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CONCEPTUAL DESIGN REPORT FOR THE ENGINEERED WASTE MANAGEMENT FACILITY, VOL 1 OF 2, - (USED AS A REFERENCE IN OU1 FS REPORT, FROM APPENDIX G)

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Conceptual Design Report for the Engineered Waste Management Facility

Volume 1 of 2

Environmental Remedial Action Project
Fernald Environmental Management Project
Fernald, Ohio

Doc. Control No.: 06CP03279201
DOE Contract No. DE-AC05-90OR21951
March 27, 1992
Revision No. 0

PARSONS

Fairfield Executive Center
6120 South Gilmore Road
Fairfield, Ohio 45014

PUBLIC ENVIRONMENTAL INFORMATION CENTER
% Westing... Matl. Co. of Ohio
P. O. Box 398704
Cincinnati, Ohio 45239-8704

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Engineered Waste Management Facility
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Fernald, Ohio

APPROVED FOR ISSUE
Revision 0

Approved By:

R. Nixdorf, Engineering Manager, PARSONS	2.26.92 Date
S. D. Young, Project Manager, EWMF, PARSONS	FOR 2/24/92 Date
G.J. Krieger, Project Manager, EWMF, WEMCO	FOR 3/6/92 Date
J.P. Hopper, WEMCO	3/6/92 Date
R. Allen, Project Manager, EWMF, U.S. DOE/FEMP	3-17-92 Date
W.E. Pasko, U.S. DOE/FEMP	3/17/92 Date

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Engineered Waste Management Facility
Volume 1 of 2

CONTENTS

Executive Summary E-1

SECTION **PAGE**

1 PROJECT DESCRIPTION

1.1 Introduction 1-1
1.2 Discussion of Scope 1-1
1.3 Justification 1-8
1.4 On-Site Disposal Alternatives 1-8
1.5 Risk Assessment 1-8
1.6 Adjustments and Clarifications 1-10

2 PROJECT STRATEGY AND SCHEDULE

2.1 Project Work Breakdown Structure/Organizational Breakdown Structure 2-1
2.2 Project Strategy 2-1
2.3 Functional Requirements 2-11
2.4 Project Milestones 2-14
2.5 Project Schedules 2-14

3 PROJECT COST AND FUNDING STRATEGY

3.1 Estimate Summary 3-1
3.2 Funding Strategy 3-1
3.3 Guide to Reading the Cost Estimate 3-1

Engineered Waste Management Facility
Volume 1 of 2

CONTENTS (CONT)

SECTION PAGE

4 ENGINEERING STUDIES

4.1 Design Criteria Report 4-1
4.2 Engineering Studies 4-1

5 QUALITY ASSURANCE

6 SAFETY, ENVIRONMENT, AND ENERGY

6.1 Safety Assessment 6-1
6.2 Environmental Considerations 6-2
6.3 Energy Impact 6-10

7 ACRONYMS AND GLOSSARY

7.1 Acronyms 7-1
7.2 Glossary 7-4

Engineered Waste Management Facility
Volume 1 of 2

CONTENTS (CONT)

SECTION **PAGE**

TABLES

2-1 Project Schedule Milestone 2-15
3-1 Summary Cost Estimate for the EWMF 3-4
6-1 MCLs and MCLGs for Groundwater Pollutants 6-8

FIGURES

1-1 Key Design Features of the Dry Vault 1-5
1-2 Key Design Feature of the Wet Vault 1-6
2-1 Work Breakdown Structure and Organizational Breakdown Structure 2-2
2-2 Performance Period/Design Life of Key EWMF Components 2-13
2-3 EWMF Title Design Network Logic Diagram 2-17
2-4 Title Design Schedule 2-18
2-5 Project Schedule 2-19
2-6 EWMF Construction Schedule 2-20

Engineered Waste Management Facility
Volume 2 of 2

CONTENTS

SECTION		PAGE
1	**PREREQUISITE DATA**	
1.1	Project Order	1-1
1.2	Project Order Plan	1-1
1.3	CDR Functional Requirements Document	1-1
2	**SCOPES OF WORK**	
2.1	Vaults	2-1
2.2	Containment System	2-5
2.3	Final Cover	2-7
2.4	Facility Support Building	2-8
2.5	Ditches, Drains, and Water Retention	2-10
2.6	Hydrogeologic Monitoring (Pre-Operating through Post-Closure)	2-11
2.7	Roads and Walkway	2-12
2.8	Fences and Gates	2-12
2.9	Landscaping	2-12
3	**OUTLINE SPECIFICATIONS**	
3.1	Civil/Structural/Architectural	3-1
3.2	Process	3-16
3.3	Mechanical	3-17
3.4	Electrical	3-20
3.5	Instrumentation	3-26

Engineered Waste Management Facility
Volume 2 of 2

CONTENTS (CONT)

SECTION PAGE

4 DESIGN SUPPORTING DOCUMENTS

4.1 Federal, State, and Local Requirements 4-1
4.2 Pertinent Industry Codes and Standards and Other References 4-6
Note: EWMF Regulatory Requirements included as Exhibit 1
4.3 Conceptual Drawings 4-11
4.4 Equipment List 4-12
4.5 Significant Supporting Calculations 4-13

5 ESTIMATING SUPPORTING DOCUMENTS

5.1 Cost Estimate Details 5-1
5.2 Engineering Estimate Breakdown 5-1
5.3 Life-Cycle Cost 5-1

6 OTHER SUPPORTING DOCUMENTS 6-1

6.1 EWMF Concept Studies 6-1
6.2 Retrieval Analysis 6-1
6.3 Preliminary Operable Unit Waste Volume Estimates 6-1
6.4 Safety Assessment 6-1

LIST OF REFERENCES

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(WMCO 1990) Westinghouse Materials Company of Ohio, April 1990. *Conceptual Design Report - Above-Ground Engineered Storage (AGES)*. Fernald: WMCO.

EXECUTIVE SUMMARY

This Conceptual Design Report (CDR) provides a preliminary description, design and cost estimate for an Engineered Waste Management Facility (EWMF) to support the remediation of the Fernald Environmental Management Project (FEMP). The EWMF will provide the capability of on-site disposal of the radioactive, hazardous, and mixed waste generated as a result of the FEMP remediation.

The FEMP is being remediated pursuant to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The FEMP is divided into five Operable Units (OUs), each of which constitutes a separate remedial action. As required by CERCLA, several remedial alternatives will be developed and evaluated to allow selection of the most appropriate remedy for each OU. The Remedial Alternatives for each FEMP OU are identified in the "Initial Screening of Alternatives" documents (Task 12) prepared by Advanced Sciences, Inc./International Technology Corporation (ASI/IT) as part of the FEMP Remedial Investigation/Feasibility Study (RI/FS) process. The remedial alternatives for each OU include, among others, the alternative of treatment and on-site disposal. The EWMF described in this CDR is intended to supply the on-site disposal capacity that will be required should the alternative of on-site disposal be selected. Selection of other remedial alternatives, such as in situ remediation or off-site disposal, would affect the mission and design of the EWMF. Therefore, the selection of remedial alternatives other than on-site disposal would require either a new or substantially modified CDR for the EWMF.

The EWMF consists of 45 slab-on-grade concrete vaults with a total disposal capacity of 2,400,000 cubic yards. This volume is based on the Preliminary Estimate of Operable Unit Waste Volumes provided by ASI/IT. The vaults are designed to accept waste either in the form of a grout slurry that will be pumped into and solidify in the vaults (wet vaults) or in the form of discrete waste containers (dry vaults). The actual waste form will be determined in the future through treatability studies; but for the purpose of this CDR, it is assumed that 80 percent of the waste will be grout slurry and 20 percent will be in containers. This ratio results in 36 wet vaults and 9 dry vaults.

The exterior dimensions of the vaults are approximately 644 feet long by 145 feet wide by 26 feet high. The vaults are divided into three modules of four cells, for a total of 12 cells per vault. Both the wet and the dry vaults will have a double liner and leachate collection and leak detection systems. The wet vaults will have an opening in the roof of each cell to allow the grout slurry to be pumped inside, and the dry vaults will have a door in the side of each cell to allow the boxes to be stacked inside by a forklift truck. After each vault or cell is filled, interim closure will be performed which consists of

extending the liners across the openings and sealing the openings with concrete. At some time after interim closure, a final cover consisting of compacted backfill, a low permeability clay layer, a drainage layer, an intruder barrier, and a topsoil cover will be installed.

The construction of the 45 vaults has been scheduled to take 16 years, which optimizes the relationship between vault construction and operations. A vault can be filled with waste (either grout or boxes) in approximately 4 months, so vault construction will be scheduled to ensure that a vault is completed every 4 months to keep pace with waste processing requirements. If required, this schedule can be expanded to match the rate of waste production from the remediation of the site; however, a contraction of the schedule from 16 years could result in increased construction interference and cost. After the vaults have been filled and the final cover has been installed, the EWMF will be monitored and maintained for a period of 100 years. At the end of this period, the leachate collection/leak detection systems will be sealed; and primary reliance will be placed on the waste form, liners, and cover, rather than on institutional controls, to continue to provide waste containment.

The total construction cost of the EWMF in 1991 dollars is estimated to be $1,123,960,700, including direct costs and markups. The total life-cycle cost, including construction, waste emplacement operations and 100 years on monitoring, is estimated to be $1,254,207,500 in 1991 dollars. This amount is equivalent to $523 per cubic yard of waste disposal capacity. In year-of-expenditure dollars, escalated at 5.5 percent per year, the construction cost is $2,615,843,200, and the total life-cycle cost is $4,305,349,000.

The CDR is presented in two volumes. Volume 1 contains general information on the EWMF project, including the Project Description; Strategy and Schedule; Cost and Funding Strategy; Engineering Studies; Quality Assurance; Safety, Environment, and Energy; and Acronyms and Glossary sections. Volume 2 contains more detailed supporting information, including Prerequisite Data; Scopes of Work; Outline Specifications; and Design, Estimating, and Other Supporting Documents sections.

SECTION 1

PROJECT DESCRIPTION

1.1 Introduction

The remediation of the FEMP facility is being conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act. The Remedial Investigation/Feasibility Study (ASI/IT 1990 a,b,c, 1991 a and b) phase of the site remediation activities has identified on-site disposal as one of the preliminary alternatives for the waste generated by this remediation. To accommodate the disposal of these wastes on site, the United States Department of Energy (DOE) has requested that a Conceptual Design Report be prepared for an on-site disposal facility. This facility is known as the Engineered Waste Management Facility.

1.2 Discussion of Scope

The main objective of the EWMF is to provide an on-site disposal facility for the wastes generated during the remediation of the FEMP. As described in the report entitled *CDR Functional Requirements for the Engineered Disposal Facility* (May 1991) (see Volume 2, Section 1 of this CDR), the basis for the design, construction, operation, and closure of the EWMF is as follows:

1) The EWMF is to be located within the FEMP site boundary.

2) The total disposal capacity of the EWMF is to be 2,400,000 cubic yards.

3) The design, construction, operation, and closure of the EWMF are to be in accordance with Federal and State of Ohio regulatory requirements that are deemed to be Applicable or Relevant and Appropriate Requirements (ARARs), DOE Orders, FEMP requirements, As Low As Reasonably Achievable (ALARA) radiation protection principles, and appropriate design standards.

4) The design, construction, operation, and closure of the EWMF are to be in accordance with non-promulgated Federal or State advisories/criteria/guidance documents that are specified by the DOE.

5) The EWMF is to be designed, constructed, and operated to accept low-level radioactive waste (Nuclear Regulatory Commission Classes A, B, and C), byproduct materials, naturally occurring radioactive materials, accelerator-produced radioactive materials, hazardous waste, and mixed waste.

6) The EWMF is to be designed, constructed, and operated to handle two forms of treated waste materials: either a pumped grout slurry that will solidify in the EWMF or discrete disposal packages.

7) Drainage control is to be provided such that stormwater runoff from the waste disposal operation areas (that is, areas that contain waste materials and have not undergone final closure) is to be retained and treated prior to discharge.

8) The FEMP remediation is estimated to take approximately 20 years.

1.2.1 Physical Description of Project

A conceptual design and life cycle for the EWMF was developed based on the conditions listed above. The major components of the EWMF will be the concrete vaults, a stormwater management system, and auxiliary support facilities. The life cycle of the EWMF project will consist of construction, operation, and closure. A description of the major components and their associated life cycle are summarized below.

Vaults

The EWMF will consist of 45 above-grade concrete vaults, each capable of storing approximately 53,000 cubic yards of waste materials. Each vault is comprised of three separate units or modules. Each module is further divided into four individual cells. Thus, each vault has 12 discrete cells. These cells provide the fundamental containment structure for the waste.

The total capacity of the 45 vaults will be approximately 2,400,000 cubic yards. This volume is based on estimates produced by ASI/IT in their preliminary operable unit waste volume calculations of March 12, 1991 (see Volume 2, Section 6.3). The actual capacity of the EWMF is likely to vary greatly depending on the results of waste characterization, processing, the waste form, and whether or not the waste generated from the decontamination and decommissioning of the plant structures is included.

Each vault has overall dimensions of approximately 644 feet by 145 feet by 26 feet high. Both the vault floor and vault roof slope at a minimum of 2 percent across the 145-foot width. The walls of each vault are typically 2-feet-thick reinforced concrete supported on concrete spread footings. The floor of the vault is a 1-foot slab-on-grade. The permanent concrete roof consists of prestressed concrete bridge beams supporting pre-cast concrete deck panels and a cast-in-place concrete topping slab.

Waste will be placed into the disposal vaults as a grout slurry or discrete waste packages. The design of the vault is dependent upon the waste form. The vault design for the grout slurry is called a wet vault design, and the design for the discrete waste packages is called the dry vault design. For the wet vault design, access panels will be provided through the concrete roof to allow placement of the grout slurry and inspection. For the dry vault design, a service opening approximately 25 feet wide by 20 feet high will be provided for each of the disposal cells along the same side of the vault to allow access. During operations, these openings will be covered with tarpaulins or overhead doors. Active disposal cells will be ventilated to exhaust combustion gases and to provide worker comfort. Sketches showing the key design features of the dry and wet vaults are provided in Figures 1-1 and 1-2.

Each disposal cell will contain a double liner system with a leachate collection and a leak detection system. The liners will be constructed of materials that prevent the migration of any waste constituent into the top liner and through the bottom liner for a time period equal to the sum of the disposal operations and institutional control. Since the operational period is assumed to be approximately 20 years and the post-closure period is a minimum of 30 years (per 40 Code of Federal Regulations (CFR) 264.117), the liners will need to hold for a minimum of approximately 50 years. (See Section 2.5 of the CDR Functional Requirements for the EWMF (see Volume 2, Section 1) for more information on these time periods.) To prevent failure, the liners will be chemically resistant to the waste and leachate. The dry vault design includes a 6-inch sand cushion and a 6-inch concrete slab over the floor liner to protect the liner from forklift traffic.

The vault slab and walls will act as a base for structurally supporting the double liner system. Each cell will be equipped with a leachate collection system for containing and collecting leachate, and a leak detection system for monitoring the performance of the primary liner. Vault floors will be sloped to drains to facilitate leachate collection and leak detection. A high density polyethylene (HDPE) sump/tank system will be provided to allow accumulation and detection of leachate. The capacity of the sump/tank system will be sized to achieve efficient operation of the leachate collection and leak detection systems (LCLDS). The leak detection system will consist of a geotextile or plastic drainage net and a HDPE leak detection sump. Liquid detection monitoring equipment will be installed within

the leachate collection and leak detection sumps and tanks. Within the EWMF support facility, alarms will be activated to alert operators of the presence of liquids within any of the leachate collection or leak detection sumps or tanks. The details of this system are given in the Scopes of Work in Volume 2, Section 2.

After filling a disposal vault to capacity, interim closure will be performed. This closure will consist of removing all temporary structures and sealing all vault openings. The project will provide all designs and procedures necessary to seal the structures.

Upon completion of waste emplacement in the vaults (and after interim closure), a multi-layer, low-permeability final cover with appropriate drainage controls will be placed over the vaults. The cover will consist of compacted backfill over and around the vaults, a layer with permeability equal to or less than the bottom liner system (not to exceed 10^{-7} cm/sec), a drainage layer, and a topsoil cover. The required 500-year intruder barrier will be provided by a cobblestone layer within the final cover drainage layer. Access facilities to the leachate collection and leachate detection systems will be extended to grade.

Provisions will be included in the operating plans to monitor the LCLDS and to remove accumulated water from the LCLDS after final closure and during the institutional control period. The operating plans shall specify that the leachate collection sumps and leachate detection piping will be sealed after it has been demonstrated that there is no more leachate generated by the waste, or at the end of the institutional control period.

Stormwater Management

Stormwater runoff from the waste disposal operation areas will be controlled by the use of drainage ditches, culverts, sedimentation and retention basins, and lift stations. The system will be designed to handle the peak discharge from a 24-hour, 25-year storm event. Provisions will be made to allow the accumulated stormwater to be emptied expeditiously from the retention basin to maintain design capacity. This accumulated water will be pumped to a wastewater treatment facility for treatment prior to discharge.

Stormwater runoff from closed and non-regulated areas will be allowed to flow off-site by man-made and natural water courses. Erosion structures will be used, if required.

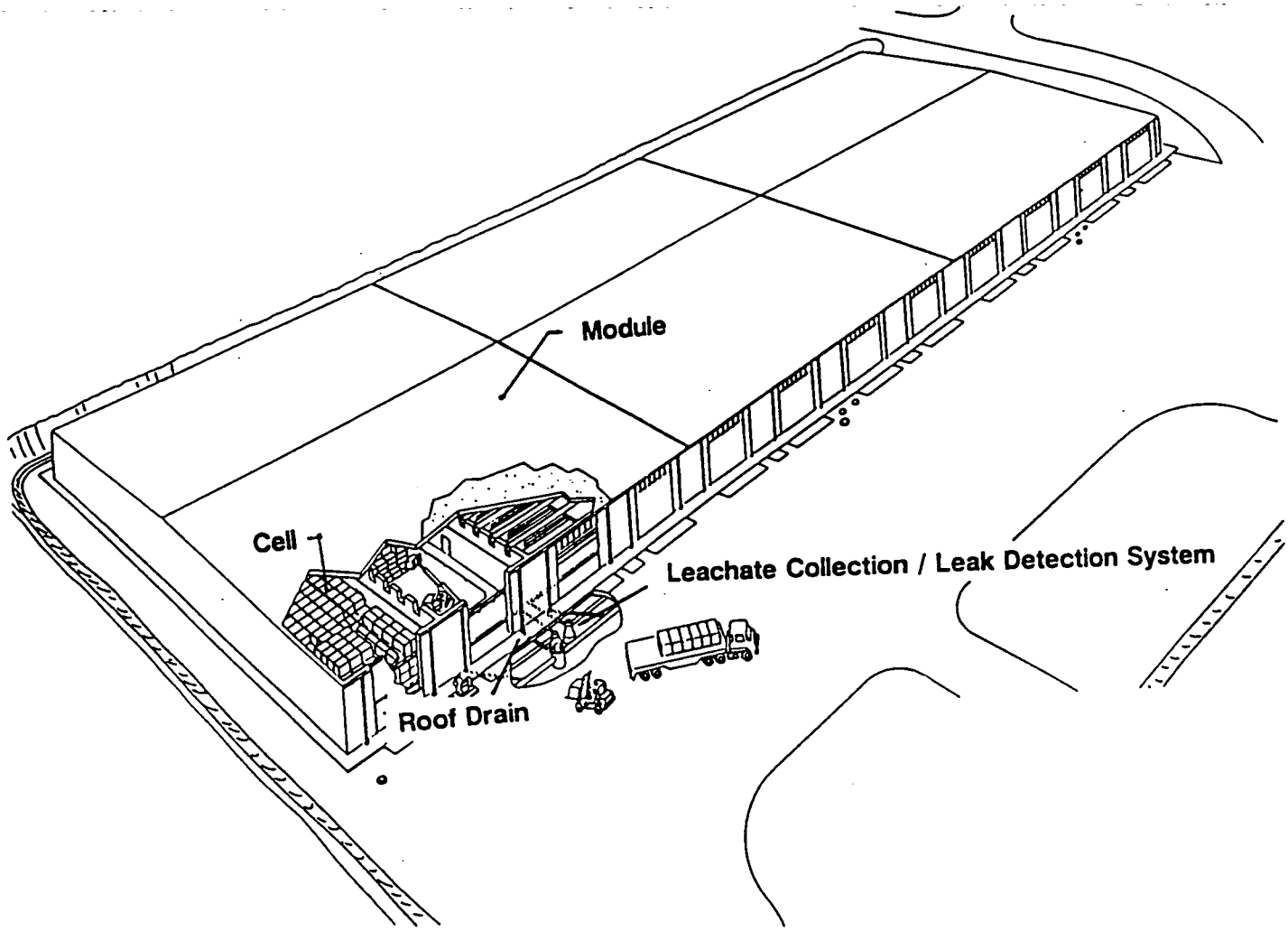

Figure 1-1 - Key Design Features of the Dry Vault

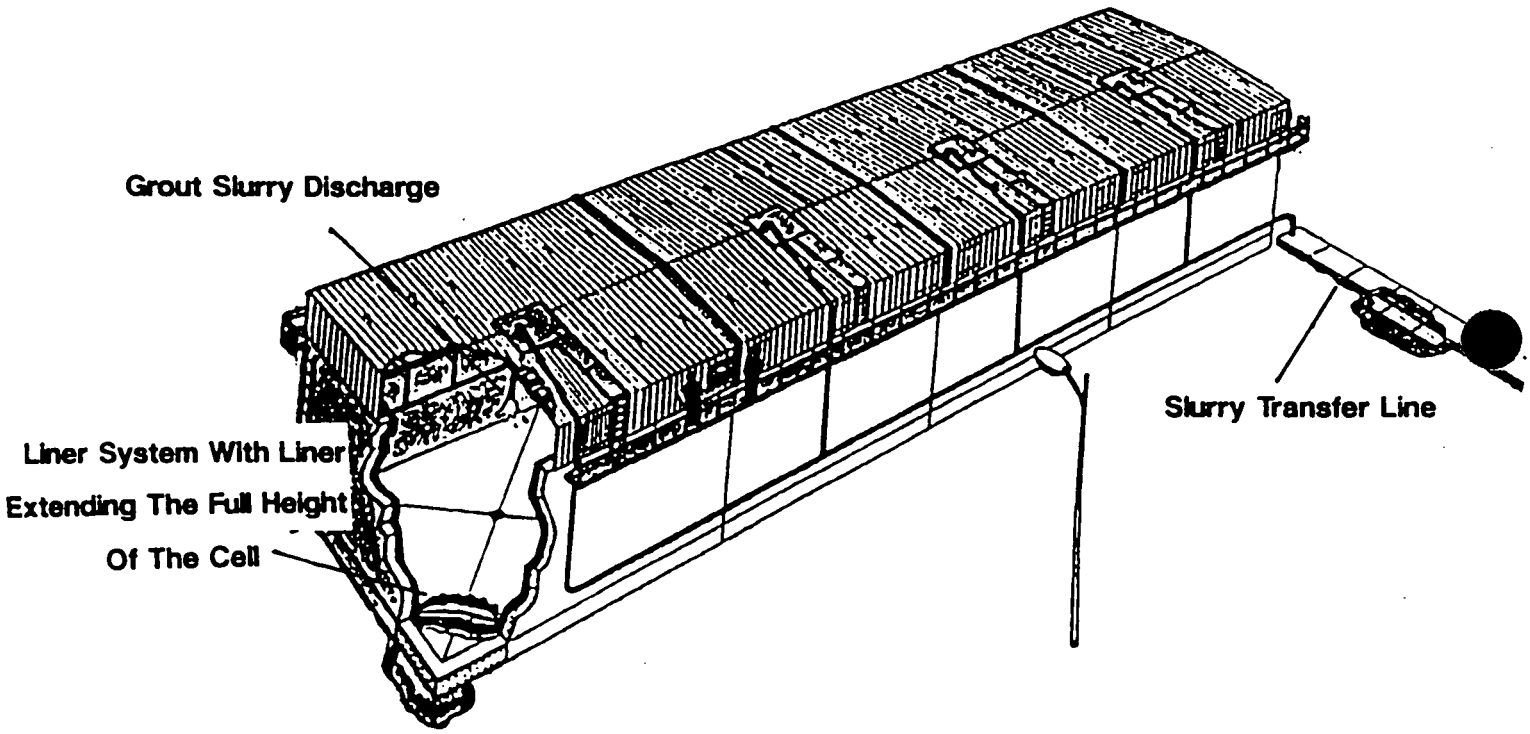

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Figure 1-2 - Key Design Features of the Wet Vault

Auxiliary Facilities

A new Facility Support Building will be provided to house records, support staff, and a monitoring/data logging system to support the operation of the EWMF. Other support services, such as change rooms, cafeteria, fueling stations, maintenance, and equipment storage, will use existing facilities during the operational period of the EWMF. Support services will be minimal during the institutional control period and will be supplied by the Facility Support Building.

1.2.2 Relationship of This Project to Other Projects

The following projects are interrelated to the EWMF Project.

1) Studies for the Engineered Treatment, Packaging, and Staging Facility (ETPSF) will provide new information about the waste forms and waste volumes that will be sent to the EWMF. This information may affect the design of the EWMF and may require revision of the EWMF design basis at a later date. For example, the current basis for the ETPSF studies assumes a 10- to 12-year total period for the remediation of the site, while this EWMF CDR assumes a 16-year construction period. Another example is the estimated volume of waste to be generated as a result of remediation activities. The current design basis for the EWMF is to provide 2,400,000 cubic yards of disposal capacity. Based upon conservative estimates prepared for sizing the ETPSF, this value could be much larger. However, it should be noted that the ETPSF study is based on the conservative assumption that only the remedial alternatives which result in the maximum amount of waste to be disposed of will be selected as part of the Record of Decision (ROD) process. These discrepancies will be resolved in subsequent EWMF and ETPSF design studies.

2) There are five operable units at FEMP where RI/FS work is currently ongoing. A Record of Decision will be issued for each OU that will specify a final remedial alternative action which may or may not include on-site disposal. These RODs will greatly affect the mission of the EWMF.

3) The Advanced Waste Water Treatment (AWWT) plant is being designed to treat process water and stormwater runoff from the FEMP. If the stormwater runoff from the EWMF operation areas needs to be treated by the AWWT, the capacity of the AWWT will need to be increased.

1.3 Justification

One alternative considered in the site-wide RI/FS is removal, waste treatment, and on-site disposal. There is no facility currently available for on-site disposal at the FEMP. The EWMF is needed to provide the capability of on-site disposal of the wastes generated during the remediation of the FEMP.

1.4 On-Site Disposal Alternatives

The following three alternative concepts were considered: (1) the vault concept, described in the *Preconceptual Design Study - Low Level Waste Disposal Facility* (PARSONS 1990) (2) the tumulus concept, described in the *Conceptual Study for Waste Tumulus* (ASI 1989) and (3) the aboveground engineered storage (AGES) concept, described in the *Conceptual Design Report - Aboveground Engineered Storage* (WMCO 1990).

A meeting was held on March 26-27, 1991, at PARSONS Fairfield office (the record of the March 26 - 27 meeting is provided in Volume 2, Section 6) to identify advantages or disadvantages of each of three design concepts for the Engineered Waste Management Facility. None of the three concepts emerged as clearly superior in the meeting because there was not sufficient detail to predict either the cost or the performance of any of the concepts with enough certainty to select a particular concept on the basis of performance or cost. PARSONS is proceeding with the vault conceptual design as specified in Project Order Number 6, with the understanding that the ultimate selection of the EWMF design concept will be made by the DOE.

1.5 Risk Assessment

As with all projects, there are certain risks associated with the conceptual design of the EWMF. Most of these risks arise from the lack of information at this stage of the design. Studies which are intended to mitigate these risks are discussed in Volume 1, Section 4 of this CDR.

1.5.1 Technical Risk

The total disposal capacity of the vaults (2,400,000 cubic yards) is based upon estimates developed for the remediation of Operable Units 1 to 5 (see Volume 2, Section 6.3). The volume estimate does not account for any waste resulting from the decontamination and decommissioning of the production facilities. Also, there are several efforts to remove or remediate material in situ, which could reduce the volume of waste destined for the EWMF. Therefore, the total disposal capacity requirements may change as additional information is obtained during the RI/FS currently being conducted at the FEMP, which may require modification of the conceptual design contained in this report.

The EWMF General Siting Report being prepared for the RI/FS is to be issued in January 1993. Results from this report could modify the current design, construction, and operation strategies.

1.5.2 Cost Risk

There are no known risks, other than the changes in capacity described in Section 1.5.1, that will affect cost that would not be covered by the 20 percent contingency factor. The vault construction duration is currently 16 years with a 5 percent escalation per year.

The cost of the vaults depends on the codes and standards specified for their construction, which in turn depend on the safety classification of the structures. DOE Order 6430.1A requies more rigorous concrete specifications for structures determined to be Safety Class items. This determination will be made in a Safety Analysis to be performed during Title design. Specification of a more rigorous code leads to greater construction costs. In particular, the code ACI 349 has been specified for concrete structures in this CDR based on the assumption that the vaults would be Safety Class items. After completion of the Safety Analysis, ACI 349 will be re-evaluated for applicability, and may be revised to the less rigorous code ACI 318.

1.5.3 Schedule Risk

The remediation schedules for the OUs are driven by CERCLA Section 120 which requires that continuous, physical, on-site remedial activities must commence within 15 months of completing the RI/FS. As such, the EWMF construction schedule needs to be consistent with the remediation schedules

for the OUs. If the EWMF construction and OU remediation schedules are inconsistent with each other, temporary storage facilities (new or existing) may need to be developed to accommodate the 15-month limitation. It is recommended that a master remediation schedule and strategy be formulated for the Environmental Remedial Action (ERA) Project to ensure compliance with CERCLA Section 120 and a consistent approach in developing remedial designs. The EWMF has a 16-year construction duration. The length of time for the remediation of the site has not been determined, but the basis for the ETPSF studies was 10 to 12 years. This discrepancy will be resolved in subsequent ETPSF and EWMF design studies.

Environmental Assessments (EA) and Environmental Impact Statements (EIS) for permanent on-site disposal will be performed as part of the RI/FS process for each OU selecting the alternative of on-site disposal. Therefore, the EWMF relies on the OUs to supply its EA and EIS. On DOE projects, Title II design does not start until the EIS has been completed. Thus, the start of Title II design for the EWMF may be delayed pending the availability of an EIS. If current schedules for the EWMF design and the OU RODs are met, an EIS should be available prior to the start of Title II design for the EWMF. However, any slip in OU schedules could delay the design of the EWMF.

As specified in 40 CFR 264 Subpart G, final closure of the EWMF is to be completed within 180 days of receiving the last waste shipment. The closure concept (Section 2.2.3.7) allows for the final closure of the EWMF to be constructed in three separate groups. This approach limits the amount of time required to complete final closure. Even with this approach, it is projected that approximately 24 months is required to complete closure of the last area. As such, an extension to the 180-day period will need to be obtained from the United States Environmental Protection Agency (US EPA).

1.6 Adjustments and Clarifications

Since the publication of the CDR Functional Requirements (CDR-FR) document, the following changes have occurred in the assumptions and name relating to this project:

1) The name "Engineered Disposal Facility" (EDF) has been changed to "Engineered Waste Management Facility" (reference letter from Jerry Krieger Westinghouse Environmental Management Company of Ohio (WEMCO) to Sharon Latham (PARSONS), dated 6/28/91).

2) The assumption in the CDR-FR Document that an existing FEMP building would be used for offices and support for the EWMF has been discarded. Accordingly, a new Facility Support Building has been included in this CDR.

3) The CDR-FR specified that the concrete structure of the vault would serve as the 500-year intruder barrier. In this CDR, the intruder barrier function has been assigned to a cobblestone layer which is included in the final cover.

Next 37 Pages Redacted

Contains Proprietary Information

SECTION 4

ENGINEERING STUDIES

This section discusses the additional engineering studies that are recommended for this project.

4.1 Design Criteria Report

The Design Criteria Report (DCR) will establish the requirements for the design criteria in performance of the Title design. This report will be an expansion of the CDR-Functional Requirements document and the CDR for this project. The Design Criteria Report will include

1) The purpose of the project.
2) The general description of the project.
3) A summary of all design requirements to be applied by the designer.
4) References to specific DOE Orders.
5) A summary of specific FEMP design standards, plant operating policies, and quality assurance standards.
6) A list of all applicable national and area codes, standards, and guides.
7) Plans for mitigation of environmental impacts in accordance with National Environmental Policy Act (NEPA).

4.2 Engineering Studies

The following studies are recommended to mitigate the technical, cost, and schedule risks described in Section 1.5 and to support the Title design of the EWMF. Many of these studies may be included in the Scope of Work for the Title I design effort.

4.2.1 On-Site Storage for Retrievability

At a minimum, this study will

1) Analyze the retrievability of the waste form from the on-site storage facility.
2) Develop or optimize the waste treatment processes required for retrievability.

3) Identify the risks associated with the waste forms (e.g., leakage from waste forms).
4) Identify any regulatory requirements for retrievability.
5) Develop cost estimates.

4.2.2 Storage Facility with Off-Site Disposal

At a minimum this study will

1) Analyze the risk associated with on-site storage and removal for off-site disposal.
2) Analyze the risk of transporting the waste.
3) Develop the waste form and the shipping container design.
4) Analyze the risk of the off-site disposal.
5) Develop cost estimates.
6) Identify off-site disposal facility waste form requirements.
7) Identify the regulatory requirements for off-site shipment preparation and transportation.

4.2.3 Siting Study

The purpose of this study is to determine the suitability of the FEMP for waste disposal. At a minimum, this study should

1) Establish the siting criteria with respect to the ARARs, specifically the location standards identified in 40 CFR 264.18, 40 CFR 270.14, DOE Order 6430.1A, and to be considered (TBCs).
2) Consider restrictions associated with the Sole Source Aquifer.
3) Develop a field program to obtain the information required to evaluate the siting criteria.
4) Demonstrate compliance with the siting criteria.
5) Identify underground utilities (such as drainage tiles) which may interfere with the development of the EWMF.
6) Support the completion of the Environmental Impact Statement for the EWMF.

4.2.4 Supplemental Geotechnical and Hydrogeologic Study

The purpose of this study is to supplement the existing RI/FS hydrogeological information to allow the establishment of a groundwater monitoring program and foundation design information for the EWMF. At a minimum, this study should

1) Support the obtaining of information required for the Siting Study.
2) Characterize the groundwater flow underneath the EWMF.
3) Supplement the information required for the Performance Assessment.
4) Identify locations for groundwater monitoring wells.
5) Develop a groundwater monitoring program for the EWMF, including monitoring parameters and background values.
6) Develop a field program to obtain the information required to support the design of the disposal vault foundations. This study may also include a seismic evaluation of the disposal vault.

4.2.5 Treatability Studies

The purpose of this study is to obtain information regarding the characteristics of the treated wastes. Components of these treatability studies are currently being developed as part of the RI/FS program for the individual operable units. At a minimum, this study should

1) Show ability of the treatments to meet remedial action objectives.
2) Provide waste leaching characteristics and total concentration analysis to support the Performance Assessment.
3) Provide information to support the handling of the treated waste materials, e.g., additional information to support the design of the pumping system for the grout slurry.
4) Provide information to characterize the potential for off-gas generation (radon and hydrogen) and to determine if a treatment system is required to control these off-gases.

4.2.6 Air Monitoring Study

The purpose of this study is to quantify the air emissions resulting from the treated waste materials and to support the ambient air monitoring program. At a minimum, this study should

1) Characterize and quantify potential emissions from the operational and post-closure periods. These emissions include radionuclides (40 CFR 61 Subpart H), Radon-222 (40 CFR 61 Subpart Q and 40 CFR 192), and other potential off-gas products. These off-gas products include hydrogen due to radioalysis of water and organic compounds. The magnitude of these emissions needs to be estimated.
2) Conduct modelling, as required, to establish the locations of new and relocated monitoring stations.
3) Determine the need for off-gas treatment systems to prevent the release of gases in excess of environmental standards and to prevent the formation of a potential explosive atmosphere or excessive pressures within the disposal vaults. (Note: An off-gas system similar to that currently installed for the K-65 silos may be required if waste treatment is ineffective in reducing the off-gas generation rates to acceptable levels.)
4) Determine the need for installing temperature and/or pressure instruments within the disposal vaults to monitor off-gas generation, to monitor the performance of the disposal vault, and to notify operators of the presence of undesirable or unsafe conditions.
5) Specify detection levels required for the instruments to be used for monitoring. The availability and reliability of these instruments need to be considered when establishing these detection levels.

4.2.7 Performance Assessment

The purpose of this study is to evaluate the long-term performance of the EWMF. At a minimum, this study should

1) Provide the documentation required to fulfill the requirements of DOE Order 5820.2A Chapter III (3)(b).
2) Demonstrate that the design of the EWMF will adequately protect the aquifer; Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) will be used as the basis of this demonstration.

3) Provide information to demonstrate that the components of the EWMF are adequate to meet the specified design lives (see Volume 1, Section 2.3).

4.2.8 Soil Characterization Study

The purpose of this study is to quantify, if any, surface soil contamination present in the EWMF construction areas. At a minimum, this study should

1) Develop and conduct a field program for the collection and analysis of surface soils.
2) Prepare the necessary CERCLA Work Plans.
3) Evaluate sampling results and determine impacts upon the construction strategy for the EWMF. If necessary, recommendations for CERCLA response action should be made.

4.2.9 Design, Construction, and Operation Optimization Study

The purpose of this study is to optimize components of the EWMF. At a minimum, this study should

1) Optimize the construction sequence/layout to meet remediation schedules. A master schedule for the entire ERA Project should be developed to integrate the design, construction, and waste processing needs for all of the operable units. The waste generated for each year of remediation should be estimated to ensure that sufficient disposal capacity and construction materials are available. This portion of the study may also consider various construction techniques; if required, a small-scale "test" vault may be constructed. The traffic impacts resulting from the EWMF construction and associated remediation sequence needs to be considered as part of this optimization study. The traffic impact analysis needs to include construction, operation, and raw material delivery. The suitability and availability of construction materials from off-site suppliers also needs to be considered.
2) Optimize the size and shape of the disposal containers to accommodate the anticipated waste. This study should consider load limits, size restrictions, maximum radiation levels for container shielding, and processing and waste disposal materials handling equipment.
3) Optimize the utility requirements for the disposal vaults and integrate these requirements with utility demands for the other operable units. Current plans are to relocate the existing electric transmission towers to accommodate the construction of disposal vaults in the southern area. The effects of this relocation need to be factored into determining the utility requirements. Portable/temporary power supplies versus permanent facilities as well as alternative power

supplies need to be considered. The utility requirements for each year of remediation should be integrated with the remediation sequence to determine the maximum design size of the utilities required.

4) Optimize the waste handling and treatment practices for the leachate and stormwater runoff. The goal of this study is to ensure that alternatives and sufficient storage and treatment capacity will be available for the long-term management of these wastewaters.

SECTION 5

QUALITY ASSURANCE

The PARSONS Quality Assurance Program and its plans and procedures will be used in their entirety on this project. PARSONS Quality Assurance Program meets the intent of the Quality Assurance requirements identified in DOE Orders 4700.1, 5700.6, 5820.2A, and 6430.1A. It also meets the intent of National Standard American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) NQA-1, 1986.

The PARSONS Quality Assurance Department (QAD) is independent of the departments performing the work and has the authority to implement the Quality Assurance (QA) Program. Quality Assurance Department personnel will conduct audits, surveillances, and document reviews to ensure conformance to the Quality Assurance Procedures and requirements.

The plans and procedures applicable to the Quality Assurance Program include the following:

1) Project Quality Assurance Program Plan
2) Project Management Plan
3) Quality Assurance Procedures
4) PARSONS ERA Project Procedures

SECTION 6

SAFETY, ENVIRONMENT, AND ENERGY

This section discusses the hazards, safety standards, environmental protection systems, consequences to the environment, and energy requirements for construction and operation of the proposed facilities.

6.1 Safety Assessment

The safety assessment and classification of the facility was performed in accordance with WEMCO procedure SP-A-01-013. The results of the safety assessment indicate that the EWMF will be a low-hazard facility. Although the facility presents low hazards, the facility is required to meet more stringent requirements for the long-term storage or disposal of wastes. It is required that more stringent design criteria than those required per DOE Order 6430.1A and UCRL 15910 for a low-hazard facility be used in order to meet the performance requirements of DOE Order 5280.2A and other pertinent ARARs. The Safety Assessment for the EWMF is included in Volume 2, Section 6.4.

The safety assessment covered the operational phases associated with the EWMF. The following potential hazards were evaluated:

1) Electrical
2) Nuclear criticality
3) Drop of container from height
4) Stored compressed gases
5) Rotational kinetic energy
6) Linear kinetic energy
7) Corrosive materials
8) Explosive/pyrophoric materials
9) Flammable materials
10) External radiation exposure
11) Toxic/pathogenic
12) External hazards (natural phenomena).

At this time, there is no performance assessment of the EWMF design nor of the FEMP site, so the assumption is that the specified performance criteria will be met. The long-term performance of the EWMF is to be determined as a part of a performance assessment per DOE Order 5820.2A. The long term performance criteria that the EWMF must meet are all well below the Moderate Hazard Guidelines listed in procedure SP-A-01-013. Thus, the safety assessment will consider only the hazards associated with potential credible accidents that bound the actual risks associated with the facility.

6.2 Environmental Considerations

This section provides a summary of the design, discharge, operational and monitoring requirements which are specified in the ARARs identified in Volume 2, Section 4. In some areas, a tentative compliance strategy is provided. The demonstration of compliance with all of the identified ARARs will be included as part of the RA Work Plan. This Work Plan is to be submitted to the US EPA for approval in accordance with the DOE/EPA Consent Agreement Section XI. This RA Work Plan will be supplemented with the identification of permits which are exempt under CERCLA Section 121(e). As required by Section XIII of the DOE/EPA Consent Agreement, the permitting standard and demonstration of compliance is to be provided. In addition to the RA Work Plan, permit applications may be required for operations with off-site effects related to the EWMF. Additional details regarding the ARARs, RA Work Plan, and permitting requirements are provided in Volume 2, Section 4.1.

6.2.1 Design Requirements

The location of the EWMF is to comply, at a minimum, with the requirements of 10 CFR 61 Subpart D, 10 CFR 1022, 40 CFR 264.18, 40 CFR 270, and Executive Orders 11988 and 11990.

At least three permanently surveyed benchmarks are to be established per 10 CFR 61.52 and 40 CFR 264.309.

A buffer zone is required by 10 CFR 61 to allow environmental monitoring of the EWMF and, if required, to mitigate releases prior to reaching the property boundary.

The disposal vaults are to have a double liner system, leachate collection and leak detection system, and a final cover system in accordance with 10 CFR 61 Subpart D and 40 CFR 264 Subpart N.

The run-on (stormwater which has not contacted waste materials) and runoff (stormwater which has the potential to contact waste materials) drainage systems are to be designed to comply with the requirements of 10 CFR 61 Subpart D, 40 CFR 264.301, and the Hamilton County Earth Works Regulations, as required.

Tank systems are to be provided with secondary containment and spill prevention devices in accordance with 40 CFR 264 Subpart J.

Test borings and abandoned monitoring wells shall be sealed to prevent contaminants from entering the groundwater in accordance with Ohio Administrative Code 3745-9-10.

6.2.2 Gaseous, Liquid, and Solid Discharge Limitations

Discharges of radionuclides and hazardous constituents will be limited in accordance with the ARARs identified for the EWMF and DOE Orders. These limitations are summarized below for each environmental medium. Modelling shall be conducted to verify that the design of the EWMF will satisfy the following listed discharge limitations.

6.2.2.1 General - Radionuclides

In accordance with DOE Order 5820.2A Chapter III, the external exposure to the waste and concentrations of radioactive material which may be released into the surface water, groundwater, soil, plants and animals shall not result in an effective dose equivalent greater than 25 mrem/yr for any member of the public. As specified in 10 CFR 61.41, the maximum radioactive release to the environment shall comply with ALARA principles and shall not expose any member of the public to an annual dose exceeding an equivalent of 25 mrem/yr to the whole body, 75 mrem/yr to the thyroid, and 25 mrem/yr to any other organ. These release limits are to be met during the operations, closure, stabilization, and institutional control periods. Additional limitations for radionuclides are specified below.

6.2.2.2 Air Discharges

Air discharges are primarily regulated under the Federal Clean Air Act and the State of Ohio Air Pollution Control Act. The specific standards for radionuclides and conventional air pollutants which are to be incorporated into the design/operation of the EWMF are identified in this subsection. In

addition to these standards, the US EPA is required by the Clean Air Act Amendments to develop and propose additional air pollution standards under the National Emission Standards for Hazardous Air Pollutants (NESHAPS) program. As these standards are promulgated, potential effects to the design and operation of the EWMF will need to be evaluated.

Radionuclides

During EWMF operations, the release of radionuclides to the atmosphere shall comply with the requirements of 40 CFR 61 Subpart H, 40 CFR 61 Subpart Q, 40 CFR 192.02, and 10 CFR 61.43.

The design shall ensure that the combined radionuclide emissions (excluding Radon-220 and Radon-222) from the EWMF and all other FEMP emission sources will not cause any member of the public to receive in any year an effective dose equivalent exceeding 10 mrem/yr (above background) per 40 CFR 61 Subpart H and DOE Order 5820.2A Chapter II, 3.a.(2). This limit is for an effective dose equivalent as calculated per the International Commission on Radiological Protection's Publication Number 26. Modelling and sampling procedures are specified in 40 CFR 61.93. The strategy for complying with 40 CFR 61 Subpart H is to conduct ambient air monitoring. The results of this monitoring program are to be provided to the US EPA on an annual basis. WEMCO-Environmental Compliance is to propose this compliance strategy to the US EPA during FY92. It is expected that construction approval for the EWMF is not required; however, this needs to be confirmed before quantifying the potential radionuclide emissions from the EWMF. The locations of the ambient air monitoring stations and quantification of emissions need to be determined per the engineering study identified in Section 4.2.6, Volume 1.

In accordance with 40 CFR 61 Subpart Q, 40 CFR 192.02, and DOE Order 5820.2A Chapter II, 3.a.(2), no more than 20 pCi/m^2-sec of Radon-222 (as an average for the entire source) shall be emitted into the air from the EWMF. As required by the DOE/EPA Consent Agreement, Executive Order 12088, and 40 CFR 61 Subpart Q, the DOE and the US EPA are currently negotiating a Federal Facilities Agreement (FFA) for the control and abatement of Radon-222 emissions. The design and operation of the EWMF will need to comply with the provisions contained within the executed FFA. The current draft of this FFA requires compliance with the 20 pCi/m^2-sec flux standard at the completion of the remedial action.

As required by 10 CFR 61.43, air effluents are to be controlled so that the radionuclide concentrations do not exceed the levels specified in 10 CFR 20.105, 10 CFR 20.106, and 10 CFR 20 Appendix B Table II.

Conventional Pollutants

During the construction and operation of the EWMF, measures shall be taken to control the discharge of conventional air pollutants as specified in the Ohio Administrative Code (OAC) 3745-15-07, OAC 3745-17-05, and OAC 3745-17-08.

In accordance with OAC 3745-15-07, the emission or escape into the open air from any EWMF source which endangers the health, safety, or welfare of the public or causes unreasonable injury or damage to property shall be prohibited.

In accordance with OAC 3745-17-05, the significant and avoidable deterioration of air quality surrounding the EWMF shall be prohibited.

In accordance with OAC 3745-17-08, visible fugitive dust emissions generated during grading, loading, construction, or other operations which emit fugitive dust shall be minimized or eliminated.

6.2.2.3 Wastewater Discharges

Wastewater discharges are primarily regulated under the Federal Clean Water Act and the State of Ohio Water Pollution Control Act. The existing National Pollutant Discharge Elimination System (NPDES) permit may need to be modified to address the discharge of the stormwater and the treated leachate. A Permit-to-Install and Permit-to-Operate may also be required to be obtained from the OEPA for the treatment and management facilities associated with these discharges. The permitting program and facility design requirements for the management and discharge of stormwater are still in the proposal stage. As the US EPA promulgates these stormwater regulations, their impact to the design and operation of the EWMF will need to be assessed. The specific standards for radionuclides and toxic/conventional pollutants which are to be incorporated into the design/operation of the EWMF are identified in this subsection.

Radionuclides

Wastewater effluents are to be controlled so that the radionuclide concentrations do not exceed the levels specified in 10 CFR 61.41, 10 CFR 20.105, 10 CFR 20.106, and 10 CFR 20 Appendix B Table II. If the wastewater discharges to a sanitary sewerage system, the standards contained in 10 CFR 20.303 apply.

Toxic/Conventional Pollutants

All wastewater discharges, including stormwater, shall comply with the requirements established in 40 CFR 122, OAC 3745-1-07, and OAC 3745-33-04 during construction, operation, and closure of the EWMF.

6.2.2.4 Groundwater Discharges

Discharge of radionuclides to the groundwater shall comply with the requirements of DOE Order 5820.2A as identified in Section 6.2.2.1.

In accordance with the groundwater protection standard of 40 CFR 264.92, the EWMF shall be designed to ensure that the hazardous constituents (40 CFR 264.93) are not detected in the groundwater (in the uppermost aquifer underlying the EWMF) at the point of compliance (40 CFR 264.95) in excess of the limits established pursuant to 40 CFR 264.94 during the compliance period (40 CFR 264.96).

Pursuant to CERCLA Section 121(d)(2)(A)(ii) and 40 CFR Section 300.430(e)(2)(i)(B), MCLs and non-zero MCLGs are specified to be relevant and appropriate for attainment in situations where remedial actions are being taken to clean up ground and surface waters which are potential drinking water sources. The MCLs for radionuclides (including radioactivity) are established under 40 CFR 141.15 and 141.16. The MCLs are for organic and inorganic pollutants and are established under 40 CFR 141.11, 141.12, 141.61, and 141.62 for public drinking water supplies. The MCLGs are for organic and inorganic pollutants and are listed under 40 CFR 141.50 and 141.51. In accordance with the ARARs identified for the EWMF, these MCLs and MCLGs are to be utilized to develop design-based performance criteria for the EWMF to ensure that the underlying aquifer is adequately protected. The performance criteria are to be established from modelling results; this modelling could be combined with the performance assessment required by DOE Order 5820.2A. The MCLs and MCLGs are shown in Table 6-1. New and revised MCLs and MCLGs are being proposed by the US EPA. As these

standards are finalized, their potential impact to the design and operation of the EWMF may need to be assessed. If required, the performance assessment will need to be updated.

6.2.3 Operational Requirements and Environmental Monitoring

The operation of the EWMF will be conducted in accordance with the provisions of the FEMP site-wide Health and Safety Plan. As required by 29 CFR 1910.120(b)(4), a task-specific health and safety plan will be developed for the operation of the EWMF. This plan will include the following provisions:

1) Provisions specified in 40 CFR 264 Subpart D are to be provided to mitigate an emergency.

2) Provisions specified in 40 CFR 125 and 40 CFR 264 Subpart J are to be followed to prevent spills and overflows.

3) Inspections and training are to be conducted in accordance with 40 CFR 264.15, 264.16, 264.33, 264.195, and 264.303.

4) Operational records are to be maintained in accordance with 10 CFR 61 Subpart G and 40 CFR 264 Subpart E.

5) Waste acceptance and disposal is to be in accordance with 10 CFR 61 Subpart D, 40 CFR 264 Subparts B, J and N, 40 CFR 268, and OAC 3745-20-05.

6) Manifests are to be used as required by 40 CFR 264 Subpart E for all off-site shipments of waste.

7) Occupational exposure to radiation is to be restricted as required by 10 CFR 20.

8) The atmosphere and groundwater shall be monitored according to 40 CFR 61 Subpart H, 40 CFR 61 Subpart Q and 40 CFR 264 Subpart F.

Table 6-1 - MCLs and MCLGs for Groundwater Pollutants

Pollutant	Current Limit[1]	Limit Effective 7/30/92[1]
Arsenic	0.05 (MCL)	
Barium	1.00 (MCL)-2.0(MCLG)	2.0 (MCL)[2]
Cadmium	0.010 (MCL) - 0.005 (MCLG)	0.005 (MCL)
Chromium	0.05 (MCL) - 0.1 (MCLG)	0.1 (MCL)
Lead	0.05 (MCL)- 0.0 (MCLG)	
Mercury	0.002 (MCL) - 0.002 (MCLG)	0.002 (MCL)
Nitrate	10.0 (MCL) - 10.0 (MCLG)	10 (MCL)
Selenium	0.01 (MCL) - 0.05 (MCLG)	0.05 (MCL)
Fluoride	4.0 (MCL) - 4.0 (MCLG)	
Endrin	0.0002 (MCL)	
Lindane	0.0002 (MCL)	0.0002 (MCL)
Methoxychlor	0.04 (MCLG)	0.04 (MCL)
Toxaphene	0 (MCLG)	0.003 (MCL)
2,4-D	0.07 (MCLG)	0.07 (MCL)
2,4,5-TP Silvex	0.05 (MCLG)	0.05 (MCL)
Total Trihalomethanes	0.1 (MCL)	
Benzene	0.005 (MCL) - 0 (MCLG)	
Vinyl chloride	0.002 (MCL) - 0 (MCLG)	
Carbon tetrachloride	0.005 (MCL) - 0 (MCLG)	
1,2-Dichloroethane	0.005 (MCL) - 0 (MCLG)	
Trichloroethylene	0.005 (MCL) - 0 (MCLG)	
1,1-Dichloroethylene	0.007 (MCL) - 0.007 (MCLG)	
1,1,1-Trichloroethane	0.20 (MCL) - 0.20 (MCLG)	
para-Dichlorobenzene	0.075(MCL) - 0.75 (MCLG)	
Ethylbenzene	0.7 (MCLG)	0.7 (MCL)
Toluene	2.0 (MCLG)	1.0 (MCL)
Nitrite	1 (MCLG)	1 (MCL)
Total Nitrate & Nitrite	10 (MCLG)	10 (MCL)
cis-1,2-Dichloroethylene	0.07 (MCLG)	0.07 (MCL)
1,2-Dichloropropane	0 (MCLG)	0.0005 (MCL)
Monochlorobenzene	0.1 (MCLG)	0.1 (MCL)
1,2-Dichloropropane	0 (MCLG)	0.0005 (MCL)
Monochlorobenzene	0.1 (MCLG)	0.1 (MCL)

Table 6-1 - MCLs and MCLGs for Groundwater Pollutants (Continued)

Pollutant	Current Limit[1]	Limit Effective 7/30/92[1]
0-Dichlorobenzene	0.6 (MCLG)	0.6 (MCL)
Styrene	0.1 (MCLG)	0.1 (MCL)
Tetrachloroethylene	0 (MCLG)	0.005 (MCL)
trans-1,2,-Dichloroethylene	0.1 (MCLG)	0.1 (MCL)
Xylenes (total)	10 (MCLG)	10 (MCL)
Combined radium-226 and 228	5 pCi/l	
Gross alpha particle activity (including radium-226, but excluding radon and uranium)	15 pCi/l	
External annual dose equivalent	4 mrem	
Tritium	20,000 pCi/l	
Strontium-90	8 pCi/l	
Alachlor	0 (MCLG)	0.002 (MCL)
Aldicarb	0.001 (MCLG)	0.003 (MCL)
Aldicarb sulfoxide	0.001 (MCLG)	0.004 (MCL)
Aldicarb sulfone	0.001 (MCLG)	0.003 (MCL)
Atrazine	0.003 (MCLG)	0.003 (MCL)
Carbofuran	0.04 (MCLG)	0.04 (MCL)
Chlordane	0 (MCLG)	0.002 (MCL)
Dibromochloropropane	0 (MCLG)	0.0002 (MCL)
Ethylene dibromide	0 (MCLG)	0.00005 (MCL)
Heptachlor	0 (MCLG)	0.0004 (MCL)
Heptachlor epoxide	0 (MCLG)	0.0002 (MCL)
Polychlorinated byphenyls	0 (MCLG)	0.0005 (MCL)
Pentachlorophenol	0 (MCLG)	0.001 (MCL)
Copper	1.3 (MCLG)	
Asbestos	7,000,000 fibers/liter (MCLG)	7,000,000 fibers/liter (MCL)

(1) Concentration limits in mg/l unless otherwise specified.
(2) Effective January 1, 1993.

Area radiation monitors shall be located appropriately throughout the facility to alert operations personnel to unusual radiation levels. Audible and visual alarms shall be automatically activated at the control room. Air monitors and samplers shall be provided to collect samples of airborne particulates for analysis of radioactivity that might be released from the disposal structures. All monitoring systems shall be capable of measuring the process parameters related to system integrity, radiological safety, and retrievability over the full range of levels anticipated during normal or credible abnormal conditions. All potentially contaminated work areas shall be provided with personnel monitoring equipment for use in checking all personnel for contamination upon leaving the work areas. A monitoring system shall be provided to monitor the loss of ventilation.

As required by 40 CFR 264 Subpart F, groundwater monitoring wells will be provided at the point of compliance in sufficient numbers and locations to allow detection of contaminant migration from the EWMF into the uppermost aquifer. Groundwater monitoring will be initiated prior to operating the EWMF to establish baseline water quality information. Construction activities will be phased so that the immediate area surrounding the monitoring well is not disturbed. A groundwater monitoring plan will be prepared prior to construction to define this program.

Monitoring of trucks and equipment delivering waste material and other materials to the EWMF during operations shall be monitored using the existing FEMP procedures.

6.3 Energy Impact

An Energy Conservation Report for the facility support building will not be required for DOE Order 6430.1A since the building is smaller than 10,000 square feet. No other energy impacts for this project have currently been evaluated.

Cost

Any cost that can be specifically identified with a particular project or activity, including salaries, travel, equipment, and supplies directly benefiting the project or activity.

Craft Support

Temporary construction, project-specific construction services, and miscellaneous construction services.

Date Construction Ends

The date on which work normally performed by construction forces (including installation of equipment by operating contractors or others) is accepted by the Government. This includes the completion of all building items, and the erection and installation of mechanical units and/or processing equipment. Correction of minor deficiencies and exceptions may be accomplished after the recorded date.

Date Physical Construction Starts

The date on which work normally performed by construction forces (including installation of equipment by operating contractors or others) is begun. This date shall not precede key Decision 3 defined in DOE Order 4700.1.

Date Title I Design Initiated

The date on which work normally performed under preliminary design is begun. This date shall not precede project authorization.

Decontaminate, Decontamination

The process of removing unwanted radioactive material (1) from equipment, environment, or persons not of themselves radioactive, frequently a matter of cleaning surfaces, or (2) from materials in a process, in which the undesirable activity is intimately intermixed.

Design Basis Accident (DBA)

A postulated accident used in design to assess system performance under worst-case conditions.

Design Basis Earthquake (DBE)

The maximum postulated earthquake occurring at a specific site and producing horizontal and vertical ground acceleration used in design. The DBE produces a horizontal ground acceleration of 20% of the acceleration due to gravity (0.2g).

Design Engineering Oversight

Includes such design overview and management costs as full-service design contractor overview services, project engineering management, project cost/schedule control systems, preparation of functional design review procedures, and technical and administrative functions.

Dismantling and Rearranging (D&R)

Effort necessary to disassemble, remove, or rearrange and dispose of existing equipment, piping, or other items to facilitate new project construction.

Engineering Design and Inspection

Includes costs of Title I, II and III services.

ERA Project

Environmental Remedial Action Project; the project for design of the CERCLA Remediation of the FEMP.

Escalation

A cost added to the estimate to cover the expected price increases due to the passage of time.

FEMP

Fernald Environmental Management Project, formerly the Feed Materials Production Center.

Leachate

Any liquid, including suspended components, that percolates through or draws from waste materials.

OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PCI	Prestressed Concrete Institute
PTI	Post-Tensioning Institute
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAD	Quality Assurance Department
QAPP	Quality Assurance Program Plan
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SAE	Society of American Engineers
SAR	Safety Analysis Report
SDI	Steel Deck Institute
SJI	Steel Joist Institute
TBC	To Be Considered
TEFC	Totally Enclosed-Fan Cooled
TSCA	Toxic Substances Control Act
UL	Underwriters Laboratories
UMTRCA	Uranium Mill Tailings Radiation Control Act
UPS	Uninterruptible Power Supply
US EPA	United States Environmental Protection Agency
WBS	Work Breakdown Structure
WEMCO	Westinghouse Environmental Management Company of Ohio
WMCO	Westinghouse Materials Company of Ohio

7.2 Glossary

Assay

A method of nondestructively determining the isotopic content of waste containers using neutron activation.

Aquifer

A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells and springs.

Authorization

DOE approval of a new start which occurs in the internal review budget process and is documented by the forwarding of the project to the OMB.

Bulk Material

Field-procured material obtained in bulk such as concrete, pipe, wire, and conduit.

Conceptual Design

An early design phase of a project that develops a project scope that will satisfy program needs, assures project feasibility and attainable performance levels, and develops reliable cost estimates and realistic schedules.

Construction Services

Covers construction support services such as maintenance of tools and equipment, craft training, and security escorts. Separate accounts within this general heading have been established for each of these items.

Contract Administration

Administration and clerical personnel responsible for implementation of the contract, cost of supporting plant utilities and services provided to the contractor, data processing, reproduction and blueprints, and plant security forces.

SECTION 7

ACRONYMS AND GLOSSARY

7.1 Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ACGIH	American Conference of Governmental Industrial Hygienists
ACI	American Concrete Institute
AGES	Above-Ground Engineered Storage
AICHE	American Institute of Chemical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALARA	As Low As Reasonably Achievable
ANS	American Nuclear Society
ANSI	American National Standards Institute
ARAR	Applicable or Relevant and Appropriate Requirement
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
AS/IT	Advanced Sciences, Inc./International Technology Corporation
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWT	Advanced Wastewater Treatment
BOCA	Building Officials and Code Administrators International
CAA	Clean Air Act
CDR	Conceptual Design Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	Certified for Construction
CFR	Code of Federal Regulations
CSI	Construction Specification Institute
CWA	Clean Water Act
DCR	Design Criteria Report
DHI	Door Hardware Institute
DOE	United States Department of Energy
DOT	United States Department of Transportation

EA	Environmental Action
EDF	Engineered Disposal Facility
EIS	Environmental Impact Statement
EPDM	Ethylene-Propylene Diene Monomer
ERA	Environmental Remedial Action
ETPSF	Engineered Treatment, Packaging, and Staging Facility
EWMF	Engineered Waste Management Facility
FEMP	Fernald Environmental Management Project
FFA	Federal Facilities Agreement
FM	Factory Mutual
FML	Flexible Membrane Liner
FR	Functional Requirements
FSB	Facility Support Building
FWCA	Fish and Wildlife Coordination Act
GFCI	Ground Fault Circuit Interrupt
HDPE	High Density Polyethylene
HEAST	Health Effects Assessment Summary Tables
HVAC	Heating, Ventilating, and Air-Conditioning
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illumination Engineering Society of North America
LCLDS	Leachate Collection and Leak Detection System
LLNL	Lawrence Livermore National Laboratory
MBMA	Metal Building Manufacturer's Association
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
OBBC	Ohio Basic Building Code
OBS	Organizational Breakdown Structure
OEPA	Ohio Environmental Protection Agency

Location Adjustment

A productivity adjustment factor used to convert standard labor hour rates to a site-specific building labor rate. Contains allowance for the degree of difficulty imposed by security restrictions, access to the building from construction facilities, working conditions internal to the building, and like conditions.

Mechanical Completion

The point in time at which responsibility for the facility under construction is transferred from construction to plant operations.

Obligations

The necessary revenues that bind the project execution to the prescribed schedules.

Operable Unit

An action taken as one part of an overall site cleanup. For example, a carbon adsoprtion system could be installed to halt rapidly spreading groundwater contaminants while a more comprehensive and long-term remedial investigation/feasibility study is underway. A number of operable units can be used in the course of a site cleanup.

Physical Completion

The point in time at which all physical work is completed, including plant engineering work orders (EWO) and any exceptions to project closing notices (PCN).

Project Contingency

An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties.

Protection to Operations

Actions taken to facilitate construction work in an operating facility such as barricades, temporary enclosures, etc.

Quality Assurance (QA)

All those planned and systematic actions necessary to provide confidence that a facility, structure, system, or component will perform satisfactorily and safely in service. Quality assurance includes quality control.

Quality Assurance Engineering

Covers the salary and expenses of quality assurance material management engineering (QAMME) personnel performing supplier site inspections.

Quality Control (QC)

Those quality assurance actions which provide a means to control and measure the characteristics of an item, process, or facility against established requirements.

Radioactive Waste

Equipment and materials (from nuclear operations) that are radioactive or have radioactive contamination and for which there are no recognized uses or for which recovery is impracticable.

Safety Analysis Report

The principal documentation of the evaluation of a process facility or process, made to determine that the facility or process can be operated without undue risk to public health and safety.

Site Overheads

Includes the salaries and expenses incurred in overall administration of the various projects and for general control and support of sitewide construction activities by the construction manager, employee relations superintendents, engineering office superintendents, field managers, senior engineers, area engineers, engineers, etc.

Start-up Assistance

Covers construction assistance during plant checkout leading up to equipment run-in.

Sump

A low-lying vessel or space to receive and contain liquid drainage.

Task Analysis

In lieu of using assumed percentages, the work effort is analyzed and resource loaded to determine the estimated cost.

Technical Manual

Permanent records that contain sufficient details of the basic technical information required for the design and operation of equipment, facilities, and processes.

Technical Standards

Documents that specify limits for important technical variables, such as time, temperature, flow, concentration, etc., in a process or operation. These limits are specified for reasons of safety, quality, and/or limitations of known technology.

Title I Design (Preliminary Design)

The preliminary stage of project design utilizing the conceptual design and design criteria that have been prepared for the project as design bases.

Title II Design (Definitive Design)

Title II definitive design (sometimes referred to as "final" or "detailed" design) is accomplished based on the approved Title I design and the project design criteria.

Title III Services

Those activities required to assure that the project is constructed in accordance with the plans and specifications and that the quality of materials and workmanship is consistent with the requirements of the project.

Unit Library

A collection of historical cost data maintained by a Design Service Contractor.

Waste Container

A portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Waste Management

The planning, execution, and surveillance of essential operations relating to radioactive wastes, including treatment, solidification, packaging, and disposal.