SECRET
7/18/51 INIT.

THIS DOCUMENT CONSISTS OF 3 PAGES
THIS IS COPY 9 OF 9a

54-3-77

[redacted]

REVIEWED AND NOT DECLASSIFIED
By
DATE

Report on Trip to Savannah River

March 9-10, 1954

MOUND DECLASSIFICATION REVIEW	
1ST REVIEW-DATE 2/11/98	DETERMINATION (CIRCLE NUMBER(S))
AUTHORITY: ☐AOC ☒ADC ☐ADD	1. CLASSIFICATION RETAINED
NAME T. K. Flanagan	2. CLASSIFICATION CHANGED TO
2ND REVIEW-DATE: 2/18/98	3. CONTAINS NO DOE CLASSIFIED INFO
AUTHORITY: ADD	4. COORDINATE WITH:
NAME:	5. CLASSIFICATION CANCELLED
	6. CLASSIFIED INFO BRACKETED
	7. OTHER (SPECIFY):

On March 9 and 10, 1954 Dr. J. J. Burbage, Dr. R. A. Staniforth, Mr. J. H. Wiesler, Dr. D. L. Timma and Mr. E. A. Walker visited Savannah River Operations to inspect the progress made on the installation of the thermal diffusion column, to discuss electrolysis, and to explore the ideas at SRO concerning the shipping container problem.

Mr. Larry Dancer, Operating Superintendent, acted as our host and arranged for our talks with appropriate people. The first morning was spent in discussing electrolysis. This work is in the Technical Division and is under the direction of Mr. Ben Johnson. They have a laboratory setup, constructed primarily of glass with rubber hose connections, which has been used for work with H_2O and D_2O. To date they have achieved a separation factor of only about 5 for hydrogen and deuterium, however, they feel that this value will increase with use of the equipment. They have devised a closed system by which it is possible to move the electrolyzed gases through a palladium-alumina catalyst up into the next electrolysis cell and the residue oxides back into the preceding cell without using valves. The important idea is a series of tall U-tubes which contain liquid and act as barriers for retaining gases.

They have designed an installation in which they will handle tritium oxide mixtures. This equipment will be mounted on a vacuum rack inside a completely sealed box. The sealed box is about six-feet tall, seven-feet long and two-feet thick and is constructed of aluminum sheet with a steel frame. The front has six large plastic windows through which the equipment can be viewed. The sealed box will be maintained at a pressure of about 6-inches of water less than atmospheric. The air exhaust will pass through a radiation monitor and then through a silica gel dryer to capture any water being exhausted. The sealed box will be placed inside an aluminum hood which will have sliding transparent doors in front. The outer hood will contain the vessels containing the feed material and the product receiver tanks. The still units will be stainless steel and will have a capacity of about 200 cc of liquid oxides. They will use thick-walled glass tubing for connecting the various units of the equipment. They recommend a 1/4" I.D. - 1/2" O.D. flange fitting tubing available from Fischer and Porter Company, Hatboro, Pennsylvania.

SECRET

Restricted Data

They are going to substitute lead gaskets for the Neoprene impregnated material supplied by the vendor. They would be glad to have our technical men visit them for a period of a week or two to learn their techniques and to study apparatus.

The work on electrolysis has progressed rapidly at Savannah River and the Technical Division people are optimistic about its possible use as a large-scale isotope-separation facility. They are expending a good deal of effort in expediting this research program.

There had been some work at Savannah on the preparation and properties of lithium hydriside. However, this has been largely discontinued. Dr. Morris, Assistant Director of the Technical Division, did not know of the teletype from the AEC establishing the responsibility for the shipping containers with Hanford and Savannah. They have done some work handling tritium with uranium beds and it appeared that they favored this device as a shipping mechanism. Dr. Harry Groh had been doing the work on a uranium-bed shipping container. Dr. Morris was interested in hearing of the possibility of using calorimetry as an assay tool and felt that the container should be designed with this in mind. They were unaware of the "blocking" phenomena described by McIntaer of Los Alamos. In fact they have worked with one to two liter quantities of tritium on uranium beds for some time and have observed no trouble in using the beds or in getting transfers which were quantitative enough for accountability requirements.

In some of their development work they needed to react lithium with hydrogen isotopes yet retain the lithium vapor. They obtained from Mr. Leo Epstein at KAPL some small (about 1-inch by 1/2-inch diameter) sealed soft-iron capsules containing distilled lithium. The capsules had been closed by induction welding and part of the wall and one end turned down until the thickness was about five mils. It had been found that hydrogen isotopes would diffuse through the walls and react with the lithium, but that none of the lithium vapor could escape through the walls. This technique may be of value in either the ceramic program or the ANP project.

Tuesday afternoon we heard a theoretical discussion of column design and operation by C. C. Harris and Duncan Randall. They listed the following eight factors as important in the design and operation of a thermal column: (1) wire temperature; (2) wall temperature; (3) tube tolerance; (4) wire tolerance; (5) concentricity; (6) vertical alignment; (7) radial symmetry of cooling wall temperature; (8) vibration. They felt that their "shorty H" column (24 feet long x 2.05 cm diameter) would have a capacity of 150 liters per 24 hours for enriching a feed of 90 per cent tritium to a product of 99.3 per cent tritium.

Wednesday morning was spent in inspecting the installation of the F column. The equipment is housed in a one-story building which also contains the facility for liberating the tritium from the slugs. The column is controlled almost entirely from a large control panel by means of remote-control valves and meters. They expect to have the installation completed and tested in about three months.

It would be to the advantage of Mound if some of our technical personnel engaged in work on electrolysis and thermal columns could visit SRO. Preliminary talks with Mr. Dancer and Dr. Morris indicated that they would be glad to have our men visit for a week or two. They felt that DuPont should be approached officially through Dr. Cole.

D. L. Timma

DLT:it

DISTRIBUTION

Copy 1 - Dr. J. J. Burbage
" 2 - Dr. R. A. Staniforth
" 3 - Mr. E. C. McCarthy
" 4 - Mr. J. R. Wiesler
" 5 - Dr. John H. Roberson
" 6 - Mr. E. A. Walker
" 7 - Dr. F. C. Mead, Jr.
" 8 - Dr. D. L. Timma
" 9 - Central Files