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MOUND LABORATORY-MONSANTO
Central File No. 63-10-278(T) + 63-10-279(T)

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October 16, 1963

Mr. W. B. Creamer, Area Manager
U. S. Atomic Energy Commission
P. O. Box 66
Miamisburg, Ohio

Dear Mr. Creamer:

Preliminary Proposals for "R and E" Building Addition and Explosives Processing Facility-Mound Laboratory-Miamisburg

We are submitting for your consideration eight (8) copies each of the Preliminary Proposals for "R and E" Building Addition, and the Explosives Processing Facility, prepared in accordance with Chapter 6106 of the AEC Manual.

Should you require any additional information in connection with this project, please advise.

Very truly yours,

David L. Scott
Vice President,
Plant Manager

DLS:lr
RC/Encs.
cc: Mr. W. B. Creamer (2)

bc: Mr. H. L. Almand w/enc.
Mr. G. A. Essig "
Dr. E. A. Rembold "
Mr. D. L. Scott "
Mr. S. P. Thomas "
Central Files (2) " ← cc

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Central File No. 63-10-278

Rcd 6/4/64

PRELIMINARY PROPOSAL FOR EXPLOSIVES PROCESSING FACILITY

a. General Description of Work: The purpose of this project is to provide an Explosives Processing Facility capable of pilot and continuous process operations for fine particle PETN, fine particle stabilized PETN, fine particle RDX and LASL type putty explosives.

This project consists of an explosive processing building housing five operating cells, a connecting operating corridor, building service and support area, process equipment, and necessary utility extensions and site improvements. The overall building is 24' x 68' and two stories high. Four cells are single story; the fifth is two story with a mezzanine. The second floor also contains the operating penthouse and locker room area. The gross area is 3050 square feet with a net usable area of 1980 square feet and a gross volume of 37,000 cubic feet.

General building construction will be reinforced concrete, concrete block and a steel joist supported built-up roof. Three walls and the ceiling of each cell will be reinforced concrete and designed to process up to 15 pounds of high explosives per cell. The fourth wall will be a metal "blow-out" panel. Subsurface explorations have indicated the necessity of providing a pile and grade beam type foundation to support this heavy foundation load. Special lightning protection, grounding, explosion-proof electrical wiring and fixtures will be provided. The building will be designed in accordance with the Ordnance Safety Manual.

Requisite laboratory furniture and process equipment such as work benches, vessels, still, filter, roll and ball mills, oven, and sieve will be procured and installed as a part of this project.

b. Justification of Need: Mound Laboratory is the major supplier for the AEC of standard particle PETN, which has an

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average surface area of approximately 3000-4000 sq. cm/gram, and which is used for all existing detonator programs. As a result of Mound's experience in PETN preparation, the Design Agencies have requested special work involving development and production of fine particle PETN and RDX, and fine particle stabilized PETN.

Fine particle PETN has an average surface area of 4000-18,000 sq. cm/gram and is being successfully tested in series type detonators. Fine particle stabilized PETN is fine particle PETN with the additive tri-PEON which inhibits dimensional degradation at temperatures up to 190°F. Fine particle RDX is standard particle RDX with a greater surface area per gram.

As a result of progress made in this development field, pilot quantities of series type detonators are being made for evaluation studies. This use of fine particle explosives could contribute materially to weapons miniaturization. Based on evaluation study results, the Design Agencies future plans include the series type detonator as a supplement to present models.

Numerous laboratory scale batches and approximately 70 production scale batches of fine particle PETN have been produced to date. In addition, series type detonators loaded with fine particle PETN are being made for Sandia. LASL has requested and received for WR, five lots of 1E26 detonators loaded with stabilized PETN.

The Design Agencies have also requested development of a series of processes to produce: fine particle PETN with a designated surface area ranging from 4000-18,000 sq. cm/gram; fine particle stabilized PETN of designated surface areas; fine particle RDX of designated surface areas; and LASL type putty explosives.

All development and process work to date has been done in the Electronics Building explosive laboratories and the Explosive Preparation Building, Building No. 1. The explosive laboratories have a maximum H.E. limit of one pound and are inadequate for development of fifteen pound quantity processes.

Production size batches of fine particle PETN and RDX have been produced in Building No. 1 between normal operations. Building No. 1 is no longer adequate to meet the present H. E. development and pilot operation requirements.

This proposed facility will provide the required capability to meet presently planned Design Agency programs, and Mound development and production programs.

Other factors bearing on the design and operation of the facility include:

1. Initial and Ultimate Planned Capacity

   The facility is designed for High Explosive batch operations of up to 15#.

2. Type of Feed, Process Flow Diagram, Material Balance, Flow Sheet and Production Specifications.

   The end product characteristics are varied by changes in feed water temperature and the addition or omission of TriPEON. Basically this process consists of dissolving PETN or RDX in acetone, filtration, addition of methanol, and distilled water, filtration, drying, milling and riddling.

3. Number of Operating Personnel, Occupants, Persons Served and/or Extent of Service Provided.

   Lockers have been provided for ten persons. Operating personnel will be assigned from the Research, Development and Production Departments as conditions require.

4. Principal Injury, Fire, Explosion and Radiation Risks

   The principal risk is H.E. material. Cells have been designed to protect personnel in the Operating Corridor from injury by detonation of 15 lbs. of H.E. in any cell. Explosion "blow-out" panels have been provided for each cell.

5. Radius or Physical Extent of Service for Communications Systems

   Existing telephone and ADT communications will be expanded to serve the proposed addition.

6. Material Accountability

Existing accountability practices for bulk explosives will be continued.

7. Security

Since this project is located within the main plant security fence, existing security practices for this area will be continued.

c. Use of Existing Structures:

Building No. 1 is the only structure capable of processing H.E. in pound or more batch sizes. This building is required for normal operations and is inadequate to meet the present H.E. development and pilot operation requirements.

d. Preliminary Plans:

Preliminary plans consisting of Drawing Nos. C-1, C-2, A-1, A-2 and A-6 are enclosed with this proposal.

e. Other Specifications: Outline specifications are also enclosed with this proposal.

f. Preliminary Estimate of Cost:

1.	Engineering, Design and Inspection		$17,000
2.	Construction Costs		126,400
	a. Improvement to land	$ 4,800	
	b. Building	76,700	
	c. Other Structures	--	
	d. Utilities	9,900	
	e. Equipment	35,000	

Contractor Cost	
Contractor Furnished	$ 5,000
Installation of GFE	9,900
Government Cost	
MRC Procurement	20,100

3. Contingency $16,600

4. Indirect Costs

(indirect costs of $9700 are prorated in construction costs with exception of MRC procurement. This covers the contractor's overhead, profit, taxes, insurance, bonds, etc.)

5. Total Project Estimate $160,000*

*The original budget write-up and design criteria estimate for this project indicated a total project cost of $120,000. The Title I estimate increased to $160,000. This $40,000 increase was caused by: a change in building location; the necessity of pile foundations; an underestimate in the original cost estimate; increased process equipment requirements; and a contingency revision. The final building location was changed to conform to Mound's current explosive process, handling and storage area master plan. This plan was developed so as to provide an exclusive high explosives area with process and storage buildings located to meet the Intraline Separation requirements of the Ordnance Manual. The original location was not now physically adequate to house this building. Several other possible sites in the valley explosives area were studied and the one presented is the only one of four meeting the Ordnance Manual requirements. Subsurface soil investigations, made during Title I design, revealed the necessity of pile foundations at this new location. A detailed description of the estimated cost increase follows:

	Item	Amount
1.	The A-E fee, as negotiated, was increased.	$ 1,000
2.	Site work (roads) was increased by the building location change.	1,800
3.	Foundation costs were increased. (Piles Req'd.)	6,000
4.	Building electrical requirements were underestimated for explosives work.	7,300
5.	The building area was increased 200 sq. ft. for a better personnel traffic pattern.	5,000
6.	Additional cell access doors were added and the cost of special shield doors corrected.	3,400
7.	General utility work (steam, condensate, sewage, potable water, and electrical extensions) were increased by the building relocation.	5,900
8.	Additional process equipment (drying oven) is now required.	4,000
9.	The contingency was increased to reflect increases in numbers 1 through 8.	5,600
	Total	$ 40,000

Building costs are as follows:

Gross Area	Gross Volume	Unit Costs (w/oEquip)
3,050 s.f.	37,000 c.f.	$25.08/s.f. 2.07/c.f.

g. Proposed Starting and Completion Dates:

	Start	Complete	Amount
Title I Engineering	June 1963	July 1963	$ 5,000
Title II Engineering	Oct. 1963	January 1964	6,800
Title III Engineering	March 1964	October 1964	5,200
Procurement	Dec. 1963	October 1964	22,200 1/
Construction	March 1964	October 1964	120,800 1/

1/ Include prorated contingency

h. Proposed Method of Accomplishment:

Title I, II and III Engineering will be accomplished by Igleburger and Henderson Architects Assoc., Hulman Bldg., Dayton, Ohio, under a fixed fee contract. Construction will be performed by a contractor on a fixed price contract after competitive bidding.