

RIO ALGOM MINING CORP.

40-8084

040080843002

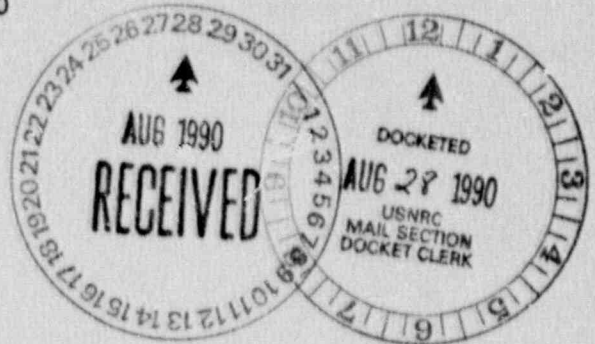
La Sal Route
MOAB, UTAH 84532

Phone: (801) 686-2215
FAX (801) 686-2337

RETURN ORIGINAL TO PDR, HQ.

August 29, 1990

Mr. Ramon E. Hall, Director
U. S. Nuclear Regulatory Commission
Region IV
Uranium Recovery Field Office
P. O. Box 25325
Denver, Colorado 80225



Re: Docket No. 40-8084
Source Material License SUA-1119

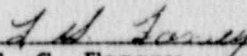
Dear Mr. Hall:

Enclosed please find five (5) copies of the Semiannual Effluent Report for Rio Algom Mining Corp.'s Lisbon Mill. This data is the result of monitoring for the period January 1, 1990 through June 30, 1990.

This submittal satisfies License Condition 22 and 10 CFR 40.65.

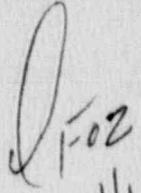
If you or your staff have any questions concerning this submittal, please call (801) 686-2217.

Respectfully,



F. G. Fossey
Radiation Safety Officer
R.A.M.C- Lisbon
Operations

DESIGNATED ORIGINAL
Certified By Mary C. Hood


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SEMIANNUAL ENVIRONMENTAL MONITORING REPORT

for

January 1, 1990 through June 30, 1990

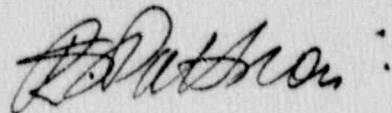
Prepared

By

RIO ALGOM MINING CORP. - Lisbon Operation

Source Materials License Number - SUA-1119

Docket Number - 40-8084



R. S. Pattison
Manager

23 August 1990.

Date

STACK- YELLOWCAKE AND ORE

R.A.M.C.-Jisbon Operation has no stack emission to report during the reporting period 01/01/90 through 06/30/90. The mill was on standby for the entire reporting period.

OFFSITE AIR MONITORING STATIONS

Date COLLECTED	LOCATION	RADIONUCLIDE	GROSS CONCENTRATION (uCi/ml)	ERROR ESTIMATE (uCi/ml)	LLD (uCi/ml)	(e) % MPCa
12/29/89 to 03/30/90	EM-1	U-Nat	6.1 E-16	2.0 E-15	5.0 E-16	0.01
		Th-230	1.1 E-16	2.0 E-16	2.0 E-16	0.13
		Ra-226	2.2 E-16	1.8 E-16	1.0 E-16	0.01
		Pb-210	1.8 E-14	1.7 E-15	9.0 E-16	0.46
		Rn-222 (gas)	2.1 E-10	9.9 E-11	6.0 E-11	6.87
03/30/90 to 06/30/90	EM-1	U-Nat	1.3 E-15	2.1 E-15	5.0 E-16	0.03
		Th-230	7.6 E-17	2.1 E-16	3.0 E-16	0.10
		Ra-226	1.5 E-17	7.6 E-17	1.0 E-16	<0.01
		Pb-210	1.1 E-14	7.6 E-16	9.0 E-16	0.26
		Rn-222 (gas)	1.5 E-10	6.0 E-11	6.0 E-11	5.03
12/29/89 to 03/30/90	EM-2	U-Nat	6.4 E-16	2.0 E-15	5.0 E-16	0.01
		Th-230	1.1 E-16	2.0 E-16	2.0 E-16	0.14
		Ra-226	2.9 E-16	2.2 E-16	1.0 E-16	0.02
		Pb-210	2.1 E-14	1.8 E-15	7.0 E-16	0.53
		Rn-222 (gas)	6.8 E-10	3.1 E-11	6.0 E-11	22.63
03/30/90 to 06/30/90	EM-2	U-Nat	3.4 E-15	2.2 E-15	5.0 E-16	0.07
		Th-230	1.6 E-16	2.5 E-16	3.0 E-16	0.20
		Ra-226	9.5 E-17	1.2 E-16	1.0 E-16	<0.01
		Pb-210	9.8 E-15	8.7 E-16	7.0 E-16	0.25
		Rn-222 (gas)	4.0 E-10	1.9 E-10	6.0 E-11	13.53
12/29/89 to 03/33/90	EM-4	U-Nat	7.0 E-16	2.2 E-15	5.0 E-16	0.01
		Th-230	1.7 E-16	2.0 E-16	1.0 E-16	0.21
		Ra-226	2.6 E-16	2.2 E-16	1.0 E-16	0.01
		Pb-210	1.8 E-14	1.2 E-15	8.0 E-16	0.45
		Rn-222 (gas)	1.1 E-10	5.5 E-11	6.0 E-11	3.50
03/30/90 to 06/30/90	EM-4	U-Nat	1.5 E-15	2.4 E-15	5.0 E-16	0.03
		Th-230	0.0 E+00	2.1 E-16	3.0 E-16	0.00
		Ra-226	1.9 E-16	1.4 E-16	1.0 E-16	0.01
		Pb-210	1.1 E-14	8.5 E-16	8.0 E-16	0.28
		Rn-222 (gas)	2.1 E-10	1.1 E-10	6.0 E-11	6.90
12/29/89 to 03/30/90	EM-6 Bckgrd.	U-Nat	0.0 E+00	2.3 E-15	5.0 E-16	0.00
		Th-230	3.7 E-16	3.0 E-16	2.0 E-16	0.46
		Ra-226	7.4 E-17	1.2 E-16	9.0 E-17	<0.01
		Pb-210	2.0 E-14	2.0 E-15	1.0 E-15	0.49
		Rn-222 (gas)	3.9 E-10	2.0 E-10	6.0 E-11	13.03
03/30/90 to 06/30/90	EM-6 Bckgrd.	U-Nat	1.5 E-15	2.4 E-15	5.0 E-16	0.03
		Th-230	5.1 E-17	2.2 E-16	4.0 E-16	0.06
		Ra-226	1.7 E-17	8.8 E-17	1.0 E-16	<0.01
		Pb-210	1.1 E-14	8.6 E-16	1.0 E-16	0.28
		Rn-222 (gas)	2.9 E-10	1.6 E-10	6.0 E-11	9.70

e) %MPCa is based upon gross nuclide concentrations divided by the appropriate unrestricted area MPCa from Table 1 on Page 23. No subtraction of EM-6 concentrations (area background) have been performed.

GROUND WATERS- Dissolved Radionuclides (North Aquifer)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>RADIONUCLIDE</u>	<u>GROSS CONCENTRATION (pCi/l)</u>	<u>ERROR ESTIMATE (pCi/l)</u>	<u>LLD (pCi/l)</u>
MW-5 Background	U-NAT	7.45 E+00	3.70 E+00	2.50 E-01
	Ra-226	2.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	4.00 E-01	1.20 E+00	9.00 E-01
	Th-230	3.00 E-01	5.00 E-01	2.00 E-01
	Gross Alpha	1.50 E+01	5.00 E+00	1.00 E+00
OW-UT-9 POC	U-NAT	3.66 E+04	8.60 E+02	6.44 E+00
	Ra-226	4.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	1.00 E-01	1.10 E-01	9.00 E-01
	Th-230	4.00 E-01	5.00 E-01	2.00 E-01
	Gross Alpha	2.00 E+04	1.00 E+02	1.00 E+00
H-56 POC	U-NAT	2.56 E+04	7.80 E+02	5.24 E+00
	Ra-226	6.00 E-01	4.00 E-01	2.00 E-01
	Ra-228	1.50 E+00	8.00 E-01	9.00 E-01
	Th-230	4.00 E-01	5.00 E-01	2.00 E-01
	Gross Alpha	1.60 E+04	4.00 E+02	1.00 E+00
EF-24 PUMP BACK	U-Nat	1.92 E+04	1.24 E+03	5.24 E+00
	Ra-226	0.00 E+00	2.00 E-01	2.00 E-01
	Ra-228	1.30 E+00	1.30 E+00	9.00 E-01
	Th-230	2.00 E-01	4.00 E-01	2.00 E-01
	Gross Alpha	1.90 E+04	5.00 E+02	1.00 E+00
EF-23	U-Nat	1.55 E+02	7.95 E+00	5.30 E+00
	Ra-226	1.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	5.00 E-01	1.00 E+00	9.00 E-01
	Th-230	1.00 E-01	6.00 E-01	2.00 E-01
	Gross Alpha	1.20 E+02	3.00 E+01	1.00 E+00
EF-25	U-Nat	1.78 E+04	7.43 E+02	5.30 E+00
	Ra-226	2.00 E-01	2.00 E-01	2.00 E-01
	Ra-228	1.90 E+00	9.00 E-01	9.00 E-01
	Th-230	4.00 E-01	5.00 E-01	2.00 E-01
	Gross Alpha	1.40 E+04	4.00 E+02	1.00 E+00

GROUND WATER- Dissolved Radionuclides (North Aquifer Cont.)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>RADIONUCLIDE</u>	<u>GROSS CONCENTRATION (pCi/l)</u>	<u>ERROR ESTIMATE (pCi/l)</u>	<u>LLD (pCi/l)</u>
MW-7	U-NAT	5.28 E+04	1.14 E+03	5.30 E+00
	Ra-226	0.00 E+00	2.00 E-01	2.00 E-01
	Ra-228	1.40 E+00	8.00 E-01	9.00 E-01
	Th-230	1.00 E+00	9.00 E-01	2.00 E-01
	Gross Alpha	2.70 E+04	1.00 E+03	1.00 E+00
MW-8A	U-NAT	3.11 E+04	1.82 E+02	5.30 E+00
	Ra-226	2.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	1.00 E+00	8.00 E-01	9.00 E-01
	Th-230	9.00 E-01	6.00 E-01	2.00 E-01
	Gross Alpha	2.20 E+04	1.00 E+03	1.00 E+00
MW-9	U-NAT	3.79 E+01	3.78 E+00	5.30 E+00
	Ra-226	1.00 E-01	2.00 E-01	2.00 E-01
	Ra-228	2.00 E+00	1.20 E+00	9.00 E-01
	Th-230	0.00 E+00	3.00 E-01	1.00 E+00
	Gross Alpha	1.20 E+02	3.00 E+01	1.00 E+00
FW-1	U-Nat	4.42 E+04	5.72 E+02	5.24 E+00
	Ra-226	1.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	7.00 E-01	8.00 E-01	9.00 E-01
	Th-230	2.40 E+00	1.10 E+00	2.00 E-01
	Gross Alpha	3.90 E+04	1.00 E+03	1.00 E+00
FW-2	U-Nat	8.46 E+03	1.64 E+02	6.44 E+00
	Ra-226	2.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	1.60 E+00	1.20 E+00	9.00 E-01
	Th-230	1.00 E-01	4.00 E-01	2.00 E-01
	Gross Alpha	6.30 E+03	2.00 E+02	1.00 E+00

GROUND WATER- Dissolved Radionuclides (South Aquifer)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>RADIONUCLIDE</u>	<u>GROSS CONCENTRATION (pCi/l)</u>	<u>ERROR ESTIMATE (pCi/l)</u>	<u>LLD (pCi/l)</u>
MW-13	U-NAT	1.49 E+01	3.74 E+00	2.50 E-01
	Ra-226	3.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	2.00 E-01	1.30 E+00	9.00 E-01
	Th-230	0.00 E+00	3.00 E-01	2.00 E-01
	Gross Alpha	2.30 E+01	4.00 E+00	1.00 E+00
MW-11A	U-NAT	4.48 E+04	5.80 E+02	5.24 E+00
	Ra-226	2.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	9.00 E-01	1.00 E+00	9.00 E-01
	Th-230	2.00 E-01	4.00 E-01	2.00 E-01
	Gross Alpha	3.70 E+04	1.00 E+03	1.00 E+00
EF-3	U-NAT	4.80 E+04	2.88 E+02	2.95 E+00
	Ra-226	4.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	1.00 E+00	8.00 E-01	9.00 E-01
	Th-230	3.60 E+00	1.10 E+00	2.00 E-01
	Gross Alpha	4.30 E+04	1.00 E+03	1.00 E+00
EF-4	U-Nat	4.10 E+01	2.05 E+00	2.95 E+00
	Ra-226	8.00 E-01	4.00 E-01	2.00 E-01
	Ra-228	1.10 E+00	8.00 E-01	9.00 E-01
	Th-230	3.00 E-01	5.00 E-01	2.00 E-01
	Gross Alpha	4.80 E+01	9.00 E+00	1.00 E+00
EF-5	U-Nat	1.58 E+04	6.57 E+01	2.95 E+00
	Ra-226	9.00 E-01	4.00 E-01	2.00 E-01
	Ra-228	9.00 E-01	8.00 E-01	9.00 E-01
	Th-230	0.00 E+00	6.00 E-01	2.00 E-01
	Gross Alpha	1.50 E+04	4.00 E+02	1.00 E+00
EF-6	U-Nat	1.79 E+03	3.26 E+01	6.44 E+00
	Ra-226	2.00 E-01	3.00 E-01	2.00 E-01
	Ra-228	5.00 E-01	1.20 E+00	9.00 E-01
	Th-230	2.60 E+00	1.40 E+00	2.00 E-01
	Gross Alpha	1.20 E+03	1.00 E+02	1.00 E+00
MW-4	U-Nat	1.19 E+03	9.46 E+01	5.30 E+00
	Ra-226	5.00 E-01	4.00 E-01	2.00 E-01
	Ra-228	9.00 E-01	8.00 E-01	9.00 E-01
	Th-230	0.00 E+00	3.00 E-01	2.00 E-01
	Gross Alpha	9.20 E+02	5.00 E+01	1.00 E+00
FT-4	U-Nat	3.78 E+00	3.80 E+00	5.30 E+00
	Ra-226	6.00 E-01	4.00 E-01	2.00 E-01
	Ra-228	1.00 E+00	8.00 E-01	9.00 E-01
	Th-230	0.00 E+00	3.00 E-01	2.00 E-01
	Gross Alpha	1.90 E+01	7.00 E+00	1.00 E+00

GROUNDWATER DISSOLVED CHEMISTRIES-(Gross Concentrations)

<u>Date Collected</u>	<u>Location</u>	<u>Sulfate mg/l</u>	<u>Chloride mg/l</u>	<u>pH SU</u>	<u>Conductivity (umho/cm)</u>	<u>Water Level(ft.)</u>
<u>NORTH</u>						
04/23/90	MW-5	249	39	7.17	968	149.84
05/04/90	OW-UT-9	5317	1690	9.43	20400	N/A
04/24/90	H-56	3502	670	8.23	10230	91.15
05/04/90	EF-24	4350	788	7.02	10700	222.17
05/01/90	EF-23	2362	534	7.01	5523	161.49
05/02/90	EF-25	3603	709	7.41	8373	149.60
05/03/90	MW-7	8252	1030	7.10	17736	145.70
05/03/90	MW-8A	5564	913	6.75	12572	173.65
05/02/90	MW-9	650	284	6.99	2140	204.61
05/09/90	RW-1	7791	1059	9.56	24232	163.37
05/07/90	RW-2	1663	767	8.68	6577	196.60
<u>SOUTH</u>						
04/23/90	MW-13	140	58	7.44	705	90.41
05/07/90	MW-11A	3984	1457	9.22	14950	N/A
04/26/90	EF-3	4509	1467	9.15	14742	65.63
04/26/90	EF-4	226	151	7.39	962	99.60
04/25/90	EF-5	2603	971	7.31	962	75.86
05/09/90	EF-6	1566	491	6.92	3831	55.53
04/27/90	MW-4	391	563	7.53	2684	134.35
04/27/90	FT-4	263	185	7.32	1439	74.18

GROUND WATER- Dissolved Cations (North Aquifer)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>CATION</u>	<u>GROSS CONCENTRATION (mg/l)</u>	<u>LLD (mg/l)</u>
MW-5	As	<0.001	0.001
	Ba	0.03	0.10
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	<0.01	0.01
	Pb	<0.001	0.001
	Mo	<0.05	0.05
	Ni	<0.001	0.001
	Se	0.01	0.002
Ag	<0.005	0.005	
CW-UT-9	As	0.580	0.001
	Ba	<0.1	0.1
	Be	<0.005	0.005
	Cd	0.001	0.001
	Cr	0.005	0.005
	Pb	<0.01	0.01
	Mo	19.00	0.05
	Ni	0.013	0.001
	Se	<0.002	0.002
Ag	0.001	0.001	
H-56	As	0.053	0.001
	Ba	0.02	0.10
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	0.01	0.01
	Pb	<0.001	0.001
	Mo	9.3	0.05
	Ni	0.003	0.001
	Se	<0.002	0.002
Ag	<0.005	0.005	

GROUND WATER- Dissolved Cations (North. Aquifer cont.)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>CATION</u>	<u>GROSS CONCENTRATION (mg/l)</u>	<u>LLD (mg/l)</u>
EF-24	As	<0.005	0.005
	Ba	<0.1	0.1
	Be	<0.005	0.005
	Cd	0.001	0.001
	Cr	0.005	0.005
	Pb	<0.01	0.01
	Mo	6.00	0.05
	Ni	<0.001	0.001
	Se	0.002	0.002
	Ag	<0.001	0.001
EF-23	As	0.002	0.001
	Ba	0.02	0.1
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	<0.01	0.01
	Pb	<0.001	0.001
	Mo	<0.05	0.05
	Ni	<0.001	0.001
	Se	0.002	0.002
	Ag	<0.005	0.005
EF-25	As	0.002	0.001
	Ba	0.02	0.1
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	0.01	0.01
	Pb	<0.001	0.001
	Mo	<0.05	0.05
	Ni	<0.001	0.001
	Se	0.040	0.002
	Ag	<0.005	0.005

GROUND WATER- Dissolved Cations (North Aquifer cont.)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>CATION</u>	<u>GROSS CONCENTRATION (mg/l)</u>	<u>LLD (mg/l)</u>
MW-7	As	<0.005	0.005
	Ba	<0.1	0.1
	Be	<0.005	0.005
	Cd	0.001	0.001
	Cr	0.005	0.005
	Pb	<0.01	0.01
	Mo	34.0	0.05
	Ni	0.004	0.001
	Se	0.010	0.002
	Ag	0.001	0.001
MW-8a	As	<0.005	0.005
	Ba	<0.1	0.1
	Be	<0.005	0.005
	Cd	0.001	0.001
	Cr	0.005	0.005
	Pb	<0.01	0.01
	Mo	9.40	0.05
	Ni	<0.001	0.001
	Se	<0.002	0.002
	Ag	<0.001	0.001
MW-9	As	0.002	0.001
	Ba	0.02	0.1
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	<0.01	0.01
	Pb	<0.001	0.001
	Mo	<0.05	0.05
	Ni	<0.001	0.001
	Se	0.008	0.002
	Ag	<0.001	0.001

GROUND WATER- Dissolved Cations (North Aquifer cont.)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>CATION</u>	<u>GROSS CONCENTRATION (mg/l)</u>	<u>LLD (mg/l)</u>
FW-1	As	0.160	0.005
	Ba	<0.1	0.01
	Be	<0.005	0.005
	Cd	<0.001	0.001
	Cr	<0.005	0.005
	Pb	<0.01	0.01
	Mo	30.0	0.05
	Ni	<0.001	0.001
	Se	0.006	0.002
	Ag	<0.001	0.001
FW-2	As	0.030	0.005
	Ba	<0.1	0.1
	Be	<0.005	0.005
	Cd	0.001	0.001
	Cr	<0.005	0.005
	Pb	<0.01	0.01
	Mo	1.40	0.05
	Ni	0.001	0.001
	Se	0.014	0.002
	Ag	<0.001	0.001

GROUND WATER- Dissolved Cations (South Aquifer)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>CATION</u>	<u>GROSS CONCENTRATION (mg/l)</u>	<u>LLD (mg/l)</u>
MW-13	As	0.020	0.005
	Ba	0.09	0.1
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	0.01	0.01
	Pb	<0.001	0.001
	Mo	<0.05	0.05
	Ni	<0.001	0.001
	Se	0.004	0.002
	Ag	<0.001	0.001
MW-11A	As	1.85	0.05
	Ba	<0.1	0.1
	Be	<0.005	0.005
	Cd	0.005	0.005
	Cr	<0.005	0.005
	Pb	<0.01	0.01
	Mo	15.0	0.05
	Ni	0.004	0.001
	Se	0.280	0.002
	Ag	0.001	0.001
EF-3	As	1.70	0.05
	Ba	0.03	0.1
	Be	<0.005	0.005
	Cd	0.10	0.01
	Cr	0.03	0.01
	Pb	<0.001	0.001
	Mo	19.5	0.05
	Ni	0.003	0.001
	Se	<0.002	0.002
	Ag	<0.005	0.005

GROUND WATER- Dissolved Cations (South Aquifer cont.)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>CATION</u>	<u>GROSS CONCENTRATION (mg/l)</u>	<u>LLD (mg/l)</u>
EF-4	As	0.016	0.005
	Ba	0.09	0.1
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	<0.01	0.01
	Pb	<0.001	0.001
	Mo	<0.05	0.05
	Ni	<0.001	0.001
	Se	<0.002	0.002
	Ag	<0.005	0.005
EF-5	As	0.033	0.001
	Ba	0.03	0.005
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	<0.01	0.01
	Pb	<0.001	0.001
	Mo	3.11	0.05
	Ni	0.001	0.001
	Se	<0.002	0.002
	Ag	<0.005	0.005
EF-6	As	0.011	0.001
	Ba	<0.1	0.1
	Be	<0.005	0.005
	Cd	<0.001	0.001
	Cr	<0.005	0.005
	Pb	<0.01	0.01
	Mo	<0.05	0.05
	Ni	0.003	0.001
	Se	0.008	0.002
	Ag	<0.001	0.001

GROUND WATER- Dissolved Cations (South Aquifer cont.)

DATE: 1st. Half 1990

<u>LOCATION</u>	<u>CATION</u>	<u>GROSS CONCENTRATION (mg/l)</u>	<u>LLD (mg/l)</u>
MW-4	As	0.006	0.001
	Ba	0.04	0.1
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	<0.01	0.01
	Pb	<0.001	0.001
	Mo	0.27	0.05
	Ni	<0.001	0.001
	Se	0.004	0.002
	Ag	<0.01	0.01
FT-4	As	0.018	0.005
	Ba	0.1	0.1
	Be	<0.005	0.005
	Cd	<0.005	0.005
	Cr	<0.01	0.01
	Pb	<0.001	0.001
	Mo	<0.005	0.005
	Ni	<0.001	0.001
	Se	<0.002	0.002
	Ag	<0.005	0.005

WATER LEVEL DATA-Ground Surface to Water

<u>North Aquifer</u>			<u>South Aquifer</u>		
<u>Date</u>	<u>Well Location</u>	<u>Depth (ft.)</u>	<u>Date</u>	<u>Location</u>	<u>(ft.)</u>
	H-6	N/A	01/90	H-14	90.00
01/90	H-10	60.04	01/90	H-67	155.17
01/90	H-38	107.34	01/90	D-3	55.04
01/90	H-48	146.67		MW-1	N/A
01/90	H-55	119.94		MW-2	N/A
01/90	H-72	74.90	01/90	MW-6A	59.51
01/90	H-77	190.36	01/90	MW-11	62.39
01/90	H-78	179.28	01/90	MW-12	89.70
01/90	MW-10	177.51	01/90	DM80-2	79.35
01/90	DM80-1	68.28	01/90	DM80-3	66.35
01/90	EF-16	76.70	01/90	DM80-4	66.80
01/90	EF-17	100.96	01/90	FT-1	74.56
	EF-19	N/A	01/90	LT-10	68.95
	EF-20	N/A	01/90	LT-20	N/A
	EF-22	N/A	01/90	EF-2	79.01
01/90	EF-26	78.59	01/90	EF-8	59.15
01/90	GW-19	157.02			
01/90	GW-20	190.51			

OFFSITE SURFACE WATER

<u>Date</u> <u>COLLECTED</u>	<u>LOCATION</u>	<u>RAD</u> <u>ISO</u> <u>TOPE</u> <u>CLIDE</u>	<u>CONCENTRATION</u> <u>(uCi/ml)</u>	<u>ERROR ESTIMATE</u> <u>(uCi/ml)</u>	<u>LLD</u> <u>(uCi/ml)</u>	<u>% MPCw</u>
05/18/90	SS-1	U-Nat d	3.8 E-12	3.8 E-12	2.0 E-11	<0.01
		s	1.5 E-12	3.5 E-12	2.0 E-11	<0.01
		Ra-226 d	0.0 E+00	2.0 E-10	2.0 E-10	0.00
		s	0.0 E+00	4.0 E-10	2.0 E-10	0.00

d= dissolved
s= suspended

%MPCw's are based upon the limits set in 10 CFR 20, Appendix B.

SOIL Annual requirement ONLY. This data will be reported on second half, 1990 40.65 report.

<u>DATE COLLECTED</u>	<u>LOCATION</u>	<u>TYPE/PORION ANALYZED</u>	<u>RADIONUCLIDE</u>	(a) <u>GROSS CONCENTRATION</u> <u>(pCi/g)</u>	<u>ERROR ESTIMATE</u> <u>(pCi/g)</u>	<u>LLD</u> <u>(pCi/g)</u>
	EM-1	Grab/Surface	U-Nat Ra-226 Pb-210			
	EM-2	Grab/Surface	U-Nat Ra-226 Pb-210			
	EM-4	Grab/Surface	U-Nat Ra-226 Pb-210			
	EM-6 Bckgrd.	Grab/Surface	U-Nat Ra-226 Pb-210			

SEDIMENT Annual requirement Only. This data will be reported on the second half, 1990 40.65 report.

<u>DATE COLLECTED</u>	<u>LOCATION</u>	<u>TYPE/PORION ANALYZED</u>	<u>RADIONUCLIDE</u>	(a) <u>GROSS CONCENTRATION</u> <u>(pCi/g)</u>	<u>ERROR ESTIMATE</u> <u>(pCi/g)</u>	<u>LLD</u> <u>(pCi/g)</u>
	SS-1	Grab/Surface	U-Nat Ra-226 Pb-210			

VEGETATION Annual requirement, will be reported second half 1990 40.65 report.

<u>MONTHS</u> <u>COLLECTED</u>	<u>LOCATIO.</u>	<u>TYPE/PORTION ANALYZED</u>	<u>RADIONUCLIDE</u>	<u>CONCENTRATION</u> <u>(pCi/g)</u>	<u>ERROR</u> <u>ESTIMATE</u> <u>(pCi/g)</u>	<u>LLD</u> <u>(pCi/g)</u>
EM-1		Comp./Dry Vegetation	Ra-226 Pb-210			
EM-4		Comp./Dry Vegetation	Ra-226 Pb-210			
EM-6		Comp./Dry Vegetation	Ra-226 Pb-210			

Vegetation sampled annually, three times during grazing season.

DOSE ASSESSMENT UPON ACTUAL ENVIRONMENTAL
MONITORING DATA AT THE NEAREST RESIDENCE - SITE NO. 4

Reporting Period: First Qtr., 1990

Internal Radiation Exposure:

The most probably pathway is inhalation of airborne particulates.

50 year dose commitment (mrem)

<u>RADIONUCLIDE</u>	<u>WHOLE BODY</u> ^(f)	<u>BONE</u> ^(f)	<u>LUNG</u> ^(f)
U-Nat	3.21 E-01	5.22 E-02	1.10 E+00
Th-230	-3.30 E-02*	-1.18 E+00*	-6.37 E-01*
Ra-226	5.75 E-01	5.75 E-02	1.23 E+00

*Calculations resulted in negative radionuclide concentration

Reporting Period: Second Qtr., 1990

<u>RADIONUCLIDE</u>	<u>WHOLE BODY</u> ^(f)	<u>BONE</u> ^(f)	<u>LUNG</u> ^(f)
U-Nat	-9.24 E-05*	-1.59 E-03*	-3.38 E-03*
Th-230	-8.52 E-03*	-3.05 E-01*	-1.65 E-01
Ra-226	5.22 E-03	5.22 E-02	1.12 E+00

*Calculations resulted in negative radionuclide concentration

External Radiation Exposure:

First Qtr., 1990

EM Site #4- EM Site #6 = Net Exposure

13.0 mrem/qtr.- 13.5 mrem/qtr. = -0.5<0 mrem/qtr.

Second Qtr., 1990

EM Site #4-EM Site #6 = Net Exposure

15.0 mrem/qtr- 14.0 mrem/qtr = 1.0 mrem/qtr.

(f) based upon nuclide concentrations.

DOSE CONVERSION CALCULATION FOR INHALATION OF AIRBORNE PARTICULATES
 AT ENVIRONMENTAL MONITORING SITE NO. 4 (NEAREST RESIDENCE MONITOR)

Reporting Period: First Qtr., 1990

(Gross Concentration) - (Background Concentration) = (Net Concentration) in uCi/ml

since: $1 \text{ uCi/ml} = 1000 \text{ pCi/M}^3$

Net Concentration (uCi/ml) x 10^3 = Net Concentration (pCi/M^3), then:

Net Concentration (pCi/M^3) x Dose Conversion Factor (mrem/pCi/M^3) = Dose (mrem)

NUCLIDE	EM-4 GROSS	-	EM-6 BACKGROUND	=	EM-4 NET	x 10^3	ORGAN DOSE CONVERSION FACTOR
U-Nat	6.95 E-16	-	0.00 E+00	=	6.95 E-16		(pCi/M^3) x fi_1
Th-230	1.71 E-16	-	3.70 E-16	=	-1.99 E-16		(pCi/M^3) x fi_2
Ra-226	2.60 E-16	-	7.40 E-17	=	1.86 E-16		(pCi/M^3) x fi_3

Organ Dose Conversion Factors (Fi)

From Table A-1 of "Compliance Determination Procedures for Environmental Radiation Protection Standards for Uranium Recovery Facilities, 40 CFR 190, November 1980".

	<u>Whole Body</u>	<u>Bone</u>	<u>Lung</u>
U-Nat	4.62	79.4	169.
Th-230	166.	5950.	3220.
Ra-226	30.9	309.	6610.

U-Nat

Whole Body	(6.95 E-16) (1 10^3) (4.62) =	3.21 E-03	mrem/yr
Bone	(6.95 E-16) (1 10^3) (79.4) =	5.52 E-02	mrem/yr
Lung	(6.95 E-16) (1 10^3) (169) =	1.11 E+00	mrem/yr

Th230

Whole Body	(-1.99 E-16) (1 10^3) (166) =	-3.30 E-02	mrem/yr
Bone	(-1.99 E-16) (1 10^3) (5950) =	-1.18 E+00	mrem/yr
Lung	(-1.99 E-16) (1 10^3) (3200) =	-6.37 E-01	mrem/yr

Ra226

Whole Body	(1.86 E-16) (1 10^3) (30.9) =	5.75 E-03	mrem/yr
Bone	(1.86 E-16) (1 10^3) (309) =	5.75 E-02	mrem/yr
Lung	(1.86 E-16) (1 10^3) (6610) =	1.23 E+00	mrem/yr

DOSE CONVERSION CALCULATION FOR INHALATION OF AIRBORNE PARTICULATES
AT ENVIRONMENTAL MONITORING SITE NO. 4 (NEAREST RESIDENCE MONITOR)

Reporting Period: Second Qtr., 1990

(Gross Concentration) - (Background Concentration) = (Net Concentration) in uCi/ml

since: $E12 \times \text{uCi/ml} = \text{pCi/M}^3$

Net Concentration (uCi/ml) \times E12 = Net Concentration (pCi/M³), then:

Net Concentration (pCi/M³) \times Dose Conversion Factor (mrem/pCi/M³) = Dose (mrem)

NUCLIDE	EM-4 GROSS	-	EM-6 BACKGROUND	=	EM-4 NET	$\times E^{12}$	\times	ORGAN DOSE CONVERSION FACTOR
U-Nat	1.48 E-15	-	1.50 E-15	=	-2.00 E-17			(pCi/M ³) \times fi ₁
Th-230	0.00 E+00	-	5.13 E-17	=	-5.13 E-17			(pCi/M ³) \times fi ₂
Ra-226	1.86 E-16	-	1.71 E-17	=	1.69 E-16			(pCi/M ³) \times fi ₃

Organ Dose Conversion Factors (Fi)

From Table A-1 of "Compliance Determination Procedures for Environmental Radiation Protection Standards for Uranium Recovery Facilities, 40 CFR 190, November 1990".

		<u>Whole Body</u>	<u>Bone</u>	<u>Lung</u>	
	U-Nat	4.62	79.4	169.	
	Th-230	166.	5950.	3220.	
	Ra-226	30.9	309.	6610.	
<u>U-Nat</u>	Whole Body	(-2.00 E-17) (E12)	(4.62)	= -9.24 E-05	mrem/yr
	Bone	(-2.00 E-17) (E12)	(79.4)	= -1.59 E-03	mrem/yr
	Lung	(-2.00 E-17) (E12)	(169)	= -3.38 E-03	mrem/yr
<u>Th230</u>	Whole Body	(-5.13 E-17) (E12)	(166)	= -8.52 E-03	mrem/yr
	Bone	(-5.13 E-17) (E12)	(5950)	= -3.05 E-01	mrem/yr
	Lung	(-5.13 E-17) (E12)	(3220)	= -1.65 E-01	mrem/yr
<u>Th230</u>	Whole Body	(1.69 E-16) (E12)	(30.9)	= 5.22 E-03	mrem/yr
	Bone	(1.69 E-16) (E12)	(309)	= 5.22 E-02	mrem/yr
	Lung	(1.69 E-16) (E12)	(6610)	= 1.12 E+00	mrem/yr

DIRECT RADIATION

<u>DATES MONITORED</u>	<u>LOCATION</u>	<u>AVERAGE EXPOSURE RATE (mr/qtr.)</u>	<u>ERROR ESTIMATE (mr/qtr.)</u>
12/29/89 to 03/30/90	EM-1	13.0	4.7
03/30/90 to 06/30/90	EM-1	15.0	4.6
12/29/89 to 03/30/90	EM-2	19.0	4.9
03/30/90 to 06/30/90	EM-2	20.0	4.8
12/29/89 to 03/30/90	EM-4	13.0	4.7
03/30/90 to 06/30/90	EM-4	15.0	4.6
12/29/89 to 03/30/90	EM-6 (Background)	13.5	4.7
03/30/90 to 06/30/90	EM-6 (Background)	14.0	4.6

Bio Assay results for the reporting period January, 1, 1990 to August 1, 1990:

No urine sample exceeded the 15 ug/l action level, during the period of time covered by this report.

SUPPLEMENTARY INFORMATIONSurface Water and Sediment Sampling Site (See Attached Map)

<u>SITE</u>	<u>DIRECTION FROM MILL</u>	<u>LOCATION</u>
SS-1	NW	West Coyote Wash

Environmental Monitoring Sites (See Attached Map)

<u>SITE</u>	<u>DIRECTION FROM MILL</u>	<u>LOCATION</u>
(EM-1)	SE	South property boundary
(EM-2)	SW	West property boundary
(EM-4)	N	Nearest resident, approximately 1 mile north of property boundary
(EM-6)	NW	10.5 miles northwest of the mill

TABLE 1

MPC's Used in Calculation of % MPC

Reference 10 CFR 20, Appendix B

	Restricted Area (uCi/ml)			Unrestricted Area (uCi/ml)	
	Air		Water	Air	Water
	Ore	Yellowcake			
U-Natural	$.5 \times 10^{-10}$ uCi/ml	1.0×10^{-10} uCi/ml	1×10^{-3} S,I	5×10^{-12}	3×10^{-5} S,I
Th-230		2×10^{-12} S	5×10^{-5}	8×10^{-14} S	2×10^{-6} S, 3×10^{-5} I
Ra-226		3×10^{-11} S	4×10^{-7} S	2×10^{-10} S	3×10^{-8} S, 3×10^{-5} I
Pb-210		1×10^{-10} S	4×10^{-6} S	4×10^{-12} S	1×10^{-7} S, 2×10^{-4} I
Po-210		3×10^{-11} I	2×10^{-5} S	1×10^{-12} I	7×10^{-7} S, 3×10^{-5} I
Rn-222				3×10^{-9}	

S = soluble = dissolved

I = insoluble = suspended

Calculation:

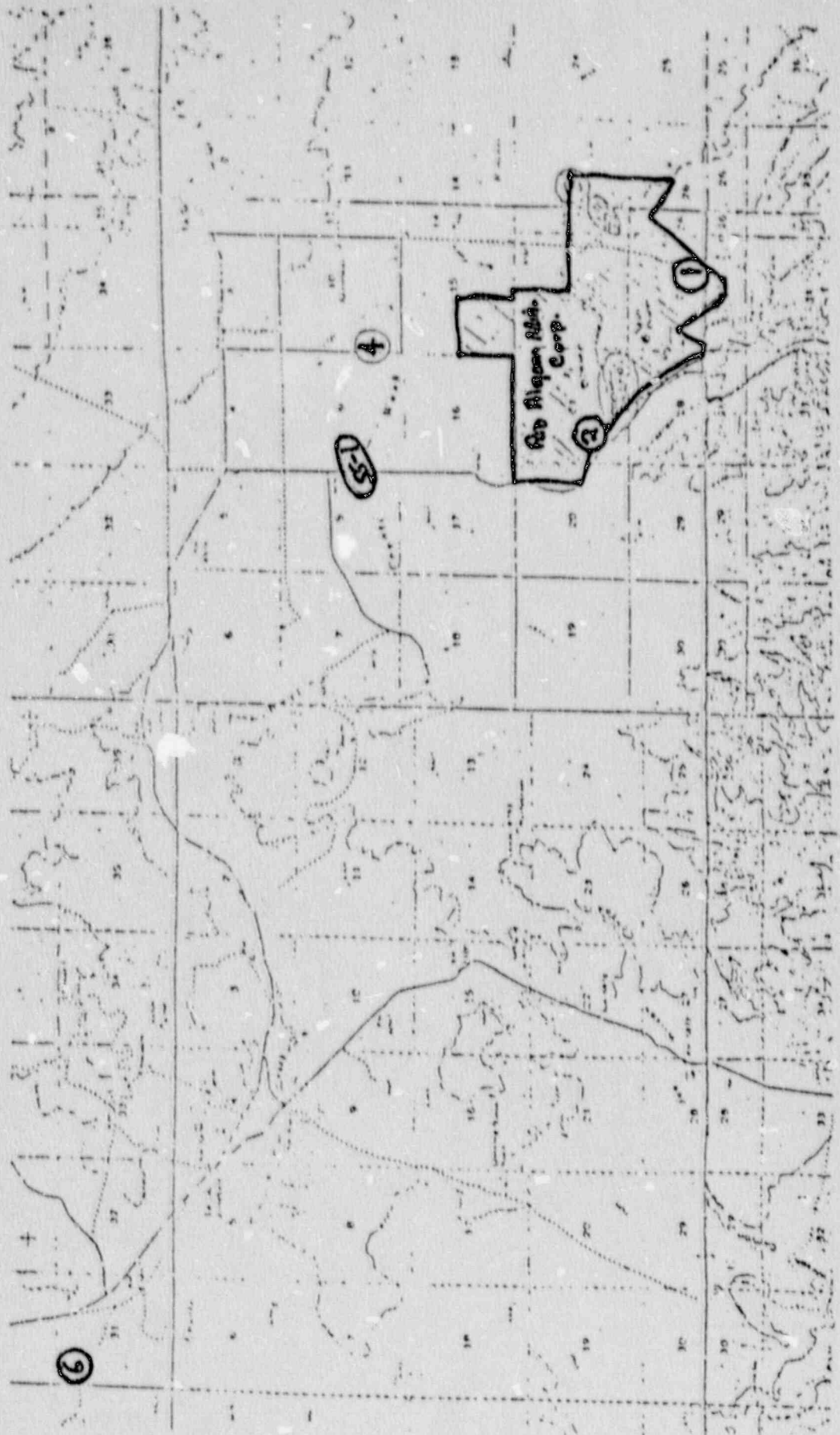
Nuclide concentration at the location = Ni

Maximum Permissible Concentration for the nuclide (above) = MPCi

$$\% \text{ MPCi} = \frac{\text{Ni}}{\text{MPCi}} \times 100$$

Em. Station - 0

N



Sampling locations for air particulates, radon, soils, and direct radiation.
Vegetation sampling near sites 1 and 2