OP-59 Revised

[redacted]

PROJECT 9536

Route List

1. ~~to~~ [illegible]
2. RECORD CENTER FILE
3.
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File _____ 72202

Date 9-12-45

Subject Production Test No.SE-224-B-PA-2

To Simon-Mackey-Smith

From R. H. Beaton

Copy No. [redacted]

L. Squires

BEFORE READING THIS DOCUMENT, SIGN AND DATE BELOW:

R Beaton 9/15

5-3077

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SEPTEMBER 12, 1945

PRODUCTION TEST NO. SM-224-B-PA-2

ACID SLURRY REMOVAL OF LANTHANUM FLUORIDE PRODUCT CAKE FROM CENTRIFUGE

Objective

To improve the completeness of removal of the lanthanum fluoride product cake from the 40-inch Bird centrifuge, B-2.

Background

At both East and West Areas, the complete removal of the LaF_3 product cake from the 40-inch Bird centrifuge, B-2, in the Concentration (224) Building has not been attained consistently and reproducibly from run to run. Partial retention varying from 1 - 2% from each of a series of runs up to 10% from a single run has been observed, necessitating frequent acid wash clean-outs.

Various modifications of the cake removal procedure have been tested thus far, with no lasting success. These tests have included (1) insertion of several types of bowl slurryings with water into the original straight bowl spraying procedure; (2) increasing of the total water used for cake removal to the full amount possible without interfering with the succeeding metathesis operation; (3) resetting of the angle of the bowl sprays to a position observed in dummy tests to be more satisfactory, 15° upstream from the perpendicular; and (4) close control of the bowl rotation speed at 10 RPM during the spraying operation, which was also determined during dummy trials to be critical.

Each of the above procedure or equipment modifications has produced a significant improvement in cake removal in one area, but has failed to remain reproducibly efficient in the other area. The East Area has experienced the more difficulty.

The current procedure now being used for cake removal, with the variation in the respective areas, is as follows:

1) With B-2 at 10 RPM, add 700 lbs. of water through the bowl sprays at a minimum pump pressure of 70 lbs./in.^{2}, keeping the bowl as nearly empty as possible by ~~jetting~~ continuously from B-2 to B-1.

2) With the bowl stopped, add 250 lbs. of water to E-2 and slurry 2 times from 0 - 110 RPM (5 times at East Area.) Rotate bowl at 10 RPM for 15 minutes (East Area only) and jet to F-1.

3) With the bowl stopped, add 200 lbs. of water to E-2 and slurry 2 times (5 times at East Area) from 0 - 110 RPM. Jet to F-1.

4) With the bowl power off, add 150 lbs. of water to E-2 via bowl sprays, jetting continuously from E-2 to F-1.

The resultant LaF_3 product slurry in F-1, approximately 1550 lbs. (including the 100 lb. water flush from F-2 to F-1), is then made up to 250 gal. of 15% KOH by adding a 50% KOH reagent solution and a small amount of flushing water from the seals tanks.

Incompleteness of cake removal from E-2 centrifuge is indicated both by low F-1-F5 yield assays and E-2 Beckman meter readings in excess of 20×10^{-14} amps. The retained cake is believed to be largely in the form of small sheets or strips densely plastered on the bowl wall or directly beneath the baffle in the bottom section of the centrifuge.

Test Procedure

Since it has been observed in bowl clean-outs using 54-60% nitric acid slurryings that very nearly complete flushing of the centrifuge can be obtained, it is proposed that a series of five consecutive test runs be carried out in the East A Area, beginning with Run E-5-09-F-5, in which a slurrying with 250 lbs. of 24% HNO_3 will be substituted for the present two water slurryings. Close observation of the E-2 Beckman meter readings during the cake removal cycle has indicated that the spraying operations are at present performing essentially all of the cake removal accomplished.

The recommended test procedure is as follows:

1) With the bowl at 10 RPM, add 700 lbs. of water to E-2 via the sprays, jetting continuously from E-2 to F-1 to keep the bowl empty.

2) With the bowl stopped, add 250 lbs. of 24% HNO_3 to E-2. Slurry 5 times from 0-110 RPM and jet to F-1.

3) With the bowl at 10 RPM, add 350 lbs. of water to E-2 via the sprays, jetting continuously from E-2 to F-1.

The total weight of slurry sent to F-1 from E-2 will be the same as at present. A slight increase in the amount of KOH solution added to the metathesis slurry (107 lbs. of 50% KOH solution additional) will be necessary to neutralize the extra HNO_3 sent to F-1. This will also make it necessary to carry out metathesis on a slightly larger volume scale, 260 instead of 250 gal. No difficulty is expected in the metathesis operation due to the larger volume since emergency operations in the past have resulted in higher than standard metathesis volumes to be used, with no harmful effects on metathesis waste losses.

Data

The Technical Department Plant Assistance Group II will assist operations in monitoring both Cells E and F operation during the test series.

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Equipment and Materials

No equipment changes or additional materials of any kind are required for the test work.

Responsibility

Technical Department Plant Assistance: R.N.Benton, E.R.Gilbert, P.E.Lehman
All operations will be carried out under the Usual S Department supervision.

Estimated Completion

These preliminary tests should be completed within one week after the start.

Approval

W C Kay — Operating Department — Date 9/13/44

M. F. Peters — Technical Department — Date 9/12/1944

J N Mackey — Assistant Manager — Date 9/13

BHB:jd