concrete and lead are used to provide shielding against gamma radiation.

geohydrologic - Pertaining to groundwater and its movements through the geologic environment.

geohydrology - The science dealing with underground water, often referred to as hydrogeology.

groundwater - Waste beneath the earth's surface that fills pores between materials such as sand, soil or gravel. Groundwater is a major source of water for agricultural and industrial purposes and is an important source of drinking water for about half of all Americans.

half-life - The time required for a radioactive substance to lose 50 percent of its activity by decay. The half-life of the radioisotope plutonium-239, for example, is about 24,000 years. Starting with a pound of plutonium-239, in 24,000 years there will be one-half pound of plutonium-239, in another 24,000 years there will be one-fourth pound, and so on. (A pound of material remains, but it gradually becomes a stable element.)

hazardous waste - A solid waste or combination of solid wastes that, because of quantity, concentration or physical, chemical or infectious characteristics, may cause or significantly contribute to an increase

in mortality or an increase in serious, irreversible, or incapacitating reversible illness or pose a substantial hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise managed. About 290 million tons of hazardous wastes are generated in the United States each year. A small percentage (about 4 percent) is recycled. The rest is treated, stored or disposed. Of the hazardous wastes disposed, most are injected as a liquid into the ground in specially designed injection wells. A large quantity is placed in surface impoundments (pits, ponds and lagoons). A small portion is placed directly on the land or buried.

heavy metals - Metals that are dense. Examples include mercury, lead, silver, gold and uranium.

HEPA - High-efficiency particulate air

high-level radioactive wastes - Highly radioactive material, containing fission products, traces of uranium and plutonium, and other transuranic elements, that results from chemical reprocessing of spent fuel. Originally produced in liquid form, high-level waste must be solidified before disposal.

ion - Atomic particle, atom or chemical radical bearing an electric charge, either negative or positive.

ionization - Removal of electrons from an atom, for example, by means of radiation, so that the atom becomes charged.

ionizing radiation - Radiation that has enough energy to remove electrons from substances it pass through, forming ions.

isotopes - Atoms of the same element that have equal numbers of protons, but different numbers of neutrons. Isotopes of an element have the same atomic number by different atomic mass. For example, uranium-238 and uranium-235.

leachate - The solution formed when soluble components have been removed from a material.

leaching - To remove a soluble substance from a material by dissolving it in a liquid, and then removing the liquid from what is left.

LLW - Low-level waste, discarded radioactive material such as rags, construction rubble, glass, etc., that is only slightly or moderately contaminated. This waste usually is disposed of by land burial.

MCL - maximum contaminant level

millirem - A unit of radiation dosage equal to one-thousandth of a rem. A member of the public can safely receive up to 500 millirems per year, according to federal standards, but the U.S. EPA ordinarily limits public exposure to 25 to 100 mrem/year.

mixed waste - Contains both radioactive and hazardous components.

mobility - The ability of radionuclides to move through food chains in the environment.

monitoring well - A hole drilled into the ground with a pipe inserted to allow for the collection of groundwater samples.

natural radiation - Radiation that is always present in the environment from such sources as cosmic rays and radioactive materials in rocks and soils. Also known as background radiation.

NCP - National Oil and Hazardous Substances Pollution Contingency Plan

NEPA - National Environmental Policy Act, requires a study of the impacts of activities at federal facilities.

neutron - A particle that appears in the nucleus of all atoms except hydrogen. Neutrons are one of three basic particles that make up the atom. Neutrons have no electrical charge.

NLO - National Lead of Ohio, Inc., the company that operated Fernald from 1951 until 1986

NOA - Notice of availability, published when a document on some aspect of Fernald cleanup is issued. Documents are available in the administrative record and public reading room.

NOV - Notice of violation

NPDES - National Pollutant Discharge Elimination System

NPL - National Priorities List, the list of the nation's worst Superfund sites. Fernald was added in 1989.

NRC - Nuclear Regulatory Commission

NTS - Nevada Test Site, a repository for radioactive wastes.

nuclear radiation - Ionizing radiation originating in the nuclei of atoms; alpha, beta, and gamma radiation.

nucleus - The central part of an atom that contains protons, neutrons and other particles.

OEPA - Ohio Environmental Protection Agency

OSHA - Occupational Health & Safety Act

OU - Operable unit, or area of study that contains similar characteristics or problems. There are five operable units at Fernald.

pathways - The means by which contaminants move. Possible pathways include air, surface water, groundwater, plants and animals.

PCB - Polychlorinated biphenyl, a synthetic, organic chemical once widely used in electrical equipment, specialized hydraulic systems, heat transfer systems, and other industrial products. Highly toxic and a potent carcinogen. Any hazardous wastes that contain more than 50 parts per million of PCBs are subject to regulation under the Toxic Substances Control Act.

PEIC - Public Environmental Information Center, 10845 Hamilton-Cleves Highway, Harrison, Ohio 45030, which houses the administrative record and the public reading room. The phone number is 513-738-0165.

PEIS - Programmatic environmental impact statement, being conducted nationally by DOE.

picocuries - Measurement of radioactivity. A picocurie is one million millionth, or a trillionth, of a curie, and represents about 2.2 radioactive particle disintegrations per minute.

plume - A defined area of groundwater containing contamination that originates from a particular source such as a waste unit.

plutonium - An artificially produced element that is fissile and radioactive. It is created when an atom of uranium-238 captures a slow neutron in its nucleus.

PP - Proposed plan, a CERCLA document on which the public comments that summarizes what cleanup remedy has been selected, and why.

RA - Risk assessment, the study and estimation of risk from a current or proposed activity. Involves

estimates of the probability and consequence of an action.

rad - Radiation absorbed dose, a measurement of ionizing radiation absorbed by any material. A rad measures the absorption of a specific amount of work (100 ergs) in a gram of matter.

radiation - Fast particles and electromagnetic waves emitted from the nucleus of an atom during radioactive disintegration.

radioactive - Giving off, or capable of giving off, radiant energy in the form of particles (alpha or beta radiation) or rays (gamma radiation) by the spontaneous disintegration of the nuclei of atoms. Radioisotopes of elements lose particles and energy through the process of radioactive decay. Elements may decay into different atoms or a different state of the same atom.

radioactive waste - A solid, liquid or gaseous material of negligible economic value that contains radionuclides in excess of threshold quantities except for radioactive material from post-weapons-test activities.

radioisotope - An unstable isotope of an element that eventually will undergo radioactive decay (i.e., disintegration). Radioisotopes with special properties are produced routinely for use in medical treatment and diagnosis, industrial tracers, and for general research.

radionuclide - A radioactive species of an atom.

radon - A radioactive gas produced by the decay of one of the daughters of radium. Radon is hazardous in unventilated areas because it can build up to high concentrations and, if inhaled for long periods of time, may cause lung cancer.

RCRA - Resource Conservation and Recovery Act, the federal environmental law designed to account for and ensure proper management of hazardous wastes, from creation to disposition

rem - Roentgen equivalent man, a unit used in radiation protection to measure the amount of damage to human tissue from a dose of ionizing radiation. Incorporates the health risks from radiation.

remedial action - Long-term cleanup activities

remedial design - A phase of remedial action that follows that remedial investigation/feasibility study

and includes development of engineering drawings and specifications for a site cleanup.

remediation - Those activities performed to remove or treat hazardous waste sites or to relieve their effects.

removal action - Interim cleanup activities that are identified as needed to protect public health and the environment

restoration - (See **environmental restoration**)

RI - Remedial investigation, the CERCLA process of determining the extent of hazardous substance contamination and, as appropriate, conducting treatability investigations.

RI/FS - Two distinct, but related studies, the remedial investigation and feasibility study. Together, they characterize environmental problems and outline remedial actions to solve those problems.

Risk assessment - (See **RA**)

risk communication - The exchange of information about health or environmental risks between risk assessors, risk managers, the general public, news media, interest groups, etc.

risk management - The process of evaluating alternative regulatory and non-regulatory responses to risk and selecting among them. The selection process necessarily requires the consideration of legal, economic and social factors.

ROD - Record of decision, a written decision that identifies the selected method for long-term cleanup of contamination at a site

SARA - Superfund Amendments and Reauthorization Act

scoping - In CERCLA, scoping is the initial planning phase of the cleanup process, when requirements are discussed and the projects defined. In the NEPA process, scoping relates to public involvement to help identify significant issues early so that efforts can be focused on those areas requiring resolution and to present a balanced environmental impact statement.

sludge - A semi-solid residue from any of a number of air or water treatment processes. Sludge can be a hazardous waste.

slurry - A watery mixture of insoluble matter that results from some pollution control techniques.

Superfund - The program operated under the legislative authority of CERCLA and SARA that funds and carries out the EPA solid waste emergency and long-term removal remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority level on the list, and conducting and/or supervising the ultimately determined cleanup and other remedial actions.

solidification - The conversion of either liquid or loose hazardous waste into a solid.

solubility - A measure of how much of a given substance will dissolve in a liquid. Usually measured in weight per unit volume.

somatic effects - Effects of radiation limited to the exposed individual, as distinguished from genetic effects, which also affect subsequent, unexposed generations.

stable isotope - An isotope of an element that is not radioactive.

SWCR - Site-wide characterization report

thorium - A naturally-occurring radioactive element

threshold dose - The minimum dose of radiation that will produce a detectable effect.

toxic - Relating to a harmful effect by a poisonous substance on the human body by physical contact, ingestion or inhalation.

toxicology - The science that deals with poisons and their effects on plant, animal and human life.

transuranic wastes - Waste materials contaminated with isotopes above uranium in the periodic table. Transuranic waste is long-lived, but only moderately radioactive.

treatment - Any activity that alters the chemical or physical nature of a waste to reduce its toxicity or prepare it for disposal.

uranium - The heaviest element found in nature. Approximately 997 out of every 1000 uranium atoms are uranium-238. The remaining 3 atoms are the fissile uranium-235. The uranium-235 atom splits, or fissions, into lighter elements when its

nucleus is struck by a neutron.

U.S. EPA - United States Environmental Protection Agency, sometimes referred to as EPA.

UST - Any underground storage tank or associated piping containing hazardous materials.

vitrification - A method of immobilizing waste that produces a glass-like solid that permanently captures the radioactive materials.

VOCs - Volatile organic compounds, chemicals that contain carbon and commonly also contain hydrogen, oxygen and other elements. The prefix "volatile" means that the compound evaporates rapidly. Most industrial solvents are volatile. Found in some liquid and air waste releases.

WAC - Waste Acceptance Criteria

waste minimization - Employing new techniques to reduce the amount of hazardous and radioactive wastes generated to as low a level as possible.

WEMCO - Westinghouse Environmental Management Company of Ohio, the contractor who ran Fernald from 1986 until December 1, 1992. Formerly WMCO, for Westinghouse Materials Company of Ohio.

x-rays - Electromagnetic radiations used in medical diagnosis; a penetrating electromagnetic radiation, usually generated by accelerating atoms to high velocity and suddenly stopping them by collision with a solid body.

Concentration Comparisons

Parts per million:

- One automobile in bumper-to-bumper traffic from Cleveland to San Francisco
- One drop of gasoline in a full-size car's tankful of gas
- One facial tissue in a stack taller than the Empire State Building
- One pancake in a stack four miles high

Parts per billion:

- One silver dollar in a roll of silver dollars stretching from Detroit to Salt Lake City

- One kernel of corn in enough corn to fill a 45-foot-silo, 16 feet in diameter

- One sheet in a roll of toilet paper stretching from New York to London

Parts per trillion:

- One square foot of floor tile on a kitchen floor the size of Indiana
- One drop of detergent in enough dishwater to fill a train load of railroad tank cars 10 miles long
- One mile on a two-month journey at the speed of light

Parts per quadrillion:

- One postage stamp on a letter the size of California and Oregon combined
- The palm of one's hand resting on a table the size of the United States
- One human hair out of all the hair on all the heads of all the people in the world
- One mile in a journey of 170 light years

Sources:

- *Glossary of Environmental Restoration Terms and Acronym List* (EPA/OPA-87-017, August 1988)
- *Glossary of Environmental Restoration* (DOE, Office of Environmental Restorations and Waste Management, Oak Ridge Operations, October 1990 and October 1991)



Overview of Proposed Site Treatment Plans

U.S. Department of Energy

March 31, 1995

For more than 40 years, the United States has produced materials for nuclear weapons, operated and conducted research on nuclear reactors, and performed various nuclear experiments on reactor equipment. These activities generated both radioactive and hazardous wastes. The Department of Energy (DOE) is faced with the challenge of managing these wastes.

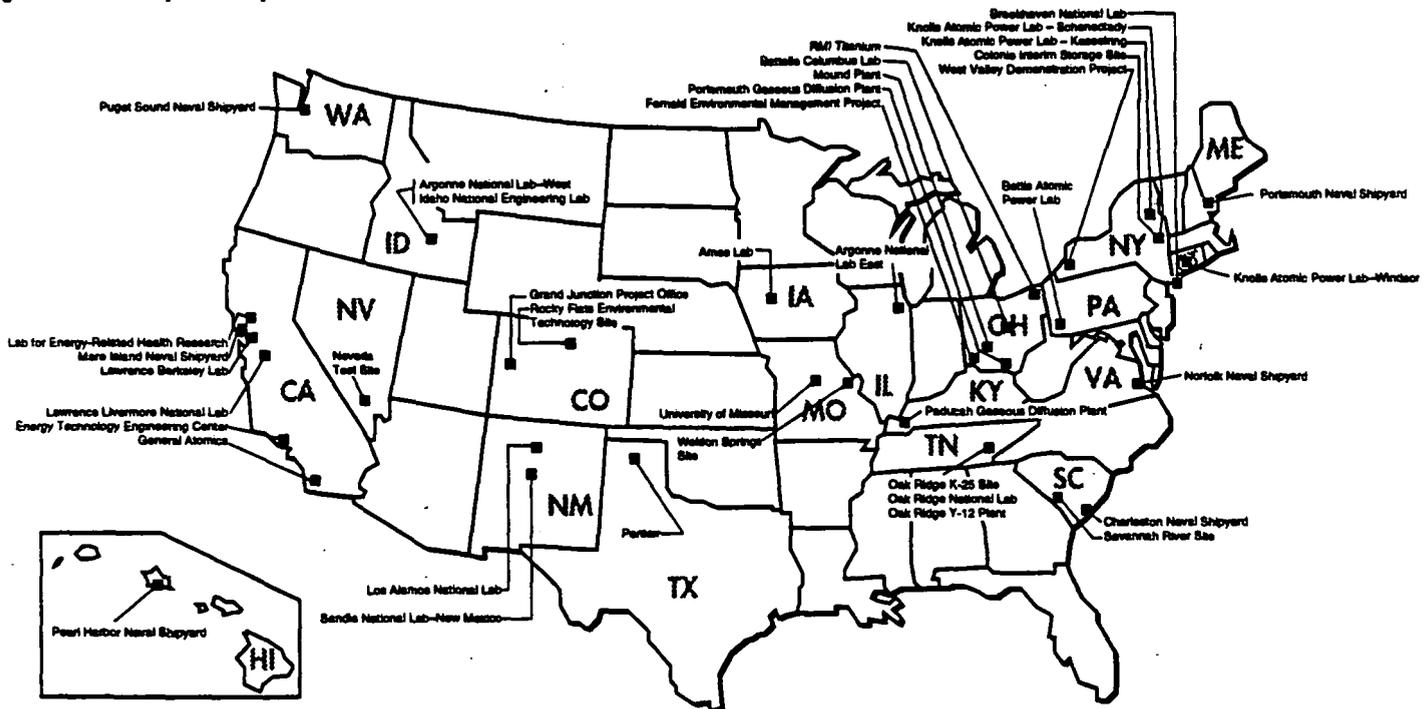
Waste that contains both a hazardous and radioactive component is identified as "mixed waste." Mixed waste can be categorized as high-level waste (HLW), mixed-transuranic waste (MTRU), or mixed low-level waste (MLLW). The management of this waste is particularly challenging to the Department. Currently, there is insufficient capacity, and in some cases a lack of available technologies, to treat these wastes to the standards required by the Resource Conservation and Recovery Act (RCRA).

DOE has prepared Site Treatment Plans to provide mixed waste treatment capacity for 40 sites in 20 States, the locations

of which are shown in Figure 1. Since the passage of the FFC Act, the status of mixed waste at nine sites has changed; and, as such, these sites are no longer required to submit Site Treatment Plans. This Overview describes the process used by the sites to prepare the Proposed Site Treatment Plans and summarizes the locations, costs, and schedules for the treatment identified in these Plans.

DOE is facing increasingly uncertain funding and anticipates that funding will be even more constrained in the future. The treatment and facility schedules contained in the Proposed Site Treatment Plans reflect funding constraints as they are currently understood. DOE has invited the regulatory agencies and other stakeholders to participate in developing the Environmental Management program budget and priorities. This interaction will improve the way DOE does business and help to develop an effective Environmental Management program that uses resources wisely.

Figure 1. DOE Prepared Proposed Site Treatment Plans for 40 Sites in 20 States



The Federal Facility Compliance Act

The Federal Facility Compliance Act of 1992 (FFCA) requires the Secretary of Energy to develop and submit Site Treatment Plans for the development of capacity and technologies for treating mixed waste. A Plan is required for each facility at which DOE stores or generates these wastes. These Plans identify how DOE will provide the necessary mixed waste treatment capacity, including schedules for bringing new treatment facilities into operation.

The FFCA amends the Resource Conservation and Recovery Act (RCRA), the law that defines requirements for the management of hazardous waste. RCRA contains specific restrictions on the land disposal of hazardous waste, including treatment standards that must be met prior to disposal or storage. In general, DOE sites that store mixed waste are not in compliance with these land disposal restrictions because of the lack of capacity for treating mixed waste.

The FFCA also subjects Federal facilities to fines and penalties for violations of RCRA. However, DOE is not subject to fines and penalties for violations of the RCRA land disposal restrictions for mixed waste until after October 6, 1995.

DOE has followed a three-phased approach for developing its Site Treatment Plans. The National Governors' Association (NGA), through a cooperative agreement with DOE, has coordinated representatives from 20 States and the U. S. Environmental Protection Agency (EPA) to

assist the DOE sites in evaluating the candidate treatment options and developing mixed waste treatment plans.

In the first phase of this process, the Conceptual Site Treatment Plans were submitted by DOE sites to their State/Federal regulating agency in October 1993. They identified the broad range of options available to treat DOE's mixed waste.

In the second phase, the Draft Site Treatment Plans narrowed the range of treatment options and presented the individual sites' proposed options for their mixed waste. These Draft Site Treatment Plans were submitted to the States and EPA in August 1994.

DOE has now completed the third phase and submitted Proposed Site Treatment Plans to the State and Federal regulators in March 1995. DOE submitted these Plans to the state regulatory agency (or to the EPA, as appropriate) for approval, approval with modification, or disapproval. Approved Plans will be enforced through Compliance Orders, which are expected to be issued by the regulating agencies by October 6, 1995.

The Proposed Site Treatment Plans contain the treatment configuration that resulted from discussions among the States, EPA, Tribal governments and the public, and from DOE's evaluation of its treatment needs. Now that these Proposed Site Treatment Plans have been submitted, further discussions will take place to work toward the treatment configuration and schedules that will be enforced through the Compliance Orders.

Overview of the Proposed Site Treatment Plans

This Overview presents a summary of the complex-wide treatment configuration resulting from the options presented in the

Definitions

Mixed Waste: Mixed waste is waste that contains both hazardous waste and radioactive material (source, special nuclear, or by-product material as regulated by the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.]). Mixed waste is classified by DOE according to the type of radioactive waste that it contains as either mixed low-level waste (MLLW), or mixed transuranic waste (MTRU). DOE's high-level waste (HLW) is assumed to be mixed waste because it contains hazardous components or exhibits the characteristic of corrosivity.

Low-Level Waste: Low-level waste (LLW) is radioactive material that is not classified as high-level waste, TRU waste, spent fuel, or uranium or thorium mill tailings.

Transuranic Waste: Transuranic waste (TRU) refers to radioactive materials contaminated with greater than 100

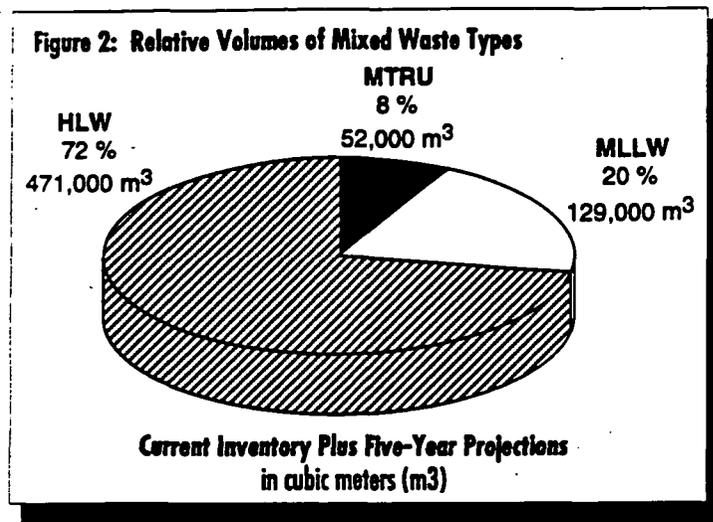
nanocuries per gram of alpha-emitting radionuclides with half-lives greater than 20 years.

High-Level Waste: High-level waste (HLW) is highly radioactive material containing fission products, traces of uranium and plutonium, and other transuranic elements, that result from chemical processing of spent nuclear fuel.

Life Cycle Cost: The life cycle cost is the sum total of costs estimated to be incurred in the design, development, production, operation, maintenance, support, and final disposition of a major system over its anticipated useful life span.

Constant Dollars: Constant dollars are a unit of cost measurement in which the current value of the dollar is assumed to remain unchanged in the future. Constant dollars in this Overview use fiscal year 1994 as the current dollar value.

Proposed Site Treatment Plans. As shown in Figure 2, 72 percent of DOE's mixed waste is high-level waste (HLW), 20 percent is mixed low-level waste (MLLW), and 8 percent is mixed transuranic (MTRU).



Although the majority of DOE's mixed waste (51 percent) is located at the Hanford site in Washington, the site did not prepare a Site Treatment Plan. Because the Hanford site had an agreement in place with its regulators for treating its mixed waste, it was not required by the FFCAct to prepare a Site Treatment Plan. Some sites preparing Site Treatment Plans are, however, proposing Hanford facilities for the treatment of their wastes. Therefore, Hanford wastes and facilities are included in this Overview.

The Proposed Site Treatment Plans are consistent with the current strategies being developed for the treatment of DOE's HLW. HLW is managed at four sites (the Hanford site in Washington, the Savannah River site in South Carolina, the West Valley Demonstration Project in New York, and the Idaho National Engineering Laboratory in Idaho). HLW will only be transported from these sites as a stable solid waste form ready for disposal.

The Proposed Site Treatment Plans are also consistent with DOE's current policy that defense related MTRU waste will be disposed at the Waste Isolation Pilot Plant (WIPP) using the No Migration Variance and will not require treatment to meet the land disposal restriction standards. The Proposed Site Treatment Plans identify the characterization and processing of MTRU waste required to meet the WIPP Waste Acceptance Criteria. The Proposed Site Treatment Plans also include options for treatment of non-defense MTRU waste to meet the land disposal restrictions. However, they recognize the need for modifications if there are variations in the WIPP disposal requirements.

The Draft Site Treatment Plans presented site-preferred MLLW treatment options and, when viewed from a national level, contained redundancies and inefficiencies. In developing the Proposed Site Treatment Plans, an evaluation was performed to determine what accommodations were necessary to blend the configuration presented in the Draft Site Treatment Plans into a national configuration of treatment systems. Because there are existing strategies to address HLW and MTRU, the focus of this evaluation was on identifying the facilities and locations to treat MLLW to land disposal restriction standards. However, specific treatment technologies have not been identified for some of those facilities. Treatment technologies are being evaluated and will be identified through implementation of the Plans and through further discussions with the States, EPA, Tribal governments, and the public.

To facilitate this evaluation, a team was established comprised of site representatives and members of the DOE Headquarters FFCAct Task Force. The team coordinated their efforts with the States through the National Governors' Association to ensure that both the States' and DOE's values were considered in developing the national mixed waste treatment configuration.

The resulting Proposed Site Treatment Plans (plus Hanford) identify on-site treatment for 95 percent of the total mixed waste volume. Over 76 percent of DOE's MLLW would be treated on site, with 98.4 percent of DOE's MLLW being treated in the State where it is stored or generated. Only 2,100 cubic meters of MLLW (1.6 percent of the total DOE MLLW volume) is proposed for treatment out-of-State. The majority of that waste (1,950 cubic meters) would be sent to Idaho and Tennessee. Approximately 22 percent of the total MLLW volume does not yet have a specified treatment location, primarily due to the examination of commercial treatment options, the locations of which have not yet been determined. An additional small volume of waste with an unspecified treatment location requires additional characterization before a treatment location can be identified. Table 1 presents the volumes of MLLW that would be treated in-State, in new or existing systems, and where wastes being shipped out of State would be treated.

The total life-cycle cost for treating mixed waste identified in the Proposed Site Treatment Plans, plus mixed waste treatment at the Hanford site, is estimated at \$50.3 billion in fiscal year 1994 constant dollars. Approximately 85 percent of the total cost (\$42.7 billion) is for the treatment of HLW. MTRU and MLLW account for 7 percent and 8 percent of the total cost, respectively. These cost estimates do not reflect anticipated savings achieved through improvements in operations. As the

sites identify specific opportunities for improvements, cost estimates will be refined.

The largest new costs resulting from the Proposed Site Treatment Plans are for 15 major new treatment facilities, each with an estimated life cycle cost of greater than \$50 million (constant dollars). The Hanford site is also proposing new major treatment facilities; however, these facilities are covered under an existing agreement and do not represent new funding commitments.

Excluding Hanford, the 15 major treatment facilities account for approximately 93 percent of the total cost of proposed new facilities and would treat 82 percent of the mixed waste proposed for treatment in new facilities. Large MLLW facilities are proposed at Idaho National Engineering Laboratory, Rocky

Flats, Savannah River, and Lawrence Livermore National Laboratory, plus new commercialized treatment facilities being examined by the Oak Ridge site. Major MTRU facilities are proposed at Oak Ridge, Savannah River, Idaho National Engineering Laboratory/Argonne-West, and Los Alamos National Laboratory. A HLW facility is proposed at the Idaho National Engineering Laboratory.

The current funding assumptions used to prepare the Proposed Site Treatment Plans differ from those used during the first two years of the Site Treatment Plan development process. Under the currently projected funding targets, schedules in the Proposed Site Treatment Plans for some facilities, particularly the largest and most costly facilities, are significantly delayed compared to schedules in the Draft Plans. Treatment schedules for small sites that rely on the capacity at these larger sites

Table 1. Mixed Low-Level Waste Treatment by State
Waste Volumes in Cubic Meters—Current Inventory Plus Five-Year Projections

STATE	DOE WASTE TREATED IN STATE		STATES RECEIVING WASTE FROM OUT-OF-STATE DOE SITES								TREATMENT LOCATION NOT SPECIFIED	TOTAL
	In Existing Systems	In New Systems	FL	ID	NM	SC	TN	TX	UT	WA		
California	1,990.2	83.1		179.3			0.7			33.2	33.3	2,319.8
Colorado	1,887.9	15,428.8		157.2				90.0			0.0*	17,563.9
Connecticut				5.1		3.6				4.3		13.0
Hawaii				0.1				16.0		4.5		20.6
Iowa								0.2		0.0*		0.2
Idaho	633.3	26,002.3									2.2	26,637.8
Illinois	16.2	131.2						3.1				150.5
Kentucky	8.4	85.7						320.5			617.7	1,032.3
Maine							0.0*			2.3		2.3
Missouri	1,960.5							61.5		1.8		2,023.8
New Mexico	56.2	197.4						18.4			401.1	673.1
Nevada			0.3								297.8	298.1
New York	6.0	0.6		30.7			9.3	9.0	1.7	5.7	8.9	166.9
Ohio	1,249.9	12,744.4		11.5				962.7		8.8	13.3	15,266.1
Pennsylvania				13.8			2.0					15.8
South Carolina	7,802.9	5,664.5		7.9	0.8						491.8	13,967.9
Tennessee	3,531.4	2,519.1									26,200.9	32,251.4
Texas	70.6	774.8										845.4
Virginia				9.8			2.1					11.9
Washington		15,904.6		19.0				36.0				15,959.6
STATE TOTALS	19,213.5	79,536.5	0.3	434.4	0.8	17.0	1,518.1	1.7	14.5	68.3	28,415.3	129,220.4

* Waste Volume < 0.05 m³

are also affected. DOE is providing its State and Federal regulators, as well as other interested parties, an opportunity to participate in prioritizing its Environmental Management activities, including mixed waste treatment, in support of fiscal year 1997 budget development. DOE expects that for some sites further discussion with the State and Federal regulators concerning priorities will result in modified schedules in the approved Plans. For example, schedules in the Proposed Site Treatment Plans for the MTRU treatment facilities are not currently integrated with the schedule for opening and closing WIPP, and discussions with the regulators and the public may result in changes to these schedules.

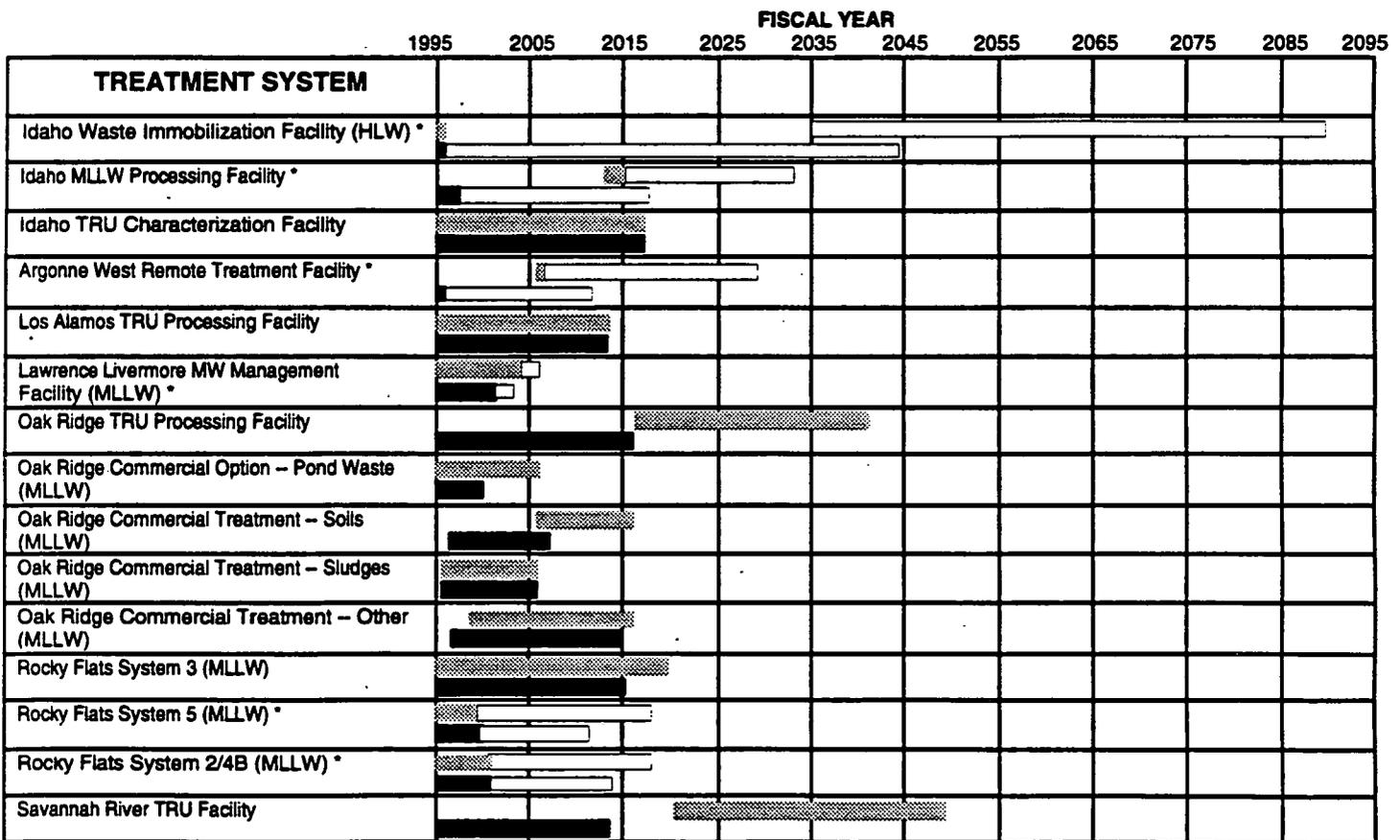
Figure 3 shows the schedules in the Proposed Site Treatment Plans, constrained by current Waste Management program funding targets, for the 15 major new treatment facilities and the schedules that the sites were considering prior to the projected funding limitations. Although the majority of the sched-

ule changes occur for the major new facilities, schedules for some of the smaller facilities have also been delayed. Excluding Idaho's Waste Immobilization Facility, which would not complete treatment until the year 2088, treatment in the 15 large facilities would be completed by 2050.

For waste for which treatment technology does not exist, the FFCAct requires schedules for research and development, rather than schedules for treatment, to be included in the Plans. Projected post-research and development schedules are shown in Figure 3 for comparison and planning purposes, but are not part of the Proposed Site Treatment Plans, and may change as a result of research and development activities. The Proposed Site Treatment Plans for the following facilities include only schedules for research and development activities:

- Idaho Waste Immobilization Facility
- Idaho MLLW Waste Processing Facility

Figure 3. Proposed Site Treatment Plan Schedules
Comparison of PSTP Schedules with Previous Draft Schedules



* Facilities to treat wastes needing technology development; schedules include R&D only. Other facility schedules include planning, design, construction, and operation.

▨ Proposed Site Treatment Plan Schedule ■ Previous Draft Schedule □ Projected Post-R&D Schedule

- Argonne-West Remote Treatment Facility
- Lawrence Livermore Mixed Waste Management Facility
- Two Rocky Flats Facilities: System 5 and System 2/4B

The Proposed Site Treatment Plans for some additional sites' new facilities will follow this same research and development scheduling approach, but are not among the 15 major new facilities.

Implementation of the Site Treatment Plans

Once the Site Treatment Plans are approved, the FFCAct requires the regulatory agencies to issue Orders requiring compliance with the Plans. In view of its significant funding limitations, DOE intends to seek a process for implementing the Plans that provides accountability, focuses resources on high priority activities, and recognizes fiscal and technical realities. One element of DOE's proposal is to establish enforceable "milestones" only for near-term activities when technical aspects and funding are more certain. The milestones would be reviewed annually with the regulatory agency to consider factors such as funding availability; the latest technical and cost information; site priorities identified through consultations among DOE, regulatory agencies, and stakeholders; new or emerging technologies; and other relevant factors, and would be revised as appropriate.

Relationship between the FFCAct and Other Initiatives

Concurrent with the FFCAct process, DOE has been pursuing two related major initiatives, the Waste Management Programmatic Environmental Impact Statement (PEIS) and the Baseline Environmental Management Report (BEMR).

DOE is undertaking a programmatic environmental impact analysis of alternative strategies for waste management activities in the Waste Management PEIS. The PEIS, being developed in accordance with the provisions of the National Environmental Policy Act, will include an evaluation of the potential environmental impacts of waste management activities at a broad level. The draft PEIS is scheduled to be released in May 1995 and finalized in late 1995.

The other related major initiative is the Baseline Environmental Management Report. The Report, developed in response to a Congressional requirement, will address the environmental liabilities of the DOE complex and provide an estimated cost for all DOE Environmental Management activities. The Report reflects the activities that DOE field offices currently ex-

pect to carry out and alternative cases developed by DOE showing the potential cost variations from four key factors: future land use, scheduling, technology development, and the waste management configuration. The Report was submitted to Congress at the end of March 1995.

The FFCAct efforts address only mixed waste treatment within the Waste Management program. The Programmatic Environmental Impact Statement, although also evaluating the Waste Management program, has a broader perspective in that it addresses five different waste types and treatment, storage, and disposal alternatives for those waste types. The Baseline Environmental Management Report is broader still, addressing all of the Environmental Management programs, including Compliance, Waste Management, Environmental Restoration, Technology Development, and Nuclear Material and Facility Stabilization. By estimating total life-cycle costs for Environmental Management programs, including costs of environmental liabilities and regulatory commitments, the Baseline Environmental Management Report highlights the challenges facing DOE in managing its wastes, cleaning up its contaminated property, considering future land use, and budgeting resources to meet these challenges.

Disposal

Established processes are being implemented by DOE for studying, designing, constructing, and ultimately operating disposal facilities for HLW and MTRU wastes (specifically the HLW repository in Nevada, and the Waste Isolation Pilot Plant in New Mexico).

Although the FFCAct does not require DOE to address disposal of treated mixed waste, both DOE and the States recognized that disposal issues are an integral part of mixed waste management activities. Currently there are no active permitted mixed waste disposal facilities operated by DOE for disposal of residuals from the treatment of MLLW. Through the Site Treatment Plan development process, DOE and State and Federal regulators have formed working groups to evaluate issues related to disposal of treated MLLW. These workgroups have defined criteria to evaluate the sites subject to the FFCAct in order to identify sites that may be suitable for disposal of these residuals. Evaluation of these facilities and determination of potential disposal locations is continuing. A description of the disposal process and its status is included in the individual site Proposed Site Treatment Plans.

Next Steps

The Proposed Site Treatment Plans have been submitted to the State/EPA regulators for their approval, approval with modification, or disapproval. The regulators are expected to issue Orders requiring compliance with the Plans by October 6, 1995. As discussions among DOE, its regulators, Tribal governments, and the public continue, it is expected that modifications and improvements will be made to the treatment configuration and schedules described in the Plans.

DOE intends to continue its dialogue with the State/EPA regulators in working to finalize the Plans, leading to issuance of the Compliance Orders. To ensure that the FFCAct process moves forward and that common goals are attained, DOE anticipates that the following steps will be taken in the near term:

- Determine, with the States, EPA, Tribes, and the public, the priorities of the Environmental Management program at each site.
- Revise facility schedules to reflect these priorities and funding limitations.
- Continue a cooperative process under the FFCAct beyond the release of the Proposed Site Treatment Plans to build on the progress that has been made to date.

In the long-term, the current process should evolve into a new way of doing business that consists of open communication with the regulators on both a local and national level, joint resolution of issues, and working toward common goals. Much work must still be done to address challenging issues such as implementation, funding, prioritization, and equity. However, there is a solid process in place to move forward through cooperation and regular communication between DOE, its regulators, and the public,

General information on a site's Proposed Site Treatment Plan, locations of DOE reading rooms where the Plans may be viewed, and addresses of regulators to whom comments on specific Plans should be sent, can be obtained from the Center for Environmental Management Information at 1-800-7EM-DATA (1-800-736-3282).

Additional information about the FFCAct may also be obtained electronically through the FFCAct Bulletin Board on the Internet at <http://eagle.haz.ornl.gov/ffcabb/ffcmain.html>.

Comments on DOE's Proposed Site Treatment Plans will be considered by the appropriate regulatory agency in reviewing the Plans. Written comments on the Plans should be sent to the State/Federal recipients by July 6, 1995.

FERNALD REPORT

JULY 27, 1995

Fernald Citizens Task Force to Present Final Report and Recommendations At August 1 News Conference

During a regular monthly meeting on July 8, the Fernald Citizens Task Force unanimously revised and approved its final report, which contains the group's formal recommendations regarding environmental remediation of the Fernald Environmental Management Project. During a news conference on August 1, Fernald Citizens Task Force Chair John Applegate will present the final report to representatives of DOE, U.S. EPA, Ohio EPA, FERMCO and the local media.

The news conference will be held from 4 p.m. to 7 p.m., at the Meadowbrook, in Ross. Representing DOE Headquarters, Office of Public Accountability Director Cindy Kelly will formally receive the task force's final report. The final report will also be mailed to local stakeholders and other interested parties.

During DOE's community meeting on August 8, Applegate will discuss the task force's final report. The community meeting will be held from 7 p.m. to 9 p.m. at the Plantation, Harrison.

Questions Considered by the Fernald Citizens Task Force

Chartered under the Federal Advisory Committee Act, the Fernald Citizens Task Force was established in August 1993 to provide DOE, U.S. EPA and Ohio EPA recommendations regarding the following:

- What should be the future use of the Fernald site?
- What residual risk should remain following remediation and what remediation levels should be used?
- Where should the waste be disposed?
- What should be the priorities among remedial actions?

Proposed Site Treatment Plan Public Comment Period Ended July 6

The 90-day public comment period on the Proposed Site Treatment Plan (PSTP) ended July 6. The PSTP is required by the Federal Facilities Compliance Act. It identifies preferred options for treating Fernald's mixed waste on site or at another DOE facility. The plan also lists waste from other DOE facilities coming to Fernald for treatment. Ohio EPA received comments on Fernald's PSTP from five individuals. Ohio EPA plans to address all comments received from Fernald, Portsmouth and Mound in separate responsiveness summaries. Once the responsiveness summaries are completed, they will be made available at each site's reading room. The PSTPs from all DOE sites that generate or store mixed waste are being reviewed, and orders to implement the selected treatments will be issued in October 1995.

FERMCO Sponsors August 8 Business Opportunity Exchange

On April 8, FERMCO, along with EG&G Mound Applied Technologies and West Valley Nuclear Services Co. (Westinghouse), is sponsoring this year's Business Opportunity Exchange. The Business Opportunity Exchange provides prospective suppliers opportunities for networking and serves as a forum to communicate technical requirements and current business opportunities at Department of Energy (DOE) Ohio Field Office sites. Last year, approximately 300 representatives attended.

Buyers and procurement specialists representing FERMCO, EG&G, and West Valley will discuss qualifications and subcontracting opportunities for the present and future. FERMCO will feature a display booth defining the requirements for FERMCO's credit card program, as well as a booth containing information on its Acquisition/Inquisition program. This online bulletin board system is designed to keep businesses updated on subcontracting opportunities.

Suppliers will be briefed on "How to Do Business," which will include presentations on responding to solicitations, participation in business programs, outsourcing opportunities and invoicing. Another session will provide information on "Construction Subcontracting Requirements and Opportunities." The focus will be bonding, safety and training, including future procurements with a concentration on decontamination, decommissioning, dismantling, and remodeling. The third morning session will concentrate on "Laboratory and Environmental Services." Potential subcontractors will be briefed on quality assurance, licensing, regulatory requirements, contractor qualifications and upcoming procurement opportunities.

Fernald Ships Isotope to Hanford for Medical Research

On June 21, Fernald shipped 4.4 millicuries of actinium-227, a radioactive element commonly found in pitchblende, to DOE's Hanford facility in Richland, Wash., for medical research. To comply with Department of Transportation shipping requirements, the actinium-227 was divided and packaged in six containers and shipped alone, by truck, to Hanford. It arrived safely at Hanford on June 26. Recently, Hanford scientists have been working closely with universities and the National Cancer Institute to research how to use DOE's radioactive waste as a treatment for cancer.

Through the radioactive decay process, actinium-227 produces radium isotopes. These isotopes emit powerful alpha particles which kill cancer cells without harming healthy tissue. Even though Fernald had only 4.4 millicuries of actinium-227 on site, the actinium-227 will produce about \$200 worth of radium isotopes every two to three weeks for decades. During the production years, Fernald used the actinium-227 for chemical testing.

DOE Deputy Assistant Secretary for Procurement and Assistance Management to be Keynote Speaker

The featured luncheon speaker is Richard H. Hopf III, DOE Deputy Assistant Secretary for Procurement and Assistance Management. Hopf was appointed to this position in February 1994 and is responsible for the development and implementation of Department-wide policies, procedures, programs, and systems pertaining to procurement, acquisition, financial assistance activities, personal property management, and industrial mobilization and related activities.

Registrations Due by July 28

Registration will begin at 8 a.m., with the opening session at 8:30 a.m. The exchange will be held August 8, at the Sharonville Convention Center, 11355 Chester Road, Sharonville, Ohio. Registrations will be accepted until July 28, on a first-come-first-serve basis (no on-site registration). For more information, call Gwen Jones, 648-7168, or Monica Human, 648-7148.



DOE-Nevada Representatives Audit Waste Shipping Program

From June 19 through June 28, a team of representatives from DOE-Nevada conducted an audit of Fernald's waste shipping program. A recertification audit is required by DOE-Nevada for all sites with approved applications to ship waste to the Nevada Test Site (NTS). The last Fernald audit by DOE-Nevada personnel was in July 1993. Successfully completing the audit is required to maintain approval to ship waste to NTS.

The primary sections audited were characterization, waste management, and quality assurance. A separate surveillance of laboratory acquisition was also conducted. Five corrective action reports (which require a formal response analysis) and 13 observations (which do not require a formal response but will be subject to review during the next audit) were reported. None of the findings were considered significant, and no shipments were stopped. The lead auditor recognized there has been continuous improvement since the last audit in 1993.

U.S. EPA Approves Operable Unit 1 Remedial Design Work Plan

On July 3, the final Operable Unit 1 (Waste Pits) remedial design work plan (RDWP) was submitted to U.S. EPA and Ohio EPA. U.S. EPA approved the document with no comments. Ohio EPA approved the RDWP under the condition that minor editorial or clarification comments are addressed. The final RDWP is at the Public Environmental Information Center, 10845 Hamilton-Cleves Road, Harrison (phone: 513-738-0165).

Hydrofluoric Acid (HF) Processing Complete

Since HF processing began on June 12, approximately 5,400 gallons of HF stored in the HF tank car and 668 gallons of HF residue stored in a portable tank have been successfully neutralized. Also, the HF tank car, the portable tank and a second empty tank (used to store HF during production) have been decontaminated. Decontamination was conducted to reduce residual HF contamination to a level below Resource Conservation and Recovery Act (RCRA) concern and to protect worker safety and health during handling. Neutralization and decontamination activities were completed July 21, 1995. While pumping the residues from the tank car, workers discovered the tank contained about 1,000 gallons more HF than originally anticipated. The excess HF is attributed to continued use of the tank car in 1988, during production, to receive additional HF from air-scrubbing systems.

The HF tank car project was initiated to address Fernald's remaining HF inventories. With a pH of less than 2, the HF residues are considered a RCRA corrosive waste and require neutralization prior to disposal. The rail tank car holding most of the HF is also considered a RCRA hazardous waste management unit (HWMU), requiring formal closure. Filtration and drumming of filtered solids (filter cake) from the resulting neutralized slurry were completed in Plant 8 on July 25, 1995. Drums are scheduled to be sampled before the end of July to verify the drummed filter cake meets NTS waste acceptance criteria. During the next few weeks, the tank car and empty car will be dismantled, cut in pieces, and staged until final disposition. If the cars cannot be recycled, they will be dispositioned as low-level radioactive waste and shipped to NTS. The portable tank will be maintained on site for reuse in other site projects.

Additional Wells Being Drilled in Southfield Area

Work started on June 21 to drill eight additional extraction wells in the Southfield area. The drilling is expected to be completed in December 1995. All piping and associated electrical services are anticipated to be complete in the spring of 1996. Operation of the expanded extraction well system is expected by late summer 1996.

Safe Shutdown Activities Progress Through Hot Summer Months

Identified by the Fernald Citizens Task Force as a key site priority in an April 8 recommendation to DOE, Safe Shutdown activities continue at a rigorous pace. The Safe Shutdown program's primary mission is to remove and eliminate nuclear and hazardous materials from former process buildings and equipment to minimize the potential spread of contamination and to de-energize these facilities.

The Safe Shutdown team is in the final stages of placing Plant 1 in a Safe Shutdown configuration. During the four months in Plant 1, the team had to overcome numerous obstacles -- the most challenging was July's heat wave. To avoid heat-related injuries to workers, several approaches have been used, including beginning the shift at 5 a.m.; changing workers to third shift for a while; and rotating crews continually. During Fernald's production era, Plant 1 (known as the Preparation Plant) was used to weigh, sample, and mill ore concentrates and recycled materials for distribution to other processes.

Keeping with the aggressive cleanup, Safe Shutdown will begin in Plant 9 by August 1, with a target completion by January 1996. FERMCO and DOE are developing a plan to dismantle, decontaminate, and disposition the Minimum Additive Waste Stabilization (MAWS) system, which is housed in Plant 9. The MAWS system includes soil washing, vitrification, and water treatment equipment. Plant 9 (Special Products Plant) was used to cast oversized ingots from derbies and recycled metal, and machine ingots into billets.

In preparation for Safe Shutdown activities to begin this fall in Plant 5, Waste Management personnel will begin to relocate 2,500 drums of enriched, restricted material. The drums will be moved before full-scale Safe Shutdown activities commence. Removal of holdup materials from Plant 5 is expected to take one year to complete. The main functions of Plant 5 (Metals Production Plant) were reduction of uranium tetrafluoride, commonly referred to as green salt, to produce uranium metal derbies, remelted derbies, and recycled uranium for casting into ingots.

Remediation Activities in Drum Storage Area Near Completion

On May 3, Ohio EPA approved a closure plan for the Drum Storage Area Near the lab loading dock at the Fernald site. The drum storage area is one of approximately 45 inactive HWMUs at the site, which means hazardous waste has been stored for more than 90 days, treated, or disposed in this area. According to environmental regulations, when a closure plan is approved, field activities must be completed within 180 days. In addition, a Certification of Closure must be issued within 240 days after the approved closure plan.

Activities in the drum storage area were completed on June 20, approximately five months ahead of schedule. These activities included: removing concrete paving blocks and plastic sheeting, washing the area, and sampling to verify the area is no longer contaminated. The samples are being analyzed to determine if field work on closure of the drum storage area is complete. The drum storage area is one of several HWMUs being closed at the Fernald site.

Springdale Facility Evacuated Due to Suspicious Briefcase

On July 10, a FERMCO employee discovered an unattended, suspicious briefcase on the fourth floor of the Springdale office facility. The briefcase was located in an area that is used as an accumulation point for trash for porters. The briefcase appeared to be brand new and did not have identification tags. After attempting to find the owner, the employee contacted the FERMCO receptionist. The security manager, who was notified, directed that the Springdale Police Department be called and briefed on the situation. After consulting with the Springdale police, who had arrived at the scene, as a safety precaution the security manager directed the evacuation of the Springdale facility. The security manager then learned a FERMCO employee owned the briefcase. Apparently, the employee had mistakenly left the briefcase in the trash accumulation area before attending a meeting. Once the evacuation terminated, all personnel returned to their work areas.

Fernald's Plant 2/3 Evacuated

On July 13, personnel in Plant 2/3 evacuated to the radiological control point after a single-point monitor (SPM) began alarming. Operators had begun pumping UNH solution from one tank to another for neutralization. Two operators were stationed on the first and second floors of the extraction area, where the pumping was taking place. Each operator was wearing a personal nitrogen dioxide (NO₂) alarm. An SPM was also located on floors where the operators were stationed. The SPM is a continuous-air monitor alarm which measures NO₂ levels in its immediate vicinity. When levels of NO₂ reach 0.5 parts per million (ppm), which is half of the permissible exposure limit, the personal NO₂ monitor and SPM alarm to allow workers to evacuate before any health hazards occur. No readings above the 0.5 ppm NO₂ alarm levels were detected. The types of NO₂ alarms used on the UNH project are susceptible to alarm activation by radio frequency and by heat and humidity. After further evaluation by Industrial Hygiene personnel, it is suspected that radio frequency, heat or humidity situations caused the SPM to alarm. Industrial Hygiene personnel re-calibrated all four alarms before UNH transfer continued.



Supporting DOE's commitment to inform and involve the public about Fernald activities and progress, a community meeting will be held August 8 at the Plantation in Harrison. DOE, EPA, and FERMCO officials will be available at 6:30 p.m. to talk with interested parties. At 7 p.m., the meeting will begin with an overview of cleanup progress, an update on the Natural Resources Trusteeship, and a report on waste shipping activities.

Breakout sessions will focus on the Fernald Citizens Task Force's final report and on the plan to accelerate Fernald cleanup to a 10-year time frame. Comments will be made by representatives of U.S. EPA, Ohio EPA, and the Fernald Residents for Environmental Safety and Health (FRESH). Questions and concerns from the public are invited and can be asked at the meeting or mailed to DOE's Information Office, c/o Gary Stegner, P.O. Box 538705, Cincinnati, OH 45253-8705.

Fernald Site Eligible for National Register of Historic Places

During cleanup of the Fernald site, DOE must comply with several historic preservation regulations. For example, there are regulations governing handling and disposition of archeological artifacts and historic properties. In 1994, Fernald was determined eligible for listing in the National Register of Historic Places by the Ohio Historic Preservation Office. Enacted in 1966, the National Historic Preservation Act requires DOE to consider the effects of projects on buildings and structures eligible to be listed in the National Register of Historic Places. The law also encourages views of the public to be considered.

CALENDAR ITEMS

August

Date, Time, Location	Event	Event Description
<p style="text-align: center;">August 1 4 p.m. to 7 p.m. Meadowbrook Ross, Ohio</p>	<p style="text-align: center;">Fernald Citizens Task Force News Conference</p>	<p>During a news conference, Chair John Applegate will present the Fernald Citizens Task Force's final report to representatives of DOE, U.S. EPA, Ohio EPA, FERMCO and the local media. The report contains the group's formal recommendations regarding environmental remediation of the Fernald Environmental Management Project.</p>
<p style="text-align: center;">August 8 7 p.m. The Plantation Harrison</p>	<p style="text-align: center;">DOE Community Meeting</p>	<p>The meeting will begin with an overview of cleanup progress, an update on the Natural Resources Trusteeship, and a report on waste shipping activities. Featured sessions will focus on the Fernald Citizens Task Force's final report and on the plan to accelerate cleanup at the Fernald site in a 10-year time frame. Comments will be made by representatives of U.S. EPA, Ohio EPA, and the Fernald Residents for Environmental Safety and Health (FRESH).</p> <p>Questions and concerns from the public are invited and can be asked at the meeting or mailed to DOE's Information Office, c/o Gary Stegner, P.O. Box 538705, Cincinnati, OH 45253-8705.</p>
<p style="text-align: center;">August 8 8 a.m. Sharonville Convention Center Sharonville, Ohio</p>	<p style="text-align: center;">Business Opportunity Exchange</p>	<p>The Business Opportunity Exchange provides prospective suppliers opportunities for networking and serves as a forum to communicate technical requirements and current business opportunities at Department of Energy (DOE) Ohio Field Office sites.</p>



Community Access Phone Line: 513-648-6272

Call the community access line for updated information about Fernald-related public meetings, public involvement activities and documents available for comment and inspection.



Radium and Precious Metal Extraction from the K-65 Residues

Considerable attention has been focussed on the potential for using Fernald's K-65 Silo residues as a source of radium for feedstocks for the production of medical isotopes and as a source of gold for recovery. Dialogue on these issues has been ongoing for the past two years and precipitated a May 11, 1995, meeting at Fernald in which interested parties discussed their positions.

Through a record of decision, Fernald is legally required by the U.S. Environmental Protection Agency (EPA) to vitrify and ship the Operable Unit 4 silos' materials to the Nevada Test Site for burial. Signed in December 1994, the Operable Unit 4 record of decision requires the project to start by March 1996, when a 1-ton-per-day vitrification pilot plant is scheduled to begin. All residues are currently scheduled to be processed by 2001.

At the March meeting, concerns were expressed that the radium would be unavailable for the medical purposes being discussed. Also, there was some doubt the proposed methodology would work for treating cancer, and much work would have to be done to develop the process for making the cancer-treating agent. The attached figure shows the steps necessary for production of the cancer-treating agent; each step is quite complicated. Although obtaining sufficient funding for extraction testing has been discussed, in the event the radium would be needed at the end of the medical testing, the vitrification process must proceed because of legal requirements and because the residues are only one potential source of radium.

Other sources of radium may be available in the future. The glass product of the vitrification process is very stable and will contain radium into the foreseeable future. If the need arises, the radium could be recovered from the glass more safely. The radon release from the glass is approximately 500,000 times lower than from the residue. The glass gems will likely be buried in one location during the vitrification plant's three-year operation. This will allow recovery and reuse, if necessary.

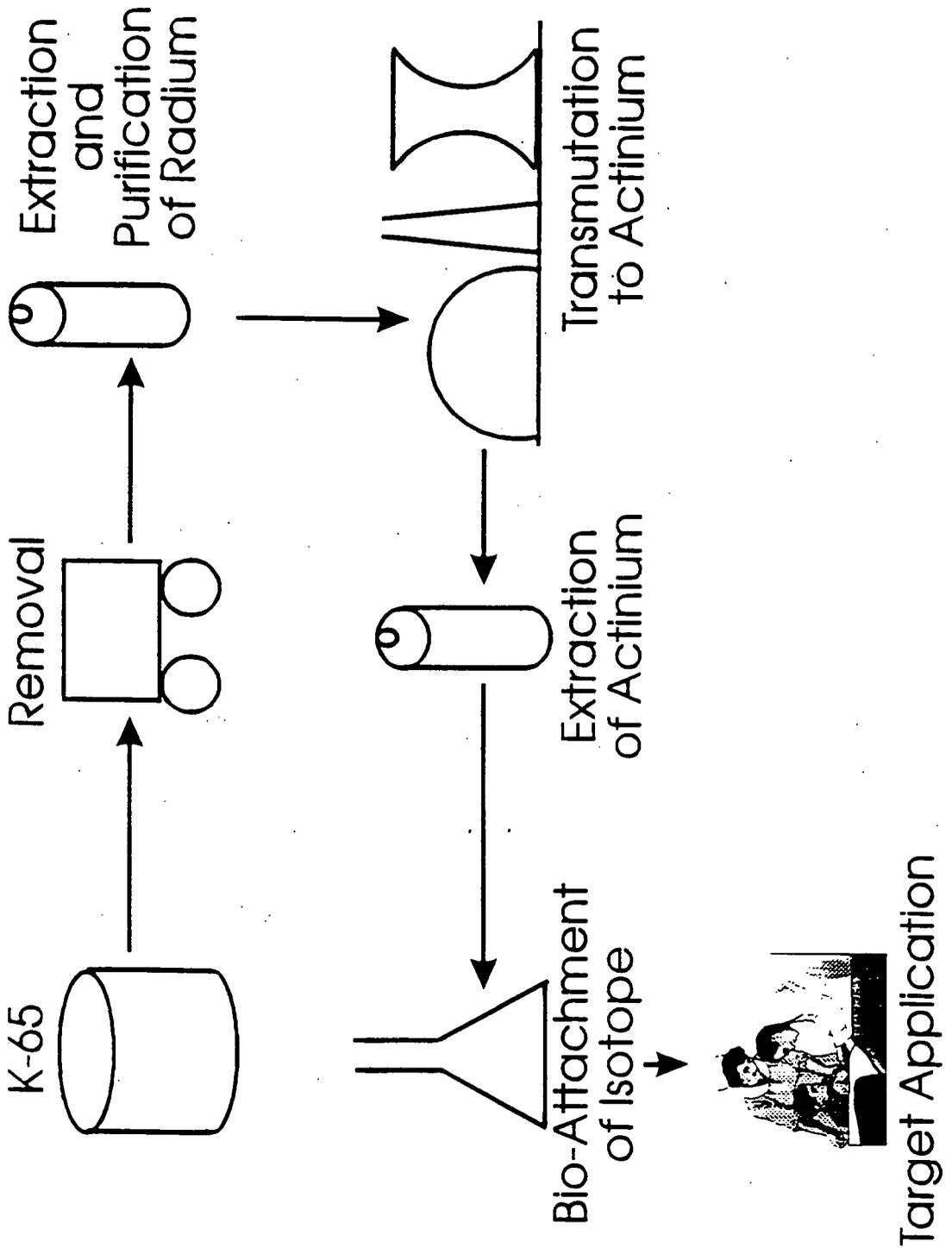
Extraction of the radium was also considered as part of Operable Unit 4's feasibility study (FS) under CERCLA, and the conclusion was it would be considerably more expensive than disposal. The study showed the extraction option was cost-prohibitive; therefore, it was rejected (Alternatives 3A.1 and 5A.1 in Volume 2 of the FS report). Data in The Remedial Investigation for Operable Unit 4 (pages 1-37) show an average of 50 parts per million of gold in the residues. If consistent throughout the residues, this represents less than \$10 million worth of gold at \$400 per ounce. Creating facilities for precious metal recovery at Fernald would likely be impractical. Even if the gold could be economically extracted using arsenic heap leaching, it would be contaminated with small quantities of radionuclides, so it is doubtful that it could be free-released under today's laws.

Contact for more information

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July 1995

Conceptual Production Of Cancer Treating Agent





Economic Impact Study of the Fernald Environmental Management Project

This Fact Sheet Describes

- ◆ Economic impact study objectives
- ◆ How the data will be collected
- ◆ Community and local business participation in study
- ◆ The time line for completing the study

INTRODUCTION

This summer, an independent research group will assist the Department of Energy (DOE) and the Fernald Environmental Restoration Management Corporation (FERMCO) in conducting an economic impact study. The objective of the study is to determine Fernald's economic impact on communities surrounding the site. It will serve as a basis for a community-led economic planning effort. The study will help DOE and the community grasp the extent to which Fernald influences the local economy now and will provide ideas on the future of the area after the cleanup is complete.

Who will conduct the study

The University of Cincinnati (UC) Department for Economic Education will conduct the study. Researchers began data generation in June and will issue a final report September 15. Community briefings will be held after the study is completed.

Focus of the study

The study will provide current economic data on local and regional geographic areas. Local areas include: Ross, Miamitown, Crosby, Morgan, and Harrison. The regional study area will cover the tri-state area (i.e., Cincinnati metro) and subdivide impact assessment to the extent possible by these jurisdictional areas: Hamilton County, Butler County, Indiana, Kentucky, and Ohio. The research findings will be used to communicate anticipated economic impacts to the local economy as the Fernald site transitions from cleanup to long-term monitoring.

Community Role

As the Fernald site transitions from environmental restoration to long-term monitoring, its economic impact on the local economy will be reduced. This study will provide data the community can use to stimulate economic development planning, if desired.

The survey will include data on the overall extent of Fernald's economic involvement in the local and regional community; the number and types of businesses that rely on Fernald as a customer base; the impact of past downsizing on surrounding communities; and the nature of organizations which rely on Fernald subcontracts. The time frame for this assessment will include 1990 through 1995, with a trend projecting economic impacts through 1998. Emphasis will be on 1994 through 1995.

How data will be collected

The research effort will employ a combination of research techniques, including focus groups and telephone surveys. Three focus groups will be conducted with members of the following: business leaders, Fernald employees, and local residents. For local residents, groups of 10 to 12 participants will be recruited to discuss perceptions of Fernald's role in the local and regional economy. Focus groups will also seek input on the extent and diversity of economic relationships that exist due to the Fernald site. For the business owners focus group, 30 local businesses will be selected from a target list. From that list 15 will be recruited to attend a focus group. Fernald employees will be sought in both management and front line positions, and will consist of a group of 10-15 employees.

Telephone surveys will be conducted in a two-pronged approach. The local business survey will consist of a telephone survey with chief executive officers from a sample of 100 businesses in a 5-mile radius of the Fernald site, including Ross, Miamitown, Crosby, Morgan, and Harrison. The survey of area businesses will determine the extent businesses serve as suppliers to Fernald facility or serve Fernald employees.

The employee survey will consist of a telephone survey conducted with a sample of Fernald employees who live in local communities surrounding the facility. The purpose of this survey is to better understand employees' economic involvement in the area.

An economic analysis report will be developed after all research has been collected. This report will measure Fernald's total economic effect on the region. This approach requires understanding the nature and extent of a company's expenditures to calculate how they affect overall business sales, household earnings and employment in the larger region. When a company's direct expenditures are known, the indirect effects can be estimated through a series of multipliers. The RIMS II will be utilized to measure Fernald's economic impact on Hamilton and Butler counties.

July 1995

Regional Input-Output Modeling System (RIMS II)

RIMS II is a tool developed by the U. S. Department of Commerce, based on a set of multipliers derived from an input-output table for the Cincinnati Metropolitan Statistical Area (CMSA). The input-output table shows linkages among various industries in the economy for the CMSA and provides multipliers to measure the indirect and induced impacts of virtually any type of production on the local economy. These multipliers will model the effects of local expenditures on business sales, household earnings, and employment.

When the study will be complete

Research began in late June and early July. Completion of the study is targeted for September 15. The study will result in a final report which will include an executive summary of principal findings, including total economic impacts on the specified regions, (direct, indirect, and induced impacts), expenditures to households, and number of jobs created by the facility. This information will be presented this fall to the community at township trustee meetings, area merchant meetings, and public workshops.

Contact for Information

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