

NATIONAL LEAD COMPANY  
OF OHIO  
Cincinnati 39, Ohio

NLO

September 23, 1960

SUBJECT TRIP REPORT TO PIONEER DIVISION, BENDIX AVIATION CORPORATION, DAVENPORT,  
IOWA, ON SEPTEMBER 6 - 9, 1960  
TO J. A. Quigley, M.D.  
FROM F. J. Klein

**CENTRAL FILES**OBJECTIVE OF TRIP

The purpose of this trip was to: (1) determine if a Bendix sonic energy cleaning system can clean uranium-contaminated drums to the extent of reducing the alpha contamination level below that required for sale as "non-contaminated" by ABC Manual Chapter 5182-05 (5000  $\alpha$  d/m/100cm<sup>2</sup> average and at peak not more than 25,000  $\alpha$  d/m/100cm<sup>2</sup>, and (2) observe the health and safety aspects of the work and insure the adequate decontamination of the machinery, tools, equipment, and test area.

CONCLUSIONS AND RECOMMENDATIONS

This was a wet operation and the tank was not ventilated; however, should this type of machinery be used at the FMPC it is recommended that adequate ventilation be provided. The loading of the drums into the sonic tank was done manually with the minimum amount of radioactive dust generation possible. If future tests are deemed necessary it is recommended that the practice of vacuum cleaning the drums prior to shipment be continued in order to minimize the possibilities of exposure to radioactive airborne dust. Due to the short duration of the test operations (about 13 hours) and the relatively small volume of uranium handled, the exposure potential was not significant.

BACKGROUND FOR TRIP

Due to the ever increasing volume of contaminated drums and amount of uranium-bearing SS materials lost in the drums it becomes necessary to seek new and more efficient means of recovering as close to 100% of the uranium content as possible.

The first tests were conducted at Bendix Pioneer Division on January 18 - 20, 1960. At that time no industrial hygiene representative from NLO was present and the radiation measurements made by Bendix personnel were in terms of beta and gamma activity only. After the first tests it was recommended by M. S. Runck in his trip report dated March 30, 1960 to C.12.0-1 P. G. DeFazio "that further tests be conducted for the purpose of determining whether sonic energy cleaning will reduce the alpha radiation count within the limits set forth by ABC".

A representative of the NLO Health & Safety Division has accompanied the NLO team on subsequent tests. The Bendix people modified their sonic cleaning equipment since the second NLO tests conducted on June 1 - 3, 1960 and hoped that this third test would show a satisfactory improvement

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DAVENPORT, IOWA, ON SEPTEMBER 6 - 9, 1960  
J. A. Quigley, M.D.  
September 23, 1960

Page 2

in the cleaning efficiency.

#### PERSONS VISITED

Mr. D. Regan - Sales Representative, Sonic Energy Products  
Dr. T. Bulat - Manager, Sonic Application, Research Laboratory  
Mr. J. Smallwood - Assistant to Dr. Bulat  
Mr. K. Simpson - Laboratory Technician  
Mr. R. Palmer - Technical Service Representative, Oakite Products, Inc.

Additional NLO personnel present were:

Mr. M.S. Runck - Engineering Division  
Mr. F. Gardella - Plant 1 Production Foreman

#### DESCRIPTION OF TRIP

The NLO representatives arrived on Wednesday, September 7. This day and most of the following day was spent attempting to clean the drums with sonic energy.

An experimental copper steel tank 12 feet long, 4 feet deep, and 4 feet wide, compartmented into three sections 4 feet x 4 feet x 4 feet, was used for the test. The tank sat on metal legs about 2 feet above the floor and had a metal drip pan mounted about 1 foot below the entire bottom of the tank. One compartment of the tank was used as a pre-soak tank. The center compartment was used for 10 kilocycle cleaning with two sets of sonic energy modules mounted on opposite sides. The third compartment was used for rinsing or 20 kilocycle cleaning.

Only the last drum tested, drum No. 8, was given a 20 kilocycle cleaning. The main ingredient in the cleaning solution consisted of 2 pounds of Oakite Rust Stripper per gallon of water. Other chemicals such as sodium carbonate, sodium hydroxide, and sodium lauryl sulfate were also used but in smaller quantities during the tests.

Ten contaminated drums of 55-gallon capacity were sent from NLO for the sonic cleaning test. After the eighth drum had been used the tests were discontinued. A list of the radiation measurements before and after cleaning is contained in the attached appendix, Table I. It should be noted in Table I that the alpha counts after cleaning drums 1, 2, and 5 are higher than the alpha counts before cleaning. This is explained by incomplete removal of contaminants, thereby getting down to and exposing a more highly contaminated surface.

Draining the sonic tank, monitoring and decontaminating machinery, tools, equipment, personnel, and the test area started on Thursday afternoon and was completed on Friday morning. The contaminated cleaning solution and slurry was pumped into the 55-gallon drums supplied by NLO and prepared

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DAVENPORT, IOWA, ON SEPTEMBER 6 - 9, 1960  
J. A. Quigley, M.D.  
September 23, 1960

Page 3

for their return shipment. No significant contamination of personnel or clothing was found. The tools, equipment, and test area were decontaminated to background levels. Smear samples were also taken after instrument monitoring and the analytical results showed that the  $\alpha$  d/m/100cm<sup>2</sup> ranged from non-detectable up to 9, or still well within the background region.

MISCELLANEOUS COMMENTS

The cooperation of the Bendix, Oakite, and NLO personnel was very good. They were all receptive to any health and safety recommendations made.

COMMITMENTS

None

*F. J. Klein*  
F. J. Klein

FJK:bg

Attach.

cc: J. A. Quigley, M.D.  
J. H. Noyes (2x)  
R. H. Starkey (1x)  
M. S. Runck  
F. Gardella

Central File ✓

APPENDIX

TABLE I

<u>Drum No.</u>	<u>BEFORE CLEANING</u>						<u>AFTER CLEANING</u>					
	<u>High</u>	<u>B<math>\gamma</math>-rad/hr</u>		<u>High</u>	<u><math>\alpha</math>-d/m/100cm<sup>2</sup></u>		<u>High</u>	<u>B<math>\gamma</math>-rad/hr</u>		<u>High</u>	<u><math>\alpha</math>-d/m/100cm<sup>2</sup></u>	
		<u>Low</u>	<u>Average</u>		<u>Low</u>	<u>Average</u>		<u>Low</u>	<u>Average</u>		<u>Low</u>	<u>Average</u>
1	16	10	12	6,000	2,250	4,000	9	5	8	45,000	24,000	35,000
2	10	7	8	15,000	9,000	13,000	5	0.8	1.5	20,000	6,000	9,000
3	15	11	13	60,000	30,000	50,000	5	3	4	45,000	21,000	23,000
3A*	5	3	4	45,000	21,000	23,000	1	0.3	0.5	3,000	1,300	1,700
4	15	12	14	60,000	30,000	40,000	6	5	5	9,000	6,000	8,000
5	13	4	8	3,000	1,500	2,500	>20	7	10	15,000	3,000	7,000
6	18	7.5	10	90,000	30,000	60,000	3	2	2.5	18,000	6,000	9,000
7	>20	10	10	90,000	60,000	60,000	2	1	1.5	6,000	1,500	3,000
8	15	15	15	75,000	60,000	60,000	15	7	10	15,000	6,000	7,500

\*No. 3 drum was used twice