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METALS DIVISION
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TECHNOLOGY DEPARTMENT
– ENGINEERING

DMB

October 5, 1983

U.S. Nuclear Regulatory Commission
Region III
Materials Radiological Protection Section
799 Roosevelt Road
Glen Ellyn, IL 60137

Attention: C. J. Paperiello - Chief, Materials Radiological Protection Section

Dear Carl:

Attached is the report from Oak Ridge National Laboratory (ORNL) which shows analytical data on the epoxy floor covering samples from the process building in Marietta.

The purpose of this work was to establish the thorium/uranium ratio in contaminants on the building floors, so that appropriate guidelines could be established for decontamination.

As suggested in your inspection report, a release limit between the thorium & uranium guidelines might be appropriate. Based on the ORNL ratio of 2.33:1 the limits would be 2200 dpm/100 cm^2 average, 6600 dpm/100 cm^2 maximum fixed Alpha and 440 dpm/100 cm^2 removable Alpha (see calculation attached).

We began our final clean up effort this month. We will attempt to remove the epoxy floor covering in areas that exceed the thorium limits. Where this is impossible we will work to the modified limits stated above.

We assume that if these limits are met, this will preclude the necessity for a hazards analysis report on the building.

Our schedule is to complete the clean up effort by November 11, 1983. Your radiological verification survey could be conducted after that date. We can offer some on-site assistance to your surveyor, if arrangements can be made to conduct the verification in November or early December.

Very truly yours,

L. G. Evans

L. G. Evans

IE 07

LGE:dac4
Attachment

CC: R. G. Beverly

CALCULATION

FIXED ALPHA

AVERAGE

Uranium $_{NAT}$	5000 dpm/100 cm^2 x .3	=	1500
Thorium $_{NAT}$	1000 dpm/$inch^2$ x .7	=	700
			2200 dpm/100 cm^2

MAXIMUM

Uranium $_{NAT}$	15000 dpm/$inch^2$ x .3	=	4500
Thorium $_{NAT}$	3000 dpm/$inch^2$ x .7	=	2100
			6600 dpm/100 cm^2

REMOVABLE ALPHA

Uranium $_{NAT}$	1000 dpm/100 cm^2 x .3	=	300
Thorium $_{NAT}$	200 dpm/100 cm^2 x .7	=	140
			440 dpm/100 cm^2

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

September 14, 1983

Mr. L. G. Evans
Union Carbide Corporation
Metals Division
P. O. Box 97
Niagara Falls, NY 14302

Dear Mr. Evans:

We have completed the uranium and thorium determination on the samples 12172, 12173, 12633 and the floor slab. These results are summarized in the attached table. Also included in the table are the calculated alpha/min./gram of material assuming chain equilibrium and 8 alpha/disintegration for uranium and 6 alpha/disintegration of thorium.

Since the Th/U ratio does not appear to be very favorable for your problems I tried a decontamination experiment. I applied a liberal quantity of 2% versene (di sodium ethylenediamine-tetraacetate) solution, brushed the surface with a soft bristle brush, and after standing for 30 min. rinsed the surface with water. The tile probed 300 d/m and after decontamination the same area probed 76 d/m. This is a decontamination factor of 3.95. The back side of the tile probes considerably higher; however, no attempt was made to decontaminate that side. The alpha spectra of the floor tile sample was highly attenuated but the high energy alphas from the ^{232}Th chain could be seen. The fraction of uranium alpha could not be obtained from the alpha spectrum but a 30% U - 70% Th distribution (calculated from the data in the table) would not be unreasonable.

If you have questions about any of the results or if we can be of further assistance, please call me at 615-576-7560.

Sincerely,

J. F. Emery

J. F. Emery
Neutron Activation
Analysis Group
Analytical Chemistry Division

JFE:daf

Attachment

Table

Element	Sample 12172 Mezzanine 100-1	12173 3rd Flr 100-2	12633 2nd Flr 100-3	Floor Slab
U(ppm)	672 ± 5	463 ± 3	689 ± 5	15.5 ± 0.1
U(α/m/gm)	4.17 E3	2.87 E3	4.27 E3	96.
Th(ppm)	9950 ± 400	2270 ± 100	6600 ± 300	150 ± 14
*Th(α/m/gm)	1.45 E4	3.31 E3	9.64 E3	220.
Th/U ratio	14.8	4.90	9.58	9.68
Th/U ratio	3.48	1.15	2.26	2.29
Cr(ppm)	3670	3230	2270	360
Ce(%)	1.92	0.41	1.12	209 ppm
Ta(%)	7.44	3.80	4.22	0.158

*Alpha/min/gm values are calculated assuming the uranium and thorium chains are in equilibrium with all of their daughters.