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EXPLOSIVES DEPARTMENT

DPW-55-474 ✓

(SR/H--780)

December 9, 1955

Mr. H. L. Kilburn, Director (2)
Technical and Production Division
U. S. Atomic Energy Commission
Savannah River Operations Office
Post Office Box A
Aiken, South Carolina

FILE
RECORD COPY

Dear Mr. Kilburn:

AEC RESEARCH PROGRAMS IN SUPPORT
OF SAVANNAH RIVER

Ref: My letter to Winston Davis
April 21, 1955 - DPW-55-224

Declassified by
[Signature]

P. L. McNair 3-21-77
MM 1-18-77

In the reference letter and later letters we made recommendations pertaining to the programs of AEC National Laboratories and other AEC contractors in direct support of the Savannah River project during FY-1956. We believe that these recommendations should now be revised in view of schedule changes and in the light of accumulated experience. The estimated cost of the programs recommended earlier totaled \$2,083,000 for FY-1956. The estimated cost of programs currently recommended total \$2,048,000 for FY-1956. The programs mentioned in succeeding paragraphs are concerned mainly with the development of processes for producing extended surface fuel elements and, to a lesser extent, with the development of separations processes. We consider these particular supporting programs important to the rapid and successful achievement of development objectives at the Savannah River Plant and accordingly recommend that the Commission sustain them. Two of the programs, specifically the work by Sylvania and by Horizons to develop processes for reducing thorium oxide to metal, are not now associated with meeting future production objectives at the Savannah River Plant. We believe that these programs should be brought to an orderly conclusion, as previously planned, to avoid any loss of the art developed to date.

OAK RIDGE NATIONAL LABORATORY

DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION
During FY-1955 ORNL conducted a preliminary design study on facilities for the separation of U-235 from spent enrichment. Earlier recommended that \$25,000 be set aside

Reviewing
Official:

C. J. Banick, AED Class Officer

Date

2/4/59

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DPW-55-474

Mr. H. L. Kilburn

-2-

December 9, 1955

to permit ORNL to complete a report on this work in the early months of FY-1956. The report was completed. With the current continued interest in U-235 separation at the Savannah River Plant, we are recommending that an additional \$15,000 be provided to cover consultation services by ORNL people during the last half of FY-1956.

Several months ago ORNL agreed to work in cooperation with the Savannah River Laboratory on the development of in-line analytical instruments for the Savannah River separations processes. At that time we recommended that the SROO support this work to the extent of \$100,000 for FY-1956. This work should be continued, and bring the total cost of recommended support at ORNL to \$140,000 for FY-1956.

KNOLLS ATOMIC POWER LABORATORY

We earlier recommended that the program at KAPL be sustained to the extent of \$90,000 for FY-1956. We see no reason for changing this program.

BROOKHAVEN NATIONAL LABORATORY

Brookhaven earlier estimated that its work in support of the Savannah River waste handling program would total \$80,000 for FY-1956. Needs have since arisen for work in addition to that covered in the original scope. This additional work includes studies of the problems associated with transferring radioactive wastes from one tank to another (such as would be required for the most economic use of additional low-cost storage tanks) and supporting work with the Griscom-Russell Company in the development of low-cost facilities for evaporating waste. We consider this augmented BNL program important and recommend that it be supported to the extent of BNL's revised estimate of \$100,000 for FY-1956.

NEW YORK UNIVERSITY

It was earlier recommended that \$10,000 be available to cover the cost of our use of the UNIVAC at NYU during FY-1956. We suggest that this sum be reduced to \$2,000.

NUCLEAR METALS, INCORPORATED

We initially recommended that the fuel element development program at Nuclear Metals be supported to the extent of \$500,000 for FY-1956, consisting of \$450,000 for operations

DPW-55-474

Mr. H. L. Kilburn

-3-

December 9, 1955

and \$50,000 for capital expenditures. Since that time Nuclear Metals was requested to do additional work consisting of the production of uranium tubes clad with zirconium and of an evaluation of the economics of this process. It was estimated that this additional work would cost \$61,000, and the SROO modified the Nuclear Metals contract accordingly, thus bringing the FY-1956 total to \$561,000. We believe that this amount would be sufficient to cover Nuclear Metals' FY-1956 costs under the current scope. However, it now seems likely that there should be further additions to the Nuclear Metals scope between now and the end of FY-1956. We recommend that an additional \$30,000 be set aside to cover such increases.

SUPERIOR STEEL CORPORATION

We earlier recommended that \$200,000 be set aside to cover the cost of producing bare plates of natural uranium. We see no reason for changing this estimate.

ATLAS STEELS, LTD.

We earlier estimated that the cost of beta-treating natural uranium plates at Atlas would total \$5,000, assuming that beta-treating facilities would be available at the Savannah River Laboratory in mid FY-1956. It now appears that the installation of this facility will not be completed until later, and we are accordingly estimating a new total of \$10,000 for FY-1956 to cover the cost of beta-treating plates.

HORIZONS INCORPORATED

It was estimated in April that the cost of the thorium reduction development work during FY-1956 at Horizons would total \$720,000, but with the decreased emphasis on thorium processing this total was reduced to \$340,000 for FY-1956 at about the beginning of FY-1956. Horizons is now bringing this work to a conclusion and will remain within expenditures of \$340,000.

BUREAU OF MINES, ALBANY, OREGON

The cost of the thorium evaluation work originally planned at the Bureau of Mines' site during FY-1956 was estimated at \$50,000, but with the decreased interest in this program we recommend that this sum be reduced to \$10,000.

SYLVANIA ELECTRIC PRODUCTS, INC.

In a letter to Winston Davis, May 6, 1955, DPW-55-244, we recommended that programs totaling \$408,050 be supported at Sylvania in FY-1956. Of this total \$280,620 was to cover the

DPW-55-474

Mr. H. L. Kilburn

-4-

December 9, 1955

continuation of Sylvania's development efforts on the fabrication of extended surface plate and tubular elements from uranium powder. We have recently reassessed the need for continuing this program at Sylvania, considering both the improvements that have been made in wrought metal quality and the success that has been attained at the Savannah River Laboratory and elsewhere in producing suitable elements. In letters dated November 8 and November 22 we recommended that Sylvania continue work only to the point of producing a limited number of acceptable elements in the near future, or, if this did not appear feasible, that Sylvania take immediate steps to bring this program to a conclusion. Sylvania is to decide by January 1, 1956 whether it is feasible to produce these elements. Accordingly, it is not possible at this time to make an accurate forecast of what this program will cost for FY-1956, but it should certainly be less than the \$280,000 estimated previously.

The other program in progress at Sylvania, the development of a process for reducing thorium oxide to metal, was to be conducted at an expenditure rate of \$128,000 for FY-1956. We see no reason for modifying the pace of this program. Our interest in this work will be satisfied by the end of FY-1956, and a report on this work should be complete at that time. We believe the process to be quite promising and feel that anyone having a continuing interest in selecting a thorium reduction process should consider conducting additional development work on this process after FY-1956.

COLUMBIA UNIVERSITY

It was earlier estimated that the Columbia program in support of Savannah River could be brought to a close during FY-1956 for a total expenditure of \$25,000. In a letter to H. L. Kilburn dated November 23 we recommended that this support be increased to Columbia's new estimated total of \$51,963.

MOUND LABORATORY

Mound Laboratory has been conducting work on gaseous thermal diffusion. With the recent increase in interest in tritium production at the Savannah River Plant, we believe that the continuation of work at Mound will add significantly to the existing technology on the separation of tritium by thermal diffusion. The information that Mound would develop would be of value to us in interpreting and correcting malfunctioning of plant equipment and in designing new equipment. Mound has proposed a program through the last half of FY-1956 at a total estimated cost of \$30,000. We recommend that this program be

DPW-55-474

Mr. H. L. Kilburn

-5-

December 9, 1955

supported. A letter containing a detailed description of this proposed program is now being written.

URANIUM TUBE MANUFACTURE

It was recommended earlier that \$150,000 be set aside to cover the cost of manufacturing experimental quantities of uranium tubes during FY-1956. Our requirements to date have been small both because facilities were not available for the development of cladding methods and because a suitable process for extruding bare uranium tubes has not yet been developed. However, the fluid pressure bonding facility at the Savannah River Plant is now being put into operation, and extrusion cladding experiments are in progress both at Battelle and at the Moczik Tool and Die Company. Both of these bonding methods show promise of being suitable for cladding tubes. Nuclear Metals has made progress recently in establishing a process for extruding uranium tubes of suitable properties. For these reasons it is expected that increasing quantities of uranium tubes for experimental purposes will be required as FY-1956 progresses. We recommend that the total funds set aside for the production of these tubes be reduced to \$75,000 for FY-1956.

INSTRUMENT DEVELOPMENT

It was originally forecast that approximately \$200,000 would be required for off-site work to support the Savannah River Laboratory in the development of prototype instruments for use both with the metallurgical processes, e.g. nondestructive testing, and with the separations processes, e.g. in-line analytical instruments. As mentioned in a preceding paragraph, arrangements have been made with ORNL to assist in this program at a cost of \$100,000 in FY-1956. We do not believe that it will be necessary for the SROO to support any additional instrument development work during the remainder of FY-1956, and accordingly we see no reason for retaining funds for this purpose.

Very truly yours,

ATOMIC ENERGY DIVISION

Hood Worthington
Hood Worthington, Director
Technical Division

LCE:EV
Attach.

SUMMARY

Page 6

	<u>Previous Forecast for FY-1956</u>	<u>Current Forecast for FY-1956</u>
Oak Ridge National Laboratory	\$ 25,000	\$140,000
Knolls Atomic Power Laboratory	90,000	90,000
Brookhaven National Laboratory	80,000	100,000
New York University (UNIVAC)	10,000	2,000
Nuclear Metals	500,000	591,000*
Superior Steel	200,000	200,000
Atlas Steels	5,000	10,000
Horizons	340,000	340,000
Bureau of Mines	50,000	10,000
Sylvania Electric Products	408,000	408,000**
Columbia University	25,000	52,000
Mound Laboratory	---	30,000
Uranium Tube Manufacture	150,000	75,000
Instrument Development	<u>200,000</u>	<u>---</u>
Total	\$2,083,000	\$2,048,000

*Includes \$30,000 to cover probable future increases in scope.

**This figure is a maximum.

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