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FERNALD CITIZENS TASK FORCE - AGENDA AND HANDOUTS FROM APRIL 8, 1995 MEETING

04/08/95

APPLEGATE TASK FORCE
50
AGENDA

FERNALD CITIZENS TASK FORCE

A U.S. DEPARTMENT OF ENERGY SITE-SPECIFIC ADVISORY BOARD

AGENDA

April 8, 1995

1. *Time and Place*

The next regularly scheduled meeting of the Task Force will be on Saturday, April 8, 1995, from 8:30 a.m. to 12:30 p.m., at the Joint Information Center, 6025 Dixie Highway, Fairfield, Ohio. We will begin the meeting promptly at 8:30.

2. *Subjects*

8:00	Continental Breakfast (optional)
8:30	Call to Order
	Approval of Minutes
	Chair's Remarks
8:50	Review of Past Resolutions
	Review of New Information
9:45	Break
10:00	Develop Options
10:30	Discussion and Draft Resolutions
11:30	Opportunity for Public Comment
11:45	Vote on Resolutions
12:00	Discussion of Grazing Issue
	Review Table of Contents for Final Report
12:25	Wrap Up
12:30	Adjourn

3. *Documents*

The documents and other materials relevant to the meeting's subjects are being developed by the Task Force staff. They will be distributed at the meeting.

4. *Chair's Announcements*

5. *Other Meetings of Interest (calendars enclosed)*

P. O. Box 544 Ross, Ohio 45061 513-648-6478

FERNALD CITIZENS TASK FORCE

April 8, 1995 • 8:30 a.m. to 12:30 p.m.
The Joint Information Center
6025 Dixie Highway, Fairfield, Ohio

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This is your opportunity to help the Task Force make its recommendations to the Department Of Energy, the U.S. Environmental Protection Agency, and the Ohio Environmental Protection Agency.

You are encouraged to attend the meeting and to express your opinions to the Task Force.

For more information, call the Task Force message line at (513) 648-6478.

WEDNESDAY, APRIL 5, 1995
THE HARRISON PRESS
2A
"Fernald Citizens Task Force"

FERNALD CITIZENS TASK FORCE

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THE JOURNAL NEWS
A4 STATE
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C2 METRO
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FERNALD CITIZENS TASK FORCE

A U.S. DEPARTMENT OF ENERGY SITE-SPECIFIC ADVISORY BOARD

FOR IMMEDIATE RELEASE
March 22, 1995

NEWS MEDIA CONTACT:
John Applegate, Chair
(513) 556-0114

FERNALD CITIZENS TASK FORCE TO HOLD MONTHLY MEETING

CINCINNATI, Ohio -- The Fernald Citizens Task Force will hold its regular monthly meeting on Saturday, April 8, 1995, from 8:30 a.m. to 12:30 p.m. at the DOE/FERMCO Joint Information Center, 6025 Dixie Highway, (above the Spinning Fork restaurant on Route 4), Fairfield, Ohio. The Task Force will continue its discussion on future uses of the Fernald site following remediation. It will also identify what uses, if any, should be allowed during cleanup, and the recommended long-term controls for the site.

The meeting is open to the public, and time will be reserved for the public to address the Task Force.

The Fernald Citizens Task Force has been created to help guide cleanup at Fernald. The U.S. EPA, Ohio EPA, and DOE collaborated to form the Task Force, and it includes representatives of the constituencies affected by cleanup decisions.

- more -

The agencies have agreed to consider carefully the Task Force's recommendations in their decisionmaking processes, though the recommendations are not legally binding. The major concerns of the Task Force are:

- What should be the future use of the site?
- What should be the cleanup levels?
- Where should radioactive and hazardous wastes present at the Fernald site be disposed?
- What should be the cleanup priorities?

########

ATTENDANCE

Meeting of April 8, 1995

Voting Members (14)

✓	John Applegate	Chair
___	James Bierer	Teacher
___	Marvin Clawson	Neighbor (FRESH)
___	Lisa Crawford	FRESH
✓	Pam Dunn	FRESH
___	Constance Fox	Physician, PSR
✓	Guy Guckenberger	Hamilton County Commissioner
✓	Darryl Huff	Morgan Township
✓	Jerry Monahan	Building Trades
✓	Tom Rentschler	Hamilton, Greater Miami Conservancy
___	Warren Strunk	Crosby Township Trustee
✓	Bob Tabor	Metal Trades
✓	Thomas Wagner	Dispute Resolution, UC
✓	Gene Willeke	Environmental Science, Miami U.

Ex Officio

✓	~~Phil Hamric~~ Jack Craig	Department of Energy
✓	Graham Mitchell	Ohio EPA
✓	Gene Jablonowski	U.S. EPA

Alternates

___	Jackie Embry	Nurse
___	Russ Beckner	Neighbor

FERNALD CITIZENS TASK FORCE

Sign-in for April 8, 1995 Meeting

NAME: Mike Strimbu

AFFILIATION: FERMCO

ADDRESS: ______

______

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: Bill Taylor

AFFILIATION: ATSDR

ADDRESS: 1600 Clifton Rd NE Mailstop E-56

Atlanta GA 30333

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: MIKE YATES

AFFILIATION: FERMCO

ADDRESS: ______

______

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: Tom Szymonick

AFFILIATION: Self

ADDRESS: [redacted]

Would you like to be added to the Fernald mailing list? ______ Yes __×__ No

NAME: TERRY BORGMAN

AFFILIATION: ______

ADDRESS: [redacted]

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: Paul Sorenson

AFFILIATION: ______

ADDRESS: [redacted]

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: Ed Knoy

AFFILIATION:

ADDRESS:

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: Bob Tabor

AFFILIATION: FAIC

ADDRESS:

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: Jane Hoopes

AFFILIATION: FERMCO

ADDRESS:

Would you like to be added to the Fernald mailing list? ______ Yes ______ No

NAME: Vicky Dastillung

AFFILIATION: FRESH

ADDRESS: 3088 Hamilton-Scipio

Hamilton, OH 45013

Would you like to be added to the Fernald mailing list? ✓ Yes (I'm on it) ___ No

NAME: L. Gilham

AFFILIATION: ODH

ADDRESS: ______

______

Would you like to be added to the Fernald mailing list? ✓ Yes ___ No

NAME: ______

AFFILIATION: ______

ADDRESS: ______

______

Would you like to be added to the Fernald mailing list? ___ Yes ___ No

March 11, 1995:

★ • The Task Force took much of the meeting time rewording the considerations and conditions of the formal "Recommendation For An On-Site Disposal Facility At Fernald", which reads as follows:

RECOMMENDATION FOR AN ON-SITE DISPOSAL FACILITY AT FERNALD

> The Fernald Citizens Task Force recommends the construction of an on-site disposal facility to accept, from the Fernald site only, materials solely with low levels of contamination meeting the site-specific waste acceptance criteria.

The Fernald Citizens Task Force does not make this recommendation lightly. It is the result of one and one-half years of study, discussion, and evaluation. Disposition of contaminated material is one of four key recommendations required of the Task Force by August 1993 charter. In the December 1993 work plan, we scheduled this decision for 1995. This schedule was then further refined in a revised work plan approved in December 1994. The draft final recommendation was prepared as scheduled in February 1995, with discussion and a public workshop on
the full range of issues having been conducted as scheduled in January 1995. It is important to the Task Force that all our recommendations be based on a thorough evaluation of the technical information available, and through discussion and feedback with our neighbors surrounding Fernald. To this end, all of our meetings are open to the public and widely publicized, and all agendas are mailed to an extensive list of local residents and government officials. Comments are received at Task Force meetings, other public meetings attended by Task Force members, by mail, and through the Task Force message line.

All members of the Task Force live and work in communities that are impacted by the decisions being made at Fernald, and eight of 14 live and work in the direct vicinity of the site. No member of the Task Force wishes to see contaminated materials from Fernald or any other location stored on the Fernald property indefinitely. As it adjoins residential and agricultural lands and is situated directly above a sole source aquifer, Fernald is far from an ideal location for disposal of contaminated materials. Nevertheless, we are aware of the many engineering, political, and financial challenges facing a project the size of the Fernald cleanup. Our primary goals are protecting human health and the Great Miami Aquifer. We believe that a balanced approach to cleanup, in which the most hazardous materials are disposed off the Fernald property and the least hazardous materials are stored safely on the property, is the most effective way to achieve prompt and enduring protection for the communities surrounding Fernald. We ultimately arrived at this recommendation in consideration of the following:

- The more quickly source materials are taken out of the environment, the better the aquifer is protected and the more quickly it can be restored. The Fernald Citizens Task Force believes that an on-site disposal facility is the quickest way to protect the aquifer and the overall environment.

- The hazard of the material to be placed in the on-site disposal facility is very low. The maximum level of contamination that will be allowed in the disposal facility would allow for a land use as a developed park under cleanup levels recommended by the Task Force. The material is to be contained in a disposal facility solely for the purpose of protecting the aquifer over the long-term, and failure of the disposal facility would not present any immediate or significant threat to human health.

- In the off-site option, the risk of transporting the expected 2.4 million cubic yards of low-level contaminated soil and debris from the Fernald site to Utah and/or Nevada includes an estimated six fatalities to the public along the transportation routes, while relatively little health and safety risk is incurred by the public under the on-site option. Both on and off-site options require similar levels of work in excavating, loading, unloading, and disposing of materials; therefore, the risk to remediation workers in both options is roughly equivalent. The Fernald Citizens Task Force believes the on-site option is the most responsible with regard to overall safety.

- The cost of off-site disposal is three times that of on-site disposal. The Fernald Citizens Task Force believes that under current and foreseeable budget conditions, an off-site decision would greatly delay cleanup and may prevent any progress at all. An on-site disposal facility is thus more viable under the current budget and political constraints.

- Both states of Utah and Nevada have written to Fernald encouraging a balanced approach to cleanup. The Fernald Citizens Task Force is concerned that if the decision were made to send all Fernald waste and contaminated materials off site, we would face the likelihood of reprisals from other states resulting in our not being able to send any waste off site. The Fernald Citizens Task Force believes that it is of paramount importance that the off-site shipment of the most hazardous materials be the first priority of cleanup, and carried out expeditiously.

- Because the entire Fernald property is situated over a sole-source aquifer, only the lowest level materials, as defined by the site specific waste acceptance criteria, will be allowed into an on-site disposal facility. The waste acceptance criteria for Fernald were established by modeling the proposed disposal facility over a thousand year period to prevent any contamination from reaching the aquifer at levels that would exceed the federal maximum levels of contamination for drinking water. This modeling assumed only natural materials in providing protection of the aquifer and excluded consideration of man-made liners that are subject to failure over the 1,000 year period.

- The Fernald Citizens Task Force wants to prevent any waste or contaminated materials coming to Fernald from other sites for permanent disposal or long-term storage. Under the Federal Facilities Compliance Act of 1992, that potential exists. By managing the Fernald materials fairly and effectively, the Fernald Citizens Task Force believes we will be in a more equitable position to prevent a decision to send outside wastes to Fernald.

The above considerations have convinced us that an on-site disposal facility is the most prudent and effective solution to Fernald's waste problems. The Fernald Citizens Task Force recommends the construction of an on-site disposal facility to accept, form the Fernald site only, materials solely with low levels of contamination meeting the site-specific waste acceptance criteria. However, on-site storage of low-level materials at Fernald is acceptable only in the context of the above considerations and under the following conditions, such considerations and conditions being inseparable from the recommendation:

- The Fernald Citizens Task Force strongly and unanimously opposes the use of the Fernald site for the permanent disposal or long-term storage of any waste or contaminated materials originating from other locations.

- Any on-site disposal facility will be built for long-term performance using the best design, technology, and engineering available.

- Any on-site disposal facility at Fernald will be designed to make the least possible negative aesthetic impact. The Fernald Citizens Task Force and the public at large shall be explicitly involved in the process for determining the ultimate appearance of the disposal facility.

- Any on-site disposal facility at Fernald will provide an adequate buffer area to minimize negative impacts to neighboring properties and the future use of the Fernald property. The Fernald Citizens Task Force and the public at large shall be explicitly involved in the planning and design process for the disposal facility.

- The U.S. federal government will retain permanent ownership of any property containing the disposal facility.

- The U.S. federal government will continually monitor the disposal facility and report these findings in a timely manner to residents and interested parties.

- The U.S. federal government will commit to retrieve and treat or redispose of the material contained in the disposal facility if a new, proven, and economically justified technology to manage these materials should be available.

- The U.S. federal government shall have in place adequate procedures to identify and correct any and all failures in performance of the disposal facility before any increased risk to public health occurs.

- The U.S. Department of Energy commits to the above conditions.

U.S. Department of Energy budget adjustments in the short or long term will not adversely impact the substance of our recommendation.

The above recommendation was approved by the Fernald Citizens Task Force on February 18, 1995 by a vote of nine supporting, one opposing, and one abstaining. The supporting considerations and conditions were approved unanimously on March 11, 1995. The dissenting voter believes the arguments to recommend on-site storage of materials containing low level contamination are outweighed by the following:

- The contamination problems at Fernald did not evolve from local concerns or result in sufficient local benefit to warrant the long-term impact on local communities from a disposal facility.

- Facilities in the western U.S. are geologically better suited for the long-term management of this material than is Fernald.

- Local communities do not wish to incur the stigma associated with a disposal facility.

- A disposal facility on the Fernald property limits the land available for productive reuse by local communities.

March 28, 1995:

★ • This special meeting was scheduled to continue the site priorities discussion that had not been completed at the March 11, 1995, meeting. The Task Force created a list of criteria for the priorities recommendation offering suggestions for the listed items and raising questions that they would like to have answered. The list reads as follows:

Questions:

- 10 year schedule - why the lull in '98 - '99?
- Measures of efficiency?
- Adequacy of staffing levels?

Statement:

Fernald is different - Model for cleanup - Change the System (exist to go out of business)

Recommendation suggestions:

- Special Nuclear Materials
- Safe Shutdown
- Legacy Waste
- Simplify overlapping regulations
- Staffing levels

★ • The Task Force asked the chair and the consultant to create a draft recommendation to establish site priorities and accelerate remediation at Fernald for the April 8, 1995, meeting.

6846

FERNALD CITIZENS TASK FORCE

1995 Tool Box
4/8/95 Version

000018

FERNALD CITIZENS TASK FORCE

TABLE OF CONTENTS: 1995 TOOL BOX

March 10, 1995

FERNALD CITIZENS TASK FORCE

1995 WORK PLAN
(Revised 2/9/95)

1995 TOPICS

Where should the waste go?		*Timing and priorities*	*How should the clean site be used?*	*How should cleanup proceed?*	*Report preparation*		*Task Force future*	
January	February	March	April	May	June	July	August	September

1995 SCHEDULE

January	Waste Disposition Evaluation *Public Roundtable*: Waste disposition/storage cell
February	Waste Disposition Decision
March	Cleanup Priorities and Timing *Special Session*: Risks from cattle grazing
April	Future Use, Transitional Use, and Institutional Controls
May	Safety and General Cleanup Criteria *Public Roundtable*: Final Recommendations
June	Final Report Development
July	Final Report Approval
August	Summer Break
September	Continuing Mission

MONTHLY ACTIVITIES

WASTE DISPOSITION EVALUATION
January 1995

Purpose of Meeting:
Evaluation of available information regarding on-site *vs.* off-site disposal of wastes and efficacy of treatment.

Information to be Provided:
Detailed descriptions of on site cell design and long-term safety issues.
Detailed descriptions of transportation requirements and risks.
Background on Waste Acceptance Criteria and impact on waste disposition.
Revisit of soil washing in light of selected cleanup levels and waste acceptance criteria.
Potential of receiving non-Fernald wastes.

Decisions:
Task Force will identify any additional information required to make decision.

WASTE DISPOSITION DECISION
February 1995

Purpose of Meeting:
To continue evaluation of waste disposition options and make a decision regarding waste disposition and treatment.

Information to be Provided:
As defined by Task Force from January meeting.

Decisions:
Identification of desired waste disposition for each major waste component.
Identification of key Task Force issues, concerns, and criteria regarding an on-site disposal cell, if identified.
Identification of key Task Force issues, concerns, and criteria regarding off-site disposal, if identified.
Recommendations regarding use of soil washing.
Waste Acceptance Criteria suitability and disposal of potential "clean" fraction of soil washing residuals.
Identification of future design and construction activities that will require Task Force and/or public input.
Resolution on non-Fernald wastes.

CLEANUP PRIORITIES AND TIMING
March 1995

Purpose of Meeting:
To identify priorities in pursuing cleanup of the Fernald property and to understand how the budget will impact schedules for cleanup.

Information to be Provided:
Probable timelines of key construction activities under current scenarios.
Key budget, time, and logistical constraints for site cleanup.
Likely budget impacts on future cleanup activities.
Understanding of how Fernald will change over time during and after remediation.
Conceptual site models at 5, 10, 15, and 20 years, and at ultimate completion.

Decisions:
Identification of the key concerns of the Task Force for setting cleanup priorities.
Identify an overall view of cleanup timing from the Task Force's perspective.
Prioritization of wastes and materials for cleanup.

FUTURE USE,TRANSITIONAL USE, AND INSTITUTIONAL CONTROLS
April 1995

Purpose of Meeting:
To finalize recommendations on the desired post-remediation uses of the site and the long-term measures required to ensure safe use of the site and to identify any transitional uses of the property that might be desirable or allowable before all cleanup activities are completed..

Information to be Provided:
Existing toolbox data.
Expected impacts of the waste disposition recommendation.
Potential native American cultural uses.
Options for ensuring the long-term effectiveness of the remedy and responsibilities and contingencies for the long-term management of the property.
Currently available options for long-term control of land uses.
Currently Planned DOE ownership strategy.

Decisions:
The desired uses of the Fernald property following remediation.
Recommended long-term controls for site.
Long-term ownership.
Identification of any portion of the property that might be released outside of Federal ownership.
Identification of what uses, if any, should be allowed during cleanup.
Identification of design activities that will require Task Force/public input.

SAFETY AND GENERAL CLEANUP CRITERIA
May 1995

Purpose of Meeting:
Evaluation of risks and safety factors resulting from cleanup operations and identification of key Task Force criteria in conducting cleanup.

Information to be Provided:
Risks resulting from remediation and proposed mitigation measures.
Review of assumptions used in setting risk levels (modelling subcommittee results).
Review impacts of applying ALARA (as low as reasonably achievable) levels on and off site.
Expected levels of traffic.
Potential community disruptions due to construction activities.
Likely protocols for evaluating cleanup effectiveness and achievement of cleanup levels.
Potential for air pollution, and mitigation and monitoring.

Decisions:
Key community concerns to take into account in planning remediation activities.
Final recommendations on actual cleanup levels.
Recommendations on protocols for achievement of cleanup levels.
Identification of design activities that will require Task Force/public input.

FINAL REPORT DEVELOPMENT
June 1995

Purpose of Meeting:
Develop the scope and language of the final report.

Information to be Provided:
Proposed report outline.
Summary of all key decisions.
Proposed language for key issues as prepared by staff.
Potential minority views to be included.

Decisions:
Proposed scope and language for final report.

FINAL REPORT APPROVAL
July 1995

Purpose of Meeting:
Review final draft of report and approve for publication.

Information to be Provided:
Draft final report.
Outline of outstanding issues.

Decisions:
A final report of all Task Force observations and recommendations.

CONTINUING MISSION
September 1995

Purpose of Meeting:
Identify nature and extent of continuing mission for the Task Force.

Information to be Provided:
Key areas for future Task Force involvement.
Options for future Task Force organization.

Decisions:
Activities for the Task Force to focus on in the future.
Updated mission.
Schedule for future meetings.
Action on expiring terms for members.
Continued role of support staff.

FERNALD CITIZENS TASK FORCE

DESCRIPTION OF FERNALD MATERIALS REQUIRING DISPOSAL

HIGHEST RELATIVE HAZARD

The highest hazard materials at Fernald are products and wastes that have high concentrations and high activities. These include the K-65 residues and Thorium waste residues and sludges generated through former production operations at FEMP or received from other sites (i.e., Niagara Falls, Mallenkrodt) exhibiting high concentrations of hazardous chemical and radiological constituents and high direct radiation fields. Located within the K-65 Silos in the waste storage area (K-65 Residues) and in containers in several warehouses in the production area (Thorium). Total volume is estimated to be 10,000 cubic yards.

MODERATE RELATIVE HAZARD

Moderate relative hazard materials have been identified as the remaining uranium product inventories and waste residues and sludges generated through former uranium production operations at FEMP that exhibit high concentrations of uranium and other hazardous constituents but relatively low direct radiation fields. The largest quantity of these wastes are located within Silo 3 and the operable unit 1 waste pits. Also stored in containers (legacy waste product inventories), in bulk (i.e., uranium metal inventories), and in buildings in the former production area. Total volume is estimated to be 678,960 cubic yards.

LOW RELATIVE HAZARD

Low relative hazard wastes are characterized by materials exhibiting low concentrations of radiological and chemical constituents and low direct radiation fields. This material is primarily comprised of contaminated debris and environmental media such as soil and construction materials, flyash, and drinking water treatment sludges. Includes sitewide soil, site buildings, flyash piles, solid waste landfill and lime sludge ponds. Total volume is estimated to be 2,388,200 cubic yards.

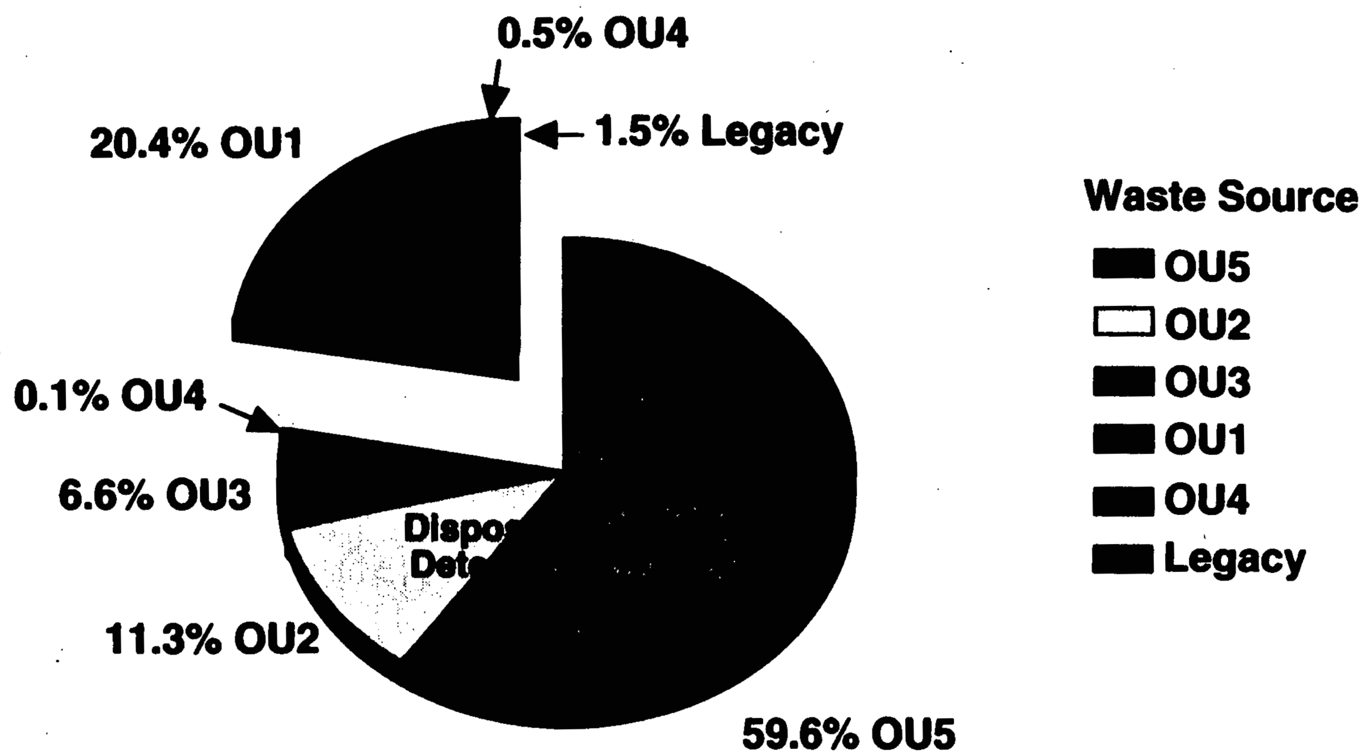
FERNALD CITIZENS TASK FORCE

VOLUMES OF WASTE MATERIALS AT FERNALD

WASTE CATEGORY	VOLUME (yd^3)	% OF TOTAL	RELATIVE HAZARD	DISPOSITION OPTIONS Utah	NTS	Reuse	Onsite
Operable Unit 1							
Pit Residues/Liners	628,200	20.4	moderate	x			
Subtotal Volume	628,200	20.4					
Operable Unit 2							
Ash	108,600	3.5	low	x	x		x
Solid Waste	15,220	0.5	low	x	x		x
Lime Sludge	16,500	0.5	low	x	x		x
Pit Residues/Liners	208,280	6.8	low	x	x		x
Subtotal Volume	348,600	11.3					
Operable Unit 3							
Nonrecycleable Debris	158,400	5.2	low	x	x		x
Recycleable Debris	43,200	1.4	low			x	
Subtotal Volume	201,600	6.6					
Operable Unit 4							
K-65 (silos 1 and 2)	9,000	0.3	high		x		
Silo 3 Contents	5,000	0.2	moderate		x		
Miscellaneous Debris	3,000	0.1	low	x	x		x
Subtotal Volume	17,000	0.6					
Operable Unit 5							
Soil	1,775,000	57.7	low	x	x		x
Water Treatment Sludge	60,000	1.9	low	x	x		x
Subtotal Volume	1,835,000	59.6					
Legacy Wastes							
Nuclear Material Inventory	10,160	0.3	moderate			x	
Containerized Waste	35,600	1.2	moderate	x	x		
Thorium	1,000	0.03	high		x		
Subtotal Volume	46,760	1.5					
Total Waste Volume	**3,077,160**	**100.0**	all				
Off-site Selected	**689,284**	**22.4**	mod-high				
Disposal to be Determined	**2,387,876**	**77.6**	low				

FERNALD CITIZENS TASK FORCE

CURRENT DISPOSITION OF FEMP WASTE BY VOLUME



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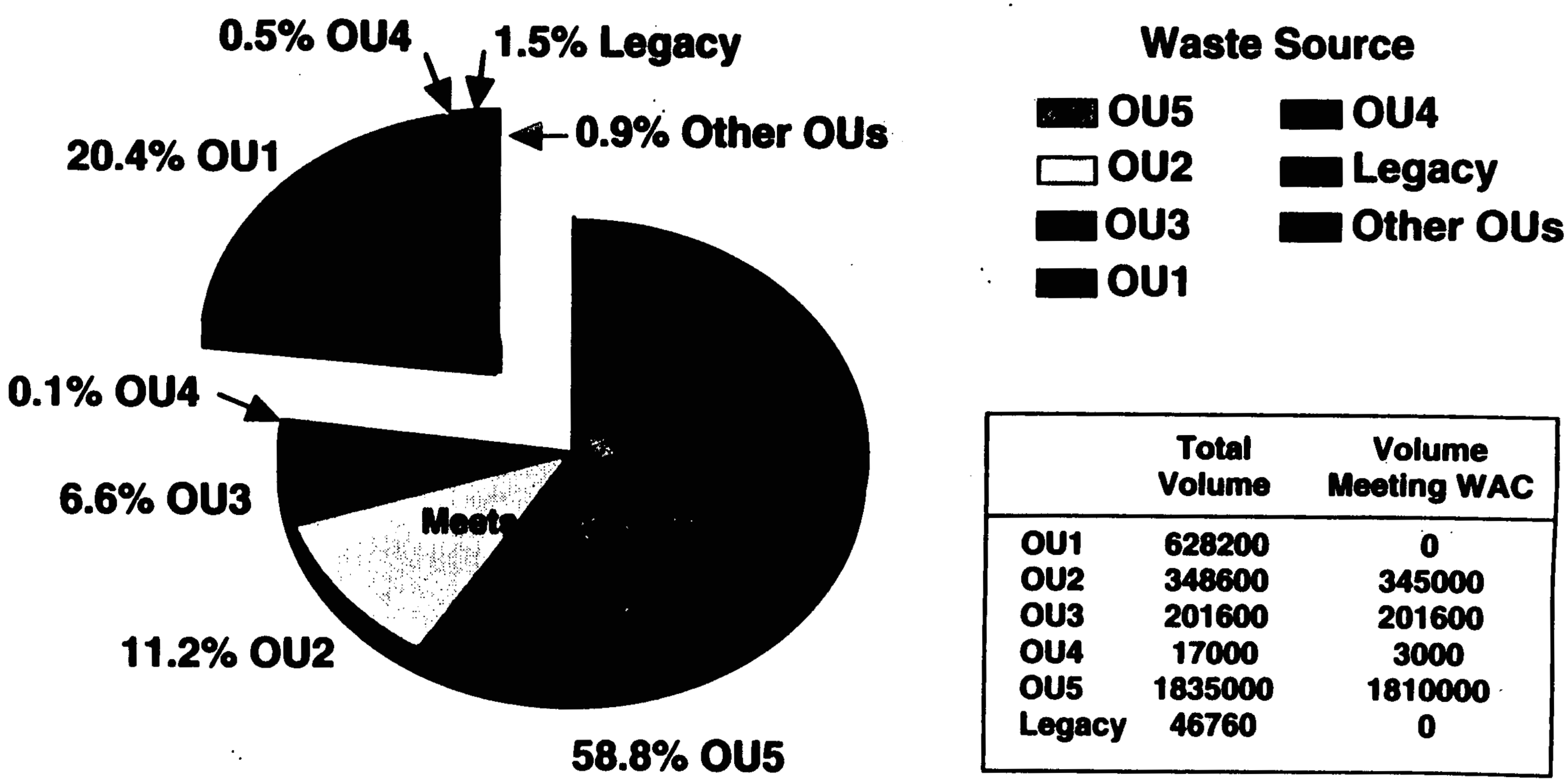
POTENTIAL DISPOSITION OF FEMP WASTE CONSIDERING WASTE ACCEPTANCE CRITERIA (WAC)



	Total Volume	Volume Meeting WAC
OU1	628200	0
OU2	348600	345000
OU3	201600	201600
OU4	17000	3000
OU5	1835000	1810000
Legacy	46760	0

Graphics #3221. 4 1/95

FERNALD CITIZENS TASK FORCE

OPTIONS FOR WASTE DISPOSITION

	ON SITE	OFF SITE	TREATMENT
REQUIRE-MENTS	Protection of GMA for 1000 years. State and Federal design requirements Waiver from State siting regulation Aesthetically acceptable	Assurance of avaialable capacity Transportation regulations Citizen/political acceptance along route and at disposal facility Receiving facility waste acceptance criteria	Treated material must meet cleanup criteria State and Federal regulations for design and operation Treatment process cannot be reversible Generated wastes must be manageable
OPTIONS	Cap materials in place (without liner) Consolidate and cap materials (without liner) Disposal facility with liner and cap	Nevada Test Site Envirocare of Utah	Soil washing with release of the clean portion Soil washing with consolidation of the clean portion
OPTIONS THAT MEET REQUIRE-MENTS	Disposal Facility (assuming waiver from State siting requirements)	Nevada Test Site Envirocare of Utah	No treatment option is available Treatment options being pursued as potential waste minimization tool in conjunction with on- or off-site disposal
DESCRIPTION	Multi-layer cap and liner Above ground disposal Gradual slope to minimize erosion On best available geology Federal ownership Long-term monitoring	Majority of material to Envirocare via bulk rail transport Containerized truck transport to NTS for wastes that do not meet Envirocare criteria	

FERNALD CITIZENS TASK FORCE

ON-SITE DISPOSAL OVERVIEW

DESIGN PARAMETERS FOR DISPOSAL FACILITY

- The proposed disposal facility for Fernald consists of a multilayered cap and bottom liner to isolate the contaminated material for above-grade disposal. Figure 1 provides a to-scale cross-section of the cell as currently envisioned.
- Cell is designed to minimize infiltration of water into waste and remove any water that does reach the waste. These design parameters are illustrated in Figure 2.
- Maximum reliance is on natural materials of construction (i.e., clay and gravel) and on-site materials to extent practical.
- Isolates waste from human and biotic intrusion.
- Provides for leachate detection and collection.
- Gradual slope on cap to minimize erosion and infiltration.
- Material is placed in cell in bulk (no containers) and compacted in layers to inhibit settlement.
- Construction is phased to minimize exposed contaminated material.
- The layers of the cap as illustrated in Figure 3 are:

Vegetative Layer	Provides rooting zone for vegetation. Provides water storage for plant growth. Protects underlying biotic barrier from erosion. Frost protection (together with the filter layer). Vegetation transpires moisture back to the atmosphere, reduces infiltration, stabilizes soil against erosion, and competitively excludes deep-rooted plants.
Filter Layer	Prevents piping of soil into biotic barrier. Drains infiltration from vegetative layer and retards further root growth. Frost protection (together with the vegetative layer).
Biotic Layer	Prevents root growth and animal intrusion. Prevents inadvertent human intrusion. Serves as backup erosion and frost protection if upper layers are eroded.

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FERNALD CITIZENS TASK FORCE

Figure 1. SCALE VIEW OF CELL

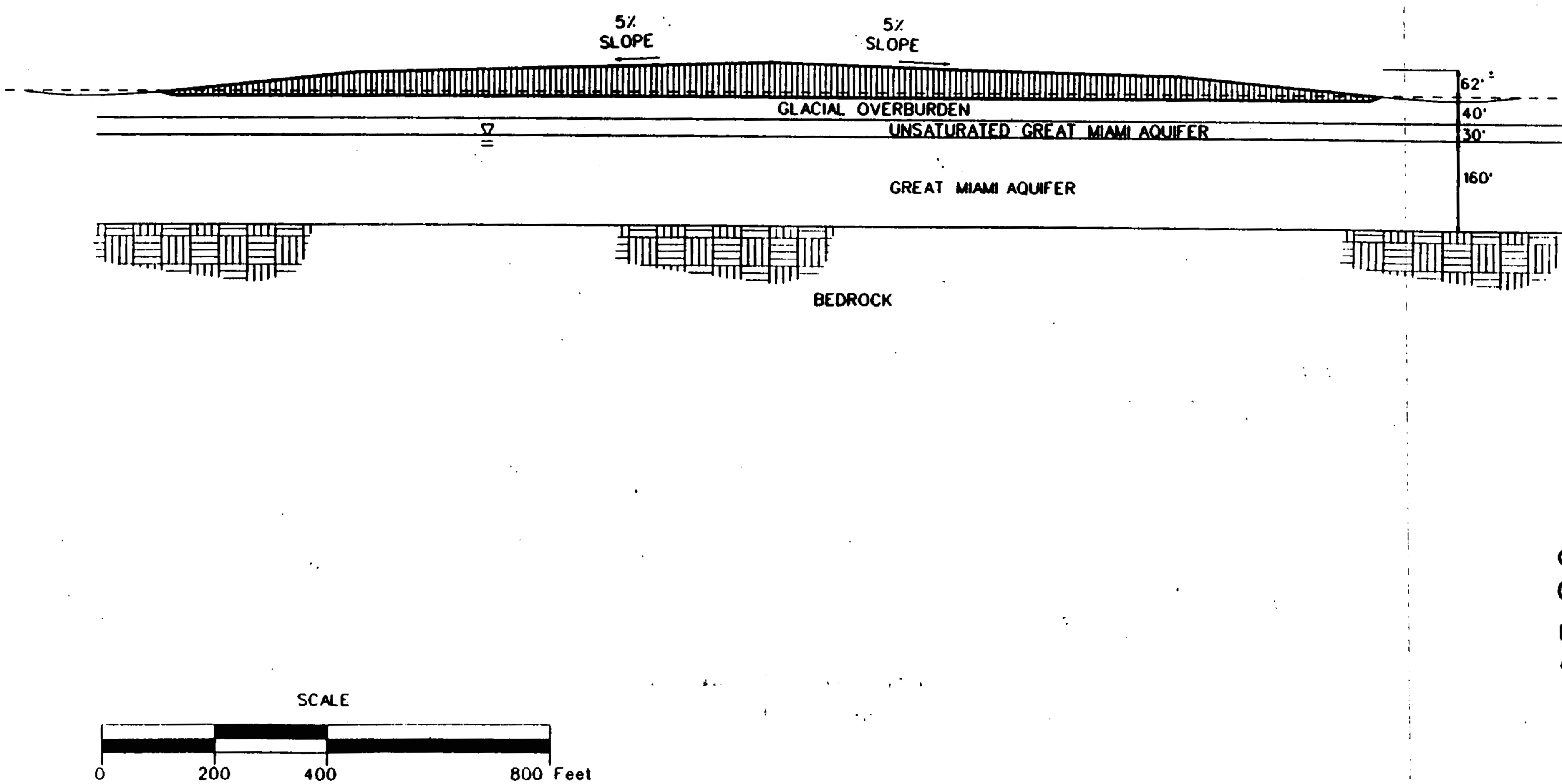
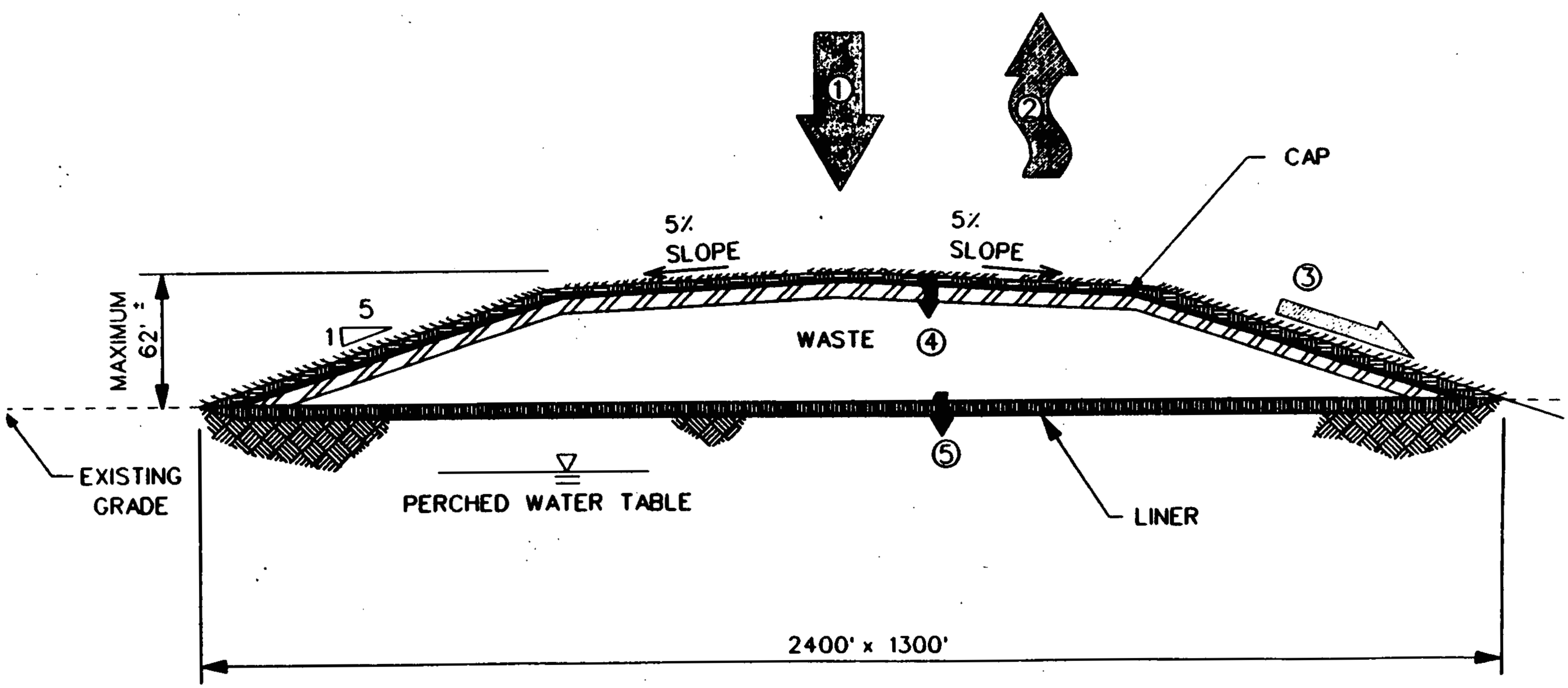


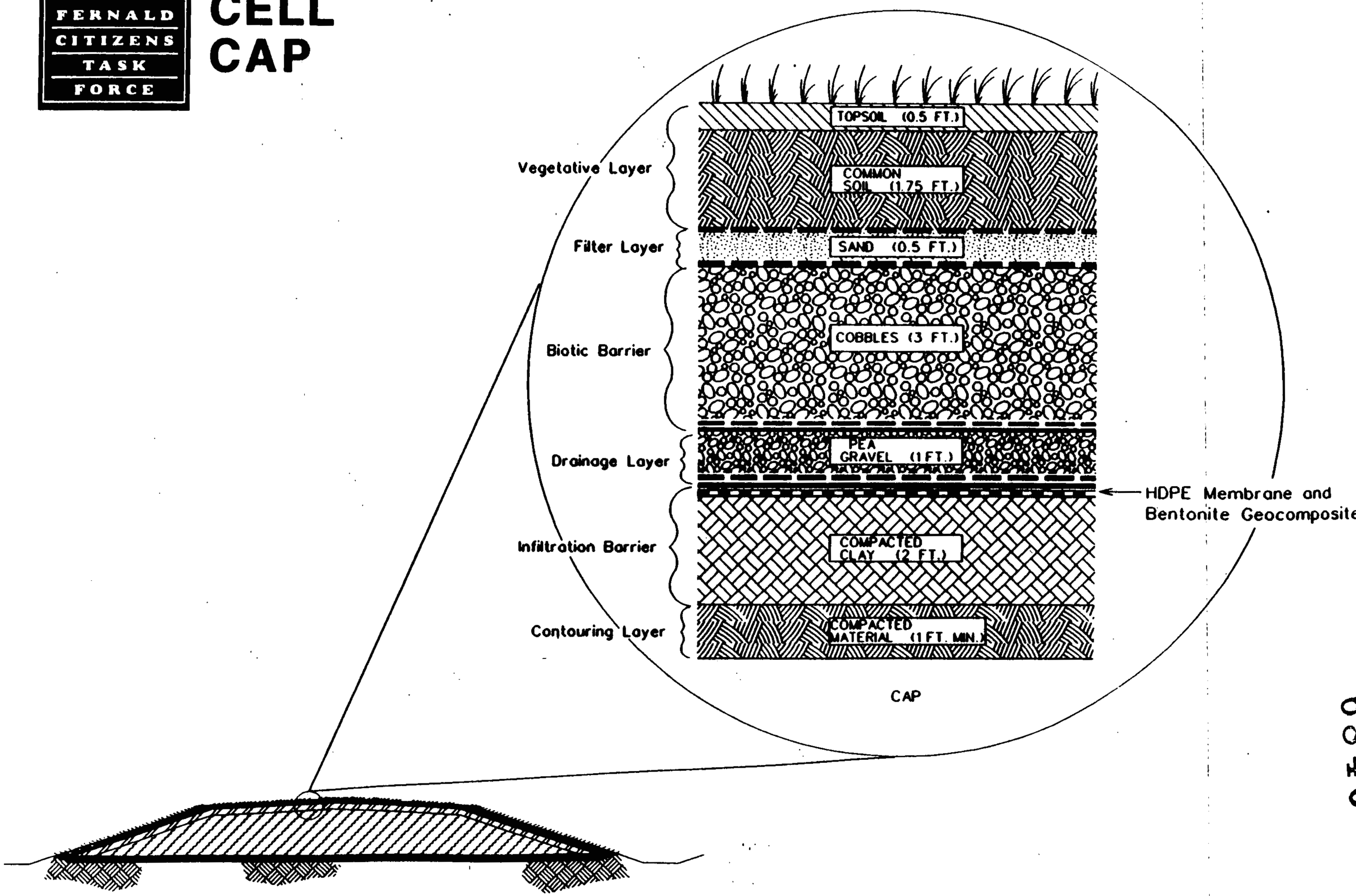
Figure 2. DESIGN OF CELL

		EXPECTED (inches/year)	MODELED (inches/year)
①	RAINFALL	40.6	40.6
②	EVAPOTRANSPIRATION	30.0	30.0
③	DRAINAGE	10.5	9.0
④	FLOW THROUGH WASTE	0.1	1.2
⑤	FLOW INTO SOIL	0	1.2



(SCALE EXAGGERATION: APPRQXIMATELY 1-VERTICAL TO 5-HORIZONTAL)

Figure 3. CELL CAP



DESIGN PARAMETERS FOR DISPOSAL FACILITY (continued)

Drainage Layer	Drains water laterally off infiltration barrier, thus reducing water pressure on barrier and infiltration through cap system. Protects infiltration barrier from larger rock in biotic barrier.
Infiltration Barrier	Barrier against infiltration of moisture into disposed material. Barrier against emanation of radon.
Contouring Layer	Allows construction of proper contours on which to lay cap system.

■ The layers of the bottom liner as illustrated in Figure 4 are:

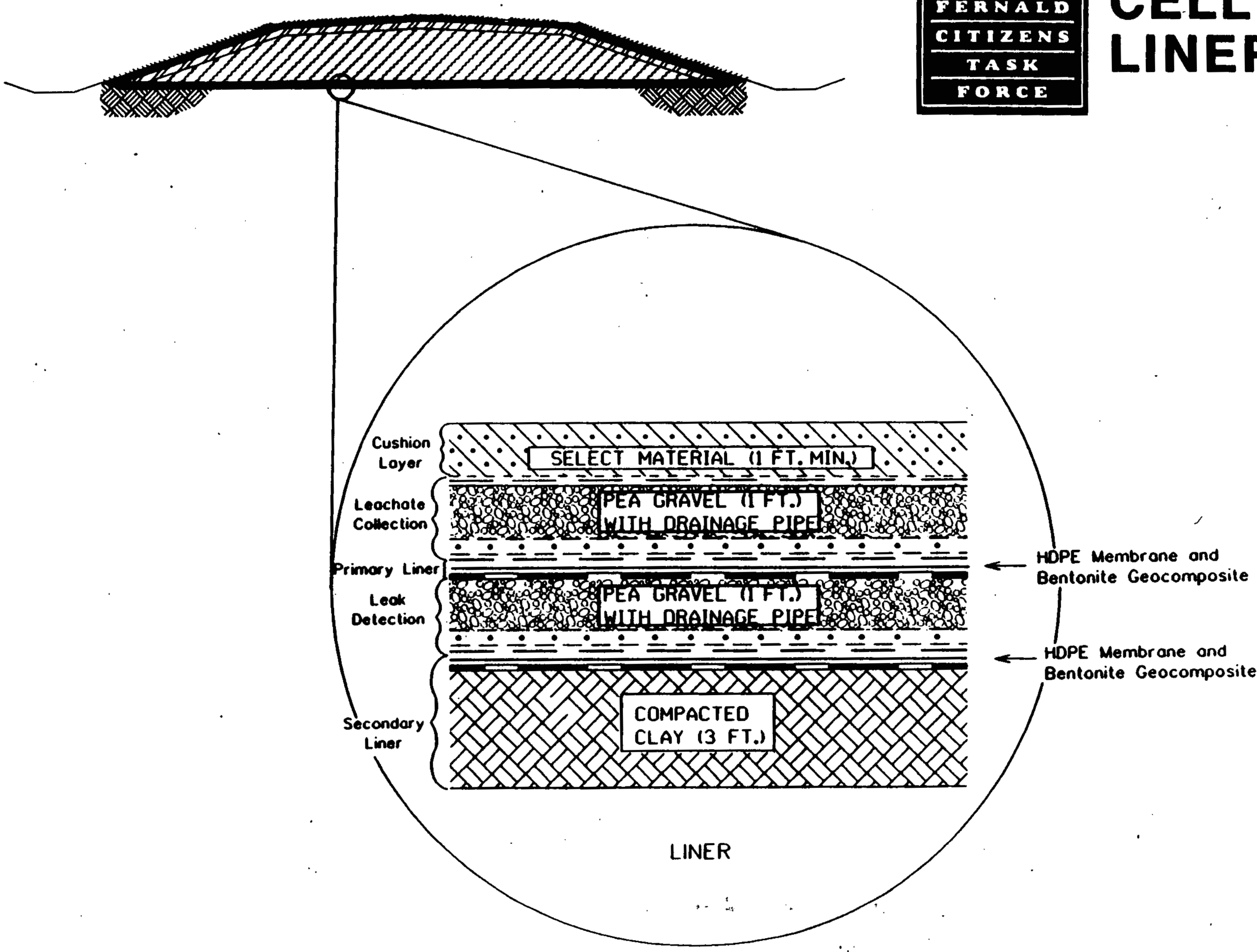
Cushion Layer	Prevents debris within disposed material from damaging liner system.
Leachate Collection System	During construction, captures water that runs off or infiltrates through waste. Following completion of construction, captures water that infiltrates cap system Captured water drains laterally to central collection facility, and water pressure on primary liner is reduced.
Primary Liner	Minimizes downward vertical movement of water during and after construction.
Leak Detection	Provides a means of determining if primary liner system is functioning properly. Intercepts and collects water that passes through primary liner. Captured water drains laterally to central collection facility, and water pressure on secondary liner is reduced.
Secondary Liner	Provides final engineered barrier against downward vertical movement of water that has infiltrated or run off the disposed material.

LOCATION OF DISPOSAL FACILITY

- Best available site geology (ongoing siting study has narrowed best geology to the northeast portion of FEMP).
- Location must take into account minimizing aesthetic impact on neighbors.
- State required buffer zones:
  300 foot required by State from line
  1,000 feet from nearest domicile or well.

FERNALD CITIZENS TASK FORCE

Figure 4. CELL LINER



WASTE ACCEPTANCE CRITERIA

- Maximum concentration for uranium in disposal facility is 1,080 ppm.
- Maximum concentration for other contaminants also required to protect aquifer to MCLs for 1,000 years.
- Waste acceptance criteria based on Fernald wastes only.
- Limitations will be placed on maximum size of construction debris to ensure cell stability. Construction debris must be mixed with soil to ensure stability.

REGULATORY REQUIREMENTS

- Placement of waste over sole source aquifer requires a waiver from State of Ohio regulation. Waiver based on demonstration that facility design in combination with geology will provide an equivalent standard of performance.
- Must meet Federal and State facility liner and cap design requirements.

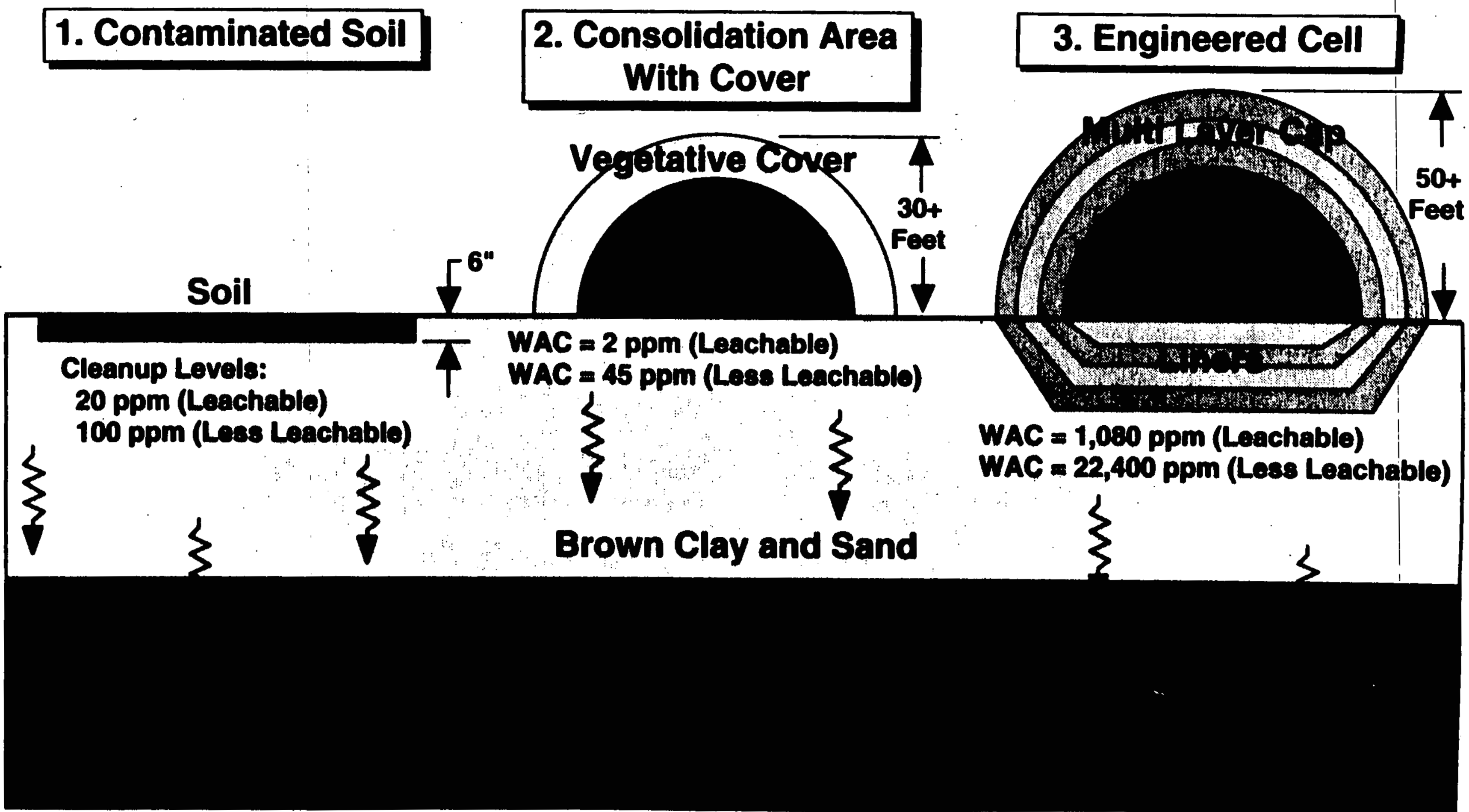
PROJECTED CAPACITY AND SIZE

- Approximately 2,4000,000 cubic yards being considered for on-site disposal under Task Force recommended cleanup levels.
- Size will be determined by final volumes and aesthetic parameters, conceptual design for cell size is 2400' x 1300' or approximately 72 acres. The 300' buffer zone would encompass an additional 59 acres.
- As conceptually designed average height will be 56 feet and maximum height will be 62 feet at peak.

COST

- Total disposal facility capital cost is $420 million ($175 per cubic yard).
- Total disposal facility annual operation and maintenance cost is $1.4 million.

DEVELOPMENT OF URANIUM WASTE ACCEPTANCE CRITERIA FOR SOIL



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MAINTENANCE/MONITORING/INSTITUTIONAL REQUIREMENTS

- Continued Federal ownership of disposal facility area.
- Permanent Markers identifying location of disposal facility.
- Fencing around disposal facility, similar to current site fencing.
- Long-term groundwater monitoring system.
- Long-term leachate collection system.
- Routine inspections and sampling every six months.
- Maintenance of cap as required.
- Reviews of system performance, at least every five years by DOE and EPA.

RETRIEVABILITY

- Consolidation without waste form modification permits future recovery in the event of improved or cost-effective treatment.

LONG-TERM PERFORMANCE

- Modeled performance of disposal cell for 1,000 years into future.
- Waste acceptance criteria was developed under assumed failure of synthetic components of cap and lining systems.
- Conservative assumptions used for underlying geology.

DURATION

- Earliest possible receipt of contaminated material in disposal facility is fall 1997.
- Disposal is expected to continue through 2017 (20 years), but will be dependent upon budgets and progress of building demolition.

RISK DURING IMPLEMENTATION

- Risk to on-site remedial workers:

Carcinogenic	7.3×10^{-3} (without respirators, see note)
Carcinogenic	7.3×10^{-4} (with respirators, see note)
Non-carcinogenic	HI = 27
Mechanical injuries	200
Mechanical fatalities	0.8

Note on use of respirators:
Use of respirators is not assumed unless air emissions are at levels requiring their use because of expense, loss of productivity, and increased risk of accident. Workers are at increased health risk due to stress and fatigue. Decreases in efficiency result in more time to perform the task and thus increased exposure to mechanical accident. Decreased visibility and communication also contribute to increased risk of accident. Use of personal protective equipment including half-mask respirators increase project costs by $26,300 per worker per year.

- Risk to on-site non-remedial workers:

Carcinogenic	5.3×10^{-7}
Non-carcinogenic	HI = 0.0038

- Risk to off-property public at fenceline:

Carcinogenic	4.4×10^{-7}
Non-carcinogenic	HI = 0.0024

USE OF MAN-MADE LINER MATERIALS AT FERNALD

- **The proposed waste disposal cell** design relies completely on natural materials to achieve the 1,000 year design life. Man-made high density polyethylene (HDPE) liners are included in the design for compliance with the legal requirements of the design and because they provide redundant protection during the short-term while the water level in the contaminated material placed in the cell reaches equilibrium. The HDPE is not expected to last 1,000 years however, and is not considered in the modeling of disposal cell performance.

- **The storm water retention basin** constructed in 1986 uses a man-made liner of a 40 mil synthetic fiber combined with 18" of soil-bentonite mix and drainage to detect and collect leaks. Holes thought to be caused by stones beneath the synthetic liner were found during repairs in 1994. Liner seams were sound.

- **The biosurge lagoon** constructed in 1985 uses the same double liner design as above using HDPE, however, the placement of drainage pipes resulted in only 6" of soil-bentonite beneath the pipes which resulted in some leaks. The system has since been redesigned to add 6" of sand above the HDPE liner with a resin coated fabric on top. Some leaks were detected early on, but is now considered to be performing well.

- **Pit 5** constructed in 1968 was installed with a rubber liner that had a 15 year guarantee. Initial inspection found 36 splices that had leak potential. Liner was reinforced, reinspected and put into service on October 21, 1968. Liner guarantee expired in 1983.

FERNALD CITIZENS TASK FORCE

OFF-SITE DISPOSAL OVERVIEW

OFF-SITE DISPOSAL LOCATIONS

- There are two U.S. facilities available to accept the waste types found at Fernald.
- Nevada Test Site
  DOE owned and operated facility
  Located 65 miles northwest of Las Vegas, Nevada
  Waste disposed in shallow pits and trenches with earthen cover
- Envirocare
  Commercially owned and operated facility
  Located near Clive, Utah 80 miles west of Salt Lake City
  Waste disposed in clay lined cells

WASTE ACCEPTANCE CRITERIA

- Nevada Test Site
  Accepts low-level nuclear wastes
  Does not accept hazardous or mixed wastes
  Wastes must be containerized
  All Fernald low-level wastes meet criteria
  No current limit on capacity
  1995 shipments from all DOE facilities expected to be 34,000 cubic yards.
- Envirocare
  Accepts low-level nuclear wastes
  Accepts hazardous wastes meeting Federal land disposal restrictions
  Accepts both containerized and bulk wastes
  Imposes size restrictions for debris
  Limits concentrations of individual hazardous constituents
  All 2.4 million under consideration meet criteria
  2.5 million cubic yards of capacity developed, much of it already claimed
  14 to 18 million cubic yards total capacity
  No indications that Utah will limit full development of this capacity
  Total Fernald waste (including OU1) of 3.2 million cubic yards would account for 15% to 20% of remaining capacity.

TRANSPORTATION REQUIREMENTS

- **Nevada Test Site: 2,200 miles from Fernald**

Using Total Truck Transport	Using Intermodal Transport
120,000 truck loads	1135 train loads (2,307 miles)
Dedicated trucks	160,000 truck loads (60 miles)
15 loads per day for 20 years	5,236,890 total rail miles
528 million total truck miles.	1,920,000 total truck miles
176 million gallons of gas	
2,600 tons of CO emissions	
755 tons of hydrocarbon emissions	
28,572 tons of NOx emissions	

- **Envirocare: 1,913 miles from Fernald**
  Both truck and rail, rail preferred
  900 train loads
  Dedicated trains
  One train of 47 cars every 8 days for 20 years
  3.4 million total rail miles.

TOTAL COST

- To Nevada Test Site: $3.46 billion ($1,440 per cubic yard) by truck
  $1.7 billion ($708 per cubic yard) by intermodal

- To Envirocare: $1.27 billion ($530 per cubic yard)

DURATION

- 20 year estimate based on budget projections and building demolition.

RISK DURING IMPLEMENTATION

- Risk to on-site remedial workers:

Carcinogenic	4.2×10^{-3} (without respirators)
Carcinogenic	4.2×10^{-4} (with respirators)
Non-carcinogenic	HI = 18
Mechanical injuries	138
Mechanical fatalities	0.6

- Risk to on-site non-remedial workers:

Carcinogenic	4.4×10^{-7}
Non-carcinogenic	HI = 0.0025

- Risk to off-property public at fenceline:

Carcinogenic	3.6×10^{-7}
Non-carcinogenic	HI = 0.002

- Risk to off-property transportation worker:

<u>Envirocare Option</u>

Carcinogenic	1.5×10^{-5}
Transportation injuries	14
Transportation fatalities	less than 1

<u>Nevada Test Site Truck Option</u>

Transportation injuries	16
Transportation fatalities	less than 1

<u>Nevada Test Site Intermodal Option</u>

Transportation injuries	17.4
Transportation fatalities	less than 1

- Risk to public along transportation route:

<u>Envirocare Option</u>

Carcinogenic	1×10^{-7}
Transportation injuries	19
Transportation fatalities	6

<u>Nevada Test Site Truck Option</u>

Transportation injuries	48
Transportation fatalities	5.2

<u>Nevada Test Site Intermodal Option</u>

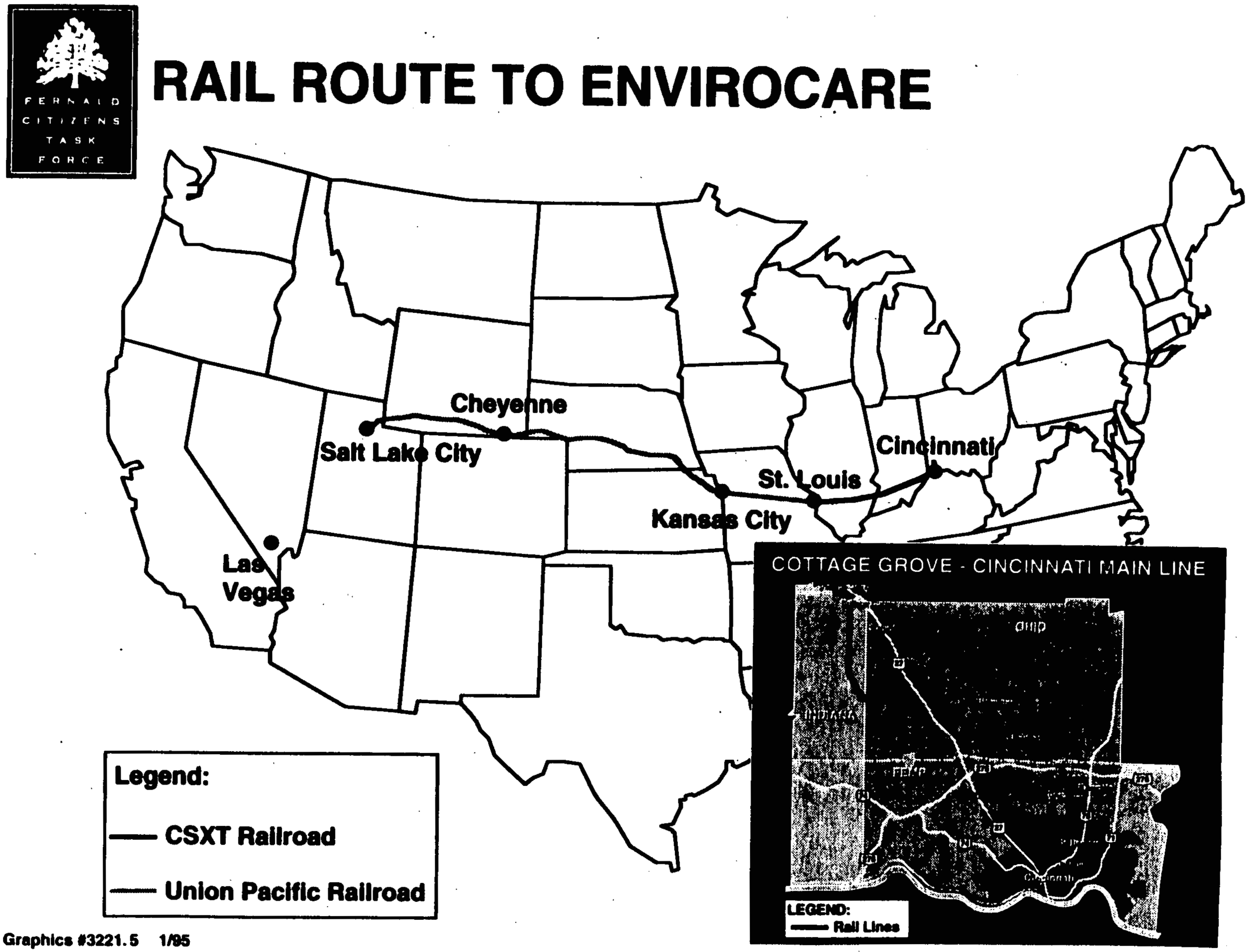
Transportation injuries	22
Transportation fatalities	5.5

FERNALD CITIZENS TASK FORCE

DOE WASTE SCEDULED FOR FY95 SHIPMENTS TO NTS

GENERATOR	VOLUME (yd^3)	PERCENT OF TOTAL	APPROVAL STATUS
Aberdeen, Maryland	286	0.8%	Approved
Mound, Ohio	7139	20.9%	Approved
Rocky Flats, Colorado	432	1.2%	Approved
Fernald, Ohio	22920	67.1%	Approved
General Atomics, California	260	0.8%	Approved
ITRI, New Mexico	0	0%	Suspended
Lawrence Livermore, California	1003	2.9%	Approved
Pantex, Texas	195	0.6%	Approved
REECO, Nevada	14	0.1%	Approved
Reactive Metals, Inc., Ohio	1236	3.6%	Approved
Rockadyne, California	368	1.1%	Approved
Sandia, California	301	0.9%	Suspended
TOTALS	34,154	100%	
Proposed Fernald shipment over 20 year period	120,000	350%	

RAIL ROUTE TO ENVIROCARE



Legend:

— CSXT Railroad

— Union Pacific Railroad

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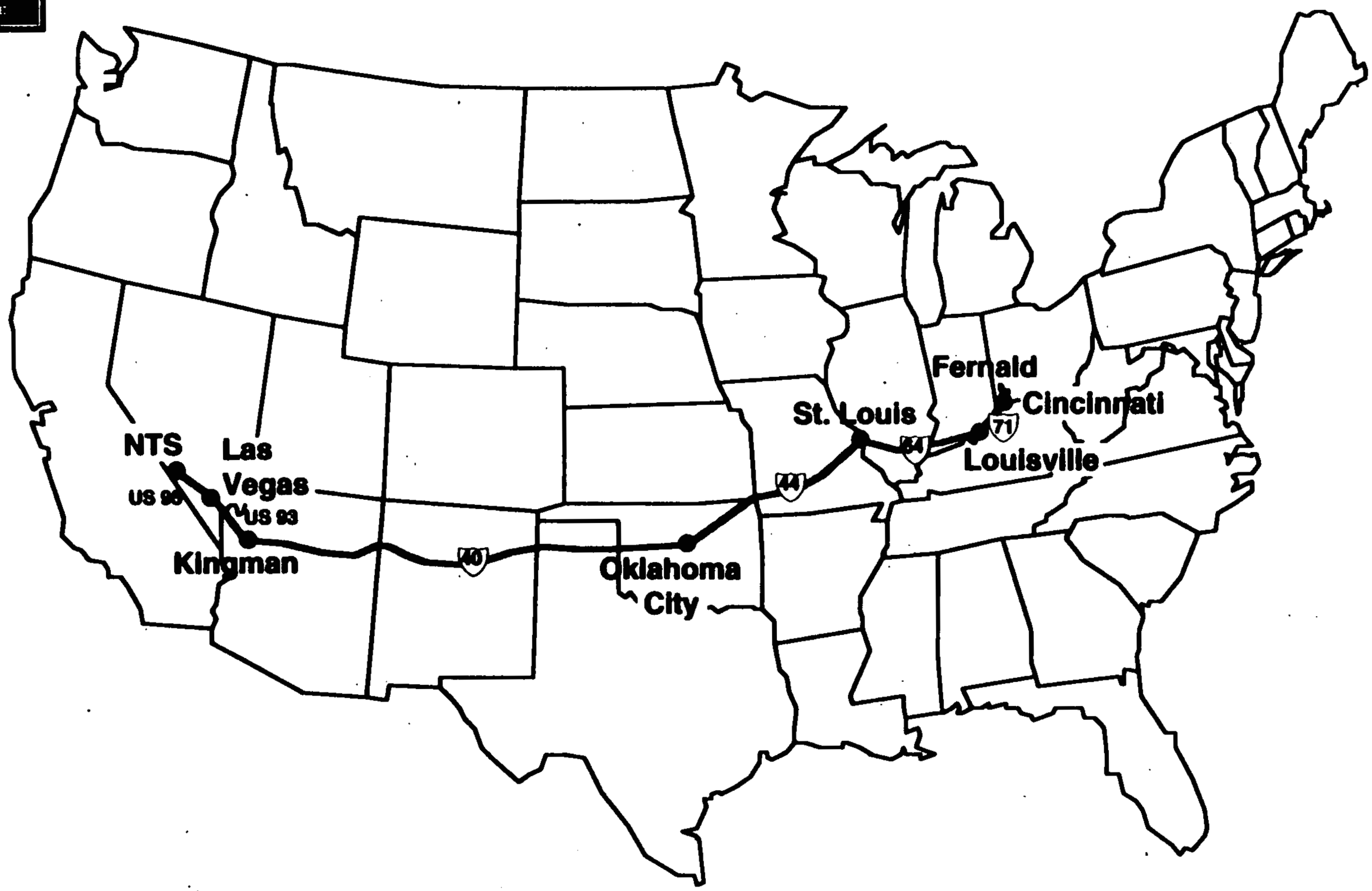
TRUCK ROUTE TO NTS

FERNALD CITIZENS TASK FORCE



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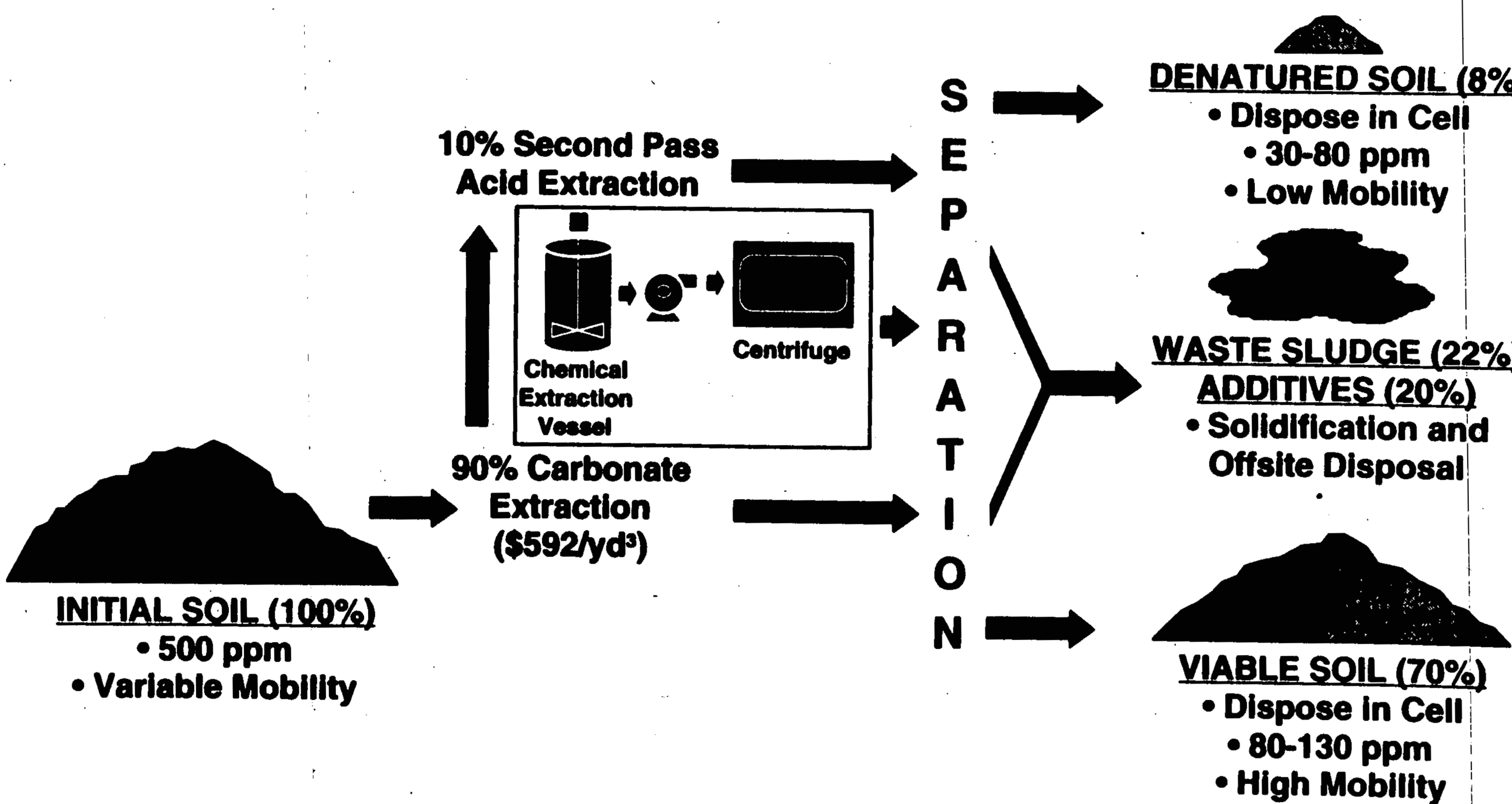
FERNALD CITIZENS TASK FORCE

SUMMARY OF ON-SITE AND OFF-SITE DISPOSAL OPTIONS

	ON SITE	OFF SITE
COST	Unit Cost: $175/cubic yard Volume 2.4 million cubic yards Total Cost $420 million Annual O&M $1.4 million	Nevada Test Site Unit Cost: $1440/cubic yard Volume 2.4 million cubic yards Total Cost $3.46 billion Envirocare Unit Cost: $530/cubic yard Volume 2.4 million cubic yards Total Cost $1.27 billion
TIME TO IMPLEMENT	Approximately 20 years (linked to building demolitions).	Approximately 20 years (linked to building demolitions).
KEY ADVANTAGES	Minimizes transportation risk for large quantities of material (2.4 million cubic yards). Keeps materials at the site that can be managed safely within site imposed constraints. Does not "shift" custodial care for these materials elseware. Reserves capacity offsite for other materials from other sites that cannot be managed safely within site imposed constraints. Minimizes transportation "opportunity costs" such as for fossil fuel consumption and air pollution along transportation route. Lowest total cost option to taxpayer.	Provides highest level of certainty of long-term protection of human health and environment at the FEMP site. Eliminates perpetual institutional care requirements at FEMP. Frees up the maximum footprint of FEMP land for available alternate use. Eliminates reliance on modeling forecasts/ future projections of risk that cannot be quantified with a high level of certainty.
KEY CONCERNS	Relies on models to assess future potential risk and degree of protection provided. Triggers need for perpetual institutional care of the waste disposition area. Engineering and institutional controls must be relied upon to provide protection over the long term. Requires dedication of approximately 10% of FEMP property to perpetual care.	Transportation risks and logistics of shipping 2.4 million cubic yards of material more than 1500 miles. Relies upon forecasted disposal capacities nationwide which remain uncertain. Relies upon State acceptance of transportation along the route and disposal at the receiving States. Less control over the ultimate costs of the remedy (disposal site capacity and nationwide demand for such capacity come into play for FEMP remedy).

SOIL WASHING PROCESS



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FERNALD CITIZENS TASK FORCE

ONGOING TREATMENT INITIATIVES

PHYSICAL SEPARATION

Several physical separation technologies are under development and testing through DOE funded programs with national labs and universities to develop cost-effective treatment options for Fernald wastes. Technologies being tested with Fernald soils include high gradient magnetic separation, mechanical and column flotation, and aqueous bi-phasic separation. The result of these options would be similar to soil washing in that a clean fraction is desired which meets concentration and mobility requirements for free release on site and a dirty fraction would be generated requiring off-site disposal.

SOIL COMPACTION

A soil compaction (brick-making) process is currently being utilized at the DOE Mound Facility for radiologically contaminated soil as a volume reduction technique. There are several potential applications for this type of process at Fernald for reducing the volume of Fernald material resulting in smaller cell size and fewer off-site shipments. It may also reduce uranium mobility allowing for a higher waste acceptance criteria for on site disposal. This process will be evaluated during 1995 for potential application as either a stand-alone system or a component to an integrated physical separation process.

PHOSPHATE TREATMENT

Treatment of contaminated media with phosphate additives to bind materials to soil has high potential for effectively reducing mobility. Limited lab tests for scoping the viability of this concept for uranium have been conducted and further lab testing is in progress.

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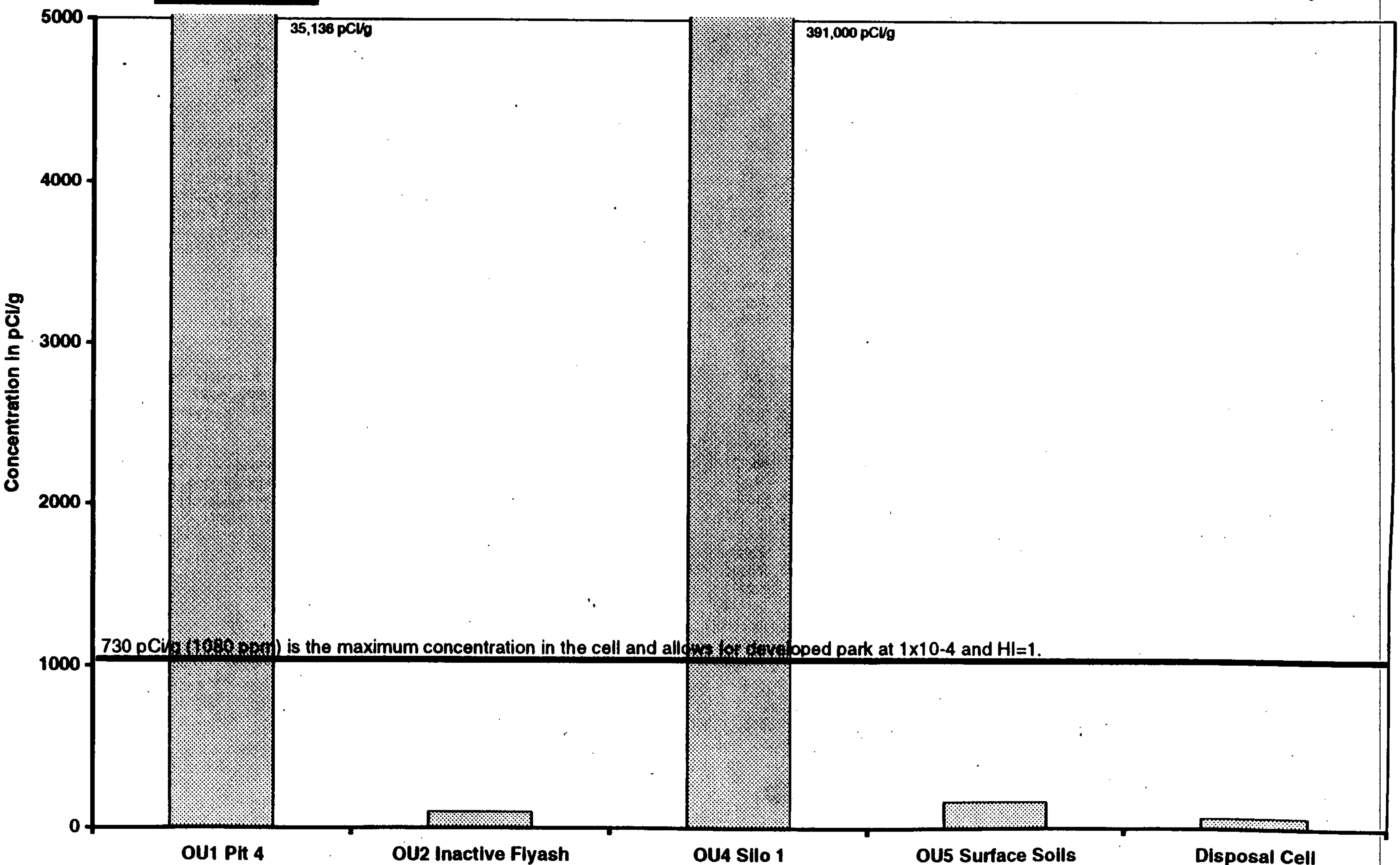
TOTAL URANIUM IN WASTE BY OPERABLE UNIT

Waste Category (and Analyte, if Different from Total Uranium)	Average Total Uranium[a] (pCi/g)	Average Total Uranium (mg/kg)	Maximum Total Uranium[a] (pCi/g)	Maximum Total Uranium (mg/kg)	Minimum Total Uranium (mg/kg)	Information Source
Operable Unit 1: Waste Storage Area						
Waste Pit 1	11,487	17,000	32,434	48,000	NA	Table A-7, OU1 Final FS Report, October 1994.
Waste Pit 2	1,960	2,900	3,919	5,800	NA	Table A-8, OU1 Final FS Report, October 1994.
Waste Pit 3	2,297	3,400	3,987	5,900	NA	Table A-9, OU1 Final FS Report, October 1994.
Waste Pit 4	35,136	52,000	81,084	120,000	NA	Table A-10, OU1 Final FS Report, October 1994.
Waste Pit 5	1,419	2,100	2,500	3,700	NA	Table A-11, OU1 Final FS Report, October 1994.
Waste Pit 6	8,784	13,000	18,920	28,000	NA	Table A-12, OU1 Final FS Report, October 1994.
Burn Pit	1,351	2,000	3,041	4,500	NA	Table A-13, OU1 Final FS Report, October 1994.
Clearwell	811	1,200	1,892	2,800	NA	Table A-14, OU1 Final FS Report, October 1994.
Operable Unit 2[a]: Solid Waste Landfill						
Surface Soil Phase II	11	16	131	194	7	Table 4-3, OU2 Final RI Report, January 1995.
Subsurface Soil Phase I	35	52	635	940	3.7[d]	Table 4-4, OU2 Final RI Report, January 1995.
Subsurface Soil Phase II	34	51	1,196	1,770	3.7[d]	Table 4-5, OU2 Final RI Report, January 1995.
Operable Unit 2[b]: South Field						
Surface Soil Phase II	1	2	34	51	3.7[d]	Table 4-48A, OU2 Final RI Report, January 1995.
Subsurface Soil Phase I	4	6	266	394	3.7[d]	Table 4-49, OU2 Final RI Report, January 1995.
Subsurface Soil Phase II	18	27	791	1,170	3.7[d]	Table 4-50, OU2 Final RI Report, January 1995.
Operable Unit 2[a]: Inactive Flyash Pile						
Surface Soil Phase II	3	4	22	32	3.7[d]	Table 4-30, OU2 Final RI Report, January 1995.
Subsoil Phase I	36	54	590	873	3.7[d]	Table 4-31, OU2 Final RI Report, January 1995.
Subsoil Phase II	101	149	2,419	3,580	3.7[d]	Table 4-32, OU2 Final RI Report, January 1995.
Operable Unit 2[a]: Lime Sludge Ponds						
Surface Soil Phase II	11	17	165	244	3.7[d]	Table 4-16, OU2 Final RI Report, January 1995.
Subsurface Soil Phase I	1	2	4	6	3.7[d]	Table 4-17, OU2 Final RI Report, January 1995.
Subsurface Soil Phase II	0.68	1	18	26	3.7[d]	Table 4-18, OU2 Final RI Report, January 1995.
Operable Unit 2[a]: Active Flyash Pile						
Surface Soil (5 samples)	8	12	10	15	10	Table 4-73, OU2 Final RI Report, January 1995.
Operable Unit 3: Production Area	NA	NA	NA	NA	NA	NA
Operable Unit 4: K-65 Silos (Radium-226)						
Silo 1	391,000	391,000 pCi/g	890,700	890,700 pCi/g	89,280 pCi/g	Table 4-2, OU4 Final RI Report, November 1993.
Silo 2	195,000	195,000 pCi/g	481,000	481,000 pCi/g	667 pCi/g	Table 4-2, OU4 Final RI Report, November 1993.
Operable Unit 4: K-65 Silos (Thorium-230)						
Silo 3	51,200	51,200 pCi/g	71,650	71,650 pCi/g	21,010 pCi/g	Table 4-19, OU4 Final RI Report, November 1993.
			0			
Operable Unit 5: Environmental Media			0			
Surface Soil[c]	165	244	61,049	90,350	3.7[d]	Table 4-14, OU5 Draft Final RI Report, October 1994.
Subsurface Soil[c]	137	202	46,826	69,300	3.7[d]	Table 4-15, OU5 Draft Final RI Report, October 1994.
Waste Disposal Cell	68	100	730	1,080	NA	OU5 Draft FS Report, Nov 1994; for $K_1$15 = 1080 ppm

[a] Average specific activity for total uranium was calculated for 0.6757 pCi/g per ppm uranium; it was assumed that the uranium was natural in composition, not depleted or enriched.
[b] Average concentration estimate = |range of positive detects|/number of positive detects.
[c] Table 4-1, OU5 Draft FS Report, November 1994, per M.Jewett, 15 Feb 1995, for K_1 = 15 leachable is 1080 ppm; 22400 ppm is for K_1 = 325; FEMP WAC.
[d] 3.7 ppm is the background amount of total uranium in soil per OU5 Draft FS, 2-47. This value replaces the measured concentration, which was below the background level.

COMPARISON OF AVERAGE LEVELS OF RADIOACTIVITY IN SELECTED WASTES



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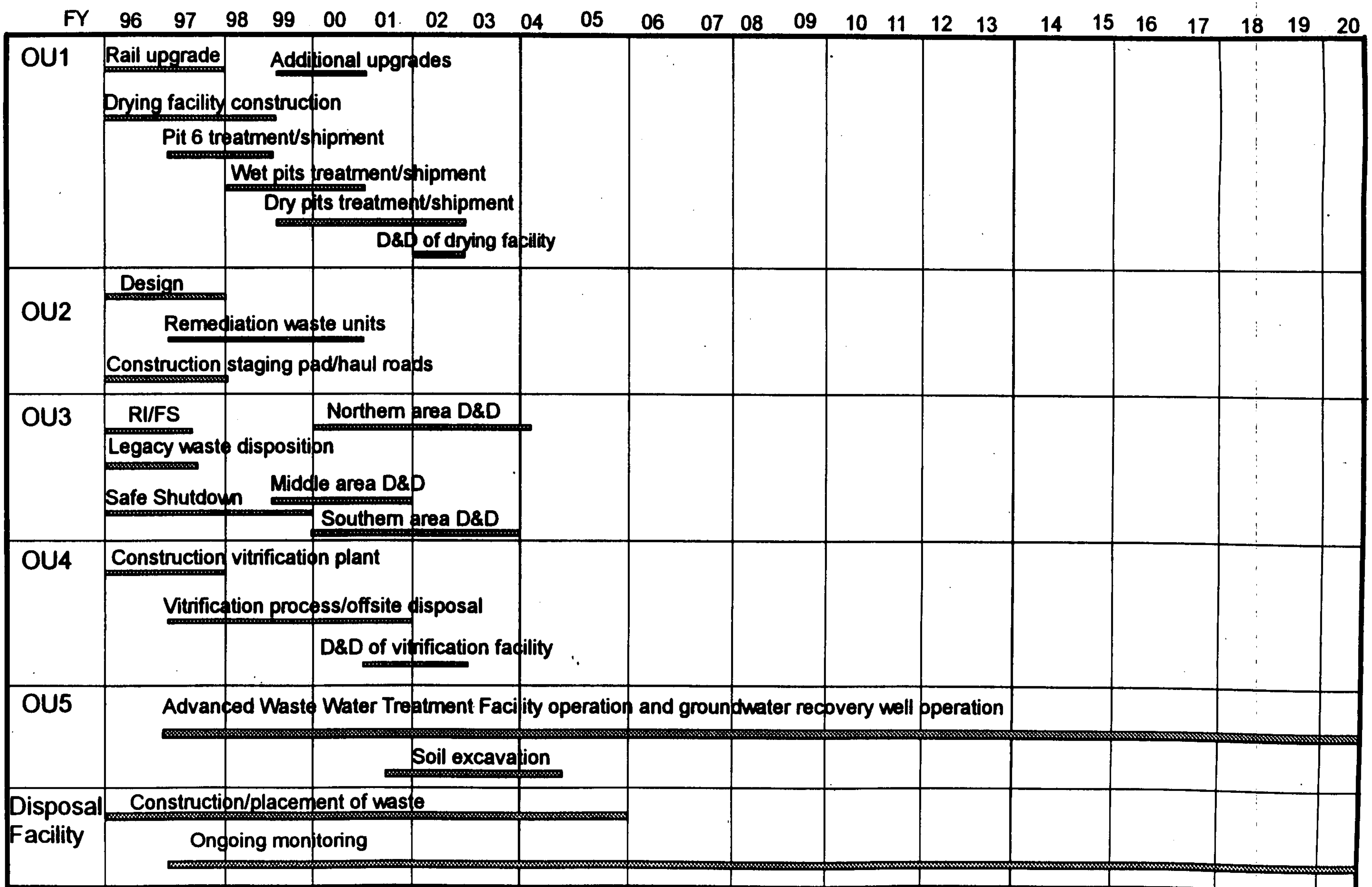
Comparison of Constrained and Unconstrained Funding Scenarios

Activity Description	*Duration in Months/ (Approx. End Date) 10-Year Schedule*	*Cost in FY-95 Dollars 10-Year Schedule*	*Duration in Months/ (Approx. End Date) 25-Year Schedule*	*Cost in FY-95 Dollars 25-Year Schedule*
OU 1 Response Actions	84 (2003)	$371,000,000	168 (2009)	$622,000,000
OU 2 Response Actions	57 (2001)	$46,000,000	36 (1999) - 24 (2011)	$61,000,000
Inactive Flyash Pile	12	$9,400,000	1999	
Active Flyash Pile	12	$9,100,000	1999	
South Field	12	$9,300,000	1999	
Landfill	3	$9,000,000	2011	
Lime Sludge	2	$9,200,000	2011	
On-Property Disposal Facility	* (2006)	$127,000,000	48 (2002) - 132 (2020)	$166,000,000
OU 3 Response Actions	108 (2004)	$291,000,000	48 (2002) - 108 (2017)	$319,000,000
Safe Shutdown Summary	48	$39,000,000	2000	
Building/facility D&D; Waste Dispositin	108	$252,000,000	2017	
OU 4 Response Actions	84 (2003)	$145,000,000	96 (2004)	$167,000,000
OU 5 Response Actions	**	$261,000,000	300 (2020)	$329,000,000
Groundwater	**	$81,000,000	(2020)	
AWWT operations thru 2005	120	$58,000,000	(2020)	
Soil	120 (2005)	$122,000,000	96 (2019)	
Legacy Waste Management	12 (1997)	$22,000,000	24 (1998)	$60,000,000
Administration/Project Management	120 (2006)	$536,000,000	300 (2020)	$766,000,000
Landlord	120 (2006)	$420,000,000	300 (2020)	$840,000,000
TOTAL		**$2.2 Billion**		**$3.3 Billion**

* Earliest possible date the on-property disposal facility will be available to receive materials is August 1, 1997. The cap will be in-place 12 months following the receipt of last materials.

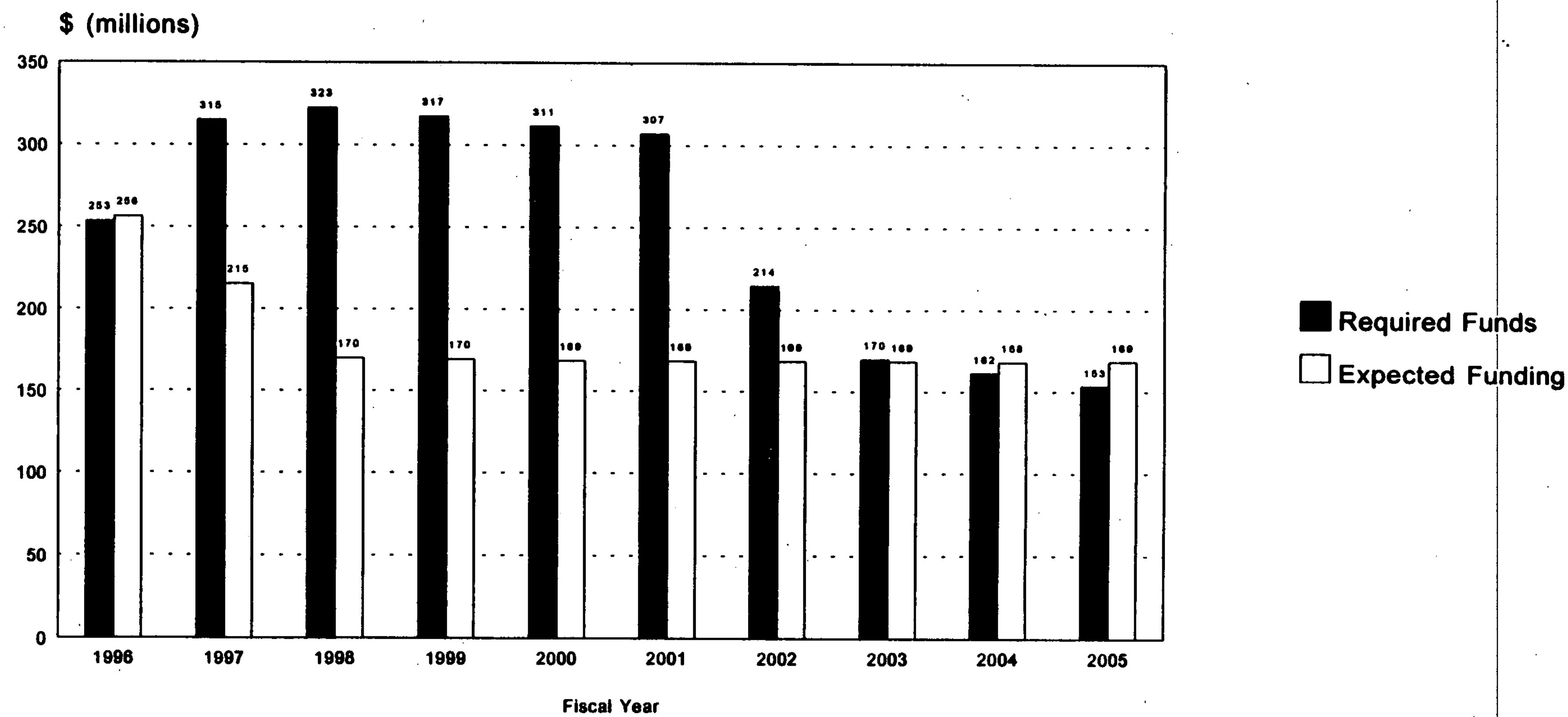
** OU5 response actions — specifically groundwater — will continue until completion in 2020. Operation of AWWT will continue as necessary beyond 2005 to attain *discharge limitation to the Great Miami River.*

10-Year Cleanup Schedule Based On Unconstrained Funding



10-YEAR CLEANUP SCENARIO

FEMP Funding Required vs Expected Funding - Unescalated



Constant 1995 dollars.

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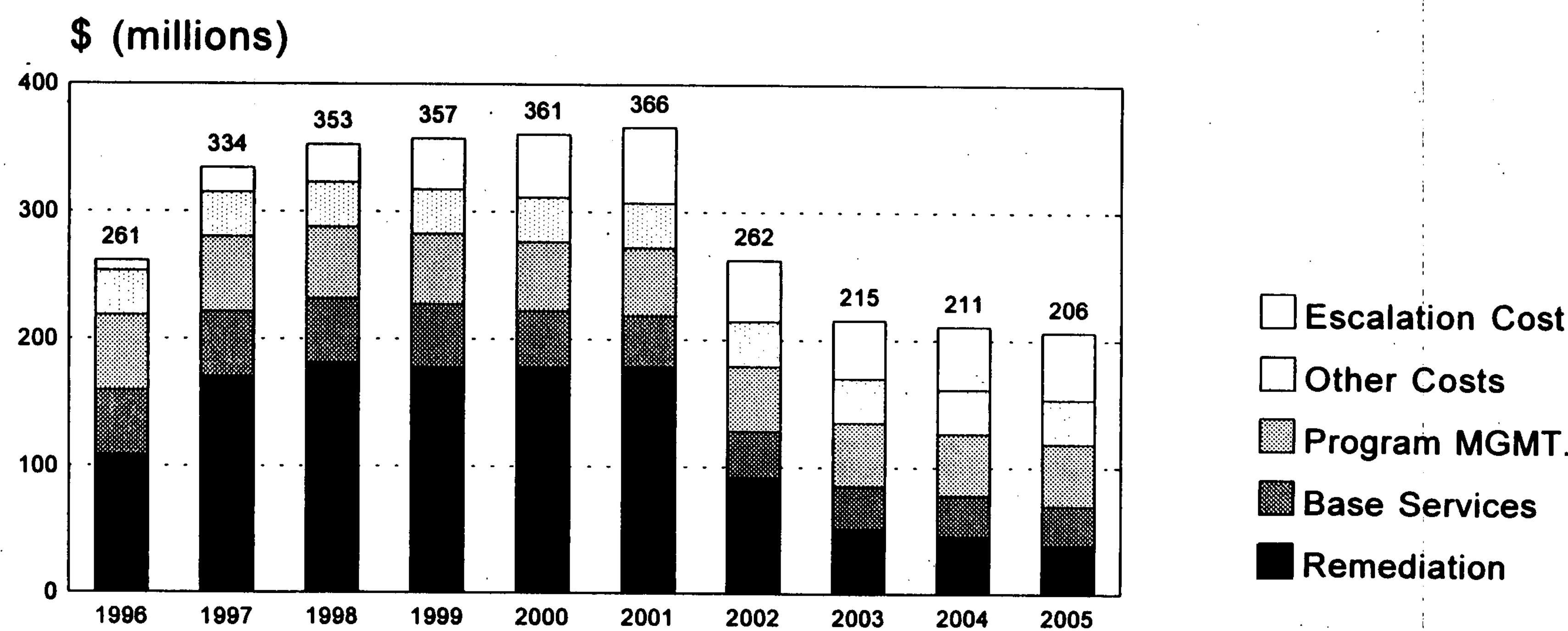
10-Year Cleanup Scenario
Cost Projection with Escalation



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Escalation Cost	8	19	30	40	49	60	48	45	49	53
Other Costs	35	35	35	35	35	35	35	35	35	35
Program MGMT.	59	59	56	55	54	53	51	50	49	49
Base Services	51	51	50	49	44	40	36	34	32	31
Remediation	109	171	182	178	178	179	92	51	45	38

Fiscal Year

Other costs include DOE support and fees.
Escalation estimated at 3% per annum.
1995 is Base Year.

10 March 1995

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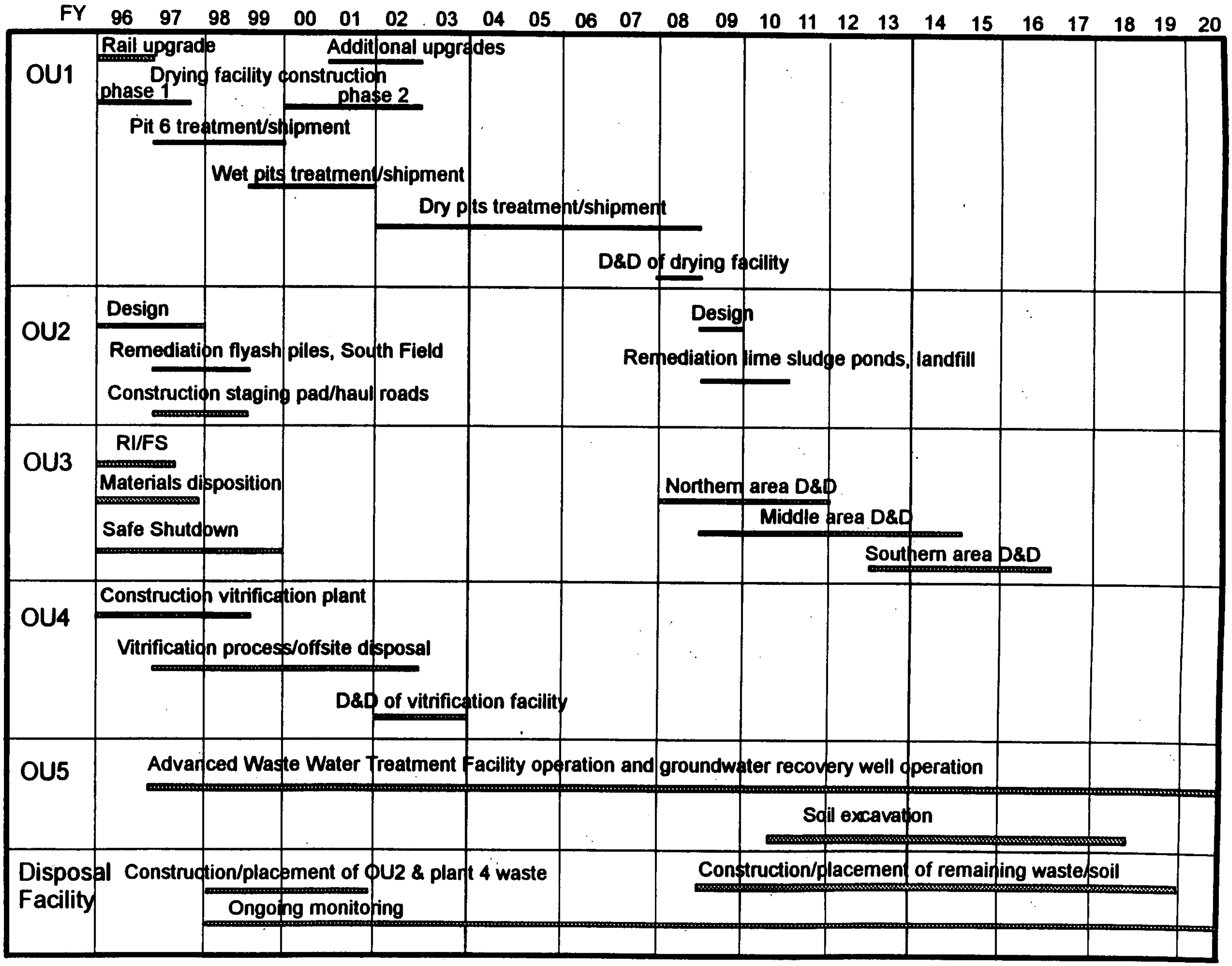
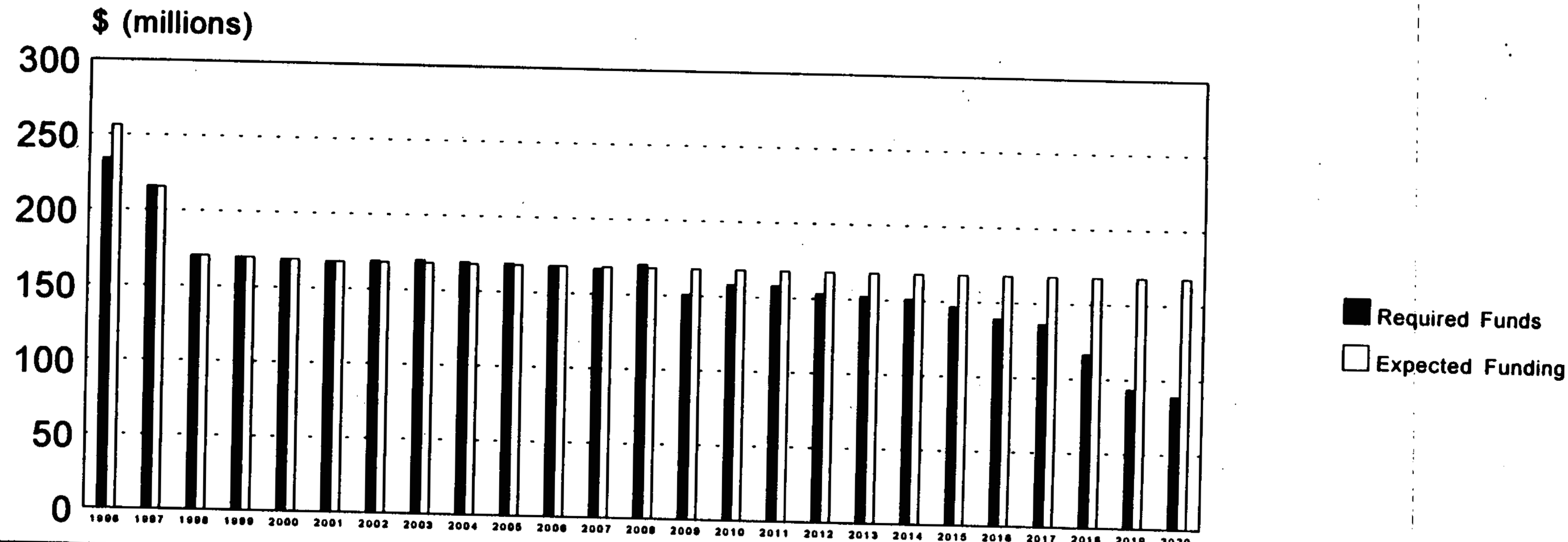
25-Year Cleanup Schedule Based On Expected Funding



000054

25-YEAR CLEANUP SCENARIO

FEMP Funding Required vs Expected Funding Unescalated



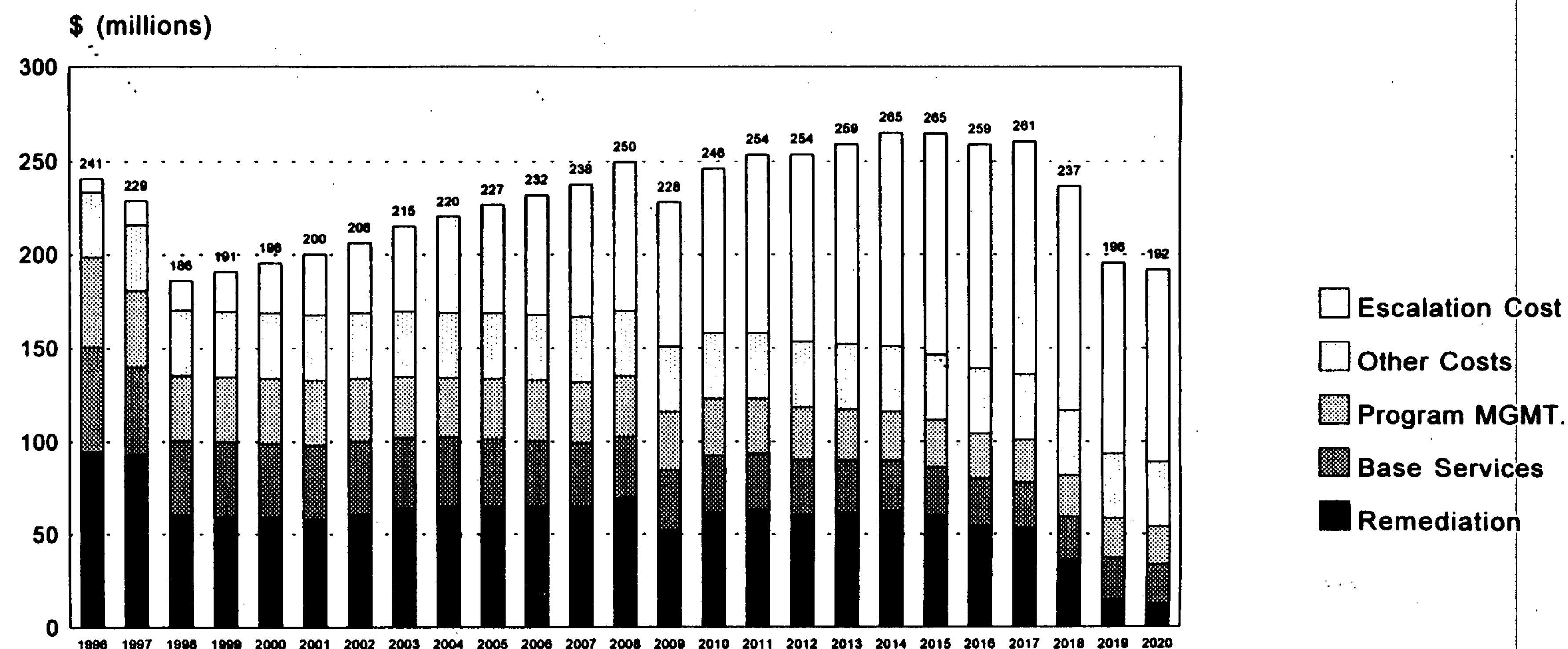
Fiscal Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Required Funds	234	216	170	170	169	168	169	170	169	169	168	167	170	151	158	158	154	152	151	147	139	136	117	94	89
Expected Funding	256	215	170	170	169	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168

Fiscal Year

Constant 1995 dollars
Includes contractor fee and DOE costs.
Operable Unit 2 preceeds Operable Unit 1

10 March 1995
page 6

25-YEAR CLEANUP SCENARIO
Cost Projection with Escalation



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Escalation Cost	7	13	16	21	27	33	38	45	51	58	64	71	80	77	88	96	100	107	114	118	120	125	120	102	103
Other Costs	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Program MGMT.	48	41	35	35	35	35	34	33	32	32	32	32	32	31	30	29	28	27	26	25	24	23	22	21	20
Base Services	56	47	40	40	40	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21
Remediation	95	93	60	60	59	58	61	64	65	65	65	65	69	52	61	63	61	62	62	60	55	53	38	15	12

Fiscal Year

Other costs include DOE support and fees.
Escalation estimated at 3% per annum. 1995 is Base Year.
Operable Unit 2 preceeds Operable Unit 1.

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FERNALD CITIZENS TASK FORCE

MEETING AGENDA AND MATERIALS APRIL 8, 1995

8:30 - 8:45	Call to Order
	Approval of Minutes
	Chair's Remarks
8:45 - 8:55	Revision to Waste Disposition Recommendation
	Materials Provided:
	Proposed Change for 4/8/95, Page 1 of Recommendation
8:55 - 9:30	Final Priorities Recommendation
	Materials Provided:
	Seven Year Funding Scenario
	Ten Year Funding Scenario
	Priorities Recommendation Markup Draft 4/7/95
	Priorities Recommendation Draft 4/7/95
9:30 - 10:00	Review Future Use Issues and Information
	Materials Provided:
	Future Use Issues, 4/8/95
	Memorandum on Grazing Risks
10:00 - 10:15	Break
10:15 - 11:15	Future Use Discussion and Draft Recommendations
11:15 - 11:30:	Opportunity for Public Input
11:30 - 12:00	Discuss Final Report Outline
	Materials Provided:
	Draft Final Report Outline, 4/6/95
12:00 - 12:25	Discussion of Activities for May and Final Report Preparation
12:25 - 12:30	Wrap Up
12:30	Adjourn

FERNALD CITIZENS TASK FORCE

RECOMMENDATION FOR AN ON-SITE DISPOSAL FACILITY AT FERNALD

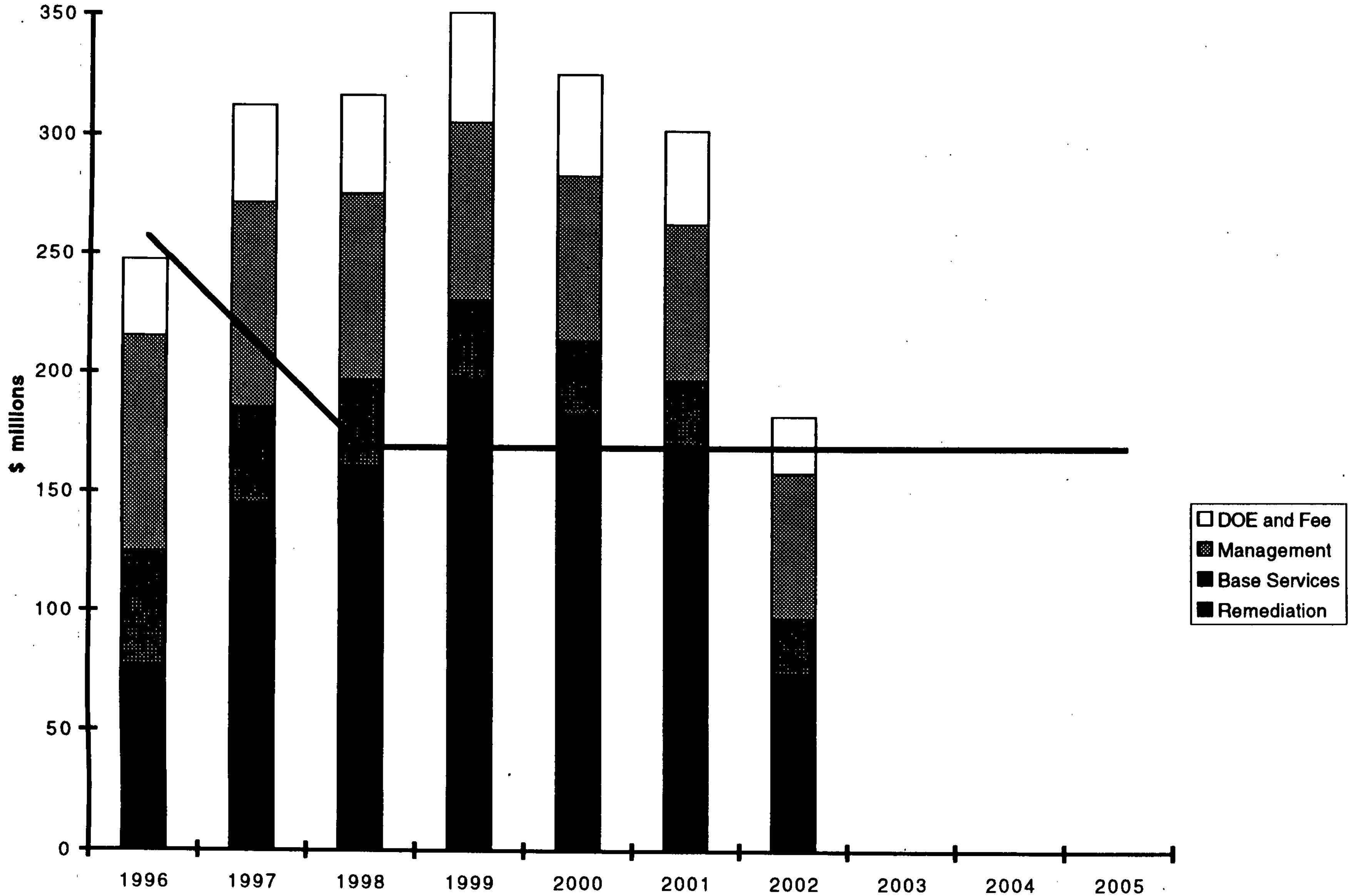
(PROPOSED CHANGE FOR 4/8/95)

The Fernald Citizens Task Force recommends the construction of an on-site disposal facility to accept, from the Fernald site only, materials solely with low levels of contamination meeting the site-specific waste acceptance criteria.

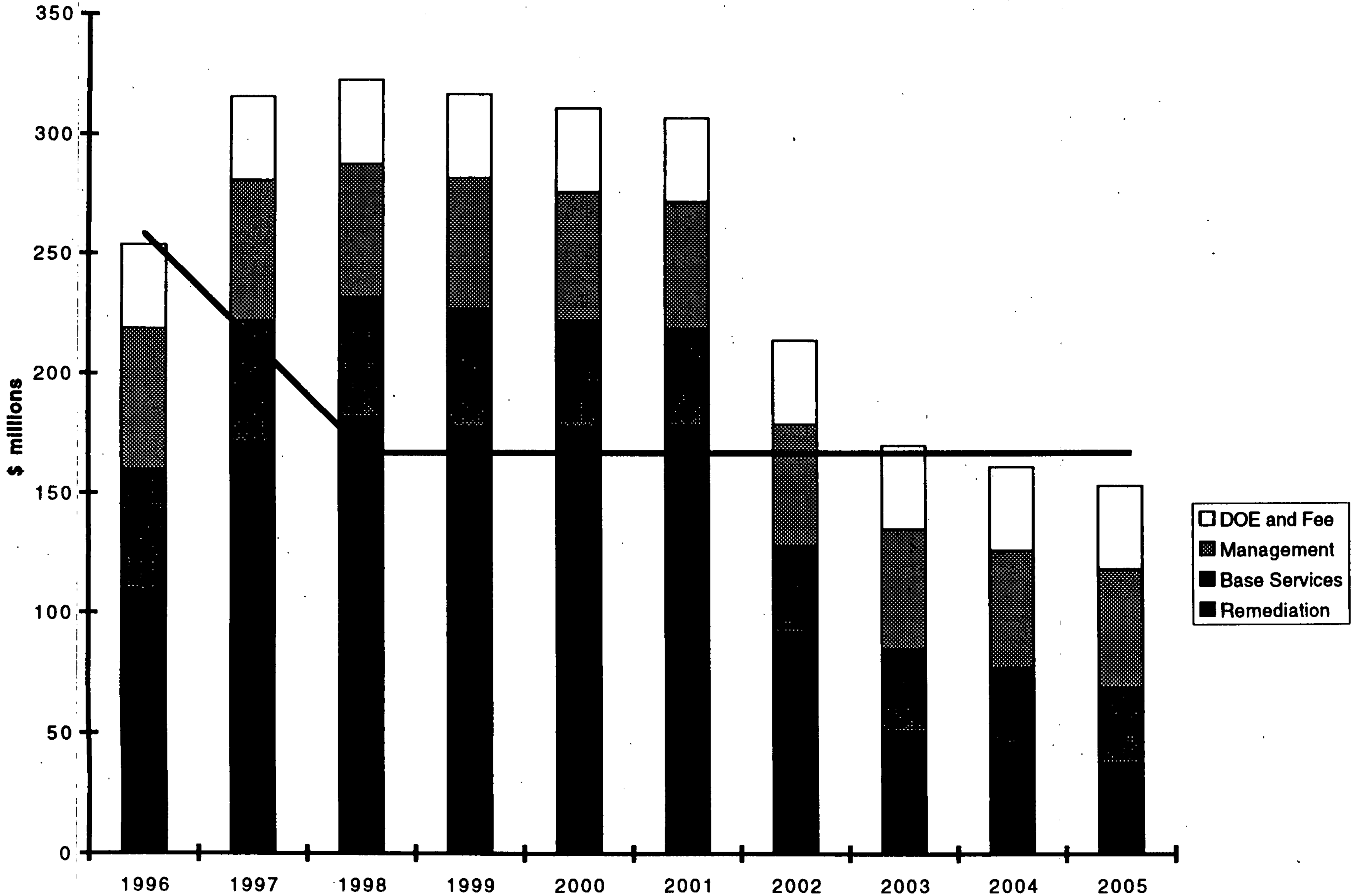
The Fernald Citizens Task Force does not make this recommendation lightly. It is the result of one and one-half years of study, discussion, and evaluation. Disposition of contaminated material is one of four key recommendations required of the Task Force by our August 1993 charter. In the December 1993 work plan, we scheduled this decision for 1995. This schedule was then further refined in a revised work plan approved in December 1994. The draft final recommendation was prepared as scheduled in February 1995, with discussion and a public workshop on the full range of issues having been conducted as scheduled in January 1995. It is important to the Task Force that all our recommendations be based on a thorough evaluation of the technical information available, and through discussion and feedback with our neighbors surrounding Fernald. To this end, all of our meetings are open to the public and widely publicized, and all agendas are mailed to an extensive list of local residents and government officials. Comments are received at Task Force meetings, other public meetings attended by Task Force members, by mail, and through the Task Force message line.

All members of the Task Force live ~~and~~ *or* work in communities that are impacted by the decisions being made at Fernald, and eight of 14 live and work in the direct vicinity of the site. No member of the Task Force wishes to see contaminated materials from Fernald or any other location stored on the Fernald property indefinitely. As it adjoins residential and agricultural lands and is situated directly above a sole source aquifer, Fernald is far from an ideal location for disposal of contaminated materials. Nevertheless, we are aware of the many engineering, political, and financial challenges facing a project the size of the Fernald cleanup. Our primary goals are protecting human health and the Great Miami Aquifer. We believe that a balanced approach to cleanup, in which the most hazardous materials are disposed off the Fernald property and the least hazardous materials are stored safely on the property, is the most effective way to achieve prompt and enduring protection for the communities surrounding Fernald. We ultimately arrived at this recommendation in consideration of the following:

Funding Requirements vs. Expected Funding for Unconstrained 7 Year Remediation Scenario



Funding Requirements vs. Expected Funding for Unconstrained 10 Year Remediation Scenario



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FERNALD CITIZENS TASK FORCE

RECOMMENDATION TO ESTABLISH SITE PRIORITIES AND ACCELERATE REMEDIATION AT FERNALD

(MARKUP DRAFT April 7, 1995)

The Fernald Citizens Task Force believes that the Fernald site is poised to make great progress in its remediation program, but only if allowed to operate in an efficient and streamlined manner. ~~All of the~~ *The most* difficult and complex decisions regarding remediation have been clearly mapped out *in accordance with the amended consent agreement and Records of Decision* and will be in place within the next few months. The challenge now is to implement these decisions in a quick, safe, and cost-effective manner. The Fernald Citizens Task Force believes that this cannot be done under the remediation approach and operating rules that exist at Fernald today.

As part of our charge to recommend site priorities, we are calling for a fundamental shift in the approach to remedial operations at Fernald. DOE and its contractor must ~~begin to~~ view the project as an environmental remediation operation, period. It is their job to implement the remediation decisions that have been made, quickly, safely, and cost-effectively, and then to leave. ~~Fernald must cease acting like an ongoing operation and move to closing up shop.~~ If Fernald is to be really treated like the ~~Superfund site~~ *remediation project* it is–where work should be focused on a single goal and completed in a finite period of time~~–site~~ management *at all levels* must make an immediate and decisive change. Such an approach has several important consequences for remedial priorities, *and focuses attention on obstacles to*

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remediation that go beyond the existing five operable units. Its cornerstone must be to eliminate big sources of non-productive expense: high overhead, storage of materials awaiting shipment, and cumbersome ~~government~~ *Department of Energy* regulations. Specifically, we would like to see immediate and substantial steps taken to deal with the following:

Special Nuclear Materials. There are 17 million pounds of special nuclear (non-waste) materials throughout the Fernald site, which require a high level of expensive security, *accounting,* and safety procedures to maintain. This material is not going to stay at Fernald. This material does not belong at Fernald now, as Fernald is an environmental remediation project. Storage and maintenance of this material is being done at the expense of remediation operations. Much more cost-effective storage facilities already exist within the DOE complex for materials such as these. ~~The decision~~ *DOE Headquarters* needs to ~~be made~~ *make* and implemente~~d~~ *the decision* immediately to move these materials to such an appropriate location.

Legacy Wastes. There are approximately 70,000 drum equivalents of legacy waste and another 12,000 drum equivalents of mixed waste sitting at Fernald awaiting shipment. Again, the storage and maintenance of these wastes is diverting money from other much needed remediation activities. There is no mystery surrounding the location for disposal of *most of* these wastes, and their immediate shipment should be a top priority.

Safe Shutdown. When production ceased at the plant in the summer of 1989, it was conducted without taking the proper steps to bring the equipment and buildings to a safe configuration. Six years later, this has still not been done. As a result, millions are spent each year to maintain and provide security to buildings that should be closed and shuttered *for subsequent demolition.* Every effort must be made to expedite the safe shutdown of the Fernald facility to eliminate these burdensome overhead costs and hasten the shift in culture from operations to environmental remediation.

Ongoing Maintenance Activities. *Another aspect of approaching Fernald as a remediation project is to discontinue the ongoing repair, maintenance, and improvement to on-site buildings and infrastructure, except where essential to remediation progress or worker safety. Of particular concern to the Task Force is the importing of clean materials onto the site to perform non-remediation tasks, realizing that all of this material will end up in the on-site disposal facility.*

Overlapping Regulations. Perhaps the most cumbersome of all regulations facing the remediation of the Fernald site are those imposed by DOE on itself. *The application of many DOE orders that are geared to the operation of highly complex and dangerous nuclear operations to remediation activities wastes significant time and money. Where these orders are redundant of other state and federal regulations, they should be waived.* The Fernald Citizens Task Force suggests that the Fernald site ~~is an ideal candidate to serve as a pilot program~~ *should be the prototype* for streamlining these requirements and placing remediation first.

Budgeting for the Long Haul. Fernald holds a unique position among DOE's major remediation sites: its decisionmaking is nearly complete, ~~all~~ needed technologies are in place, and its size is manageable. With the above reforms, a relatively modest up-front investment will yield a nearly complete remediation in one-half to one-third of the time projected in current reduced-budget scenarios. *Under current budget constraints, remediation is estimated to take 25 years at a total escalated cost*

~~*of $5.7 billion. Without constraints, the same remediation could be conducted in*~~ *seven years at a total escalated cost of $2.7 billion.* ~~The financial~~ *In addition to* savings~~ run into the~~ billions of dollars, the symbolic significance of getting a major facility "off the books" is incalculable. Our understanding of the options available to DOE in budgeting the Fernald project boil down to two basic choices: the potential for a big win by completing remediation in the seven ~~to ten~~ year time-frame or a project constrained by annual funding caps that eventually costs twice as much and lasts three times as long. Dollar for dollar, there must be few opportunities in the DOE complex that offer a clearer choice or more attractive dividends.

DOE, its regulators, and its stakeholders must work together, with flexibility on all sides, to make these changes happen. It is time that DOE changed its legacy from a slow moving and expensive dinosaur, to a model of government/*contractor* efficiency. Given the tools **and the reforms,** Fernald can lead the way.

FERNALD CITIZENS TASK FORCE

RECOMMENDATION TO ESTABLISH SITE PRIORITIES AND ACCELERATE REMEDIATION AT FERNALD

(DRAFT April 7, 1995)

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FERNALD CITIZENS TASK FORCE

FUTURE USE ISSUES
APRIL 8, 1995

1. **Location And Appearance Of Cell**
   - Actual location decision not possible, but can identify general concerns and issues that are important in locating cell

2. **Desired Buffer Zones**
   - How far from property border?
   - How far from nearest residence?
   - What, if any, uses should be permitted in buffer zones?

3. **Desired Uses On Remaining Property**
   - What is the preferred use of remediated property?
   - Should post-remediation restrictions on farming include grazing?

4. **Ongoing Government Control Of Property**
   - How should control of cell and buffer zones be structured?
   - Is ownership required on remediated property outside the established buffer zone?
   - Is ownership required on property that required no remediation at all?

5. **Transitional Use**
   - Should any uses be allowed during construction?
   - Should uses be allowed to be phased in as different parcels of the property are remediated?
   - Does this change depending on 7 year vs. 25 year schedules?

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Washington, D.C. 20007
Phone: 202-342-2110
Fax: 202-337-8103

Georgetown Risk Group

December 30, 1994

MEMORANDUM

TO: Sarah Snyder
Senior Public Affairs Specialist, FERMCO

FROM: Resha M. Putzrath, Ph.D., DABT
Principal, Georgetown Risk Group

SUBJECT: Review of Risk Assessment on Milk and Meat from Cows

Summary and Conclusions:

Within the scope of this very limited review of a risk assessment that is based on a small number of samples, *no large risk above background appears to be present*. While standard regulatory risk assessment procedures appear to have been used, the small number of samples and remaining issues regarding the models and methods used preclude an independent verification of the absolute values of the risk estimates. Some of the issues regarding the risk estimates are discussed in my review. The conclusions must be considered within the following context.

- The methods used for the analysis have not been evaluated in depth, and therefore, these conclusions are based on a general knowledge of regulatory risk assessment procedures. In particular, no independent risk assessments were performed to verify the analyses presented in the documents reviewed.

- Information about the process by which the meat and milk samples were collected was not available in the documents provided. Issues that could affect my conclusions include: whether the cows were randomly selected or another process used; whether the same or different cows were sampled in the multiple months of milk sampling; and whether the amount of time the cows grazed on land that is potentially contaminated or known to be contaminated prior to sampling is available.

- Only one analysis for radioactivity in meat was provided. Some of the analyses of Sr-90 in milk were not available for technical reasons. Thus, the data available for analysis is limited.

- No statistical procedures were used to determine if the samples from exposed cows were different from those of unexposed cows.

- It is not clear if the risk assessors evaluated: (1) potential retention of radionuclides by the receptors or (2) tissue-specific doses. If these were not appropriately considered in the risk assessment, the risk estimates could underestimate the potential hazard.

If additional resources were available, this review could benefit from:

- more knowledge about the source and selection of samples for analysis, e.g., how were the cows selected for sampling,

- a review of the models and references cited in the reports and/or conversations with the people who performed the analysis,

- an independent risk assessment (possibly using different assumptions) to verify the conclusions,

- a statistical analysis of the data (if a statistician believes sufficient data exist to provide a sufficiently meaningful analysis), or

- obtaining more data, especially on strontium in milk and all chemicals in beef.

Introduction

Based on the information provided, I was asked to address review the risk assessment data and methodology for the environmental monitoring data with regard to consumption of milk and meat from cows grazing on DOE property. In particular, no independent risk assessments were to be performed as part of this assignment. As this was a not a thorough critique of the risk assessment, I have depended on several assumptions, including that:

- the data are accurately reported, and did not include data qualifiers (e.g, as to the accuracy of the chemical analysis) that are not in the tables as sent,

- the parameters for the risk assessments are accurately transcribed from the sources noted,

- the cancer potency factors for radionuclides are accurate, even though as stated in materials provided, these values are controversial among health physicists and others who have examined the data extensively,

- the risk assessments provided used the equations and extrapolations presented in the *Risk Assessment Work Plan Addendum* of June 1992, and
- the calculations were performed as noted in the text and have been checked for accuracy of both values and units of measure.

To provide the most efficient analysis in the limited scope, I have focused on what are likely to be the critical questions for decisions about the risk analysis. Each is addressed in turn. Furthermore, I have focused my analysis on Sr-90 and uranium, for milk and meat respectively, as (based in the information sent) these are the most likely to be elevated from the site and of concern in the selected medium.

- **Was the risk analysis performed by a reasonable procedure?**

Multiple decisions must be made at every step of a risk analysis; therefore, one cannot necessarily determine one "best" method, but rather whether the approach is reasonable for the questions to be answered. Within that caveat, the risk assessments at Fernald appear to have been performed by methods commonly used by regulatory agencies.

- In that regard, the assumptions and models generally used by regulatory agencies will tend to err on the side of not underestimating exposure, toxicity, and risk. In particular, to the extent the risks include modeling exposure from air or soil to intake by cows to production of meat and milk, the conservative nature of the models and assumptions will tend to overstate the risk. For example, the memo of 11/30/94 states that, when the detected levels were *below* the background levels, the uncertainty in the chemical analysis was maximized to allow a "concentration" to be estimated.
- While the references on which the parameters for exposure were not available for this analysis, it is likely (based on the discussion in the text) that they include further assumptions and extrapolations that needed to be included in for the transuranic chemicals. Risk assessments based on data are to be given preference over risks estimated based on models.
- Even under the conditions of these assumptions, the highest risk estimated in the documents provided was 1.2×10^{-4} for an individual chemical. The issue of composit risk is discussed later.

While there are some issues I might question or differ with the authors of the current risk assessments, differences of approach is common among risk assessors. Many of the differences might be resolved by more data (discussed further below), as a paucity of data tends to exacerbate differences in assumptions (and degrees of risk aversion) among practioners. A more thorough analysis would be required to determine whether or not I believed that the risk assessment could be substantially improved.

- **What are some of the effects of choice of models and methods on the estimated risks?**

Because I was not able to analyze the references used to support this risk assessment, some questions remain. Some of these are presented below for illustrative purposes. It is important to emphasize that these factors may have been included in this risk analysis. The issue is that it is not possible, from this level of review and based on the materials sent for that review, to ensure that they were.

Issues such as these can be raised for many of the parameters used in the risk estimate. The risk assessments presented cite various government reports as the source for the values used. Most regulatory values tend to estimate the higher possible exposures. Without a thorough review of the source of each value within the analysis, however, the previous statement can not be absolute.

- **Were body burdens and tissue-specific doses evaluated?**

  It is clear that the risk assessments used various models to determine the uptake of radioactive nuclides by receptors (cows and people). It is not clear if the risk assessors evaluated potential retention (i.e., body burden) of radionuclides by the receptors or tissue-specific doses. In particular, Sr-90 can accumulate in bone and other calcium-rich tissues. Thus, if the assumption is that all beta-emitters are equally potent but the fact that some accumulate in the body was not included in the evaluation, the risk assessment could underestimate the potential hazard.

- **On what data are the cancer potency factors based?**

  A related issue is the source(s) of the cancer potency factor. For example, if the cancer potency factor were derived from long-term (chronic) exposure of animals to Sr-90, then the effects of retention by the body are likely to have been incorporated into the analysis. If the cancer potency factor was derived for beta-emitters in general, it is unlikely that this factor was included in the estimate of cancer potency. A related issue is whether the analysis was for whole body or for the organ with the highest burden and risk. For example, the National Academy of Sciences report, *Drinking Water and Health* reports a substantially higher dose to the bone than the whole body for Sr-90.

- **What method was employed to select cows for sampling?**

No information was provided about the method for selecting cows for sampling. Issues such as random selection of samples and the degree to which the selected cows represent either the average exposure or the high (or low) end of the potential exposures, therefore, cannot be addressed. Thus, even though the concentrations used in the risk analysis were at the high end of the values in the samples, the extent to which the samples represent the average, high, or low concentrations in the population of cows can not be determined from the information provided.

- **Do sufficient data exist to assess the risk?**

While scientists always desire more data, that which was provided for my review was quite limited, especially for beef. Although the scope of work for this review did not cover statistical analyses, e.g., to determine if the levels in the exposed cows were different from that of the controls, it is clear from one of the analyses (FEMP-05RI-5, Draft of 10/31/94) that there were *insufficient data to determine the distribution (normal, log-normal) of the potential contaminants.* Therefore, it is not certain whether a statistical analysis would be meaningful. Thus, by at least some definitions, insufficient data exists. Before gathering more data, however, two other questions with regard to whether more data would substantially change decisions with regard to potential contamination of milk and meat should be addressed.

- **Are the chemicals present above background levels?**

By observation, radioactive Sr and Ur are sometimes present (value minus one standard deviation greater than zero) in higher levels in the milk and meat from exposed cows than background samples. The levels in exposed cows were also sometimes lower than background. More data and a statistical analysis would be required to determine if a true difference exists between the two populations. In particular, some of the issues raised earlier with regard to methods and models may become critical in distinguishing between low levels of contamination and background. What is clear is that no large, consistent difference was observed in milk or beef -- at least in the very limited number of samples reported.

If there is really no difference between the levels in exposed cows and unexposed cows, additional data would only verify this fact. If there is a small, but real, difference between concentrations in exposed and unexposed cows, the sampling protocol must be carefully designed to provide the greatest opportunity to observe this difference.

- **Even if the chemicals are at or near background levels, are the chemicals present at levels that might be of concern?**

In the analyses provided, the highest estimated risk for an individual chemical is 1.2×10^{-4} for Sr-90. The highest composit risk from all radionuclides is 6.3×10^{-4} for Grazing Area 4. These values, however, appear to be dependent on modeling consumption by the cow from air, soil, and surface water of the contaminants, and I have not reviewed the validity of the models (FEMP-05RI-5, Draft of 10/31/94). As discussed below, even based on limited data, this is likely to represent a conservative estimate of the actual risk. It should be noted, however, that almost all risk assessments prepared using regulatory guidelines are conservative estimates of risk, and therefore similar benchmarks for acceptability should be considered when evaluating these risks.

The issue of acceptable levels of risk is dependent on individuals and communities and should not be assumed by the risk assessor. Two issues are worth noting, however, as these values are considered.

-- *If a 1×10^{-4} (one in ten thousand) risk is acceptable*, then the risk assessment process is not sufficiently accurate to distinguish between 1.0×10^{-4} and 1.2×10^{-4}. The composit risk value of 6.3×10^{-4}, however, would usually be considered higher than 1.0×10^{-4}.

-- *If composit risks are the basis for concern*, the method used for combining the risks should be carefully evaluated. Based on my analysis of composit risk estimates, I have demonstrated some problems with the mathematics of the models that are frequently used. Thus, although I have not performed such a critiques of this analysis, my previous experience suggests that composit risk estimates overstate the risk by more than the risks of individual chemicals. Again it should be noted that the method used in the analyses in the documents sent appears to be the standard procedure.

- **Why do some risk values differ from empirical data?**

Risk assessments depend on assumptions and approximations. For example, even with the limited data, decisions were made as to how much of the chemical might be present. In this case, the levels may not be statistically different than background levels. Nevertheless, it appears that the decision was to use high values, sometimes the highest value detected. It was then assumed that people consumed milk or meat contaminated at this level for the entire exposure period. Obviously, if the value used is at the high end of the actual levels that would be found, the risk assessment overestimates the amount present and the actual risk. This is particularly true for cancer risks where the total exposure for a lifetime is usually the exposure of interest.

FERNALD CITIZENS TASK FORCE
Final Report Outline
Draft 4/6/95

I. Background

A. Site Background
1. Site History
2. Contamination

B. Task Force History
1. DOE Approach
2. Convening Process
3. Membership
4. Charter and Ground Rules

II. Task Force Organization and Approach

A. Approach to Achieving the Mission
1. The Future Use Paradigm
2. Focused Meetings
3. Subcommittees
4. Staff Support and Outside Experts
5. Information Development
6. Public Involvement
7. Reporting Recommendations

B. Decision Making Processes
1. Goal-setting
2. Workplans
3. Decision Criteria and Consensus Values
4. Organizing Information
5. Decision Tools

III. Task Force Recommendations

A. Cleanup Levels
1. Recommendation
2. Supporting Arguments
3. Key Issues evaluated
4. Public input received
5. Impact of recommenation

B. Waste Diposition
    1. Recommendation
    2. Supporting Arguments
    3. Key Issues evaluated
    4. Public input received
    5. Impact of recommenation

C. Priorities for Remediation
    1. Recommendation
    2. Supporting Arguments
    3. Key Issues evaluated
    4. Public input received
    5. Impact of recommenation

D. Future Use
    1. Recommendation
    2. Supporting Arguments
    3. Key Issues evaluated
    4. Public input received
    5. Impact of recommenation

Appendices

A. Key Elements of The Task Force Toolbox
B. Public Outreach Activities and Summary of Comments
C. Summary of Task Force Meetings