



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
1600 E. LAMAR BLVD  
ARLINGTON TX 76011-4511

November 15, 2016

Theresa Ballaine, Manager  
Rio Algom Mining LLC  
P.O. Box 218  
Grants, NM 87020

SUBJECT: NRC INSPECTION REPORT 040-08905/2016-001 AND NOTICE OF VIOLATION

Dear Ms. Ballaine:

On August 25, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed a routine inspection at your Ambrosia Lake facility in McKinley County, New Mexico. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures, representative records, observations of activities, and interviews with personnel.

The preliminary inspection findings were presented to you and your staff at the conclusion of the onsite inspection on August 25, 2016. After a preliminary in-office review of your letter to the NRC dated September 8, 2016 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML16277A007), which included recent radon flux measurement results, the final inspection results were presented to you by telephone on November 8, 2016. The enclosed report presents the results of this inspection.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. The violation involved your failure to submit a regulatory-required report to the NRC within the time frame specified in regulations. The violation was evaluated in accordance with the NRC Enforcement Policy. (The current Enforcement Policy is included on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.) The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it was identified by the NRC.

The NRC has concluded that information regarding: (1) the reason for the violation; (2) the corrective actions that have been taken and the results achieved; and (3) the date when full compliance will be achieved is already adequately addressed in the enclosed inspection report and on the docket in your letter to the NRC dated September 8, 2016 (ML16277A007). Therefore, you are not required to respond to this letter unless the description herein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's ADAMS, accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Dr. Robert Evans at 817-200-1234 or the undersigned at 817-200-1549.

Sincerely,

*/RA/*

Lee E. Brookhart, Acting Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Docket: 040-08905

License: SUA-1473

Enclosures:

1. NRC Notice of Violation
2. NRC Inspection Report 040-08905/2016-001

Attachment: Supplemental Information

cc w/enclosures:

Michelle Hunter, New Mexico Environment Department  
Santiago Rodriguez, New Mexico Environment Department  
Dr. April Gil, U.S. Department of Energy

## NOTICE OF VIOLATION

Rio Algom Mining LLC  
Grants, New Mexico

Docket No. 040-08905  
License No. SUA-1473

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted from August 22-25, 2016, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Regulation 10 CFR Part 40, Appendix A, Criterion 6(4) states, in part, that within 90 days of the completion of all testing and analysis relevant to the required verification in paragraphs (2) and (3) of this criterion, the uranium mill licensee shall report to the Commission the results detailing the actions taken to verify that levels of release of radon-222 do not exceed 20 picocuries per meter-squared second when averaged over the entire pile or impoundment.

Contrary to the above, in November 2015, the licensee completed all testing and analysis relevant to the required verification in paragraphs (2) and (3) of Criterion 6 for the alternate disposal cell and impoundment No. 2. However, as of August 25, 2016, a period greater than 90 days, the licensee had not reported to the Commission the results detailing the actions taken to verify that levels of release of radon-222 do not exceed 20 picocuries per meter-squared second when averaged over the entire pile or impoundment.

This is a Severity Level IV violation (Section 6.9).

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance will be achieved, is already adequately addressed in Enclosure 2 of this inspection report and on the docket in your letter and technical report dated September 8, 2016 (Agencywide Documents Access and Management System [ADAMS] Accession Number ML16277A007). However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark the response as a "Reply to a Notice of Violation" and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region IV, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or in the NRC's ADAMS, accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 15<sup>th</sup> day of November 2016

**U.S. NUCLEAR REGULATORY COMMISSION  
Region IV**

Docket: 040-08905

License: SUA-1473

Report: 040-08905/2016-001

Licensee: Rio Algom Mining LLC

Facility: Former Ambrosia Lake mill

Location: McKinley County, New Mexico

Dates: August 22-25, 2016

Inspectors: Robert Evans, PhD, PE, CHP, Senior Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Matthew Meyer, Acting Branch Chief  
Materials Decommissioning Branch  
Division of Decommissioning, Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Duane Schmidt, Health Physicist  
Reactor Decommissioning Branch  
Division of Decommissioning, Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Adam Schwartzman, Risk Analyst  
Performance Assessment Branch  
Division of Decommissioning, Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Zahira Cruz, Geotechnical Engineer  
Reactor Decommissioning Branch  
Division of Decommissioning, Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Accompanied by: Jeffery Whited, Project Manager  
Materials Decommissioning Branch  
Division of Decommissioning, Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Approved by: Lee E. Brookhart, Acting Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Attachment: Supplemental Inspection Information

## EXECUTIVE SUMMARY

Rio Algom Mining LLC  
NRC Inspection Report 040-08905/2016-001

This inspection was a routine, announced inspection of decommissioning activities being conducted at the former Ambrosia Lake mill in McKinley County, New Mexico. In summary, the licensee was conducting decommissioning activities in accordance with license and regulatory requirements, with one exception as described below.

### Management Organization and Controls

- The licensee had staffed all management-level positions and provided sufficient staff for the work in progress. The licensee conducted routine audits and site inspections in accordance with license and regulatory requirements. (Section 1.2)

### Onsite Construction

- Based on the records reviewed and the site tour, the licensee adequately conducted reclamation work in accordance with regulatory and license requirements. (Section 2.2)

### Radiation Protection/Operator Training

- The licensee and its reclamation contractor implemented their respective radiation protection programs in compliance with license and regulatory requirements. Occupational exposures were small fractions of the annual regulatory limits. Equipment calibrations and training were up-to-date, and no contamination problems were identified during routine sampling. (Section 3.2)

### Radioactive Waste Management

- During site tours, the inspectors observed recently completed work and interviewed site staff. The construction work appeared to be of acceptable quality. Independent radiological survey results indicate that the site had been effectively remediated. Site security was adequate for the status of the site. The licensee recently conducted radiological scans of outdoor areas as part of the final status survey and plans to collect additional soil samples in the near future as part of the survey. (Section 4.2.a)
- The inspectors performed a preliminary review of the results of radon flux measurements collected on two waste byproduct material disposal cells. The NRC inspectors noted that the measurements were collected in accordance with regulatory requirements. The results of the measurements were below the regulatory limit. The licensee's failure to submit two radon flux measurement reports to the NRC in a timely manner was identified as a violation of regulatory requirements. (Section 4.2.b)

### Effluent Control and Environmental Protection

- The licensee continued to implement the environmental and groundwater monitoring programs and continued to report the results to the NRC as required by the license. The licensee continued to conduct public dose assessments to verify compliance with the

regulatory limits, and the licensee continued to conduct land use surveys as required by the license. (Sections 5.2.a-c)

- A previously identified Unresolved Item involving laboratory lower limits of detection for certain environmental samples was reviewed but remained open pending NRC acceptance of the licensee's plans to suspend environmental sampling. (Section 5.2.d)

## Report Details

### **Site Status**

The Ambrosia Lake mill processed approximately 33 million tons of uranium ore from 1958-1985. Reclamation of the tailings cells commenced in 1989, and the mill was demolished in 2003-2004. In November 2014, the licensee demolished the administrative office, maintenance shop, change house/guard shack, scale house, pump house, block house (used for records storage), decontamination pad, water tower, and other miscellaneous foundations and concrete pads. In March 2015, the licensee demolished the ion exchange and water treatment buildings. In April 2016, the licensee demolished the remaining site structures including the water tanks and several remaining slabs. The licensee also closed the north disposal area, the area that had been left open for disposal of any remaining radioactive material.

Construction activities were completed by early-May 2016, with the exception of one borrow pit that required reclamation and one road that required removal to support site drainage. Two electrical substations will remain onsite after completion of all reclamation activities. The licensee free-released most construction equipment and support trailers. At the time of the inspection, a security trailer remained onsite, and several office trailers were located adjacent to the licensed property. No reclamation activities were in progress.

During the inspection, the licensee discussed the procedures used to radiologically survey and sample the decommissioned site. In recent months, the licensee conducted portions of the final status survey of the site. The final status survey included surface scans and soil sampling. The licensee conducted the surface scans between April and July 2016. Soil sampling will commence later this year or next year. Upon completion of the licensee's survey activities, a final status survey report is expected to be submitted to the NRC for review and approval.

### **1 Management Organization and Control (88005)**

#### **1.1 Inspection Scope**

The inspectors reviewed the licensee's oversight and control of licensed activities.

#### **1.2 Observations and Findings**

##### **a. Site Staffing**

At the time of the inspection, site staffing consisted of a combination of licensee staff and contractors. The manager of operations (site manager) was the highest ranking individual. Other staff assigned to the project included the reclamation project manager, engineer, radiation safety officer (RSO), two site specialists, administrative assistant, and various contractors and consultants as needed to provide radiation protection, environmental, groundwater, and security services. All management level positions were filled, and the licensee had sufficient staff to maintain compliance with license requirements.

Since the last inspection, conducted in August 2015, the licensee made several management-level changes. By letters dated December 18, 2015 (ADAMS Accession No. ML16012A114) and June 6, 2016 (ML16176A157), the licensee notified the NRC of a change in managers of operations (site managers). The licensee also notified the

NRC of a change in RSOs by letter dated June 16, 2016 (ML16211A066). The NRC acknowledged the licensee's change in RSOs by letter dated August 8, 2016 (ML16109A429).

b. Routine Site Audits, Inspections and Reports

Regulation 10 CFR 20.1101(c) requires licensees to periodically (at least annually) review the radiation protection program content and implementation. Additional details about the annual As Low As Reasonably Achievable (ALARA) audit are provided in the Health Physics and Environmental Program Manual, referenced in License Conditions 10 and 29. The inspectors reviewed the licensee's annual ALARA audit for 2015 during the inspection.

The licensee's RSO conducted the annual program review for 2015 in April 2016. The review included site reclamation activities that were in progress during the year. The audit did not include the results of the reclamation contractor's radiation safety program, because the contractor implemented its own radiation safety program. The inspectors concluded that the ALARA report provided adequate summaries of bioassays, air sampling, occupational exposures, contamination monitoring as well as applicable trends and corrective actions. The inspectors concluded that the licensee had conducted and documented the annual program review as stipulated by license and regulatory requirements.

The Health Physics and Environmental Program Manual specifies that the licensee's staff shall conduct routine facility inspections. In June 2016, the licensee revised the inspection frequency from weekly to monthly, commensurate with a reduction in onsite activities. The monthly visual inspections included observation of radiation protection practices and status of site fences and gates. As part of the June 2016 manual revision, the licensee also eliminated the requirement for monthly reports. The inspectors concluded that the licensee could make changes to the facility inspection program as allowed by License Condition 10. The inspectors reviewed a representative sampling of records issued prior to, and after the revision of the audit and inspection program, and concluded that the licensee had conducted the facility inspections with an emphasis on radiological safety.

1.3 Conclusions

The licensee had staffed all management-level positions and provided sufficient staff for the work in progress. The licensee conducted routine audits and site inspections in accordance with license and regulatory requirements.

**2 Onsite Construction (88001)**

2.1 Inspection Scope

The inspectors reviewed the licensee's decommissioning activities to determine if these activities were being conducted in accordance with reclamation plan requirements.



## 2.2 Observations and Findings

The licensee is required to conduct reclamation activities in accordance with the requirements provided in Appendix A to 10 CFR Part 40, as well as License Conditions 32, 37, 42, and 43. At the time of the inspection, no construction activities were in progress. The inspectors conducted a review of construction records and interviewed site staff about work recently completed. The inspectors reviewed documents related to construction of erosion protection features completed in 2008-2016. The review included construction documentation for the Ponds 7 and 8 diversion channel, 100-year berm interior channel located next to Ponds 4-6, alternate disposal cell, Cell 4 (small portion northwest of Pond 2), Ponds 3-6, and the 100-year berm (Arroyo del Puerto diversion channel and embankment). The inspectors used the following documents to complete the review: (1) proposed reclamation plan from the licensee, as revised; (2) NRC staff approved documentation including technical evaluation reports; and (3) final as-built drawings and completion reports.

The licensee prepared a draft report (Site Completion Report, Volumes 1 and 2 dated July 13, 2016), which included information for recent construction activities completed from March 2013 through March 2016. These activities included: (1) the 100-year channel and unlined Ponds 4-6; (2) alternate disposal cell; (3) Ponds 7 and 8 diversion channel; (4) borrow areas; (5) bridge removal project; (6) on-site structure demolitions; (7) mill yard; (8) mill pond; (9) swamp area; and (10) Pond 2.

The inspectors reviewed results of compaction tests conducted at the 100-year interior channel, alternate disposal cell frost protection-radon barrier subgrade, Pond 2 (Cell 4) frost protection-radon barrier-subgrade, and Ponds 7 and 8 diversion channel. Compaction criteria established in September 24, 1990, for these areas included an in-place density of 90-percent plus or minus 3-percent optimum moisture for frost protection, and in-place density of 95-percent plus or minus 2-percent optimum moisture for the radon barrier. The inspectors found that the required number of tests were conducted, and the tests passed the compaction criteria. As necessary, the licensee re-compacted and re-tested areas until the areas passed the applicable tests.

The staff reviewed the document entitled, "Closeout Documents Record Drawings and QA/QC Documentation, Arroyo del Puerto Diversion Channel and Embankment, 2008." This document contained the construction completion information for the 100-year berm that was constructed in 2007-2008. The staff reviewed the density and moisture content field tests results, rock gradation, rock quantities, rock production quality assurance/quality control, and as-built drawings. The NRC staff found these records to be adequate.

The NRC staff also reviewed information related to Ponds 3-6. The document, "Site Erosion Protection Measures from Surface Water Flow in the Arroyo del Puerto, January 2008, Revision 1," contained information regarding the design of Ponds 3-6. The NRC staff's design evaluation was provided in the Technical Evaluation Report provided with License Amendment 59 dated September 9, 2008 (ML081000595). The inspectors were unable to review all as-built drawings and completion reports for these areas because the information could not be quickly located by licensee staff. This inspection area will be reviewed during a future inspection.

The inspectors noted that some information in the license related to the erosion protection system was outdated or had been superseded by revisions to the reclamation plan, specifically, License Conditions 37.K and 37.M. Licensee representatives stated that they planned to submit a license amendment to the NRC in the near future and will update these license conditions as needed.

The inspectors toured the site, in part, to observe the quality of the construction work that had been completed. The areas toured included the various ponds, impoundments, borrow areas, diversion channels, and Section 4 property. The inspectors concluded that recent construction activities were performed in accordance with licensee's procedures and decommissioning plans.

### 2.3 Conclusions

Based on the records reviewed and the site tour, the licensee adequately conducted reclamation work in accordance with regulatory and license requirements.

## 3 **Radiation Protection/Operator Training (83822/88010)**

### 3.1 Inspection Scope

The inspectors reviewed the licensee's implementation of its radiation protection and training programs to verify compliance with 10 CFR Part 20 and license requirements.

### 3.2 Observations and Findings

License Condition 10 states that the licensee shall maintain a health physics and environmental monitoring program. Details about the licensee's radiation protection program are provided in the licensee's Radiation Protection and Environmental Program Manual dated June 2016. Based on the status of decommissioning, the licensee implemented several changes to its radiation protection program in June 2016 as allowed by License Condition 10. The licensee downgraded the requirements for routine occupational air sampling, respiratory protection, bioassays, site inspections, semi-annual gamma radiation surveys, and building contamination surveys. The licensee retained the requirements for personnel training, personnel monitoring, contamination monitoring, equipment releases, instrument calibrations, and radiation work permits. The radiation protection program may be downgraded further, when reclamation activities are completed.

The inspectors reviewed the licensee's radiation protection records for 2015, prior to revision of the radiation protection program requirements. The licensee's records indicate that total effective dose equivalent exposures were less than 0.005 rem with an annual regulatory limit of 5 rem. No bioassay sample results exceeded the lowest action level. Personnel monitoring records indicated that no individual left the site with contamination above the action level. All surface contamination checks conducted in the restricted area were less than the action level. Equipment release records indicate that no component was released above the respective action level. In summary, no action levels were exceeded and no widespread contamination problems were identified.

License Conditions 14 and 16 state that written standard operating procedures shall be established, and the procedures shall be reviewed annually. The licensee's records

indicated that site procedures had been established and reviewed by the RSO. The last annual review was conducted in June 2016.

License Condition 10 provides the training requirements. The licensee conducted various types of training including visitor orientation, initial site training, on-the-job training, safety training, and daily job safety analyses. The inspectors reviewed selected records of completed training.

In addition to the licensee's radiation protection program, the contractor conducted occupational exposure monitoring, bioassay sampling, breathing zone air sampling (lapel monitors), high-volume general area air sampling, personnel surveys, and area surveys to support the work in progress. The contractor also issued radiation work permits for special work activities. According to licensee representatives, none of the various radiological sample results were indicative of radiological problems. The inspectors reviewed the results of the contractor's radiation protection program and concluded that the program had been effectively implemented.

The licensee maintained radiation detection instrumentation for use during routine surveys and scans. The licensee established a program to ensure that survey instruments were calibration checked at the intervals specified by the license. Portable radiological survey instruments and equipment were examined to verify operability, response, and proper settings. All instruments and equipment in use were properly calibrated. The calibration and surveillance program for these instruments were being accomplished in accordance with license requirements or licensee procedures.

### 3.3 Conclusions

The licensee and its reclamation contractor implemented their respective radiation protection programs in compliance with license and regulatory requirements. Occupational exposures were small fractions of the annual regulatory limits. Equipment calibrations and training were up-to-date, and no contamination problems were identified during routine sampling.

## **4 Radioactive Waste Management (88035)**

### 4.1 Inspection Scope

The inspectors interviewed licensee representatives, toured the site, and reviewed applicable records to determine if the licensee had established and maintained an effective program for managing radioactive wastes.

### 4.2 Observations and Findings

#### a. Review of Site Activities

The licensee completed most construction activities in early-May 2016, with the exception of one borrow pit and one road that required removal to support site drainage. The licensee also closed the north disposal area, the area that had remained open for disposal of any remaining radioactive material. Several trailers located outside of the restricted area will remain at the site to support future license compliance activities.

The inspectors observed the status of the site. No reclamation work was in progress during the site tour, and the work that had been completed appeared to be of acceptable quality.

The inspectors conducted radiological surveys during the site tour using a Ludlum Model 19 survey meter (NRC No. 015518, calibrated to radium-226, calibration due date of 07/13/17). With a background of about 15-16 microRoentgen per hour, the highest measurements—approximately four time background levels—were identified in the mining affected areas located to the north of the tailings impoundments. The inspectors noted that the exposure rates in the reclaimed areas were at or below background levels, indicating that the areas had been effectively remediated.

The inspectors reviewed site security. By letter dated August 18, 2016 (ML16238A193), the licensee notified the NRC of its intent to eliminate the security officer's presence at the facility. The licensee stated that this action was being taken because all radioactive material had been consolidated and covered, and all permanent site structures have been demolished. The licensee stated in its letter that it will continue to maintain the fences, gates, and signs, as well as perform monthly tours to observe the status of the security measures in place. The licensee subsequently discontinued the onsite security guard position in September 2016. The NRC staff noted that the proposed site security measures were similar to other uranium recovery sites that have been reclaimed.

During the inspection, the licensee and NRC staff discussed the cleanup process for the site, focusing specifically on what areas of the site have been remediated and which areas have been final status surveyed including the various ponds. The licensee plans to supplement previously collected information with additional information that will be collected as part of a comprehensive final status survey. The final status survey program will include surface scans and soil sampling. The licensee commenced with radiological surface scan surveys in April 2016. The licensee completed the surface scans in July 2016. At some point in the near future, the licensee plans to collect approximately 400 soil samples. The licensee is expected to submit the results of the final status survey, consisting of both previously collected information and recently collected information, to the NRC at a later date. The NRC plans to conduct a confirmatory survey, confirming the results of the licensee's final status survey, after receipt of the final status survey report.

By letter dated August 16, 2016 (ML16242A301), the licensee submitted a request for release of the Section 4 ponds from the license. Attached to the letter was a report of the radiological dose consequences, supporting the licensee's request to free-release the Section 4 property without additional remediation. The licensee's technical analysis and request for release is currently under NRC review and approval that would be issued under separate correspondence.

b. Review of Radon Flux Measurements

Criterion 6 of 10 CFR Part 40, Appendix A, includes requirements for design of the cover for waste byproduct material disposal cells. Criterion 6(2) requires, in part, that after emplacement of the final cover to limit releases of radon-222 from uranium byproduct material and prior to placement of erosion protection barrier, the licensee shall verify through appropriate testing and analysis that the design and construction of the final radon barrier is effective in limiting releases of radon-222 to a level not exceeding

20 picocuries per meter-squared second (pCi/m<sup>2</sup>s) averaged over the entire pile or impoundment. To measure the radon flux, Criterion 6(2) states that licensees will use the procedures described in 40 CFR Part 61, Appendix B, Method 115, or another method of verification approved by the Commission as being at least as effective in demonstrating the effectiveness of the final radon barrier.

Since the August 2015 inspection, the licensee collected verification radon flux measurements at two onsite disposal cells, the alternate disposal cell and impoundment No. 2, after placement of the final covers. The inspectors reviewed the two radon flux measurement reports and discussed the results with licensee representatives. The report for the alternate disposal cell was dated September 2015, and the report for impoundment No. 2 was dated November 2015.

The inspectors performed a preliminary comparison of the licensee's radon flux measurement protocols to the instructions provided in Method 115. For the alternate disposal cell, the licensee sampled 100 locations across the cell using radon flux canisters. For impoundment No. 2, the licensee sampled 107 locations across the impoundment. The reports document that no precipitation was measured in the preceding 24 hours prior to, or during, canister deployment. The minimum temperature during deployment did not fall below 35 degrees Fahrenheit. All canisters were deployed for periods of time between 24 and 28 hours. The average measured radon fluxes for the alternate disposal area and impoundment No. 2 were 1.55 and 0.89 pCi/m<sup>2</sup>s, respectively. These two averaged results were below the 20 pCi/m<sup>2</sup>s regulatory limit. In summary, based on this preliminary evaluation, the licensee's records indicated that it collected a sufficient number of samples and conducted the radon flux measurements in accordance with the instructions provided in Method 115. The results were less than the regulatory limit. The submitted reports will be formally reviewed by the NRC program office.

Regulation 10 CFR Part 40, Appendix A Criterion 6(4) requires, in part, that within 90 days of the completion of all testing and analysis relevant to the required verification in Criteria 6(2) and (3), the licensee shall report to the Commission the results detailing the action taken to verify that levels of radon-222 release do not exceed 20 pCi/m<sup>2</sup>s. As discussed above, the reports and analysis of the verification radon flux measurements for the alternate disposal cell and impoundment No. 2 were completed in September 2015 and November 2015, respectively. Contrary to the above, at the conclusion of the onsite inspection in September 2016, the two reports and analysis, had not been submitted to the NRC within 90 days of completion. The licensee's failure to submit the two radon flux reports to the NRC within 90 days of completing the verification measurements was identified as a violation of 10 CFR 40, Appendix A, Criterion 6(4) requirements (VIO 040-08905/1601-01).

In response to the NRC's findings, the licensee subsequently submitted the two reports to the NRC by letter dated September 8, 2016 (ML16277A007). The licensee noted that it initially planned to submit the results of the radon flux measurements to the NRC as part of the final construction completion report. However, the licensee subsequently submitted the results, after onsite discussions with the inspectors, as required by Criterion 6(4). Although less than timely, the submittal of the two reports fulfilled the reporting requirements specified in Criterion 6(4). At the time of the inspection, there were no other areas that required measurement of radon-222 flux to meet the 90-day

reporting requirement, thus, the licensee fulfilled the corrective action requirements by submitting the two reports to the NRC.

#### 4.3 Conclusions

During site tours, the inspectors observed recently completed work and interviewed site staff. The construction work appeared to be of acceptable quality. Independent radiological survey results indicate that the site had been effectively remediated. Site security was adequate for the status of the site. The licensee recently conducted radiological scans of outdoor areas as part of the final status survey and plans to collect additional soil samples in the near future as part of the survey.

The inspectors performed a preliminary review of the results of radon flux measurements collected on two waste byproduct material disposal cells. The NRC inspectors noted that the measurements were collected in accordance with regulatory requirements. The results of the measurements were below the regulatory limit. The licensee's failure to submit two radon flux measurement reports to the NRC in a timely manner was identified as a violation of regulatory requirements.

### **5 Effluent Control and Environmental Protection (88045)**

#### 5.1 Inspection Scope

The inspectors reviewed the licensee's effluent and environmental protection programs to ensure compliance with license and regulatory requirements.

#### 5.2 Observations and Findings

##### a. Effluent and Environmental Monitoring

The effluent and environmental monitoring program requirements are specified in License Conditions 10 and 29. Section 4.0 of the Radiation Protection and Environmental Program Manual provides detailed instructions for implementing the program. The program consisted of air particulate, radon, gamma radiation, groundwater, soil, vegetation, and sediment sampling. The sample results were presented to the NRC in semi-annual reports in accordance with License Condition 19 requirements. The inspectors reviewed the sample results for 2015 and discussed the results with site staff. The report for the first half of 2015 was submitted to the NRC by letter dated August 28, 2015 (ML16300A226), and the report for the second half of 2015 was submitted by letter dated February 26, 2016 (ML16095A074).

The licensee operated seven air particulate sample stations, five in the vicinity of the former mill site and two at the Section 4 property. The licensee sampled for concentrations of natural uranium, thorium-230, radium-226, and lead-210 in air. The air particulate sample results for 2015 were less than 2-percent of the respective limits provided in 10 CFR Part 20, Appendix B, Table 2, Effluent Concentrations. The inspectors also confirmed that the licensee calibrated the high volume air samplers on an annual basis in accordance with procedure requirements.

Radon-222 concentrations were measured at the seven sample stations. The highest sample results were measured at sample station Section 30W VH6. This station is located adjacent to a former uranium mine ventilation shaft.

The licensee measured ambient gamma radiation levels at eight locations, the seven sample stations and one additional location in Section 4. The sample results indicate that the highest gamma radiation levels were measured in the vicinity of the former uranium mine ventilation shaft, the same location where the highest radon-222 concentrations were measured.

The licensee typically collected vegetation samples three times a year at the seven sample stations. The licensee did not collect samples during the fourth quarter of 2015 due to insufficient vegetation being available for collection. The licensee also collected annual soil samples at the seven sample stations and sediment samples at three locations. (The fourth sediment sample station was permanently removed from service as a result of reclamation activities in 2014.) No specific action levels have been established for these samples. The licensee used the data for trend analysis and to ensure that radioactive material was not building up in the soil, sediment, and vegetation over time.

As part of the June 2016 revision to the Health Physics and Environmental Program Manual, the licensee eliminated the surface water sampling requirements. This sampling included the liquid effluents from the ion exchange building. The licensee demolished this structure in March 2015, thus, the need to sample these liquid effluent discharges was eliminated.

The license does not clearly specify which sampling stations are designated as the background and nearest resident stations. Based on information provided in the semi-annual reports, the licensee selected the substation as the background location and Section 17 VH4 as the nearest resident station. The licensee conducted a public dose assessment to determine the potential doses to the nearest residences. The results were documented in the licensee's annual ALARA review dated April 2016.

By letter dated August 16, 2016 (ML16242A301), the licensee informed the NRC that it planned to cease portions of the environmental monitoring program, based on site conditions, as allowed by License Condition 10. The NRC had not responded to the licensee's letter at the conclusion of the onsite inspection. If the NRC agrees with the licensee's request, the licensee plans to suspend most of the environmental monitoring program, with the exception of groundwater monitoring.

b. Groundwater Monitoring

License Condition 34 states that the licensee shall implement a groundwater compliance monitoring program. The program included semi-annual sampling of 22 wells in four formations. The samples were analyzed for various chemical constituents including gross alpha, lead-210, radium-226 plus radium-228, thorium-230, and natural uranium. The license also required the licensee to submit semi-annual groundwater monitoring reports to the NRC. The inspectors reviewed the reports for 2015-2016 (ML15219A452, ML16041A247, ML16041A248, and ML16215A059) and discussed the results of the sampling program with licensee staff. The inspectors concluded that the licensee

collected all required samples and reported the sample results in the semi-annual reports.

As documented in the semi-annual reports, the most notable observation in the data was the decline in the potentiometric surface in the Alluvium unit. The licensee has observed a decline of over 30 feet at monitoring well 32-69 since February 2005. The drop was attributed to the discontinuance of the Alluvium corrective action program which previously maintained an artificial water mound in the vicinity of the site. The inspectors also noted that some wells could not be sampled due to insufficient volume or because the wells were dry.

Samples from three wells (36-06, 31-02, and 32-45) exceeded certain groundwater protection standards as specified in the license. These wells were being sampled monthly in accordance with License Condition 34.F. Recent sample results for Well 36-06 exceeded the beryllium and cadmium groundwater protection standards specified in the license. Samples collected from Well 31-02 exceeded the gross alpha activity groundwater protection standard. Additionally, samples collected from Well 32-45 exceeded the molybdenum and nitrate protection standards.

License Condition 34.F states, in part, that if the exceedances continue for three consecutive months, the licensee shall submit to NRC a groundwater corrective action designed to regain compliance with groundwater protection standards. The inspectors reviewed the available quarterly reports for 2015-2016 during the inspection and confirmed that the licensee discussed the exceedances for the three wells listed above. The most recent quarterly report was dated July 29, 2016 (ML16215A059). This report indicated that the planned corrective action included submittal of a license amendment request to modify the groundwater protection standards currently listed in the license.

During a public meeting held in April 2016 (ML16141B267), the licensee indicated that it was considering a proposed license amendment to revise the alternate concentration limits specified in License Condition 34.B. The licensee was considering revising the limits for beryllium and cadmium in the Dakota sandstone unit and gross alpha in three upper bedrock units. The licensee planned to submit the amendment request for revised alternate concentration limits to the NRC in the near future. This proposed license amendment may eliminate some of the groundwater exceedances discussed above.

By letter dated October 6, 2015 (ML15281A221), the licensee informed the NRC of recent wells that were abandoned and replaced during 2012-2013. These wells included licensed wells. The licensee's report provided detailed information about 15 wells that were plugged and abandoned and 14 replacement wells that were installed and developed. Wells 32-45 and 31-02 (discussed above) were two of the wells that were abandoned and subsequently replaced. The licensee continued to sample the new wells as required by the license.

c. Annual Land Use Survey

License Condition 39 requires the licensee to conduct an annual survey of land use. This license condition also requires the licensee to submit the results of the annual land use survey to the NRC by July 1<sup>st</sup> of each year. The licensee submitted the most recent land use survey to the NRC by letter dated June 28, 2016 (ML16187A334). The land use within 2 miles of the mill site included livestock grazing and utility distribution. The



report notes that the nearest resident was located approximately 3 miles north-northeast of the mill site. In summary, the licensee submitted an annual land use survey for 2015 that met the intent of the license.

- d. (Discussed) Unresolved Item 040-08905/1301-05: Lower limits of detection for soil, sediment, and vegetation samples

License Condition 10 requires the licensee to implement the lower limits of detection for environmental samples equal to those recommended in Section 5 of NRC Regulatory Guide 4.14, "Radiological Effluent and Environmental Monitoring at Uranium Mills." As described in NRC Inspection Report 040-08905/2015-002 dated September 11, 2015 (ML15257A511), the licensee changed laboratories as one corrective action. The new laboratory could meet the lower limit of detection requirements for soil and sediment, but the laboratory could not meet the lower limit of detection requirements for vegetation samples. At that time, the licensee stated that it planned to either amend the license to revise the lower limit of detection limit for vegetation or to discontinue vegetation sampling.

By letter dated August 16, 2016 (ML16242A301), the licensee informed the NRC that it planned to cease portions of the environmental monitoring program, including vegetation sampling, as allowed by License Condition 10. The licensee's request to discontinue environmental monitoring is currently under review by the NRC's program office. This Unresolved Item will remain open until the NRC's program office responds to the licensee's letter.

### 5.3 Conclusions

The licensee continued to implement the environmental and groundwater monitoring programs and continued to report the results to the NRC as required by the license. The licensee continued to conduct public dose assessments to verify compliance with the regulatory limits, and the licensee continued to conduct land use surveys as required by the license. A previously identified Unresolved Item involving laboratory lower limits of detection for certain environmental samples was reviewed but remained open pending NRC acceptance of the licensee's plans to suspend environmental sampling.

## 6 **Exit Meeting Summary**

The inspectors presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on August 25, 2016. The final inspection results were presented to the licensee's representative by telephone on November 8, 2016. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary that was included in the report.

## **SUPPLEMENTAL INSPECTION INFORMATION**

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

K. Applegate, Site Specialist  
C. Ardito, Hydrogeologist, Intera  
T. Ballaine, Manager  
C. Farr, Consultant, Environmental Restoration Group, Inc.  
A. Marek, Site Specialist  
B. Ray, Manager of Projects  
M. Schierman, Radiation Safety Officer, Environmental Restoration Group, Inc.  
R. Schietinger, Engineer  
C. Short, Geochemist, Intera

### INSPECTION PROCEDURES (IPs) USED

IP 83822	Radiation Protection
IP 88001	Onsite Construction
IP 88005	Management Organization and Controls
IP 88010	Operator Training/Retraining
IP 88035	Radioactive Waste Management
IP 88045	Effluent Control and Environmental Protection

### ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

040-08905/1601-01 VIO Failure to submit required report to NRC in timely manner

#### Closed

040-08905/1601-01 VIO Failure to submit required report to NRC in timely manner

#### Discussed

040-08905/1301-05 URI Lower limits of detection for environmental monitoring samples

## LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission
pCi/m <sup>2</sup> s	picocuries per meter-squared second
RSO	Radiation Safety Officer
URI	Unresolved Item
VIO	violation

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's ADAMS, accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Dr. Robert Evans at 817-200-1234 or the undersigned at 817-200-1549.

Sincerely,

*/RA/*

Lee E. Brookhart, Acting Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Docket: 040-08905  
License: SUA-1473

Enclosures:

- 1. NRC Notice of Violation
- 2. NRC Inspection Report 040-08905/2016-001

Attachment: Supplemental Information

cc w/enclosures:

Michelle Hunter, New Mexico Environment Department  
Santiago Rodriguez, New Mexico Environment Department  
Dr. April Gil, U.S. Department of Energy

ADAMS ACCESSION NUMBER: **ML16320A233**

<input checked="" type="checkbox"/> SUNSI Review By: RJE	ADAMS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sensitive <input checked="" type="checkbox"/> Non-Sensitive	<input type="checkbox"/> Non-Publicly Available <input checked="" type="checkbox"/> Publicly Available	Keyword
OFFICE	DNMS/FCDB	NMSS/DWUP/MDB	NMSS/DWUP/RDB	NMSS/DWUP/PAB
NAME	REvans	MMeyer	DSchmidt	ASchwartzman
SIGNATURE	<i>/RA/</i>	<i>/RA By email/</i>	<i>/RA By email/</i>	<i>/RA By email/</i>
DATE	11/15/16	10/31/16	11/08/16	11/08/16
OFFICE	NMSS/DWUP/RDB	C:FCDB		
NAME	ZCruz	LEBrookhart		
SIGNATURE	<i>/RA By email/</i>	<i>/RA/</i>		
DATE	11/08/16	11/15/16		

OFFICIAL RECORD COPY

Letter to Theresa Ballaine from Lee Brookhart dated November 15, 2016

SUBJECT: NRC INSPECTION REPORT 040-08905/2016-001

DISTRIBUTION:

RIV Regional Administrator (Kriss.Kennedy@nrc.gov)  
RIV Deputy Regional Administrator (Scott.Morris@nrc.gov)  
DNMS Director (Mark.Shaffer@nrc.gov)  
DNMS Deputy Director (Linda.Howell@nrc.gov)  
FCDB Branch Chief (Lee.Brookhart@nrc.gov)  
RIV Senior Health Physicist (Robert.Evans@nrc.gov)  
NMSS Project Manager (Jeffrey.Whited@nrc.gov)  
NMSS Branch Chief (Matthew.Meyer@nrc.gov)  
NMSS (Duane.Schmidt@nrc.gov)  
NMSS (Adam.Schwartzman@nrc.gov)  
NMSS (Zahira.Cruz@nrc.gov)  
Fee Coordinator (Marisa.Herrera@nrc.gov)

**Rio Algom Mining LLC Distribution List**

Santiago Rodriguez, Chief New Mexico Environment Department Radiation Control Bureau P.O. Box 5469 Santa Fe, NM 87502-5469	Dr. April Gil U.S. Department of Energy Office of Legacy Management 2597 Legacy Way Grand Junction, CO 81503
Michelle Hunter, Chief New Mexico Environment Department Ground Water Quality Bureau Harold Runnels Building 1190 Saint Francis Drive P.O. Box 5469 Santa Fe, NM 87502	