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Series A

Classification

Decontamination and Recovery Tests - K-1303 - K-131

Short Title of Document

H. F. Henry

Author

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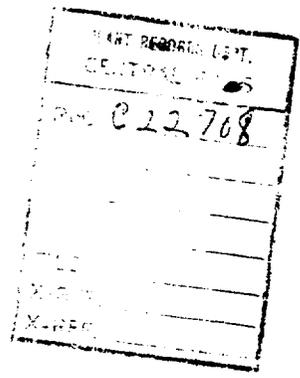
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ANSWERING LETTER DATE

SUBJECT Decontamination and Recovery Tests - K-1303 - K-131

KS-64

KS 64 3 A



Problem

Special hazards consideration has been requested for an experimental test procedure in which thirteen (13) converters will be decontaminated in K-1303, using a sodium dichromate and nitric acid solution. Subsequent recovery of the uranium will be made by the batch process now in operation in K-131 with the exception that a solution of tributyl phosphate will replace the existing carbital solution. The procedure includes the withdrawal of forty (40) gallons of solution from the acid loop without analysis into a fifty-five (55) gallon drum immediately after the decontamination of a converter. A second converter will be decontaminated before the result of the analysis is received.

The thirteen (13) converters are part of a group which have been removed from the upper section of the cascade after a year to a year and a half of process operation and which, in decontamination to date by normal procedure, have averaged from ten (10) to forty (40) grams of T per converter. However, no solution has been withdrawn into 55 gallon drums without analysis.

Operation

The acidity of the dichromate concentration will be varied during this operation to determine the optimum decontamination solution. The acid loop will contain approximately 160 gallons of solution and this volume will be maintained by the transfer of make-up solution from the water rinse loop. Approximately forty (40) gallons of the acid loop solution will be drained off after the decontamination of each converter and sent to K-132 where the dichromate will be reduced to chromic nitrate by the addition of nitric acid and hydrogen peroxide. The acid solution

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will then be taken to K-131 for the recovery of uranium by tributyl phosphate-ammonia precipitation processes. Throughout the operation, each drum will have a batch number and its contents will not be mixed at any time with another batch.

T and X samples will be taken from the loop after the decontamination of each converter. However, before the T analysis is completed it is planned to decontaminate a second complete converter.

Special Hazards Considerations

Converters of this category which have been decontaminated to date have proved exceptionally clean in that uranium material was not visible in the tubes or in the converter head. A recovery maximum of forty (40) grams of T for a converter of this type has been experienced to date, which is equivalent to an acid loop concentration of sixty-six (66) ppm for the 160 gallon volume. However, there is a possibility that plugged tubes in the converter may have caused the deposit of a large amount of uranium material. Experience has shown that such material has been visible on converter parts where as much as 200 grams of T has been removed during decontamination. If the acid storage loop were at 300 ppm or .3 grams per liter, 200 grams of T would then increase the uranium concentration of the loop to 630 ppm. A total of 881 grams of T would need to be removed from the converter to raise the concentration of the loop to 1750 ppm, which is the maximum concentration that may be drained into a 55 gallon drum.

Conclusion

The forty (40) gallon sample may be withdrawn from the acid loop into a fifty-five (55) gallon drum without analysis, provided:

1. The concentration of the loop, as shown by analysis performed after decontamination of the preceding converter, does not exceed 300 ppm.
2. Only one converter is decontaminated without the result of an analysis on the loop being known.
3. The volume of the acid loop is maintained at 160 gallons before a converter is decontaminated.
4. An analysis must be made of the solution before each converter is run if any analysis shows a concentration above 300 ppm.
5. The solution will be drained into containers such that the quantity of uranium will not exceed 350 grams of T per container if the concentration of the solution exceeds 1750 ppm of uranium.
6. The foreman must make a personal check of each converter for decontamination and note its condition in the log. Any converter sections on which material is noted will require special handling.

RFH:AJM:lja

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Hugh F. Henry
H. F. Henry

Radiation Hazards Department

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