New Stat CT 05-1
AL

STATION F
NEW YORK 16, N. Y.

CT.5

Special Review
Final Determination
Unclassified
By: K. A. Walter
Date: 1-30
P. F. Brown

...it to Yale University on 22 January 1944.

...OM to the files

Thru: Lt. Col. Ruhoff, Major Hadlock, Major Vance, Lt. Sturges.

1. A sketch of the proposed 1" diameter glass extraction column was transmitted to Professors English and Wood. It was agreed that the construction work would be started immediately.

2. Professors Harned and Van Name reported that the X content of 65% ores was completely extracted by nitric acid equivalent to all of the metallic oxides present (except silica). They found that these filtrates contained excess nitric acid. They are experimenting to find the ratio of nitric acid to ore that will give the extraction with no excess nitric acid in the filtrate. They are starting on the 10% ore digestion experiments. They were asked to make an additional experiment to show that the 10% ore content could be extracted with a strong solution resulting from previous ore extractions containing just enough excess nitric acid to dissolve the content of the added ore. The purpose was to investigate the possibility of operating a continuous dissolver with a continuous removal of solids, such as with a Bird continuous centrifuge. By this means, a strong extract could be obtained without excessive pulp densities or an elaborate countercurrent dissolving scheme.

3. Professor Thomas was engaged in setting up a Geiger counter and a simple electroscope. Prof. Evans is preparing for them a special gamma sensitive countering tube. By their present apparatus, they are supposed to be able to measure radium contents to ± 10%. More accurate determinations will have to be made by Prof. Evans. There seems to be some doubt both in Prof. Evans' and Prof. Harned's minds as to the arrangements made for the reimbursement of Prof. Evans.

4. After their samples of ore were received, Prof. Harned took 500 grams of the 65% material and extracted it with strong nitric acid. A barium sulfate precipitation was made on the filtrate which was separated and washed. The second nitric acid extraction was made on about 80% of the first residue. The examination of the filtrate and of the second residue showed no X content. Therefore, the X values were in the first filtrate. A series of simple experiments were made on the activity of these materials using the electroscope. As the instrument was housed in an 1/8" thick brass case, it was felt that the machine would measure only gamma rays. The background was found to be 0.25 divisions per minute. When the bottle containing the second extract was placed on top of the instrument, the deflection was still 0.25 divisions per minute, indicating very little, if any, radioactivity. The remainder of the residue from the first extraction was placed on the instrument and the deflection was 0.90 divisions per minute or a net activity of 0.65 divisions per minute. When the barium sulfate from the precipitation made on the first filtrate was placed on the instrument, a deflection of 14 divisions per minute was observed. Admittedly, the experiments are very crude and in no way quantitative but merely indicative

University on 22 January 1944. 25 January 1944

a large fraction of the radium had been extracted the first time and all, or practically all, was obtained in two extractions. Work is going forward on making more qualitative determinations and in setting up a quantitative counter mechanism to definitely prove the behavior of the radium.

CHARLES E. WINTERS

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