Rio Algom Mining LLC

Rio Algom

ALARA Summary

January – December 2015

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Introduction

The annual ALARA summary for Rio Algom Mining LLC's (RAML) Ambrosia Lake facility (ALF) for calendar year 2015 is submitted for NRC's review in accordance with Rio Algom Mining LLC's Source Material License Condition #10. License Condition #10 contains RAML's ALARA Policy as specified within the Health Physics and Environmental Programs Manual (HPEM).

The primary focus of activities at the site during calendar year 2015 was the continuation of excavation and removal of contaminated material and backfilling with clean material. The main health physics related task was the demolition of the Water Treatment and IX buildings. This successful project required detailed work plans, radiation work permits, and strict contamination controls. The NRC was on site for observation and auditing during the process and were satisfied with the management and controls in place.

Health Physics Sampling Summary

A. Bioassay

Bioassay samples were collected quarterly in accordance with the HPEM Bioassay Program section. During the year there were a total of 7 routine samples collected and all of them were below the laboratory's lower detectable limit of five (5) micrograms per liter (µg/L). All quality assurance spike samples were within the Regulatory Guide 8.22 suggested variance for acceptable spike results.

B. Personnel Contamination Checks

A personnel contamination survey protocol was set up in the BHP site trailer and checks were performed whenever personnel were in the LTSM area.

C. Surface Contamination Checks

There were 40 surface contamination checks performed during 2015. They were performed at various places throughout the restricted area during the first and second quarters of 2015. All sample results were below the action levels stated in the NRC Regulatory Guide 8.30.

D. Radon Daughter Sampling

No longer applicable

E. Uranium Dust

No longer applicable

F. Gamma Surveys

No longer applicable

II. Respiratory Protection Program

The current Respiratory Protection Program is in place and proper training and testing has been done in case the necessary action is needed. In 2015 there was not an occasion to implement this procedure. Air sampling data continues to indicate that airborne concentrations are well below the DAC for soluble natural uranium.

III. Exposure Summary

All licensees are required to ensure compliance with the occupational dose limits specified within 10 CFR 20.1201(a). This regulation establishes an annual limit based on internal exposures as well as external

exposures. Dosimetry Badges were used throughout 2015 and were monitored quarterly. There were no remarkable exposures to report.

A. Total Effective Dose Equivalent

The total effective dose equivalent (TEDE) exposure results for all employees are presented in Table 1 below. The TEDE is the sum of the deep dose equivalent (external exposures) and the committed effective dose equivalent (internal exposures, CEDE).

TABLE 1
2015 Total Effective Dose Equivalent (TEDE)

Exposure (REM)	0 - .005	.006 - .010	.011 - .050	>.050
No. of Employees	9	0	0	0

10 CFR 20.1502 requires exposure monitoring of any individual likely to receive a dose in excess of 10% of the occupational dose limits prescribed in 10 CFR 20.1201. Based on the annual exposures determined for facility personnel, individual exposure monitoring of visitors will not be necessary.

B. Deep Dose Equivalent (Gamma Exposure)

Gamma exposures are determined by the results of personnel dosimetry worn by all employees and analyzed in accordance with National Voluntary laboratory Accreditation Program (NVLAP) procedures and specifications by an accredited outside contract laboratory. Table 2 summarizes the 2015 employee gamma dose exposures.

TABLE 2
2015 Deep Dose Exposures

Exposure (REM)	0 - .005	.006 - .010	.011 - .050	>.050
No. of Employees	9	0	0	0

C. Radon Daughter Exposures

Air samples are obtained in accordance with the facility sampling program outlined within the NRC approved HPEM. Occupancy times are then factored into these values in order to obtain an employee's internal exposure to radon daughters for that time period.

Based on occupancy factors, all employee radon daughter exposures during 2015 were below the annual allowable occupational exposure limit of 4 wlm.

D. Yellowcake and Uranium Ore Dust

There has been no activity associated with uranium/yellowcake since 2003; therefore, no employee exposures were incurred.

E. Dose to Members of the Public

In addition to the occupational exposures discussed above, RAML prepares an annual evaluation for radiation doses to members of the public. These are prepared as per requirements of 10 CFR 20.1301-1302 and 40 CFR 190.10.

RAML submits semi-annual Effluent Monitoring Reports to the NRC. These reports are generally submitted in February and August of each year; exact dates of the submittals are dependent on the dates results are received from the laboratories. RAML would like to incorporate these reports by reference.

Dose to members of the public are prepared for the nearest resident, a typical delivery driver, and the occasional visitor that might spend some time near the boundary of the site property, such as a hunter or rancher. The 2015 results for dose to member of the public are submitted below.

TABLE 3
2015 Dose to Member of the Public

Individual	Direct Gamma (mrem)	Radon (mrem)	Air Particulate (mrem)	Total TEDE (mrem)
Nearest Resident	3.83	24.35	.03	28.21
Delivery Person	.31	1.61	.05	1.97
Occasional Visitor	.15	1.93	.07	2.16

The table shows that the potential dose calculations for members of the public for 2015 were well below the 10 CFR 20.1301 dose limit 100 mrem/yr.

IV. Miscellaneous ALARA Activities

A. Health, Safety, Environment and Community Management System

Implementation of the corporate wide Health, Safety, Environment and Community Management system (HSEC) continued throughout 2015. The management system provides a framework for personal, site, and corporate HSEC responsibilities and leadership and ensures the continued improvement of HSEC programs and performance.

Use of the ALARA principle in the site HSEC management system has provided and additional mechanism to monitor progress toward continued improvement in HSEC activities.

B. Daily and Weekly Inspections

Job safety analyses were typically performed prior to initiation of work to identify potential hazards expected to be encountered with appropriate mitigation controls implemented.

Weekly inspections of pertinent mill areas by designated personnel are performed to observe and ensure that general radiological control practices are being used. The weekly inspections did not identify any unusual conditions or situations that required corrective action.

C. Safety and Training Activities

The annual training as outlined in Section 2.5 of the 2015 Health Physics and Environmental Program Manual was completed for all employees and included the topics as outlined in RAML's "Radiation Safety Training Program".

Safety meetings, conducted throughout the year, reviewed various topics pertaining to general safe work practices and included radiation safety.

D. Performance of Emission Control Equipment

The facility emission control equipment was demolished in late 2003.

E. Operational Procedures & Emergency Response Actions

During the year all Standard Operating Procedures (SOP) and Emergency Response Procedures were reviewed and updated, if necessary, to better conform to the corporate HSEC management guidelines. In addition, all procedures utilized within the radiation safety program were reviewed, updated, as necessary, and signed in 2015.

V. Other Health Physics Sampling

During March and April the IX building was demolished. Additional personnel gamma badges were assigned to those working on the project to assess dose specific to this task. Table 4 below shows the results.

TABLE 4
Gamma Badge Results for the IX Building Demolition

Name	Badge #	1/1/2015-3/31/2015		
		Landauer		
		Rio Algom #201440		
		mrem	mrem	mrem
		Deep	Lens	Shallow
Jordan Gettys IX	175	2	2	1
Josh Kincade IX	176	1	1	1
Nick Gettys IX	177	1	1	1
Josh Tedrick IX	178	1	1	1
Blake Squibb IX	193	1	1	1
Kevin Baumgartner IX	212	1	1	1
Chris Berry IX	213	1	1	1
Hilario Trejo IX	214	1	1	1
Frank Tiefinthal IX	215	1	1	1
Landon Scoby IX	216	1	1	1
Matt Crosby IX	217	1	1	1
Doug Weaver IX	218	1	1	1
Steve Corning IX	219	1	1	1
Scott Roberts IX	220	1	1	1