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USE OF DEPLETED URANIUM
FOR HIGHER ISOTOPE PU

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By DK Hansen, 4-11-94

Verified By J. Sawley 4-15-94

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May 8, 1963

USE OF DEPLETED URANIUM FOR HIGHER ISOTOPE PU

INTRODUCTION

As an outgrowth of conversations held May 1st and 2nd between Division of Production and Savannah River representatives, general agreement was obtained that HAPD should produce some of the Pu feed for the Savannah River curium-244 program by irradiating depleted uranium. Although the Hanford program included

- (1) Production of Pu of roughly 18 percent Pu-240 content by irradiating depleted uranium,
- (2) Production of Pu of 50 percent Pu-240 by irradiating as Pu-Al the Pu from (1),
- (3) Construction of storage facilities for high-40 Pu to allow Am-241 milking prior to shipment of the Pu for Savannah River feed;

agreement was reached only on the first proposal. The other elements of our suggested program will be given further consideration.

The production of Pu from depleted uranium as outlined below will require immediate action in the fuel and reactor sections of IPD.

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SUMMARY

It was stated by HAPO representatives at meetings held in Washington and Savannah River on May 1st and 2nd, that roughly 200 kgs of Pu of 18 percent Pu-240 could be furnished by July 1, 1965 to Savannah River for their proposed Cm-244 program. The Pu would be produced by irradiating .2 percent U-235 depleted uranium for a period of roughly ten months. The reactivity required for the depleted uranium irradiation would be furnished by .947 percent U-235 enriched uranium. Nine tons of slightly enriched uranium would be required for each ton of depleted uranium during its complete irradiation. Slightly more than three columns of E-metal per column of depleted uranium would be required upon charging, but only 2.5 columns might be needed during the terminal irradiation period. Since the depleted uranium can be used to produce non-representative Pu, no special authorization need be given for the initial order of 200 tons. Delivery of the depleted uranium would be made four months after the initial order was received, and irradiation could start about two months after delivery. If the Cm-244 project authorization and need for high-40 Pu was not indicated by the time the Pu-240 isotope level of 8 percent was reached in the depleted uranium (three-month irradiation), the material would be discharged to meet non-representative Pu commitments. Authorization of the Cm-244 would presumably include HAPO authorization to proceed with the depleted uranium irradiation to produce feed of 18 percent Pu-240.

To implement this program to deliver Pu of high isotope content by July 1, 1965 will require immediate internal program approvals and appropriate implementation steps. These steps will include design and specification of the depleted uranium; ordering appropriate quantities of E and depleted; determining and ordering appropriate canning components; and determining reactor loading patterns. Special attention will ultimately be required in the separation of the reactor products. The additional quantities of E-metal required for the loading will probably necessitate early installation of the annular type Purex dissolver.

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