

# URANIUM REDUCTION COMPANY

## INTER-OFFICE CORRESPONDENCE

**To** B. B. Winn  
**From** T. R. Downard  
**Date** 3-4-59  
**Subject** A10-TRD 20  
Calculations of Specific Activity of uranium concentration in airborne samples.

### Supplement to Report A10-TRD 20

**Procedure:** In order to determine the specific activity of the dust samples taken in this test, the following calculations are necessary:

The assay results received from the analytical laboratory are in terms of  $U_3O_8$  content in the entire sample, expressed in milli-grams. This figure is converted to micro-grams of  $U_3O_8$ , or grams  $\times 10^{-6}$   $U_3O_8$ . This figure is then multiplied by .842 to determine the number of grams times  $10^{-6}$  of U present in the sample. The number of grams times  $10^{-6}$  U is multiplied by  $0.68 \times 10^{-6}$ , the resultant being the number of micro-curies times  $10^{-6}$  for the entire sample. The total volume of air filtered in each sample was 50 cubic feet or 1.416 liters.

Therefore, to obtain the specific activity per ml, the total activity of the sample, in  $\mu c \times 10^{-6}$ , is divided by  $1.416 \times 10^6$ , and the result is the specific activity expressed in terms of  $\mu c \times 10^{-12}/ml$ . The decimal point is then moved one place to the left, and the final result is expressed in  $\mu c \times 10^{-11}/ml$ .

**Example:** The assay results obtained by the analytical laboratory indicate that the total weight of  $U_3O_8$  in the sample taken at the barrel loading position in the packaging area was .043 mg.  $U_3O_8$ , or  $43 \times 10^{-6}$  gms. of  $U_3O_8$ . This figure is multiplied by .842, the result being  $36.2 \times 10^{-6}$  gms. of U in the sample. This figure is then multiplied by  $.68 \times 10^{-6}$ , and the result is  $24.6 \times 10^{-12}$  C. This figure is the total activity of the entire sample in terms of Curies, and is written as  $24.6 \times 10^{-12}$  C, or  $24.6 \times 10^{-6}$  C. This figure is then divided by  $1.416 \times 10^6$ , which is the number of ml of air sampled, and the result is  $17.4 \times 10^{-12} \mu c/ml$ . Then by moving the decimal point one place to the left, we obtain the final result of  $1.7 \times 10^{-11} \mu c/ml$ . This is the specific activity for this particular sample.

The analytical laboratory results and the specific activity for each sample are listed in the following table:

Sample Location	Assay Results mg U <sub>3</sub> O <sub>8</sub>	Specific Activity $\mu\text{C} \times 10^{-11}/\text{ml}$
Packaging - barrel loading	.043	1.7
Packaging - general area	.133	5.4
Hearth Dryer		
#5 hearth level	.088	3.5
#1 hearth level (1)	.953	38.5
#1 hearth level (2)	.250	9.9
Precipitation Section (1)	.520	21.0
Precipitation Section (2)	.013	0.5
Crushing Building		
Cone Crusher	.580	23.4
Jaw Crusher	.155	6.3
Upper Levels	.093	3.7
Ground Floor	.034	1.0
Belt Picker's Location	.028	1.1
Sample Tower		
#4 Belt	.065	2.6
Fine Ore Bins	.078	3.2
Rolls Crushers	.180	7.3
Ground floor	.183	7.4
Ball Mill - gallery	.010	0.4
Scale House	.020	0.8
Lot Sample Room	.050	2.0
Using Air hose	.050	2.0
Using Vacuum Cleaner	.025	1.0
Moisture Determination Room	.020	0.8