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May 12, 1964

HANFORD ATOMIC PRODUCTS OPERATION - RICHLAND, WASHINGTON

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TITLE

HAPO PLANT & CAPITAL EQUIPMENT BUDGET FOR
FY 1966 & REVISION OF BUDGET FOR FY 1965
EQUIPMENT NOT RELATED TO CONSTRUCTION PROJECTS

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AUTHOR

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GENERAL ELECTRIC COMPANY
HANFORD ATOMIC PRODUCTS OPERATION
PLANT AND CAPITAL EQUIPMENT BUDGET FOR FY 1966
AND REVISION OF BUDGET FOR FY 1965
EQUIPMENT NOT RELATED TO CONSTRUCTION PROJECTS

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May 12, 1964

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NOTE: The following data are based on the existing General Electric organization, and no provision or consideration has been given to transfer operations which will take place within this period of time. Similar data prepared by other contractors may differ widely, based on assumptions used.

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GENERAL ELECTRIC

SCHEDULE 33A

COMPANY
HANFORD ATOMIC PRODUCTS OPERATION
EQUIPMENT PROJECT DATA SHEET

SUBPROGRAM:
3502 - Special Nuclear Materials
Program

TITLE AND LOCATION OF PROJECT

BY-PRODUCT HORIZONTAL CONTROL ROD SYSTEM - FIVE REACTORS

PROJECT NO:

AEC
GE

START DATES		COMPLETION DATE	PREVIOUS ESTIMATE	CURRENT ESTIMATE
			\$ None	\$ 675,000
A. DESIGN -	7-65	2-67	DATE	DATE
B. PROCUREMENT-	10-65			January 31, 1964
C. CONSTRUCTION-	7-66			

Description of Facilities

At 105-KE, 105-KW, and three small reactors, modify selected horizontal control rod channels, install equipment for horizontal control rod tip flush-discharging, construct shielded irradiated by-product storage facilities, and provide chargeable rod tips and shipping casks.

Detailed Justification

Tritium can economically and practically be produced during normal operation of the Hanford production reactors by utilizing the wasted neutrons normally absorbed by the horizontal control rods as a control function. The installation of chargeable rod tips will permit the insertion of lithium-aluminum target elements into the neutron field through the HCR channels where neutrons absorbed for control purposes can serve a dual function of by-product irradiation. Production from the proposed facilities is calculated to amortize the project in 1.2 years.

Schedule

Basic and control data have been analyzed to assure feasibility of the by-product production concept. Alternate methods and raw materials have been studied to develop the most desirable proposal. Preliminary design and testing is programmed to start about September 1964 and be completed by April 1965. Project authorization is forecast for July 1965, with orderly project scheduling to completion about February 1965. Beneficial use of the final facility to be modified is scheduled for January 1965. The currently forecasted project procurement period takes into account the lack of specific definition of equipment design at this time. Preliminary engineering and market surveys will aid in determining a realistic schedule by the time that project authorization is requested.

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GENERAL ELECTRIC

COMPANY
HANFORD ATOMIC PRODUCTS OPERATION

SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

BY-PRODUCT HORIZONTAL CONTROL ROD SYSTEM - FIVE REACTORS - (Continued)

PROJECT NO:

AEC

GE

Detail of Cost Estimate

There will be an estimated annual operating cost increase of approximately \$87,500 per year, which has been deducted from the value of expected annual production in arriving at the estimated 1.2 year amortization period. There will be no cost reduction and no increase or decrease in force as a result of this installation.

	Reactors		Total
	100-K/KW	Other	
(a) Titles I, II, and III (approx. 16% of Equipment Cost) - - - - -	\$ 65,000	\$ 12,000	\$ 77,000
(b) Equipment Cost - - - - -	222,500	250,000	472,500
(c) Contingency (approx. 13% of other cost) - - - - -	82,500	43,000	125,500
Total - - - - -	\$ 370,000	\$ 305,000	\$ 675,000

The cost distribution between reactors of Title I and II and contingency, used in calculating the amortization period, was based on full project authorization for five reactors for which the estimate above indicates a cost of \$675,000. The breakdown of the above estimate indicates that the 100-K Area improvements could be installed as an independent project for about \$370,000. As a reduces scope project, however, design and contingency cannot be proportioned downward on a precise pro rata basis, and therefore the \$370,000 indicated estimate for 100-K only slightly exceeds the 100-K Area proportional share of the total project estimate. The amount shown for the other (three small) reactors is an incremental addition to the basic cost and is not an amount for which those reactor installations could be accomplished as an independent project.

This cost estimate has not been reduced nor has the amortization calculation included any saving that may actually result from the installation on the project's rod tips in locations where existing rod tips would otherwise have to be replaced for routine reactivity control under the existing HCR replacement maintenance program.

Method of Performance of Work

Installation design will be by the on-site Architect-Engineer. Process equipment design will be by General Electric Company. Installation will be by the CPFF Construction Service Contractor.

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GENERAL ELECTRIC

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HANFORD ATOMIC PRODUCTS OPERATION
EQUIPMENT PROJECT DATA SHEET

SUBPROGRAM:
3502 - Special Nuclear Materials
Program

TITLE AND LOCATION OF PROJECT HIGH SPEED SCANNING - EFFLUENT TEMPERATURE MONITORING SYSTEM, KE REACTOR			PROJECT NO: AEC GE	
START DATES		COMPLETION DATE	PREVIOUS ESTIMATE	CURRENT ESTIMATE
A. DESIGN -	4-65	March 1967	\$ None	\$ 800,000
B. PROCUREMENT-	9-65		DATE	DATE
C. CONSTRUCTION-	4-66			January 22, 1964

Description of Facilities

Duplicate the 105-KW lead reactor high speed scanning effluent temperature monitoring system at the 105-KE Reactor, which provides in a single technologically advanced system rapid scanning of individual process tube temperatures, data logging, visual readout, approach-to-limit alarm, and automatic safety circuit protection consisting of both high-limit trip and excessive linear rate of power increase trip. Supporting systems include ventilation and cooling, and circuits for reduction of electric power supply transients.

Detailed Justification

The past performance experience and present equipment condition of the existing 100-K Area effluent temperature monitor systems is evidence of the requirement for system replacement.

The existing system was vendor-designed against a functional specification; it was to be, and was temporarily, installed in the safety circuit system. The safety circuit intertie had to be abandoned because of system erratic performance. Time and increased temperature have compounded and will continue to compound the failure experience resulting from the weaknesses of the system. Some existing system monitoring controllers, when combined with the data logging system stepping switches, have an inherent recording inaccuracy of as much as 10 per cent of the temperature differential at the approach-to-trip range. Accumulated inherent circuit and mechanical relay deviations in the data recording system compound the individual inaccuracies. Single-incident type circuit failures could result in the complete loss of the temperature monitor function for periods in the order of two to three weeks. The existing system organization results in the inability to perform systematic preventive maintenance, prompt repair, or to provide economical system improvements because of its complexity and the fact that it cannot be electrically separated into its functional parts. Many components contribute not to a single function but to a part of all functions in varying ways. These deficiencies cannot be corrected by component replacement in like kind. The primary system components are mechanical devices that are subject to wear and resultant defect. Natural progressive deterioration is expected to require mass replacement of the system by the end of CY 1966. These system weaknesses are eliminated by the substitution of the superior

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HANFORD ATOMIC PRODUCTS OPERATION

SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

HIGH SPEED SCANNING - EFFLUENT TEMPERATURE MONITORING SYSTEM, KE REACTOR - (Cont.)

PROJECT NO:

AEC

GE

Detailed Justification - (Continued)

solid-state electronic high speed scanning system which will, in addition to the approach to high-limit and other alarms, other advanced operating aids, and required safety circuit trip protection, equip the reactor with new, reliable, readily maintainable effluent temperature monitoring capability.

Since component replacement in like kind will not eliminate many of the existing system deficiencies, since the high speed scanning system includes the required safety circuit trip protection which otherwise must be installed independently, and since programming for costly component replacement would otherwise be required in the immediate future, this project is proposed as the continuation of the program for this specific work that was started with the procurement of the 116-point demonstration model (CGI-802), which has been extensively and satisfactorily tested for about 27,000 operating hours under laboratory conditions. That program has been continued in the full-scale replacement of the 105-KW lead reactor system under Project CGI-967, High Speed Scanning System for Temperature Monitors - KW Reactor, equipment for which is being fabricated and is scheduled to be installed during FY 1965.

Schedule

No development work is required for this project since it is a duplication of the system currently being designed and fabricated for installation at the 105-KW Reactor. The design and construction schedule is based upon a prediction of the end of the maintainable life of the original system. The procurement schedule is based on the promised delivery period for the 105-KW unit. This schedule requires advance funding for the preparation of the purchase specification to allow orderly procurement negotiations and timely placing of the principal purchase order.

Any accelerated deterioration, not now predicted, could require that the proposed schedule be advanced to accommodate the actual requirement for continuity of reliable and safe operation of the reactor.

Detail of Cost Estimate

There will be no noticeable cost increase, no cost reduction other than reduced maintenance expense resulting from the replacement of the deteriorating original system, and no increase or decrease in forces as a result of this installation.

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HANFORD ATOMIC PRODUCTS OPERATION

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SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

HIGH SPEED SCANNING - EFFLUENT TEMPERATURE MONITORING SYSTEM, KE REACTOR - (Cont.)

PROJECT NO:

AEC

GE

Detail of Cost Estimate - (Continued)

(a) Titles I, II, and III (approx. 2% of Equipment Cost) - - - - -	\$ 13,000
(b) Equipment Cost - - - - -	663,000
(c) Contingency (approx. 18% of other cost) - - - - -	<u>124,000</u>
Total - - - - -	\$ 800,000

The design estimate is unusually low since design is confined essentially to specifications and installation drawings and much of the design created for the 105-KW installation will be useful for this project. The equipment estimate also anticipated the advantages of duplication of 105-KW equipment by the same experienced vendor.

Method of Performance of Work

Installation design will be performed by the on-site Architect-Engineer under the technical guidance of the General Electric Company. Any required revision of procurement specifications will be prepared by General Electric Company. Equipment fabrication will be performed by Astrodata, Inc., utilizing existing vendor designs and specific technology and experience. Installation will be by the CPFF Construction Service Contractor.

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FORM 33A

GENERAL ELECTRIC

COMPANY
HANFORD ATOMIC PRODUCTS OPERATION
EQUIPMENT PROJECT DATA SHEET

SUBPROGRAM:
3502- Special Nuclear Materials
Program

TITLE AND LOCATION OF PROJECT

IMPROVED REACTOR GAS SYSTEM , 100-KE AND KW

PROJECT NO:

AEC
GE

START DATES

COMPLETION DATE

PREVIOUS ESTIMATE

\$

CURRENT ESTIMATE

\$ 465,000

A. DESIGN -

B. PROCUREMENT-

C. CONSTRUCTION-

DATE

DATE

March 19, 1964

Description of Facilities

Provide improved reactor inert gas recirculation systems at the 105-KE and KW reactors. The improvements will consist of increasing the drying capacity of the desiccant by replacing the silica gel with a new desiccant system, increasing the preheater-cooler capacity, installing in-line booster heaters, reducing equipment air in-leakage and providing improved control and instrumentation systems.

These improvements are required for control of the graphite oxidation or "burnout" rate in the reactor moderator. Oxidation results in the reduction in the compressive strength of the graphite and thereby reduces the useful reactor moderator life. The primary cause of graphite oxidation is contamination of the graphite moderator gas atmosphere with carbon dioxide, water vapor, and oxygen from air in-leakage in the presence of elevated moderator temperature. No precise method of determining the accumulated oxidation effect is available. The condition of elevated temperature exists, and moisture monitoring reveals the presence of significant quantities of water vapor routinely circulated in the reactor gas stream. Additional research in this unknown area is being conducted. Graphite sampling technique currently in use indicates that the permissible oxidation rate is not now being exceeded. There is a lack of precise knowledge as to actual graphite condition, and a lack of knowledge as to true maximum permissible oxidation. There is a need to be prepared to implement immediate corrective measures in the even current sampling techniques and limited knowledge are determined to be causing underestimating of the extent of actual burnout.

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EQUIPMENT PROJECT DATA SHEET

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SCHEDULE 33A

SUBPROGRAM:
3502- Special Nuclear Materials
Program

TITLE AND LOCATION OF PROJECT

SAFETY CIRCUIT SYSTEM MODIFICATIONS - FIVE REACTORS

PROJECT NO:

AEC
GE

START DATES

COMPLETION DATE

PREVIOUS ESTIMATE

CURRENT ESTIMATE

A. DESIGN -

B. PROCUREMENT-

C. CONSTRUCTION-

\$

DATE

\$ 290,000

DATE

March 19, 1964

Description of Facilities

Provide improved reactor critical instrumentation power supply and a safety circuit ground detector system at each of the five operating Hanford production reactors. The improvements will consist of static inverter, power supply system relays, and ground detectors and relays at the five reactors, and battery chargers at the three small reactors.

The automatic response of existing and proposed reactivity instrumentation and control systems will normally cause the shutdown of a reactor when predetermined operating limits are exceeded. To reduce the possibility of significant personnel-induced accidents during a blackout power failure period when personnel response would be least reliable, and to permit notification of evacuation need or possible corrective measures in the event of compounded system failures, there is a definite need to provide an electrical backup system with power reliability factors consistent with the reactor critical instrumentation requirement. This improvement will assure a minimum of lighting, communication, and reactivity information during a primary and secondary power supply systems failure. This concept is consistent with the established process water flow backup concept. The ground detector system will assure that the safety circuit will not be compromised by grounding faults within the system.

GENERAL ELECTRIC

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HANFORD ATOMIC PRODUCTS OPERATION
EQUIPMENT PROJECT DATA SHEET

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SCHEDULE 33A

SUBPROGRAM:
3502 - Special Nuclear Materials
Program

TITLE AND LOCATION OF PROJECT

ALTERNATE PROCESS HOT DIE SIZING, 313 BUILDING - 300 AREA

PROJECT NO:

AEC
GE

START DATES

A. DESIGN - 1-65
B. PROCUREMENT- 8-65
C. CONSTRUCTION- 12-65

COMPLETION DATE

FY 1967

PREVIOUS ESTIMATE

\$ 2,500,000

DATE

March 20, 1963

CURRENT ESTIMATE

\$ 1,535,000

DATE

November 20, 1963

Description of Facilities

Conversion of the entire fuels production facility to the Solid State Diffusion Bonding-Hot Die Sizing Process is proposed. The conversion will be accomplished by the purchase and installation of new equipment and by modification and relocation of existing equipment. Carefully planned installation of new equipment and relocation of old equipment will make production continuity possible with only limited operation of existing equipment on additional shifts.

Conversion of the Hanford fuels fabrication facility from the current Alsi braze process to the Hot Die Size Bonding Process is strongly supported by economic incentives, improvements in fuel quality, and significant increases in process versatility. Studies based on the current Official Production Forecast indicate that the reduction in fuels fabrication costs alone will economically justify conversion of the plant to the Hot Die Sizing Process. The additional advantages of improved fuel quality and greater process versatility are important factors in the Hanford fuel requirements; however, neither of these benefits is considered in the economic justification.

Detailed Justification

(A) Production Incentives

The basic economics, evaluation and status of the Hot Die Sizing Process, were reported in HW-79706, "Development Status and Incentives for the Hot Die Sizing Process," by W. A. Blanton dated November 20, 1963. Recent communication with Mr. Blanton reveals that new figures have been developed based on the above study, which indicate the reactor fuel requirements for five operating reactors. Operation of the proposed Hot Die Sizing production plant on a three shift, five days per week schedule will provide the reactor fuel requirements to meet the current Official Production Forecast during FY-1966.

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SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

ALTERNATE PROCESS HOT DIE SIZING, 313 BUILDING - 300 AREA - (Continued)

PROJECT NO:

AEC

GE

Detailed Justification - (Continued)

(A) Production Incentives - (Continued)

The major economic incentives for plant conversion to the basic Hot Die Sizing Process are realized by the use of less expensive tube cladding components and by reductions in operating labor costs with amortization in 1.6 years. Use of tube cladding components is not feasible with the Alsibraz process. Tests and experience with the Hot Die Sizing Process indicate that additional savings may be expected in two other process areas:

1. It has been demonstrated that integral ribs can be extruded on the fuel during the die sizing operation. The use of this technique would eliminate the present support welding and associated operations as separate steps in the process with potential amortization of capital costs in 1.4 years. Integral ribs will be more resistant to handling and reactor charging damage than the present collapsible-bridge rail design. In addition, this concept has potential for more advanced design of spiral ribs to improve intermixing of annular coolant flow in the reactors.
2. Since diffusion bonded fuel elements produced by the Hot Die Sizing Process are essentially free of voids, pinholes, thin walls, and other defects found in the Alsibrazed fuel, statistical non-destructive testing would be adequate to assure process control. The reduction in nondestructive testing requirements will result in a corresponding reduction in operating, maintenance, and overhead costs now required to support this function.

The incorporation of end bonding in the die sizing operation is being given high priority in the development program. Such a combination appears to be technically feasible; however, process feasibility has not as yet been established. If the process feasibility is established during detail design, an estimated capital cost of \$1,145,000 with amortization in 1.0 year would result. Such a combination will not only simplify the process but will also result in significant labor and equipment saving which are reflected in the data shown in the economic summary.

(B) Reactor Incentives

Thinner and more closely controlled cladding thickness in the Hot Die Sizing Process permits the use of more uranium in each fuel element. In addition, improvement in reactor operating efficiency could be expected by the use of Hot Die Sizing fuel, which would be less susceptible to manufacturing-oriented ruptures.

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HANFORD ATOMIC PRODUCTS OPERATION

SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

ALTERNATE PROCESS HOT DIE SIZING, 313 BUILDING - 300 AREA - (Continued)

PROJECT NO:

AEC

GE

Detailed Justification - (Continued)

(C) Other Advantages

The Hot Die Sizing Process has a number of advantages which are inherent in the process but which do not lend themselves to economic evaluation. Among the advantages which are now foreseen are:

1. Hot Die Sizing is basically a highly flexible process in terms of component design, fuel geometry, and length. Compared to the Alsibraz process, only simple die replacements are required to accommodate changes in component or fuel geometry. Aluminum component designs and dimensions are less critical, which provides greater flexibility and adaptability for the use of new and more economical component design.

The use of longer fuel elements in the Hanford reactors is being considered. The capability of processing fuels up to twelve inches long would be present in the Hot Die Sizing Process. Capital expenditure for conversion of the Alsibraz process to handle fuels of similar lengths is estimated at \$320,000.

2. The Hot Die Sizing Process is free of many of the inherent variables in the Alsibraz process which adversely affect the uniformity, quality, and irradiation performance of the finished fuel. Both cladding thickness control and dimensional control of Hot Die Sized fuels are significantly better than Alsibrazed fuel. Both of these attributes are important factors in irradiation performance of the fuel. Hot Die Sized fuels are essentially free of porosity, brittle fractures, and aluminum non-bonding which are characteristic of the thicker Alsibrazed fuels.

The improved quality of Hot Die Sized fuel should provide significantly greater rupture resistance than that of the Alsibrazed fuel. This improvement is important to the present reactor operation but could become even more important in the fabrication of elements which may be subjected to increases in irradiation severity in future product diversification programs.

3. The Hot Die Sizing Process is much more amenable to mechanization than the Alsibraz process. This basic characteristic should lead to better control and lower unit costs.

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SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

ALTERNATE PROCESS HOT DIE SIZING, 313 BUILDING - 300 AREA - (Continued)

PROJECT NO:

AEC

GE

Detailed Justification - (Continued)

(C) Other Advantages - (Continued)

4. Process flexibility of Hot Die Sizing includes capability for cladding fuels in other alloys. Development work is now under way on high silicon-aluminum alloys which have exhibited increased corrosion resistance in recent tests. The use of such alloys in the Alsi braze process is not feasible since the composition of the cladding approaches that of the Alsi canning baths. In addition to the improvement in corrosion resistance, these alloys may provide other benefits in terms of bond quality and reduced nickel plate thickness.

Estimated Schedule - Obligation and Cost of Proposed Item

FY of Obligation	FY of Expenditure			
	1st. Qtr.	2nd. Qtr.	3rd. Qtr.	4th. Qtr.
1965	-0-	30 000	50 000	60 000
1966	200 000	400 000	500 000	295 000

On the following page is an estimate for the cost of converting the Alsi Process Equipment to the Hot Die Sizing Process.

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HANFORD ATOMIC PRODUCTS OPERATION

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SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

ALTERNATE PROCESS HOT DIE SIZING, 313 BUILDING - 300 AREA - (Continued)

PROJECT NO:

AEC

GE

Installation and Erection Cost

(a) Construction Costs

Bldgs. and/or Structures	\$ 15 000
Equipment	925 000
Demolition and Removal	60 000

Sub-total Const. Cost 1 000 000

(b) Supervision of Const. (Title III) 30 000

(c) Project Start-up 30 000

(d) Contingency 250 000

(e) Escalation 35 000

(f) General Overhead 40 000

(g) Design Services (Title I & II) 150 000

Total Project Cost \$ 1 535 000

Construction Cost Breakdown

Equipment Removal	\$ 60 000
Equipment Relocation & Mod.	100 000
New Equipment:	
Tubing Preparation	104 000
Electroplating Machine	151 000
Fuel Assembly Equipment	35 000
Preheat Furnaces	48 000
Die Sizing Presses	180 000
Flash Trimming Machine	25 000
End Bonding Press	220 000
Cleaning & Quenching Equip.	13 000
Miscellaneous Equipment	30 000
Ventilation	7 000
Electrical	9 000
Piping	12 000
Foundation Work	6 000

Construction Cost \$1 000 000

Method of Construction

It is recommended that Title I, Title II, Title III, and owner-operator services be performed by the General Electric Company. Project management be performed by the General Electric Company, and engineered equipment be procured by the General Electric Company. Equipment installation and construction be performed by a lump-sum contractor under contract with the Atomic Energy Commission. Tie-ins which may affect operating continuity be performed by plant forces.

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SCHEDULE 33A

COMPANY
HANFORD ATOMIC PRODUCTS OPERATION
EQUIPMENT PROJECT DATA SHEET

SUBPROGRAM:
3502 - Special Nuclear Materials
Program

TITLE AND LOCATION OF PROJECT BUTTON LINE EQUIPMENT - 234-5 BUILDING			PROJECT NO: AEC GE
START DATES	COMPLETION DATE	PREVIOUS ESTIMATE	CURRENT ESTIMATE
A. DESIGN - 1-65	6-67	\$	\$ 445,000
B. PROCUREMENT- 12-65		DATE	DATE
C. CONSTRUCTION- 3-66			March 31, 1964

Description of Facilities

Replacement equipment will be provided for the continuous process portion of the RMC Button Line contained in Glove Boxes HC-7 and HC-9B. The new facilities will incorporate the latest process equipment technology. The continuous process equipment in the feed system, direct calcination system and fluorination system will be replaced.

Detailed Justification

The continuous processing equipment of the RMC Button Line is currently twice as old as the average of other equipment in the line. Ultimate life of this portion of the line is unpredictable and must be replaced to assure continued plutonium production reliability in a safe and operationally efficient manner in the 234-5 Building.

Detail of Cost Estimate

(a) Engineering, Design and Inspection (approx. 25.4% of B)			\$ 80,000
(b) Construction Costs			
1. Equipment Costs			
Continuous Process Equipment	120,000		
Hoods	50,000		
Electrical, Instrumentation & Piping	75,000		
Shielding	40,000		
Other	5,000	290,000	315,000
2. Demolition and Removal		25,000	50,000
(c) Contingency (approx. 12.7% of A & B)			
	Total		\$ 445,000

GENERAL ELECTRIC
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 EQUIPMENT PROJECT DATA SHEET

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SCHEDULE 33A

SUBPROGRAM:
 3502 - Special Nuclear Materials
 Program

TITLE AND LOCATION OF PROJECT IN-TANK WASTE SOLIDIFICATION - THIRD UNIT			PROJECT NO: AEC GE	
START DATES		COMPLETION DATE 9-66	PREVIOUS ESTIMATE \$	
A. DESIGN - 4-65			CURRENT ESTIMATE \$ 550,000	
B. PROCUREMENT - 8-65			DATE	
C. CONSTRUCTION - 11-65			March 30, 1964	

Description of Facilities

To provide a semi-portable facility at a tank farm that will permit in-tank solidification of non-boiling process wastes. The proposed unit will be similar to the unit currently being installed on project CAC-965. As currently conceived the facility will consist of the following: a forced air supply system, a weatherproof electric air heater, an air circulator, a movable de-entrainment and filtration unit, an off-gas system including condenser, condensate separator and exhaust blower, instrument air compressor and dryer system, and miscellaneous other equipment.

Detailed Justification

The proposed facility coupled with the first and second units to be provided by FY 1963, FY 1964 and FY 1965 equipment funds will provide the capability to solidify the existing inventories of non-boiling wastes plus balancing the projected addition rates to the non-boiling tanks from normal processing and from B Plant processing of aged self-boiling wastes. These in-tank waste solidification units will defer installation or provision of additional storage tanks for non-boiling wastes.

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HANFORD ATOMIC PRODUCTS OPERATION

SCHEDULE 33A

TITLE AND LOCATION OF PROJECT:

IN-TANK WASTE SOLIDIFICATION - THIRD UNIT - (Continued)

PROJECT NO:

AEC

GE

Detail of Cost Estimate

(a) Engineering, Design and Inspection - (approx. 11.6% of Item B) - - - - - \$ 50,000

(b) Construction Costs

Equipment			
Centrifugal Compressor with Auxiliaries	45,000		
Heater Assembly	30,000		
Condensor	15,000		
Tower	30,000		
Demister	20,000	140,000	
Structural		30,000	
Piping and Mechanical		115,000	
Instrumentation		55,000	
Electrical		80,000	
Miscellaneous		10,000	430,000

(c) Contingency - (approx. 14.6% of A & B) - - - - - 70,000

Total - - - - - \$ 550,000

GENERAL ELECTRIC

COMPANY
HANFORD ATOMIC PRODUCTS OPERATION
EQUIPMENT PROJECT DATA SHEET

DECLASSIFIED

SCHEDULE 33A

SUBPROGRAM:
3502 - Special Nuclear Materials
Program

TITLE AND LOCATION OF PROJECT MISCELLANEOUS MINOR EQUIPMENT PROJECTS			PROJECT NO: AEC GE	
START DATES	COMPLETION DATE	PREVIOUS ESTIMATE \$	CURRENT ESTIMATE \$ 1,285,000	
A. DESIGN -		DATE	DATE May 12, 1964	
B. PROCUREMENT-				
C. CONSTRUCTION-				

Brief Physical Description

Provide minor capital equipment improvements for the Hanford production and supporting facilities. All such improvement will be of an equipment procurement or installation nature and will not include facility construction or capital plant type work. Each such improvement will be justified on the basis of reduced operating expense, increased efficiency, improved safety and control, and/or personnel safety and protection. The work will consist of projects, capital work orders, or miscellaneous equipment procurement such as:

Alternate Products Development and Production - 300 Area

\$ 150 000

Several pieces of equipment are necessary for completing a pilot facility for high-density thorium oxide canning development work. Special equipment required is either not available on site or requires extensive modification.

Thyratron Replacements Process Tube Flow Monitors

150 000

To replace thyratron indicators with transistor switched incandescent or neon bulbs. This will require replacement of a circuit board in each of the 1,004 controller modules (each containing four indicators).

Task III Renovation

200 000

To improve operability, safety and continuity of operation by reducing maintenance and down time. As currently conceived, the work consists of improvement to the hydraulic system incorporation of a new pressure vessel system and improved handling system for slag and crucibles.

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HANFORD ATOMIC PRODUCTS OPERATION

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SCHEDULE 32A

TITLE AND LOCATION OF PROJECT:

PROJECT NO:
AEC
GE

New Diesel Generators - 200-East and West Power House

\$ 180 000

Provide new diesel generators at the 200 East and West Power houses to improve the backup electricity system reliability.

Tri-Laurylamine Treatment Equipment

100 000

Provides a batch contactor for the treatment of Purex concentrated acid waste for the recovery of Plutonium and Neptunium.

Radiation Dose Rate Telemetering & Integration, 5 Reactors

200 000

Provide remote electronic radiation monitoring equipment to improve personnel protection and reduce cost.

By-Product Spline Facilities

150 000

Provide spline handling facilities for tritium or other alternate product production by utilization of waste neutrons.

Thorium Irradiation Facilities, 100-K

100 000

Provide hardware and control for the discharge of the short-residence-time-irradiated thorium in the production of the U-233 isotope.

Cobalt Irradiation Installation

25 000

Procure and install cobalt-clad or impregnated process tubes for irradiation in the production of irradiated cobalt-60 through the use of waste neutrons.

Bauxite Conveyor Modification, 183-B/D

30 000

Modify the vertical conveyor and install horizontal augers to mechanically convey raw bauxite to required locations.

DATE

FILMED

8/29/94

END