

# Rio Algom Mining LLC

February 25, 2015

ADDRESSEE ONLY

Mr. Tom McLaughlin, Project Manager  
U.S. Nuclear Regulatory Commission  
Mail Stop T-8F5  
Washington, DC 20555

CERTIFIED MAIL

Re: **License SUA-1473, Docket No. 40-8905**  
**Semiannual Effluent Report – 2<sup>nd</sup> Half 2014**

Dear Mr. McLaughlin,

In accordance with license condition #19 of the above referenced source material license and the NRC approved *Health Physics and Environmental Programs Manual*, please find attached the 2<sup>nd</sup> Half 2014 Semiannual Report for the Ambrosia Lake facility.

During the site reclamation project, the earth moving activities by Conestoga Rovers and Associates (CRA) has flattened the sediment sampling location P-0 to where the drainage wash is no longer there. Our intent is to remove this location from the 2015 sampling event.

The environmental High Volume air sample results presented in this semiannual report typically show <1% of the environmental limits for each isotope. For the third quarter samples, the North Fence and KGL North locations were well below the Environmental Concentration limit for Th-230 of 2.0E-14  $\mu\text{Ci/ml}$  but showed positive results of 2.6E-16  $\mu\text{Ci/ml}$  (1.29%) and 4.5E-16  $\mu\text{Ci/ml}$  (2.27%) of the Th-230 limit respectively.

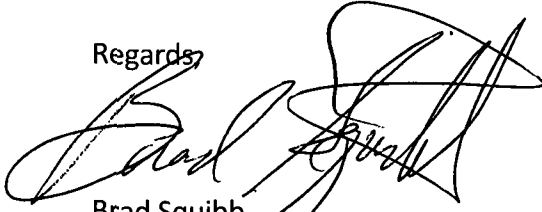
As mentioned in the August 27, 2014 cover letter for the 1<sup>st</sup> Half 2014 Semiannual Report, we have been working with our outside lab (ACZ) concerning the capability to meet the lower limits of detection (LLD) for soil and sediment samples and they have proposed some new methods for certain isotopes while requiring additional volume and count times for other isotopes.

I have also contacted other laboratories inquiring about their ability to meet the vegetation LLD's. Each lab has stated that the volume of material required and the time required to ash enough material make meeting these LLD's cost prohibitive. We will be submitting a license amendment shortly proposing new LLD's based on our laboratories capabilities and

will commence discussions concerning the elimination of vegetation sampling during our scheduled inspection with Dr. Evans in late March.

If you have any questions or need additional information, please do not hesitate to call me at (865) 220-7193.

Regards,

A handwritten signature in black ink, appearing to read "Brad Squibb", written over a large, stylized scribble.

Brad Squibb  
Radiation Safety Officer

Attachment

cc: NRC (document control)  
File

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Environmental Gamma Radiation  
2014

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3rd Quarter		4th Quarter	
Sample Media: Gamma		Sample Media: Gamma	
Date: 7/1/2014 - 9/30/2014		Date: 10/1/2014 - 12/31/2014	
Location:	Rate (mRem/qtr)	Location:	Rate (mRem/qtr)
Substation	0.0	Substation	0.0
Mill Diversion	0.0	Mill Diversion	0.0
Section 30W VH6	8.5	Section 30W VH6	17.0
North Fence	0.0	North Fence	6.0
Section 17 VH4	8.5	Section 17 VH4	0.0
Section 4 - #1	2.3	Section 4 - #1	0.0
Section 4 - #2	3.4	Section 4 - #2	8.8
Section 4 - #3	0.0	Section 4 - #3	1.9

Notes:  
Values are net after subtraction of control value

Environmental Radon  
 2014

3rd Quarter  
 Sample Media: Track Etch

Location:	Rate pCi/L	Error pCi/L
Substation	0.9	0.1
Mill Diversion	1.6	0.1
Section 30W VH6	2.0	0.1
North Fence	2.1	0.1
Section 17 VH4	0.8	0.1
KGL - North	1.3	0.1
KGL - South	1.5	0.1

4th Quarter  
 Sample Media: Track Etch

Location:	Rate pCi/L	Error pCi/L
Substation	0.8	0.1
Mill Diversion	2.7	0.2
Section 30W VH6	3.6	0.2
North Fence	3.3	0.2
Section 17 VH4	1.3	0.1
KGL - North	2.4	0.1
KGL - South	2.3	0.1

Notes:

High Volume Environmental Air Samples  
2014

3rd Quarter					4th Quarter					
Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit	Substation		Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit
					Nuclide					
U-nat	3.0E-18	2.3E-16	2.5E-18	< 1.0	U-nat		3.5E-18	6.7E+12	9.9E+10	< 1.0
Th-230	7.1E-17	6.1E-17	7.4E-17	< 1.0	Th-230		9.0E-18	5.9E-18	8.2E-18	< 1.0
Ra-226	-3.7E-19	4.6E-18	5.6E-18	< 1.0	Ra-226		4.6E-18	2.8E-18	1.8E-18	< 1.0
Pb-210	2.8E-16	1.9E-17	5.4E-17	< 1.0	Pb-210		7.1E-16	3.6E-17	5.1E-17	< 1.0

3rd Quarter					4th Quarter					
Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit	Section 17 VH4		Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit
					Nuclide					
U-nat	2.6E-18	2.4E-16	2.6E-18	< 1.0	U-nat		0.0E+00	6.6E+12	9.7E+10	< 1.0
Th-230	3.7E-17	4.7E-17	7.6E-17	< 1.0	Th-230		4.7E-18	3.4E-18	7.3E-18	< 1.0
Ra-226	1.5E-17	3.4E-18	2.6E-18	< 1.0	Ra-226		2.2E-18	2.0E-18	3.9E-18	< 1.0
Pb-210	3.9E-16	2.5E-17	6.8E-17	< 1.0	Pb-210		6.2E-16	3.5E-17	5.4E-17	< 1.0

3rd Quarter					4th Quarter					
Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit	Mill Diversion		Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit
					Nuclide					
U-nat	4.7E-18	2.4E-16	2.6E-18	< 1.0	U-nat		7.3E-18	6.5E+12	9.5E+10	< 1.0
Th-230	5.8E-17	1.5E-16	7.5E-17	< 1.0	Th-230		2.7E-17	7.2E-18	7.8E-18	< 1.0
Ra-226	5.2E-18	3.6E-18	2.5E-18	< 1.0	Ra-226		9.3E-18	2.2E-18	3.0E-18	< 1.0
Pb-210	6.3E-16	2.8E-17	6.8E-17	< 1.0	Pb-210		8.5E-16	3.8E-17	5.3E-17	< 1.0

3rd Quarter					4th Quarter					
Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit	Section 30 West VH6		Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit
					Nuclide					
U-nat	4.5E-18	2.3E-16	2.5E-18	< 1.0	U-nat		4.7E-18	6.6E+12	9.7E+10	< 1.0
Th-230	8.2E-17	5.1E-17	7.5E-17	< 1.0	Th-230		9.9E-18	5.2E-18	8.4E-18	< 1.0
Ra-226	1.0E-17	3.6E-18	3.4E-18	< 1.0	Ra-226		6.0E-18	2.6E-18	1.5E-18	< 1.0
Pb-210	6.5E-16	3.4E-17	9.0E-17	< 1.0	Pb-210		7.6E-16	4.6E-17	5.5E-17	< 1.0

High Volume Environmental Air Samples  
2014

3rd Quarter					4th Quarter				
North Fence									
Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit	Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit
U-nat	5.1E-18	2.3E-16	2.6E-18	< 1.0	U-nat	2.2E-17	6.0E+12	8.8E+10	< 1.0
Th-230	2.6E-16	6.7E-17	7.3E-17	1.29%	Th-230	9.2E-17	1.3E-17	8.4E-18	< 1.0
Ra-226	9.1E-18	4.3E-18	5.2E-18	< 1.0	Ra-226	3.7E-17	5.2E-18	6.6E-18	< 1.0
Pb-210	7.0E-16	3.2E-17	7.6E-17	< 1.0	Pb-210	7.3E-16	3.7E-17	5.7E-17	< 1.0

3rd Quarter					4th Quarter				
KGL - North									
Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit	Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit
U-nat	7.9E-18	2.4E-16	2.6E-18	< 1.0	U-nat	0.0E+00	6.6E+12	9.7E+10	< 1.0
Th-230	4.5E-16	9.4E-17	7.7E-17	2.27%	Th-230	6.0E-18	4.6E-18	7.5E-18	< 1.0
Ra-226	1.1E-17	2.9E-18	2.5E-18	< 1.0	Ra-226	3.1E-18	1.7E-18	1.8E-18	< 1.0
Pb-210	2.6E-16	1.9E-17	5.2E-17	< 1.0	Pb-210	6.9E-16	3.3E-17	4.7E-17	< 1.0

3rd Quarter					4th Quarter				
KGL - South									
Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit	Nuclide	Conc. (uCi/ml)	Error (uCi/ml)	LLD (uCi/ml)	% Limit
U-nat	4.6E-18	2.3E-16	2.5E-18	< 1.0	U-nat	0.0E+00	6.6E+12	9.7E+10	< 1.0
Th-230	6.6E-17	4.9E-17	7.3E-17	< 1.0	Th-230	3.3E-18	3.6E-18	7.6E-18	< 1.0
Ra-226	4.9E-18	2.6E-18	2.6E-18	< 1.0	Ra-226	8.3E-18	2.3E-18	6.1E-18	< 1.0
Pb-210	5.4E-16	2.6E-17	5.9E-17	< 1.0	Pb-210	7.3E-16	3.7E-17	5.3E-17	< 1.0

Vegetation  
 2014

3rd Quarter

Location: Substation			
Date: 21-Aug-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	3.2E-04	1.7E-05	3.4E-05
Th-230	1.1E-03	1.1E-03	1.8E-03
Ra-226	2.1E-03	1.6E-03	5.1E-03
Pb-210	-3.0E-02	5.0E-03	1.9E-02

Location: Mill Diversion			
Date: 21-Aug-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	2.0E-04	1.1E-05	3.4E-05
Th-230	2.7E-03	1.1E-03	1.6E-03
Ra-226	1.1E-03	1.2E-03	4.7E-03
Pb-210	-4.6E-02	5.7E-03	2.3E-02

Location: Section 30 West VH6			
Date: 21-Aug-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	3.6E-04	1.9E-05	4.1E-05
Th-230	8.1E-04	1.3E-03	2.2E-03
Ra-226	2.8E-03	1.6E-03	5.0E-03
Pb-210	-6.2E-02	7.0E-03	2.9E-02

Location: North Fence			
Date: 21-Aug-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	4.8E-04	2.6E-05	3.4E-05
Th-230	2.4E-04	1.0E-03	2.3E-03
Ra-226	1.1E-03	1.2E-03	4.8E-03
Pb-210	-4.9E-02	6.3E-03	2.6E-02

4th Quarter

Location: Substation			
Date: 21-Oct-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	7.0E-04	4.2E-05	3.4E-05
Th-230	3.0E-03	1.2E-03	1.6E-03
Ra-226	1.8E-03	6.0E-04	7.0E-04
Pb-210	-4.6E-03	5.3E-03	1.8E-02

Location: Mill Diversion			
Date: 21-Oct-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	4.9E-04	3.0E-05	3.4E-05
Th-230	9.1E-04	8.5E-04	1.4E-03
Ra-226	8.5E-04	3.6E-04	1.3E-03
Pb-210	-8.7E-03	5.3E-03	1.9E-02

Location: Section 30 West VH6			
Date: 21-Oct-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	7.4E-04	4.5E-05	3.4E-05
Th-230	6.8E-04	9.9E-04	1.6E-03
Ra-226	2.8E-03	7.2E-04	1.9E-03
Pb-210	-5.2E-03	5.4E-03	1.9E-02

Location: North Fence			
Date: 21-Oct-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	3.0E-04	1.8E-05	3.4E-05
Th-230	4.4E-04	9.3E-04	1.5E-03
Ra-226	1.4E-03	5.4E-04	9.2E-04
Pb-210	-3.2E-03	6.0E-03	2.0E-02

Vegetation  
 2014

3rd Quarter

Location: Section 17 VH4 Date: 21-Aug-12			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	6.8E-05	3.6E-06	3.4E-05
Th-230	1.2E-04	9.5E-04	2.1E-03
Ra-226	0.0E+00	1.1E-03	5.1E-03
Pb-210	-4.2E-02	5.3E-03	2.2E-02

Location: KGL - North Date: 21-Aug-12			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	1.3E-04	6.9E-06	3.4E-05
Th-230	1.5E-03	1.2E-03	2.0E-03
Ra-226	0.0E+00	1.1E-03	5.2E-03
Pb-210	-4.3E-02	5.8E-03	2.3E-02

Location: KGL - South Date: 21-Aug-12			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	1.2E-04	6.2E-06	3.4E-05
Th-230	-2.5E-03	2.8E-03	2.4E-03
Ra-226	0.0E+00	9.2E-04	4.5E-03
Pb-210	-5.0E-02	5.7E-03	2.3E-02

4th Quarter

Location: Section 17 VH4 Date: 21-Oct-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	4.3E-04	2.6E-05	3.4E-05
Th-230	1.2E-03	9.9E-04	1.6E-03
Ra-226	2.5E-03	5.3E-04	8.9E-04
Pb-210	7.3E-03	6.0E-03	1.9E-02

Location: KGL - North Date: 21-Oct-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	2.6E-04	1.6E-05	3.4E-05
Th-230	1.6E-03	1.0E-03	1.5E-03
Ra-226	1.0E-03	3.9E-04	3.6E-04
Pb-210	2.6E-03	5.5E-03	1.8E-02

Location: KGL - South Date: 21-Oct-14			
Nuclide	Conc. (uCi/kg)	Error (uCi/kg)	LLD (uCi/kg)
U-nat	2.1E-04	1.3E-05	3.4E-05
Th-230	2.0E-04	6.7E-04	1.4E-03
Ra-226	8.8E-04	3.1E-04	3.7E-04
Pb-210	3.0E-03	5.5E-03	1.8E-02



Soil  
 2014

Location: Substation			
Date:			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: Mill Diversion			
Date:			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: Section 30 West VH6			
Date:			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: North Fence			
Date:			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: Section 17 VH4			
Date:			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: KGL - North			
Date:			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: KGL - South			
Date:			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Sediment  
 2014

Location: P-0			
Date: 5/16/2014			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014 Removed from Sampling		
Th-230			
Ra-226			
Pb-210			

Location: P-1			
Date: 5/16/2014			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: P-2			
Date: 5/16/2014			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			

Location: P-3			
Date: 5/16/2014			
Nuclide	Conc. (uCi/g)	Error (uCi/g)	LLD (uCi/g)
U-nat	Completed in 1st Half of 2014		
Th-230			
Ra-226			
Pb-210			