FORM M-33

Uranium Reduction Company

MOAB, UTAH

REPORT OF METALLURGICAL TESTS

TO: B. B. Winn PROBLEM NO.: A10-TRD20

FROM: T. R. Downard DATE: 2-20-59

SUBJECT: Uranium concentration in airborne dust samples taken in the mill.

Refer to A10-D17

PROCEDURE: On 2-17-59 and 2-18-59, a series of airborne dust samples were taken in various work locations throughout the mill. These samples were procured by means of a Staplex Hi-Volume air sampler. The air volume sampled was passed through TFA#41 air filter papers, on which the suspended dust was collected. The air volume sampled at each work location was 50 FT^3. The sampler was operated at a flow rate of 12.5 FT^3/min. for a period of 4 minutes to obtain this total volume.

At the end of each 4 minute sampling period, the filter paper was removed from the sampler and immediately placed in a 150ml beaker containing 10 ml of concentrated HNO_3. The beakers were kept covered with aluminum foil both before and after the introduction of the filter paper in order to avoid contamination.

The samples in the beakers were then submitted to the analytical laboratory for further preparation and assay for U_3O_8 content.

DISCUSSION: As has been stated, the volume of air sampled in each case was 50FT^3. In order to determine the concentration of uranium in the airborne dust in each work location where a sample was taken, the following calculations are necessary:

The assay results received from the analytical laboratory are in terms of milli-grams of U_3O_8 present in the entire sample submitted. This figure is then converted to micro-grams, or ug.

Inasmuch as 50FT^3 is equal to 1.43M^3, each assay result is then divided by 1.43, the resultant being the number of ug of U_3O_8/M^3 in each location.

This figure is then multiplied by .842, to determine the amount of U concentration in terms of ug/M^3.

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RESULTS:

$1\ \mu g/M^3 = 6.81 \times 10^{-13}$ ... = 0.068×10^{-11} ...

SAMPLE LOCATION	mg U_3O_8 in 50FT³	ug U_3O_8/M^3	ug U/M^3	$\times 10^{-11}$ ...
Packaging - Barrel Loading rack	.043	30.3	25.5	1.78
Packaging - General area	.133	93.7	78.9	5.35
Hearth dryer # 5 hearth	.088	62.0	52.2	3.66
Hearth dryer # 1 hearth	.953	671.1	565.1	39.5
Precipitation section	.520	366.2	308.3	21.0
Crushing - Cone crusher	.580	408.5	344.0	23.4
Crushing - Jaw crusher	.155	109.2	91.9	6.4
Crushing - Upper levels	.093	65.5	55.2	3.76
Crushing - ground floor	.024	16.9	14.2	0.97
Crushing - Belt Picker's chair	.028	19.7	16.6	1.11
Sample Tower # 4 Belt	.065	45.8	38.6	2.63
Sample Tower Fine ore bins	.078	54.9	46.2	3.15

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SAMPLE LOCATION	mg U_3O_8 in 50FT^3	ug U_3O_8/M^3	ug U/M^3	
Sample Tower rolls crushers	.180	126.8	106.8	7.3
Sample Tower ground floor	.183	128.9	108.5	7.3
Ball Mill gallery	.010	7.0	5.9	0.4
Scale house	.020	14.1	11.9	0.82
Lot Sample room	.050	35.2	29.6	2.0
Moisture sample room	.020	14.1	11.9	0.82

CONCLUSIONS: It is to be noted that while the U concentration in most cases is well below the permissible limit, there are three locations which exceed the ~~200~~ 75 ug/M^3 limit. In order to determine whether these excessive results are due to high levels of U concentration present in these locations, or whether the samples became contaminated in handling, a follow up sample was taken in each location. The results of these samples are as follows:

SAMPLE LOCATION	mg U_3O_8 in 50FT^3	ug U_3O_8/M^3	ug U/M^3	
Lot sample room using air hose for clean up	.050	35.2	29.6	2.0
Lot sample room using vacuum cleaner	.025	17.6	14.8	1.0
Precipitation #2	.013	9.2	7.7	0.5
Hearth dryer #1 Hearth level	.250	176.1	148.2	10.0

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REPORT OF METALLURGICAL TESTS

TO: _____ PROBLEM NO.: _____

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SUBJECT: _____

In considering the results of these follow-up samples, it appears that the earlier sample taken at the Precipitation section became contaminated in some phase of handling. The re-check shows the U concentration to be very low.

The re-check at the #1 hearth level shows a greatly reduced level of concentration also. During the earlier sampling period, the yellow cake operator opened one of the access doors in the #2 hearth to break up a crust build-up on the rakes. This is probably the cause of the high concentration on the first sample.

In the lot sample room, the vacuum cleaner seems to be very effective in reducing the dust concentration in the air. It is to be noted that this method reduced the concentration present by half.

URANIUM REDUCTION COMPANY

INTER-OFFICE CORRESPONDENCE

To B. B. WINN A10-TRD 20

From T. R. DOWNARD Enclosure 2 **Date** 2-20-59

Subject Uranium concentration in airborne dust samples taken in the mill.

Refer to A10-TRD 17

PROCEDURE: On 2-17-59 and 2-18-59, a series of airborne dust samples were taken in various work locations throughout the mill. These samples were procured by means of a Staplex Hi Volume air sampler. The air volume sampled was passed through TFA#41 air filter papers, on which the suspended dust was collected. The air volume sampled at each work location was 50 FT^3. The sampler was operated at a flow rate of 12.5 FT^3/min. for a period of 4 minutes to obtain this total volume.

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The samples in the beakers were then submitted to the analytical laboratory for further preparation and assay for U_3O_8 content.

DISCUSSION: As has been stated, the volume of air sampled in each case was 50 FT^3. In order to determine the concentration of uranium in the airborne dust in each work location where a sample was taken, the following calculations are necessary:

The assay results received from the analytical laboratory are in terms of milli-grams of U_3O_8 present in the entire sample submitted. This figure is then converted in micro-grams, or μg .

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This figure is then multiplied by .842, to determine the amount of U concentration in terms of μg /M^3.

RESULTS:

Sample Location	mg U_3O_8 in 50 Ft^3	μg U_3O_8/M^3	μg U/M^3
Packaging-Barrel Loading rack	.043	30.3	25.5
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Sample Tower #4 Belt	.065	45.8	38.6
Sample Tower Fine ore bins	.078	54.9	46.2
Sample Tower Rolls crushers	.180	126.8	106.8
Sample Tower Ground floor	.183	128.9	108.5
Ball Mill gallery	.010	7.0	5.9
Scale House	.020	14.1	11.9
Lot Sample Room	.050	35.2	29.6
Moisture Sample Room	.020	14.1	11.9

CONCLUSIONS: It is to be noted that while the U concentration in most cases is well below the permissible limit, there are seven locations which exceed the 75 μg /M^3 limit. In order to determine whether these excessive results are due to high levels of U concentration present in these locations, or whether the samples became contaminated in handling, follow up sample was taken in each location. The results of these samples are as follows:

Sample Location	mg U_3O_8 in 50 Ft^3	μg U_3O_8/M^3	μg U/M^3
Lot sample room using air hose for clean up	.050	35.2	29.6
Lot sample room using vacuum cleaner	.025	17.6	14.8
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