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ORNL
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SUBJECT: Eurochemic Assistance Program: Comments by BNL, dated February 17, 1959, on Eurochemic Documents

TO: E. M. Shank, ORNL

FROM: B. Manowitz, BNL

Acknowledgment

The attached comments were given by BNL personnel on various Eurochemic documents sent to ORNL for USAEC review. The comments have been retyped at ORNL, after official release, to permit general distribution.

DISCLAIMER

I have reviewed the Eurochemic reports sent to me thus far. In general, a thorough survey has been made of the aqueous reprocessing field. I was particularly impressed by the proposed development program which parallels several programs in this country.

The following specific comments are offered by Carl Pierce and myself:

1. The use of NO_2 gas in place of $NaNO_2$ in the first valence adjustment step should be investigated, since the sodium limits the degree of concentration of the high level waste stream.

2. When considering the use of a sorption step (inorganic anion exchanger) in place of an extraction step, the solids waste handling and disposal problems should be critically evaluated. This probably need only be considered for sorption steps upstream of the tail-end treatment.

3. A change in the flow sheet stream nomenclature is recommended for ease of exchange of data between the U. S. and Eurochemic. Use of such designations as 2ASv and 1CSt seem cumbersome.

4. The flow sheet calls for do-decane as a diluent. The use of this diluent seems to be extravagant considering a cooling time of 100 days and the limited amount of data on the use of do-decane. Consideration of a diluent other than kerosene base type probably would be required only if the dual-temperature scrub process is used.

Some consideration should be given by the Eurochemic group to the problems of shipping spent fuel and the handling of shipping casks at the plant. Uniformity of shipping containers would reduce the investment required to handle the containers.

Consideration should be given to the use of the recently designed critically safe mixer settler units. These units can be operated with total flow rates of 15 l/min. and are critically safe with concentrations of U-235 up to 400 grams/liter.

H. L. Finston has indicated that emission spectroscopy will probably play a greater role in the analytical program than anticipated, and suggests that more thought be given to required instrumentation and related facilities.

I might bring to your attention the relatively cheap yet accurate U-235 isotopic assay by neutron activation developed at Fernald. F. L. Cuthbert might be contacted for further information.

We are particularly interested in the Eurochemic report on waste disposal, which we assume will soon be forthcoming. We are withholding comments in this area until we can review their plans.

The following are pertinent BNL documents:

Waste

BNL 446 - Studies on Characteristics of Savannah River Wastes, April 1957

BNL 493 - An Absorption Process for Recovery of Fission Product Noble Gases, February 1958

The Recovery of Fission Product Xenon and Krypton by Absorption Processes (to be issued)

Head End Processes and Corrosion

BNL 511 - Reprocessing of Power Reactor Fuels - The Enrico Fermi Fast Breeder Reactor Fuel - Progress Report #1

Reprocessing of Power Reactor Fuels - The Enrico Fermi Fast Breeder Reactor Fuel - Progress Report #2 (to be issued)

It is suggested that ex-KAPL personnel be contacted for possible assistance. A. C. Schafer (ORNL) might be a lead to the location of appropriate personnel. In addition, Dr. Silverman at Harvard could assist on gaseous waste disposal, and the Bettis Plant has information on solids waste disposal.

I note that consideration will be given to the loan of U. S. personnel to the Eurochemic group. On a short-term basis, I think this would be valuable experience for Carl Pierce. At the same time he could provide valuable assistance to the Europeans.

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