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May 11, 1951

T. Prudich
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This document consists of

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Tables, Series

Subject: INTERIM REPORT OF N-1 TANK PRODUCT RECOVERY IN THE 231 BUILDINGEXTRACT

The method of leaching the N-1 tank filter blocks in the 231 Building process cells was altered during the month of March, 1951. The leaching solution adopted consisted of 60% nitric acid instead of 25% nitric acid hitherto used. The purpose of the change was to attempt to improve the time required to filter a run through the N-1 tank and insure the removal of all product hold-up in the block. The filtering time in Cell 2 was reduced to a twenty to thirty minute range but the desired reduction was not achieved in Cells 3 and 4, consequently, the filter blocks in Cells 3 and 4 were replaced. Total product recovered from a series of N-1 block leaches in the operating cells during March and April was as follows: Cell 2 - 1.4 Kgs., Cell 3 - .9 Kgs. and Cell 4 - .9 Kgs., or a total of 3.1 Kgs. for the three cells, basing all calculations on an assumed I Factor of .930. These figures represent 11 standard runs basing a standard run as 2.10×10^{13} ATTC.

INTRODUCTION

With the increased production schedule of the 200 Areas, it became apparent that the 231 Building processing cycle would require corresponding reductions as well as rigid follow-up to maintain the building on a three shift, five day basis. It was noted that the time required to filter a run through the N-1 Tank of the various cells was approximately 90 minutes as compared to a normal filtration time of 20 to 30 minutes. Product recovery from normal N-1 tank cleanouts was large, particularly in Cell 2. While performing a master cleanout in Cell 1, it was found that 60% nitric acid possessed more desirable leaching properties than the 25% nitric acid hitherto used. Based on the above fact it was decided to leach the N-1 tank filter blocks in the operating cells using 60% nitric acid.

The objective of this report is to describe the leaching procedures utilized and summarize the quantity of product recovered.

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DISCUSSION

© The normal flow of materials through the processing cycle in the 231 Building requires the filtration of each charge as received from the Concentration Buildings. This is accomplished by means of the N-1 filter tanks located in each operating cell. This assembly consists of a stainless steel tank with a porous Grade "E" Filtros block mounted in the bottom of the tank. A designated quantity of elutriated filter aid is used to precoat the block prior to using the assembly. This filter aid serves as a protective barrier for the filter block proper and facilitates cleanouts.

© Approximately once each month, a cleanout of the N-1 tank is performed in each operating cell. This type cleanout consists of adding 25 Kgs. of nitric acid to the N-1 Tank. The contents in the tank are agitated for 20 to 30 minutes and jetted to the F-2 Tank for sampling and load out. The solution is drawn through the filter block while being removed from the N-1 Tank. This operation is repeated three times, making a total of four acid leaches of the filter aid and filter block. The leached filter aid in the N-1 Tank is then backwashed into a recycle can and transferred to the N-1 Tank in Cell 1 for further leaching with additional cleanout material.

© The above described procedure is considered a normal cleanout. In addition to this procedure another quick method of leaching the N-1 tanks has been utilized. This procedure consists of adding 25 Kgs. of nitric acid to the N-1 Tank and agitating the contents for 60 to 120 minutes. The acid is then drawn through the filter block and jetted to the F-2 Tank for sampling and load out. This operation is repeated once and the N-1 Tank is then flushed with 25 liters of distilled water to remove any residual acid. The filter aid is not removed with this type cleanout. A cleanout of the above type is called a "quick leach".

© All leaches of the N-1 Tank filter blocks in the past have been performed as described above, using 25% nitric acid for the leaching agent. Leaches performed during the months of March 1951 and April 1951 were the same as those leaches previously performed with the exception of substituting 60% nitric acid in place of the 25% nitric acid hitherto used.

© A master cleanout of the N-1 Tank in Cell 1 was started during February, 1951. Material in this tank consisted of backwashed filter aid from Cells 2, 3 and 4 plus additional filter aid which was in a number of recycle cans in Vault A. Samples of the filter aid in the recycle cans indicated that approximately 60 to 70 units of product were in this material. It was added to the Cell 1 N-1 Tank to be processed with the master cleanout.

A series of 25% nitric acid leaches performed on the accumulated filter aid in the Cell 1 N-1 Tank resulted in the recovery of 80 units of product. Core samples of the leached filter aid indicated that approximately 40 units of product were still present in the material. Since 25% nitric was ineffective in removing this product, the use of 60% nitric acid was inaugurated. This readily recovered the remaining product in the filter aid as shown by additional core samples of the leached filter aid and samples of the leaching acid.

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Since the above procedure, utilizing 60% nitric acid, rendered efficient leaching, a leach of the N-1 Tank in Cells 2, 3 and 4, with 60% nitric acid was performed. Product recovery from these leaches was as follows:

<u>Date Leached</u>	<u>Cell No.</u>	<u>% Std. Run Recovered</u>
3-7-51	2	151.7
3-8-51	3	82.3
3-15-51	4	116.2

The above leaches decreased the filtering time through the N-1 Tank in each cell. However, it was felt that the time cycles were still excessive, thus necessitating further leaching. In an effort to determine if the filter block proper was holding up product, the procedure for the Cell 3 cleanout was altered to include two 60% nitric acid leaches of the clean N-1 block after backwashing the filter aid. The leaches performed in Cells 2 and 4, included two leaches of the N-1 tanks without backwash and precoat operations, were the "quick type leach". Product recovery from these leaches was

<u>Date Leached</u>	<u>Cell No.</u>	<u>% Std. Run Recovered</u>
3-23-51	2	50.9
3-23-51	3	71.4*
3-23-51	4	33.4

* includes 10.5% recovered in two block leaches.

In an effort to insure the maintaining of batch size in the N-1 Tank, another series of leaches were performed. The backwashed filter block of Cell 2 was given an additional three leaches to determine product hold-up. The Cell 3 and 4 leaches were "quick type leaches", consisted of two nitric acid leaches without backwashing and precoating. Results of these leaching operations were:

<u>Date Leached</u>	<u>Cell No.</u>	<u>% Std. Run Recovered</u>
4-6-51	2	134.1*
3-30-51	3	21.2
4-2-51	4	33.8

* includes 27.2% recovered in three block leaches.

Data compiled above indicated that a considerable quantity of product was present in the filter blocks proper. It was, therefore, deemed necessary to perform a series of leaches of the backwashed filter blocks. These leaches were performed with the following results:

<u>Date Leached</u>	<u>Cell No.</u>	<u>Total % Recovered</u>	<u>No. of Block Leaches</u>	<u>% in Block Leach</u>
4-9-51	3	71.2	23	35.2
4-12-51	4	113.7	27	62.0
4-14-51	2	164.0	59	117.7

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The above leach reduced the filtration time through N-1 tank in Cell 2 from 90 minutes to 20 minutes. The filtration time of approximately 100 minutes in Cells 3 and 4 was reduced to 60 minutes, but the desired normal filtration time of 20 to 30 minutes was not obtained. Visual observation or runs filtering through the respective cells also indicated that the Cell 3 and 4 blocks were not clear. It was, therefore, felt necessary to replace these two filter blocks. N-1 cleanouts in these two cells were performed and the blocks replaced. Product recovery from these cleanouts were: ©

Date Leached	Cell No.	Total % Recovered	No. of Block Leaches	% in Block Leaches
4-23-51	3	31.2	2 ©	© 0.69
4-25-51	4	25.6	2 ©	© 0.71

The N-1 Tank filter blocks in Cells 2, 3 and 4 were leached again resulting in product recovery as listed below: ©

Date Leached	Cell No.	Total % Recovered ©	No. of Block Leaches ©	% in Block Leaches ©
5-2-51	2	33.6	8	8.2
5-3-51	4	16.45	2 ©	© 0.16
5-4-51	3	16.41	4	© 0.13 ©

Preliminary results of the last leaches performed indicate that the blocks may be free of product, as standard quantities of recovered material were obtained by the leaches. The problem is being studied by the Technical Divisions and results of their findings will be covered by an individual report. The filter blocks removed from Cells 3 and 4 will be leached by special means to recover any additional product which they may contain, and a final report summarizing the findings will be issued. ©

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