W FILE

DFW-55-455
SR/H--770

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

This document consists of 4
pages No. 7 of 14 copies,
Series A.

- 1 - H. Worthington - D. F. Babcock
- 2 - J. C. Woodhouse - N. F. Spraggins
- 3 - E. E. Hayes - R. E. Fisher
- 4 - W. J. O'Leary - R. R. Herries
- 5 - L. C. Evans
- 6 - S. A. McNeight
- 7 - W File
- 8 - M. H. Wahl - C. W. J. Wende
- 9 - J. W. Croach - F. H. Permar
- 10 - C. C. McBride - G. W. Beckman
- 11 - V. I. Montenyohl
- 12 - B. W. Dunnington - R. T. Huntoon
- 13 - B. L. Richards - G. L. Tuer
- 14 - TIS File

MEMORANDUM TO FILE

FROM: W. J. O'LEARY

November 22, 1955
DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION

Reviewing Official: *J. Banick* 2/4/59
C. J. Banick, AED Class Officer

MEETING WITH BMI REPRESENTATIVE TO
DISCUSS PROGRESS ON SUBCONTRACT RESEARCH
WILMINGTON, NOVEMBER 21, 1955

On November 21 Mr. D. C. Martin of Battelle Memorial Institute visited Wilmington to discuss the progress at BMI on subcontract research. The following were present:

BMI

D. C. Martin

Du Pont

H. Worthington
J. C. Woodhouse
L. C. Evans
S. A. McNeight
W. J. O'Leary

Classification Cancelled/Changed
TO UNCLASSIFIED

Name Title Date
J. Banick AED CO 2/4/59

SUMMARY

1. Work on outgassing and corrosion testing full elements has stopped and no funds are available for further work.
2. Work on the uranium-aluminum system has been brought to a close at a logical stopping point, and a report is being prepared. New data have clarified and firmed up the portion of the uranium-aluminum diagram investigated, with the result that homogeneous castings can be made predictably in the range 13% to 25% uranium. This project is also out of funds.
3. A new tube expander has been ordered for internal cladding; a section of uranium tube should be clad soon after delivery, at a guess within 3 weeks.

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

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, make 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.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

4. The new container for external extrusion cladding is being machined by Moczik and should be ready in 2 weeks. The die and mandrel tip are being reworked. Adequate heating coils, and a mechanism for pulling flat plates through the die are being installed. The equipment should be ready to try out again within a month.
5. Classification of BMI reports was discussed. It was called to the attention of BMI that much of the work being done for SRP was far more revealing when placed in the pattern of already declassified or downgraded information than when considered as a package by itself. Consequently, this work could be construed as more sensitive than the "Confidential" category now employed for it by BMI. On this basis it appears to be not in the best interest of security to specify that certain research, development, and accomplishment are specifically for SRP.
6. Work on dingot tubes will be initiated in accordance with the BMI proposal to Du Pont.

DISCUSSION

Outgassing and Corrosion Work - Work on this project has stopped at BMI because of lack of funds. Dr. Woodhouse pointed out that in SRL's efforts to clear up the difficulties that had beset them last summer, SRL had determined that it was desirable to vacuum anneal; most of the information that BMI had originally been asked to assemble had now been collected by SRL so this project would not be continued at BMI. The work had been assigned to BMI on the basis of general belief that SRL had a standardized, satisfactory step-pressing process; when it developed that the process was not satisfactory and duplicable during the summer months, neither BMI nor SRL was able to make control samples to compare with outgassed ones. SRL has now found that a major improvement is effected by employing outgassing and vacuum annealing; consequently this phase of the work is completed.

Alloy Work - BMI had originally been asked to reinvestigate part of the system uranium-aluminum, and a) to pinpoint more precisely the eutectic point, and the peritectic point in the region 13% to 18% uranium; b) to determine definitely the liquidus line in the region of the peritectic point; and c) to develop information for reproducibly making homogeneous castings of alloys containing 15%, 20%, 30%, and 40% uranium. Parts a) and b) have been completed. On part c) the information is available to make homogeneous castings reproducibly up to 25% uranium; a few castings made at 30% and 40% uranium were quite porous, probably from gas content. This project is now out of funds, and a report is being written covering the work that has been completed. BMI will advise Du Pont on what further program is required to obtain the information necessary to make homogeneous castings reproducibly and predictably at concentrations of uranium from 25% to 40%. On the question of determining the mechanical and physical properties of higher uranium alloys, Dr. Woodhouse said that any such work should be deferred until homogeneous castings can be made.

Internal Tube Cladding - A new tube expander with 5 rollers instead of 4, and with a larger radius of expansion, has been ordered, and delivery is expected within 2 weeks. The uranium tubing will have been nickel plated by then, and will be tried out. It probably will be necessary to cold draw with plugs to improve the rough surface left by the expander. Messrs. Worthington and Woodhouse advised Mr. Martin that it was not necessary to achieve internal surface perfection so early in the game; the work should be concentrated on obtaining a bonded internal cladding. There is \$1000 available for this work; it was estimated that this fund would be used up with 3 cladding experiments. Dr. Woodhouse said he would wait for the results of this work before deciding on further support.

External Extrusion Cladding of Flat Plates - The new container, found during machining to be cracked, has been welded, and is being finish machined by Moczik. Mr. Martin expressed some doubt of the expected integrity of the container because of the welds. BMI and De Buigne have agreed on setting the wall thickness at 5 inches; BMI had designed to put in 16 cartridge heaters of 650 watts each, but compromised with 14. These are expected to keep the container and billet at 1000° to 1100°F without trouble. Messrs. Fiorentino and Slunder of BMI have discussed with De Buigne changes in mandrel tip and die to avoid pinching and sticking of the core. It is expected that the container with 2 mandrels and 2 dies will be ready to try out in 3 to 4 weeks. BMI is arranging to heat the bolster block with gas, and is installing a mechanism to pull on the core in case it hangs up in the die. They are going to make initial runs on nickel plated steel flats, using a die for 30 mil ribbed cladding. They hope to have the equipment tried out, dry runs made, and be ready for cladding trials between the middle and end of December. Dr. Woodhouse said he wished to be present at this trial.

Mr. Martin advised that BMI was running out of funds for this work, and would need \$4000 to carry through December; his letter of October 28 asked for \$13,500 to carry through the end of February. Dr. Woodhouse said he would authorize \$13,500 subject to the proviso that if the December trial was unsuccessful the work would be stopped, and no further expenditures beyond a total of \$4000 would be authorized; a letter incorporating this, and stating that the \$13,500 support was contingent on December success will accompany the short form contract to be signed by Du Pont.

Classification - Mr. McNeight explained to Mr. Martin the concern of Du Pont on BMI's interpretation of the Classification Guide with respect to published BMI reports on work for SRP. BMI has recently adopted a split form of report, in which weapons, weapons components, and ANP and other mobile reactors are Secret, whereas work for production sites, power reactors, etc., are merely Confidential. In addition, BMI labels work in the Confidential category as having been done specifically for Hanford or for the Savannah River Plant, as the case may be. Since the purpose of SRP is to produce weapons

Classification (continued)

materials, and since SRP production plans may be deducible from certain disclosures when considered with the vast amount of information already disclosed, the sensitiveness of certain information was explained. It was pointed out to Mr. Martin that omission of the SRP label on this work by BMI would eliminate most of the difficulty. Mr. Martin said that he would take this up with his management.

Dingot Work - Du Pont is interested in dingot tubes and in the inclusions in dingot material that may have a bearing on the fabrication of reproducible and satisfactory tubes. Hanford's responsibility is for the quality of dingot metal in general. So far, Hanford's data on two different lots of dingot metal indicate that there are wide variations in the types of metal being produced by Mallinckrodt. In order, therefore, for BMI to develop standard transverse mechanical tests for dingot tubes, there should be standard dingot metal available. Fisher and O'Leary will visit Mallinckrodt in order to learn about the availability of a standardized process for making standard dingot metal.

BMI had not thought about the necessity for applying the proposed transverse tests to both unirradiated and irradiated tubes; it seemed offhand probable that the tests could be conducted as well in a cell as outside, but BMI will look into this and advise Du Pont. The program will be aimed at determining if fabricating dingot metal into tubes by extrusion affects it adversely, and also how irradiation affects the metal. In general, the proposal made by BMI will be adopted, subject to modification if BMI finds that the necessity for cell testing introduces complications. The program that BMI proposed would include the mechanical and physical tests desired by SRL.

Miscellaneous - Instead of the outgassing and corrosion work that is being discontinued at BMI, SRL is interested in having some long range research conducted, involving rates and amounts of diffusion of nickel into uranium. When this situation is clarified by discussions between SRL and Wilmington, there may be some additional work for BMI to do in this field.

The long delayed report on the work completed early last spring, on the subject of rates of diffusion of thorium and aluminum into one another, has been rewritten and is now in the course of reproduction. It should be issued soon.

The date of December 19, 1955 was agreed upon for the next meeting to be held in Wilmington.

WJC'L/ib