

PDR WM-24

Cyprus Mines Corporation
Uranium Division

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April 29, 1980
80-20.17-633



Ms. Madonna Krug
Uranium Recovery Licensing Branch
Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Ms. Krug:

RE: Hansen Project
Radiological Parameters

Enclosed are the responses to the questions related to the radiological parameters, as discussed in the meeting in your office on April 17, 1980.

Very truly yours,
M. A. Thompson
M. A. Thompson
Principal Licensing Engineer

MAT:lrf

Encl.

cc: Mr. Richard Gamewell - CDH, w/encl.

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RESPONSE TO RADIOLOGICAL PARAMETERS

1. a) Mill emissions are based on a capacity of 4,500 tons per day, 350 days per year, 24 hours per day.
b) The operational time sequence for the tailings cells has been provided in a letter dated April 16, 1980.
2. Dust control factors are based on EPA publications.
3. The locations of the three tailings cells in relation to the yellowcake dryer stack are as follows:

<u>Cell #</u>	<u>Distance East (ft.)</u>	<u>Distance North (ft.)</u>	<u>Elevation (ft.)</u>
1 (upstream)	5,000	420	-430
2	4,590	1,750	-490
3	4,170	3,670	-515

The surface areas and volumes are as follows:

<u>Cell #</u>	<u>Surface Area (acres)</u>	<u>Volume (acre-ft.)</u>
1 (upstream)	62	3,098
2	61	3,052
3	94	4,653

4. The uranium -238 activity in the tailings is estimated to be 20 pCi/g.
5. Source elevations relative to the base of the yellowcake dryer stack are as follows:

	<u>Ft.</u>
a) Yellowcake Dryer	- 90
b) Grinder (SAG mill)	- 82
c) Crusher (Grizzly)	- 50
d) Rod Mill	- None
e) Ore Stockpiles	- 20
f) Fine Ore Blending	- None
g) Tailings Pond	- See Response 3
h) Yellowcake Precipitation	- 52
i) Yellowcake Packaging	- 90

6. Receptor locations have been provided. The attached map (Attachment A) shows the restricted area fence around the mill and three-cell tailings area.

7. Revised estimated population distribution is provided in the enclosed table. (Attachment B)
8. Revised meteorological data for the mill area has been previously provided. Revised meteorological data for the mine area is enclosed as Attachment C.
9. The average acreage required to graze on animal for one month is estimated to be 1.4 ha.
10. The restricted area boundary for the mine is shown on the enclosed map (Attachment D).
11. The distance from the yellowcake stack to the center of the mines is as follows:

Hansen Mine: 13,125 ft. south
 500 ft. west
 -375 ft. elevation

Picnic Tree Mine: 18,000 ft. south
 4,000 ft. east
 -350 ft. elevation

ATTACHMENT B: ESTIMATED POPULATION DURING THE MILL OPERATION¹.

Distance From Mill ²	2 KM ³	3 KM	4 KM	5 KM	10 KM	20 KM	30 KM	40 KM	50 KM	60 KM	70 KM	80 KM
N	0	2	0	0		37	50	60	100	100	100	150
NNE	0			2	8	32	160	200	600	400	600	500
NE	0	2			8	32	160	600	200	1000	120000	80000
ENE	3		5		15	25	110	350	500	500	16500	17000
E	0				11	28	120	250	200	200	200	400
ESE	0				10	30	360	10600	3000	1000	1000	2000
SE	0		0		4	45	50	50	75	75	150	150
SSE	0		3		10	40	100	100	450	100	200	200
S	0				15	45	140	100	100	250	150	200
SSW	0				22	15	110	100	150	200	200	700
SW	0				25	25	20	55	75	80	120	100
WSW	0				12	18	70	5100	300	300	400	300
W	0				5	25	90	180	600	500	300	700
WNW	0					30	70	100	200	2300	500	300
NW	0		3			20	50	55	75	100	100	100
NNW	5					30	40	55	75	100	100	100

¹ Expressed as total population in each sector from mill to specified distance. Estimates 1979, using population data for counties, communities and districts and by contacts with residents near the mill site.

² Grid set up on N-S orientation with 16 equal sectors; thus, for example, the N sector covers 22.5° from due N to NNE.

³ 1 KM = 0.63 miles

ATTACHMENT C

MINE AREA JOINT
FREQUENCY DISTRIBUTION

Wind Speed Class. Stability Class A

Direction	2	3	4	5	6	7	Total
N	.001449	.002899	.001449	.000121	0		.005918
NNE	.000966	.001449	.001087	0	0		.003502
NE	.001570	.00966	.001087	0	0		.002623
ENE	.001208	.001208	.00725	0	0		.003140
E	.003382	.003382	.001329	0	0		.008092
ESE	.003261	.004348	.001812	.000604	0		.010024
SE	.003623	.003019	.002295	.000362	.000121		.009420
SSE	.002053	.001087	.002657	.000121	0	-0-	.005918
S	.003019	.003382	.003140	.000604	0		.010145
SSW	.001812	.003382	.003986	.000725	0		.009903
SW	.003019	.005435	.009541	.000604	0		.018599
WSW	.003382	.003382	.007609	.001449	0		.015821
W	.005072	.004710	.006159	.002208	.000362		.017512
WNW	.002778	.001449	.002415	.000483	.000121		.007246
NW	.002899	.001932	.004469	.000483	0		.009783
NNW	.001812	.001329	.003944	.000242	0		.007126
Total	.041305	.043357	.053502	.007005	.00604	0.0	.145773

Stability Class B

Wind Speed Class

Direction	2	3	4	5	6	7	Total
N	.000121	.000242	.000725	0			.001087
NNE	0	0	0	.000362	0		.000362
NE	.000121	.000242	.000604	0	0		.000966
ENE	.000242	.000141	.000121	0	0		.000483
E	.001932	.001932	.001329	0	0		.005193
ESE	.001449	.003865	.001812	.000362	0		.007488
SE	.000845	.000725	.000966	0	0		.002536
SSE	.000242	.000604	.000483	.000121	0		.001449
S	0	.000483	.000362	.000362	0	0	.001208
SSW	.000121	.000725	.001812	.001449	0		.004106
SW	.000242	.001570	.006522	.001449	0		.009783
WSW	.000141	.000725	.003865	.003140	0		.007850
W	.000242	.000242	.003382	.002536	.000242		.006643
WNW	0	0	.001087	.000362	0		.001449
NW	0	.000242	.000966	.000483	0		.001691
NNW	0	0	.001449	.000121	0		.001570
Total	.005676	.011715	.025483	.010749	.000242	0	.053865

Stability Class C

Wind Speed Class

Direction	2	3	4	5	6	7	Total
N	0	.000362	.000604	0	0	0	.000966
NNE	0	.000242	.000121	.000242	0	0	.000604
NNE	.000121	0	0	0	0	0	.000121
ENE	.000362	.000725	.000121	0	0	0	.001208
E	.000483	.003261	.001208	.000362	0	0	.005314
ESE	.002295	.004589	.004348	.002295	0	0	.013527
SE	.000362	.000966	.000725	.000121	0	0	.002174
SSE	.000121	.000242	.000242	.000121	0	0	.000725
S	0	.000121	.000362	0	0	0	.000483
SSW	.000121	.000121	.001208	.002415	.000362	0	.004227
SW	.000121	.001932	.008454	.004831	.000242	0	.015580
WSW	.000121	.001570	.010145	.007367	.000483	.000121	.019807
W	0	.000362	.003623	.007126	.000483	0	.011594
WNW	.000121	0	.001691	.000725	.000362	.000121	.003019
NW	0	0	.001449	.001932	0	0	.003382
NNW	0	.000242	.002295	.000121	0	0	.002657
Total	.001227	.014734	.036594	.027657	.001932	.000242	.085386

Stability Class D

Wind Speed Class

Direction	2	3	4	5	6	7	Total
N	0	.000362	.002778	.000121	0	0	.003261
NNE	0	.000121	.001087	.000121	0	0	.001329
NE	.000121	.000604	.000604	0	0	0	.001329
ENE	.000242	.000242	.000483	0	0	0	.000966
E	.001329	.002657	.003140	.001087	0	0	.008233
ESE	.004589	.017633	.024758	.013285	.000362	0	.060628
SE	.001449	.001812	.001691	.000242	0	0	.005193
SSE	.000121	0	.001087	0	0	0	.001208
S	.000121	.000483	.000966	.000362	0	0	.001932
SSW	0	.000242	.003865	.001812	0	0	.005918
SW	.000121	.005676	.015580	.012560	.001208	.000121	.035266
WSW	.004469	.021377	.028019	.021024	.003744	.000725	.079348
W	.002778	.012681	.028430	.016304	.005676	.000725	.061594
WNW	.000483	.001449	.004952	.004952	.000725	.000362	.012923
NW	0	.000845	.004227	.003865	.000362	0	.009300
NNW	.000121	.000725	.002657	.000242	0	.000121	.003865
Total	.015942	.066908	.119324	.075966	.012077	.002053	.292271

Stability Class E

Wind Speed Class

Direction	2	3	4	5	6	7	Total
N	.000121	.000345	.000121	0	0	0	.000687
NNE	0	.000242	.000242	0	0	0	.000483
NW	0	.000121	0	0	0	0	.000121
E	.000483	.000362	0	0	0	0	.000845
ESE	.001449	.000845	.000725	.000121	0	0	.003140
SE	.003623	.010266	.014130	.008575	.000121	0	.026715
SSE	.000916	.001570	.000121	0	0	0	.002657
S	.000121	.000362	0	0	0	0	.000483
SSW	.010362	.000725	0	0	0	0	.001087
SW	.000121	.001329	0	0	0	0	.001449
WSW	.000845	.004589	.003174	.000966	.000121	0	.008696
W	.007246	.013889	.007367	.008575	.002157	.000845	.046580
WNW	.019494	.019449	.004227	.006401	.003502	.002415	.051208
NW	.001087	.002415	.000242	.000121	.000362	.000121	.004348
NNW	.000121	.001932	.000242	.000121	0	0	.002415
	0	.000966	0	.000121	0	0	.001087
Total	.035990	.055676	.029589	.025000	.006763	.003382	.156401

Stability Class F+G

Wind Speed Class

Direction	2	3	4	5	6	7	Total
N	.003019	.000483	0	0	0	0	.003502
NNE	.003053	.000604	0	0	0	0	.003657
NW	.000725	.000483	0	0	0	0	.001329
EVE	.001570	.000845	0	0	0	0	.002415
E	.004016	.002174	0	0	0	0	.006280
ESE	.002174	.002778	.000483	0	0	0	.005435
SE	.002053	.001812	0	0	0	0	.003865
SSW	.003261	.000604	0	0	0	0	.003865
S	.004831	.002657	0	0	0	0	.007488
SSW	.007126	.002778	0	0	0	0	.009903
SW	.013889	.00483	.000362	.000121	0	0	.019444
WSW	.038768	.014372	.000604	.000604	0	0	.053986
W	.076087	.023068	.000362	.000121	.000121	.000483	.099638
WNW	.019807	.007005	0	0	0	0	.026570
NW	.007488	.03623	0	0	0	0	.011111
NNW	.006159	.001208	0	0	0	0	.007367
Total	.193237	.069807	.001812	.000815	.002121	.000483	.266309

Stability Class

Wind Speed Class

Direction

1000

	2	3	4	5	6	7	Total
N	.004710	.005193	.005676	.000242	0	0	.015821
NNE	.003019	.002657	.002536	.000725	0	0	.008937
NE	.002772	.002415	.002295	0	0	0	.007488
ENE	.004106	.003502	.001449	0	0	0	.009058
E	.012681	.014251	.007729	.001570	0	0	.036232
ESE	.017391	.043478	.047343	.025121	.000483	0	.133816
SE	.009300	.009903	.005997	.000725	.000121	0	.025845
SSE	.005918	.002299	.004469	.000362	0	0	.013647
S	.008333	.007850	.004831	.001329	0	0	.022343
SSW	.009300	.008575	.010870	.006401	.000362	0	.035507
SW	.018237	.024517	.042633	.020531	.001570	.000121	.107609
WSW	.054106	.055314	.057109	.042150	.006664	.001691	.217759
W	.109623	.056280	.041184	.033646	.010366	.003623	.248792
WNW	.024275	.012319	.010386	.006643	.001570	.000604	.055797
NW	.010507	.008575	.011353	.006664	.000362	0	.037681
NNW	.008092	.004469	.010145	.000845	0	.000121	.023671
Total	.296377	.262198	.266304	.147222	.021739	.006159	1.000000