NRC

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Manpower Education, Research, and Training Division

January 30, 1989

Mr. John Kinneman
Region I
Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Subject: ADDITIONAL ANALYSES - SELECTED SOILS FROM SHIELDALLOY SITE

Dear Mr. Kinneman:

As part of the 1987 radiological survey of the Shieldalloy Corporation site in Newfield, New Jersey, ORAU was requested to also analyze a few samples from the site perimeter and drainage pathways for non-radiological components. Twenty soil samples were analyzed by a combination of X-ray fluorescence and neutron activation. Results are presented in the attached tables. As might be expected, most of these samples had concentrations of chromium, vanadium, and niobium (columbium) in excess of those in baseline soil. I would not attempt to interpret this data, but I would appreciate if you would pass it on to the appropriate contacts in the New Jersey Department of Health.

If NRC or New Jersey officials have any questions, I may be reached at (615) 576-3305 or FTS 626-3305.

Sincerely,

James D. Berger, Manager
Radiological Site Assessment Program

JDB:jls

copies to: G. LaRoche, NRC/6H3
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CONCENTRATIONS (PPM) OF NON-RADIOLOGICAL ELEMENTS IN SOIL
SHIELDALLOY CORPORATION SITE
NEWFIELD, NEW JERSEY

Element	Baseline	Sample[a, b]						
		1	2	3	4	5	6	7
Ag	<0.5	122	<5.7	<5.2	-	<5.44	<5.14	<4.28
Al	34,000	-[c]	24,900	23,700	-	23,800	15,300	9,900
As	12	36.4	8.15	4.01	<3.9	3.90	12.1	3.09
Ba	200	1,223	621	92.1	4,988	<214	<184	<171
Ce	52	338	175	35.8	2,669	<7.9	28.0	3.28
Co	7.3	33.8	12.3	12.1	<6.5	<2.75	8.46	4.13
Cr	38	2,782	2,062	108	33,200	168	174	73.4
Dy	4.3	3.95	2.13	1.54	84.2	1.55	1.11	0.73
Eu	0.90	1.11	0.61	0.28	95.4	0.28	<0.99	0.12
Fe	22,400	66,500	23,800	22,800	<2,900	20,600	14,200	4,600
Ga	<2	13.1	<2.6	4.88	-	3.27	1.54	1.54
Hf	9.9	40.5	61.5	18.5	39.1	13.7	10.2	10.6
Hg	<1	<3.45	<1.96	<1.21	<11.2	<1.20	<1.33	<1.16
In	<0.05	0.87	6.16	<0.15	<0.49	<6.33	0.38	<0.12
K	10,000	4,089	2,323	2,795	-	2,291	1,767	1,329
La	22	61.5	30.5	13.0	569	9.60	8.53	6.24
Lu	0.40	<0.3	<0.14	-	<0.39	<0.19	<0.09	0.27
Mn	630	1,613	1,130	170	523	476	274	162
Mo	6	25.7	39.6	<6.0	288	<6.11	<7.30	<7.65
Na	3,500	2,773	838	528	8,200	451	401	359
Nb	-	2,800	2,000	32	35,000	90	180	28
Ru	-	<18	14.8	<5.4	150	<4.98	<4.61	<4.33
Sb	0.84	11.6	1.98	<0.28	1.7	0.42	0.67	<0.26
Sc	5.4	12.5	4.38	5.14	16.9	3.73	2.52	1.50
Sm	4.3	8.68	5.35	2.08	108	1.77	1.59	1.12
Sr	70	-	-	-	2,580	<402	<29	<20
Ta	<0.1	25.9	42.1	<1.21	444	4.69	6.09	<1.30
Ti	3,700	-	3,275	5,700	17,900	4,994	2,786	3,134
V	45	4,940	505	66.5	1,120	170	213	42.3
W	0.7	13.2	7.39	<0.58	16.4	3.71	2.47	1.35
Yb	2.5	2.6	1.73	<0.71	14.9	<0.62	1.01	<0.42
Zn	116	2,090	591	<59	<168	520	668	711

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Element	Baseline	Sample						
		8	9	10	11	12	13	14
Ag	<0.5	4.58	<4.84	<5.01	<4.40	<5.64	<6.38	<5.22
Al	34,000	14,500	13,700	10,400	12,700	16,000	43,200	20,400
As	12	4.00	7.40	4.50	22.9	3.00	1.41	3.71
Ba	200	<184	<185	31.2	-	<199	2,440	917
Ce	52	<7.37	27.8	<6.50	20.2	31.4	801	306
Co	7.3	<2.41	<2.43	<253	<2.20	<2.90	<2.92	5.91
Cr	38	128	185	122	183	97.7	3,725	42,900
Dy	4.3	1.28	<0.19	0.83	1.09	1.87	10.0	1.67
Eu	0.90	0.18	0.18	0.11	0.18	0.32	3.55	0.83
Fe	22,400	9,000	8,700	4,200	9,100	13,000	9,900	9,500
Ga	<2	2.14	<2.71	<0.66	1.98	3.65	2.84	<5.73
Hf	9.9	17.4	18.1	7.83	17.9	13.8	46.8	19.1
Hg	<1	<1.42	<0.71	<1.07	<1.09	<1.35	<4.02	<2.76
In	<0.05	7.77	<3.85	<0.06	<7.22	<7.13	<2.14	<15.2
K	10,000	2,222	2,199	1,277	1,777	2,266	1,639	7,100
La	22	12.5	8.66	5.51	9.12	12.7	131	53.4
Lu	0.40	0.18	0.15	<0.09	<0.08	<0.11	1.97	<0.17
Mn	630	273	283	207	318	219	305	321
Mo	6	<8.27	<3.48	<5.39	<5.96	<8.76	46.0	<14.5
Na	3,500	626	630	390	586	543	1,515	7,100
Nb	-	59	82	130	55	63	3,800	2,600
Ru	-	<4.77	<4.79	<4.99	<3.94	<5.16	<8.35	<6.78
Sb	0.84	0.45	0.64	0.60	1.68	0.33	0.43	1.81
Sc	5.4	2.41	2.51	1.38	2.16	3.13	3.21	1.79
Sm	4.3	2.05	1.59	1.00	1.37	2.32	16.7	5.11
Sr	70	<30.9	<36.6	<17.6	<26.2	<30.0	230	<202
Ta	<0.1	<1.41	<1.51	<1.38	<1.16	<1.48	147	25.0
Ti	3,700	4,516	4,487	2,097	5,200	4,288	<944	1,949
V	45	64.8	97.9	84.2	121	81.5	486	1,451
W	0.7	1.42	2.64	1.16	3.45	<0.69	462	5.38
Yb	2.5	0.89	1.05	<0.63	<0.39	<0.57	8.24	<1.34
Zn	116	453	656	1,028	2,286	150	<72.0	<68.3
Zr	390	<362	731	<287	704	736	2,463	<655

CONCENTRATIONS (PPM) OF NON-RADIOLOGICAL ELEMENTS IN SOIL
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NEWFIELD, NEW JERSEY

Element	Baseline	Sample					
		15	16	17	18	19	20
Ag	<0.5	<5.33	<5.63	<21.4	<15.7	<25.6	<36.0
Al	34,000	40,800	31,900	58,200	53,000	57,500	9,900
As	12	6.81	3.55	14.4	47.6	75.2	9.26
Ba	200	563	<370	<944	<643	<1,350	<1,400
Ce	52	194	90.1	166	<187	399	26.2
Co	7.3	<2.95	63.6	52.9	245	440	80.9
Cr	38	6,000	1,736	10,100	12,300	10,800	2,755
Dy	4.3	1.41	3.70	12.9	<8.51	26.3	1.73
Eu	0.80	0.58	1.03	6.61	6.5	7.75	1.58
Fe	22,400	11,400	17,100	41,000	58,400	76,400	38,300
Ga	<2	5.14	4.64	<3.91	29.4	21.8	9.61
Hf	9.9	63.3	24.8	44.4	165	<30	52.6
Hg	<1	<1.63	<1.80	<5.60	<4.94	<7.5	<7.87
In	<0.05	<0.38	<0.96	<0.63	<2.2	<2.5	<0.29
K	10,000	2,656	630	-	-	5,700	4,659
La	22	68.3	47.6	68.0	156	236	32.2
Lu	0.40	0.22	<0.22	0.82	<0.29	2.43	0.23
Mn	630	1,245	968	1,291	4,561	998	584
Mo	6	32.4	26.2	<27.8	<27.9	89.5	<36.0
Na	3,500	1,306	581	2,324	1,776	1,683	1,069
Nb	-	17,000	1,500	1,000	3,500	3,500	480
Ru	-	<5.65	<6.23	<20.4	<15.3	<25	<32.3
Sb	0.84	4.90	4.18	10.4	36.1	39.8	278
Sc	5.4	1.62	2.39	11.7	8.08	10.9	9.48
Sm	4.3	4.05	5.87	15.6	12.2	36.9	4.1
Sr	70	<129	<152	-	-	-	<2,400
Ta	<0.1	7.77	24.8	24.9	84.6	145	4,224
Ti	3,700	2,351	-	10,500	-	-	8,500
V	45	4,208	6,100	4,200	30,100	-	221
W	0.7	22.2	11.4	30.7	65.9	83.9	2,895
Yb	2.5	0.95	<1.03	6.39	3.94	13.5	378
Zn	116	354	855	1,155	1,039	2,380	566
Zr	390	2,991	690	<1,397	8,300	2,975	<1,000

[a]Refer to attached Figure.
[b]Data have associated 2σ confidence levels of ± 10 to 20%.
[c]Dash indicates analyses not performed or result inconclusive because of interferences from other elements.