E. I. du Pont de Nemours & Company
Explosives Department
Atomic Energy Division
Wilmington 98, Delaware

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- 1 - R. M. Evans - B. H. Mackey
2 - H. Worthington - L. C. Evans
3 - J. C. Woodhouse - S. A. McNeight
4 - N. F. Spraggins
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MEMORANDUM TO FILE

FROM: N. F. SPRAGGINS

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VISIT REPORT
ALLEGHENY LUDLUM STEEL CORPORATION
ON URANIUM TUBES

A meeting was held in Wilmington on May 15, 1956, with representatives of Allegheny Ludlum to discuss possible production by Allegheny of uranium tubes in the number needed this next year for development work on tubular elements by Savannah River. Those present were:

Clark W. King, Allegheny Ludlum, Executive Vice-President
William B. Pierce, Allegheny Ludlum, Sales Vice-President
H. Worthington
J. C. Woodhouse
N. F. Spraggins

Following the meeting, R. M. Evans and B. H. Mackey joined the group for lunch and informal discussion.

Allegheny Ludlum, through King, had expressed a possible interest in the manufacture of uranium tubes. The Allegheny representatives, in the meeting, reiterated their interest in trying to determine whether Allegheny should consider entering the business of fabricating nuclear fuel elements and nuclear fuel element components, pointing out that they did not wish to do this work in existing facilities.

Woodhouse covered the work done by Nuclear Metals, Inc., on bare uranium tubes. He stated that this work had reached a stage in which there would be needed, for development purposes, a supply of the order of 500 bare tubes at Savannah River over the next twelve months. These will be in excess of Nuclear Metals ability to supply. King as a director of NMI and Pierce as a former director were familiar with the NMI situation. On question by King, Worthington

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stated the order-of-magnitude of the tube requirements if the development work is successful and tubes are used on a production basis. It was pointed out, however, that there were uncertainties, quite aside from technical satisfactoriness, as to any production use and that our discussion with Allegheny concerned only the tube supply for development purposes in the next year.

Woodhouse outlined briefly the process for manufacture of uranium tubes which is considered best to date. It was stated that there were optional steps and that work was going on on these, but only the process as covered below was far enough along to consider for use in production of the tubes for development purposes.

Feed Material

Finished castings of natural uranium would be furnished to the vendor.

Forging or heat treating

In order to break up the cast grain structure of the uranium ingots, they would need to be forged, pierced or heat-treated in preparation for extrusion.

Machining and Plating

The resulting material from the above processes would then be machined into approximately 6-1/2 inch billets with holes appropriate to the size of tube needed. The next step would be copper plating, which would serve as a lubricant during extrusion and as a deterrent to oxidation of the uranium billet or, later, the extruded tube.

Heating and Extrusion

The billets would then be heated and extruded to the final tube dimensions.

Cropping, Straightening and Pickling

The extrusions would then be cropped and straightened and the copper removed by pickling in a 50-50 nitric acid-water solution.

Tube Reducing

The tubes would probably have to be cold worked by tube-reducing in order to meet the dimensional tolerances required. There was some mention made of the possibility of "warm" handling in this stage.

Beta Treatment

Allegheny was then told that we were currently doing the heat-

treating at Atlas Steels, Welland, and would expect to continue to do so for the immediate future.

King asked about possible rollings of flats by Allegheny, and du Pont provided general information as to the properties and dimensions required of the flats, but also stated that we have a current supplier for the quantities of plates needed for development work.

The Allegheny Ludlum representatives did not commit themselves definitely as not being in a position to supply tubes. They did point out the difficulties and problems involved. Mr. King stressed that they know of these from the uranium rolling work done at Water-vliet in preparation for the building of Fernald. He said the problems involved in tube making would obviously be greater than the ones for rods and that Allegheny would be in a less satisfactory position to fabricate the tubes, especially with the properties and dimensional tolerances required. He further stated he did not know of any company in a good position to undertake supplying the development costs of tubes. Mr. Pierce was somewhat more optimistic as to what Allegheny might, physically, be in a position to do. He agreed that metal fabricators frequently supplemented their own facilities by borrowing use of facilities such as tube reducing equipment.

King told Woodhouse that he would at least be willing to suggest other companies to contact.

The meeting was held on a cleared basis as both King and Pierce have "Q" clearances.

NFS:hw

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