P.O. BOX 3000 MIAMISBURG, OHIO 45343-0987 • TEL (513) 865-4020

February 21, 1989

Mr. James A. Morley, Area Manager
U. S. Department of Energy
Dayton Area Office
P. O. Box 66
Miamisburg, Ohio 45343

Dear Mr. Morley:

FY 1991/FY 1992 Budget Submission
Environmental, Safety and Health Upgrades, Phase III
Mound, Miamisburg, Ohio

Enclosed are thirteen copies of the Revised Conceptual Design Report (CDR) for the subject FY 1991 Line Item submitted in response to a telephone request from Mr. Ron Ater, AL/BRMD.

The Suspended Solids Removal subproject has been deleted from the line item because of lack of support at AL. The subproject will be resubmitted at the next budget call.

Very truly yours,

M. R. Hunter
Project Manager

R. A. Neff
Program Manager

Approved: V. E. Castleberry/2014
V. E. Castleberry
Director, Engineering

/lm

cc: Mr. J. A. Morley (2) w/attachments

cdrIII

DISCLAIMER

**Portions of this document may be illegible
in electronic image products. Images are
produced from the best available original
document.**

NOTICE

*OK to Release
Mary Bando
7-18-96*

~~This Conceptual Design Report contains confidential commercial information that shall be used or duplicated only for official Governmental purposes, and this notice shall be affixed to any reproduction or abstract thereof. Disclosure of the confidential commercial information contained in this report outside the Government shall not be made without the advice of counsel. The restrictions contained in this notice do not apply to any data or information in this report which is not commercial information or to information generally available to the public on an unrestricted basis.~~

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

CONCEPTUAL DESIGN REPORT
FOR
ENVIRONMENTAL, SAFETY AND HEALTH
PHASE III
FY-91 LINE ITEM
MOUND FACILITY
MIAMISBURG, OHIO

PROJECT NO. 91-DA-01

PREPARED FOR THE USDOE

BY: HAYES, SEAY, MATTERN AND MATTERN, INC. F. L. Petoskey, Project Manager
Architects-Engineers-Planners

UNDER CONTRACT TO:

EG&G MOUND APPLIED TECHNOLOGIES, INC. M. R. Hunter, Project Manager

CONCEPTUAL DESIGN REPORT
FOR
ENVIRONMENTAL, SAFETY, AND HEALTH
PHASE III
MOUND

RECOMMENDED FOR APPROVAL

R. A. Neff
Manager, Operational Safety
EG&G - Mound

Date

V. E. Castleberry
Director, Engineering
EG&G - Mound

Date

B. S. Claiborne
Facilities Engineer
Dayton Area Office, DOE

Date

D. V. Eckman
Chief, Operations Branch
Dayton Area Office, DOE

Date

for J. A. Morley
Area Manager
Dayton Area Office, DOE

Date

CONCEPTUAL DESIGN REPORT
FOR
ENVIRONMENTAL SAFETY AND HEALTH
PHASE III
MOUND
MIAMISBURG, OHIO

PREPARED FOR THE USDOE
BY EG&G MOUND APPLIED TECHNOLOGIES, INC.

MRH FEBRUARY 21, 1989

FOR EG&G MOUND APPLIED TECHNOLOGIES, INC.

M. R. Hunter Project Manager
Dr. D. G. Carfagno Environmental Assessment Supervisor

FOR HAYES, SEAY, MATTERN AND MATTERN, INC.:

F. L. Petoskey, Jr. Project Manager
T. S. Kincer Project Civil Engineer
J. A. Brundege Project Mechanical Engineer

NO.	DATE	REVISION	REVIEWED BY	DOE/DAO APPROVAL

FEBRUARY 21, 1989

TABLE OF CONTENTS

	<u>PAGE</u>
ABSTRACT	ix
 <u>PART I - DESIGN CONCEPT</u>	 .1
A. General Description of Project	.1
1. General	.1
2. Solvent Waste Handling and Incineration	.2
3. Environmental Buffer Zone	.2
4. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	.4
B. Justification	.5
1. General	.5
2. Solvent Waste Handling System	.7
3. Environmental Buffer Zone	.7
4. Sanitary Treatment Plant Clarifier and Gas Cylinder Banks Upgrade	.8
C. Relationship to Other Projects	.9
D. Alternatives to Proposed Project	10
E. Design Concept	10
1. Project Design Description	10
a. Solvent Waste Handling System	11
b. Environmental Buffer Zone	12
c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	13
2. Energy Conservation	14
3. Environmental Considerations	14
a. Solvent Waste Handling System	15
b. Environmental Buffer Zone	15
c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	16
4. Safety Considerations	16
a. Solvent Waste Handling System	16
b. Environmental Buffer Zone	16
c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	17
5. Security Considerations	17
6. Provisions for the Handicapped and Fallout Shelters	18

TABLE OF CONTENTS (Cont'd.)

	<u>Page</u>
7. Maintenance and Operation	18
a. Solvent Waste Handling System	18
b. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	19
8. Decontaminating and Decommissioning (D&D)	19
a. Solvent Waste Handling System	20
b. Environmental Buffer Zone	20
c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	20
9. Telecommunications	20
10. Computer Equipment	20
11. Site Development Plan Coordination	20
12. Outline Specifications and Criteria	21
a. Solvent Waste Handling System	21
(1) Earthwork	21
(2) Pavement Replacement	21
(3) Exterior Process Piping	21
(4) Seeding and Sodding	22
(5) Building Construction	22
(6) Equipment	23
b. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	24
(1) Earthwork	24
(2) Pavement	25
(3) Utilities	25
(4) Seeding	26
(5) Concrete Work	26
(6) Equipment	26
F. Quality Assurance (QA)	26
G. Analysis of Uncertainties, Contingencies, and Effort to Resolve Uncertainties	27
H. Project Execution	28

TABLE OF CONTENTS (Cont'd.)

	<u>Page</u>
I. Schedules	30
J. Cost Estimate Summary	33
1. Total Project Cost Summary	33
2. ED&I Costs (Less Contingency)	33
3. Construction Costs (Less Contingency)	34
4. EG&G Project Management and Construction Management Costs	34
5. Contingency	35
6. Basis of Cost Estimate	35
a. General	35
b. ED&I Costs	35
c. Construction Costs	36
K. Procurement Actions	37
L. Cost and Funding Plan	38
M. Preliminary Drawings	40
 PART II - PROJECT MANAGEMENT	 .1
A. Project Management Organization	.1
B. Manpower Requirements	.1
C. Project Control	.3
1. Performance Control	.3
2. Construction Inspection and Acceptance	.3
3. Technical Reviews	.4
4. Progress Review	.4
5. Financial Control	.5
6. Construction Contractor Control	.5
7. Documentation	.5
8. Reporting Requirements	.6

PART III - SUPPORTING DATA (Separate Cover)

ABSTRACT

The Mound Facility (Mound), located in Miamisburg, Ohio, is a Department of Energy (DOE) development and production facility performing support work for DOE's weapons and energy-related programs. EG&G Mound Applied Technologies (EG&G) is the Operating Contractor (OC) for this Government-Owned, Contractor-Operated (GOCO) facility. The work performed at Mound emphasizes nuclear energy and explosives technology. Mound is currently implementing an Environmental, Safety, and Health (ES&H) Program designed to protect its employees, the public, and the environment from adverse effects caused by the facility's activities. Design has been completed, and construction is in progress for Phase I of this multiphase program. Phase II has been submitted for fiscal year (FY) 89 funding and Phase IV is being submitted as an FY 92 line item. This Conceptual Design Report (CDR) addresses Phase III of the ES&H program.

This ES&H Phase III project is divided into three subprojects, each of which is a solution to specific environmental problems at the site. The three subprojects are:

- Solvent Waste Handling and Incineration. A solvent waste handling system will be provided to incinerate process waste solvents to assure compliance with hazardous waste management standards and eliminate the costs and risks associated with the current practice of off-site disposal.
- Environmental Buffer Zone. By purchasing the land adjacent to the northwest boundary of the facility and by leaving the property undeveloped, Mound creates a much needed separation between land outside of the facility occupied by dwellings and buildings on the facility. This land will provide Mound with the means to monitor and control contamination on-site.
- Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade. The proposed new clarifier will provide Mound with an increase in wastewater treatment capacity at the existing plant. Over the years, all other treatment plant components have been upgraded to meet the treatment needs of a growing work force and expanding facility. This segment of the subproject will provide additional clarification capacity, will eliminate the clarifier as the limiting component in the treatment facility, and will provide greater

assurance that the National Pollution Discharge Elimination Systems (NPDES) permit limits on suspended solids will be met. The new clarifier will also reduce the solids loading on the sand filter, thus increasing its effectiveness.

The gas cylinder bank upgrade will eliminate explosion and fire hazards resulting from improperly stored and improperly secured gas cylinders and manifolds. Implementation of this segment of the subproject will bring the gas cylinder banks in compliance with the National Fire Protection Association (NFPA) and Mound safety standards.

Mound generates hazardous waste solvents at its Explosive Powder Processing Facility. Present disposal practice at the site is to drum these hazardous wastes on-site and to contract transportation and off-site disposal to a hazardous materials disposal contractor. Off-site disposal of this hazardous waste exposes Mound to the liability of an off-site accident which could result in injury to people and damage to the environment. Mound retains responsibility and liability even if the wastes are mismanaged by the disposal contractor. The on-site incinerator proposed by this subproject will eliminate this unnecessary risk.

A separate contract for design services is planned for each subproject as well as separate construction contracts. Title I design is scheduled to begin in early FY-91. Construction on the first subproject is scheduled to begin in the fourth quarter of FY-91. Total project completion is planned for the first quarter of FY-93.

The total estimated cost (TEC) of the project is \$3.8 million. The Cost and Funding Plan forecasts costs being incurred in FY-91 through FY-93.

PART I - DESIGN CONCEPT

A. General Description of Project

1. General

ES&H Phase III is the continuation of a consolidated and comprehensive effort to solve a number of environmental, safety, and health problems at Mound. The corrective actions proposed in this project will be implemented in three subprojects. These subprojects are:

- Solvent Waste Handling and Incineration. A solvent waste handling system will be provided to incinerate process waste solvents to assure compliance with hazardous waste management standards and eliminate the costs and risks associated with the current practice of off-site disposal.
- Environmental Buffer Zone. By purchasing the land adjacent to the northwest boundary of the facility and leaving the property undeveloped, Mound creates a much needed separation between land outside of the facility occupied by dwellings and buildings on the facility. This land will provide Mound with the means to monitor and control contamination on-site.
- Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade. The proposed new clarifier will provide Mound with an increase in wastewater treatment capacity at the existing plant. Over the years, all other treatment components have been upgraded to meet the treatment needs of a growing work force and expanding facility. This segment of the subproject will provide additional clarification capacity, will eliminate the clarifier as the limiting component in the treatment facility, and will provide greater assurance that the National Pollution Discharge Elimination Systems (NPDES) permit limits on suspended solids will be met. The new clarifier will also reduce the solids loading on the sand filter, thus increasing its effectiveness.

The gas cylinder bank segment will eliminate explosion and fire hazards resulting from improperly stored and improperly secured gas cylinders and manifolds. Implementation of this segment of the subproject will bring the gas cylinder banks in compliance with the National Fire Protection Association (NFPA) and Mound safety standards.

The various elements which make up each subproject are shown on the "Project Breakdown Chart" on page I-3. The location on the site of each of these subprojects is shown on Figure 2, "Key Plan," Section M, "Preliminary Drawings." A detailed description of each subproject is provided below.

2. Solvent Waste Handling and Incineration

This subproject consists of an on-site solvent waste handling system, including a licensed hazardous waste incinerator, to dispose of burnable liquid solvent waste. Mound generates a significant amount of solvent waste at the Explosive Powder Processing Facility, Building 27. This waste contains acetone, ethanol, and trace amounts of explosives and is considered hazardous waste. In addition, similar solvent waste mixtures and oils are generated at various other locations on the site. Currently, solvent wastes from Building 27 operations are filtered to remove explosives then stored in polyethylene-lined steel drums; other solvent waste mixtures and waste oils are stored in steel drums. These burnable wastes are shipped off-site for disposal. The proposed solvent waste handling system will eliminate off-site transport and disposal of this hazardous waste and will provide a cost-effective and environmentally safe on-site system for incinerating these wastes.

3. Environmental Buffer Zone

This subproject consists of purchasing land along the northwest boundary of the Mound facility to create an environmental buffer zone between the facility and the adjacent properties. Acquisition of this property will provide Mound with better control of ground water monitoring facilities located within the buffer zone. Should a hazardous spill occur along the northwest border, the buffer zone will enable Mound to

PROJECT BREAKDOWN

contain the spill on the Mound property, thus preventing damage to the property of others and making cleanup and control much easier.

4. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

This subproject consists of the following two elements:

- Sanitary Treatment Plant (STP) Clarifier
- Gas Cylinder Bank Upgrade

The sanitary treatment plant clarifier will provide Mound with the necessary treatment capability to meet the National Pollution Discharge Elimination System (NPDES) effluent permit limits and will place a lower solids loading on the plant's sand filters. Should the work under this subproject not be performed, Mound risks the possibility of exceeding the NPDES permit limits and of paying fines for noncompliance.

The gas cylinder bank upgrade includes modifications to the existing gas cylinder banks throughout the facility to bring them into compliance with NFPA and EG&G safety standards. To bring the cylinder banks into compliance, the work will include implementing a combination of fire walls, rails, chains, platforms, and canopies, and relocating or modifying the existing manifolds and regulators. The gases involved are nitrogen, oxygen, helium, argon, propane, hydrogen, methane, acetylene, and deuterium. This segment of the project will separate the flammable gases from the oxidizers and will provide safer methods of storage.

A Cost and Funding Plan for the project is summarized on Table I-2, page I-39. Funds will be required for Titles I and II Design, Title III, Equipment, and Construction. A schedule for the project is provided on page I-32.

A detailed conceptual description of project components is given in Section E, "Design Concept." Also included in Section E are descriptions of the equipment and the approximate sizes and quantities of

materials required. The designs and the materials proposed for the project have previously been proven; however, to ensure a quality installation, the components of each subproject will be tested.

A CDR for the ES&H - Phase III Upgrades Program was submitted in October 1987 as an FY-91 line item. The 1987 CDR consisted of three major elements.

- Suspended Solids Removal
- Solvent Waste Handling
- Upgrading Site Storm Drainage

The first two elements and that portion of the third element directly related to the suspended solids removal were incorporated into the 1988 CDR for the ES&H Phase III Program along with the addition of the Environmental Buffer Zone and the Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade subprojects. Remaining elements from the 1987 CDR were assembled as an FY-92 line item for site drainage control.

For this CDR, the entire suspended solids removal subproject has been deleted from the ES&H Phase III Program. This subproject is being deferred and will be resubmitted at the next budget call. The remaining elements from the 1988 CDR are the same.

No studies are being proposed or performed on the project as described in this CDR. All work proposed in this CDR is in compliance with the Mound Site Development Plan - April 1985, revised December 1988.

B. Justification

1. General

The proximity of the site to the Great Miami River and the location of a "sole-source" water supply aquifer below the site make it important to contain existing contamination and detect and control future incidents, however unlikely, involving the spill of radioactive material. ES&H Phase III will reduce environmental risks as well as risks to the

safety and health of operating personnel and the public. The first subproject addresses risks associated with current methods of handling hazardous solvent wastes. The second subproject deals with the need to protect people and property immediately adjacent to the site from possible exposure to hazardous contaminants. The third subproject will enable Mound to meet effluent limits on the domestic wastewater treatment plant and eliminate fire and explosion hazards associated with current methods for storage of gas cylinders throughout the facility.

Current solvent waste handling methods carry a high risk of organic and hazardous waste contamination of the environment. Off-site disposal has the risk of second-party mismanagement of the waste for which Mound would be liable. The proposed solvent waste handling and incineration subproject will eliminate these risks.

No environmental buffer exists between the northwest boundary of the Mound facility and the neighboring properties, some of which contain inhabited dwellings. An environmental buffer zone would permit Mound to detect, contain, and remove contamination before contamination can spread to adjoining property.

The existing clarifier at the wastewater treatment plant is undersized to handle the sanitary flow and provide adequate treatment. In addition, the gas cylinder banks throughout the facility are not in compliance with the National Fire Protection Association (NFPA) and the Mound safety standards. This project will protect both the environment, by enabling Mound to meet the effluent limits placed on the domestic wastewater treatment plant, and personnel, by eliminating fire and explosion hazards that exist at the gas cylinder banks.

Because of increased concern over environmental issues and increased liability from environmental damage, Mound could encounter adverse publicity and large monetary damages should an accidental discharge or spill of radioactive contaminants or other hazardous wastes occur. The potential risks to the health and safety of people and the environment are too great not to implement this project.

Detailed justification for each of the subprojects follows:

2. Solvent Waste Handling System

This subproject is necessary for several reasons. On-site disposal will eliminate drumming, shipping, and off-site disposal of liquid hazardous waste, other waste solvent mixtures, and waste oils. The number of waste samples required and the cost for sample analyses will be greatly reduced. Environmental regulations governing the shipment and off-site disposal of hazardous waste continue to place a liability on the generators of such waste. This subproject will eliminate the potential liabilities associated with the off-site transport and disposal of these materials. As required by EPA and DOE, this subproject will also reduce the volume and toxicity of Mound-generated waste sent off-site for disposal. With respect to Building 27 waste, this subproject will result in a less expensive method of waste disposal. Lastly, this subproject will correct the deteriorated solvent waste collection system at Building 27. Relining the existing collection trough at Building 27 and eliminating the drumming operation located behind Building 27 will preclude solvent waste from entering the adjacent main drainage channel.

3. Environmental Buffer Zone

The acquisition of the property adjacent to the existing northwest boundary of the facility will provide Mound the opportunity to better control groundwater flow off-site and will allow unimpeded access for ground water monitoring. Mound property has been developed up to the current property boundary along the northwest side of the facility, leaving no buffer zone between Mound and the neighboring properties, some of which contain inhabited dwellings. Ground water monitoring facilities exist on the neighboring property; however, Mound personnel must obtain permission from the property owners before sampling or remedial actions can commence. This subproject is essential for Mound personnel to contain and remove the contamination originating from the Mound site before creating an adverse environmental condition off-site.

4. Sanitary Treatment Plant Clarifier and Gas Cylinder Banks Upgrade

Upgrading of the STP clarifier is necessary to meet the effluent requirements imposed by the EPA on the sanitary treatment plant and to prolong the life and reduce operating and maintenance costs on the sand filters. The existing STP clarifiers are the only treatment components which have not been upgraded to keep pace with the increase in employees and building additions at the facility. Because of the increase in sanitary flow to the treatment plant, the existing clarifiers are undersized and do not effectively provide the level of treatment required to produce an acceptable secondary effluent. Because these clarifiers do not remove enough solids, the sand filters are overloaded, thus reducing their effectiveness and their useful life.

In 1987, Factory Mutual and the EG&G Explosives Safety Group conducted inspection of gas cylinder banks and noted deficiencies in the storage methods and separation distances between flammable gas cylinders and oxidizers. This subproject will provide safer gas cylinder storage by constructing fire-resistant barriers between flammables and oxidizers to prevent propagation of fires and subsequent explosions. A more positive means of securing the cylinders to prevent overturning and possible unrestricted discharge of gases from a broken regulator will also be provided.

These subprojects will comply with all local, state, and federal regulations. Specific issues to be addressed in the design of these subprojects include control of air pollution emissions, control of solvent wastes, control of radioactive pollution, reduction in solids in the STP, and prevention of potential gas fires and explosions.

The proposed components of the project are based on proven technology and are designed to achieve the project's objectives.

Funding is essential in order for Mound to conduct operations in a manner that will safeguard the health and safety of the public and operating personnel and that will protect the environment. Every segment of the proposed project will solve one or more specific problems that have been

identified as threats to the environment or to the safety and health of people.

C. Relationship to Other Projects

This project is the third of four major phases of the overall ES&H Upgrades Program at Mound. Phase I of the program is being implemented in two parts. The first part, ES&H Phase IA - Separate Process Water from Storm Drainage System, is, at this writing of this CDR, in the construction phase. The purpose of Phase IA is to remove the majority of once-through process cooling water discharge from the storm drainage system. The presence of cooling water in the storm system is one of the reasons why limits on suspended solids in the storm water discharge are contained in the NPDES permit. Construction is currently underway for Phase IB - Upgrade Site Sanitary Sewer and Storm Drainage System. Phase IB will replace damaged sanitary and storm drain piping identified in earlier surveys of these systems. No direct interface exists with these ongoing Phase I projects.

The ES&H Phase II project has been submitted for FY-89 funding. It contains three subprojects: Fuel Oil Storage, Potable Water System, and Explosives Storage. No interrelationship exists between the Phase II project and this Phase III project other than the general purpose of environmental, safety, and health protection.

The fourth phase of the ES&H Upgrades Program addresses site drainage control. It consists of making repairs and improving the existing storm drainage system to prevent the spread of radioactive contaminants from areas of known contamination to other areas on the site. Phase IV is an FY-92 line item currently in the conceptual design stage. No interface exists between Phase IV and this Phase III project.

This project complies in all respects with the Mound Site Development Plan-April 1985, revised December 1988.

D. Alternatives to Proposed Project

Two alternatives were investigated for the solvent waste handling subproject. The first alternative is to continue to dispose of the waste off-site. This alternative was rejected because of the risks associated with off-site disposal. The second alternative considered was locating the proposed on-site solvent handling facility at various places on the site. Three alternative locations were investigated. One location is adjacent to and east of Building 27 at the site of the existing fuel storage tank. The second location is near Building 72. The third and preferred location is at Building WD. This location is preferred because it offers available space and the potential for sharing operators who have similar responsibilities at the building. Additional study will be given to this tentative location to confirm the acceptability of building within a contaminated soil zone.

The only alternative considered for the environmental buffer zone subproject is to take no action. With development on the Mound facility up to the current boundary, no other option exists. This alternative would force Mound to accept the risk of a contaminated spill having adverse effects on the neighboring property and the people living there.

The only alternative to the gas cylinder and STP clarifier subproject considered is to take no action. This alternative would leave Mound with the continuing risk of fire and possible explosion and of not being able to meet the STP effluent limits imposed by the NPDES permit.

E. Design Concept

1. Project Design Description

Section A of the CDR provided a general description of the project. This section of the report provides a detailed design description for each segment of the three subprojects. Figure 2, "Key Plan," Section M, "Preliminary Drawings," shows the location of each subproject on the site. Details of each subproject are provided on figures in Section M as referenced in the text.

a. Solvent Waste Handling System

Figures 3, 4, and 5 in Section M show flow diagrams for the waste solvent incinerator system, the location of the incinerator, and the site layout of the solvent piping. This subproject consists of modifications to the existing deteriorated trough collection system at Building 27 and installation of a new solvent waste filtering system, new pumps, an incinerator with accessories, a building to house the incinerator equipment, and an aboveground pipe from Building 27 to the new incinerator building. This subproject also provides for the receiving and storage of waste solvents brought to the incinerator area in cans and drums. Separate holding tanks will be provided for water-soluble and water-insoluble wastes.

Modifications to the existing troughs at Building 27 will remove the deteriorated aluminum liner and will replace it with a stainless steel liner. This stainless steel liner will provide more corrosion protection from the acidic wastes which are occasionally discharged through the troughs.

The majority of solvent waste is generated at Building 27. A new pump behind Building 27 will collect solvent waste from an internal network of lined troughs. The waste will be pumped by diaphragm pumps through a filtering system to remove suspended explosives material. The filtrate will then flow through approximately 500 feet of aboveground 1-1/2-inch pipe to a new incinerator building. Waste holding tanks will be provided at the incinerator building to store solvent waste before feeding the waste to the incinerator unit. Waste generated at other on-site locations is relatively small. This waste will be brought to the incinerator building waste holding tank in polyethylene-lined steel drums.

The incinerator will have burner capacities of about 1.6 million Btus per hour and will be fired by propane gas. It will have the capacity to destroy about 25 gallons per hour of nearly all types of liquid waste. Estimates are that 25,000 gallons per year of

liquid solvent waste will require destruction at the facility. About 60 percent of this material will be aqueous waste containing water-soluble solvents; the remainder will be a wide variety of mixed solvents, including some chlorinated hydrocarbons. A performance test must be conducted on the incinerator before it can receive a permit to operate. Particulate emissions cannot exceed 0.1 pounds per 100 pounds of feed material, and hydrogen chloride emissions cannot exceed 4 pounds per day. The destruction removal efficiency (DRE) for hazardous compounds must be at least 99.99 percent. This destruction efficiency must be proven with one key component. Trichloroethane, which is believed to be the most widely used chlorinated hydrocarbon on this site, would be a likely candidate for the DRE test.

The incinerator will be a dual-chamber, controlled-air type, operating with a secondary chamber temperature of 1800 to 2000 degrees F. A wet scrubber will be provided to remove over 90 percent of the hydrogen chloride fumes and a portion of the particulates from the flue gas.

The incinerator will be housed in a pre-engineered structure possessing approximately 800 to 1000 gross square feet. Heating, lighting, mechanical ventilation, and fire protection will be provided in the building. The waste solvent tanks, solvent transfer pumps, and a waste solvent drum storage area will be located in the building. Because the proposed building location is in a contaminated soil zone, soil disturbance will be minimized by supporting the building structure directly on the floor slab. The site is located within a secure area so no additional fencing will be required.

b. Environmental Buffer Zone

Figure 7, Section M, "Preliminary Drawings", shows the location and approximate boundaries of the proposed environmental buffer zone. The buffer zone will contain approximately 26 acres of land along the northwest boundary of the site. Mound currently uses this

property for ground water monitoring but must obtain permission from the current land owners before entering the land to conduct testing and, if necessary, to take corrective action.

This subproject only includes the purchase of property and does not include the addition of any new monitoring wells or any preventative measures.

c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

Figure 6, Section M, "Preliminary Drawings", shows a typical plan and section of the clarifier to be used at the waste treatment facility. The new clarifier will be approximately 26 feet in diameter. The tank will be constructed of cast-in-place reinforced concrete. The new clarifier will be located at the present location of one of the sludge drying beds. Because the area for the new clarifier will be prepared prior to construction of the new clarifier, no sludge bed demolition is included in this project. Piping to the new clarifier is preliminarily sized at 4 and 8 inches. Supplemental construction on this portion of the project involves replacement of approximately 1100 square yards of bituminous pavement and construction of a sewage pumping station to feed the new clarifier. The pumps will be submersible, with a capacity of 40 gallons per minute. The existing treatment plant is not in a secure area; therefore, no security fencing will be required. Excavation of contaminated soils are not anticipated.

The cylinder bank segment of this subproject (see Figure 8, Section M) involves separating flammable gases from other flammables and oxidizers, chaining or providing other means of positive restraint for storage of cylinders, providing canopies above cylinders to prevent damage by falling objects, and providing separate storage areas for full and empty cylinders. A minimum of 20 feet is required to physically separate flammables and oxidizers. If space constraints exist, a fire wall will be used to achieve separation. Fire walls will have a fire rating of 1 hour, will be constructed of cinder block, and will have a minimum height of 5

feet. The cylinder banks are located at buildings R, 42, E, 26, DS, H, 71, M-East, and M-South. Canopies are required at Buildings 42 and 71. Building 71 will also require a 500-square-foot expansion of the cylinder storage area to accommodate the gas cylinders currently stored at Building 73. All other buildings listed require fire walls or physical separation of cylinders. Each of the buildings listed have cylinders that require chaining or modifications to the cylinder storage areas.

2. Energy Conservation

The incinerator is the Solvent Waste Handling System subproject's major energy consumer. Propane gas, a clean-burning fuel source, will be used to fire the unit. In addition to the propane gas, acetone, ethanol, and other solvents and oil contained in the waste will provide a substantial amount of the energy required to maintain the required combustion temperature. It is estimated that approximately 6000 gallons of propane will be consumed each year to incinerate 25,000 gallons of waste solvent. The incinerator building will be insulated, and floor space will be optimized at 800 square feet, thereby minimizing the heat loss. The building will not be air conditioned. Space heat for freeze protection during the shutdown periods will be provided by either an electric or propane-fired unit heater. Electric power will be required for the incinerator air blowers, controls, pumps, and lights. It is estimated that 4000 kWh of electric power will be consumed annually. The scrubber will consume about 1,700,000 gallons of water each year and will produce an equal volume of wastewater.

3. Environmental Considerations

The total cost of this project includes the cost of those measures necessary to ensure compliance with Executive Order 12088, the National Environmental Policy Act, and current DOE policies. Energetic material's (explosives and pyrotechnics) waste, rejected and defective materials and wipes, etc., will be segregated, labeled, and sent to Mound's explosive burn area for disposal. All solid and liquid chemical wastes are packaged for shipment in compliance with DOT Standards prior to

removal from the building generating the waste. These wastes are collected and held in a controlled access staging area until they are shipped to an EPA-approved disposal site.

The components of this project are located in an area not subject to flooding as determined in accordance with Executive Order 11988.

Information on the proposed project and pertinent environmental factors have been submitted to the Albuquerque Operations Office (AL) on January 5, 1987 in the form of an Action Description Memorandum (ADM). This information was provided for AL's use in determining the need for additional National Environmental protection Act (NEPA) documentation for this project.

a. Solvent Waste Handling System

This subproject will implement environmental protection of the immediate plant site and eliminate potential off-site environmental damage. The current process of solvent waste handling has the potential for accidental environmental contamination because the drumming process is located adjacent to the main site drainage channel. In addition, each drum is handled frequently from the time it is filled to the time its contents are eventually shipped off-site and incinerated. Double containment, limited transportation, and on-site incineration will reduce potential environmental impacts. Emissions from the incinerator will be a possible source of air pollution; however, abatement equipment will be provided to ensure compliance with air quality standards. An ADM for this subproject was prepared in March 1986. The intent of the memorandum has been implemented in this CDR.

b. Environmental Buffer Zone

This subproject will offer environmental protection to the property outside of the northwest boundary of the Mound facility by leaving an undeveloped area between the adjacent properties and the buildings at Mound. This land will serve as an area for ground

water monitoring and, if necessary, for remedial action. Should a contamination spill occur in the developed area of the site, this land will allow the contaminants to be contained on Mound property.

c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

The STP clarifier installation will offer environmental protection by improving the suspended solids removal capabilities of the existing wastewater treatment plant and by preventing an unpermitted discharge of suspended solids into the Great Miami River. The STP clarifier's location will be based on the availability of space around the existing plant and the relationship between the existing treatment components before and after the clarifier. The new clarifier will, like the treatment plant as a whole, be operated in accordance with federal, state, and local regulatory agencies responsible for facilities discharging treated effluent into a body of water.

4. Safety Considerations

a. Solvent Waste Handling System

This subproject will ensure the safety of Mound employees. The safe handling of bulk solvent waste adjacent to the Explosive Powder Processing Facility will be improved. The filtration of explosive-laden waste solutions will be done in a weatherproof enclosure with an automatically controlled pump instead of manually in the open as is now done. The need to ship waste solvents, some of them environmentally hazardous, off-site for disposal will be eliminated. The pipeline for conveying waste solvents from Building 27 to the Incinerator Building will be run aboveground on a combination of pipe stanchions and pipe bridges. This will allow visual inspection of the pipeline so that any leak can be found and corrected before extensive environmental contamination occurs.

b. Environmental Buffer Zone

The purpose of this subproject is described in Section E.1, "Project Design Description." This subproject's major impact is in environmental protection. By expanding the environmental considerations to encompass the effects that a contamination spill would have on the occupied dwellings at the northwest boundary, this subproject will enable Mound to contain and control an accidental spill in the buffer zone before it becomes a danger to the neighboring dwellings.

c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

The STP clarifier segment of this subproject does not address any specific safety problems. The clarifier will be designed in accordance with Mound safety standards and OSHA requirements.

The gas cylinder bank segment directly affects the safety of Mound operating personnel. The major purpose for upgrading the cylinder banks is to eliminate safety hazards in gas cylinder storage and manifolding, as documented by Factory Mutual and the Mound Explosive Safety Group. This upgrade will bring the gas cylinder banks throughout the facility into compliance with NFPA and Mound safety standards.

As in all construction projects at Mound, the work associated with implementing this and the other subprojects in this CDR will be closely scrutinized by Mound's safety personnel. All design and construction will be accomplished in accordance with the DOE, Mound, EPA, and the Occupational Safety and Health Administration (OSHA) regulations and safety standards.

5. Security Considerations

Much of the work in this project is located in restricted areas where fencing and/or escorts will be required. Because the nature of the gas cylinder bank upgrade subproject makes it unfeasible to install a tem-

porary security fence around the work, security personnel will be assigned to construction crews working on those segments of the subproject within the security islands. A temporary security fence will be constructed around the portion of the solvent waste handling subproject and the sanitary treatment plant clarifier subproject located on the Main Hill security island. This fencing will limit the need for security personnel supervision. None of the work on any of the subprojects will involve significant security considerations.

6. Provisions for the Handicapped and Fallout Shelters

No provisions will be made to include access for the handicapped or to provide fallout shelters in any portion of this project. These provisions are not applicable for the Environmental Buffer Zone and Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade subprojects because no buildings are involved in their design. The Solvent Waste Handling System subproject has structures incorporated into their design; however, these structures are related only to the incinerator operation and will not be appropriate for a fallout shelter or for access for the handicapped. A fallout shelter is provided in the existing underground T-Building which is equipped to conform to emergency civil defense standards for fallout shelters.

7. Maintenance and Operation

a. Solvent Waste Handling System

Implementation of this subproject will result in some additional maintenance and operating costs. The diaphragm pumps will require replacement of the diaphragm every few years. The other pumps are fractional horsepower and are used intermittently. An annual maintenance check-up should suffice. The incinerator pilots and burners will need periodic cleaning and tuning. Very little maintenance is anticipated on the incinerator itself except for lubrication of the air blowers and minor repairs to the refractory lining.

Operation of the solvent waste handling system will be accomplished on an intermittent basis. The incinerator has the capacity to combust more than the anticipated amount of solvent waste, and intermittent operation is both desirable and cost-effective. Operators at WD Building can handle the duties on an intermittent basis, so no additional staffing will be necessary. Filtration and transfer pumping will be automatically controlled and will require very little labor. The disposable filter bags must be manually removed and replaced when they begin showing high pressure drop.

Additional annual maintenance and operating costs for this subproject are estimated to be \$21,000 and \$7000, respectively. These costs are not escalated from the date of this CDR.

b. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

The additional operation and maintenance costs associated with the STP clarifier upgrade will be a fraction of the current operating and maintenance costs for the existing treatment plant. No additional personnel will be required to operate and maintain the new clarifier. Operating and maintenance costs will be approximately \$4900 per year and include electricity, labor, and maintenance materials. The clarifier will be a standard component of wastewater treatment and will not require any special design or unique maintenance. The clarifier manufacturer's representative will instruct the plant's operating personnel on proper operating and maintenance techniques and will provide inspection of the system prior to start-up.

No additional operating and maintenance costs are associated with the cylinder bank upgrade.

8. Decontaminating and Decommissioning (D&D)

All disposal of radioactive-contaminated soil is currently handled by Mound personnel. The soil is exhumed and boxed by a dedicated crew and shipped to the Nevada Test Site for disposal. The soil boxes are transported in exclusive-use, closed, commercial vans. All applicable DOT regulations are followed.

a. Solvent Waste Handling System

A review of the contaminated soil zones map indicates that the incinerator site is the only area where contaminated soil may be encountered on this subproject. If contaminated soils are encountered, they will be disposed of in accordance with standard facility disposal practices for contaminated soil.

b. Environmental Buffer Zone

No contamination exists on the buffer zone property; therefore, D&D work for this subproject is not required.

c. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

The proposed location of the STP clarifier is not in an area of known contamination, and D&D work is not anticipated.

9. Telecommunications

No telecommunications systems are required for this project.

10. Computer Equipment

No computer equipment is required for this project.

11. Site Development Plan Coordination

This project is in compliance with the Mound Site Development Plan-April 1985, revised December 1988.

12. Outline Specifications and Criteria

a. Solvent Waste Handling System

(1) Earthwork

(a) Building earthwork will be as minimal as practical and will be as required for siting the structure. The finished floor elevation for the building will be 6 inches above existing grade to ensure adequate drainage away from the building.

(b) Trench earthwork for installation of fuel lines will likewise be as minimal as practical. Trench depth will not exceed 3 feet. No pipe bedding is anticipated.

(2) Pavement Replacement

Aggregate base material, primer, and bituminous surface course will comply with the Ohio Department of Transportation Specifications.

(3) Exterior Process Piping

(a) Solvent Waste Lines: Aboveground, Schedule 10, 304L stainless steel pipe conforming to ASTM A 312. Pipe will be heat-traced for freeze protection and insulated with fiberglass insulation and aluminum jacket. Pipe will be supported on pipe racks and bridges at a maximum span of 8 feet.

- (b) Propane Fuel Lines: Buried, Schedule 40, black steel conforming to ASTM A 120. Pipe will be coal-tar epoxy coated.

(4) Seeding and Sodding

- (a) Flat and mildly sloped areas less than or equal to 3(H) to 1(V) disturbed during construction will be seeded.
- (b) Steeply sloped areas greater than 3(H) to 1(V) disturbed during construction will be sodded for erosion control.

(5) Building Construction

- (a) The buildings will be pre-engineered metal buildings with insulated metal wall and roof panels. Total area will not exceed 800 square feet for the incinerator building and 150 square feet for the filter house and transfer pump house.
- (b) The floor slab will be concrete slab-on-grade. Foundations will be integral with the floor slab.
- (c) Ventilation will be provided at ten air changes per hour with no air conditioning provided.
- (d) No potable water or toilet facilities will be provided. Water may be required for cooling the incinerator. Fire protection will be provided by extinguishers suitable for use on flammable materials.
- (e) Lighting will be provided by fluorescent lights at 30 footcandles.
- (f) When necessary, and when waste heat is available, heating will be provided by waste heat from the in-

cinerator. This heat will be supplemented with electric space heaters.

(6) Equipment

- (a) Incinerator: A dual-chamber, controlled-air-type incinerator with 800,000-Btu-per-hour propane-fired, modulating burners in each chamber will be provided. The incinerator capacity will be 200 pounds per hour of Type 5 waste having a calorific value that varies from zero to 8000 Btu per pound. The retention time for the flue gases in the secondary chamber will be 2 seconds minimum when the temperature is 1800 degrees F. The incinerator will be a factory-fabricated unit complete with blowers, controls, and liquid injection system such as those fabricated by Ecolaire, Brule, or Hirt.
- (b) Scrubber System: A venturi-type water scrubber which cools the flue gas to about 120 degrees F while removing at least 90 percent of the hydrogen chloride fumes and at least 50 percent of the particulates will be provided. A gas-to-gas heat exchanger will be provided on the scrubber outlet to reheat the cleaned flue gas to at least 220 degrees F while cooling the hot flue gas to the scrubber. The scrubber will be complete with controls for the water injection, a pH control for sodium carbonate solution addition, and an induced-draft fan to discharge the treated flue gases to the stack.
- (c) Solvent Holding Tanks: Two 1000-gallon, 304 stainless steel tanks will be provided. These tanks will be located in a diked area inside the incinerator building. Both tanks will be vented outdoors.
- (d) Propane Storage Tanks: A 2000-gallon, ASME-rated steel tank will be located on concrete pad with curbs.

- (e) Solvent Pumps: Two 5-gpm, 316 stainless steel centrifugal pumps will be provided.
- (f) Filter Feed Pumps: The filter feed pumps will be air-operated diaphragm pumps, local compressed-air operated.
- (g) Solvent Unloading Pump: The solvent unloading pump will be air-operated diaphragm pumps, local compressed-air operated.
- (h) Filter: The filter will be a basket type with coarse mesh inner bag and fine mesh outer bag for removing trace quantities of suspended explosive material. The filter will be similar to the Rosedale filter now in use at Building 27.
- (i) Sumps: Sumps will be precast or cast-in-place concrete conforming to ASTM and ACI specifications for precast and cast-in-place concrete. A stainless steel liner will be investigated during Title I design.
- (j) Waste Collection Troughs: The existing waste collection troughs in Building 27 will be renovated by removing all existing linings and covers, repairing or replacing the concrete, and providing new stainless steel liners and aluminum covers.

b. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

(1) Earthwork

- (a) Excavation: Structural excavation will be required for the clarifier foundation and footers for the fire walls. Trench excavation will be along straight lines and will be of sufficient depth to accommodate the pipe and bedding material and to maintain the grades shown on the con-

struction drawings. No excavation of contaminated soil is anticipated. All excavations will be unclassified.

- (b) Backfill: Backfill includes replacing excavated material on installed utilities, as well as around partially below-grade structures. Backfill around structures and beneath pavement will require compaction to 95 percent of standard proctor. All other backfill will require compaction to 90 percent of standard proctor.
- (c) Grading: Grading will be required to establish necessary ground slopes and drainage patterns.
- (d) Erosion Control: Erosion and sediment control features will be implemented to prevent sediment from leaving the immediate construction area. Features are to conform to the Ohio Erosion and Sediment Control Handbook.

(2) Pavement

- (a) Pavement Patch: Pavement patch will be used to restore pavement disturbed by pipeline crossing.

Type: Pavement materials will be specified in accordance with the Ohio Department of Transportation.

Thickness: Thickness will be equal to 1-1/2 times the original pavement thickness.

- (b) Pavement Overlay: The thickness of the pavement overlay will be 1-1/2 inches of a bituminous wearing surface. Materials will conform to the requirements of the Ohio Department of Transportation.

(3) Utilities

- (a) Gravity Pipe: Main gravity flow pipe through the facility will be large-diameter PVC pipe. Capacity was determined using the Manning Equation, with a "n" of 0.010.
- (b) Pressure Pipe: Pressure piping will be ductile-iron pipe, Class 50 or 51 depending on size. Sizes range from 4 inches to 8 inches. Capacities were determined by the Hazen-Williams Formula, using a "c" of 100.

(4) Seeding

In all areas disturbed during construction and not occupied by structure or paving, lime, fertilizer, and seed will be broadcast or hydroseeded to establish a good ground cover. Seed mixture and application rates will be based on soil types and growing seasons in the Miamisburg, Ohio, area.

(5) Concrete Work

- (a) The clarifier will be reinforced concrete designed to withstand buoyancy effects. Concrete will be 4000-psi strength.
 - (b) Concrete will have a 28-day compressive strength of 4000 psi. Reinforcing steel will be Grade 60, deformed.
- (6) Equipment: The equipment will consist of one 25- to 30-foot-diameter, center-fed, peripheral overflow clarifier, with bottom-scraping sludge-rake arm.

F. Quality Assurance (QA)

This project has been evaluated by key EG&G personnel, including the Loss Prevention and Environmental Control Representative, according to EG&G QA guidelines and the Albuquerque Office of the DOE Order 5700.6A.

According to the Consequences of Failure analysis, the STP clarifier subproject, and the environmental buffer zone subproject are rated as Class III. The analysis rates the solvent waste handling system and gas cylinder bank subprojects as Class II. Class II requires assurance that the design and components of the subproject provide for a safe, reliable, and economic operation within the definition of acceptable risk. A Class II rating requires a formal QA plan. EG&G will prepare this plan by June 1989.

EG&G guidelines for QA will be applied throughout the project. The EG&G Project Manager will be responsible for enforcing the guidelines. According to these guidelines, a design criteria is required for each subproject to assure that project objectives will be met.

The A/E will be required to implement a QA program consistent with the formal plan for Category I and with the EG&G QA guidelines. All Title I and Title II documentation will be reviewed by EG&G and will be checked by the A/E for compliance with the design criteria.

To ensure trouble-free solvent waste handling and STP clarifier systems, the construction contract documents will require manufacturer's assistance, including operator training, during equipment installation, checkout, and start-up. In addition, the specifications will require operating and maintenance manuals for all equipment.

During construction, contractor submittals will be reviewed by the A/E and EG&G Inspector for conformance with the contract documents. EG&G field inspection work will be supported by periodic inspections made by the A/E.

G. Analysis of Uncertainties, Contingencies, and Effort to Resolve Uncertainties

A number of uncertainties and unknowns have been identified during the development of the CDR. These unknowns and the plans for resolving them are listed below:

- Unknown: Location of existing underground utilities.

Resolution: Prior to Title I design, a mapping program will be initiated to locate horizontal and vertical alignment of all underground utilities in the immediate project area.

- Unknown: Quantity of contaminated soil to be encountered.

Resolution: An analysis of soil radioactivity in areas where construction is to take place will be performed to determine the extent of contamination. This analysis will allow D&D costs to be quantified. This unknown will be accounted for in the contingency percentage applied to this project. The rationale for the contingency percentage is explained in Part III, "Supporting Data."

- Unknown: Soil types and strength.

Resolution: A detailed soils analysis providing the Unified Soil Classification System's classification of soil types, bearing capacity, moisture-density relationships, Atterberg limits, and California Bearing Ratio values will be provided. The design of foundations, footers, slabs, and pavement cannot be finalized until this information is provided. An estimated thickness of concrete for slabs and an estimated area of footers and foundations have been made for concept design and estimating purposes. A small portion of the contingency used for this project will be dedicated to unknown soils.

- Unknown: Allowable emission limits for the solvent waste handling system.

Resolution: Allowable emission limits for this subproject will be established during the Title I design phase. A small portion of the contingency used for this project will be dedicated to the unknown emission limits.

H. Project Execution

Each of the subprojects will be divided into separate design and construction packages. This project division is planned because of the varying nature

and magnitude of the subprojects. A professional A/E firm, with assistance and input from EG&G, will perform the design. The subprojects, with the exception of the environmental buffer zone which will fall under the category of land, will be broken down into the following procurement items:

- A/E Services for Title I, II, and III
- Equipment
- Construction

The sequence for procuring these items by calendar and fiscal year can be found in Section I, "Schedules." EG&G will manage and coordinate the contracts and equipment purchases.

The unknowns listed in Section G, "Analysis of Uncertainties, Contingencies, and Effort to Resolve Uncertainties," will be resolved prior to or in the early stages of Title I design. The construction contractors performing the work will install the EG&G-purchased equipment, will make alarm hook-ups, and will sequence the construction.

If split or incremental funding is chosen, the following priority list should be used to determine the importance of each subproject. The subprojects are listed by level of importance, with item (1) being the most important:

1. Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade
2. Solvent Waste Handling
3. Environmental Buffer Zone

The total estimated cost for each subproject can be found in Section J, "Cost Estimate Summary."

The A/E contract will be procured through proposals solicited by EG&G. This contract will be awarded based on the firm's qualifications, experience, and ability to perform the necessary services in the required time frame.

The construction contracts will be procured through public advertisement and competitive bidding and will be awarded based on the contractor's experience, financial stability, and low-bid price.

I. Schedules

The project schedule included in this section shows that Title I design on all subprojects will begin on November 1990. This starting date is based on a lack of funding until FY-91. Mound currently has project funding for ES&H, Phases I and II. The schedule shows key dates for the design, procurement, and construction phase of each subproject. The length of each activity in the schedule was established based on the scheduler's familiarity with similar construction projects and on past construction projects at Mound. Emphasis will be placed on obtaining the necessary air pollution permits for the solvent waste handling project to ensure that project design and construction is not delayed. Table I-1 (Milestone Table) shows important items and completion dates for the four subprojects.

MILESTONE TABLE
Table I-1

Activity	Subproject		
	Solvent Waste Handling and Incineration	Environmental Buffer Zone	Sanitary Treatment Plant Clarifier & Gas Cylinder Bank Upgrade
Procurement of Equipment	Sep 91-Feb 92	N/A	Jul 91 - Nov 91
Procurement of Land	N/A	Nov 90-May 91	N/A
Permits	Nov 91, Sep 92	N/A	Mar 91, Sept 91
Demolition	Nov 91-Jan 92	N/A	N/A
PSAR/FSAR	N/A	N/A	N/A
Incremental Acceptances	Mar 91, Sep 91	N/A	Feb 91, July 91
Parallel Procurement Strategies	N/A	N/A	N/A
Support Activities (ED&I, Cons. Equip)	Nov 90-Dec 92	N/A	Nov 90 - Dec 92
Design and Review	Nov 90-Sept 91	N/A	Nov 90 - July 91
Contract Awards	Nov 90, Oct 91	N/A	Nov 90, Sept 91
Construction Complete	Nov 92		Nov 92

NOTE: 1. N/A means not applicable.
2. Dates are calendar year and represent the first day of each month.

ENVIRONMENTAL, SAFETY AND HEALTH
PHASE III PROGRAM

PROJECT SCHEDULE

J. Cost Estimate Summary

1. Total Project Cost Summary

The total estimated cost (TEC) for the project is summarized as follows:

Engineering, Design, and Inspection (ED&I)	\$ 370,712
Construction	2,399,226
EG&G Project Management	135,120
EG&G Construction Management	135,120
Contingency	<u>764,932</u>
 TOTAL ESTIMATED PROJECT COST	 \$3,805,110

A tabulation of the TEC for each subproject is as follows:

	<u>TEC</u>
Solvent Waste Handling and Incineration	\$1,293,302
Sanitary Treatment Plant Clarifier and Gas Cylinder	
Bank Upgrade	847,500
Environmental Buffer Zone	<u>1,664,308</u>
PROJECT TOTAL	\$3,805,110

2. ED&I Costs (Less Contingency)

Estimated ED&I costs are summarized as follows:

Architect/Engineer	\$ 163,185
EG&G Engineering	31,356
EG&G Inspection	<u>176,171</u>
TOTAL ED&I (Less Contingency)	\$ 370,712

ED&I cost calculations are included in Part III, "Supporting Data."

3. Construction Costs (Less Contingency)

Estimated construction costs are summarized as follows:

Solvent Waste Handling and Incineration:

a. Buildings	\$ 157,757
b. Utilities	53,704
c. Special Facilities	253,882
d. Prepurchased Equipment	<u>151,512</u>
SUBPROJECT TOTAL (Less Contingency)	\$ 616,855

Environmental Buffer Zone:

a. Land	<u>\$ 1,221,000</u>
SUBPROJECT TOTAL (Less Contingency)	\$ 1,221,000

Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade

a. Improvements to Land	\$ 22,182
b. Other Structures	253,592
c. Utilities	136,321
d. Special Facilities	91,776
e. Prepurchased Equipment	<u>57,500</u>
SUBPROJECT TOTAL (Less Contingency)	\$ 561,371

TOTAL CONSTRUCTION COST (LESS CONTINGENCY) \$ 2,399,226

The detailed Construction Cost Estimate is included in Part III, "Supporting Data."

4. EG&G Project Management and Construction Management Costs

EG&G project management and construction management cost calculations are included in Part III, "Supporting Data."

5. Contingency

Contingency costs are summarized as follows:

<u>ELEMENT OF COST</u>	<u>BASE COST</u>	<u>AVERAGE PERCENT</u>	<u>DOLLARS</u>	<u>TEC</u>
ED&I	\$ 370,712	21	\$ 77,406	\$ 448,118
Solvent Waste Handling and Incineration	616,855	18	108,221	725,076
Environmental Buffer Zone	1,221,000	36	439,560	1,660,560
Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade	561,371	16	88,401	649,772
EG&G Project Management	135,120	19	25,672	160,792
EG&G Construction Management	<u>135,120</u>	<u>19</u>	<u>25,672</u>	<u>160,792</u>
TOTAL	\$ 3,040,178	25	\$ 764,932	\$ 3,805,110

NOTE: Amounts shown are not precise due to rounding of the contingency.
The contingency analysis is included in Part III, "Supporting Data."

6. Basis of Cost Estimate

a. General

The Construction Cost Estimate is in accordance with DOE/MA-0063, Volume 6, Cost Estimate Manual. The contingencies used are derived from the alternate method of contingency analysis described in Section 3900, Attachment 3 of Mound Project Manual 804. The estimate is a CDR cost estimate and is not defined to the current working estimate level of detail (detailed material takeoffs). The estimate summary format conforms to DOE Order 5700.

b. ED&I Costs

(1) Architect/Engineer Costs

The estimated A/E costs are broken into Title I, Title II, and Title III services and are based on 10 percent of the

bare construction costs. A percentage markup for contingencies is included as well as escalation to the midpoint of the project. Independent Cost Estimating (ICE) Staff escalation rates were used based on the following indices:

<u>Subproject</u>	<u>Project Midpoint</u>	<u>ICE Index</u>
Solvent Waste Handling and and Incineration	11/1/92	1.22
Environmental Buffer Zone	2/1/91	1.11
Sanitary Treatment Plant Clarifier and Gas Cylinder Banks Upgrade	11/1/91	1.15

(2) EG&G Engineering Costs

The estimated EG&G engineering costs are based on a staffing plan for Title I, Title II, and Title III. Manhours obtained from the staffing plan were multiplied by an average EG&G wage rate of \$22.00 per hour and an overhead rate of 115 percent. Escalation to the midpoint of the project is included along with the ED&I contingency computed in the contingency analysis.

c. Construction Costs

The construction cost estimate is based on either labor and material or square-foot costs depending on the information available at the time of this CDR. The estimate summary is broken down into the subprojects indicated on the WBS. Prices obtained from standard references, such as R.S. Means, from the A/E's experience with similar projects, and from vendor quotations were used to develop the estimate. Special prices for contaminated soil disposal were obtained from EG&G and are based on a 1987 rate of \$40 per cubic foot.

A separate prime contract will be let for each of the subprojects. Subcontractor overhead and profit used was 15 percent and the

prime contractor overhead and profit used was 20 percent for prime contractor's own work and 10 percent on his subcontracted work. These percentages are based on the A/E's experience with similar projects, as well as normal overhead and profit rates for construction work of this type. Because no sales tax is necessary on items that will become a permanent part of the Facility, sales tax is not included in the estimate. The markup used for taxes and insurance on labor was 23 percent based on a contractor-fixed overhead of 15 percent and an Ohio Worker's Compensation rate of 8 percent.

The construction cost was escalated to the midpoint of construction for each subproject using the following multipliers as calculated from the ICE escalation rate list FY 1990 guidance:

<u>Subproject</u>	<u>Construction Midpoint</u>	<u>ICE Multiplier</u>
Solvent Waste Handling and Incineration	5/1/93	1.25
Environmental Buffer Zone	2/1/91	1.11
Upgrade Gas Cylinder Banks and Sanitary Treatment Plant Clarifier	4/1/92	1.18

The contingencies included are tabulated in the Contingency Analysis Summary Sheet and are detailed on the Contingency Analysis Work Sheets.

K. Procurement Actions

The initial step in the procurement process will be to obtain an A/E firm to provide the Title I, Title II, and Title III services for each subproject. The next step will be to advertise, bid, and award the construction contracts for the three subprojects. Concurrent with the bid and award process for the construction work, EG&G will advertise and receive quotations for the major pieces of equipment required for each subproject. EG&G will be

responsible for administering the services and purchases from all outside sources.

L. Cost and Funding Plan

A cost and funding plan has been prepared. Obligations and costs by fiscal year are summarized in the table on the following page. Obligations for each activity in the Project Schedule on page I-32 are incurred in the fiscal year in which that activity begins. The costs are prorated proportionally among the fiscal years during which the activity occurs.

ES&H PHASE III
OBLIGATIONS/COSTS (\$1,000)

TABLE I-2

ES&H PHASE III		FY91	FY92	FY93
Titles I and II	Obligations	161	--	--
	Costs	154	7	--
Titles III	Obligations	68	142	--
	Costs	5	188	17
Equipment	Obligations	45	164	--
	Costs	45	164	--
Construction	Obligations	1,754	706	--
	Costs	1,262	1,102	96
Contingency	Obligations	581	184	--
	Costs	480	262	23
Total	Obligations	2,609	1,196	--
	Costs	1,946	1,723	136

M. Preliminary Drawings

The following preliminary drawings (Figures) are included in this section to supplement the text.

FIGURE LIST

<u>Figure Number</u>	<u>Title</u>
1	Contaminated Soil Zones
2	Key Plan
3	Waste Solvent Incinerator System - Flow Diagram - New Filter House
4	Waste Solvent Incinerator System - Flow Diagram - New Incinerator Building
5	Waste Solvent Incinerator System - Site Plan- Building and Pipeline
6	STP Clarifiers
7	Location Map for Environmental Buffer
8	Location Map for Gas Cylinder Bank Upgrade

NOTE:

ZONE NUMBERS REFER TO
CONTAMINATION EVENTS.
SEE PART III, SUPPORTING
DATA FOR THE YEAR OF THE
EVENT AND TYPE OF CONTAMINANTS
IN EACH ZONE.

FIG. 1

CONTAMINATED SOILS ZONES

SCALE: 1"=600' (APPROX.)

SANITARY TREATMENT
PLANT CLARIFIER
FIG. 6

SOLVENT WASTE
HANDLING AND
INCINERATION
FIGS. 3 - 5

LEGEND

SSA-1

STORM SEWER AREA DESIGNATION

EXISTING OPEN DITCH OR CHANNEL

APPROXIMATE LIMITS OF A PROPOSED PROJECT
NOT OTHERWISE DEFINED

BOUNDARY OF STORM SEWER AREA

EXISTING STORM SEWER

GAS CYLINDER BANK UPGRADE
FIG. 8

ENVIRONMENTAL
BUFFER ZONE
FIG. 7

FIG. 2

KEY PLAN

SCALE: 1"=550' (APPROX.)

25° 30' 48.53"

PLANT

TRUE

HOUND ROAD

PARKING

EMPLOYEE PARKING

MAIN PARKING LOT

PLAN
NO SCALE

SECTION A-A
NO SCALE

FIG. 6
STP
CLARIFIER

LEGEND

- EXISTING OPEN DITCH OR CHANNEL
- APPROXIMATE LIMITS OF A PROPOSED PROJECT NOT OTHERWISE DEFINED
- BOUNDARY OF STORM SEWER AREA
- EXISTING STORM SEWER

LIMITS OF ENVIRONMENTAL BUFFER ZONE

FIG. 7
LOCATION MAP
FOR
ENVIRONMENTAL
BUFFER ZONE
SCALE: 1"=550' (APPROX.)

25° 30' 48.53"
PLANT
TRUE

PART II - PROJECT MANAGEMENT

A. Project Management Organization

Effective management and control of the project can best be accomplished utilizing a project management type structure for project execution. Responsibility for all aspects of the project will rest with the EG&G Project Manager. The EG&G Project Manager will be directly accountable to the EG&G directors for delivering a quality project on time and within the budget. The Project Manager will be supported by a project team of highly qualified EG&G personnel, outside consultants, and contractors. The basic role of the team members will be consistent with DOE Order 4700.1, and each will be experienced in the planning and execution of projects similar to those proposed in this CDR. An organizational chart showing the planned team structure is provided on page II-2.

B. Manpower Requirements

The responsibilities of individual members of the project team shown on the organization chart are outlined below:

- The EG&G Senior Buyer will be responsible for all procurement activities and for administering all contracts.
- The EG&G Engineering Project Manager will have overall responsibility for preparing budget and authorization request documents, interpreting design criteria, coordinating the design effort, monitoring contractor progress during construction, and coordinating any EG&G trades work. He will also be responsible for controlling expenditures of project funds and for maintaining the project schedule.
- The EG&G Engineering Construction Manager will work closely with the EG&G Project Manager. He will be responsible to the EG&G Project Manager for coordinating the day-to-day design and construction activities.

PROJECT ORGANIZATION CHART

EG&G procedures for final inspection, checkout and test, start-up, and acceptance will be followed.

3. Technical Reviews

The following reviews will be conducted to assure that all performance and safety parameters are met for all aspects of this project:

- Conceptual Design Reviews based upon the CDR will be conducted with both EG&G and DOE management.
- The CDR prepared for EG&G will be reviewed and approved by DOE. Any discrepancies will be corrected.
- The Design Criteria will be reviewed and approved by DOE management and technical staff. Any discrepancies will be corrected.
- The EG&G Project Team, EG&G Management, and DOE staff will perform Title I and II Design Reviews of the A/E-prepared drawings and specifications.
- The A/E will review construction contractor submittals.
- Operational Reviews will be conducted following completion of construction and before commencement of operations. Both EG&G and DOE safety and technical staffs will participate in these reviews.

4. Progress Review

All progress will be monitored against schedules prepared for each work element. Construction progress will be monitored against the approved construction schedule. The design and construction will be monitored by the EG&G Project Manager. In addition, the EG&G Inspector will monitor all construction activities. Quarterly construction progress reviews will be conducted with DOE/DAO and AL management.

5. Financial Control

A cost estimate will be prepared for the project. Costs will be monitored against the estimate. Financial information will be periodically reported in accordance with the requirements of DOE Order 4700. Reporting will include:

- A Quarterly Report for Construction Jobs will be prepared by EG&G and submitted to DAO and AL. The information included in this report will be similar to that shown in Chapter VI, DOE Order 4700.
- A Weekly Project Status Report, providing current and significant project cost and schedule information, will be prepared by the Project Manager for EG&G management.
- A Monthly Engineering Work Order Status Report that includes all costs charged against the project will be prepared by the EG&G Project Manager.
- The EG&G Project Manager will brief EG&G and DOE management at quarterly Construction Status Meetings. At these meetings, all design and construction schedules and cost information through the end of the preceding month will be presented.

6. Construction Contractor Control

The EG&G Senior Buyer will be responsible for administering commercial aspects of the contract. The EG&G Project Manager, with the support of the EG&G Construction Manager and EG&G Inspector, will be responsible for assuring contractor performance on a daily basis. The prime construction contractor will be responsible for the performance of his subcontractors.

7. Documentation

The EG&G Project Manager will be responsible for ensuring that complete records of all actions on the project are properly prepared and maintained. Contract and purchasing records will be maintained by the EG&G

Senior Buyer. All project correspondence; design documentation, including design criteria and Title I and Title II submittals; schedules and reports; construction files; etc., will be maintained by the EG&G Project Manager.

8. Reporting Requirements

Reporting will comply with DOE Order 4700. The following reports will be prepared:

- Operating Contractor Construction Progress Report
- Monthly A/E Progress Report
- Quarterly AL Construction Report
- Monthly Operating Contractor Procurement Report
- Monthly Interim Actions Report

The EG&G Project Manager will be responsible for the timely preparation and submittal of each report.