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ODP:JTC

43441

February 29, 1952

General Electric Company
Hanford Works
Richland, Washington

Attention: O. H. Greager, Manager
Technical Section

Subject: REACTIVITY OF UO_3 IN THE OAK RIDGE FEED PLANT

Gentlemen:

Transmitted herein are a number of facts concerning UO_3 reactivity which were brought out at a meeting held in Oak Ridge on February 6, 1952, which should prove to be of interest to you.

A condensation of the discussion which transpired was sent in a letter to R. W. Cook, Director of Production, and is quoted as follows:

"For some reason not known at this time the UO_3 which is produced at the Harshaw refinery cannot be converted to UF_6 in the Oak Ridge feed plant at the same rate as the UO_3 from the Mallinckrodt refinery. At this time the feed plant can produce UF_6 at a rate of 180 tons uranium equivalent per month if the [illegible] is used as a feed. However, if the UO_3 from Harshaw is used, the plant capacity is, at this time only 120 tons per month. This difference results from the fact that the rate of conversion of UO_2 to UF_4 in the second stage of the process is slower for the Harshaw material than for the MCW material. If the UO_2 - UF_4 time cycle is lengthened to increase the conversion, the overall capacity of the plant is decreased. If, on the other hand, the green salt containing more oxide and oxyfluoride is sent to the fluorination tower, more fluorine is required to produce the UF_6. The total amount of F_2 production capacity at

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this time is insufficient to fluorinate the mixture of fluoride, oxide and oxyfluoride which results from the use of Harshaw UO_3 in amounts greater than 120 tons per month. Carbide is currently increasing the F_2 production capacity to the maximum possible without construction of more buildings and states that the plant capacity using Harshaw UO_3, will be raised to 135 tons per month.

"Studies which have been made by the New York office, have indicated that, using the MCW green salt plant, the rate of conversion of Harshaw UO_3 is somewhat less than of MCW UO_3, but that the difference is not very great. It is generally agreed, however, that the conversion rate is dependent not only on the type of UO_3 but also on the type of converter used, and that, with our present state of ignorance on the subject, studies must be made with specific UO_3 in a specific converter. Thus the results of the experiments at MCW cannot be used to solve the Oak Ridge problem.

"At this time Oak Ridge and Mallinckrodt are carrying out a joint experimental program which is aimed at determining what effect changing certain variables in the UNH to UO_3 process has on the rate of conversion of UO_3 to UF_4 in the Oak Ridge feed plant. Samples of UO_3 which were made by varying the calcining time at MCW are currently at Oak Ridge for evaluation in the pilot plant.

"In view of the facts that: (1) The Oak Ridge feed plant is capable of handling even Harshaw material at a rate sufficiently great to take care of all the virgin UO_3 which New York can furnish during the next six months, (2) Virgin material will be sent to Oak Ridge for only six or eight months longer, (3) The major continuing problem revolves around the use of Hanford UO_3 in the Oak Ridge feed plant, and (4) Solution of the problems concerning the use of Harshaw UO_3 will take at least several months and would probably not have much direct bearing on the as yet unknown Hanford problem, it was agreed that no specific action should be taken to modify either the Harshaw UO_3 process or the Oak Ridge feed process to allow the use of Harshaw UO_3 at a rate of 180 tons per month. It was felt that the program which Oak Ridge and Mallinckrodt are currently carrying out to determine the effect of calcining time on the "reactivity"

should be completed, but that future experimental programs should be developed between Oak Ridge and Hanford to determine what is necessary to allow the Hanford UO_3 to be used in the Oak Ridge and Paducah feed plants at maximum efficiency. Since there is a chance that at some time in the future there will be sufficient raw material available to allow the use of some virgin UF_6 in the cascade, it was agreed that New York and its several interested contractors (MCW, HCC and National Lead) should keep in touch with the progress of the program and offer any assistance possible in its prosecution."

We trust that this information will prove to be of some value to you in your investigations concerning UO_3 reactivity.

Very truly yours,

Donald G. Sturges
Chief, Operations Division

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