To: Dr. J. H. Roberson

Date: August 26, 1953

Subject: Cost Studies on Plutonium and Americium Separations

In a meeting with Dr. F. K. Pittman in Washington, D. C. on August 5, 1953 Dr. Staniforth agreed to prepare rough cost and feasibility determinations on three projects of interest to the Division of Production and the Division of Military Application. I am enclosing these studies for transmittal to Dr. Pittman.

These studies were handicapped by a severe time schedule and a lack of data at Mound on which to base process premises and cost estimates. It is believed the more accurate data for a more detailed estimate would result in shorter time scales and reduced costs. Space and manpower could be made available at once for these programs. A summary of the results of the studies is given below:

The Separation of Plutonium and Americium from Hanford Reduction Crucibles

When this report was prepared, the only data available were those associated with an ion exchange process. The data on the Oak Ridge solvent extraction process are now available and this process could be substituted. The recovery of americium is a complicating factor, for there does not seem to be a process available to specifically handle both the americium and plutonium recovery. The other uncertain technical point is the effect of the very large quantities of magnesium. These points will require some chemical engineering studies to provide a firm process flow sheet. The project is estimated to require twelve months if a complete process flow sheet can be made immediately available. Three to six months additional development time will be required if this cannot be done. Of this twelve months, six months is actual operating time. The cost summary is as follows:

Facility and equipment		$180,810*
Chemical engineering and operations		
	FY-54	77,400
	FY-55	249,360
Total		$507,570

* $104,160 is equipment and materials cost.
$ 76,650 is Mound labor and associated overhead.

The Separation and Purification of Plutonium and Americium from the Fuel Rods of Clementine

Here again an ion exchange procedure was selected. A factor which will require some chemical engineering study time is the jacket removal. The project is estimated to require twelve months if a complete process flow sheet can be made immediately available. Three to six months development time will be required if this cannot be done. Of this twelve months, six months is actual operating time. The cost summary is as follows:

Facility and equipment		$146,870 *
Chemical engineering and operations		
	FY-54	57,880
	FY-55	145,590
Total		$350,340

* $58,780 is equipment and materials cost.
$88,090 is Mound labor and associated overhead.

The Preparation of Curium-242

This was not to be examined from a cost standpoint at this time, but rather as to whether Mound could play an active role in this program. Mound and Berkeley have met and considered this. Two questions were asked in Washington:

1. Could Mound assist Berkeley in any immediate fashion to prepare the curium-242 for the Castle tests? Berkeley determines that the present problem is well in hand from both facility and manpower considerations. Mound can probably be of some assistance by providing a calorimeter. These negotiations are underway.

2. Could Mound assume the responsibility for future curium-242 needs? Dr. Perlman stated that it was his opinion that the scheduling problems associated with the use of curium-242 precluded the use of any laboratory but Berkeley from such consideration. This was largely dictated by the short supply of americium-241. If a large stock of this material were available, another site for curium-242 production would seem feasible.

An examination of the process and facility indicated that the operation could be performed at Mound should the occasion arise. A cost examination will not be made unless specifically requested.

It is also the opinion of the Mound staff that Dr. Perlman's scheduling objection may not be completely valid. The half-life of curium-242 is 160 days and a delay in shot time of a few weeks should not have an appreciable effect. The

Mound staff has for years been successfully dealing with the scheduling problems associated with polonium-210 with a 138 day half-life. It is felt that this barrier is not insurmountable even with the present stock of americium-241 and certainly not if the first two projects discussed above were carried to completion to provide an additional americium stockpile.

Edw. C. McCarthy

E. C. McCarthy
Acting Director

RAS:pm

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