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24 February 2011

Mr. Keith I. McConnell, Deputy Director
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, Mail Stop T7-E18
Rockville, MD 20852

Dear Mr. McConnell:

SUBJECT: Sweetwater Uranium Project - Docket Number 40-8584
Source Materials License SUA-1350 - Semiannual 10 CFR 40.65 Report
Airborne Effluents

Enclosed is Kennecott Uranium Company's Semiannual 10 CFR 40.65 Report for the second half of 2010 for airborne effluents. This report addresses the requirements of License Condition 11.5 of SML #SUA-1350, as well as the requirements of 10 CFR 40.65(a)(1).

Kennecott Uranium Company is only required to monitor for ambient gamma and airborne particulates at the downwind location (Air 4A) and radon at the upwind (Air 2) and downwind (Air 4A) locations as long as operations remain suspended as per License Condition 11.5. Kennecott is not required to perform stack, soil, sediment or vegetation sampling as long as operations remain suspended.

Kennecott Uranium Company has examined the data included in this report, calculated the dose to the nearest resident in millirems per year for the second half of 2010 from the licensed activities and concluded that the dose does not exceed the 100 mrem per year dose limit. A copy of the calculation sheet as well as an explanation of the calculation method is included. This is being done at the request of Elaine Brummett, previously of your staff, in an email dated September 7, 2001. This issue was discussed with James Webb of your staff in a telephone conversation and email dated Wednesday, January 19, 2011. The email and telephone conversation were in response to the presentation given by Duane Schmidt at the meeting between Nuclear Regulatory Commission (NRC) staff and members of the uranium recovery industry on January 12, 2011 in Denver, Colorado. During a second telephone conversation on Thursday, February 3, 2011 James Webb of your staff stated that Kennecott Uranium Company should not delay the submittal of the 40.65 Report pending a decision on dose calculation methodology, but rather submit the report using the dose calculation method currently in use, pending further guidance and a reply to the email.

Should you have any questions, please contact me at (307) 328-1476.

Sincerely yours,

Oscar A Paulson

Oscar Paulson
Facility Supervisor

cc: James Webb, Project Manager
Director - USNRC DNMS, Region IV (w/o enc.)
Rich Atkinson

KENNECOTT URANIUM COMPANY
SWEETWATER URANIUM PROJECT
Source Material License SUA-1350

2010
RadTrak Radon Monitor
(pCi/L)

DATE	LOCATION	RADIONUCLIDE	CONCENTRATION	ERROR ESTIMATE	LOWER LIMIT OF DETECTION (LLD)	
				pCi/L	pCi/L-Days	pCi/L
1/3/10 – 3/31/10	Downwind - Air 4A	Radon	2.7 pCi/L	+/- 0.12	6.0	0.06
1/3/10 – 3/31/10	Upwind - Air 2-A[1]	Radon	N/A [2]	N/A [2]	6.0	0.06
1/3/10 – 3/31/10	Upwind – Air 2-B[1]	Radon	3.3 pCi/L	+/- 0.14	6.0	0.06
	Average – Air 2		**3.3 pCi/L**			
3/31/10 – 6/30/10	Downwind - Air 4A	Radon	1.7 pCi/L	+/- 0.10	6.0	0.06
3/31/10 – 6/30/10	Upwind - Air 2-A[1]	Radon	1.7 pCi/L	+/- 0.09	6.0	0.06
3/31/10 – 6/30/10	Upwind – Air 2-B[1]	Radon	1.7 pCi/L	+/- 0.09	6.0	0.06
	Average – Air 2		**1.7 pCi/L**			
6/30/10 – 9/29/10	Downwind - Air 4A	Radon	2.2 pCi/L	+/- 0.11	6.0	0.06
6/30/10 – 9/29/10	Upwind - Air 2-A[1]	Radon	2.2 pCi/L	+/- 0.11	6.0	0.06
6/30/10 – 9/29/10	Upwind – Air 2-B[1]	Radon	2.8 pCi/L	+/- 0.12	6.0	0.06
	Average – Air 2		**2.5 pCi/L**			
9/29/10 – 1/3/11	Downwind - Air 4A	Radon	1.6 pCi/L	+/- 0.08	6.0	0.06
9/29/10 – 1/3/11	Upwind - Air 2-A[1]	Radon	1.9 pCi/L	+/- 0.09	6.0	0.06
9/29/10 – 1/3/11	Upwind – Air 2-B[1]	Radon	2.4 pCi/L	+/- 0.11	6.0	0.06
	Average – Air 2		**2.0 pCi/L**			

[1] See attached explanation – Item 1
[2] See attached explanation – Item 2

KENNECOTT URANIUM COMPANY
SWEETWATER URANIUM PROJECT
Source Material License SUA-1350

Explanation of RadTrak data:

1. A second RadTrak was deployed at the upwind Air 2 location during the second two (2) quarters of 2010 for comparative and quality assurance/quality control purposes. The results from both RadTraks were averaged to generate the final values for the third and fourth quarters of 2010 for monitoring station Air 2 (upwind air). An average was not used for the first quarter of 2010 as explained below.

2. No result was provided for the Air 2-A detector for the first quarter of 2010. The report from Landauer, Inc. stated that there was a “Processing Irregularity”, hence no data was provided. The Air 2-B detector provided the upwind radon concentration for the first quarter of 2010.

KENNECOTT URANIUM COMPANY
SWEETWATER URANIUM PROJECT
Source Material License SUA-1350

2010
DIRECT RADIATION MEASUREMENTS
(TLD)

Location	Date	Exposure Rate (mr/Qtr)	Lower Limit of Detection (LLD) Millirems
TLD			
0000 - Control	1/3/10 – 3/31/10	36.8	10[1]
0004 - Air 4A	1/3/10 – 3/31/10	47.6	10[1]
TLD			
0000 - Control	3/31/10 – 6/30/10	40.4	10[1]
0004 - Air 4A	3/31/10 – 6/30/10	49.5	10[1]
TLD			
0000 - Control	6/30/10 – 9/29/10	39.5	10[1]
0004 - Air 4A	6/30/10 – 9/29/10	49.8	10[1]
TLD			
0000 - Control	9/29/10 – 1/4/11	37.6	10[1]
0004 - Air 4A	9/29/10 – 1/4/11	51.6	10[1]

[1] Please see the following copy of a letter from ThermoNUtech on Lower Limits of Detection (LLDs).

Thermo NUtech
5635 Jefferson Street NE
Albuquerque, NM 87109
(505) 345-9931 • FAX (505) 761-5410

Lower Limits of Detection (LLDs)

1990 DOELAP Study (See DOELAP Handbook § 3.4)
95% Confidence Level Values

Known Fields: LLD in mrem per period					
Radiation Field		Deployment Period			
Type	Test Source	Monthly*	Quarterly	Semi-Annual*	Annual*
gamma	^{137}Cs	6	11	16	22
X-ray	mixed beam	6	11	16	22
hard beta	^{90}Sr/Y	8	13	18	26
soft beta	^{204}Tl	36	63	89	126
slow neutron	^{252}Cf mod.	5	8	11	16
fast neutron	^{252}Cf unmod.	43	74	105	148

*Extrapolated from quarterly values. The study was done using a period of one quarter.

For routine reporting purposes, the LLD is taken to be 10 mrem.
This value is very close to the measured LLD for most commonly encountered radiation fields.
No values less than this nominal LLD are reported.

CONTINUOUS LOW-VOLUME AIR PARTICULATE ANALYSIS

STATION 4A – 2010

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/ml	Counting Precision µCi/ml	LLD µCi/ml	Effluent Conc.* pCi/ml	% Effluent Concentration
1st Quarter	U-nat	6.89 E-17	N/A	1.00 E-16	9.00 E-14	7.66 E-02
1/4/10–3/29/10	Th-230	2.72 E-17	1.12 E-17	1.00 E-16	3.00 E-14	9.08 E-02
Air Vol in mLs	Ra-226	1.78 E-17	2.03 E-17	1.00 E-16	9.00 E-13	1.98 E-03
4.19 E+10	Pb-210	1.72 E-14	2.26 E-16	2.00 E-15	6.00 E-13	2.87 E+00
2nd Quarter	U-nat	3.56 E-16	N/A	1.00 E-16	9.00 E-14	3.96 E-01
3/29/10–6/30/10	Th-230	1.55 E-16	2.41 E-17	1.00 E-16	3.00 E-14	5.18 E-01
Air Vol in mLs	Ra-226	5.66 E-17	1.72 E-17	1.00 E-16	9.00 E-13	6.28 E-03
4.68 E+10	Pb-210	1.06 E-14	1.81 E-16	2.00 E-15	6.00 E-13	1.77 E+00
3rd Quarter	U-nat	9.02 E-17	N/A	1.00 E-16	9.00 E-14	1.00 E-01
6/30/10–10/4/10	Th-230	9.23 E-17	3.00 E-17	1.00 E-16	3.00 E-14	3.08 E-01
Air Vol in mLs	Ra-226	1.78 E-17	1.00 E-17	1.00 E-16	9.00 E-13	1.97 E-03
4.75 E+10	Pb-210	2.21 E-14	3.00 E-16	2.00 E-15	6.00 E-13	3.69 E+00
4th Quarter	U-nat	7.72 E-17	N/A	1.00 E-16	9.00 E-14	8.58 E-02
10/4/10-1/3/11	Th-230	2.22 E-17	1.00 E-17	1.00 E-16	3.00 E-14	7.40 E-02
Air Vol in mLs	Ra-226	3.55 E-17	3.00 E-17	1.00 E-16	9.00 E-13	3.94 E-03
4.13 E+10	Pb-210	2.45 E-14	4.00 E-16	2.00 E-15	6.00 E-13	4.08 E+00

LLD's are as published in Reg. Guide 4.14
*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2
Year for Natural Uranium
Year for Thorium-230
Week for Radium-226
Day for Lead-210

Rio Tinto

Internal memo

27 January 2011

To: File – 10 CFR 40.65 Report

Subject: Dose to the General Public in Millirems per Year as Represented by the Nearest Resident – Second Half 2010

The following is a dose calculation for the nearest resident (the contract security guard) for the second half of 2010.

Calculation Assumptions:

1. The nearest resident for dose calculation purposes is considered to be the site security officer when he is not on duty and sleeping inside the Security Trailer. The site security officer is scheduled to be on site from 5:30 p.m. on Thursday of each week to 10:00 p.m. the following Sunday, on holidays and at times that the Senior Facility Technician is on vacation. In spite of the fact that the site security officer does not reside on site continuously, no occupancy factor is assigned to him and for dose calculation purposes he is assumed to reside on site continuously. The security officer's trailer is located immediately south of the site's southern chain link fence. As such, the calculated dose to the security officer would also apply to any member of the general public approaching the site fence. No member of the general public would be in close proximity to the site for as long as the security officer, whose dose is calculated based on continuous occupancy, in spite of the fact that he does not reside on site continuously.
2. Radon concentrations are measured in the Security Trailer with RadTrak detectors placed in the kitchen and bedroom and changed quarterly. The results from these detectors are averaged to derive a semiannual radon concentration in Pico curies per liter for the Security Trailer.
3. Radon decay product exposures in working levels are measured semiannually in the Security Trailer using a calibrated Buck Basic 12, Bendix BDX-44, MSA or Sensidyne GilAir II air pump and filter. The filter is read by the modified Kusnetz Method.
4. The radon concentration and decay product exposure are used to calculate the equilibrium factor. The equilibrium factors calculated semiannually are averaged to derive a site equilibrium factor.
5. This equilibrium factor is applied to the upwind radon concentrations to derive a background radon dose and to the average semiannual radon concentration in the Security Trailer to derive a radon dose to the nearest resident. An equilibrium factor table is attached.
6. The dose from the semiannual downwind airborne particulate concentrations of natural uranium, radium-226 and thorium-230 are used to calculate the dose from airborne particulates in the Security Trailer in spite of the fact that the Security Trailer is not downwind of the facility. The use of airborne particulate data from downwind of the facility provides conservative particulate concentrations.
7. Beginning in the third quarter of 2010 an environmental thermoluminescent dosimeter was placed in the Security Trailer and exchanged quarterly to directly measure actual gamma dose in the trailer.
8. The doses from radon-222, airborne particulate radionuclides and gamma radiation are summed to produce a dose to the nearest resident (the Security Trailer).
9. The radon concentrations measured at the upwind air monitoring stations during the two (2) quarters for a given semiannual period are averaged, corrected for the site equilibrium factor and converted to a background radon dose for the facility.
10. This background radon dose is summed with the background gamma radiation dose (from the revised Environmental Report – dated August 1994) and the doses derived from the background airborne

particulate concentrations (natural uranium, radium-226 and thorium-230 as described in the revised Environmental Report dated August 1994) to yield a background radiation dose for the facility for the given semiannual period.

11. The background dose is subtracted from the calculated dose to the nearest resident (Security Trailer) to derive a dose to the nearest resident from the facility.

BACKGROUND

		Average Concentration	Dose (mrem)
Gamma Exposure:			200.70 (approx. 22.9 uR/hr)
Airborne Particulates:			
	U nat	6.2 E-16 µCi/ml	0.34
	Ra-226	3.9 E-16 µCi/ml	0.22
	Th-230	3.9 E-16 µCi/ml	0.65
Gases:			
	Radon-222	2.31 pCi/l	169.1
Total			**371.1**

Notes:

1. An equilibrium factor of 0.167 was used for radon based on twenty-eight (28) comparisons of radon-222 and radon-222 daughter concentrations over 17 years. Please see attached sheet entitled “Equilibrium Factors for Nearest Resident”.
2. Gamma and airborne particulate background data is from the revised Environmental Report (August 1994).
3. The average background radon concentration of the RadTraks deployed at Air 2 in the third and fourth quarters of 2010 of 2.31 pCi/L was used for the second half 2010 radon concentration.
4. Calculation: (Radon concentration (pCi/l))*(Equilibrium factor)*(0.44 rems/pCi/l) = Dose (rems)

SECURITY TRAILER

		Average Concentration	Dose (mrem)
Gamma Exposure:			179.6
Airborne Particulates:			
	U nat	8.37 E-17 µCi/ml	0.047
	Ra-226	2.67 E-17 µCi/ml	0.001
	Th-230	5.73 E-17 µCi/ml	0.095
Gases:			
	Radon-222	1.62 pCi/l	118.7
Total			**298.4**

Notes:

1. An equilibrium factor of 0.167 was used for radon based on twenty-eight (28) comparisons of radon-222 and radon-222 daughter concentrations over 17 years.
2. Downwind airborne particulate concentrations and gamma doses for the third and fourth quarters of 2010 were used for the security trailer. These doses were converted to millirems per year (mrem/yr).
3. Radon concentration was measured in the security trailer for the third and fourth quarters of 2010 and is based on an average of RadTrak units located in two (2) locations; the kitchen and the bedroom.

Second Half – 2010		
	Third Quarter	**Fourth Quarter**
Kitchen	1.5 pCi/L	1.6 pCi/L
Bedroom	1.5 pCi/L	1.9 pCi/L
Trailer Average:		**1.62 pCi/L**

4. The annual gamma dose rate is based upon the TLD dosimeters for the third and fourth quarters located in the Security Trailer converted to an annual dose rate by doubling of the sum.

The calculated net (dose to the nearest resident minus background dose) annual TEDE from the licensed operations for the second half of 2010 is **0.0** mrem/year, which is below the 100 mrem/year dose limit to members of the general public.

Oscar A Paulson

Oscar Paulson
Avg dose.doc

Kennecott Uranium Company
Sweetwater Uranium Project
Equilibrium Factor for Nearest Residence
(Security Guard Trailer)

Date	Radon Concentration (pCi/L)	Exposure (WL)	Equilibrium Factor
1/1/93 – 6/30/93	3.20	0.009	0.28
1/1/97 – 6/30/97	1.50	0.003	0.20
7/1/97 – 12/31/97	2.20	0.002	0.09
1/1/98 – 6/30/98	1.65	0.003	0.18
1/1/99 – 6/30/99	1.90	0.009	0.47
7/1/99 – 12/31/99	3.25	0.002	0.06
1/1/00 – 6/30/00	2.12	0.004	0.19
7/1/00 – 12/31/00	3.05	0.009	0.30
1/1/01 – 6/30/01	3.60[1]	0.012	0.33
7/1/01 – 12/31/01	2.78	0.013[2]	0.47
1/1/02 – 6/30/02	2.48	0.009[2]	0.34
7/1/02 – 12/31/02	2.80	0.003[2]	0.11
1/1/03 – 6/30/03	2.40	0.004[2]	0.17
7/1/03 – 12/31/03	3.75[3]	0.006[2]	0.16
1/1/04 – 6/30/04	2.08	0.003[2]	0.14
7/1/04 – 12/31/04	3.00	0.0005	0.017
1/1/05 – 6/30/05	2.55	0.0013	0.051
7/1/05 – 12/31/05	3.22	0.0035	0.109
1/1/06 – 6/30/06	2.40	0.000	0.00
7/1/06 – 12/31/06	2.13	0.014	0.66
1/1/07 – 6/30/07	1.65	0.000	0.00
7/1/07 – 12/31/07	2.10[4]	0.0001	0.005
1/1/08 – 6/30/08	3.28	0.000	0.00
7/1/08 – 12/31/08	2.83	0.000	0.00
1/1/09 – 6/30/09	2.25	0.000	0.00
7/1/09 – 12/31/09	2.03	0.002	0.10
1/1/10 – 6/30/10	2.13	0.002	0.09
7/1/10 – 12/31/10	1.62	0.002	0.12
Average			**0.167**

[1] This value is based upon an average of three (3) RadTrak detectors. The second quarter RadTrak detector in the Security Trailer bedroom was lost.
[2] Average of two (2) measurements
[3] Fourth quarter 2003 concentration only. Landauer, Inc. lost the third quarter 2003 RadTrak units.
[4] This value is based upon an average of three (3) RadTrak detectors. The fourth quarter RadTrak detector in the Security Trailer kitchen was lost.

Calculation Parameters

1. Radon concentrations in the Security Trailer are calculated based upon the results of two (2) RadTrak detectors (one in the kitchen and one in the bedroom) that are changed quarterly. The radon concentration for a given semiannual period is an average of the results of four (4) RadTrak detections, one in the kitchen and one in the bedroom, changed quarterly.
2. Radon exposures (radon daughters concentrations measured in Working Levels) are taken semiannually in the trailer in two (2) locations (kitchen and bedroom) using a Buck Basic 12, Bendix BDX-44, MSA or Sensidyne GilAir II air pump and a filter. The filter is evaluated using the modified Kusnetz Method.
3. The equilibrium factor is calculated.

   Radon Dose (rems) = (Radon Concentration (pCi/L)) * (Equilibrium Factor) * (0.44 rem/pCi/L)
   An occupancy factor may be added as required.
   1 WL ~ 100 pCi/L with daughters present (100% equilibrium)
   Equilibrium Factor Formula: Equilibrium Factor = Exposure (WL) * 100 / Concentration (pCi/L)

Source: National Council on Radiation Protection (NCRP) Report #97