

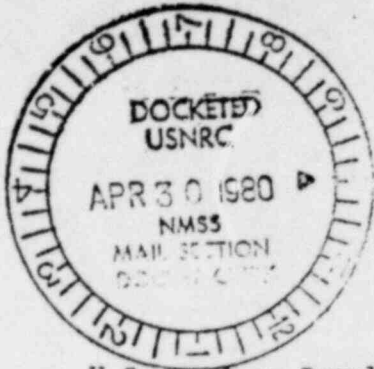
TIC . 40-1341

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

8005140168

400 Chestnut Street Tower II



April 9, 1980



U.S. Nuclear Regulatory Commission
Mr. Ross A. Scarano
Uranium Recovery Licensing Branch
Mail Stop SS 483
7914 Eastern Avenue
Silver Spring, Maryland 20910

Docket No. 40-1341

Dear Mr. Scarano:

Enclosed for your information are the results of TVA's analysis of soil samples collected in the city of Edgemont. As you are aware, the purpose of this sampling effort was to determine whether the radioactive anomalies identified in previous surveys are a result of tailings. Of the 18 residential locations selected for sampling only 13 were sampled for radionuclide concentrations (refer to Table 1 of enclosure). These results are summarized and compared to available data on control soils and sand tailings in Tables 2 and 3 of the enclosure. Copies of this enclosure have already been provided to the State of South Dakota and the EPA.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills by ELL

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

cc: Mr. Roger Caywood (Enclosure)
Silver King Mines
P.O. Box 49
Edgemont, South Dakota 57735

16147

FEE EXEMPT
AWK

APR 14 1980

Received 4/14/80

TABLE 1

RADIOACTIVITY IN SOIL AND OTHER MATERIALS - EDMONT, SOUTH DAKOTA, AREA

SAMPLES COLLECTED^a IN NOVEMBER 1979

Location	Total Uranium ($\mu\text{g/g}$)	Thorium-230 (pCi/g)	Radium-226 (pCi/g)	Ratio: Radium-226 to Uranium-238 ^b
1-1-A ^c	3.4	77 \pm 39 ^{d,e}	94.5 \pm 4.7	83
3-1-A	2.2	29 \pm 14	34.5 \pm 1.7	47
3-2-A	9.8	29 \pm 15	25.1 \pm 1.3	7.7
5-1-S	5.4	4 \pm 2	14.4 \pm 0.1	8.0
5-1-A	10.9	23 \pm 12	22.0 \pm 1.1	6.1
5-2-A	4.3	1 \pm 1	8.6 \pm 0.4	6.0
5-3-S	9.5	2 \pm 1	36.2 \pm 1.0	11.4
5-3-A	22.3	6 \pm 3	44.9 \pm 2.2	6.0
6-1-A	10.7	1 \pm 1	3.2 \pm 0.2	0.90
7-1-A	2.5	9 \pm 5	60.3 \pm 3.0	72
7-2-A	18.3	56 \pm 28	58.0 \pm 2.9	9.5
7-2-B	3.2	67 \pm 33	145 \pm 7	136
7-2-C	3.2	8 \pm 4	94.9 \pm 4.8	89
7-3-B	13.9	77 \pm 38	133 \pm 7	29
7-3-C	16.9	75 \pm 38	154 \pm 8	27
7-3-D	12.8	19 \pm 10	65.7 \pm 3.3	15
7-3-F	13.5	65 \pm 32	122 \pm 6	27
7-4-A	0.4	3 \pm 2	16.0 \pm 0.8	120
7-5-A	2.8	36 \pm 18	12.5 \pm 0.6	13
8-1-S	11.0	72 \pm 36	154 \pm 1	42
8-1-A	14.6	29 \pm 15	29.9 \pm 1.5	6.2
8-2-C	3.8	6 \pm 3	1.9 \pm 0.1	1.5
9-1-A	0.6	11 \pm 6	22.7 \pm 1.1	114
10-1-S	24.2	4 \pm 2	51.7 \pm 1.0	6.4

- a. Collection of samples was performed by State of South Dakota, Tennessee Valley Authority, and Silver King Mines personnel, under the direction of the South Dakota personnel.
- b. Uranium concentrations in pCi/g were calculated assuming the uranium isotopes are in their natural abundance ratio and a specific activity of 0.333 $\mu\text{Ci/g}$ for uranium-238 in natural uranium. Numerator and denominator are in pCi/g .
- c. Location code is as follows: First number--property designation; second number--designation for the core hole on the property; letter--designation for depth in the core. S = surface (top 2 inches), A = 2 inches to 8 inches, B = 8 inches to 14 inches, C = 14 inches to 20 inches, D = 20 inches to 26 inches, E = 26 inches to 32 inches, and F = 32 inches to 38 inches.
- d. Uncertainty is one standard deviation.
- e. Difficulties in obtaining a consistent chemical yield, due to the silica content of the samples, make the thorium results relatively more uncertain than the uranium and radium results.

Note: Samples were analyzed by the Radiological Hygiene Branch (TVA) Radio-analytical Laboratory by Ge(Li) spectrometry. The samples were sealed for at least 30 days. Radium concentrations were determined assuming equilibrium with bismuth-214 and lead-214. Uranium concentrations were determined from the uranium-235 activity in the 186 keV photopeak, after the total activity in that photopeak was reduced by the activity of radium-226.

POOR ORIGINAL

(TABLE 1 Continued)

RADIOACTIVITY IN SOIL AND OTHER MATERIALS - EDMONT, SOUTH DAKOTA, AREA

SAMPLES COLLECTED^a IN NOVEMBER 1979

<u>Location</u>	<u>Total Uranium ($\mu\text{g/g}$)</u>	<u>Thorium-230 (pCi/g)</u>	<u>Radium-226 (pCi/g)</u>	<u>Ratio: Radium-226 to Uranium-238^b</u>
10-1-A	128	67 \pm 34	65.8 \pm 3.3	1.5
11-1-A	11.1	69 \pm 35	106 \pm 5	29
12-1-A	1.0	24 \pm 12	16.2 \pm 0.8	49
12-1-B	5.6	26 \pm 13	3.4 \pm 0.2	1.8
15-1-A	3.5	46 \pm 23	72.9 \pm 3.7	63
17-1-S	616	113 \pm 57	194 \pm 1	0.95
17-1-A	416	107 \pm 53	147 \pm 7	1.1
17-1-C	31.2	-	7.8 \pm 0.4	0.75
18-1-A	550	91 \pm 45	173 \pm 9	0.94
19-1-A	10.1	26 \pm 13	3.4 \pm 0.2	1.0
21-1-A	26.3	13 \pm 7	146 \pm 7	17
22-1-A	595	83 \pm 42	190 \pm 10	0.96
23-1-A	2,020	544 \pm 272	627 \pm 32	0.93
24-1-A	2.9	3 \pm 2	1.2 \pm 0.1	1.2
25-1-A	2.3	3 \pm 2	0.9 \pm 0.1	1.2

TABLE 2

SUMMARY OF DATA ON RADIUM-226 AND URANIUM-238 CONCENTRATIONS
IN SOIL, SAND TAILINGS, AND OTHER MATERIALS - EDMONT, SOUTH DAKOTA, AREA

	<u>Mean Uranium Concentration ($\mu\text{g/g}$)</u>	<u>Mean Radium-226 Concentration (pCi/g)</u>	<u>Ration of Mean Radium-226 to Mean Uranium-238</u>	<u>Mean Ratio of Specific Radium-226 to Uranium-238 Values</u>
Soil-control locations ^a	3.5	1.8	1.5	2.0
Location 1 through 18 ^b	60	66	3.3	31
Location 19 ^c	10.1	3.4	1.0	1.0
Locations 24 and 25 ^d	2.6	1.1	1.3	1.2
Locations 22 and 23 ^e	1,310	410	0.94	0.95
Location 21 ^f	26.3	146	17	17
Sand Tailings ^g				
Area A ("AEC")	14.5	155	32	110
Area C ("east")	17.9	139	23	93
Pond No. 2	20.1	76	11	74
Pond No. 7	3.7	53	43	86
Area between ponds No. 4 and No. 7	9.3	48	15	85
Total	14.4	88	18	91

- a. Edgemont airport, Gull Hill Park, and proposed tailings disposal site. Collection in the 1974 to 1979 time period.
- b. November 1979, sampling under the direction of State of South Dakota personnel. Residential locations.
- c. November 1979, sampling under the direction of State of South Dakota personnel. City dump at point of highest direct radiation reading.
- d. November 1979, sampling under the direction of State of South Dakota personnel. Gravel and sand respectively.
- e. November 1979, sampling under the direction of State of South Dakota personnel. Lyon-McKnight and Runge ore piles, respectively.
- f. November 1979, sampling under the direction of State of South Dakota personnel. Area A ("AEC") sand tailings.
- g. Collection in 1974 and 1976.

Note: The variability in the average uranium and radium concentrations reported is very high, especially for the sand tailings. For sand tailings, the standard deviation is generally within a factor of 2 above or below the reported average value.

TABLE 3

DISTRIBUTION OF RATIO OF RADIUM-226 TO URANIUM-238 IN SOIL, SAND TAILINGS, AND OTHER MATERIALS

EDGEMONT, SOUTH DAKOTA, AREA

	Ratio (Cumulative Percent)						
	0.5-1.0	1.0-1.5	1.5-3	3-5	5-10	10-20	>20
Soil-control locations ^a	5(17)	14(66)	6(86)	2(93)	2(100)		
Locations 1 through 18 ^b	4(12)	1(15)	3(24)		8(48)	3(58)	14(100)
Location 19 ^c		1(100)					
Locations 24 and 25 ^d		2(100)					
Locations 22 and 23 ^e	2(100)						
Location 21 ^f						1(100)	
Sand tailings ^g							
Area A ("AEC")	1(3)			1(6)		5(23)	24(100)
Area C ("east")		1(2)	1(4)	3(10)	6(22)	8(37)	32(100)
Pond No. 2		1(4)	2(11)	1(14)	1(18)	4(32)	19(100)
Pond No. 7						4(18)	18(100)
Area between Ponds No. 4 and No. 7		1(5)	1(10)	1(14)	2(24)	1(29)	15(100)
Total	1(1)	3(3)	4(5)	6(9)	9(15)	22(29)	108(100)

- a. Edgemont airport, Gull Hill Park, and proposed tailings disposal site. Collection in the 1974 to 1979 time period.
- b. November 1979, sampling under the direction of State of South Dakota personnel. Residential locations.
- c. November 1979, sampling under the direction of State of South Dakota personnel. City dump at point of highest direct radiation reading.
- d. November 1979, sampling under the direction of State of South Dakota personnel. Gravel and sand, respectively.
- e. November 1979, sampling under the direction of State of South Dakota personnel. Lyon-McKnight and Runge ore piles, respectively.
- f. November 1979, sampling under the direction of State of South Dakota personnel. Area A ("AEC") sand tailings.
- g. Collection in 1974 and 1976.

10217