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**Cover Sheet for a Hanford  
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**Pacific Northwest Laboratory  
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REDUCTION TEST 234-5-1-85Evaluation of Use of Filter Paper in Conjunction with Filter BoatsIntroduction:

In the 231 Building a plutonium IV oxalate precipitate is filtered through sintered platinum filter discs incorporated in platinum lined Hastalloy boats. These boats containing the charges of plutonium oxalate are then transferred to the 234-5 Building where they are charged to furnaces, the plutonium hydrofluorinated to plutonium fluoride, and then transferred from the boats to a reduction furnace and reduced to plutonium metal.

- The boats as presently designed undergo considerable varpage in processing resulting in frequent leakage around the sintered filters with a subsequent excessive amount of material being recycled for reprocessing. The ability to maintain these boats leak-free is limited by the nature of the boat design.

Objective:

The purpose of this test is to evaluate the feasibility of utilizing filter paper in conjunction with the filter boats in order to prevent leakage of plutonium oxalate precipitate through the present filters.

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BY P. J. Jernigan DATE 5-19-81  
 BY JW Jordan DATE 7-27-81

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Basis and Justification:

During the first one-and-one-half years of operation of the 234-5 Building, filter paper was used between the supernatant head tank and the supernatant hold tank to catch product precipitates prior to the supernatant hold tank (waste). Periodically, these filter papers, containing plutonium III oxalate precipitate, were charged to a boat and fluorinated according to normal procedures to produce a plutonium fluoride powder, which was reduced to a plutonium button for normal processing with main line material.

Recent studies made in the Technical Section Development Laboratory using filter paper both on top and bottom of the fluorination boat has resulted in fluoride product and later a metal button which has been satisfactory in carbon content (200 PPM) with no adverse effects being encountered during fluorination or reduction.

If the use of filter paper in conjunction with the current filter boats proves satisfactory, the following benefits will be derived:

1. Leakage through the filters will be decreased, lowering the amount of recycled product materially.
2. Hold-up of solid material in the 231 Building equipment will be materially decreased, giving better batch size control and accountability.
3. The life of the platinum filter boats will be increased by elimination of constant repairs to the filter disc.

Procedure:

Normal processing conditions will prevail with the exception that ashless filter paper will be used to cover the bottom of the filter boat before filtration is made. This paper will remain in the boat and be processed through the hydrofluorination and reduction operations. All buttons processed under this test will be combined, in proper amounts, to produce castings for further processing. In the event that the carbon content of the buttons is above specifications, the buttons will either be recycled or blended with clean buttons so that the final casting is within specifications.

Data:

The data and observations needed to evaluate this test are:

1. Observation of any undue resistance in filtering at the filter boat stations in the 231 Building.
2. Observation of any passage of oxalate precipitate through the boat when filtering.
3. Observation of ash remaining following hydrofluorination and reduction.

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4. Analyses for carbon in the buttons produced before casting.
5. Analyses for carbon in castings made of these buttons.
6. Comparison of material balance to evaluate effect on accountability.

Schedule:

Thirty test runs will be made using filter paper scheduled so that no interference with production will occur due to time required for analysis of the buttons.

Responsibilities:

The Process Unit will be responsible for making the observations and analyzing the results. The Operations Unit will be responsible for taking the samples and recording the required data. Conclusions will be drawn jointly by the Operations and Process Units of the Separations Section.

Approved by:

W R Chapman  
Superintendent, Operations Unit  
Separations Section

W M M... ..  
Superintendent, Process Unit  
Separations Section

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