~~SECRET~~ COVER SHEET

~~UNCLASSIFIED~~

X-426 (Rev. 8-55)

OAK RIDGE NATIONAL LABORATORY

Operated By

UNION CARBIDE NUCLEAR COMPANY

POST OFFICE BOX P
OAK RIDGE, TENNESSEE

ORNL
CENTRAL FILES NUMBER

56-6-46

DATE: June 8, 1956

SUBJECT: Continuous Plutonium Isolation Contactor

This document consists of 2 pages.

Copy 2 of 5 copies. Series A.

TO: W. H. Swift

FROM: I. R. Higgins

Distribution

1. W. H. Swift
2. F. L. Culler
3. R. E. Blanco
4. I. R. Higgins
5. C. W. Hancher

Classification cancelled (or changed to) ~~SECRET~~ UNCLASSIFIED
by authority of *memo & let J. H. F. Cornell*
Chiey. Dir. B. At. 9-26-58
by *J. L. Tideman* TIE, date *10-3-58*

NOTICE

~~RESTRICTED DATA~~

This document contains Restricted Data as defined in the Atomic Energy Act of 1954. Its transmittal or the disclosure of its contents in any manner to an unauthorized person is prohibited.

This document contains information of a preliminary nature and was prepared primarily for internal use at the Oak Ridge National Laboratory. It is subject to revision or correction and therefore does not represent a final report.

1 8154

~~SECRET~~ COVER SHEET

~~UNCLASSIFIED~~

UNCLASSIFIED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

cc: F. L. Culler
R. E. Blanco
I. R. Higgins
C. W. Hancher

~~SECRET~~

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION

U44

POST OFFICE BOX P

OAK RIDGE, TENN.
June 8, 1956

Mr. W. H. Swift
Purex Plant Process Unit
Engineering Department
Hanford Atomic Products Operation
Richland, Washington

Dear Winn:

We are happy to hear that you have resolved your resin moving problem. There is no substitute for actual operation to get the feel of the contactor.

We have the same kind of question about elution as you have, which we expect to answer by actual operation. According to fixed bed data, the distribution coefficient of Pu for the 8% resin is about 2 in 6 M HNO_3 . This means, if we load to 150 g/l, the maximum product concentration possible with an infinite length of strip column is 75 g/l; we hope to achieve 50 g/l. Your flowsheet indicates an impossible situation. You are not feeding enough HNO_3 to strip the resin. However, you can still get 50 g/l product if you load up to 150 g/l; I think this is entirely practical.

Other comments on your flowsheet are as follows: (1) I do not think it necessary to have the strip wash so high that you need to dilute the HNO_3 from 9.6 to 6 M. I would assume that mixing is poor and plan on something nearer to 7 to 6. I do not think 4 M would be greatly inferior to 6 M. However, concentrations below 4 M are undesirable. (2) I think that the slip water volume will be about 1/2 of what you assumed, using 40 psi resin moving pressure. (3) You are using 100% too much H_2SO_4 in the uranium scrub.

The answer to your question about how far the Pu should be stripped from the resin before recycle to the loading section will have to be determined under run conditions. Pu has a very favorable distribution coefficient for the resin from the feed and scrub solutions. The quantity that can be left on the lean end of the strip section may be this distribution factor greater than the acceptable loss. On start-up it may be desirable to install a fixed bed to clean up the feed waste. If it proves difficult or expensive to reduce the Pu to a very low level, it may be practical to use the fixed bed permanently. We find many situations where it would be desirable to include a clean resin scrub in the continuous operation. Rather than complicate the contactor operation it is often practical to use a separate fixed bed when infrequent regeneration is adequate.

As you know we are starting up a Pu contactor ourselves and would appreciate maintaining close contact with you.

Sincerely,

I. R. Higgins
I. R. Higgins
Chemical Development Section
Chemical Technology Division

IRH:lg

ADP:lg

~~SECRET~~