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- 1 -

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By Authority of D. S. Lewis

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By J. E. Savelly 8-20-93

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October 30, 1936

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COPY 1 OF 1, SERIES MA

PUREX PLANT L CELL PLUTONIUM CONCENTRATION FLOWSHEET

Since the start-up of the Purex Plant, numerous process and equipment difficulties have been encountered in the concentration of plutonium in the L Cell Package. A summary of these problems and their resolutions is currently being documented by the Purex Technology Operation. One of the proposed remedial measures for improving on the present plutonium concentration equipment in the Purex Plant is to install new equipment constructed of more corrosion resistant materials and of a design simplified for contact maintenance.

The purpose of this memo is to confirm the current plutonium concentration flow-sheet recently transmitted to J. R. LaRiviere. This new flow-sheet has been required to produce plutonium nitrate solution meeting specifications (80-120 grams Pu per liter at 5 to 7 g HNO₃) and still prevent formation of plutonium IV polymer in the equipment.

The current L Cell Package flow-sheet which gives the most satisfactory performance to date is as follows:

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BN-46384

J. B. Focht

October 30, 1976

<u>STREAM</u>	<u>FLOW(1)</u>	<u>M HNO₃</u>	<u>Pu. G./L.(2)</u>
SEK	8.2	0.01	
SEP	8.2	0.19	3.3
SEP-HNO ₃	0.2	13.0	
PEF	8.4	0.51	
PEC	5.4	0.75	5.0
PEO	3.0	trace	
IPC	0.21	6.7	130 (up to 200)

- (1) Flow relative to HAF of 750 gallons per ton U = 100
 (2) Based on HAF containing 765 grams Pu per ton U.

Changes in routings or conditions from those currently in use in the L Cell Package are recommended as follows:

1. provide live steam stripping to the Plutonium Stripper T-13 for supplemental use;
2. install SEP sample pot downstream of SEP-HNO₃ introduction point;
3. reroute T-13 tower reflux back to T-13 (via IAF);
4. reroute the 2B Column empty-out jet from package into waste header (covered by separate work order);
5. install instrumentation (e.g., electromagnetic flow indicator or pitot tubes) to indicate relative recirculation rate in the Plutonium Concentrator E-14 loop;
6. decrease the geometrical dimensions which are limiting from a critical mass standpoint (i.e., tees at top of recirculation loops and stripping tower diameter); and
7. design the system to permit operation at a capacity factor of four.

For additional information, GC Uberg (or ME Swift) should be contacted.

ORP ENCL. 1
 E. R. HARRIS
 Manager, Purex Technology
 Research and Engineering
 CHEMICAL PROCESSING DEPARTMENT

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11/5/93