UNCLASSIFIED

[redacted]

MONTHLY REPORT - PROCESS SECTION

MANUFACTURING DIVISION

DECEMBER 1956

[redacted]

JANUARY 15, 1957

E. I. du Pont de Nemours & Co. (Inc.)
Explosives Department - Atomic Energy Division
Wilmington, Delaware

COPY NO.	DISTRIBUTION
1.	B. H. Mackey - R. M. Evans - H. F. Brown
2.	R. C. Blair - AEC - Aiken
3-8.	Winston Davis - AEC - Aiken
9-11.	Jean O'Leary - AEC - Washington
12.	C. W. Reilly - AEC - Terre Haute
13.	J. A. Burns - Engineering
14.	S. I. Winde - Engineering
15.	D. A. Miller - SRP
16.	D. A. Miller - W. P. Overbeck - SRP
17.	R. O. Waugh - SRP
18.	M. H. Wahl - SRL
19.	H. Worthington - AED - Wilmington
20.	V. R. Thayer - S. A. McNeight - AED - Wilmington
21.	D. F. Babcock - J. C. Woodhouse - AED
22.	J. E. Cole - AED - Wilmington
23.	J. B. Tinker- AED - Wilmington
24.	M. S. Bloomsburg - AED - Wilmington
25.	H. W. Bellas - AED - Wilmington
26.	R. J. Christl - AED - Wilmington
27.	Process Section File - AED - Wilmington
28.	Process Section File - AED - Wilmington
29.	"W" File - AED - Wilmington
30.	"SP" File - AED - Aiken

DISTRIBUTION - PARTIAL REPORTS

DPW-56-7-12-R
(100 Area SRP)

1. E. E. Wilson - Engr.
2. J. W. Croach - SRL

DPW-56-7-12-MET
(300 Area SRP)

1. E. E. Wilson - Engr.
2. J. W. Croach - SRL

DPW-56-7-12-S
(200 Area SRP)

1. A. E. Daking - Engr.
2. J. W. Morris - SRL

DPW-56-7-12-HW-D

1. R. P. Kelly - Dana
2. H. O. Aaron - Engr.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

[redacted]

TABLE OF CONTENTS

[redacted]

SAVANNAH RIVER PLANT

100 AREA - REACTORS

PRODUCTIVITY IMPROVEMENT PROGRAM

1. Increased Moderator Circulation (Project S8-1022)

The long shutdown of the reactor in Building 105-C to install the new Bingham pumps was started on December 28 as planned. At month end all major equipment dismantlement was practically complete and form work for new pump foundations started. All work was moving on schedule with the possible exception of the cut-off of 16-inch pump discharge piping in preparation for modification to fit the new pumps. Some difficulty with the machines provided for this cut-off was experienced.

All critical material required for this installation has been received or has been shipped. Final test reports on the Bingham pumps have been published and forwarded to the Savannah River Plant for plant use. The Design Division is now completing a design for other areas covered by Project S8-1037.

Shipments of Bingham pumps on Project S8-1037 for the R, P, L and K Areas are now scheduled as follows:

Pumps #8 through #12	Mar. 1 to Mar. 17, 1957
Pump #13	Apr. 10, 1957
Pumps #14 through #19	June 14 to July 15, 1957
Pumps #20 through #25	Sept. 16 to Oct. 15, 1957
Pumps #26 through #31	Dec. 23, 1957, to Jan. 21, 1958

2. New Fuel Elements - Assembly and Disassembly (Project S8-1053)

Assembly of the C-6 charge of Mark VI fuel elements was started on December 22, having been delayed by vendor's failure to meet production schedules of component parts. Receipt of these parts continues to be slow due to a high rejective rate and assembly is proceeding as parts are received. Difficulty was encountered in assembling the first fuel tube of this charge but since then all operations have been significantly free of any difficulty.

Design of disassembly equipment for Building 105-C has been approved. Design of the tubular fuel shipping cask and equipment for handling it in the transfer area is now well along and quotations have been requested for providing the basic cask. Orders were placed on Whiting Corporation for the cask handling cranes on the basis of competition. Orders have been placed for the containers or magazines in which the fuel tubes will be handled, stored, and shipped.

[redacted]

[redacted]

PRODUCTIVITY IMPROVEMENT PROGRAM (Continued)

2. New Fuel Elements - Assembly and Disassembly (Project S8-1053) Continued

"P" Work Orders have been authorized for an additional scrap cask for Buildings 105-L and K and for vertical storage hangers for the disassembly basins of Buildings 105-L, K and C.

GENERAL

1. Twin Reactor Study

A report has been issued (DPE-926) bringing to completion the design studies for two "C"-type reactors located in a common operating area. This final report describes facilities located on a large cooling pond, with improvements made in the structural design of the reactor to alleviate thermal stresses, together with other improvements. Estimated costs are given, also.

[redacted]

[redacted]

SAVANNAH RIVER PLANT

SEPARATIONS PLANTS - 200 AREAS

TRITIUM PROCESSING

1. Building 232-H - First Process Line - Project S8-1036

Development of a mercury pump for the eight liter per minute Sprengel pump is continuing; none of the potential candidates were eliminated in December. Testing of a bellows piston pump having a single large diameter rolled bellows, has started. A bellows piston pump using seven small diameter rolled bellows, duplicating those in the existing two liter Sprengel pumps in 232-F, has accumulated over three million cycles. It appears likely that the small bellows will continue to function indefinitely. In the interest of time on this critical equipment item procurement has been initiated on both large and small bellows, so that, without jeopardizing pump delivery, a final choice can be made when experiments are completed.

A project analysis has indicated that with normal construction schedules and expected equipment deliveries, the first process line completion date would be July 30, 1957. A three shift, seven day construction work schedule plus equipment expediting and fabrication premiums could result in a start-up date of May 6, 1957. As an interim measure, field work on a two shift, five day week has started, and equipment premiums have been authorized. Various other work schedules with their incremental costs and start-up date improvements are being studied to arrive at a final decision.

2. Building 232-H - Second Process Line - Project S8-1036

Scoping of the second process line is in progress and a review of the CCE scope is scheduled for mid-January. At that time the process scope will be considered firm.

Drawings of the multi-stage diffuser were approved and quotations have been requested for the extraction furnaces. The development by the Consolidated Electrodynamics Corporation of a mercury jet booster pump is progressing according to schedule. A test booster pump has been designed and will be fabricated, meanwhile preliminary tests will be made using mercury in a standard oil jet pump.

3. Building 232 - General

Scouting studies were made on an additional process line equivalent in capacity to the 232-H second process line. The studies included some investigation of simplified processes. It was

[redacted]

TRITIUM PROCESSING (Continued)

3. Building 232 - General (Continued)

concluded that the savings resulting from a simplified process would be small unless time could be taken to pilot and prove the practicality of additional simplification. The quickest way to provide an additional process line would be to suplicate the 232-H second line equipment with some piping or flowsheet simplifications. If built, the location of an additional line attached to 232-H would be preferable from an operating standpoint and would have a slight cost advantage. The facility could be isolated to protect it from an accident in the original 232-H Building.

4. Building 234 - Project S8-1040

Design of all facilities included in the original scope of work has been completed. Design work on "P" Work Order and FDM items is now in progress, with the largest single item being the change to the pinch spot-weld reservoir closure.

A prototype pinch spot-welding unit is being fabricated by the C. W. Middlestead Co. This unit will be shipped to the Plant late in January for testing by the Engineering Assistance Section. Tests will include accurate determination of the welding conditions required to make homogeneous high strength closures, and demonstration of the suitability of the electrode holding jig for production use. Prototype reservoir neck assemblies will be procured from ACF Industries, Inc. for use in testing the welding unit.

Construction is proceeding as rapidly as promised equipment deliveries warrant. A project analysis indicates that completion may be moved from July 30 to June 24 by field premiums starting with three shift schedules after April 1. A decision as to the need for premium work will not be made until after a further analysis early in February.

200-F - INCREASED CAPACITY - Project S8-1025

The estimate for Project S8-1025 has been received from the Engineering Department and has been reviewed in detail. It will be revised to reflect a scope reduced as indicated by recent developments, a more realistic appraisal of production requirements and eliminating items when the scope is not firm and changes may be made later without extended plant outages. In no case is the 10 batch rating of the canyon jeopardized. The following major changes are being made:

1. All new A-line facilities will be deleted except for piping necessary to allow trans-shipment of dilute 1EU to H Area, thus making the evaporator in that area a spare for the single unit in F Area.

[redacted]

[redacted]

200-F INCREASED CAPACITY - Project S8-1025 (Continued)

2. Twelve spare canyon transfer pumps and their piping will not be installed.

3. Canyon heat exchangers for the 1A and 1D mixer-settlers and provision for spare rate jets to back up twin rate pump installations will not be provided.

4. Various recent minor deletions from the scope and corrections to the estimate will be included in a revised estimate.

The major reductions in the "JB" Line scope are:

1. Deletion of one Precipitator, one No. 1 Furnace, and one No. 2 Furnace in the Mechanical Line.

2. Reduction in the number of coupling columns from eight to four by making the columns larger in diameter and shorter in length.

The revised estimate should be available by the end of January.

A prototype pump with a ten-foot overhung shaft is being obtained on a priority basis for testing at TNX. Continued efforts to eliminate the unstable operation of the existing shaft have been unsuccessful. The existing test set-up, however, is not considered typical of the type of pump being contemplated for canyon service.

Approximately 90% of the material is now on hand at the vendor's shop and fabrication of the mixer-settlers should start during January.

WASTE DISPOSAL

1. Building 241-F - Additional Low Level Waste Storage - Project S8-1030-20

   Part II approval has been given by the AEC for the completion of this project. Aughorized expenditures amount to $2,300,000 for the addition of four 1,300,000 gallon low level waste storage tanks. The project analysis completion date is indicated to be the first quarter of 1958.

2. Building 241-H - Additional Waste Storage

   Evaluation estimates have been made by the Engineering Department for additional low level waste storage capacity in H Area. Four cases were examined with the following results:

Case		Cost $/gal.
1	Installation of one tank	0.58
2	" " two tanks	0.46
3	" " three tanks	0.41
4	" " four tanks	0.37

[redacted]

[redacted]

WASTE DISPOSAL (Continued)

2. Building 241-H - Additional Waste Storage (Continued)

Based on current forecasts of production and waste volume, it has been determined that additional waste tanks would not be required until at least the third quarter of 1960. A project for such tankage could be delayed until the first half of 1958. Waste tank requirements will be reviewed periodically; meanwhile Engineering studies have been terminated.

"25" PLANT

Evaluation estimates have been received from the Engineering Department on four alternate locations for a "25" recovery plant:

a. First cycle equipment located in the north end of the 221-H hot canyon with the remainder of the process in an adjoining building.

b. The entire process in an extension northward of the existing 221-H canyon and using 221-H service facilities.

c. A separate process building located near 221-H in order to use common service facilities.

d. A completely independent facility located generally in an area about half-way between 221-H and the 241-H waste storage area.

Various sub-cases were included under the above major divisions to show the relative costs of "remote" versus "direct" maintenance.

Costs for all of the cases studied were in the range of 10 to 20 million dollars. Because of the short time available for these evaluations, many assumptions regarding operability had to be made as well as arbitrary decisions as to the methods used and type of equipment provided. On full evaluation it is likely that the range of costs would be narrowed considerably. It has been decided, therefore, to proceed with an Order-of-Magnitude Estimate on a facility which contains the fewest unknowns, is the most likely to give satisfactory operations, and will interfere the least with possible future "Purex" needs. The following bases are to be used:

1. Determine the cost of a completely independent facility assuming that:

   a. Remote maintenance will be by a crane utilizing television rather than optical viewing.

[redacted]

[redacted]

"25" PLANT (Continued)

b. Precision positioning of vessels and canyon nozzles will not be required to obtain inter-changeability of vessels and jumpers. Piping connections will be individually made from recorded dimensions.

2. Determine the cost savings assuming that 221-H service facilities such as ventilation, stack, sand filter, process air, instrument air, refrigeration, emergency power, etc., are utilized for the new building.

[redacted]

[redacted]

SAVANNAH RIVER PLANT

REACTOR FUELS FABRICATION - 300 AREA

INCREASED PRODUCTIVITY PROGRAM

1. Extended Surface Enriched Elements - Mark VI Program (Project S8-1044)

a. General

Although the construction cost estimate for Project S8-1044 has been in the possession of the Atomic Energy Division since November, preparation of a Part II has been held up pending receipt of an order-of-magnitude estimate covering addition of Mark VI-A production facilities. The Mark VI-A estimate was received at month end and Part II preparation is under way.

b. Fuel Facilities - Building 321-M

Installation of sub-floor piping and conduit is in progress, the concrete floor slab in the office and shop areas has been poured, and pouring of the remaining floor slab is in progress.

Initial quantities of building steel are on the plant site and it is expected that steel delivery will be completed during January as scheduled.

Pouring of the concrete slab for the substation, Building 352-4M, has also been completed.

There has been no major change in equipment delivery status since last month.

Performance of the Ajax melting furnace, ultimately required for Building 321, installed on an interim basis in Building 313 has been satisfactory. The first casting lathe has been received from Gisholt and is scheduled for installation in Building 313-M on an interim basis during the first week in January.

The first billet evacuation furnace was shipped by Trent on December 26, 1956, and associated vacuum equipment was shipped on December 27, 1956. Other auxiliary equipment is already on hand at SRP. This furnace will be installed in Building 320-M on an interim basis.

[redacted]

[redacted]

INCREASED PRODUCTIVITY PROGRAM (Continued)

1. Extended Surface Enriched Elements - Mark VI Program (Project S8-1044) Continued

c. Target Facility - Building 320-M

Building steel for the furnace room extension has been received and is currently being erected. Pouring of the concrete floor slab in this area has been deferred pending completion of sub-floor piping and steel erection. It is anticipated that erection of the building extension should be essentially complete by early in February.

Expansion of the air conditioned machining area has been partially completed; however, final completion of this area awaits delivery of additional machining equipment and removal of the old partitions.

There has been no major change in the equipment delivery status reported last month.

The Stokes Machine Company is preparing an estimate of additional costs and time requirements for performance of a proof test on a completely assembled vacuum outgassing unit prior to shipment of this equipment. A firm proposal is expected from Stokes in early January.

d. Consolidated Metallurgical Laboratory - Building 322-M

Work on Building 322 is essentially completed. Painting, wiring and installation of floor tile are currently in progress. Further major work in the Met Lab building awaits receipt of additional equipment.

2. Extended Surface Enriched Elements - Mark VI-A Program (Project S8-1044)

An order-of-magnitude estimate in the amount of $2,300,000, covering extension of 300 Area manufacturing facilities for Mark VI-A element production, was received from Engineering at month end. Funds for Mark VI-A facilities will be requested in the Part II of Project S8-1044 to be submitted during January for authorization.

3. Extended Surface Uranium Elements

a. Extrusion Cladding Facilities - Building 773-A

The internal dies and the heating elements for the external dies were received during the month and installed in the extrusion press. During initial heating of the die box and containers the calrods shorted out and further tests have been delayed.

[redacted]

[redacted]

INCREASED PRODUCTIVITY PROGRAM (Continued)

3. Extended Surface Uranium Elements (Continued)

a. Extrusion Cladding Facilities - Building 773-A (Continued)

Fabrication of the material handling equipment is expected to be completed by mid-February.

b. Extrusion Cladding Facilities - Building 320-M

During the past month three extrusion tests were run, two of which were made with attached end plugs. Short sections were satisfactorily clad during the runs; however, loose fitting end plugs in the one case and deflection of the mandrel tip in the other caused the cores to seize during the runs. The extrusion of integral end plugs was attempted during the third extrusion run but not accomplished due to die misalignment causing back extrusion into the mandrel guide.

Tests will continue with emphasis directed toward extruding the clad elements with integral end plugs.

c. Alternate Production Facilities - Building 314-M

The evaluation estimates prepared by Engineering on the four alternate processing schemes were reviewed with AED Management and it was concluded that further work on Building 314-M should be based on the extrusion cladding process.

Engineering will proceed with the preparation of an order-of-magnitude estimate which will incorporate the following: 1) vertical plating of the cores, 2) horizontal cladding using a two-cylinder horizontal extrusion press and 3) a building with horizontal cladding but with columns heavy enough in the extrusion area for adding height in order to vertically clad Mark V elements. In addition, Engineering will prepare evaluation studies on the following alternates: 1) a building for vertical cladding and 2) the cost of adding additional bays for extrusion cladding in the vertical position should this be required for Mark V elements.

Current work is being directed toward the preparation of a specification for the extrusion press and in obtaining the latest technical information on the basic process.

[redacted]

[redacted]

HEAVY WATER

DANA PLANT

With the decision to discontinue Dana operations and place the plant in standby condition during calendar year 1957, assistance has been provided on obtaining information necessary for formulation of miscellaneous lay-away procedures.

GENERAL

Particular attention is being given to disposition of replacement Type 304 SS tray assemblies for Dana GS units on order from F. W. Glitsch. Alternatives now under consideration are: 1) payment of cancellation charges, 2) storage either separately or installed in the Dana GS towers and 3) utilization of the tray assemblies on a replacement basis in the 400 Area GS units at the Savannah River Plant.

[redacted]

[redacted]

SAVANNAH RIVER PLANT

UTILITIES AND GENERAL SERVICES

ADMINISTRATIVE, TECHNICAL AND GENERAL

Some revisions to the general scope for the order-of-magnitude estimate of the proposed Intermediate Level Cells for the Technical Laboratory, Building 773-A, have been requested by Laboratory personnel. These revisions reflect recent operating experience and will expedite final design. They are, however, of sufficient magnitude to justify revision of the original Design Data Report at this time, which will delay preparation of the order-of-magnitude estimate. This, in turn, will delay Part I project submittal until early March 1957 and also set the end date of the project back accordingly (4 to 6 weeks).

The construction cost estimate in the amount of $1,400,000 for Building 773-A, High Level Caves Addition, has been received from the Engineering Department. The Part 2 of the project has been prepared and submitted to the Committees for approval. The service piping diagram for the addition has been approved and construction drawings are being issued on schedule. Design is currently 75% complete. Structural steel is now firm for May delivery, which is an improvement over the previously reported July delivery. Start of field construction work is currently scheduled for the first of March.

The Engineering Assistance Facility, Building 723-A, has been completed and turned over to Operations. All miscellaneous clean-up items are scheduled for completion by the Construction Division the week of January 7. Expenditures and commitments now total approximately $790,800 against $860,000 authorized.

In accordance with our request included in the December 1956 AEC Budget Review of Plant and Equipment, the Commission has issued modifications to all currently active Study Directives in the Productivity Improvement Program. These modifications involve only the redistribution of presently authorized funds and the total authorized study money for the program remains unchanged.

Directive No. 175(SR) in the amount of $5,000 has been authorized by the AEC for the design and preparation of a construction cost estimate for a Jumper Jig for Building 717-F. This design is expected to result in a project in the amount of $40,000 to $60,000.

The Building Cost Study being performed by the Engineering Department on EWR-850227 is approximately 70% complete and all phases are now in estimating. A draft of the study summary report is currently scheduled for submittal to AED for review and comments by the middle of February.

[redacted]

[redacted]

ADMINISTRATIVE, TECHNICAL AND GENERAL (Continued)

100 AREA UTILITIES

The installation of new 25 1/4" impellers in the 190 Building pumps in 100-C Area has been completed. The larger impellers provide the additional pumping capacity required by the Productivity Improvement Program.

600 AREA UTILITIES

The No. 2 river water pump in Building 681-1G Pump House was returned to the vendor on December 10, 1956, for rebuilding. This is the third motor to be returned. Two rebuilt motors have been received from the vendor and are now in service. The remaining thirteen (13) motors will be consecutively returned to the vendor for rebuilding as availability of the five (5) new motors and production water requirements permit. The existing pump motors are being rebuilt in connection with the increased river water flow required by the Productivity Improvement Program.

Four of the five new 3600 HP river water pump motors have been received at the Plant during the month. The one remaining motor is scheduled to be shipped from the vendor on January 11, 1957. The four new motors that have been received are being installed as replacement for existing motors, as noted above, so as to facilitate their return to the vendor for rebuilding.

The site survey program initiated to establish the feasibility of the two cooling pond sites, Tinker Creek and Lower Three Runs, has been completed. The Engineering Department has submitted a report to AED concluding that both cooling pond sites are feasible on a seepage loss basis. The permanent seepage losses from Tinker Creek and Lower Three Runs reservoirs were calculated to be approximately 8000 GPM respectively. The Engineering is preparing a revised report on additional cooling water by recirculation employing the use of cooling ponds, incorporating data obtained in the site survey program.

The following Projects, Work Requests and Repair Orders were authorized during the month:

S8-1030-2	Additional Waste Storage Tanks, 200-F Area, Total Parts 1-2 - $2,300,000	$1,340,000 (increase)
S8-1059-2	Experimental Plating Facility, Bldg. 773-A, Total Parts 1-2 - $47,000	22,000 (increase)
S9-1062	Two Roll Rotary Straightener, Bldg. 773-A, (OME ± 20%)	91,500
S9-4514	Quatrefoil Disassembly Machine, Assembly Area, Bldgs. 105-R,P,L	6,400

[redacted]

ADMINISTRATIVE, TECHNICAL AND GENERAL (Continued)

Projects, Work Requests and Repair Orders (Continued)

S9-4518	Additional Gas Analysis Bench Rack, Lab. Wing, Alloy Bldg. 320-M	$ 7,500
S9-4520	Rail Car Moving Equipment, Bldg. 615-G	18,300
EWR-850196-10 (Part 2)	In-Tank Evaporator Type 2 Waste Total Parts 1 and 2 - $15,000	10,000 (increase)
EWR-850219-10 (Part 2)	Facilities for Mark VI-A Fuel Production - Total Parts 1 & 2 - $30,000	15,000 (increase)
EWR-981063-10	NFE(Nat) Mark III-A Facilities, 300-M Area	75,000
EWR-850412	Water Consultation 1957 (Dana)	2,500
EWR-850413-10	Power Recovery Study	2,000
IRO-Z-18067 (Part 3)	High Differential Pressure Switches, Bldgs. 105-R,P,L,K,C - Total Parts 1-3- $70,000	27,600 (increase)
IRO-Z-18133	Calibration of 42" Venturi Meters, Bldg. 105-R,P,L,K,C	25,000
RO-D-01147	Unit 12 Annual Overhaul, Bldg. 411-D Total Parts 1-2 - $33,357, Work Complete	14,057 (increase)
RO-D-01148	Unit 13 Annual Overhaul, Bldg. 411-D Total Parts 1-2 - $29,365, Work Complete	9,865 (increase)
RO-D-05009	Unit 25 Annual Overhaul, Bldg. 412-D Total Parts 1-2 - $24,058, Work Complete	4,558 (increase)

Dana Plant Projects

C-71-2	Additional Capacitor Installation Total Parts 1-2 - $56,000, Work Complete	14,500 (decrease)