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31 January, 2018

Mr. Gregory Suber, Acting Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
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
Rockville, MD 20852-2738

Dear Ms. Kock:

**SUBJECT: Sweetwater Uranium Project - Docket Number 40-8584
Source Materials License SUA-1350 - Semiannual 10 CFR 40.65 Report
Airborne Effluents- Second Half 2017**

Enclosed is Kennecott Uranium Company's Semiannual 10 CFR 40.65 Report for the second half of 2017 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 and a letter dated September 23, 1983 from the Nuclear Regulatory Commission (NRC). 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 2017 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.

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

Sincerely yours,

Oscar Paulson
Facility Supervisor

cc: James Webb, Project Manager- (2)
Director - USNRC DNMS, Region IV (w/o enc.)
Rich Atkinson

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

2017
Rapidos HS Radon Monitor
(pCi/L)

DATE	LOCATION	RADIONUCLIDE	CONCENTRATION	ERROR ESTIMATE	LOWER LIMIT OF DETECTION (LLD)	
				pCi/L	pCi/L-Days	pCi/L
1/3/17 – 4/4/17	Downwind - Air 4A	Radon	1.4 pCi/L	+/- 0.19	11.0[4]	0.11[4]
1/3/17 – 4/4/17	Upwind - Air 2-A[2]	Radon	1.8 pCi/L	+/- 0.25	11.0[4]	0.11[4]
1/3/17 – 4/4/17	Upwind – Air 2-B[1]	Radon	1.8 pCi/L	+/- 0.25	11.0[4]	0.11[4]
	Average – Air 2		**1.8 pCi/L**			
4/4/17 - 7/5/17	Downwind - Air 4A	Radon	1.3 pCi/L	+/- 0.17	11.0[4]	0.11[4]
4/4/17 - 7/5/17	Upwind - Air 2-A[1]	Radon	1.8 pCi/L	+/- 0.22	11.0[4]	0.11[4]
4/4/17 - 7/5/17	Upwind – Air 2-B[1]	Radon	1.7 pCi/L	+/- 0.22	11.0[4]	0.11[4]
	Average – Air 2		**1.7 pCi/L**			
7/5/17 - 10/5/17	Downwind - Air 4A	Radon	1.9 pCi/L	+/- 0.28	11.0[4]	0.11[4]
7/5/17 - 10/5/17	Upwind - Air 2-A[1]	Radon	2.6 pCi/L	+/- 0.36	11.0[4]	0.11[4]
7/5/17 - 10/5/17	Upwind – Air 2-B[1]	Radon	2.8 pCi/L	+/- 0.38	11.0[4]	0.11[4]
	Average – Air 2		**2.7 pCi/L**			
10/5/17 – 1/2/18	Downwind - Air 4A	Radon	2.2 pCi/L	+/- 0.30	11.0[4]	0.11[4]
10/5/17 – 1/2/18	Upwind - Air 2-A[1]	Radon	2.7 pCi/L	+/- 0.36	11.0[4]	0.11[4]
10/5/17 – 1/2/18	Upwind – Air 2-B[1]	Radon	3.1 pCi/L	+/- 0.38	11.0[4]	0.11[4]
	Average – Air 2		**2.9 pCi/L**			

[1] Fence posts and barbed wire were placed around the Air 2 monitoring location to prevent animals (cattle and horses) from knocking down the detectors.
[2] A second Rapidos HS unit was deployed at the upwind Air 2 location during the first and second halves of 2017 for comparative quality assurance/quality control purposes. The results from both Rapidos HS units were averaged to generate final values for the first, second, third, and fourth quarters of 2017 for monitoring station Air 2 (upwind air).
[3] Beginning in the third quarter of 2016 Landauer HS Rapidos detectors were used instead of RadTrak detectors. Landauer, Inc. ceased supplying RadTrak detectors. Please see included May 13, 2016 email from Landauer, Inc. in the second half 2016 40.65 Report.
[4] Based on 4 Bq/m^3 at a three (3) month measurement. (Please see attached Rapidos HS data sheet – 1 Bqm^3 = 0.027027027 pCi/L)

AARST

Tryggve Ronnqvist

Radonova

Has satisfactorily fulfilled the requirements set forth by the National Radon Proficiency Program and is therefore certified as a:

Analytical Laboratory

NRPP ID 107831 AL Expires 12/31/2018

NATIONAL RADON PROFICIENCY PROGRAM
AARST

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Janna Sinclair

Janna M. Sinclair
NRPP Credentialing Coordinator

Valid for specific activities or measurement devices, which can be verified with NRPP.
State and local agencies may have additional requirements.

Bruce Rauner
Governor

James K. Joseph
Director

State of Illinois

IEMA Division of Nuclear Safety

Pursuant to the Radon Industry Licensing Act, 420 ILCS 44 et seq. and 32 Illinois Adminstrative Code 422, Licensing of Radon Detection and Mitigation Services, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued.

This is to certify that **Radonova**

License Number **RNL2015201**

has met the requirements for **Laboratory Analysis**

Issued - Expires **03/10/2017 - 02/28/2018**

Limited to Analyzing the radon or radon progeny concentrations with passive devices, or the act of calibrating radon or radon progeny measurement devices, or the act of exposing radon or radon progeny devices to known concentrations of radon or radon progeny.

SEAL OF THE STATE OF ILLINOIS AUG. 26TH 1818

171291002

Patrick I. Daniels, Radon Program

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

2017
DIRECT RADIATION MEASUREMENTS

Location	Date	Exposure Rate (mr/Qtr)	Lower Limit of Detection (LLD) Millirems
Environmental Dosimeter			
0000 – Deploy Control	1/3/17 – 4/3/17	41.2	1[1]
0004 - Air 4A	1/3/17 – 4/3/17	43.1	1[1]
Security Trailer	1/3/17 – 4/3/17	48.4	1[1]
Environmental Dosimeter			
0000 – Deploy Control	4/3/17 - 7/5/17	39.6	1[1]
0004 - Air 4A[1]	4/3/17 - 7/5/17	51.8	1[1]
Security Trailer	4/3/17 - 7/5/17	47.7	1[1]
Environmental Dosimeter			
0000 – Deploy Control	7/5/17 – 10/5/17	43.2	1[1]
0004 - Air 4A	7/5/17 – 10/5/17	52.0	1[1]
Security Trailer	7/5/17 – 10/5/17	50.5	1[1]
Environmental Dosimeter			
0000 – Deploy Control	10/5/17 – 1/2/18	36.6	1[1]
0004 - Air 4A	10/5/17 – 1/2/18	47.3	1[1]
Security Trailer	10/5/17 – 1/2/18	45.9	1[1]

[1] Please see the following copy of a brochure from Landauer, Inc. containing information on Lower Limits of Detection (LLDs).

Note: The Deploy Control dose used on this form and in this report is the dose listed on the Environmental Dosimetry Report as Control Dose Used. Landauer, Inc. no longer provides labeled Deploy and Transit Control doses.

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100518-0

Landauer, Inc.
Glenwood, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Ionizing Radiation Dosimetry

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

2018-01-01 through 2018-12-31
Effective Dates

For the National Voluntary Laboratory Accreditation Program

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Landauer, Inc.
2 Science Road
Glenwood, IL 60425
Mr. Christopher N. Passmore, CHP
Phone: 708-441-8455 Fax: 708-755-7035
E-Mail: cpassmore@landauerinc.com
URL: http://www.landauer.com

IONIZING RADIATION DOSIMETRY **NVLAP LAB CODE 100518-0**

Scope of Accreditation:
This facility has been evaluated and deemed competent to process the whole body radiation dosimeters and extremity dosimeters listed below by employing the following readers/processes:

(1) Landauer InLight manual, 200, 500, 3000 and microStar Optically Stimulated Luminescence (OSL) readers; (2) LDR Custom Laser Heater TLD Reader; (3) Harshaw 3500 single-chip reader; (4) Landauer Automatic and Manual Luxel/Luxel+ Pulsed Optically Stimulated Luminescence (POSL) reader; (5) Landauer Manual Luxel/Luxel+ Light Emitting Diode (LED) OSL accident reader; (6) Neutron Auto CR-39 reader RadOsys; (7) microscopes; and (8) RadLight OSL manual and automatic readers.

WHOLE BODY

This facility is accredited to process the following dosimeters by demonstration of compliance with ANSI HPS N13.11 through testing.

OSL Dosimeters:

A4 - [Beta/photon] - Luxel+ Pa (w/permanent clip), process 5 and 6 for ANSI N13.11-2009 categories IA, IIA, IIIA, and IVAA.

A5 - [Beta/photon/thermal & fast neutrons] - Luxel+ Ta (w/permanent clip), process 5, 6, 7, and 8 for ANSI N13.11-2009 categories IA, IIA, IIIA, IVAA and VCA.

For the National Voluntary Laboratory Accreditation Program

IONIZING RADIATION DOSIMETRY **NVLAP LAB CODE 100518-0**

A7 - [Beta/photon] - InLight LDR Model 2-L02N (w/permanent clip), process 1 for ANSI N13.11-2009 categories IA, IIA, IIIA, and IVAA.

A9 - [Beta/photon/thermal & fast neutrons] - InLight LDR Model 2T-L02T (Polyethylene and Boron Radiator CR39) (w/permanent clip), process 1, 7, and 8 for ANSI N13.11-2009 categories IA, IIA, IIIA, IVAA, and VCA.

B3 - [Beta/photon/fast neutrons] - Luxel+ Ja (w/permanent clip), process 5, 6, 7, and 8 for ANSI N13.11-2009 categories IA, IIA, IIIA, IVAA, and VCA.

B6 - [Photon] - Luxel+ Pa Escort, process 5 and 6 for ANSI N13.11-2009 category IA.

C1 - [Beta/photon/ neutron] - InLight LDR Model 2 OSLN-L11N, process 1 for ANSI N13.11-2009 categories IA, IIA, IIIA, IVAA and VCA.

C2 - [Beta/photon/thermal & fast neutrons] - InLight LDR Model 2T OSLN-L11TN, process 1, 7, and 8 for ANSI N13.11-2009 categories IA, IIA, IIIA, IVAA, and VCA.

C3 - [Photon] - RadWatch Model 1 in RadWatch holder, process 9 for ANSI N13.11-2009 categories IA and IIC.

EXTREMITY

This facility is accredited to process the following dosimeters by demonstration of compliance with ANSI HPS N13.32 through testing.

TLD Dosimeters:
Z - [Beta/photon] - U Ring (TLD 100-chip) (Finger), process 2 and 4 for ANSI N13.32-2008 categories IB, IC, IIB, IIC, IID, IIIB, IIIC, IIID, and IVBB.

C5 - [Beta/photon] - S Ring (TLD 100-chip) (Finger), process 2 and 4 for ANSI N13.32-2008 categories IB, IC, IIB, IIC, IID, IIIB, IIIC, IIID, and IVBB.

OSL Badges:

B2 - [Beta/photon] - Luxel+ Pa Wrist (Wrist) , process 5 and 6 For ANSI N13.32-2008 categories IA, IIA, IIIA, and IVAA.

CONTINUOUS LOW-VOLUME AIR PARTICULATE ANALYSIS

STATION 4A – 2017

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/ml	Error Estimate µCi/ml	LLD µCi/ml	Effluent Conc.* µCi/ml	% Effluent Concentration
1st Quarter	U-nat	3.7 E-17	N/A	1 E-16	9 E-14	4.1 E-02
1/2/17–4/3/17	Th-230	2.1 E-17	4.0 E-18	1 E-16	3 E-14	7.0 E-02
Air Vol in mLs	Ra-226	3.3 E-17	1.6 E-17	1 E-16	9 E-13	3.7 E-03
4.57 E+10	Pb-210	2.0 E-14	5.9 E-15	2 E-15	6 E-13	3.3 E+00
2nd Quarter	U-nat	5.0 E-17	N/A	1 E-16	9 E-14	5.5 E-02
4/3/17 - 7/5/17	Th-230	3.3 E-17	6.4 E-18	1 E-16	3 E-14	1.1 E-02
Air Vol in mLs	Ra-226	5.4 E-17	2.6 E-17	1 E-16	9 E-13	6.0 E-03
4.44 E+10	Pb-210	2.1 E-14	6.3 E-15	2 E-15	6 E-13	3.5 E+00
3rd Quarter	U-nat	3.0 E-17	N/A	1 E-16	9 E-14	3.4 E-02
7/5/17 – 10/2/17	Th-230	2.2 E-17	4.1 E-18	1 E-16	3 E-14	7.2 E-02
Air Vol in mLs	Ra-226	3.5 E-17	7.8 E-18	1 E-16	9 E-13	3.9 E-03
4.40 E+10	Pb-210	2.8 E-14	8.5 E-15	2 E-15	6 E-13	4.7 E+00
4th Quarter	U-nat	4.1 E-17	N/A	1 E-16	9 E-14	4.5 E-02
10/2/17 – 1/2/18	Th-230	3.7 E-17	7.1 E-18	1 E-16	3 E-14	1.2 E-01
Air Vol in mLs	Ra-226	3.6 E-17	1.8 E-17	1 E-16	9 E-13	4.0 E-03
4.64 E+10	Pb-210	2.0 E-14	6.1 E-15	2 E-15	6 E-13	3.4 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

Radionuclide Releases
From the Sweetwater Uranium Project

The Sweetwater Mill is not operating, thus there are no releases from stacks related to the mill such as the dryer stack, exhausts from the Solvent Extraction (SX) Building, or any other stacks. There is no ore on the Ore Pad and the Ore Pad was cleaned following cessation of operations on April 15, 1983, thus there are no emissions (windblown ore dust or radon) from stockpiled ore. The tailings impoundment has been largely covered with fluid-filled, lined lagoons minimizing any windblown tailings. The attached map entitled **Tailings Impoundment – December 2009** and the most recent Google Earth image entitled **Tailings Impoundment – June 8, 2014** attest to the current water covered condition of the impoundment.

The impoundment is tested as required by 40 CFR Part 61 Subpart W annually to determine average Radon-222 flux. The most recent test for which complete information with calculations is available was completed on Wednesday, August 9, 2017. In addition, concurrent with the test, the impoundment was surveyed to determine the total area of 11(e).2 byproduct material as well as the total water covered area. The results of the 2017 Method 115 Test and survey are as follows:

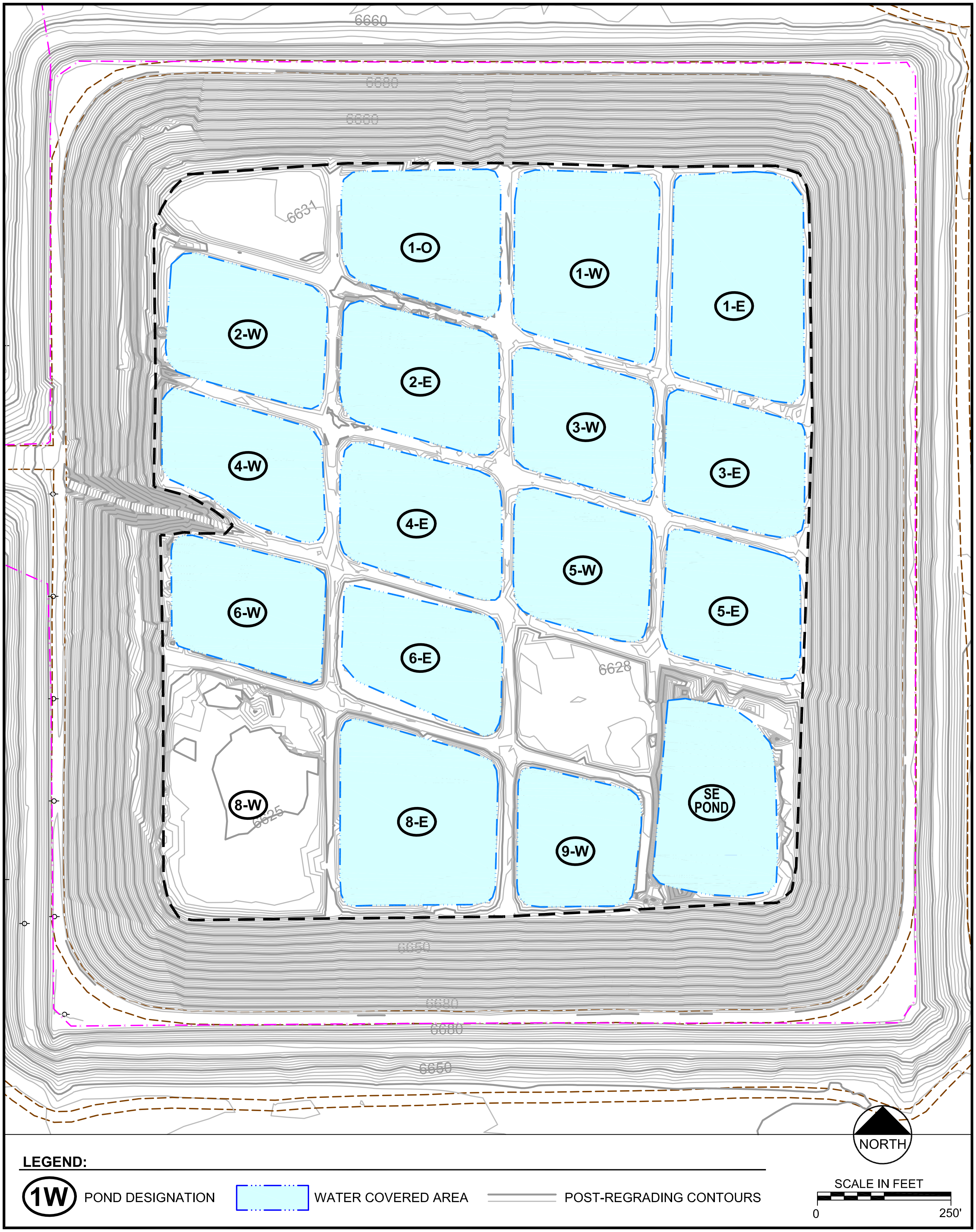
Area Description	Area (square meters)	Radon-222 Flux (pCi/m^2-sec)
Exposed tailings	57,505.8	14.37
Water covered areas	98,702.8	0
Total	156,208.6	5.29 (average)

The total area of 11(e).2 byproduct material of 156,208.6 square meters has an average flux rate of 5.29 pCi/m^2 –sec. This equates to a total annual Radon-222 release from the impoundment of:

(5.29 pCi/m^2–sec) (156,208.6 square meters) (365 days/year) (24 hours/day) (60 minutes/hour) (60 seconds/minute) = 2.61 E+13 pCi = 26.1 curies of Radon-222 per year.

This average flux rate of 6.52 pCi/m^2- sec is higher than the average background flux rate of 4.07 pCi/m^2-sec based on fifteen (15) background flux measurements taken concurrently with the 2017 Method 115 Test in undisturbed locations south and west of the facility. Radon-222 activities of air downwind of the facility averaged less than upwind Radon-222 activities in the second half of 2017. This situation (downwind average Radon-222 activities in air being less than upwind activities) has been consistently observed for the facility for at least the past two (2) decades.

No liquid effluents have been released from the facility in 2017. All contaminated liquids as well as pumpback water are placed in the tailings impoundment.



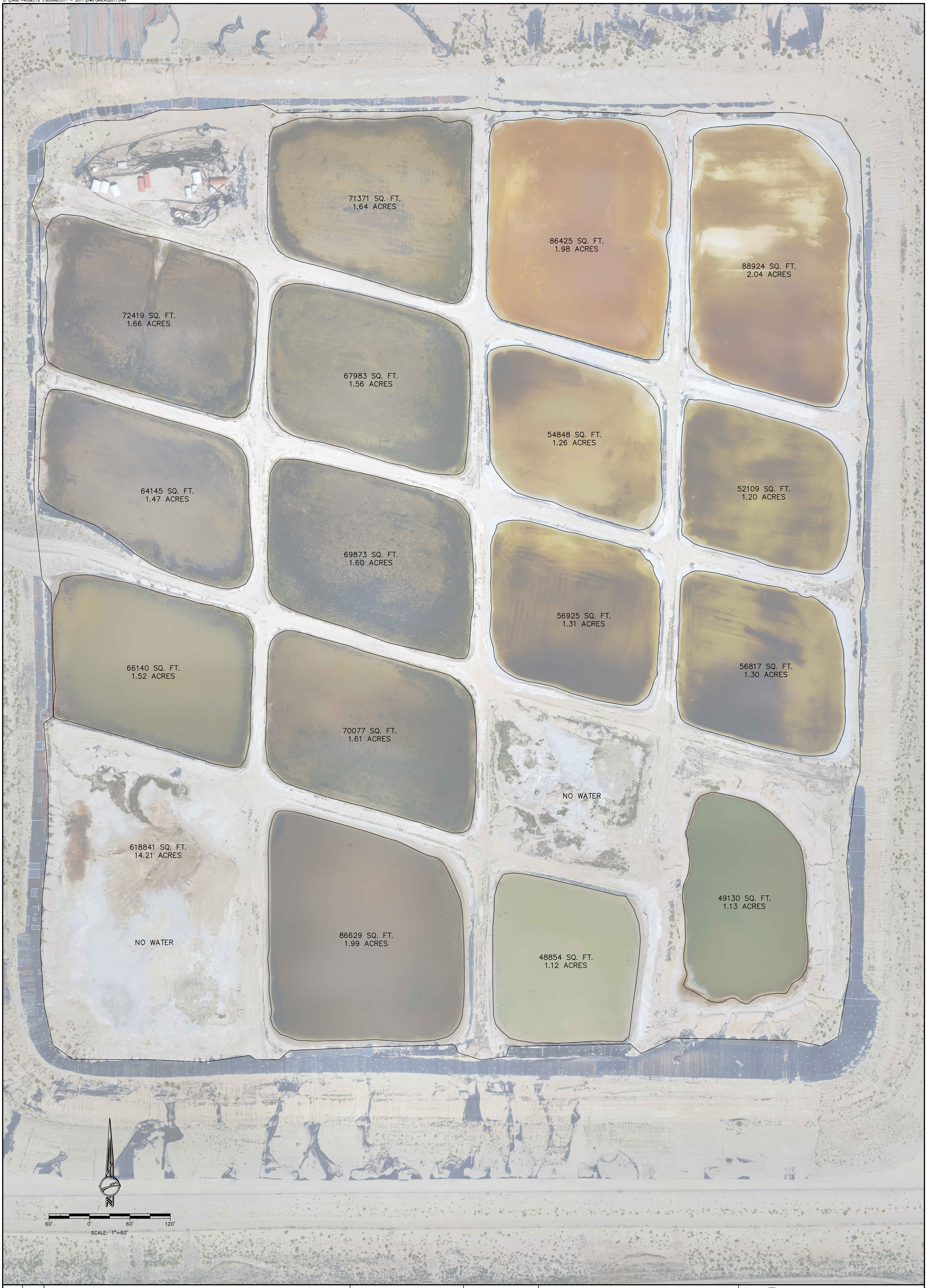
SWEETWATER URANIUM FACILITY
TAILINGS IMPOUNDMENT – DECEMBER 2009

Date:	FEBRUARY 2010
Project:	06-442\REP2010\
File:	Tailings 2009-Dec.dwg

Tailings Impoundment – June 8, 2014

Image from Google Earth

D:\LAND PROJECTS 3\KENNECOTT - 2017\DWG\AREAS2017.DWG



DATE: 9-6-17	SHEET NO. 1 OF 1	METHOD 115 TESTING 8-18-2017	REVISIONS	Drwg. By: JSG W.O. No.: 13958-06 Chk. By: CTM Book No.: Acad File: AREAS2017 FOR: KENNECOTT P.O. BOX 1500 RAWLINS, WY 82301	WLC ENGINEERING · SURVEYING · PLANNING 200 PRONGHORN, CASPER, WY. 82601

January 20, 2018

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 2017

The following is a dose calculation for the nearest resident (the contract security guard) for the second half of 2017.

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 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. A map showing the location of the Security Trailer is attached.
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 PicoCuries 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 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 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 station 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.
12. This method was discussed with James Webb, Project Manager, of the Nuclear Regulatory Commission in an email dated Wednesday, January 19, 2011. In an email dated Monday, February 28, 2011, he replied that Kennecott Uranium Company should continue to follow the methods identified in the semiannual effluent (10 CFR 40.65) reports until directed otherwise. The emails are included in this report.

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	2.80 pCi/l	158.8
Total			**360.7**

Notes:

1. An equilibrium factor of 0.129 was used for radon based on forty-two (42) comparisons of radon-222 and radon-222 daughter concentrations over twenty-four (24) 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 2017 of 2.80 pCi/L was used for the second half 2017 radon concentration.
4. Calculation: (Radon concentration (pCi/l))*(Equilibrium factor)*(0.44 rems/pCi/l) = Dose (rems)
5.

SECURITY TRAILER

		Average Concentration	Dose (mrem)
Gamma Exposure:			192.8
Airborne Particulates:			
	U nat	3.55 E-17 µCi/ml	0.020
	Ra-226	3.55 E-17 µCi/ml	0.002
	Th-230	2.95 E-17 µCi/ml	0.049
Gases:			
	Radon-222	2.64 pCi/l	150.1
		Total	**343.0**

Note: Average radon concentration may vary slightly from those elsewhere in the document due to rounding differences

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]	0.36
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	0.00
7/1/06 – 12/31/06	2.13	0.014	0.66
1/1/07 – 6/30/07	1.65	0	0.00
6/30/07 – 12/31/07	2.10[4]	0.0001	0.005
1/1/08 – 6/30/08	3.28	0	0.00
6/30/08 - 12/31/08	2.83	0	0.00
1/1/09 - 6/30/09	2.25	0	0.00
6/30/09 - 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	1.63	0.002	0.12
1/1/11 - 6/30/11	0.95	0.0015	0.16
7/1/11 - 12/31/11	1.90	0	0.00
1/1/12 - 6/30/12	1.50	0.003	0.20
7/1/12 - 12/31/12	1.98[5]	0	0.00
1/1/2013 - 6/30/13	1.71	0	0.00
7/1/143 - 12/31/13	1.68	0.001	0.06
1/1/14 - 6/30/14	1.25	0	0.00
7/1/14 - 12/31/14	2.40	0	0.00
1/1/15 - 6/30/15	1.73	0.001	0.06
6/30/15-12/31/15	2.94	0.001	0.03

1/1/16 - 6/30/16	2.10	0.001	0.05
7/1/16 - 12/31/16	2.63	0	0.00
1/1/17 - 6/30/17	1.93	0.001	0.05
7/1/17 - 12/31/17	2.65	0.004	0.15
Average			**0.129**

[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.

[5] Used a single radon progeny measurement for the Security Trailer for the first half of 2012 collected in the bedroom. The measurement collected in the kitchen was not used since it appeared abnormally low and use of a conservative value is desireable.

<u>Calculation Parameters</u>

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

Notes:

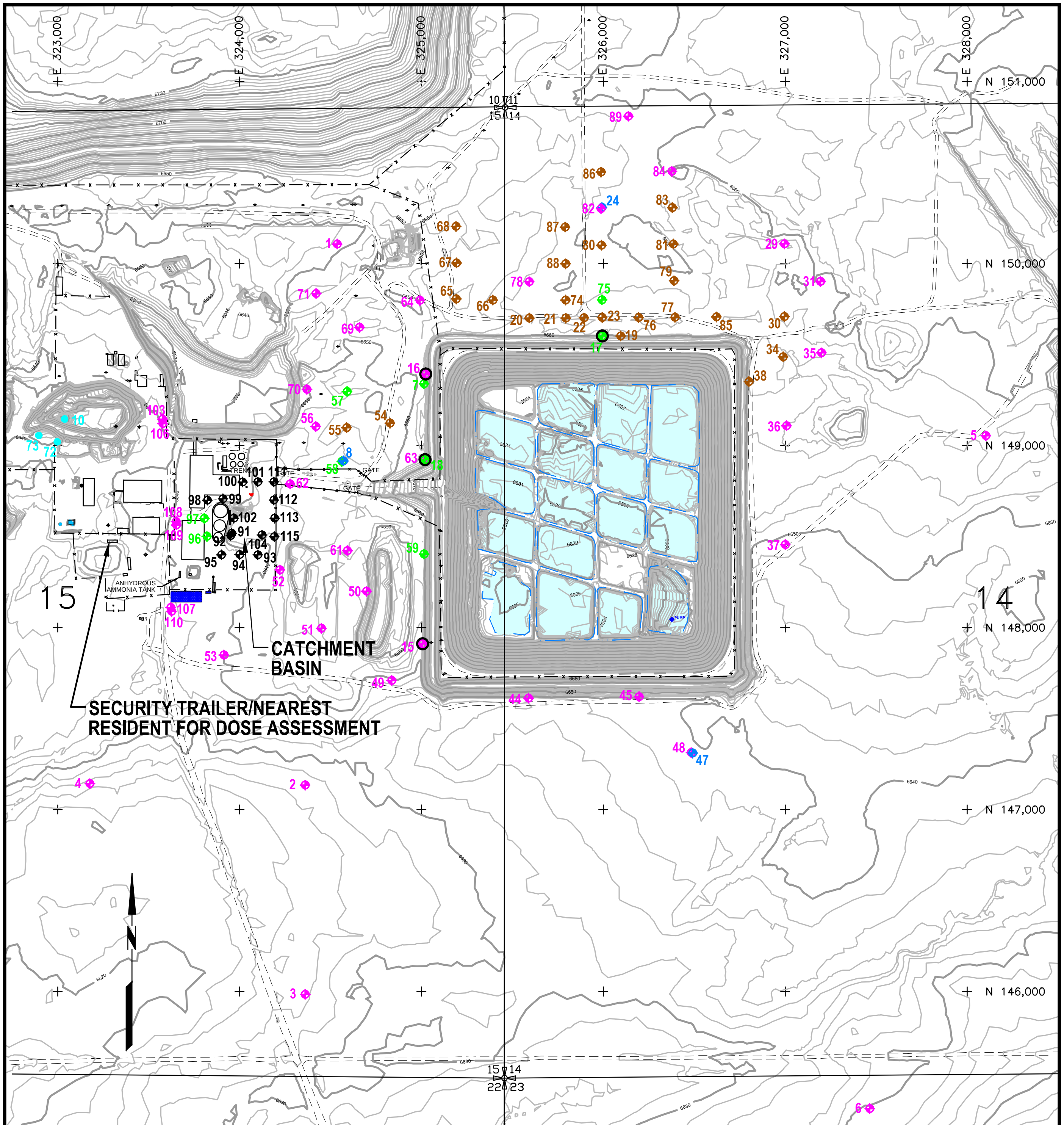
1. An equilibrium factor of 0.129 was used for radon based on forty-two (42) comparisons of radon-222 and radon-222 daughter concentrations over twenty-four (24) years.
2. Downwind airborne particulate concentrations for the third and fourth quarters of 2017 were used for the security trailer. These 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 2017 and is based on an average of RadTrak units located in two (2) locations; the kitchen and the bedroom.
4. The gamma exposure for the Security Trailer is based upon an environmental dosimeter placed in the Security Trailer and exchanged quarterly.

Second Half – 2017		
	Third Quarter	**Fourth Quarter**
Kitchen	2.4 pCi/L	2.6 pCi/L
Bedroom	2.6 pCi/L	3.0 pCi/L
Trailer Average:		**2.64 pCi/L**

5. The annual gamma dose rate is calculated by doubling the sum of the first and second quarter dosimeter readings, converting them to an annual dose rate.

The calculated net (dose to the nearest resident minus background dose) annual TEDE from the licensed operations for the second half of 2017 is **0.0** mrem/year, which is below the 100 mrem/year dose limit to members of the general public.

Oscar Paulson
Avg dose.doc



SCALE IN FEET

0 800

TOPOGRAPHY UPDATED JULY 2009
BY ROBERT JACK SMITH & ASSOC.
INC. CONSULTING LAND
SURVEYORS
P.O. BOX 1104, 1015 HARSHMAN ST.
RAWLINS, WY 82301

NOTE:
ALL WELLS HAVE A TMW PREFIX (TYP.)

LEGEND

- SHALLOW WELLS (PERCHED)
- DEEP AQUIFER WELLS
- AQUIFER WELLS
- PUMPBACK WELLS, AQUIFER
- COMPLIANCE MONITORING WELLS
- POINT OF COMPLIANCE (POC) WELLS (TAILINGS IMPOUNDMENT)
- CONTAMINATED SOIL EXCAVATION MONITOR WELLS

RioTinto

SWEETWATER URANIUM PROJECT
NEAREST RESIDENT LOCATION MAP
SEMIANNUAL 10 CFR 40.65 REPORT

Date:	FEBRUARY 2012
Project:	06-442\REP2012
File:	2012-Nearest

Additional Requested Radon Information

This section contains the additional relevant radon dose and concentration information requested in the telephone conversation with James Webb on Tuesday, January 12, 2016, and is excerpted from the responses to the July 13, 2015 Requests for Additional Information (RAI's) regarding the Renewal Request for Source Material License (SML) SUA-1350. The excerpted information is in italics.

Modeled Radon Concentration and Dose Data

Radon-222 concentrations at the requested receptor point locations (Air Station 4A and Security Trailer) were modeled using the MILDOS-AREA computer code (ANL, 2015).In addition, the spatial distribution of Rn-222 air concentrations and corresponding doses to a hypothetical receptor at any given location in the general vicinity of the Mill were modeled for 3,723 individual receptor points on a 100 × 100 meter grid covering approximately 8,900 acres with the impoundment situated at the center of the grid

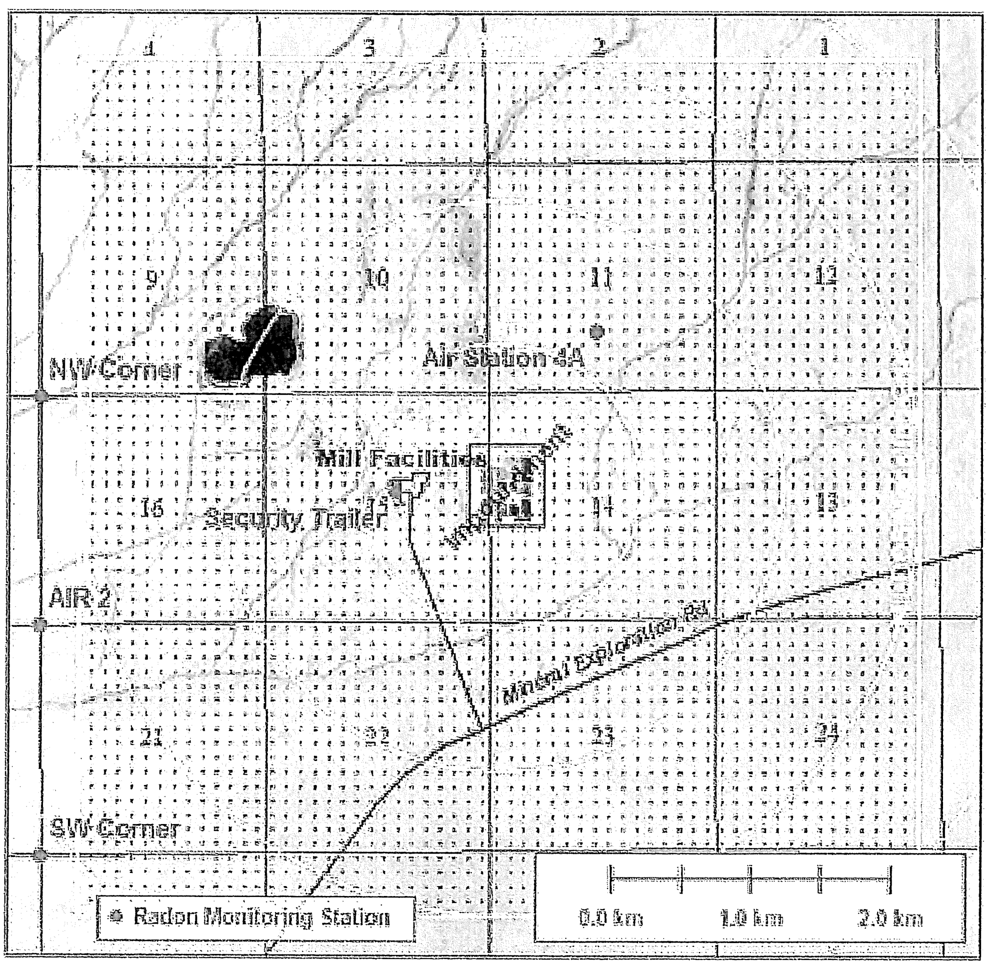


Figure 8-1: MILDOS modeling grid (receptor locations on 100-m centers).

The Rn-222 effluent source term for the tailings impoundment was based on an average radon flux of 8.97 pCi/m2-s across a total area of 157,449 m2 (about 39 acres) as reported in the 2014 Semi-annual Effluent Report (Kennecott, 2014). The value of 8.97 pCi/m2-s is based on the average flux value for the exposed tailings divided over the entire areal extent of 11(e).2 byproduct material residing within the impoundment, including both water covered areas and areas with exposed tailings. Radon flux measurements and determination of the average flux across the impoundment were performed in accordance with Method 115 in 40 CFR Part 61 Subpart W.

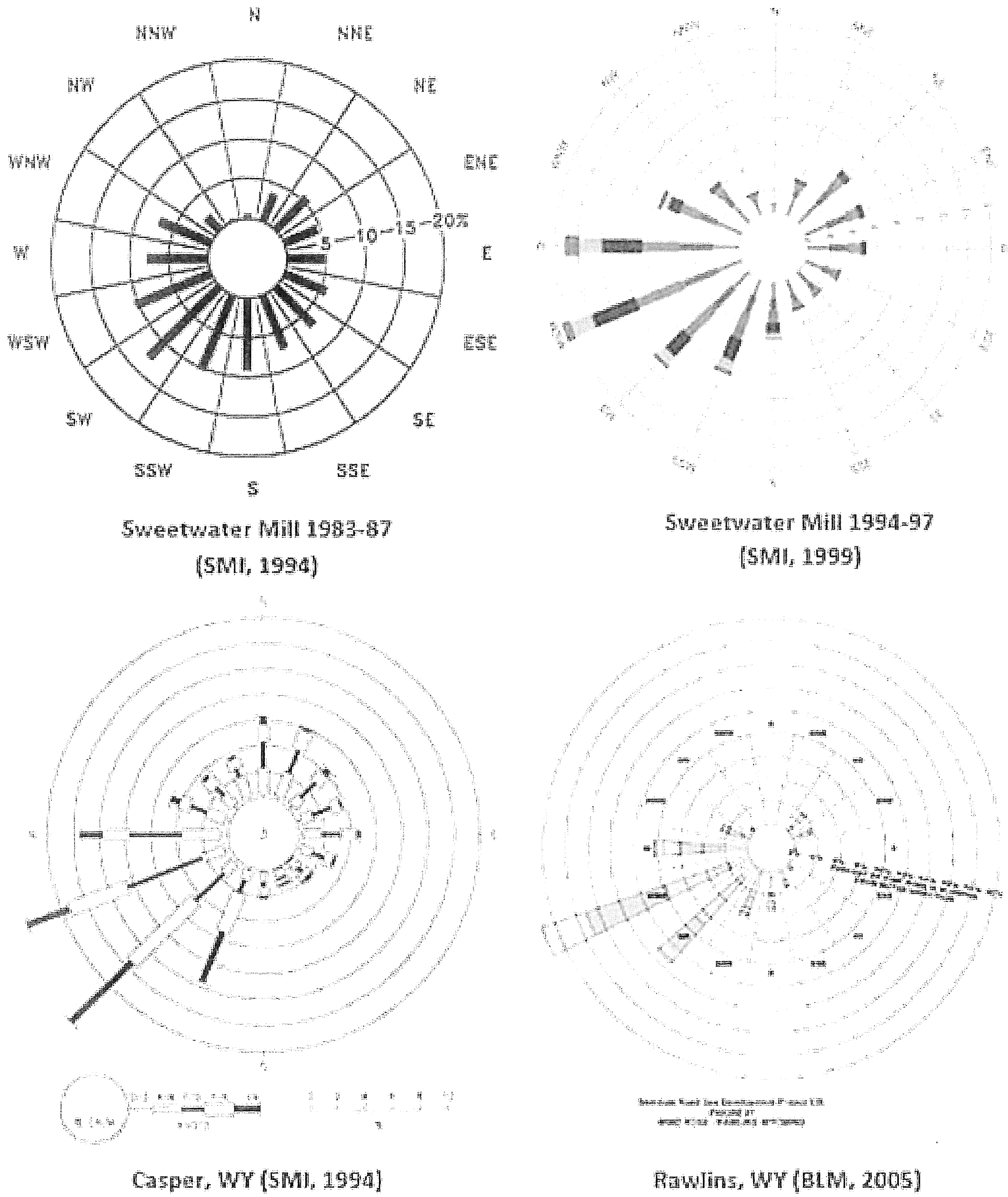
Atmospheric dispersion modeling in MILDOS requires joint wind and atmospheric stability frequency data in a "STAR" (.STR) file format. The only multi-year set of Site specific meteorological (MET) data which included the necessary joint frequency tables to create a .STR file was provided in the 1994 Revised Environmental Report (SMI, 1994). These data were reported for the years 1983-1987, and were used for MILDOS modeling in the 1994 Revised Environmental Report to support planned resumption of milling activities in a respective submittal to the U.S. Nuclear Regulatory Commission (NRC) (SMI, 1994). This data was accepted for use by the NRC.

Current review of all historical MET data for the Site suggests that the Site's annual wind rose for the 1983 87 time period was somewhat different relative to data collected in later years (1994 1997) (SMI, 1999). Moreover, the later data appear to agree more closely with typical regional wind rose data for both Rawlins and Casper, WY (Figure 8-2). In addition, in the Technical Report portion of a recent NRC license application for the nearby Lost Creek ISR project (Lost Creek ISR, 2010), a statistical analysis was performed showing that the meteorology at Rawlins, WY is statistically representative of meteorology at the now licensed Lost Creek ISR site (NRC License SUA 1598). The Lost Creek ISR facility is located about 10 km northeast of the Sweetwater Mill, and lacking any significant topography in this part of Wyoming (within the Great Divide Basin), it is reasonable to assume that meteorological conditions at both sites are very similar.

Joint wind/atmospheric stability data for Rawlins, WY are available in the required .STR file format from the RESRAD-OFFSITE computer code (ANL, 2009). Due to uncertainty with respect to the most representative MET data to use for atmospheric dispersion modeling of radon effluents from the tailings impoundment, a joint frequency .STR file was generated for the site-specific 1983-87 data set for use in the modeling, and the .STR file for Rawlins, WY from the RESRAD-OFFSITE program was also used to separately model atmospheric dispersion of radon effluents in the event that this data set is more representative of long-term meteorological conditions at Sweetwater.

In addition to modeling the spatial distribution of atmospherically dispersed radon effluents from the tailings impoundment, the corresponding effective dose to a hypothetical human receptor at each grid location was modeled based on standard MILDOS assumptions of 100% occupancy and age weighted dose conversion factors for members of the public (NRC, 1982; ANL, 2008). This modeled dose takes into account the spatial variability in effluent radon progeny and equilibrium ratios with distance from the impoundment source term as discussed in the response to RAI #6 (see Figure 6-3). (Included in the October 2015 Responses to NRC Requests for Additional Information but not in this discussion)

MILDOS modeling output for each meteorological scenario (Rawlins .STR file or Sweetwater .STR file) as described above was mapped using commercially available GIS software (Global Mapper®). This software was further used to develop continuous color coded contour gradients representing the spatial distributions of modeled values for radon effluent concentrations and receptor doses (based on triangular interpolation between receptor grid points). The results are presented in Figure 8-3 through Figure 8-5.



Sweetwater Mill 1983-87
(SMI, 1994)

Sweetwater Mill 1994-97
(SMI, 1999)

Casper, WY (SMI, 1994)

Rawlins, WY (BLM, 2005)

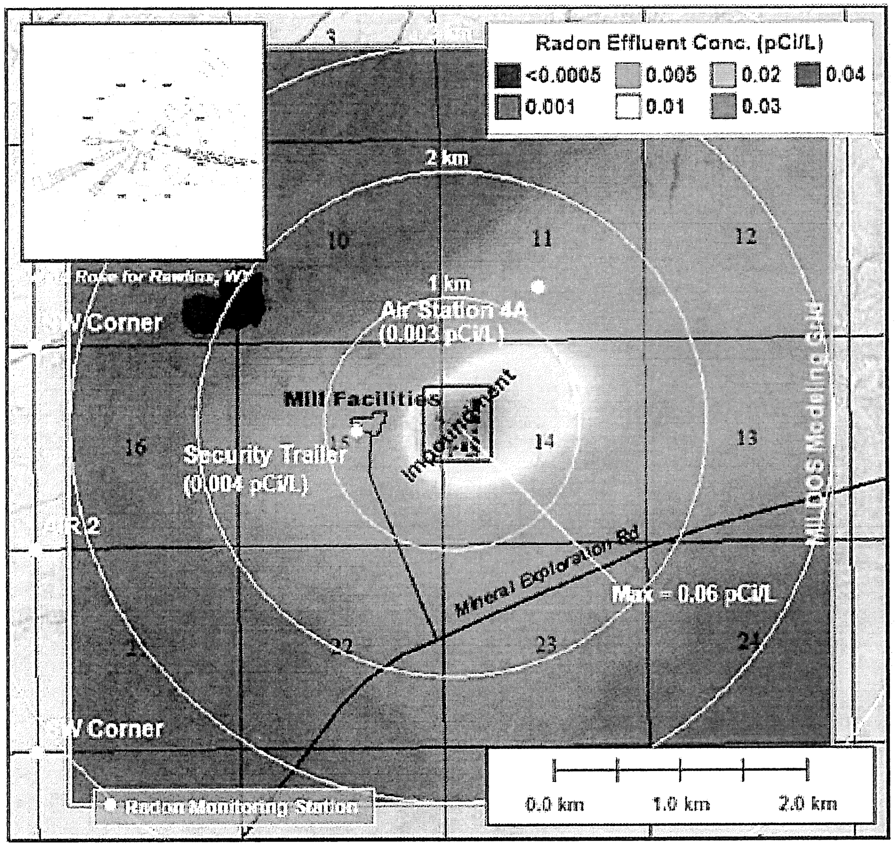
Figure 8-2 Annual average wind rose data for the Sweetwater Mill Site (top) compared to typical regional wind roses for Casper, WY (bottom left) and Rawlins, WY (bottom right).

The modeling results in Figure 8-3 through Figure 8-5 indicate negligible radon concentrations and doses at the Security Trailer and Air Station 4A due to effluents from the impoundment (values are annotated in the Figures). Radon effluents from licensed materials cannot be measured with track etch detectors at either of these locations as is demonstrated by the data comparisons in Table 8-1, which include reported analytical uncertainties and detection limits. MILDOS modeling based on actual radon flux measurements indicates that effluents from licensed materials at these locations are expected to be an order of magnitude lower than detection limits and data uncertainties for track etch monitoring devices.

Station	Quarter	2014 RadTrak® Radon Monitoring Results			Modeled Radon Effluent Concentration from Licensed Materials (pCi/L)	
		Mean Conc (pCi/L)	Uncertainty (pCi/L)	LLD (pCi/L)	Based on Rawlins Joint Frequency Surrogate MET Data	Based on 1983-1987 Sweetwater Joint Frequency MET Data
4A	1	1.3	0.08	0.06	0.003	0.003
	2	1.6	0.08	0.06		
	3	1.9	0.10	0.06		
	4	2.3	0.11	0.06		
	Mean	1.8	0.09			
	Std Dev	0.4	0.02			
Security Trailer	1	1.5	0.09	0.06	0.004	0.006
	2	1.0	0.07	0.06		
	3	1.3	0.08	0.06		
	4	2.4	0.11	0.06		
	Mean	1.5	0.08			
	Std Dev	0.6	0.02			

Table 8-1 Comparison of Quarterly Track Etch Radon Monitoring Data Versus Modeled Radon Effluents From Licensed Materials at the Security Trailer and Downwind Radon Monitoring Station 4A

With respect to locations other than the Security Trailer where a public receptor could potentially receive a radiological dose due to radon effluents from licensed materials, the maximum dose to any public receptor residing 100% of the time anywhere beyond the impoundment would be less than 2 mrem/y. Based on the MILDOS modeling results shown in Figure 8-3 and Figure 8-6, the consistently higher background radon concentrations measured upwind of the site with track etch detectors (versus those measured downwind of the site) as discussed in the July 2014 License Renewal Application are not related to airborne effluents from the impoundment.



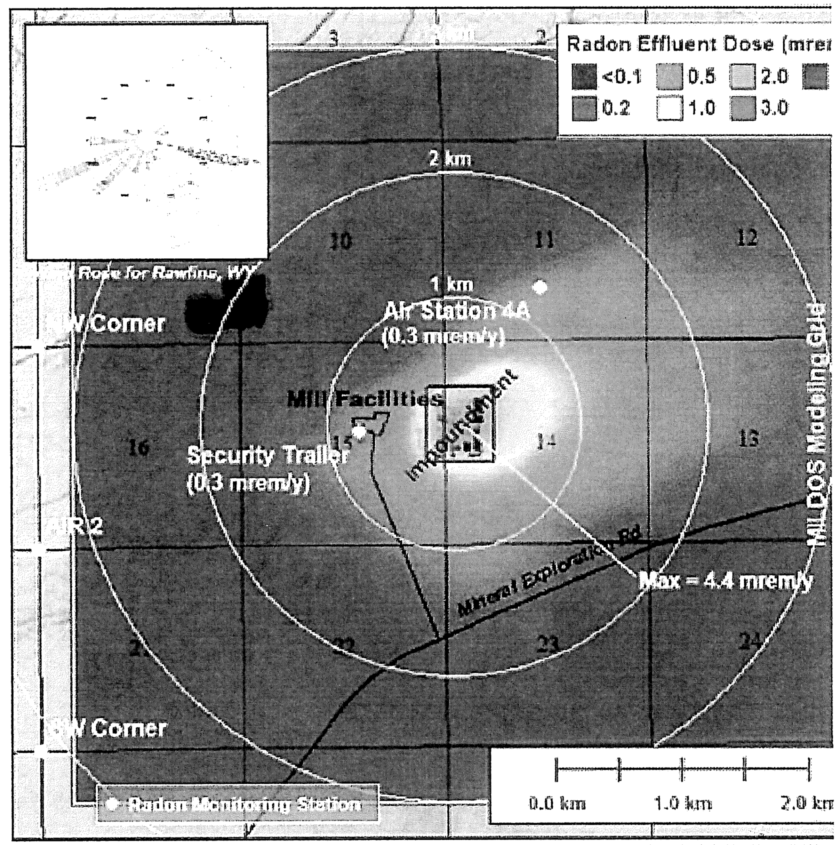


Figure 8-3: Modeled Spatial Distribution of Rn-222 Concentrations in Air in the Vicinity of the Sweetwater Mill Due to Effluents from the Impoundment. (Based on radon flux measurements across the impoundment along with joint wind and atmospheric stability frequency data for Rawlins, WY [used as a representative surrogate for meteorological data for the Sweetwater Mill area]).

Figure 8-4: Modeled Spatial Distribution of Radiological Doses to a Hypothetical Receptor Located Anywhere in the Vicinity of the Sweetwater Mill Due to Rn-222 Effluents from the Impoundment. (Based on radon flux measurements across the impoundment along with joint wind and atmospheric stability frequency data for Rawlins, WY [used as a representative surrogate for meteorological data for the Sweetwater Mill area]).

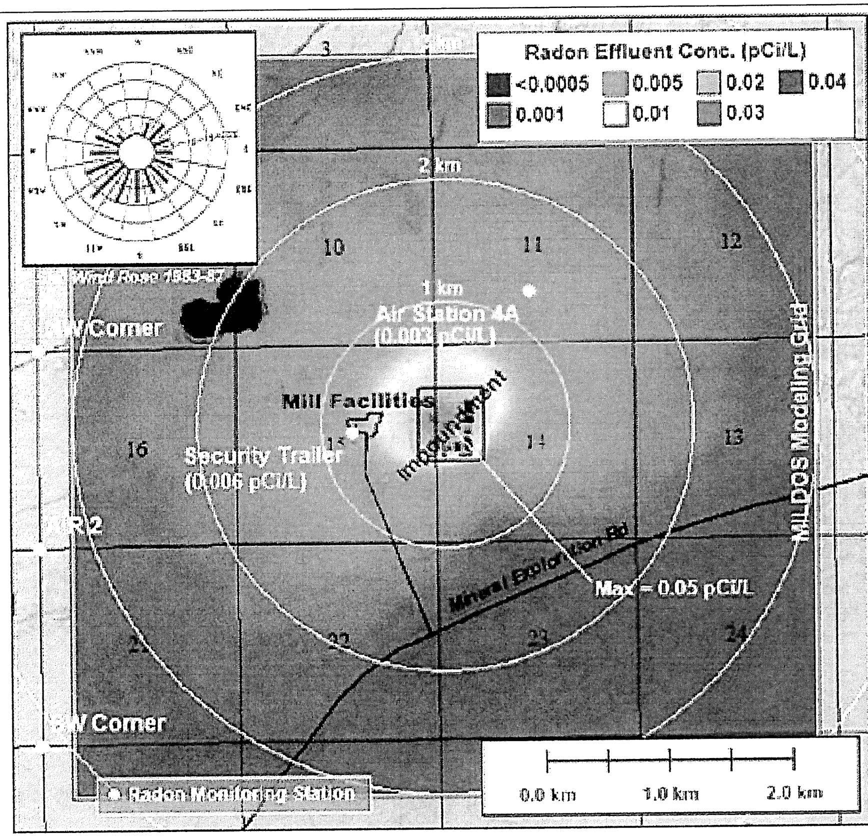


Figure 8-6: Modeled Spatial Distribution of Rn-222 Concentrations in Air in the Vicinity of the Sweetwater Mill Due to Effluents from the Impoundment. (Based on radon flux measurements across the impoundment along with site-specific joint wind and atmospheric stability frequency data collected between 1983 and 1987 [SMI, 1994]).

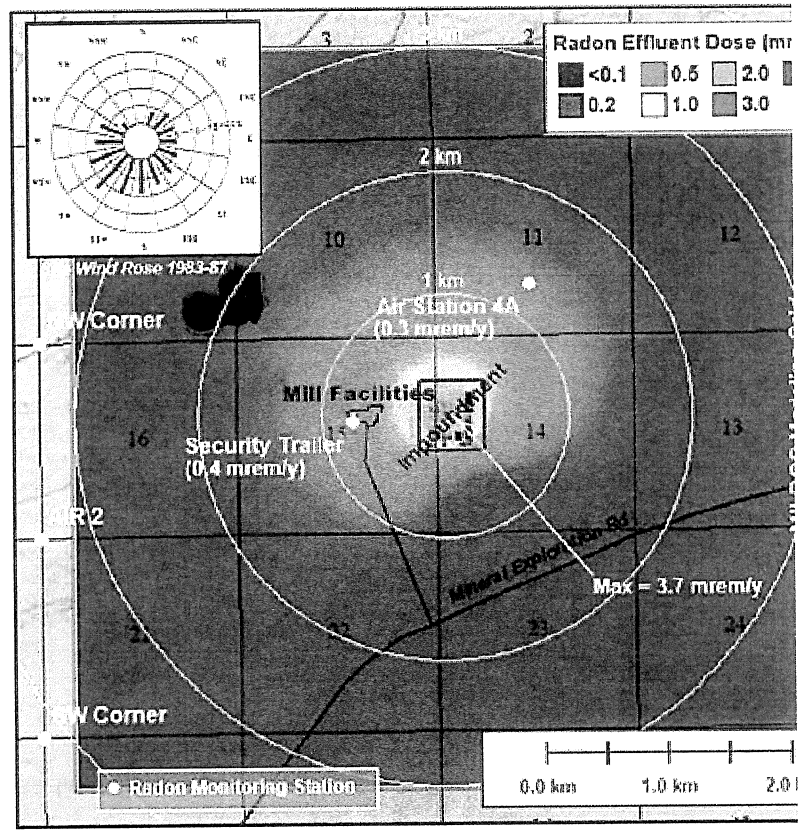


Figure 8-5: Modeled Spatial Distribution of Radiological Doses to a Hypothetical Receptor Located Anywhere in the Vicinity of the Sweetwater Mill Due to Rn-222 Effluents from the Impoundment. (Based on radon flux measurements across the impoundment along with site-specific joint wind and atmospheric stability frequency data collected between 1983 and 1987 [SMI, 1994]).

Modeling of Radon Activities and Decay Product Doses at the Security Trailer

The only source of radon on site is the tailings impoundment. Modeling data shows that the modeled Radon-222 activity at the Security Trailer from licensed activities (the tailings impoundment) varied from 0.004 to 0.006 pCi/L with a maximum of 0.05 to 0.06 pCi/L in the center of the tailings impoundment resulting in a dose of 0.3 to 0.4 millirems per year at the Security Trailer with a maximum of 1.7 to 4.4 millirems per year at the center of the tailings impoundment based upon the 2014 radon flux rate of 8.97 pCi/m^2 –sec from the tailings impoundment in 2014. The 2017 radon flux from the tailings impoundment was less at 5.29 pci/m^2 –sec. This would have resulted in a lower dose in 2017. Given these low doses the public dose limit at the Security Trailer could not have been exceeded in 2017.

Enhanced Measurement of Radon-222 Decay Product Activities in the Security Trailer.

In the second half of 2017 an enhanced measurement of Radon-222 decay product activities were made in the Security Trailer. Normally Radon-222 decay product activities are measured via the modified Kusnetz Method using a personal breathing zone sampler generally operating at a flow rate of no greater than 10 liters per minute.

Enhanced modified Kusnetz Method measurements were made in the Security Trailer in the third and fourth quarters of 2015 and in 2016 and 2017 at flow rates at approximately or slightly greater than 400 liters per minute via the following method, the technical specifications of which are as follows:

The technical specifications of the method are as follows:

- *The method used is the modified Kusnetz Method as described by EPA (EPA, 2011) and elsewhere (e.g. CNSC, 2003), except that a larger sample is collected to increase method sensitivity (decrease the LLC).*
- *The air is sampled for approximately 5 minutes with an F&J Model DFHV-1DS high volume sampling pump at a typical flow rate on the order of 465 liters/minute, or a Graseby high volume air sampler fitted with a four (4) inch diameter filter holder.*
- *The sampling filter is an F&J Specialty Products glass-fiber filter with diameter of 10 cm (4 inches).*
- *The typical elapsed time between the end of the collection interval and the beginning of the counting interval is approximately 60 minutes, with a typical applied hold time correction factor of about 110 in accordance with the standard Kusnetz Method table of correction factors.*
- *The filters are counted on an Eberline SACR-5 alpha scintillation detector calibrated within the previous six months.*

The results are as follows:

Table 7-1 Measured Working Levels and Lower Limits of Detection for Radon Progeny within the Security Trailer in 2015, 2016, and 2017.

Date	Location	Sample Volume (L)	Working Level	LLD[1]	LLD[2]
7/30/2015	Kitchen	2210	0.0017	0.0003	0.0003
8/10/2015	Bedroom	1968	0.0019	0.0002	0.0004
8/10/2015	Kitchen	1964	0.0013	0.0002	0.0003
8/11/2015	Bedroom	2229	0.0008	0.0002	0.0002
8/11/2015	Kitchen	2095	0.0009	0.0002	0.0002
8/13/2015	Bedroom	2088	0.0013	0.0003	0.0006
8/13/2015	Kitchen	2139	0.0013	0.0003	0.0006
8/19/2015	Bedroom	2054	0.0017	0.0002	0.0003
8/19/2015	Kitchen	2008	0.0021	0.0002	0.0003
8/26/2015	Bedroom	2243	0.0019	0.0002	0.0002
8/26/2015	Kitchen	2109	0.0024	0.0002	0.0002
9/3/2015	Bedroom	2147	0.0004	0.0002	0.0003
9/3/2015	Kitchen	2100	0.0005	0.0002	0.0003
9/10/2015	Bedroom	2175	0.0008	0.0002	0.0002
9/10/2015	Kitchen	2268	0.0010	0.0002	0.0002
12/30/2015	Bedroom	2071	0.0008	N/C	N/C
12/30/2015	Kitchen	1901	0.0010	N/C	N/C
6/30/2016	Bedroom	2071	0.0008	N/C	N/C
6/30/2016	Kitchen	1925	0.0008	N/C	N/C
1/22/2017[1]	Bedroom	3221[2]	0.0034	N/C	N/C
1/22/2017[1]	Kitchen	5306[2]	0.0074	N/C	N/C
6/30/2017	Bedroom	2015	0.0004	N/C	N/C
6/30/2017	Kitchen	1950	0.0005	N/C	N/C
12/31/17	Bedroom	2015	0.0059	N/C	N/C
12/31/2017	Kitchen	1821	0.0075	N/C	N/C
		Average:	0.0019		

- LLD[1] based on applicable equations provided in Cember and Johnson (2009) and Knoll (2000)
- LLD[2] based on incorrect equation provided in Appendix B of Regulatory Guide 8.3 (NRC, 2002)

[1] Samples were originally collected on December 22, 2016. The data from these samples was discarded since it appeared that the SACR-5 and MS-2 scaler used to count the filters was malfunctioning.
[2] Samples collected using the Graseby high volume sampler with four (4) inch filter holder.

Given the average Radon-222 decay product activity of 0.0019 Working Levels and an average Radon-222 activity of 2.65 pCi/L in air for the trailer of the period from July 1, 2017 to December 31, 2017 the average equilibrium factor is:

((0.0019 WL)/(2.65))*(100) = 0.0566

This value is less than the equilibrium factor of 0.129 used in the dose calculation.
If this equilibrium factor were used the dose in the Security Trailer due to Radon-222 progeny during the second half of 2017 would be:

(2.65 pCi/L)*(0.0566)*(440 millirems per pCi/L) = 65.7 millirems

This is less than the calculated dose due to Radon-222 progeny of 150.1 millirems.

This demonstrates the inherent conservatism of the dose calculation method used in the report.

Schutterle, Shelley (RTE)

From: Paulson, Oscar (CCC)
Sent: Wednesday, January 19, 2011 5:47 PM
To: Webb, James
Cc: Schutterle, Shelley (CCC); Haag, Kelly (RTEA-Temp)
Subject: Source Material License SUA-1350 Docket Number: 40-8584 Calculation of the Dose from Radon and Radon Decay Products to the Nearest Resident/Member of the General Public

Follow Up Flag: Follow up
Flag Status: Completed

James Webb:

On Wednesday, January 12, 2011, Duane Schmidt of the Nuclear Regulatory Commission (NRC) gave a presentation that included a discussion of the calculation of dose from radon and its decay products to members of the general public and to the nearest resident from licensed uranium recovery facilities. In it, he cited the preamble to the revised 10 CFR 20 (Federal Register Volume 56, Number 98 - Tuesday, May 21, 1991 - Rules and Regulations - page 23375) which states:

The Commission is aware that some categories of licensees, such as uranium mills and in situ uranium mining facilities, may experience difficulties in determining compliance with the values in appendix B to Part 20.1001 – 20.2401, Table 2, for certain radionuclides, such as radon-222. Provision has been made for licensees to use air and water concentration limits for protection of members of the general public that are different from those in Appendix B to Part 20.1001 – 20.2401, table 2, if the licensee can demonstrate that the physiochemical properties of the effluent justify such modification and the revised value is approved by the NRC. For example, uranium mill licensees could, under this provision, adjust the table 2 value for radon (with daughters) to take into account the actual degree of equilibrium present in the environment.

At the Sweetwater Uranium Project, the nearest resident is the security guard who lives in a trailer adjacent to the facility. He is considered a member of the public/resident during times that he is on site but not being paid. Two (2) RadTrak/TrackEtch units are installed in the trailer in which he stays to measure radon concentrations. These are exchanged quarterly. In addition, air samples are collected in the trailer by the two (2) RadTrak/TrackEtch units twice each year. These air sample filters are analyzed by the modified Kusnetz Method to determine radon decay product concentrations in working levels. This data is maintained in a spreadsheet and equilibrium factors for radon and its decay products have been calculated for each six (6) month period (January to June and July to December) for each year for over a decade. These equilibrium factors are averaged to generate an average equilibrium factor for the trailer over time. This spreadsheet containing the equilibrium factors along with the entire dose calculation method is provided in each semiannual 10 CFR 40.65 Report that is submitted to the Commission.

During the August 2009 inspection, you examined the site's 10 CFR 40.65 Report and specifically examined the method used to calculate the dose to the nearest resident/member of the general public (the security guard) from radon and its decay products and stated that you concurred with the method being used. The inspection report documents this review stating:

The inspectors reviewed annual effluent reports for 2007 – 2008 to assess doses to the general public. Doses were assessed for individuals at the background station and at the security trailer. During 2007 – 2008 does at the security trailer were below the background station measurements. Therefore, the inspectors concluded that doses to the public were below the limits specified in 10 CFR 20.1301 and 10 CRFR 1302.

During his presentation, Duane Schmidt stated that use of a site specific equilibrium factor for radon and its decay products requires "*approval of a member of NRC staff.*"

While the use of a site specific equilibrium factor was discussed with members of Commission staff in the past, for example Elaine Brummett in an e-mail dated September 7, 2001 specifically requested that a copy of the calculation sheet and explanation of the method for calculation of does to the nearest resident be included for her review in each 40.65

Report that is submitted, no recent written approval by a member of Commission staff exists on file for the use of site specific equilibrium factors for radon and radon decay products at the Sweetwater Uranium Project.

Given that you reviewed and concurred with the use of site specific equilibrum factors for radon and its decay products and with the dose calculation method during the August 2009 inspection, Kennecott Uranium Company is requesting that you provide concurrence with the use of site specific equilibrum factors for radon and its decay products and with the dose calculation method used at the Sweetwater Uranium Project in a reply to this e-mail so that a current approval is on file at the site.

This issue was discussed with you in a telephone conversation on the afternoon of Wednesday, January 19, 2011. The dose calculation method and equilibrium factor spreadsheet can be reviewed in the facility's most recent 40.65 Report which was submitted at the end of August 2010.

If you have any questions please do not hesitate to contact me.

Oscar Paulson

Facility Supervisor
Kennecott Uranium Company
Sweetwater Uranium Project
P.O. Box 1500
42 Miles Northwest of Rawlins
Rawlins, Wyoming 82301-1500

Telephone: (307)-324-4924
Fax: (307)-324-4925
Cellular: (307)-320-8758

E-mail: oscar.paulson@riotinto.com

Paulson, Oscar (CCC)

From: Webb, James [James.Webb@nrc.gov]
Sent: Monday, February 28, 2011 11:53 AM
To: Paulson, Oscar (CCC)
Cc: Schmidt, Duane; Gersey, Linda
Subject: Radon and Radon Decay Products Response

Mr. Oscar Paulson
Facility Supervisor
Kennecott Uranium Company
Sweetwater Uranium Project
P.O. Box 1500
Rawlins, WY 82301-1500

Dear Mr. Paulson,

NRC staff reviewed your request to provide concurrence with the use of site specific equilibrium factors for radon and its decay products and with the calculation method used at the Sweetwater Uranium Project. NRC staff notes that these methods are described in each semi-annual effluent (10 CFR 40.65) reports submitted to the NRC. Because of the nature of your request, and the industry interest in this particular issue, NRC staff has determined that this issue should be addressed in a future guidance on radon developed by the NRC. Your email was placed in ADAMS (ML1102602791) for future reference. Kennecott should continue to follow the methods identified in your semi-annual effluent (10 CFR 40.65) reports until directed otherwise.

Sincerely,

James Webb
Project Manager
USNRC
Washington D.C.