NJ.33-1

NJ.33
FRC41

UNITED STATES GOVERNMENT

Office Memorandum

WNP 326 85501 Box 24
Folde: FMPC research-1

TO : Files

DATE: May 18, 1951

FROM : A. B. Babcock, Jr., Process Development Branch
Engineering and Construction Division

SUBJECT: SPRAY CALCINING TESTS AT BOWEN ENGINEERING, INC. - MAY 15 AND 16, 1951

SYMBOL: EPD:ABB:bt

RESEARCH & DEVELOPMENT (GEN.) - 1 ✓ C

On May 15 and 16, 1951 Bowen Engineering, Inc. made test runs on spray calcining of boiled-down Mallinckrodt pitchblende raffinate. These runs were made in Bowen's laboratory unit at North Branch, New Jersey. The initial results indicate that raffinate may be successfully spray calcined to an alkaline powder.

The first run on May 15 was made using a feed rate of 45 - 60 cc's per minute of raffinate with an inlet air temperature of 920 - 990°F (equivalent to about 7 pounds per minute). The feed temperature was about 130°F. The outlet air temperature was 420 - 490°F. This run resulted in incomplete calcination as indicated by a reddish brown product.

In run 2 the inlet air temperature was increased to 1000 - 1050°F and secondary air was admitted which was about 25 - 50% of the total air flow. Feed rate and temperature were the same as run 1. The outlet air temperature was 300 - 330°F. Again, the raffinate was not completely calcined.

In run 3 the inlet air temperature was increased still further to 1150 - 1180°F (maximum obtainable) and the feed rate was reduced to 25 - 30 cc's per minute. The outlet air temperature was 510 - 550°F. The product of this run was a black powder and was found to give an alkaline reaction when slurried with water (pH 7.7), and contained 23.5% NO_3 by weight (equivalent to 70 - 80% NO_3 recovery). About 265 grams of product were obtained, part of which will be sent to NBL for complete analysis. This analysis will be part of that eventually forwarded to the ore vendor.

More runs were made on May 16 in order to determine the effect of calcining a partially dehydrated product and of calcining with reduced air flow. None of these tests were as successful as run 3, although chemical data are not yet available. Detailed results of the tests outlined above will be submitted in a report by Catalytic and Bowen.

The equipment, most of which was stainless steel, was decontaminated on May 17. A laboratory scaler (scintillation counter) was used for the decontamination check. All equipment was scrubbed with dilute nitric acid and washed with water. Standard smear tests did not show any

significant contamination. The dust bag at the blower exhaust on the roof did not show any contamination (without cleaning), indicating that very little dust was formed. Mr. Ralph Martin, sales engineer for Bowen, was assured that no danger would be present using the equipment in future work.

Mr. Martin Kapp of Catalytic and Mr. Richard Hill of Kellex were present during the tests on May 15 and 16, 1951. Mr. Al Mezzina and Mr. Emil Lazzer of Kellex were present during decontamination of the equipment.

CC: H. B. Fry
F. M. Belmore
S. H. Brown
Engineering