MLM-MU-91-62-0006

**CONCEPTUAL DESIGN REPORT
FOR THE
SITE DRAINAGE CONTROL
FY 1993 LINE ITEM**

February 1991

RECEIVED

JUL 0 1 1996

OSTI

EG&G MOUND APPLIED TECHNOLOGIES

P.O. BOX 3000

MIAMISBURG, OHIO 45343-3000

513-865-4020

operated for the UNITED STATES DEPARTMENT OF ENERGY

Contract No. DE-AC04-88-DP43495

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

MASTER

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

February 15, 1991

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 1993 Budget Submission
Site Drainage Control
Mound, Miamisburg, Ohio

Enclosed are thirteen copies of the Conceptual Design Report (CDR) for the subject FY 1993 Line Item submitted in response to the FY 1993 Budget Call.

This line item was previously submitted in November, 1989, in response to the FY 1992/FY 1993 Budget Call. A revised submission, with a modified funding profile, was issued in May 1990.

The project currently being submitted differs from the previous submission. The stormwater management system for the undeveloped southernmost property, including a large stormwater retention pond, is being deleted. Also, the existing Overflow Pond is being expanded to increase its storage capacity. In addition, some smaller elements of the project have been deleted and been replaced with other elements, the need for which has only recently been identified.

This line item is necessary to ensure that Mound satisfies the applicable federal and state regulations and DOE requirements. The line item is consistent with the long range plan for Mound and is reflected in the current Mound Site Development Plan.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'M. R. Hunter'.

M. R. Hunter
Project Manager

A handwritten signature in cursive script, appearing to read 'C. S. Friedman'.

C. S. Friedman
Manager,
Environment & Waste Management

Approved: _____

A handwritten signature in cursive script, appearing to read 'V. E. Castleberry'.

V. E. Castleberry
Director, Engineering

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

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 Pacinda
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
SITE DRAINAGE CONTROL
FY-93 LINE ITEM
MOUND PLANT
MIAMISBURG, OHIO

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

SITE DRAINAGE CONTROL

MOUND

RECOMMENDED FOR APPROVAL

C. S. Friedman
C. S. Friedman
Manager, Environment & Waste
Management
EG&G - Mound Applied Technologies, Inc.

1/23/91
Date

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

1-23-91
Date

J. M. Bernier
J. M. Bernier
Facilities Engineer
Dayton Area Office, DOE

Date

D. V. Eckman
D. V. Eckman
Chief, Programs & Operational
Surety Branch

Date

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

Date

CONCEPTUAL DESIGN REPORT
FOR
SITE DRAINAGE CONTROL
MOUND
MIAMISBURG, OHIO

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

MRH FEBRUARY 14, 1991

FOR EG&G MOUND APPLIED TECHNOLOGIES, INC.

M. R. Hunter	Project Manager
Dr. D. G. Carfagno	Senior Environmental Specialist

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

F. L. Petoskey, Jr.	Project Manager
T. S. Kincer	Project Civil Engineer
J. H. Spyhalski	Cost and Scheduling Engineer

TABLE OF CONTENTS

	<u>PAGE</u>
ABSTRACT	x
<u>PART I - DESIGN CONCEPT</u>	I-1
A. General Description of Project	I-1
1. General	I-1
2. Improvements to the Main Drainage Channel and Retention Structures	I-4
a. Main Drainage Channel	I-4
b. Overflow Pond	I-4
c. Retention Basin	I-4
d. SM Area Retention Pond	I-5
3. Improvements to the Collection Systems in Contaminated Soils Areas	I-5
a. Drainage Along West Side of Main Hill	I-5
b. Drainage for Building 19 Area	I-5
c. Drainage for Test Fire Area	I-5
d. Drainage for Area Between Firehouse and Building 51 Area	I-6
e. Drainage Along Old South Boundary Between Developed and Undeveloped Properties	I-6
f. Drainage for Area North of SM-PP Area	I-6
g. Channel Between Magazine 52 and Building 57	I-6
h. Drainage for Area Between Buildings 30 and 71	I-7
i. Drainage for Area North of Road North of SM Area Retention Pond	I-7
4. Improvements to Construction Spoils Area and Main Parking Lot	I-7
a. Old Construction Spoils Area Drainage	I-7
b. Main Parking Lot Subsurface Drainage	I-7
c. Main Parking Lot Storm Drainage Control	I-8

B.	Justification	I-10
1.	General	I-10
2.	Improvements to Main Channel and Retention Structures . .	I-12
a.	Main Drainage Channel	I-12
b.	Overflow Pond	I-12
c.	Retention Basin	I-14
d.	SM Area Retention Pond	I-15
3.	Improvements to Collection Systems in Contaminated Soils Areas	I-16
a.	Drainage Along West Side of Main Hill	I-16
b.	Drainage for Building 19 Area	I-17
c.	Drainage for Test Fire Area	I-17
d.	Drainage for Area Between Firehouse and Building 51 Area	I-17
e.	Drainage Along Old South Boundary Between Developed and Undeveloped Properties	I-17
f.	Drainage for Area North of SM-PP Area	I-18
g.	Channel Between Magazine 52 and Building 57	I-18
h.	Drainage for Area Between Buildings 30 and 71	I-19
i.	Drainage for Area North of Road North of SM Area Retention Pond	I-19
4.	Improvements to Construction Spoils Area and Main Parking Lot	I-20
a.	Old Construction Spoils Area Drainage	I-20
b.	Main Parking Lot Subsurface Drainage	I-20
c.	Main Parking Lot Storm Drainage Control	I-21
C.	Relationship to Other Projects	I-22
D.	Alternatives to Proposed Project	I-24
1.	Project Alternatives	I-24
2.	Design Alternatives	I-24

E.	Design Concept	I-29
1.	Project Design Description	I-29
a.	Improvements to Main Channel and Retention Structures	I-29
b.	Improvements to Collection Systems in Contaminated Soils Areas	I-38
c.	Improvements to Construction Spoils Area and Main Parking Lot	I-47
2.	Energy Conservation	I-49
3.	Environmental Considerations	I-50
4.	Safety Considerations	I-51
5.	Security Considerations	I-51
6.	Provisions for the Handicapped and Fallout Shelters . . .	I-52
7.	Maintenance and Operation	I-52
8.	Decontaminating and Decommissioning (D&D)	I-53
9.	Telecommunications	I-54
10.	Computer Equipment	I-54
11.	Site Development Plan Coordination	I-54
12.	Outline Specifications and Criteria	I-54
a.	Demolition	I-54
b.	Earthwork	I-56
c.	Pavement	I-57
d.	Storm Drainage System	I-58
e.	Seeding	I-60
f.	Concrete Work	I-60
g.	Building Construction	I-61
h.	Structural Steel	I-61
i.	Miscellaneous Metalwork	I-61
j.	Pumping Equipment	I-61
F.	Quality Assurance (QA)	I-62
G.	Analysis of Uncertainties, Contingencies, and Effort to Resolve Uncertainties	I-63

H.	Project Execution	I-65
I.	Schedules	I-66
J.	Cost Estimate Summary	I-70
1.	Total Project Cost Summary	I-70
2.	ED&I Costs	I-70
3.	Construction Cost (Less Contingency)	I-71
4.	EG&G Project Management and Construction Management Costs	I-72
5.	Escalation.	I-72
6.	Contingency	I-73
7.	Basis of Cost Estimate	I-73
a.	General	I-73
b.	ED&I Costs	I-74
(1)	Architect/Engineer Costs	I-74
(2)	EG&G Engineering Costs	I-74
c.	Construction Costs	I-75
K.	Procurement Actions	I-76
L.	Cost and Funding Plan	I-76
M.	Preliminary Drawings	I-79
N.	Reference Drawings	I-103
<u>PART II - PROJECT MANAGEMENT</u>		II-1
A.	Project Management Organization	II-1
B.	Manpower Requirements	II-1
C.	Project Control	II-4
1.	Performance Control	II-4

2.	Construction Inspection and Acceptance	II-4
3.	Technical Reviews	II-4
4.	Progress Review	II-5
5.	Financial Control	II-5
6.	Construction Contractor Control	II-6
7.	Documentation	II-6
8.	Reporting Requirements	II-7

PART III - SUPPLEMENTAL INFORMATION (Separate Cover)

A.	Project Cost Summary	III-1
B.	ED&I Cost Calculations	III-2
C.	Construction Cost Estimate	III-12
D.	EG&G Project Management and Construction Management Cost Calculations	III-34
E.	Contingency Analysis	III-34
F.	Work Breakdown Structure	III-41
G.	Technical Information	III-43
1.	Studies and Reports	
a.	Geotechnical Analysis and Technical Assistance at Building 38 Construction Spoils Area by Bowser-Morner, September 1983	
b.	Memorandum: DOE Facility in Ohio - Frequency Analysis dated September 6, 1989	
2.	Correspondence	
3.	Contaminated Soil Locations	
4.	Cost Estimate Backup	
5.	Design Calculations	

ABSTRACT

The Mound Plant (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, Inc. (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 & Health (ES&H) Upgrades Program designed to protect its employees, the public, and the environment from adverse effects caused by facility activities. The first project of this multiphase program is now in the final stages of construction, and the second project is currently under design. Four additional projects, one of which is presented in this report, are in the conceptual design stage.

At Mound, 22 soil zones have become contaminated with radioactive material. These zones cover approximately 20 percent of the total area of developed property at the site. During a storm event, the rainwater washes contaminated soil from these zones into the storm sewer system. These radioactive contaminants may then be discharged along with the stormwater into the Great Miami River via the Miami Erie Canal. This conceptual design report (CDR), Site Drainage Control, the fourth project in the ES&H program, describes a project that will provide improvements and much needed repairs to inadequate and deteriorating portions of the storm drainage system on the developed property. The project also will provide a stormwater retention facility capable of storing the stormwater runoff, from the developed property, resulting from a 100-year storm event. These improvements will permit the effective control and monitoring of stormwater to prevent the spread of radioactive contaminants from contaminated soil zones and will provide a means to collect and contain accidental spills of hazardous substances.

The corrective actions proposed in this CDR are divided into three major groups. Each group contains elements of related storm drainage improvements which offer solutions to specific environmental problems at the site. The three groups are:

- Improvements to the Main Drainage Channel and Retention Structures.
- Improvements to the Collection Systems in Contaminated Soils Areas.
- Improvements to Construction Spoils Area and Main Parking Lot.

If this project is not implemented, Mound's ability to effectively monitor and control the spread of radioactive contamination will continue to be limited. The risk of events similar to that which occurred in 1969 when radioactive contamination was released from the site will remain. That event resulted in correspondence from the Ohio Environmental Protection Agency indicating the agency's intent to pursue legal action against Mound and DOE.

Titles I and II design will be accomplished by a qualified architectural/engineering (A/E) firm under a single fixed-price contract. The construction will be performed under a competitively bid fixed-price contract.

Project design is scheduled to begin in early FY-93. Construction is scheduled to begin in FY-95, with total project completion planned for the last quarter of FY-96. The total estimated cost (TEC) is \$17.8 million. Project costs are forecast to be incurred from FY-93 through FY-96.

PART I - DESIGN CONCEPT

A. General Description of Project

1. General

The Site Drainage Control project is the continuation of a consolidated and comprehensive effort to solve a number of environmental, safety, and health problems at Mound. This project will provide much needed improvements repairs to inadequate and deteriorating portions of the existing storm drainage system. These improvements will allow the effective control and monitoring of stormwater to prevent the spread of radioactive contaminants from contaminated soil zones. The improvements will also provide a means to collect and contain accidental spills of hazardous substances. The effect of these improvements on existing drainage patterns is shown on the drainage pattern map, Figure 19, in Section M. In addition, the improvements will reduce soil erosion and will direct stormwater to the expanded overflow pond for containment. The expanded pond will have the capacity to contain the stormwater runoff from the developed property resulting from a 100-year storm event. This increased storage capacity will virtually eliminate the off-site discharge of stormwater carrying suspended solids. Stormwater from the developed property not directed to the overflow pond because of the existing topography and drainage patterns will be discharged directly to the City of Miamisburg's storm sewer system.

The corrective actions proposed by the site drainage control project are grouped as follows:

- Improvements to the Main Drainage Channel and Retention Structures.

- Improvements to the Collection Systems in Contaminated Soils Areas.
- Improvements to Construction Spoils Area and Main Parking Lot.

The elements of work which make up each of these three groups are shown on the project breakdown chart on page I-3. The site location of each element of work is shown on Figure 2, "Key Plan," Section M. A general description of each element follows the project breakdown chart. A more detailed conceptual description of the project is given in Section E, "Design Concept" beginning on page I-29. Also included in Section E are descriptions, sizes, and quantities of the proposed construction materials.

PROJECT BREAKDOWN

NOTE: "P" DESIGNATIONS REFER TO THE
ORIGINAL CDR TASK NUMBERING SYSTEM.

2. Improvements to the Main Drainage Channel and Retention Structures (Figure numbers following the title of each element of work refer to the preliminary drawings found in Section M of this report.)

a. Main Drainage Channel (Figures 3A through 3C)

Widen, realign, and line with concrete the existing main drainage channel which flows through the site.

b. Overflow Pond Expansion (Figure 4)

Dewater and remove sediment from the existing overflow pond south of the wastewater treatment plant. Expand the overflow pond to store the stormwater runoff, from the developed property, generated by a 100-year storm event. In addition to expanding the pond, demolish, relocate, and reconstruct structures displaced from the Building 34 area. Construct a new withdrawal structure, emergency spillway, and bypass channel. Install a low permeability clay liner and a dewatering/ sediment removal sump in the pond. Cover the impervious clay layer with a protective concrete liner.

c. Retention Basin (Figure 5)

Dewater, remove sediment from and demolish, the existing retention basin southwest of Building 34. Construct a new concrete retention basin capable of retaining a chemical or hazardous material spill occurring during normal low flow (nonstorm event) conditions. Install a dewatering/sediment removal sump in the new basin.

d. SM Area Retention Pond (Figure 6)

Dewater and remove sediment from the existing retention pond west of Building 61. Replace the deteriorated asphalt liner in the pond with a new low permeability clay liner. Install a dewatering/sediment removal sump and cover the impervious clay layer with a protective concrete liner.

3. Improvements to the Collection Systems in Contaminated Soils Areas

a. Drainage Along West Side of Main Hill (Figure 7)

Install new curb and gutter, channels, inlets, and piping along the road west of Building I to collect potentially contaminated stormwater runoff from the Main Hill. The collected stormwater will be directed to a new concrete channel north of Building 79. This channel will discharge into a combination of existing and new piping installed to create a more direct piping route to the main drainage channel.

b. Drainage for Building 19 Area (Figure 8)

Construct a new concrete drainage channel and install piping in Building 19 area to eliminate uncontrolled surface runoff along the west property line behind Building 19.

c. Drainage for Test Fire Area (Figure 9)

Reconfigure the existing storm drain piping system in the area between Building 49 and Building 35 to provide a single point of stormwater discharge from the area into the main drainage channel.

- d. Drainage for Area Between Firehouse and Building 51 Area (Figure 10)

Install new concrete curb, inlets, piping, and a concrete-lined channel east of Building 51 to route stormwater runoff directly into the storm drainage system without causing erosion of potentially contaminated soil. Stabilize the embankment southeast of Building 51 with rip rap.

- e. Drainage Along Old South Boundary Between Developed and Undeveloped Properties (Figure 11)

Construct piping and concrete channels along the north side of the road at the southeast boundary of the developed property. This construction will prevent potentially contaminated surface runoff from crossing the road and flowing onto the undeveloped property. The new system will provide a lined channel to convey potentially contaminated stormwater runoff to the overflow pond. This channel will adjoin a concrete channel on the lower portion of the road.

- f. Drainage for Area North of SM-PP Area (Figure 12)

Construct an inlet, earthen berm, and concrete drainage channel and install storm drain piping and headwalls southeast of Building 61 to direct stormwater runoff into the existing storm drainage system. Connect drainage from this area into the SM area retention pond.

- g. Channel Between Magazine 52 and Building 57 (Figure 13)

Remove culvert piping from channel east of Building 57. Remove sediment and realign the existing channel between SD

1264 and the main drainage channel. Reshape and line the channel with concrete.

h. Drainage for Area Between Buildings 30 and 71 (Figure 14)

Reshape hillside to prevent water from ponding at the toe of the embankment for the truck parking area northeast of Building 30. Eliminate ponding at discharge from the SM area retention pond's emergency spillway by constructing a ditch from the spillway discharge to an existing storm drain inlet south of the parking lot behind Building 98 (Firehouse). Provide a ditch on the west side of the same inlet.

i. Drainage for Area North of Road North of SM Area Retention Pond (Figure 15)

Regrade the area west of the truck scales across from Building 61 and install concrete drainage ditches that drain into a replacement inlet for the existing inlet, SD 1325.

4. Improvements to Construction Spoils Area and Main Parking Lot

a. Old Construction Spoils Area Drainage (Figures 16A and 16B)

Reshape the top of the spoils area and install ditches to promote positive drainage to the existing storm drain inlet in the spoils area. Construct berm to divert stormwater away from the spoils area. Install piping to extend the existing storm drain system to the main drainage channel.

b. Main Parking Lot Subsurface Drainage (Figure 17)

Perform hydrogeological testing and install a subsurface drainage system beneath the parking lot to intercept

groundwater currently seeping to the surface of the parking lot through joints and cracks in the pavement. Pipe under drain system to existing inlet, SD 1514.

c. Main Parking Lot Storm Drainage Control (Figure 18)

Construct curb and gutter and install storm drain piping and inlets along the north and east sides of the main parking lot to collect all stormwater runoff from the parking lot and to convey it to the City of Miamisburg's storm drain system.

Cost and funding plans for the project are summarized in Tables I-3 and I-4 on pages I-77 and I-78. Funds will be required for Titles I and II design, Title III, construction, contaminated soil removal, and project and construction management. A schedule for the project is provided on page I-69.

The designs and the materials proposed for the project have previously been proven acceptable for use in similar applications; however, to ensure a quality installation, a materials testing program will be developed during design for implementation during fabrication and construction.

This project was initially included in a CDR titled ES&H Upgrades - Phase III Program which was submitted in October 1987 as an FY-91 line item. At that time, the CDR consisted of three major subprojects:

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

The first two subprojects and that portion of the third subproject directly related to the suspended solids removal, along with two additional subprojects -- the Environmental Buffer Zone and the Sanitary Treatment Plant Clarifier and Gas Cylinder Bank Upgrade -- were

incorporated into a September 1988 CDR for the ES&H Phase III Upgrades Program. Remaining elements from the 1987 CDR were submitted as an FY-92 line item in a September 1988 report titled ES&H Phase IV, Site Drainage Control.

In November 1989, the following three new elements were added to the September 1988 Phase IV CDR:

- Overflow Pond
- Drainage for Area North of SM-PP Area
- Main Parking Lot Storm Drainage Control

The overflow pond was taken from the Suspended Solids Removal Subproject described in the September 1988 CDR for Phase III. The other two elements, Drainage for the Area North of SM-PP Area and Main Parking Lot Storm Drainage Control, were new elements of work previously not included in any CDR. The November 1989 CDR also updated elements of the September 1988 CDR to reflect construction work accomplished since the September 1988 CDR was prepared.

Some modifications have been made to the scope of the project since submittal of the November 1989 CDR. The Retention Basin for Building 41 Area Drainage and New Land Retention Pond have been deleted from the program. The overflow pond and retention basin have been revised to expand the capacity of the overflow pond and to construct a new retention basin. Three new elements have also been added. These new elements have not previously been described in any other CDR. They are:

- Channel Between Magazine 52 and Building 57
- Drainage for Area Between Buildings 30 and 71
- Drainage for Area North of Road North of SM Area Retention Pond

This February 1991 edition of the CDR for Site Drainage Control also updates elements of the November 1989 CDR to reflect construction that has

occurred since the November 1989 CDR was prepared. In addition, the project is now being submitted as an FY-93 line item.

No studies are currently being proposed or performed on the project described in this CDR. All work proposed in this CDR is in compliance with the Mound Site Development Plan - April 1985, revised January 1991.

B. Justification

1. General

As a result of operational incidents at Mound involving radioactive materials, as much as 20 percent of the site has been contaminated. From a previously completed site characterization study, 22 isolated zones of subsurface contamination have been identified. These zones are shown on Figure 1 in Section M, "Preliminary Drawings." A description of the contaminants is included in Part III, "Supplemental Information," a separate volume. This study is evidence of the contamination problems which exist at Mound. The proximity of the site to the Great Miami River and the location of a "sole-source" water supply aquifer adjacent to the Mound site make it important to contain existing contamination and to detect and control future incidents, however unlikely, involving the spill of radioactive and hazardous materials. Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the release of hazardous radioactive materials into the environment is reportable to the National Response Center if the released hazard is equal to or greater than 1 pound. Regulations significantly lowering the reportable-quantity limit for releases of hazardous materials are being considered. Mound is liable for any damage occurring to natural resources from such a release.

The Site Drainage Control project will reduce environmental risks as well as risks to the safety and health of operating personnel and

the public. The project also addresses the pending environmental regulations that may significantly lower the allowable discharge levels of radioactive contaminants. Although present discharge levels of radioactive contaminants from the Mound site are below EPA and DOE limits, Draft DOE Order 5480.XX requires lower discharge levels under two guidelines: ALARA (as low as reasonably achievable) and BAT (best available technology). This project responds to those guidelines. Even though Mound's discharge levels are below present EPA and DOE limits, risks of exceeding these limits are present. The allowable quantities involved are quite small, and a minor upset in existing conditions can potentially create a major discharge.

This project will direct stormwater away from known contaminated areas, will allow accumulations of stormwater to be carried away before infiltration into the soil occurs, and will provide pipes and lined channels of adequate capacity to convey stormwater to the overflow pond with minimum soil contact. In addition, the expanded overflow pond will provide better drainage control for the developed property and will provide a settling basin for the future stormwater treatment plant addressed in a separate CDR.

If funding for this project is delayed or denied, Mound will not be able to adequately monitor, control, or contain the contaminated soil transported by the stormwater runoff, a situation which could contaminate adjacent soil areas, the Great Miami River, and the "sole-source" aquifer. Detailed justification for each element of the project follows. Figure numbers following the title of each element of work refer to the preliminary drawings found in Section M of this report.

2. Improvements to Main Channel and Retention Structures

a. Main Drainage Channel (Figures 3A through 3C)

This natural channel that cuts across the site and drains into the overflow pond serves as the main drainage collector for single-pass, noncontact process cooling water and stormwater runoff from the developed property. The majority of the cooling water is being removed from this channel under ES&H Phase IA. Because the existing channel is a natural unlined drainage way, not all flow that reaches the channel discharges into the retention basin or overflow pond. Some of the flow infiltrates into the ground and finds its way into the aquifer below the site. Because of this infiltration, any accidental spill of contaminants discharged into the storm drainage system could potentially contaminate the aquifer. In addition, the channel has an irregular bottom where pockets of silt form during periods of low flow. These pockets wash downstream during periods of high water and overload the sedimentation facilities. The proposed improvements to the main drainage channel will mitigate these problems and will reduce future maintenance costs of the channel.

b. Overflow Pond Expansion (Figure 4)

Modifications and upgrades to the existing overflow pond are required to:

- Remove contaminated sediment from the pond.
- Expand the capacity of the overflow pond from 3.1 million gallons to more than 17.5 million gallons (53.4 acre-feet). The expanded overflow pond will be able to

contain the stormwater runoff, from the developed property, generated from a 100-year storm event.

- Prevent contamination of the Buried Valley Aquifer by virtually eliminating the infiltration of contaminated stormwater runoff through the bottom and sides of the pond.
- Contain contaminated stormwater by providing a means of diverting flow away from the retention basin and into the overflow pond at the onset of a storm.
- Provide a primary spillway to remove over a 7-day period a volume of water from the overflow pond sufficient to contain a 1-year storm event occurring in that same 7-day period. The effective use of this spillway will provide Mound with a 98-percent probability of containing the runoff from that second storm event.
- Provide an emergency spillway of sufficient capacity to prevent stormwater from over topping the embankments and causing catastrophic dam failure and damage to off-site property below the impoundment.

The expanded overflow pond, along with operational improvements, will enable Mound to contain, monitor, and control the discharge of stormwater from the developed property. With the addition of the clay/concrete liner, the cost and difficulty of maintaining the overflow pond will be lowered.

c. Retention Basin (Figure 5)

Because of space constraints and operational considerations associated with the expansion of the existing overflow pond, the existing retention basin will be demolished and reconstructed at a different location. The existing retention basin had the following problems which will be eliminated with construction of the new basin:

- The basin was not impervious and did not prevent contaminants in the stormwater from seeping into the underlying groundwater.
- The lack of adequate flow diversion capabilities caused the basin to flood when storms of greater than 2-year intensity occurred.
- The storage volume was reduced because of sediment buildup due to the excessive time and money required to clean the basin.

The retention basin offers one of the last opportunities to collect contaminants in the storm drainage system during periods of low flow prior to their discharge from the site. The new retention basin which will be located north of the existing retention basin will be designed:

- As a liquid-holding, cast-in-place, reinforced concrete structure to contain all nonstorm event flows. Stormwater will be automatically diverted to the overflow pond as flow in the main drainage channel increases.

- With a separate chamber in the basin to retain any nonstorm event flows that contain chemical or hazardous material spills.
- As a two-chamber basin to maintain operation of the retention basin while a chemical spill is being removed from the other chamber.
- To the original capacity of the existing retention basin.

This element of the project will reduce the amount of sediment entering the retention basin by not accepting stormwater runoff, will prevent potentially contaminated low flow from being discharged off-site or seeping into the groundwater, and will improve maintainability. In addition, operating and maintenance costs for periodically removing sediment from the retention basin will be lowered.

d. SM Area Retention Pond (Figure 6)

The SM area retention pond west of Building 61 has vegetation growing through cracks in the asphalt liner, evidence that the water tightness of the pond cannot be assured. Cracks in the liner will allow contaminated stormwater to percolate into the soils below. This deficiency will be corrected by providing an impermeable clay liner and protective concrete cover in the pond. To facilitate sediment removal and to reduce maintenance cost, a sump will be constructed in the bottom of the pond to accommodate a suction line from a portable pump. The protective concrete lining will be less susceptible than asphalt to weathering, chemical attack, and damage from maintenance operations.

The operating and maintenance costs for this element will include the power to run a portable pump during cleaning operations and the cost of disposing of the contaminated sediment removed from the pond. These costs are already associated with operating and maintaining the pond, and the improvements planned will reduce these costs.

Without the liner replacement, the risk of radioactive contamination of soil and groundwater beneath the pond will remain high.

3. Improvements to Collection Systems in Contaminated Soils Areas

a. Drainage Along West Side of Main Hill (Figure 7)

New curb and gutter, storm drainage structures, and piping on the road northwest of I and B Buildings, storm drain piping in the vicinity of I and T Buildings to an area southeast of Building 79, a concrete channel on the north side of the road behind Building 79, and new piping on the hill north of Building 43 are needed to direct stormwater runoff away from the contaminated soils area west of WD Building and to more directly connect the Main Hill stormwater flow with the main drainage channel. The runoff will be collected and conveyed to the overflow pond via the main drainage channel. The area around WD Building is contaminated with polonium-210, cobalt-60, and plutonium-238. Reducing the amount of stormwater runoff across this contaminated area will decrease the amount of contaminated soil carried away in the stormwater. No increase in operating or maintenance costs is associated with this improvement because maintenance personnel will be able to inspect this portion of the storm drainage system during their routine inspection of the existing system.

b. Drainage for Building 19 Area (Figure 8)

Concrete channels and associated piping in the Building 19 area are required to prevent uncontrolled surface runoff from leaving the site. No increase in operating costs is associated with this construction.

c. Drainage for Test Fire Area (Figure 9)

A new storm drain pipe and storm drainage structures in the Test Fire area north of Building 35 are required to reconfigure the existing storm drainage in this area to provide a single point of discharge into the main drainage channel. A single discharge point will simplify monitoring for potential contamination from the SM and Building 53 areas. No operating costs are associated with this work.

d. Drainage for Area Between Firehouse and Building 51 Area (Figure 10)

A drainage inlet, piping, and concrete channel to carry runoff from the road, unpaved contractor parking area, and grassed area northeast of Building 51 are required to prevent further erosion of the contaminated soil in this area. This contamination consists of thorium-232 and -228, radium-226, actinium-227, and polonium-210. No operating costs are associated with this work. Maintenance costs will be lower with the new drainage system.

e. Drainage Along Old South Boundary Between Developed and Undeveloped Properties (Figure 11)

Pipe and concrete channel are necessary along the north side of a portion of the road on the south boundary of the

developed property to prevent potentially contaminated stormwater from crossing the road and contaminating the undeveloped property. If left uncontrolled, another zone of contamination would be created; cleanup costs would be increased; and development of the Mound property south of the developed site would be more expensive. No operating costs are associated with this work.

f. Drainage for Area North of SM-PP Area (Figure 12)

Currently stormwater runoff from the area between SM Building and Building 61 drains toward Mound Road. This condition could cause contaminated materials to be carried off-site during periods of heavy rainfall. Because this runoff is uncontrolled, no means exist to collect and test for harmful materials. A new inlet and an earthen berm with concrete channel will collect and redirect the stormwater flow into the Mound storm drain system and will prevent off-site contamination in this area.

g. Drainage between Magazine 52 and Building 57 (Figure 13)

A regraded channel lined with concrete is required to replace the relatively flat, natural, unlined channel between SD 1264 and the main drainage channel. This channel receives runoff from the thorium-contaminated area around Building 57 and from the plutonium-contaminated area southwest of WD Building. The regrading is required to provide a positive means of drainage to the main drainage channel. The concrete lining will prevent any contaminated runoff from seeping into the groundwater. No operating costs are associated with this work. Maintenance costs will be lower for this new channel.

h. Drainage for Area Between Buildings 30 and 71 (Figure 14)

This multifaceted element is required to:

- Reduce the potential of a slope failure beneath the unpaved truck parking area north of Building 30.
- Reduce the possibility that stormwater discharged from the SM area retention pond's emergency spillway will pond and infiltrate into groundwater.
- Reduce the amount of stormwater runoff seeping beneath pavement in the parking lot south of the firehouse, thus reducing the pavement life.

No operating costs are associated with this work.

i. Drainage for Area North of Road North of SM Area Retention Pond (Figure 15)

Concrete-lined channels and a replacement storm drain inlet are required to eliminate an inadequately drained portion of land bordering the truck scales and access road from Post 8. Stormwater currently ponds in this area for as long as 3 days following a storm event. Because this area is adjacent to the access road from Post 8, the accumulation of water after a heavy rain crosses the road and causes hazardous winter driving conditions endangering both Mound employees and contractors. No operating costs are associated with this work. Maintenance costs should decrease after this work is complete.

4. Improvements to Construction Spoils Area and Main Parking Lot

a. Old Construction Spoils Area Drainage (Figures 16A and 16B)

The old construction spoils area is located on the hillside west of Building 38. In 1983, a geotechnical study by Bowser-Morner found that the spoils area embankment has a strong failure potential in the event of an earthquake or saturation of the fill. For this reason, Mound no longer uses this area for spoil disposal. If water continues seeping into the spoils area, the existing area will become unstable. Therefore, regrading of the top of the spoils area will eliminate the poorly drained areas and will allow stormwater to drain into an existing storm drain inlet. Stormwater from other areas that was flowing onto the construction spoils area will be diverted away or collected, thus minimizing the volume of water infiltrating into the fill. If surface and groundwater control is not implemented catastrophic failure of the slope could occur. This failure could expose unstabilized soil to rainfall which, in turn, could create large volumes of sediment-laden runoff that could overload the downstream treatment facilities. The planned improvements will minimize the amount of surface water entering the spoils area.

b. Main Parking Lot Subsurface Drainage (Figure 17)

The main parking lot is located northwest of the primary entrance to the facility, Post 8. Currently, groundwater is seeping up through the asphalt surface of the parking lot. During the winter, this water freezes and creates treacherous conditions for vehicular and pedestrian traffic. This condition has caused several incidents resulting in injury to Mound personnel. Hydrogeological testing, along with a subsurface drainage system to carry groundwater to the storm

drain system, are required to quantify and alleviate this problem. No additional operating or maintenance costs, except those for routine inspection and cleaning of piping, are anticipated once this work has been complete

c. Main Parking Lot Storm Drainage Control (Figure 18)

Stormwater from the main parking lot currently discharges onto the adjacent property north of the parking lot with concentrated discharge from two storm drain pipes and overland flow from the north edge of the lot. DOE/DAO has expressed concern that uncontrolled stormwater is being discharged off-site without being properly tested for contamination. Constructing a new curb and gutter and stormwater collection system to convey the water to the City of Miamisburg's storm drain system will solve this problem. Possible contamination and stormwater damage to the adjacent property will be prevented. A manhole will be provided immediately ahead of the discharge into the city system to allow the stormwater to be sampled and tested while it is still on Mound property. No operating costs or increased maintenance costs are associated with this element.

This project will comply with all local, state, and federal regulations. The components of the project are based on proven technology and are adequate to achieve the project's objectives. Funding is essential 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. As described in the above justification, every element of the proposed project will solve specific problems that have been identified as a threat to the environment or to the safety and health of people.

C. Relationship to Other Projects

The Site Drainage Control project is the fourth phase of the overall ES&H Upgrades Program at Mound. The first project in the program, ES&H Phase I, was implemented in two parts. The first part, ES&H Phase IA - Separate Process Water from Storm Drainage System, eliminates once-through process cooling water that discharges into the storm drainage system. The presence of cooling water in the storm system is one reason why suspended solids limits on stormwater discharge are contained in the NPDES permit. Phase IA is in the final stages of construction. The second part of ES&H Phase I, ES&H Phase IB - Upgrade Site Sanitary Sewer and Storm Drainage Systems, replaced and upgraded damaged sanitary and storm drain piping and related items identified in earlier surveys. Construction of Phase IB was completed in May 1990. Although no direct interface exists between the Site Drainage Control and the ES&H Phase I projects, Phase IA effectively eliminated the process cooling water from the main drainage channel and other elements being upgraded in the Site Drainage Control project. In addition, Phase IB contributes to the proper collection and conveyance of the stormwater and thus complements the Site Drainage Control project.

The second project in the program, ES&H Phase II, was funded as an FY-89 project. Phase II contains three subprojects: Fuel Oil Storage, Potable Water System, and Explosives Storage. These subprojects are currently under design. No interrelationship exists between the Phase II project and this Site Drainage Control project.

The third project in the program, Solvent Waste Incinerator, is an FY-94 line item currently in the conceptual design stage. The Solvent Waste Incinerator project provides on-site disposal of waste solvent, assures compliance with hazardous waste management standards, and eliminates the costs and risks associated with the current practice of off-site disposal. No interrelationship exists between the Solvent Waste Incinerator line item and this Site Drainage Control project.

The fifth project of the ES&H Upgrades Program, Off-Site Drainage Containment, is an FY-93 line item currently in the conceptual design stage. The objective of the Off-Site Drainage Containment project is to directly convey stormwater collected in the expanded overflow pond to the Great Miami River via closed-conduit. This stormwater currently flows to the river by way of open ditches and the abandoned Miami-Erie Canal. An interrelationship exists between the Off-Site Drainage Containment line item and this Site Drainage Control project because both the primary and emergency spillways from the expanded overflow pond and the effluent from the retention basin will discharge into the box culvert proposed in the Off-Site Drainage Containment project.

The sixth project in the ES&H Upgrades Program, Stormwater Treatment Plant, is also an FY-93 line item currently in the conceptual design stage. The project will provide a 1.5-mgd treatment plant to remove suspended solids from the stormwater runoff collected in the expanded overflow pond. An interrelationship exists between the Stormwater Treatment Plant line item and this Site Drainage Control project. As with Phase IB, the Site Drainage Control project contributes to the proper collection and conveyance of the stormwater to be treated. Also, the gravity settling provided by the expanded overflow pond is the first stage of the suspended solids treatment process proposed in the Stormwater Treatment Plant project. This gravity settling will reduce the suspended solids load to the stormwater treatment plant.

This Site Drainage Control project complies in all respects with the Mound Site Development Plan - April 1985, revised January 1991.

D. Alternatives to Proposed Project

1. Project Alternatives

The only alternative to the project is to take no action. This alternative would force Mound to accept the continuous risk of having an inadequate storm drainage system that allows radioactive contamination on the site to spread to uncontaminated areas, both on site and off. It also leaves Mound with inadequate conveyance controls throughout the existing storm drainage system.

2. Design Alternatives

Design alternatives were considered for two elements of the project the overflow pond and the main parking lot subsurface drainage. The design alternatives considered for each are discussed below.

To address the DOE/DAO concerns about controlling and treating all stormwater runoff from the developed property and to maintain a stormwater runoff containment risk level acceptable to Mound, storage facilities are required to contain the stormwater runoff, from the developed property, generated by a 100-year storm event. This volume is equal to 53.4 acre-feet. The following alternatives were considered to achieve the required volume:

Alternative 1: Enlarge the existing overflow pond to accommodate the 100-year storm runoff volume from the developed property.

Alternative 2: Maintain the present capacity in the existing overflow pond, construct a new retention pond on the undeveloped property capable of storing the combined 100-year storm runoff from the developed and undeveloped properties, and construct a concrete channel from the existing overflow pond to the new retention pond on the undeveloped property.

During the conceptual design process for Alternative 1, the following secondary alternatives were investigated to achieve the minimum volume of 53.4 acre-feet.

Alternative 1A: Maintain the same surface area in the existing pond and increase the depth to approximately 30 feet. This alternative would place the new pond bottom at elevation 680 feet. With the pond bottom at elevation 680 feet and the invert elevation of the existing 60-inch-diameter site drainage pipes at elevation 705 feet, more than 80 percent of the pond's storage volume could not be drained without pumping. A pond of that depth and shape is very impractical from a construction and maintainability standpoint.

Alternative 1B: Maintain a bottom-of-pond elevation high enough to allow gravity draining of the pond contents and increase the surface area of the pond to achieve the required storage volume.

The overflow pond is bounded to the north by the Building 34 area, to the south by the clay-encapsulated solid waste cell, to the east by Building 85, and to the west by railroad tracks and property owned by Conrail. Building 85 is a relatively new building containing equipment which will be operated daily by Mound personnel. The Building 34 area is used, although infrequently, by Mound's fire department as a training facility. The encapsulated solid waste cell contains some amount of contaminated materials, as evidenced by traces of contamination found in the monitoring wells adjacent to the fill. Based on how the buildings and land bordering the overflow pond are used and on conversations with Mound personnel, the Building 34 area is the only suitable area into which the overflow pond could be expanded.

After discussing the alternatives with Mound, the decision was made to not conduct any land-disturbing activities on the undeveloped property if another option could be implemented for controlling

runoff from the developed property. This eliminated Alternative 2. Alternative 1A thus became the preferred alternative and the one presented in this CDR.

As part of the conceptual design for the overflow pond expansion, several pond lining materials were investigated. The materials investigated included flexible membrane liners such as HDPE (high-density polyethylene), PVC, and hypalon; clay; bentonite clay; and a geocomposite liner constructed of clay and a geotextile. The criteria used to evaluate the different materials were:

- Resistance to Ultraviolet Rays
- Stress/Strain Performance
- Dimensional Stability
- Chemical Reactivity
- Permeability/Penetration/Cracking Resistance
- Repair and Maintainability

Table I-1, "Liner Material Investigation" on page I-28 summarizes HSMM's investigation of the various materials.

Based on the material's natural ability to seal cracks in the lining after being wet and because the radioactive particles exhibited an affinity for clay, the bentonite clay liner was chosen for lining the ponds. Should radioactive particles come in contact with the liner, the clay should attract and hold the radioactive particles and prevent seepage into the groundwater below. To solve the maintainability problem, a protective concrete cap will be installed over the clay liner. The concrete cap will be installed on a layer of stone bedding and filter fabric. These three items will protect the clay liner from the drying effects of the sun and wind; thus, maintain the impermeable integrity of the clay liner. Should water build-up between the clay liner and the protective concrete cap, the resulting pressures will be relieved by maintaining open joints in

the concrete cap or by installing valves in the concrete cap to release any hydrostatic pressures. To minimize differential movement and to maintain the surface uniformity of the concrete cap, smooth dowels will be used in the concrete joints.

The design alternative considered for the main parking lot subsurface drainage was to construct a groundwater diversion and interceptor to direct groundwater away from the main parking lot, thus eliminating the seepage problem and the hazardous conditions. To fully investigate this option, the results of the proposed hydrogeological testing are needed. This alternative will be examined in the early stages of design after the results of the testing are known.

LINER MATERIAL INVESTIGATION

TABLE I-1

PERFORMANCE CRITERIA	SYNTHETIC MEMBRANE LINERS			BENTONITE/CLAY	GEOCOMPOSITE (CLAY & GEOTEXTILE)
	HDPE	CSPE (HYPALON)	PVC		
1. UV Resistance	Carbon Black Req'd.	Good	Poor	Good	Good
2. Stress/Strain Performance	Poor	Good	Good	-	-
3. Dimensional Stability	High Expansive	Moderately Expansive	Moderately Expansive	Dries and Cracks Swells and Reseals after Wetting	Dries and Cracks Swells and Reseals after Wetting
4. Chemical Reactivity	Inert	Inert	Inert	Good Affinity for Isotopes	Good Affinity For Isotopes
5. Permeability/ Penetration/ Cracking	Good-Brittle Failure Risk	Good-Risk at Seams	Good-Risk at Seams	Good	Good
6. Maintenance	Punctures No Heavy Equipment	Punctures No Heavy Equipment	Punctures No Heavy Equipment	Protective Rock/ Concrete Req'd.	Protective Rock/ Concrete Req'd.

E. Design Concept

1. Project Design Description

Section A of this CDR provided a general description of the project. This section of the report provides a more detailed design description for each element of the project. Figure 2, "Key Plan" (Section M, "Preliminary Drawings") shows the location of each element on the site. Details of each element are provided on figures referenced in the text.

a. Improvements to Main Channel and Retention Structures

Main Drainage Channel: In this element, a reinforced concrete drainage channel will be constructed generally along the path of the existing main drainage ditch from the termination of the existing storm drain line south of Building 22, west to the entrance to the expanded overflow pond located south of the chlorine contact tank for the Mound Sewage Treatment Plant (see Figures 3A through 3C, Section M). The new channel will have a trapezoidal shape with a bottom width of 6 feet and side slopes of 1(H) to 1(V). Full flow depth in the channel will be between 2.25 and 2.5 feet. An inlet transition section will be provided at the head of the concrete channel where it meets the existing pipe.

Concrete transition channels will be used where existing storm drain pipes meet the new main drainage channel. Because the size and slope of these transitions can vary to suit different pipe sizes and ground slopes, no tie-in difficulties should be encountered. The new channel will straighten the meandering path of the drainage ditch, and the side slopes of the channel will be cleared, reshaped, and grassed.

The main drainage channel will be designed to convey runoff generated by a 25-year storm. A combination of SEDIMOT and the Rational Method will be used to compute runoff quantities.

Limiting criteria for these improvements are: 1) the location of the existing drainage ditch, 2) the location of the overflow pond, 3) space constraints created by existing construction, and 4) limitations inherent with the Rational Method of calculating runoff.

Overflow Pond: This element includes the following work on the existing overflow pond located south of Building 34 (see Figure 4, Section M):

- Removal of settled solids
- Expansion of the pond to a volume greater than 53.4 acre-feet
- Installation of an impervious clay liner
- Installation of protective concrete liner
- Construction of a new withdrawal structure, discharge piping, emergency spillway, and bypass channel
- Demolition of the Building 34 area and reconstruction of the essential buildings and structures east of Building 53. Proposed location for the new Building 34 area will be finalized prior to Title I design
- Demolition of the existing retention basin (Reconstruction of the retention basin is described as a separate element in this CDR.)
- Construction of a new road around the expanded overflow pond and relocation of the access road into Building 85.

The existing overflow pond will be expanded to approximately 54 acre-feet to provide storage volume for the runoff from the developed property created by a 100-year storm event. The

expanded pond will only receive stormwater runoff. All other flow will be diverted to the retention basin. This diversion will make the overflow pond more effective in containing the larger storm events because the pond will not be used for storing normal low flows. The diversion mechanism is described in the retention basin element beginning on page I-35.

Proper sequencing of the construction will be a critical aspect of this portion of the project. Following demolition of the retention basin, and prior to any construction activity on the existing overflow pond, a temporary bypass channel will be constructed to prevent water from entering the work area. The existing overflow pond will then be drained and cleaned. Approximately 4000 cubic yards of sediment will be removed. Contamination levels in the sediment will not be known until construction begins. Contaminated material will require special handling and disposal.

Upon removal of the sediment, excavation will begin to enlarge the surface area of the overflow pond to approximately 4.5 acres. The enlargement will require approximately 40,000 cubic yards of excavation. Based on work at Mound to identify areas of contamination, two small areas have been identified that will be disturbed by the overflow pond construction. One area is east of Building 34 and the other is west of the existing entrance channel to the overflow pond. The material from these areas will require special handling and disposal. This quantity of material is estimated to be 250 cubic yards. Other than these two areas and the pond sediment, excavation of contaminated soils is not anticipated.

To provide a storage volume of 54 acre-feet, construction of an earthen dam with 2.5 (H) to 1 (V) side slopes is required on the north and west sides of the pond. The crest elevation of the dam will be set at 727.5 feet. This elevation will provide 4 feet of elevation difference (freeboard) between the maximum normal pool elevation of 723.5 feet. The bottom of the pond will slope toward the new withdrawal tower to allow the pond to drain. Elevations at the bottom of the pond will vary between 710 feet and 706 feet. The bottom and sides of the new pond will be lined with an 8-inch-thick layer of bentonite clay covered with filter fabric, a 4-inch-thick stone base, and a 6-inch-thick protective concrete liner.

A new 5-foot by 5-foot cast-in-place concrete outlet structure with a multilevel withdrawal, located along the west embankment, will be constructed to replace the existing draw-down standpipe. The multilevel withdrawal will be accomplished by gate valves operated from the top of the withdrawal tower. Actual elevations of the withdrawal valves will be determined during Title I design. The existing draw-down standpipe and discharge piping will be removed.

The new withdrawal tower will discharge into a new 12-inch-diameter outlet pipe and terminate in the existing weir basin at the head of the existing twin 60-inch-diameter pipes. A walkway for access to the withdrawal tower will be constructed from the top of the new embankment to the top of the withdrawal tower.

The entrance to the expanded overflow pond will be an 8-foot by 8-foot box culvert with an 8-foot by 8-foot sluice gate to isolate the pond when it is full or when it is to be cleaned. When the pond is taken off-line, flow will be diverted through the retention basin via a 5-foot by 6-foot box culvert bypass

with sluice gate. The bypass is designed to pass a 25-year storm event. The pond entrance is designed to pass a 100-year storm event runoff.

Another component of the expanded overflow pond is an emergency spillway. The emergency spillway is sized to pass half of the stormwater runoff generated by the Probable Maximum Precipitation (PMP). This design criterion was established under the Ohio Dam Safety Laws. The intent of the laws is to assure that catastrophic failure of the dam does not occur under 50 percent-PMP conditions.

To finalize the criteria for sizing the emergency spillway and to determine the effects of a dam failure, a meeting with the Ohio Department of Natural Resources (ODNR) will be scheduled prior to Title I design. The meeting will establish:

- An interpretation of the Dam Safety Hazard Class for this structure.
- The need for a dam breach analysis study and to define the assumptions to be used in such a study.
- General regulatory requirements prior to preparing the preliminary dam plans for submission to ODNR.

A study of the watershed will be performed to determine the runoff from a 50-percent PMP storm, and a computer model will be prepared to determine the storm's effect on the dam. This study and model will be completed during the early stages of Title I design.

For the purposes of this CDR, the emergency spillway is sized for 2100 cubic feet per second, which is 50 percent of the PMP

runoff rate. Based on a cursory review of the area surrounding the expanded overflow pond, the majority of the 50 percent of PMP flow will bypass the overflow pond because the 8-foot by 8-foot entrance box culvert will be a restricting orifice and will flow through the retention basin and sewage treatment plant, then along and over the Conrail railroad tracks. The most likely adverse effect of the 50-percent PMP runoff would be the eroding of the outside face of the embankment caused by water rushing down the main drainage channel and along the railroad track. To protect against this occurrence, the outside of the embankments will be armored with large rip rap.

Reconstruction of the Building 34 area includes three buildings, jib cranes, fire pits, and drop tower. The jib cranes and drop tower will be salvaged from the existing Building 34 area and reconstructed in the new location east of Building 53. The Building 53 area is a preliminary location. Other locations will be investigated and the site selection finalized prior to Title I design. All other construction will be new.

In addition to improving the pond's maintainability, the proposed modifications at the overflow pond will make the pond acceptable for use as the first stage of treatment in the Stormwater Treatment Plant project proposed in another conceptual design report.

The overflow pond improvements will be designed to meet the tie-in constraints of the main drainage channel and the existing weir basin. The elevation of the existing 60-inch-diameter discharge pipes, the space restrictions imposed by other structures, and the possibility of encountering contaminated soils are limiting design factors.

Final design of this element of the project will be based on accepted design standards and engineering principles.

Retention Basin: This element involves constructing a new retention basin to replace the retention basin demolished by expansion of the overflow pond. The new retention basin will be located north of the existing retention basin and adjacent to the chlorine contact tank at the sewage treatment plant (See Figure 5, Section M). The work involved with constructing this element includes:

- Removal of settled solids from the existing basin prior to demolition.
- Installation of level sensors in the main drainage channel to send a signal to close a sluice gate at the entrance to the retention basin at the onset of a storm event.
- Installation of a low-flow diversion weir in the main drainage channel and in the channel between Magazine 52 and Building 57 to divert low flows into the influent pipes to the retention basin.
- Installation of influent piping to collect low flows (nonstorm-related flows) diverted by the low-flow diversion weirs.
- Construction of a new cast-in-place concrete retention basin to replace the existing retention basin demolished during the overflow pond expansion.
- Installation of effluent piping from the retention basin to the existing weir basin.

- Installation of drain piping from the retention basin to the overflow pond.
- Installation of a 5-foot by 6-foot box culvert and sluice gate through the wall of the retention basin to serve as a bypass for the overflow pond.

Approximately 500 cubic yards of sediment will be removed from the existing retention basin. Contamination levels in the sediment will not be known until construction begins. Contaminated material will require special handling and disposal. Upon removal of the sediment, the basin will be demolished.

The new retention basin will be constructed of cast-in-place concrete and will be a two-compartment structure, with one compartment used for spill containment and the other for normal operation. The spill containment and normal operation compartments will have liquid storage volumes of approximately 197,500 gallons and 190,800 gallons, respectively. The working depth in the basin will be 6 feet with a freeboard of 4 feet. The bottom slab elevation will be 706 feet. The top of the exterior walls will be set at elevation 720 feet. Valves on the influent piping will determine which compartment is to be used; valves on the effluent lines will be used to select the mode of operation: collection or flow-through. The size of the influent piping will be 15 inches. The piping will take all low flows diverted into the system by the low-flow diversion weirs. The low-flow diversion weir in the main drainage channel will be equipped with a level sensor to monitor the flow depth in the channel. Should the water level in the channel begin to rise, the sensor will send a signal to the sluice gate on the influent piping at the low-flow diversion weir in the new channel between Magazine 52 and Building 57. This signal will close a sluice gate to prevent

stormwater flows from entering the retention basin. Should a power failure occur, the sluice gate will automatically close to divert flow to the overflow pond and prevent water from entering the retention basin. Water will exit the retention basin via an 18-inch standpipe and a 15-inch effluent pipe in each compartment. The basin will also be designed with an emergency spillway sized to pass a 25-year storm. The crest of the emergency spillway will be set to overflow at elevation 716 feet. Each compartment will be equipped with a 10-inch drain line to drain the basin contents to the overflow pond. The primary function of this drain is to provide a method of flushing solids from the basin.

Site work will include excavation and grading for the new basin. The extent of the expanded overflow pond, the location of the existing weir basin and chlorine contact tank, and the operational relationship between the overflow pond and retention basin influence the design of this element.

Final design of this element of the project will be in accordance with accepted design standards and engineering principles.

SM Area Retention Pond: This element involves replacing the existing asphalt lining in the SM-PP retention pond located west of Building 61 (see Figure 6, Section M) with a 6-inch-thick protective concrete slab on a 4-inch-thick stone base on filter fabric, atop an 8-inch-thick impervious clay liner. Before the new clay and concrete liners can be installed, the retention basin must be cleaned of sediment, and the existing liner must be removed. Contamination levels in the sediment will not be known until construction begins. Contaminated material will require special handling and disposal. The design will include a dewatering/sediment removal sump built

into the bottom of the pond to accommodate the suction line from a portable pump to remove sediment-laden water.

Site work will be limited to the demolition and earthwork required inside the basin. The location of the present basin, storm drain system components, and topography of the area influence the work in this element. The concrete liner will be designed and constructed to connect to the existing primary spillway, existing emergency spillway channel and the influent line into the pond. No other tie-ins or connections are required.

Final design of this element of the project will be based on accepted design standards and engineering principles.

b. Improvements to Collection Systems in Contaminated Soils Areas

Drainage Along West Side of Main Hill: This element consists of placing approximately 420 linear feet of curb and gutter along the west side of the road and 720 linear feet along the east side of the road west of OS Building to Building 48 (see Figure 7, Section M). The new curb and gutter sections will contain five curb inlets: two new ones and three replacements. One catch basin will be constructed to replace a drop pipe at the end of the concrete channel. The concrete channel ahead of the new inlet needs to be repaired and will be rebuilt. New inlets will be connected to the existing storm drain system with 12-, 15-, and 24-inch-diameter concrete pipe. The concrete channel northeast of Building 79 is currently being used to convey stormwater from the Building 48 area to the lower storm drain system. The channel contains large amounts of sediment and vegetation. This channel will be replaced with a new cast-in-place, trapezoidal-shaped concrete channel. The pipe routing chosen for the upgraded

system combines several individual storm drain systems and establishes a more direct route to the main drainage channel while diverting stormwater runoff away from the WD Building area. To accomplish this more direct routing, a new 24-inch concrete pipe and manholes will be installed between SD 1277 and an existing inlet and piping system leading to the main drainage channel.

The limiting criteria for this work are existing underground utilities in the area and the possibility of encountering contaminated soils. Contamination levels will not be known until construction begins. Connections to the existing system will not cause any difficulties because the majority of drop inlets are replacements. For this CDR, the preliminary pipe sizing is based on conveying the runoff volumes from a 25-year storm event.

Drainage for Building 19 Area: This element consists of constructing a new cast-in-place concrete drainage channel west of Building 19 and storm drain piping from the new channel to the main drainage channel. Existing pipes that discharge west of the Building 19 area will be connected directly to the channel or new inlet (See Figure 8, Section M). The new drainage channel will be trapezoidal in shape and will have a bottom width of 3 feet. Side slopes will be 1(H) to 1(V). Channel depth will be approximately 2 feet. The drainage channel will begin at a new concrete apron located northeast of Building 19, will continue southwest along the fence for approximately 415 linear feet, and will then discharge into a new drop inlet. From the new drop inlet, stormwater will pass through approximately 315 linear feet of 30-inch-diameter RCP and through one 5-foot-diameter manhole before being discharged into the main drainage channel. The pipeline construction will require that a portion of the

railroad spur line serving the Mound site be removed prior to pipe installation and replaced after installation is complete. Construction beneath the railroad track will require the use of a steel casing pipe to protect the carrier pipe. The pipe alignment was chosen to avoid conflicts with the existing sewage treatment plant and new retention basin. The channel route was chosen to intercept stormwater runoff before it leaves the site and to miss a groundwater monitoring well located along the property fence. For this CDR, the components are sized to provide additional capacity should the need arise for diverting the flow from SD 1199A into the new concrete channel.

Drainage for Test Fire Area: This element consists of connecting three independent drainage systems in the Test Fire area to provide only one point of discharge into the main drainage channel (see Figure 9, Section M). The three systems will be tied together by running approximating 164 linear feet of 15-inch-diameter pipe from the existing 12-inch-diameter pipe west of Building 63 to the existing 24-inch-diameter pipe west of Building 35. Four new manholes will be used to connect the existing drainage system into the new pipe. With the new interconnecting pipe, a small portion of the existing system will be plugged and abandoned in place. Trench excavation for pipeline installation and removal and replacement of the existing security fence make up the site work portion of this element. Pipe routing was chosen to avoid conflicts with existing utilities and to economically consolidate and improve stormwater monitoring from this area. Because known deficiencies in the existing storm drainage systems within the Test Fire area were corrected under ES&H Phase 1B, no portion of the existing systems is being replaced or rerouted. The location of the new tie-ins will be the same as that of the existing tie-ins. Pipelines will be sized to

accommodate flows through the existing piping system. The size of the existing pipelines will be the controlling design element. Pipe capacities will be calculated using Manning's Equation for gravity flow.

Drainage for Area Between Firehouse and Building 51 Area:

This element consists of installing approximately 90 linear feet of trapezoidal concrete channel, 43 feet of V-shaped concrete ditch, 60 feet of concrete curb, a headwall, two drop inlets, approximately 20 feet of 12-inch-diameter concrete pipe, and approximately 46 linear feet of 21-inch-diameter RCP (see Figure 10, Section M). The design of this element involves sizing the pipe and channel to convey stormwater runoff from the existing unpaved contractor parking area northeast of Building 51 to the existing storm drain system. Site work will involve excavation, backfill, and grading for the storm drain piping, drainage channel, appurtenances, and placement and compaction of fill material to reduce the slope of the embankment east of Building 51. After the fill is compacted, the slope will be stabilized with approximately 230 tons of rip rap. Pipe routing was based on the location of previously installed features in the storm drain system and on the location of an existing drainage channel. Service tie-ins consist of connecting to existing portions of the storm drain system. The capacity of the existing pipe and stormwater runoff from the drainage area above the channel were used to size the components in this element.

Drainage Along Old South Boundary Between Developed and Undeveloped Properties:

This element consists of constructing a concrete trapezoidal channel in the existing drainage ditch along the north side of the road east of Building 21 (see Figure 11, Section M) and of replacing an existing pipe with two new 24-inch RCP culverts.

The new channel will have a 6-foot bottom width, side slopes of 1(H) to 1(V), and a design flow depth of approximately 9 inches. The new 24-inch-diameter culvert pipes will have reinforced concrete headwalls at each end to provide a smooth connection between the pipes and the channel. A new headwall will also be constructed on the existing culvert pipes northwest of Building 21. No special siting limitations are applicable.

The components of this element are sized to accommodate a 25-year storm under full-flow conditions. The Rational Method was used to determine runoff quantities. The only limitation created by this method is the variability in estimating stormwater runoff quantities.

Drainage for Area North of SM-PP Area: This element consists of constructing approximately 25 linear feet of 12-inch-diameter RCP, 60-linear feet of 24-inch diameter RCP, three headwalls, 165 linear feet of concrete channel, an earthen berm, 100 linear feet of rip-rap-lined channel, and stabilization of the road shoulder with prime-and-seal pavement (see Figure 12, Section M). The 12-inch-diameter pipe, three headwalls, and 40 feet of concrete channel will be constructed southeast of Building 61 and will direct stormwater runoff from the area north of Building 88 into the on-site storm drainage system south of Building 61. One headwall will be constructed at each end of the concrete channel. The concrete headwall at the discharge end of the channel will be installed as a replacement for the existing rock wall at SD 1509. To collect flow from the upper reach of the channel, an inlet backed by a concrete headwall will be installed in the flow line of the ditch to divert that flow into the new concrete channel and into the on-site storm drainage system south of Building 61. At present, the flow

that enters the storm drain system south of Building 61 bypasses the SM area retention pond. The 24-inch-diameter concrete pipe and manhole proposed in this element will be installed to divert the stormwater flow in the pipes south of Building 61 into the SM area retention pond.

To prevent further erosion, a rip-rap channel will be installed in a badly eroded existing channel located on the east side of the road leading to the SM-PP area. The rip-rap channel will discharge into a 45-foot-section of concrete channel connected to an existing concrete channel at the entrance to SD 1517. In addition to the channel erosion, the shoulder of the road in this area is badly eroded. This shoulder will be stabilized with prime-and-seal asphaltic pavement.

An earthen berm with 60 linear feet of concrete channel will be constructed south of Gate 10 and northeast of Building 61. The flow from the earthen berm and concrete channel will discharge into the existing storm drainage system via inlet SD 1517. To accommodate this flow, to protect the inlet, and to improve the inlet's effectiveness, the following modifications are proposed:

- Cutting an opening in the inlet to accept flow from the V-shaped concrete ditch.
- Installing a grate on the inlet.
- Extending the wing wall from the inlet to the edge of pavement.

The concrete channel southeast of Building 61 will have a trapezoidal shape with a bottom width of 2 feet and a depth of 1 foot. The earthen berm will be approximately 1 foot high with side slopes of 2(H) to 1(V). The concrete ditch adjacent

to the earthen berm will be V-shaped with 1.5(H) to 1(V) side slopes. The channel and berm will intercept runoff on the west side of Mound Road and will discharge the flow into Mound's storm drainage system. The rip-rap channel will have a trapezoidal shape with a 3-foot bottom width, side slopes of 2(H) to 1(V), and a depth of 2 feet. The concrete channel to receive flow from the rip-rap channel will also have a trapezoidal shape with a bottom width of 3 feet, side slopes of 1(H) to 1(V), and a depth of 2 feet.

The headwalls will be of cast-in-place concrete construction with wall thicknesses of 8 inches. Twenty feet of concrete channel is also required to replace an existing stone waterway and to divert stormwater runoff from the road east of Building 61 to the inlet on the northeast corner of Building 61. No siting limitations are apparent.

The components of this element are sized to carry the runoff from a 25-year storm and to convey it to the SM area pond and eventually to the overflow pond. The limitations with this design are the slope of the existing influent line into the SM area retention pond and the inherent variability in determining stormwater runoff with the Rational Method.

Drainage between Magazine 52 and Building 57:

This element consists of constructing 180 linear feet of concrete-lined channel from the headwall at SD 1264 to the main drainage channel (see Figure 13, Section M). The channel will be trapezoidal in shape with a bottom width of 3 feet, side slopes of 1.5(H) to 1(V), and a depth of 2 feet. To install the new channel, several utilities that serve the sewage treatment plant, including sanitary sewer, air, water, and electric lines, will need to be lowered, and 22 feet of 42-inch-diameter corrugated metal pipe culvert will need to be

removed. Several existing drain lines discharge into the existing ditch. These drain lines will be tied directly to the new concrete channel.

Site work will be limited to demolition, sediment removal, and channel excavation to ensure that sufficient slope is available.

The new channel is sized to accommodate the 25-year stormwater runoff rate. The only limitations that exist for this element are the space constrain for equipment operating in the channel and the possibility of encountering contaminated soil and sediment during excavation.

Drainage for Area Between Buildings 30 and 71:

This element (see Figure 14, Section M) of work consists of:

- Constructing two grass-lined channels along the south side of the parking lot west of the SM area retention pond.
- Regrading, filling, and compacting soil to eliminate a ponded water area at the toe of the fill area used for truck parking.

One of the grass-lined channels will extend from the discharge of the SM area retention pond's emergency spillway to an existing inlet along the south edge of the parking lot south of the firehouse. This channel will be trapezoidal in shape with a bottom width of 4.5 feet, side slopes of 1.5(H) to 1(V), and a depth of 2.25 feet. To ensure that all flow in the channel enters the storm drain system, an earth berm will

be constructed on the north, west, and south sides of the inlet.

The second channel will extend from the west side of the berm surrounding the inlet to the hillside southeast of Building 51. The channel will have a trapezoidal shape with a 1.5-foot bottom width, 1(H) to 1(V) side slopes, and a depth of 1 foot.

The drainage components of this project are sized to carry the runoff from a 25-year storm event.

Site work on this element consists of grading, filling, and compacting to eliminate the water ponding problem and excavation to construct the grass-lined channels. The only limitation on this element of work is the elevations of the existing emergency spillway and the existing inlet.

Drainage for Area North of Road North of SM Area Retention Pond:

This element consists of constructing two cast-in-place concrete channels to divert and convey stormwater from the hillside west of the truck scale at Post 8 to a replacement inlet on the northside of the road from Post 8 (see Figure 15, Section M).

The existing inlet on the north side of the access road from Post 8 is being replaced to lower the top of the structure so that an adequate slope on the new concrete channels can be established. The concrete channel west of the replacement inlet is 100 feet long. This channel is V-shaped and has side slopes of 2(H) to 1(V) and a depth of 1 foot.

The concrete channel east of the replacement inlet is 175 feet long and has the same shape as the concrete channel on the west side of the inlet.

The only limitation apparent in this element is the lack of grade in the area of the inlet. The components of this element are sized to convey the runoff from a 25-year storm event.

c. Improvements to Construction Spoils Area and Main Parking Lot

Old Construction Spoils Area Drainage: This element consists of reshaping the top of the spoils area to provide positive drainage to the inlet located in the fill area, installing diversion dikes and channels to control and direct stormwater runoff away from the fill areas, stabilizing a channel on the face of the fill that is badly eroded, and installing approximately 350 linear feet of 18-inch-diameter RCP east of Building 49 to connect the drain pipe installed under a previous project to the main drainage channel (see Figures 16A and 16B, Section M).

Approximately 1600 cubic yards of soil will be excavated from the top of the construction spoils area to create a minimum slope of 2 percent. This slope will eliminate the pockets of water that form on the fill. An earthen diversion dike will be installed on the south side of the spoils area. Stormwater on the north side of the diversion dike will be collected in a grass-lined trapezoidal channel with a bottom width of 1.5 feet, side slopes of 1(H) to 1(V), and a depth of 2.4 feet. The channel will convey the runoff to the same inlet located on the spoils area.

The limiting design criteria are the size of the disposal area, and the capacity of existing storm drain pipe.

The only tie-in required is the extension of the existing storm drain piping from the spoils area to the main drainage channel. This tie-in can be easily made because sufficient grade exists to convey the required quantity of stormwater to the channel.

Pipe and channel sizing will be determined from the amount of stormwater runoff calculated for this area from a 25-year storm event and the capacity of the existing upstream piping.

Main Parking Lot Storm Drainage Control: This element consists of constructing new concrete curb and gutter along the north and east sides of the Main Parking Lot (see Figure 18, Section M). Five inlets will be constructed along the curb and gutter to collect stormwater runoff and to convey the runoff to the City of Miamisburg's stormwater collection system. The inlets will be connected to the city's system through a combination of 15-, 18-, and 24-inch-diameter RCP. A manhole will be provided immediately ahead of the discharge into the city system to allow the stormwater to be sampled and tested while it is still on Mound property.

Two of the new inlets will intercept the existing storm drain lines and divert the stormwater away from the adjacent property into the new collection system. The site work required for this project is limited to pavement demolition, pipe demolition, and excavation for pipe installation.

Connections to the existing storm drain pipes and to the City of Miamisburg's system will not present any difficulties because of the considerable change in elevation. The inlets

and piping in this element will be designed to carry a 25-year storm event.

Main Parking Lot Subsurface Drainage: This element consists of conducting hydrogeological tests and installing an under-drain system in the eastern third of the main parking lot (see Figure 17, Section M). Testing is necessary to determine the depth and spacing of subsurface drains required to lower area groundwater. For this CDR, 1870 linear feet of 4-inch-diameter perforated, corrugated polyethylene pipe has been estimated. The pipe will be placed in eight runs spaced 50 feet on center and will discharge into an 8-inch-diameter PVC header located at the north end of the parking lot. The 8-inch-diameter pipe will discharge into the storm drain system at SD 1514. After the subsurface drain piping is installed, the disturbed area will be overlaid with new asphalt. Site work will involve excavation for the subsurface drains and header piping and replacement of pavement removed during installation of the piping. The only limiting criterion is the groundwater elevation which will be unknown until subsurface investigations are completed. Preliminary sizing and spacing of subsurface drains are based on prior experience. Refinements in sizing and spacing will be made during Title I design.

2. Energy Conservation

The only electrically powered equipment proposed for use in the major portions of this project are the electric sluice gate operators and the level sensor in the main drainage channel. These items use very little power; however, energy conservation measures will be implemented where applicable. The only piece of equipment needed for this project is a gasoline or diesel fuel operated pump for removing solids from the bottom of the ponds and basin. The

design of Building 34 will incorporate the use of energy efficient systems and components.

3. Environmental Considerations

This project will significantly reduce the risk of contaminating the underlying aquifer and uncontaminated areas on and off the site. All potentially contaminated runoff will be conveyed to the expanded overflow pond and eventually to the stormwater treatment facility proposed in another ES&H project, thus preventing the spread of soil contamination.

The environmental regulations that relate to this project are erosion and sediment control requirements established by state and local agencies and the National Pollutant Discharge Elimination System (NPDES) permit issued and administered by the Ohio Environmental Protection Agency (OEPA).

This project will offer greater assurance that the NPDES permit limits on stormwater suspended solids will be met.

An "Action Description Memorandum" (ADM) for all but the following elements of this project was prepared in March 1989:

- Drainage for Area North of SM-PP Area
- Main Parking Lot Storm Drainage Control
- Drainage between Magazine 52 and Building 57
- Drainage for Area Between Buildings 30 and 71
- Drainage for Area North of Road North of SM Area Retention Pond

Subsequently, an Environmental Checklist was prepared and submitted to AL in September 1990. The Environmental Checklist was submitted in lieu of the ADM. The intent of the Environmental Checklist has

been incorporated into this CDR. Mound plans to submit a "brief" Environmental Assessment (EA) to DOE in FY-91.

4. Safety Considerations

The operational description is given in Section E.1, "Project Design Description." The risk level required to verify the adequacy of design and siting requirements is addressed in Section E.3, "Environmental Considerations." Because all components of this project are designed to function during a storm event and do not require any personnel to initiate operation, scheduling from an operational safety standpoint is not applicable. No explosives will be used in the construction of this project.

Based on the nature of this project, the National Fire Protection Association (NFPA) recommendations will apply only to the design of Building 34.

Two major safety issues are addressed in this project. The first is to provide adequate subsurface drainage in the main parking lot to remove groundwater before it seeps through the pavement and freezes during cold weather. The second is to design and construct the emergency spillway and other features at the expanded overflow pond to prevent catastrophic failure of the dam, thus preventing damage to property or injury to people.

No preoperational safety checks have been identified for this project.

5. Security Considerations

Only certain portions of the project are located in restricted areas. Most of the construction work will be outside the security islands where no fencing or escorts will be required. Because the

nature of this project makes it unfeasible, in most cases, to install a temporary security fence around the work, security personnel will be assigned to uncleared construction crews working on those elements of the project within the security islands. The only exception is the Drainage for Test Fire Area element. Because the new pipe will be installed adjacent to the security fence, temporary security fencing will be used while the permanent fence is removed for pipe installation. None of the work on any of the elements involves special security considerations.

6. Provisions for the Handicapped and Fallout Shelters

The only buildings required in this project are the structures in the Building 34 area that were demolished with the expansion of the overflow pond and subsequently relocated. Because these new structures are being constructed to provide a fire fighting training facility for the Mound fire department, provisions to include access for the handicapped or to provide fallout shelters are not appropriate for these facilities.

7. Maintenance and Operation

The only operational expense associated with this project will be the cost of running the dewatering pump when cleaning sediment from the ponds and retention basin. Because of the infrequency of sediment removal, this expense will be minimal on a yearly basis unless the sediment is determined to be contaminated to a level requiring special handling and disposal. The pump chosen for this application will be a self-priming, centrifugal, solids-handling, suction-lift pump with high-pumping efficiency. No special training, parts, or start-up will be required for this project.

The implementation of this project will have no effect on the present manpower requirements at Mound. The following items will be necessary to maintain the components of this project:

- Routine check of all storm sewer pipes and channels for blockage.
- Periodic removal of sediment from retention basin and ponds.

When this project is implemented, maintenance costs for the storm drainage system as a whole should decrease because of the elimination of erosion in the storm drainage system and the reduction in sediment.

8. Decontaminating and Decommissioning (D&D)

This project will not impact the DOE's D&D program; however, some low level radioactive waste disposal may be required in the form of radioactive soil and sediment removed during excavation. The sediment and material to be excavated will be tested. If the materials exceed the contamination limits, they will be containerized and transported off-site for disposal at an approved facility. Where new components are installed, the location of these components will be chosen to minimize contact with contaminated soil.

Any contaminated soil or sediment encountered will be excavated and boxed by a dedicated Mound crew and shipped to the Nevada Test Site (NTS) for disposal. At the time this CDR was prepared, shipments of contaminated soil to the NTS had temporarily been suspended. Shipments are expected to resume prior to the start of construction for this project. The soil boxes will be transported in exclusive-use, closed, commercial vans by a licensed disposal firm. All applicable DOT regulations will be followed. The only permit

required is a transportation permit from each state along the transport route. Because transportation of contaminated soil from the site has taken place in the past, no additional permits or approvals, beyond those currently used for similar disposals from Mound, should be required.

Mound also has the option of procuring the services of a contractor who specializes in site remediation for the removal and disposal of contaminated soils. Since excavation of contaminated soils is expected, testing, removal and disposal activities need to be coordinated with the environmental group at Mound prior to beginning Title I design.

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 complies with the Mound Site Development Plan - April 1985, revised January 1991.

12. Outline Specifications and Criteria

a. Demolition

- (1) Building 34 Area: Two masonry buildings and one metal building totalling 470 cubic yards of material will be removed. Pavement, monitoring wells, concrete fire

pits, and utilities will also be removed. Concrete removal totals approximately 800 cubic yards.

- (2) Low-Flow Retention Basin: All structural concrete and appurtenances in the retention basin will be removed.
- (3) Storm Drop Inlets: Five precast concrete drop inlets will be removed, leaving portions of the inlet and outlet pipes from the drop inlets intact.
- (4) Pipe: Approximately 1200 linear feet of 1-inch- through 42-inch-diameter pipe will need to be removed. The existing connections to the drainage structures should be plugged. Several other lines will be abandoned in place.
- (5) Asphalt Retention Pond Liner: Approximately 4550 square yards of 2-inch-thick pond liner in the SM area retention pond will be removed
- (6) Asphalt Pavement: Approximately 3150 square yards of asphalt concrete pavement and 400 square yards of portland cement concrete pavement will be removed to accommodate the new storm drain piping. Included in this demolition will be approximately 7700 linear feet of pavement saw cutting.
- (7) Concrete Curb and Channel: Approximately 1120 linear feet of concrete curb and 98 square yards of concrete channel will be removed to accommodate new drainage features.
- (8) Fence: Approximately 200 linear feet of security fencing will need to be removed for construction and

pipe installation. This fencing will be reinstalled in the same location.

b. Earthwork

- (1) Bentonite Clay Liner: The clay material when in place will have a permeability no greater than 1×10^{-7} cm/sec. Compaction of the clay liner will be 95 percent of standard proctor.
- (2) Excavation: Structural excavation will be required for slabs, footings and foundations. Pipeline and channel excavations will be along straight lines and will be of sufficient depth to accommodate the pipe and bedding material. Excavations will also maintain the grades shown on the construction drawings. Excavated material through contaminated soil zones will require testing for radioactivity. If radioactive levels are excessive, the soil will be containerized for disposal in an approved area. All excavation will be unclassified.
- (3) Stone Bedding and Base: Bedding and base material will be No. 57 or No. 6 aggregate as defined in AASHTO M43 and M80, Class B.
- (4) Backfill: Backfill will include placing excavated material on installed pipe, as well as around partially below-grade structures and placing an 8-inch-thick bentonite clay liner in the SM area retention pond and the expanded overflow pond. Compaction of backfill around structures, beneath pavement and bentonite clay liners will be to 95-percent standard proctor. Compaction of all other backfill will be to 90-percent standard proctor.

- (5) Grading: Grading will be required to establish necessary ground slopes and drainage patterns. Grading will also be required along new roadways to achieve the proper cross section.
- (6) Erosion Control: Minimum erosion and sediment control features will be shown on an erosion and sediment control drawing. Features will comply with the Ohio Erosion and Sediment Control Handbook. Features will be installed in locations necessary to keep erosion and sedimentation limited to the immediate construction area.
- (7) Basin Dewatering and Sediment Removal: Surface water will be removed from the retention pond, retention basin and overflow pond. The sediment-laden water will be sent through a dewatering device (i.e., belt filter press or centrifuge) furnished by the contractor. Filtrate and surface water will be transported to the WD Building for disposal as industrial waste. The dewatered sediment will be containerized and shipped to an approved off-site disposal facility.

c. Pavement

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

Type: Pavement patch 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.

- (2) Pavement Overlay: After pavement patch has been placed, the disturbed area of the main parking lot will be overlaid with 1-1/2 inches of asphalt wearing surface.

d. Storm Drainage System

- (1) Subsurface Drain Pipe: Subsurface drain pipe will be perforated, corrugated polyethylene tubing in accordance with ASTM F 405. Subsurface drain pipe will be installed in a trench that has been backfilled with an open-graded aggregate.
- (2) Storm Sewer Pipe: Storm sewer pipe will be either PVC, unreinforced concrete, reinforced concrete, or corrugated metal ranging in size from 8 inches to 30 inches in diameter. Flows will be determined by SEDIMOT and the Rational Method for stormwater runoff. In using the Rational Method, the minimum time of concentration used in determining stormwater flows was 10 minutes. This time of concentration provided the greatest intensity (i). The following runoff coefficients (c) were used in determining the stormwater flows:

<u>Area</u>	<u>c</u>
Heavy Industrial Area	0.70 - 0.85
Light Industrial Area	0.55 - 0.65
Grassed Area	
(Heavy Soil, Steep Slope)	0.40
Pasture Area	
(Heavy Soil, Moderate Slope)	0.30
Pasture Area	
(Heavy Soil, Steep Slope)	0.40

The Manning Equation and the following roughness coefficients (n) were used to determine pipe capacities:

<u>Material</u>	<u>n</u>
PVC	0.010
Unreinforced Concrete Pipe	0.013
Reinforced Concrete Pipe	0.013
Corrugated Metal Pipe	0.025

Pipe slopes will be designed to maintain a minimum velocity of 2 feet per second. If pipe slopes exceed 20 percent, concrete pipe anchors will be required every 36 feet.

- (3) Valves and Sluice Gates: Gate valves will be double-disc parallel-seat, bronze-mounted, iron body valves conforming to AWWA C509-87 or C500-86. Sluice gates will conform to AWWA C501-87 and will be designed to withstand a seating head of 55 feet. Gates will have top, bottom, and side wedges.
- (4) Concrete Channels: Concrete channels will be trapezoidal in shape and will have side slopes varying from 2(H) to 1(V) to 1(H) to 1(V). Sizing of channels will be based on Manning's Equation for open channel flow. The roughness coefficient (n) used in this equation will be 0.014. Construction materials are specified in "f. Concrete Work." Minimum velocity in the channel will be 2 feet per second. Channel slope will conform to the existing ground surface, and channel configuration will change as necessary to accommodate the design flow.
- (5) Manholes, Curb Inlets, and Drop Inlets: Precast concrete manholes, curb inlets, and drop inlets will conform to ASTM C 478. Joints between the base, risers, transitions, and flat tops will be rubber O-ring conforming to ASTM C 443. Frames and covers and grates

will be cast-iron conforming to ASTM A 48. Manhole and inlet diameters will be sized to accommodate the required diameter pipe.

e. Seeding

In all areas disturbed during construction, lime, fertilizer, and seed will be broadcast to stabilize the ground surface. Seed mixture and application rates for these materials will be based on soil types and growing seasons in the Miamisburg, Ohio, area.

f. Concrete Work

(1) Temporary Concrete Forms: The design of these forms will be the responsibility of the contractor and will conform to ACI 301, 318, and 347.

(2) Wire Fabric Reinforcement (WFR): WFR will conform to ASTM A 185. Laps will be made with two full-mesh sections plus wire extension.

(3) Steel Bar Reinforcement: Steel bar reinforcement will conform to ASTM A 615, Grade 60, deformed.

(4) Concrete and Aggregate: Cement will conform to ASTM C 150, Type 1 portland cement. Aggregate will conform to ASTM C 33. Coarse aggregate size will be No. 67. Concrete will be proportioned and mixed to develop a minimum compressive strength of 3000 psi at 28 days and a maximum slump of 4 inches, in accordance with ACI 301. Ready-mix concrete will conform to ASTM C 94. The contractor will be responsible for submitting a concrete mix design to EG&G for approval.

- (5) Foundations for the metal and CMU buildings will be reinforced slab-on-grade with thickened edges or shallow spread footings.

g. Building Construction

Materials of construction for the new Building 34 area structures will consist of pre-engineered metal buildings and CMU/fire brick buildings to match the materials in the existing Building 34 area. Building sizes will also match those in the existing Building 34 area.

h. Structural Steel

Structural steel will conform to all applicable requirements of the American Institute of Steel Construction (AISC) specifications and code of standards. Structural steel will be used to construct a catwalk from the bank of the expanded overflow pond to the top of the withdrawal tower.

i. Miscellaneous Metalwork

Miscellaneous metalwork will include grating, angles, and handrails used on the catwalks. Metal will be aluminum. Grating will be designed for a live load of 100 pounds per square foot. Deflection is not to exceed length divided by 120, or 1/4 inch.

j. Pumping Equipment

A nonclog, self-priming, solids-handling, suction-lift centrifugal pump will be provided to dewater and remove diluted sediment from the retention basins and pond. The pump will be sized to limit the amount of liquid delivered to the

dewatering device. Flow limitations will be determined during Title I design.

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 (AL) Office of the DOE Order 5700.6B, Revision 2.

According to the "Consequences of Failure" analysis, most elements in the project are rated as Class III. Only the expanded overflow pond is given a Class II rating. This rating was given to the expanded overflow pond because catastrophic failure of the dam could cause severe damage to the Conrail railroad located west of the pond. A Class II rating requires that the design and components of the expanded overflow pond provide for a safe, reliable, and economic operation within the definition of acceptable risk. A Class II rating also requires a formal quality assurance plan. EG&G will prepare this plan.

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, design criteria will be prepared for the project to assure that project objectives will be met.

The A/E selected for the design will be required to implement a QA program consistent 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.

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

Uncertainties and unknowns identified during the development of this CDR and the plans for resolving them are listed below:

- Unknown: The depth and flow direction of the groundwater beneath the main parking lot.

Resolution: Prior to beginning design, a hydrogeological testing program and study of the seepage in the parking lot will be performed to verify the proposed design solution. The testing program will consist of drilling approximately 16 groundwater monitoring wells between 5 and 60 feet deep at various locations in and around the parking lot. Water level readings in the wells will be taken every month for at least 8 months. The cost of this testing program will be included in the Title I design. No additional work beyond what can be covered by contingency is anticipated. The potential exists to reduce the work required.

- Unknown: Adequacy of the existing stormwater collection system to carry the runoff from a 25-year storm event as required in DOE Order 6430.1A.

Resolution: Because all new components in this system are designed to handle the runoff generated from a 25-year, 24-hour storm event and because these new components connect to pipes of unknown design capacity, a hydrology and hydraulic study should be conducted for the entire drainage system. Any pipe sections that do not comply with DOE Order 6430.1A should be replaced with larger diameter pipe. The cost for a study will be funded as part of the Title I design. If additional work is found beyond what can be covered by contingency, another project will be developed.

- 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. The cost of this program will be included in the Title I design. No additional work beyond what can be covered by contingency is anticipated.

- Unknown: Quantity of contaminated soil to be encountered.

Resolution: Careful analysis has been made of available historical data relative to contaminated soils and is reflected in the estimated quantities of excavated soil to be boxed. Additional analysis of soil radioactivity in areas of proposed construction will be performed to further define the extent of contamination. This unknown is accounted for in the contingency percentage applied to this project. The rationale for the contingency percentage is explained in Section J, "Cost Estimate Summary."

- Unknown: Sediment quantities and sediment radioactivity levels in the overflow pond, retention basin, and SM area retention pond.

Resolution: Careful analysis has been made of available historical data relative to contaminated soils and is reflected in the estimated quantities of excavated soil to be boxed. However, prior to Title I design, an inventory of the sediment quantities and radioactivity levels will be taken for the overflow pond, retention basin, and SM area pond. This inventory and testing will provide a better indication of the quantities of contaminated soil to be boxed. The cost for this unknown is included in the contingency percentage applied to this project.

- Unknown: The exact criteria for sizing the emergency spillway for the overflow pond.

Resolution: Prior to Title I design, the Ohio Department of Natural Resources (ODNR) will be contacted to obtain an interpretation of the Dam Safety Hazard Class Standards for the dam and to discuss the need for a dam breach analysis study. Should such a study be required, the cost will be funded as part of Title I design. No additional work beyond what is covered by contingency is anticipated.

- Unknown: The effect of stormwater runoff from 50 percent of a Probable Maximum Precipitation (PMP) storm.

Resolution: The watershed will be studied to determine the effects of stormwater runoff from 50 percent of a PMP storm. Flooding that results from this runoff may be so severe that the failure of the dam would be insignificant by comparison. The results of the study will help establish the proper size for the emergency spillway.

H. Project Execution

The project will be designed as a single construction package. Titles I and II design will be accomplished by a qualified architectural/engineering (A/E) firm under a fixed-price contract. The A/E will be selected based on the firm's qualifications, experience, and ability to perform the necessary services in the required time frame. Title III services will be performed on a time-and-materials basis by the design A/E. Construction inspection will be performed by EG&G personnel. The construction will be performed under a fixed-price contract. The construction contract will be procured through public advertisement and competitive bidding and will be awarded based on the contractor's experience, quality control, reliability, creativeness of approach, responsiveness, responsibility, financial stability, and low-bid price.

The project will be broken down into the following procurement items:

- A/E Services for Titles I, II, and III
- 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.

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.

If split or incremental funding is chosen, the priority list below should be used to determine the importance of each element of the project. The elements listed by level of importance, with item 1. being the most important are:

1. Improvements to Main Channel and Retention Structures
2. Improvements to Collection Systems in Contaminated Soils Areas
3. Improvements to Construction Spoils Area and Main Parking Lot

A tabulation of the TEC for the project is provided in Section J, "Cost Estimate Summary" on page I-70.

I. Schedules

The project schedule included in this section shows key dates for the design and construction phases of the project. 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. Design is scheduled to begin in February 1993. Construction completion is scheduled for the fourth quarter of FY-96.

In the project schedule, the length of time allotted for removing contaminated soil is based upon using two crews working concurrently. The amount of contaminated soil removed each day is based on a rate of 270 cubic feet per crew. Contaminated soil removal will begin after the construction contract has been awarded. Therefore, Mound will have the option of using its personnel to remove the contaminated soil or employing a specialty contractor to complete the work.

The Milestone Table below shows important items and completion dates for the project:

MILESTONE TABLE
Table I-2

Activity	Completion Date
Procurement of Equipment	N/A
Procurement of Land	N/A
Permits	July 94
Demolition	N/A
PSAR/FSAR	N/A
Incremental Acceptances	Oct 93 & Jun 94
Parallel Procurement Strategies	N/A
Support Activities (ED&I, Construction, Equipment)	Feb 93 - Aug 96
Design and Review	Feb 93 - Jun 94
Contract Awards	Jan 93 & Sep 94
Construction Complete	Aug 96

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

SITE DRAINAGE CONTROL PROJECT SCHEDULE

MILESTONES

J. Cost Estimate Summary

1. Total Estimated Cost (TEC) Summary

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

Engineering, Design, and Inspection (ED&I)	\$ 817,000
Construction	3,986,000
Contaminated Soil Disposal	9,699,000
EG&G Project Management	110,000
EG&G Construction Management	219,000
Contingency	<u>2,966,000</u>
TOTAL ESTIMATED COST	\$17,797,000

2. ED&I Costs (Less Contingency)

Estimated ED&I costs are summarized as follows:

Architect/Engineer - Titles I, II, and III	\$612,000
EG&G Engineering	43,000
EG&G Inspection	<u>162,000</u>
TOTAL ED&I	\$817,000

ED&I cost calculations, including Title I, II, and III breakdown, are included in Part III, "Supplemental Information," a separate volume.

3. Construction Cost (Less Contingency)

<u>Element</u>	<u>Construction Cost Less Contaminated Soil</u>	<u>Contaminated Soil Removal and Disposal</u>
Main Drainage Channel	157,000	775,000
Retention Basin	461,000	777,000
SM Area Retention Pond	264,000	476,000
Drainage along West Side of Main Hill	95,000	0
Drainage for Bldg 19 Area	71,000	479,000
Drainage for Test Fire Area	21,000	0
Drainage between Firehouse and Bldg 51	20,000	76,000
Drainage along South Boundary	49,000	372,000
Drainage for Area North of SM-PP Area	29,000	0
Old Construction Spoils Area Berm and Drainage	42,000	0
Main Parking Lot Subsurface Drainage	341,000	0
Main Parking Lot Storm Drainage Control	92,000	0
Channel between Magazine 52 and Building 57	20,000	98,000
Drainage for Area between Buildings 30 and 71	6,000	483,000
Drainage at Area West of Road West	8,000	0
Overflow Pond Expansion, Demolition	192,000	0
SUBTOTAL	<u>1,868,000</u>	<u>3,536,000</u>

<u>Element</u>	<u>Construction Cost Less Contaminated Soil</u>	<u>Contaminated Soil Removal and Disposal</u>
Overflow Pond Expansion, Pond Enlargement	1,973,000	6,163,00
Overflow Pond Expansion, Erection of Building 34	145,000	0
TOTAL	<u>3,986,000</u>	<u>9,699,000</u>

The detailed construction cost estimate is included in Part III, "Supplemental Information."

4. EG&G Project Management and Construction Management Costs

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

5. Escalation

Escalation costs are summarized as follows:

<u>Element of Cost</u>	<u>Unescalated Cost(\$)</u>	<u>Escalation (%)</u>	<u>Escalation Dollars (\$)</u>	<u>Escalated Cost (\$)</u>
ED&I	662,000	24	155,000	817,000
Construction	10,289,000	33	3,396,000	13,685,000
EG&G Project Management	89,000	24	21,000	110,000
EG&G Construction Management	177,000	24	42,000	219,000
TOTAL	<u>11,217,000</u>		<u>3,614,000</u>	<u>14,831,000</u>

NOTE: Escalation percentages shown are not precise because of rounding.

6. Contingency

Contingency costs are summarized as follows:

<u>Element of Cost</u>	<u>Escalated Cost (\$)</u>	<u>Contingency (%)</u>	<u>Contingency Dollars (\$)</u>	<u>Total Estimate Cost (\$)</u>
ED & I	817,000	20	163,000	980,000
Construction	13,685,000	20	2,737,000	16,422,000
EG&G Project Management	110,000	20	22,000	132,000
EG&G Construction Management	219,000	20	44,000	263,000
TOTAL	14,831,000		2,966,000	17,797,000

NOTE: Contingency percentages shown are not precise because of rounding. The "Contingency Analysis" is included in Part III, "Supplemental Information."

7. 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 Cost Estimating Guide for Application of Contingency, revised 15 June 1985, as developed by the DOE Committee for Cost Methods Development (CCMD). 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 5700.2C.

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 an estimate of the manhours required to accomplish each task. An average direct labor rate of \$20.00 per hour and an overhead rate of 140% of direct labor were used to calculate the labor costs. Expenses were calculated as a percentage of direct labor cost based on previous experience. Profit was calculated at 10% of labor and expenses. The A/E cost calculations are included in Part III, "Supplemental Information." A percentage markup for contingencies is included as well as escalation to the midpoint of the activity. Independent Cost Estimating (ICE) staff escalation rates were used based on the following indices:

	<u>ICE Index</u>
Title I & II Engineering Midpoint = 10/1/93	1.20
Title III Midpoint = 10/1/95	1.33

(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 60 percent. Escalation to the midpoint of the activity 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. 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 escalated to the midpoint of construction. The price used was \$743 per cubic yard. This price results in the EG&G supplied price after taxes, insurance, and overhead markups are applied.

The contractor overhead and profit used was 25 percent and the prime contractor overhead and profit used was 25 percent for prime contractor's own work and 10 percent on his subcontracted work. These percentages are based on experience with similar projects, as well as on 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. In addition, an 8-percent markup rate was used for Ohio Worker's Compensation.

The costs used in the November 1989 CDR were escalated to 1990 costs by applying a 4.3 percent markup provided by Mound for preparation of this CDR. These costs were then escalated using FY-92 guidance ICE escalation rates also supplied by Mound (FY-92 rates begin at FY-90).

The contingencies included are tabulated on the "Contingency Analysis Summary Sheet" and are detailed on the "Contingency Analysis Work Sheets" included in Part III, "Supplemental Information."

K. Procurement Actions

The initial step in the procurement process will be to negotiate a contract with a qualified A/E firm to provide the Title I, Title II, and Title III services. The next step will be to advertise, bid, and award the construction contract. 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 on Tables I-3 and I-4 and on the following pages. Funds for each activity in the Project Schedule on page I-69 are obligated in the first quarter of the fiscal year in which that activity begins. The costs are prorated proportionally among the fiscal years during which the activity occurs.

SITE DRAINAGE CONTROL

COSTS PROFILE (\$1,000)
TABLE 1-3

COSTS	FY 93				FY 94				FY 95	FY 96	TOTAL
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q			
TITLE I		89	133	133							355
TITLE II					68	102	67				237
TITLE III									113	112	225
CONSTRUCTION									1,993	1,993	3,986
CONTAMINATED SOIL									8,953	746	9,699
EQUIPMENT PROCUREMENT											
PROJECT & CONSTRUCTION MANAGEMENT	21	21	21	21	20	20	20	22	82	81	329
CONTINGENCY				88	12	12	12	11	2,831		2,966
TOTALS	21	110	154	242	100	134	99	33	13,972	2,932	17,797

SITE DRAINAGE CONTROL

FUNDING PROFILE (\$1,000)

TABLE I-4

OBLIGATIONS	FY 93				FY 94				FY 95	FY 96	TOTAL
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q			
TITLE I	355										355
TITLE II	237										237
TITLE III									225		225
CONSTRUCTION									3,986		3,986
CONTAMINATED SOILS									8,953	746	9,699
EQUIPMENT PROCUREMENT											
PROJECT & CONSTRUCTION MANAGEMENT	166								82	81	329
CONTINGENCY	135								2,665	166	2,966
COMMITMENT TOTALS	893								15,911	993	17,797

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
3A	Main Drainage Channel, Sta 0+00 to Sta 4+81.5
3B	Main Drainage Channel, Sta 4+81.5 to Sta 10+35.5
3C	Main Drainage Channel, Sta 10+35.5 to Sta 15+81.0
4	Overflow Pond Expansion
5	Retention Basin
6	SM Area Retention Pond
7	Drainage Along West Side of Main Hill
8	Drainage for Building 19 Area
9	Drainage for Test Fire Area
10	Drainage for Area Between Firehouse and Building 51 Area
11	Drainage Along Old South Boundary Between Developed and Undeveloped Properties
12	Drainage for Area North of SM-PP Area
13	Drainage between Magazine 52 and Building 57
14	Drainage for Area Between Buildings 30 and 71
15	Drainage for Area North of Road North of SM Area Retention Pond
16A	Old Construction Spoils Area Drainage - Flow Diversion

FIGURE LIST (CONT.)

<u>Figure Number</u>	<u>Title</u>
16B	Old Construction Spoils Area Drainage - Piping Addition
17	Main Parking Lot Subsurface Drainage
18	Main Parking Lot Storm Drainage Control
19	New and Existing Drainage Patterns

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
SOIL ZONES**

SCALE: 1"=600' (APPROX.)

LEGEND

SSA-1

STORM SEWER AREA DESIGNATION:

PROPOSED STORM SEWERS

PROPOSED OPEN DITCH OR CHANNEL

EXISTING OPEN DITCH OR CHANNEL

APPROXIMATE LIMITS OF A PROPOSED PROJECT NOT OTHERWISE DEFINED

BOUNDARY OF STORM SEWER AREA

EXISTING STORM SEWER

PROPOSED CURB AND GUTTER

ABANDON

PROPOSED DROP OR CURB INLET

PROPOSED MANHOLE

PROPOSED ENDWALL

EXCEPT AS NOTED ABOVE ALL FEATURES & IMPROVEMENTS ARE EXISTING UNLESS INDICATED AS BEING NEW OR PROPOSED.

KEY PLAN

SCALE: 1"=550'(APPROX) FIG. 2

PLANT NORTH IS
WEST OF TR

PLANT NORTH

5°30'48.53"
NORTH

PROPOSED
DRAINAGE
CHANNEL

NOTE:
LOCATION OF BLDGS SHOWN ARE
NOT SURVEY LOCATIONS. BLDGS
SHOWN FOR REFERENCE ONLY.

- NOTES:
1. SEE LEGEND FIG. 2.
 2. TOP DATA FROM
FIELD SURVEY BY HSM.
 3. CONTOUR INTERVAL IS 2'

1"=20' 20' 10' 0 20' 40'

GRAPHIC SCALE

NO.		DATE		REVISIONS		BY	OK	PROJ	D.O.E.
UNITED STATES DEPARTMENT OF ENERGY DAYTON AREA OFFICE MOUND FACILITY MARIETTA, OHIO						CONTRACT NO. (A-E) BUDGET NO. A-E JOB NO. 5220H DRAWN CHECKED DESIGNER			
PROJECT TITLE						APPROVALS			
SITE DRAINAGE CONTROL						A-E PROJ. HGR. HRC TECH. HGR. HRC ENG. HGR.			
DRAWING TITLE						SCALE AS NOTED			
MAIN DRAINAGE CHANNEL STA 0+00 TO STA 4+81.5 FIG 3A						DATE FEB 1991			
SUBMITTED			RECOMMENDED			APPROVED			
HAYES, SEAY, MATTERN & MATTERN ARCHITECTS - ENGINEERS - PLANNERS ROANOKE, VIRGINIA						DRAWING NO.		REV.	
						BLDG. CODE		SHEET NO.

PLANT NORTH IS 25°30'48.53"
WEST OF TRUE NORTH

NOTE:
LOCATION OF BLDGS SHOWN ARE
NOT SURVEY LOCATIONS. BLDGS
SHOWN FOR REFERENCE ONLY.

NOTES:

1. SEE LEGEND FIG. 2
2. TOPS DATA FROM
FIELD SURVEY BY HSMN.
3. CONTOUR INTERVAL IS 2'

1"=20' 20' 10' 0 20' 40'

GRAPHIC SCALE

NO.	DATE	REVISIONS	BY	CK	PROJ ENGR	D.O.E. APP.
UNITED STATES DEPARTMENT OF ENERGY DAYTON AREA OFFICE MOUND FACILITY MIAMI, OHIO			CONTRACT NO. (A-E)			
			BUDGET NO.			
			A-E JOB NO. 5220H			
			DRAWN			
			CHECKED			
			DESIGNER			
PROJECT TITLE			APPROVALS			
SITE DRAINAGE CONTROL			A-E PROJ.			
			HRC TECH.			
			HRC ENG.			
DRAWING TITLE			SCALE			
MAIN DRAINAGE CHANNEL STA 4+81.5 TO STA 10+35.5 FIG 3B			DATE			
SUBMITTED			APPROVED			
RECOMMENDED			DATE			
HAYES, SEAY, MATTERN & MATTERN ARCHITECTS - ENGINEERS - PLANNERS ROANOKE, VIRGINIA			DRAWING NO.		REV.	
			SHEET NO.			

MATCH LINE FIGURE 5B

STA 10+85.5

PLANT NORTH

PLANT NORTH IS 25°30'48.53"
WEST OF TRUE NORTH

NOTE:
LOCATION OF BLDGS SHOWN ARE
NOT SURVEY LOCATIONS. BLDGS
SHOWN FOR REFERENCE ONLY.

- NOTES:
1. SEE LEGEND FIG. 2
 2. TOPO DATA FROM
FIELD SURVEY BY HSMM.
 3. CONTOUR INTERVAL IS 2'

1"=20'

GRAPHIC SCALE

NO.	DATE	REVISIONS	BY	CK	PROJ ENGR	D.O.E. APP.
UNITED STATES DEPARTMENT OF ENERGY DAYTON AREA OFFICE MOUND FACILITY MUMFISBURG, OHIO			CONTRACT NO. (A-E)			
			BUDGET NO.			
			A-E JOB NO.		5220H	
			DRAWN			
PROJECT TITLE .SITE DRAINAGE CONTROL			CHECKED			
			DESIGNER			
			APPROVALS			
			A-E PROJ. FOR			
DRAWING TITLE MAIN DRAINAGE CHANNEL STA10+35.5 TO STA15+81.0 FIG 3C			A-E TECH. FOR			
			A-E ENGR. FOR			
			SCALE		AS NOTED	
			DATE		FEB 1991	
SUBMITTED		RECOMMENDED		APPROVED		
HAYES, SEAY, MATTERN & MATTERN ARCHITECTS - ENGINEERS - PLANNERS ROANOKE, VIRGINIA			DRAWING NO.		REV.	
			BLOC. CODE		SHEET NO.	

LOW FLOW
RETENTION BASIN
BOTTOM EL 710.0
STORED WS = EL 7
(NEW)

NEW
EMERGENCY SPILLWAY
CREST EL 723.5

NEW
5'x6' BOX CULV
NEW
8'x8' BOX

FUTURE INFLUENT
PIPING TO STORMWATER
TREATMENT PLANT

NOTE:
REMOVE
ROADS
SURFA
LIMITS
OVERF

EXPANDED OV
POND

NEW
WITHDRAWAL
TOWER

709.0
NEW
TOP OF EMBANKMENT
EL 727.5

EXST.
712.1

NOTE:
FOR LEGEND
SEE FIG. 2

FIG 4

NOTE:

REMOVE ALL S
ROADS, UTILITIES
SURFACE FEATU
LIMITS OF EXPAN
OVERFLOW.

NOTE:
FOR LEGEND
SEE FIG. 2

RETENTION
BASIN

SCALE: 1"=80'

FIG. 5

EXPANDED OVERFLOW
POND

NEW
MAIN DRAINAGE
CHANNEL

SD 1456
END PIPE

SD 1135
SD 1263
END PIPE

SD 1489
END PIPE

MH

NEW
RETENTION
BASIN

20' OF NEW 36"
STL. CASING
PIPE AT R.R.

30"

GRADE CHANNEL
TO CATCH BASIN

NEW
CATCH
BASIN

REMOVE 2-
10" PIPES
AT FENCE

CONN EXST 12"
PIPE TO CHANNEL

72

EXST
10" OUTFALL
SEWER

NEW
CONC
APRON

SD 1199A

BLDG
19

NEW
CONC CHANNEL

SD 1202
END PIPE

NOTE :
FOR LEGEND
SEE FIG. 2
REMOVE 5 - 10" PIPES
AT FENCE
7'X7' MONITORING WELL

DRAINAGE FOR
BUILDING 19 AREA

SCALE: 1"=80'

FIG. 8

FIG. 10

NOTE:
FOR LEGEND
SEE FIG. 2

DRAINAGE ALONG OLD
SOUTH BOUNDARY BETWEEN
DEVELOPED & UNDEVELOPED
PROPERTIES

SCALE: 1"=80'

FIG. 11

NOTICE

Page(s) size did not permit electronic reproduction. Information may be purchased by the general public from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161 (Area Code 703-487-4650). DOE and DOE contractors may purchase information by contacting DOE's Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, Attn: Information Services (Area Code 423-576-8401).

FIG 14

OLD
CONSTRUCTION
SPOILS AREA

BLDG : 38 AREA

LINE 35206-3-01005

SCALE: 1" = 80'

OLD CONSTRUCTION
SPOILS AREA
DRAINAGE -
PIPING ADDITION

NOTE: FOR LEGEND SEE FIG. 2

DRAINAGE FEATURE LEGEND

- EXIST DRAINAGE PATTERN
- EXIST DRAINAGE PATTERNS CHANGED BY SITE DRAINAGE CONTROL
- PROPOSED DRAINAGE FEATURES IN SITE DRAINAGE CONTROL

LEGEND

- STRUCTURE
- RETAINING WALL
- PAVED ROADWAY AND PARKING
- UNPAVED ROADWAY AND PARKING
- FARMROAD
- PARKING LOT STRIPE
- WATER
- OVERHEAD PIPE
- FENCE

PLANT NORTH IS 27° 30' 45" E
 TRUE NORTH
 PLANT NORTH ELEVATION IS
 143.5 FT. ABOVE U.S.C.S.

NOTE: BASE MAPPING FROM 1968 AERIAL SURVEY BY
 WOOLPERT CONSULTANTS

NO. DATE		REVISIONS		BY CHK	
UNITED STATES DEPARTMENT OF ENERGY DAYTON AREA OFFICE MOUND MAMERSBURG, OHIO					
PROJECT TITLE				APPROVALS	
SITE DRAINAGE CONTROL				1st PRG 2nd PRG 3rd PRG 4th PRG 5th PRG 6th PRG 7th PRG 8th PRG 9th PRG 10th PRG	
DRAWING TITLE				SCALE	
NEW AND EXIST DRAINAGE PATTERNS				1"=200'	
FIG. 19				DATE	
SUBMITTED				APPROVED	
RECOMMENDED				DATE	
A-E				E.G.B.G.	
B.A.E.				B.A.E.	
BUILDING CODE				SHEET NUMBER	
REV.				REV.	

N. Reference Drawings

Information on areas surrounding the elements in this project is available on the following Mound reference drawings.

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
SITE	UTILITIES RESTORATION- PHASE 1 SUB-PROJECT B SUBSTATION UPGRADING	SITE PLAN	352029	S-01-001
SITE	UTILITIES RESTORATION- PHASE 1 SUB-PROJECT B SUBSTATION UPGRADING	SUBSTATION E PLAN AND DETAILS- EXISTING	352029	EL04010
SITE	UTILITIES RESTORATION- PHASE 1 SUB-PROJECT B SUBSTATION UPGRADING	SUBSTATION E PLAN AND DETAILS- NEW	352029	EL04011
SITE	UTILITIES RESTORATION- PHASE 1 SUB-PROJECT B SUBSTATION UPGRADING	SUBSTATION E SEQUENCE OF OPERATIONS	352029	EL04012
SITE	UTILITIES RESTORATION- PHASE 1 SUB-PROJECT B SUBSTATION UPGRADING	SUBSTATION TF PLAN AND DETAILS- EXISTING	352029	EL04018
SITE	UTILITIES RESTORATION- PHASE 1 SUB-PROJECT B SUBSTATION UPGRADING	SUBSTATION TF PLAN AND DETAILS- NEW	352029	EL04019
SITE	UTILITIES RESTORATION- PHASE 1 SUB-PROJECT B SUBSTATION UPGRADING	SUBSTATION TF SEQUENCE OF OPERATIONS	352029	EL04020
110	REPLACEMENT GARAGE SITE PREPARATION DESIGN PHASE I	GRADING PLAN	311000	01004
110	REPLACEMENT GARAGE SITE PREPARATION DESIGN PHASE I	LAYOUT PLAN	311000	01003
110	REPLACEMENT GARAGE SITE PREPARATION DESIGN PHASE I	STORM SEWER PLAN AND NOTES	311000	01008A

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
21	THORIUM SLUDGE STORAGE BUILDING	SITE PLAN	302100	01002
SITE	LOWER MAIN PARKING LOT EXTENSION	EAST LOT-SITE PLAN	352051	01002
SITE	LOWER MAIN PARKING LOT EXTENSION	EAST LOT-GRADING PLAN	352051	01003
SITE	LOWER MAIN PARKING LOT EXTENSION	WEST LOT-SITE PLAN	352051	01004
SITE	LOWER MAIN PARKING LOT EXTENSION	WEST LOT-GRADING PLAN	352051	01005
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	TITLE SHEET	352042	01001
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CELL #1 BID PLAN (PHASE 1)	352042	01002
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	QUALITY CONTROL REQUIREMENTS AND DETAILS	352042	01003
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	TITLE SHEET	352043	00001
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CELL #1 BID PLAN	352043	01001
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	EMBANKMENT DETAILS	352043	01002
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CROSS SECTIONS OF CELL NO. 1	352043	01003
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CROSS SECTIONS OF CELL NO. 1	352043	01004
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CROSS SECTIONS OF CELL NO. 1	352043	01005
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CROSS SECTIONS OF CELL NO. 1	352043	01006
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	TITLE SHEET	352041	01001

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	BORING LOCATION PLAN	352041	01002
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	SOIL PROFILE	352041	01003
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CELL #1 BID PLAN	352041	01004
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	QUALITY CONTROL REQUIREMENTS	352041	01005
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CELL #1 PLAN	352041	01006
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	CELL #2 PLAN	352041	01007
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	FINAL CELL PLAN	352041	01008
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	EMBANKMENT CROSS SECTIONS	352041	01009
SITE	SPOIL STORAGE FACILITY NEW PROPERTY	EMBANKMENT DETAILS	352041	01010
SITE	CONTROL OF WATER POLLUTION	OIL STORAGE TANK DIKE	352007	03006
95	BLDG. 95 BRINE PIPE LINE EXTENSION	PARTIAL SITE PLAN	309502	04004
95	BLDG. 95 BRINE PIPE LINE EXTENSION	PARTIAL SITE PLAN	309502	04005
95	BLDG. 95 BRINE PIPE LINE EXTENSION	PARTIAL SITE PLAN	309502	04006
SITE	CONSTRUCTION DUMP SITE REHABILITATION PLAN	SITE PLAN	352077	01001
SITE	CONSTRUCTION DUMP SITE REHABILITATION PLAN	PROFILE, DETAIL, QUANTITY TAKE OFF	352077	01002

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
SITE	UPGRADE DRAINAGE "SM-PP" HILL	STORM SEWER AROUND RETENTION BASIN	352024	01004
SITE	UPGRADE DRAINAGE "SM-PP" HILL	RETENTION BASIN	352024	01005
SITE	UPGRADE DRAINAGE "SM-PP" HILL	PRINCIPAL SPILLWAY	352024	01011
SITE	UPGRADE DRAINAGE "SM-PP" HILL	DETAILS: EMERGENCY SPILLWAY ENERGY DISSIPATOR TYPICAL SECTION THROUGH RETENTION BASIN	352024	01012
02	TEST FIRING AREA- BLDG. NO. 2	GRADE ELEVATIONS DRIVEWAYS AND FENCING	300200	01001
02	TEST FIRING AREA- BLDG. NO. 2	WATER SUPPLY- PLAN & DETAILS	300200	04007
02	TEST FIRING AREA- BLDG. NO. 2	SERVICE ENTRANCE WIRING ELECTRICAL	300200	05001
22	ADDITIONAL FACILITIES FISCAL YEAR 1964	STORAGE WAREHOUSE CIVIL SITE DEVELOPMENT	302200	01001
59	NEUTRON RADIOGRAPHY FACILITY	SITE PLAN KEY PLAN BLDG. #59	305900	501001
59	NEUTRON RADIOGRAPHY FACILITY	ELECTRICAL SITE PLAN AND DETAILS - BLDG. 59 & 35	305900	E04001
SITE	NEW STORM SEWER WD TO DRAINAGE DITCH	PLAN VIEW AND NOTES	352047	01002
98	CENTRAL FIRE STATION BUILDING 98	SITE UTILITY PLAN-FIRE STATION	309800	01002
SITE	BUILDING 29-PARKING FACILITY	SITE PLAN BID ITEM NO. 1	352045	01004

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>BLDG. CODE</u>	<u>DWG NO. SH NO.</u>
94	MATERIALS COMPATIBILITY BUILDING	SITE PLAN	309400	01001
94	MATERIALS COMPATIBILITY BUILDING	MANHOLE AND DUCT BANK SITE PLAN	309400	05005
63	BUILDING 63 ADDITION	SITE UTILITY PLAN BASE BID	306301	03001
63	BUILDING 63 ADDITION	BUILDING 63 ADDITION BASE BID PLUS ALTERNATES	306301	04001
67	ENERGETIC MATERIALS SUPPORT BUILDING	A1 INDEX-AREA MAP- SITE PLAN-DETAILS	306700	00001
67	ENERGETIC MATERIALS SUPPORT BUILDING	M1 SITE PLAN- DETAILS	306700	03001
SITE	BUILDING 51-BUILDING 22 STORM SEWER UPGRADE	PLAN VIEW AND NOTES	35205	01002
40	PRINTING SERVICE FACILITY	UTILITY PLAN	304000	01002
35	NON-DESTRUCTIVE TESTING FACILITY	SITE WORK	303500	04001
35	NON-DESTRUCTIVE TESTING FACILITY	PLOT PLAN & PROFILES	303500	04002
63	SURVEILLANCE FACILITY	SITE PLAN & DETAILS	306300	03001
63	BUILDING 63 ADDITION BASE BID & ALTERNATES	SITE PLAN & DETAILS	306301	01001
72	BUILDING 72 RELOCATION	SITE PLAN AND SITE DETAILS	307201	01003
72	BUILDING 72 RELOCATION	ELECTRICAL DETAILS AND FENCE DETAILS	307201	01009
03	TEST FIRING ADDITION BUILDING NO. 3	SITE PLAN	300300	01001

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
03	TEST FIRING ADDITION BUILDING NO. 3	MECHANICAL UTILITY PLAN	300300	01006
03	TEST FIRING ADDITION BUILDING NO. 3	SANITARY SEWER AND SEWAGE LIFT STATION	300300	01007
03	ENVIRONMENTAL TEST FACILITIES	BUILDING NO. 3 SITE DEVELOPMENT PLAN	300301	01001
03	ENVIRONMENTAL TEST FACILITIES	BUILDING NO. 3 UTILITY SITE PLAN AND DETAILS	00301	01004
03	ENVIRONMENTAL TEST FACILITIES	BUILDING NO. 3 ELECTRICAL SITE PLAN	300301	01005
03	ADDITION TO TEST FIRE BUILDING	SITE DEVELOPMENT PLAN	300302	01001
03	ADDITION TO TEST FIRE BUILDING	UTILITIES PLAN	300302	01003
03	ADDITION TO TEST FIRE BUILDING	ELECTRICAL SITE PLAN	300302	01004
03	ADDITION TO TEST PREPARATION AND STORAGE FACILITY BUILDING NO. 3	SITE PLAN	300305	01001
49	TIMER FABRICATION FACILITY	SITE WORK SITE PLAN	304900	S01001
49	TIMER FABRICATION FACILITY	MECHANICAL & ELECTRICAL OUTSIDE UTILITIES PLAN	304900	S01003
49	TRIDENT II, BUILDING 49 RENOVATION	DEMOLITION PLAN	304902	01002
49	TRIDENT II, BUILDING 49 RENOVATION	SITE DEVELOPMENT PLAN	304902	01003
49	TRIDENT II, BUILDING 49 RENOVATION	SITE UTILITIES PLAN	304902	01004
49	TRIDENT II, BUILDING 49 RENOVATION	ELECTRICAL SITE & DEMOLITION PLAN	304902	05006

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE SH NO.</u>
SITE	EMERGENCY BASIN - BLDG. 38 AREA	BILL OF MATERIAL GENERAL SUMMARY	FSD 16223
SITE	EMERGENCY BASIN - BLDG. 38 AREA	CONTRACTORS (SELLERS) ROUTE	FSD 16222
SITE	EMERGENCY BASIN - BLDG. 38 AREA	SERVICE SLAB	FSD 16232
SITE	EMERGENCY BASIN - BLDG. 38 AREA	REINFORCING DETAILS	FSD 16231
SITE	EMERGENCY BASIN - BLDG. 38 AREA	REINFORCING DETAILS	FSD 16230
SITE	EMERGENCY BASIN - BLDG. 38 AREA	(EMERGENCY BASIN PLAN & SECTIONS)	FSD 16229
SITE	EMERGENCY BASIN - BLDG. 38 AREA	BILL OF MATERIAL SUB-SUMMARY	FSD 16228
SITE	EMERGENCY BASIN - BLDG. 38 AREA	PIPING ELEVATIONS	FSD 16227
SITE	EMERGENCY BASIN - BLDG. 38 AREA	MISC. DETAILS	FSD 16226
SITE	EMERGENCY BASIN - BLDG. 38 AREA	DRAINAGE UPGRADING DRUM STORAGE AREA	FSD 16225
SITE	EMERGENCY BASIN - BLDG. 38 AREA	SITE LOCATION PLAN	FSD 16224
SITE	HEADWALL MRC EFFLUENT DITCH AND SOUTH CANAL	DETAILS	FSD 16376
SITE	HEADWALL MRC EFFLUENT DITCH AND SOUTH CANAL	PROFILES	FSD 16377
SITE	HEADWALL MRC EFFLUENT DITCH AND SOUTH CANAL	DETAILS	FSD 16375

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
SITE	HEADWALL MRC EFFLUENT DITCH AND SOUTH CANAL	(PLAN VIEW & VIEW OF CONSTRUCTION AREA)	FSD 16374	
(B)	ADDITION TO "B" BLDG. MATERIALS PROCESSING FACILITIES	PLOT PLAN	350102	S01002
(B)	ADDITION TO "B" BLDG. MATERIALS PROCESSING FACILITIES	PLOT PLAN	350102	S01003
(B)	TRANSDUCER FABRICATION FACILITY	SITE WORK SITE PLAN	350103	S01001
(B)	TRANSDUCER FABRICATION FACILITY	MECHANICAL & ELECTRICAL OUTSIDE UTILITIES PLAN	350103	S01002
(I)	PRODUCTION PLANT ADDITION TO "I" BUILDING	SITE WORK & FENCING PLAN	351002	S01001
(I)	I BUILDING NORTHWEST ADDITION	SITE PLAN	351006	01002
(I)	I BUILDING NORTHWEST ADDITION	UNDERGROUND PIPES & DETAILS	351006	01003
(I)	PRODUCTION PLANT ADDITION TO "I" BUILDING	UTILITIES SITE PLAN	351002	S01002
48	PROCESS MECHANIZATION FACILITY	SITE PLAN	304800	01002
48	PROCESS MECHANIZATION FACILITY	UTILITY PLAN	304800	01003
48	PROCESS MECHANIZATION FACILITY	UTILITY LINE PROFILES	304800	01004
OS	OPERATIONAL SUPPORT FACILITY	SITE PLAN	353700	S01002
OS	OPERATIONAL SUPPORT FACILITY	SITE UTILITY PLAN	353700	S01003

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
92	BLDG. 92	UTILITIES & SERVICES PLAN	FSD 21849	
SITE	WELL PUMP HOUSES 1 & 2 AND GAS BOTTLE STORAGE SHED	SITE IMPROVEMENTS	352000	05012
87	COMPONENT TEST FACILITY	SITE UTILITIES (UNDERGROUND)	308700	S01011
87	COMPONENT TEST FACILITY	SITE ELECTRICAL - POWER & COMMUNICATIONS	308700	S01017
87	COMPONENT TEST FACILITY	SECURITY LIGHTING SITE PLAN	308700	S01022
87	COMPONENT TEST FACILITY	GROUNDING PLAN LIGHTING PROTECTION PLAN	308700	EL04003
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN INDEX	5-1900	1 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	5 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	6 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	7 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	11 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	12 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	13 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	14 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	19 OF 82

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	24 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	26 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	27 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	28 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	29 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	32 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	36 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	37 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	41 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	42 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	43 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	44 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	45 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	49 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	50 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	51 OF 82

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	52 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	57 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	63 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	71 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	75 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	76 OF 82
UTILITIES	UTILITIES & SERVICES MAPPING	SITE PLAN	5-1900	81 OF 82
WELL PUMP HOUSE NO. 3	WELL PUMP HOUSE NO. 3	WELL PUMP HOUSE NO. 3	4-4125	-
19	FIRE SYSTEM-VALVE BUILDING	SITE PLAN	4-7357	-
19	FIRE SYSTEM-VALVE BUILDING	ELECTRICAL LAYOUT	3-3564	-
19	FIRE SYSTEM-VALVE BUILDING	UTILITY PLAN	4-6260	-
SITE	STORM DRAINAGE DITCH SURVEY	PLAT OF SURVEY	352021	S01001
SITE	LOW FLOW RETENTION BASIN	MISCELLANEOUS DETAILS	FSD 16255	
SITE	LOW FLOW RETENTION BASIN	WEIR WALL & MEASURING PLATFORM SECTIONS & DETAILS	FSD 16253	
SITE	LOW FLOW RETENTION BASIN	CROSS SECTIONS	FSD 16254	
SITE	LOW FLOW RETENTION BASIN	PIPE BOX - SECTIONS & DE.	FSD 16252	

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
SITE	LOW FLOW RETENTION BASIN	CONCRETE SECT. & DET.	FSD 16251	
SITE	LOW FLOW RETENTION BASIN.	SECTIONS & DETAILS	FSD 16250	
SITE	LOW FLOW RETENTION BASIN	PLAN VIEW	FSD 16249	
SITE	SPOILS AREA ROADWAY MISSOURI CROSSING	PLAN VIEW AND NOTES	352061	01002
SITE	SPOILS AREA ROADWAY MISSOURI CROSSING	PLAN AND PROFILE STA. 9+00 TO STA. 14+00	352061	01003
SITE	SPOILS AREA ROADWAY MISSOURI CROSSING	PLAN AND PROFILE STA. 4+00 TO STA. 9+00	352061	01004
SITE	SPOILS AREA ROADWAY MISSOURI CROSSING	CHANNEL EXTENSION	352061	01007
SITE	SPOILS AREA ROADWAY MISSOURI CROSSING	ESTIMATED QUANTITIES AND TYPICAL SECTION	352061	01009
57	SEWAGE DISPOSAL PLANT LOWER AREA	TITLE SHEET	305700	00001
57	SEWAGE DISPOSAL PLANT LOWER AREA	SITE PLAN AND STANDARD SYMBOLS	305700	01001
57	SEWAGE DISPOSAL PLANT LOWER AREA	SITE PLAN AND BORING LOGS	305700	01002
57	SEWAGE DISPOSAL PLANT LOWER AREA	PLANT LAYOUT	305700	01003
57	SEWAGE DISPOSAL PLANT LOWER AREA	OUTSIDE UTILITIES PLAN	305700	01004
57	SEWAGE DISPOSAL PLANT LOWER AREA	OUTSIDE UTILITIES PLAN	305700	01005
57	SEWAGE DISPOSAL PLANT LOWER AREA	OUTSIDE UTILITIES PLAN	305700	01006
57	IMPROVED TREATMENT OF SANITARY AND OTHER LIQUID WASTES	SLUDGE DISTRIBUTION DETAILS AND PIPE MODIFICATIONS	305701	03001

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE</u>	<u>SH NO.</u>
57	IMPROVED TREATMENT OF SANITARY AND OTHER LIQUID WASTES	BLOWER DETAILS AND PIPE MODIFICATIONS	305701	03002
57	IMPROVED TREATMENT OF SANITARY AND OTHER LIQUID WASTES	SITE PLAN	305701	01001
57	EQUALIZATION BASIN MODIFICATION AT WWTP	LAYOUT PLAN	305702	01002
57	EQUALIZATION BASIN MODIFICATION AT WWTP	PLAN	305702	01003
112	INSTALLATION OF SAND FILTERS AT THE SANITARY WASTE TREATMENT FACILITY	SITE PLAN	FSD 860158	
112	INSTALLATION OF SAND FILTERS AT THE SANITARY WASTE TREATMENT FACILITY	SITE PLAN	FSD 861214	
112	INSTALLATION OF SAND FILTERS AT THE SANITARY WASTE TREATMENT FACILITY	ELECTRIC PLANS & DETAILS	FSD 860166	
SITE	RETENTION POND CHANNEL GATE ADDITION	LAYOUT PLAN AND DETAILS	352078	01002
SITE	OVERFLOW POND MODIFICATIONS	PLAN VIEW AND NOTES	352053	01002
SITE	OVERFLOW POND MODIFICATIONS	CHANNEL IMPROVEMENT PLAN VIEW	352053	01003
SITE	OVERFLOW POND MODIFICATIONS	CHANNEL IMPROVEMENT AND CHANNEL SECTIONS	352053	01004
SITE	OVERFLOW POND MODIFICATIONS	CONCRETE WALL EXTENSION AND CHANNEL SECTIONS	352053	01005

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO.</u> <u>BLDG. CODE</u> <u>SH NO.</u>
SITE	OVERFLOW POND MODIFICATIONS	CHANNEL-PARTIAL PLAN AND SECTIONS	352053 01006
SITE	OVERFLOW POND	ENTRANCE CHANNEL CONSTRUCTION PLAN AND PROFILE BID ITEM #1	FSD 16980
SITE	OVERFLOW POND	TITLE SHEET	FSD 16654
SITE	OVERFLOW POND	CONTRACTORS (SELLERS) ROUTE	FSD 16655
SITE	OVERFLOW POND	BID ITEM PLAN	FSD 16656
SITE	OVERFLOW POND	EARTHWORK PLAN BID ITEM #1	FSD 16657
SITE	OVERFLOW POND	BLDG. 34 NEW INSTALLATION PLAN BID ITEMS #1 & #5	FSD 16658 (SHT. 2)
SITE	OVERFLOW POND	BLDG. 34 AREA REMOVAL & RELOCATION PLAN	FSD 16658 (SHT. 1 OF 2)
SITE	OVERFLOW POND	CROSS SECTIONS THROUGH ROAD STA. 10+00 TO STA. 15+77.46 BID ITEM #1	FSD 16659
SITE	OVERFLOW POND	CROSS SECTIONS THROUGH ROAD STA. 16+00 TO STA. 17+60 BID ITEM #1	FSD 16660
SITE	OVERFLOW POND	CROSS SECTIONS THROUGH ROAD STA. 18+00 TO STA. 19+50 BID ITEM #1	FSD 16661
SITE	OVERFLOW POND	CROSS SECTIONS THROUGH ROAD STA. 19+75 & STA. 20+00 BID ITEM #1	FSD 16662

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO. BLDG. CODE SH NO.</u>
SITE	OVERFLOW POND	ACCESS & DUMP ROADS CONSTRUCTION PLAN & PROFILES STA. 10+00 TO STA. 14+26.15 BID ITEMS #1 & #4	FSD 16663
SITE	OVERFLOW POND	ACCESS ROAD CONSTRUCTION PLAN & PROFILE STA. 14+26.15 TO STA. 20+26 BID ITEM #1	FSD 16664
SITE	OVERFLOW POND	PROFILE THROUGH BASELINE PC. STA. 14+26.15 BID ITEM #1	FSD 16665
SITE	OVERFLOW POND	SECTIONS THROUGH POND & FILL AREA BASELINE STA. 0+50 & 1+00 BID ITEM #1	FSD 16666
SITE	OVERFLOW POND	SECTIONS THROUGH POND & FILL AREA BASELINE STA. 1+50 BID ITEM #1	FSD 16667
SITE	OVERFLOW POND	SECTIONS THROUGH POND & FILL AREA BASELINE STA. 2+00 BID ITEM #1	FSD 16668
SITE	OVERFLOW POND	SECTIONS THROUGH POND & FILL AREA BASELINE STA. 2+50 BID ITEM #1	FSD 16669
SITE	OVERFLOW POND	TYPICAL DOT DETAILS	FSD 17048
SITE	OVERFLOW POND	TYPICAL DOT DETAILS	FSD 17047
SITE	OVERFLOW POND	BILLS OF MATERIALS & REINFORCING BAR SCHEDULES BID ITEMS #2 THROUGH #7	FSD 17046

<u>BUILDING NAME</u>	<u>PROJECT TITLE</u>	<u>DWG TITLE</u>	<u>DWG NO.. BLDG. CODE</u>	<u>SH NO.</u>
SITE	OVERFLOW POND	REINFORCING BAR SCHEDULES AND BILL OF MATERIALS BID ITEM #1	FSD 17045	
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01001
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01002
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01007
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01015
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01016
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01017
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01019
SITE	1986 AERIAL SURVEY SURVEY	TOPOGRAPHICAL MAPPING	352070	01020
100	SM-PP PRECINCT BUILDING 100 PHASE II	CIVIL SITE GRAPHING PLAN	310000	01002
100	SM-PP PRECINCT BUILDING 100 PHASE II	CIVIL SITE SITE UTILITY PLAN	310000	01003

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-3.

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.
- The EG&G Construction Inspector will be responsible for daily inspection of the construction work. He will ensure construction contractor compliance with the contract documents.
- The EG&G Loss Prevention Specialist will coordinate all personnel safety, waste management, and environmental control activities during design, construction, installation, start-up, and operation.
- EG&G design engineers will be responsible for detailed design review and for engineering advice during design and construction.
- EG&G Technical Support personnel will be responsible for preparing technical sections of the project design criteria, for reviewing the detailed drawings and specifications prepared by the A/E, and for assisting in resolving technical issues which may arise during design and construction.
- The A/E will be responsible for Title I and Title II design and will assist EG&G during Title III.
- The construction contractor will be responsible for construction of the project.

Organizational Chart SITE DRAINAGE CONTROL

C. Project Control

1. Performance Control

Cost and schedule progress of the A/E and the construction contractor will be monitored by the EG&G Project Manager against the design criteria and contract documents. Progress payments less a retainage will be matched to performance. EG&G will conduct regularly scheduled meetings with the A/E and the construction contractor to ensure that all project goals are being achieved.

2. Construction Inspection and Acceptance

The EG&G Construction Inspector will continuously monitor construction activities on the site. In addition, the A/E will provide periodic inspections at designated intervals during the construction. Standard 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.