

URANIUM REDUCTION COMPANY

INTER-OFFICE CORRESPONDENCE

To B. B. Winn

From T. R. Downard

Date 1/13/59

Enclosure 1

Subject Uranium Concentration in Airborne dust samples taken in the mill. A10-TRD 17

Procedure: On 12-22-58 a series of samples of airborne dust was taken in various locations in the mill. The samples were taken by means of a Staplex Hi-Volume air sampler. The dust was collected on TFA #41 air filter papers.

At the completion of the sampling series, a circular area was cut from the center of each filter paper, the diameter of this disc being 1". This was done to facilitate counting in a window type counter.

After these samples had been counted, they were submitted to the analytical laboratory for analysis of uranium concentration in the dust.

Results of counting* in the window type counter are as follows:

<u>Sample Location</u>	<u>Counts per minute</u>
Crusher Building	61 c/m
Ball Mill gallery	8 c/m
Ball Mill & Classifier area	9 c/m
Packaging area	37 c/m
Fine Ore Bins	25 c/m
Sample Tower	42 c/m

* Counting was done at the Htex Laboratory on a Nuclear Chicago Model 163 Decade Scaler.

The results of the analysis of uranium in the samples submitted are as follows:

<u>Sample Location</u>	<u>U in micro-grans</u>
Crusher Building	154
Ball Mill gallery	9.4
Ball Mill & Classifier area	10.2
Packaging area	401
Fine Ore Bins	7.7
Sample Tower	10.2

The above figures show the amount of uranium collected in the 1" circular area. This disc has an area of .79 sq. in. However, the total volume of air sampled was passed through a circle having a 2.5" diameter. The area of this circle is 4.91 sq. in. This area is larger than the sampled area by a factor of 6.22

Therefore, we will multiply the uranium analysis results by the factor of 6.22 in order to determine the total amount of uranium filtered from the total volume of air sampled.

The sampler was operated at a sampling rate of 9 cu. ft. per minute for a period of 1 hour at each sample location. Thus our total volume of air sampled in each case was 540 cu. ft., or 15.3 cu. meters.

In order to determine the uranium concentration in each cubic meter of air sampled, we will divide the amount of uranium filtered at each location by the number of cubic meters of air sampled, or 15.3.

This series of calculations is made for each sample taken.

Example: The analytical results of the sample taken in the crushing building showed a uranium content of $154 \mu g$

$$154 \mu g \times 6.22 = 958 \mu g \text{ uranium in 15.3 cubic meters}$$

$$958 \mu g \div 15.3 = 62.6 \text{ micrograms U per cubic meter of air.}$$

Therefore, we determine that the uranium concentration in the airborne dust in the crushing building is $62.6 \mu g / M^3$.

The following table shows the calculated uranium concentration for the areas listed.

URANIUM CONCENTRATION IN AIRBORNE DUST

<u>Sample Location</u>	<u>U Concentration</u>
Crushing Building	$62.6 \mu g / M^3$ <i>62.6 x 10⁻⁷ g/ml</i>
Ball Mill gallery	$3.8 \mu g / M^3$ <i>3.8 x 10⁻⁷</i>
Ball Mill and Classifier area	$4.1 \mu g / M^3$ <i>4.1 x 10⁻⁷</i>
Packaging area	$163 \mu g / M^3$ <i>163 x 10⁻⁷</i>
Fine Ore Bins	$3.1 \mu g / M^3$ <i>3.1 x 10⁻⁷</i>
Sample Tower	$4.1 \mu g / M^3$ <i>4.1 x 10⁻⁷</i>

The air samples were taken over a one hour time period. This sampling period was proportioned in such a manner as to represent the same ratio of time the operators would normally spend in each particular area during an 8 hour work day within the location described. For example: If during an eight hour day, the packaging operator spends 2 hours of his time in the control room, 4 hours around the Skinner dryer and 2 hours on the bottom floor of the barrelling platform, the air sample was taken 15 minutes in the control room, 30 minutes in the area around the Skinner dryer and 15 minutes around the packaging area.

During the sampling periods all equipment was functioning properly and all areas were in good condition from the standpoint of "housekeeping".