UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

March 9, 2001

Mr. Marvin Freeman, Vice President
Rio Algom Mining Corporation
6305 Waterford Blvd., Suite 325
Oklahoma City, Oklahoma 73118

SUBJECT: NRC INSPECTION REPORT 40-8964/01-01

Dear Mr. Freeman:

This refers to the routine inspection conducted on February 7- 8, 2001, at your Smith Ranch in-situ uranium processing facility in Converse County, Wyoming. The inspection consisted of a routine review of management organization and controls, site operations, radiation protection, radioactive waste management, environmental monitoring, and followup of open items. The inspection findings were discussed with your staff at the exit briefing on February 8, 2001. The enclosed report presents the results of that inspection. Overall, the inspection determined that you had continued to operate the uranium production facility in a safe and effective manner.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mrs. Judith Walker at (817) 860-8299 or the undersigned at (817) 860-8191.

Sincerely,

/JVEverett for/

D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle and Decommissioning Branch

Docket No.: 40-8964
License No.: SUA-1548

Enclosure:
NRC Inspection Report
40-8964/01-01

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	40-8964
License No.:	SUA-1548
Report No.:	40-8964/01-01
Licensee:	Rio Algom Mining Corporation
Facility:	Smith Ranch In-Situ Leach Facility
Location:	Converse County, Wyoming
Dates:	February 7-8, 2001
Inspectors:	Louis C. Carson II, Health Physicist Fuel Cycle/Decommissioning Branch
	Judith L. Walker, Health Physicist, (Inspector-In-Training) Fuel Cycle and Decommissioning Branch
Approved By:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle/Decommissioning Branch

EXECUTIVE SUMMARY

Smith Ranch In-Situ Leach Facility
NRC Inspection Report 40-8964/01-01

This inspection included a review of the status of the site, management organization and controls, in-situ leach operations, environmental protection/radioactive waste management programs, radiation protection and followup of open items.

Management Organization and Controls

- The licensee continued to maintain a staff organization at the site that complied with the license. The organizational structure and staffing levels were determined to be acceptable for the work in progress at the facility (Section 2).

In-Situ Leach Facilities

- Routine site activities were conducted in accordance with applicable license and regulatory requirements. Housekeeping was adequate. No yellowcake product spills were observed. Plant process parameters were within license limits. Site fences were in good condition and perimeter postings were appropriate (Section 3).

Environmental Protection and Radioactive Waste Management

- A review of the environmental monitoring and radioactive waste management programs revealed that the licensee was in compliance with the license and regulatory requirements. No effluents had been released into the environment exceeding regulatory limits. Reports related to groundwater and environmental monitoring programs had been submitted to the NRC as required (Section 4).

Radiation Protection

- The licensee had implemented a radiation protection program that met the requirements in 10 CFR Part 20 regulations and the conditions of the license. Survey instrument calibrations and personnel monitoring were being performed as required. Occupational exposures were within the 10 CFR Part 20 limits during 2000 (Section 5).

Report Details

1 Site Status

A commercial license was issued during March 1992 to Rio Algom Mining Corporation for recovery of uranium through in-situ leach operations at the Smith Ranch facility. Full scale construction of the central processing plant began in January 1996, and commercial operations began on June 20, 1997. Wellfields 1, 3, and 4 were in service during the inspection. The yellowcake dryer and filter press were operational for drying and packaging the yellowcake product.

Wellfield 1 was in service with six operating mine units. Wellfield 2 was not in service and is currently under development and drilling. Wellfield 3 was originally placed into operation on August 10, 1998, with eight operating mine units in service. Wellfield 4 began production on September 10, 1999, with six operating mine units. A satellite facility was completed in August 1998, which supports mining operations from Wellfield 3. The satellite facility has sufficient capacity to support all mine units in Wellfields 3 and 4.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organizational structure was reviewed to verify that the licensee had established an effective organization with defined responsibilities and functions.

2.2 Observations and Findings

a. Management Organization

License Condition 9.13 states that any changes to the licensee's corporate organization structure illustrated in Figure 9-4 of the March 31, 1988, application as amended by the submittal dated December 10, 1991, shall require approval of the NRC in the form of a license amendment. During this inspection, the licensee's functional organization was compared to the organization chart as referenced in the license. The licensee's overall organizational structure was in agreement with the conditions of the license.

Approximately 64 individuals were employed at the site during the inspection, which included 16 independent contractors for well drilling. The general manager remained the highest ranking official on site. The radiation safety officer (RSO) continued to report directly to the general manager. In summary, the licensee had fully staffed the site to support commercial operations.

License Conditions 9.13 and 9.14 delineates the responsibilities and qualifications for the RSO and radiation safety technicians (RST). All qualifications and required refresher training had been completed as specified in the license and Regulatory Guide

(RG) 8.31, “Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Mills will be As Low As Reasonably Achievable,” dated May 1983.

b. Management Controls

The licensee had established an operations review committee (ORC) comprised of key operations, environmental health/safety and management personnel. The ORC reviewed non-routine radiation work permits (RWPs) to assure potential hazards and risks were assessed for new construction, modification of existing processes and procedures, equipment changes, and proposed corrective actions. The licensee had conducted 14 ORC reviews for 2000.

2.3 Conclusions

The licensee continued to maintain a staff organization at the site that complied with the license. The organizational structure and staffing levels were determined to be acceptable for the work in progress at the facility

3 In-Situ Leach Facilities (89001)

3.1 Inspection Scope

A site tour was performed to verify that site activities were being conducted in accordance with applicable regulations and the conditions of the license and to ensure that operational controls were adequate to protect the health and safety of workers and members of the general public.

3.2 Observations and Finding

A site tour was performed to verify that site activities were being conducted in accordance with applicable regulations and license conditions. During the site tour, plant buildings, equipment, fences, and gates were observed. Site fences were in good condition and were properly posted in accordance with License Condition 9.16. The facility and related components were operational and properly maintained. Within the plant control room, no equipment misalignments were identified, and no process flow, level, or pressure indications were found outside required parameters. During the site tour, yellowcake dryer and re-loading operations were in progress. The inspectors observed workers donning respiratory protection equipment in the yellowcake dryer area. No yellowcake product was observed on the floor of the central processing plant.

The inspectors also toured the facility’s chemistry laboratory within the central processing plant. The inspectors observed the radiation safety technician taking contamination swipes within various areas in the laboratory. Laboratory personnel were noted to be wearing dosimetry.

3.3 Conclusions

Routine site activities were conducted in accordance with applicable license and regulatory requirements. Housekeeping was adequate. No yellowcake product spills were observed. Plant process parameters were within license limits. Site fences were in good condition and perimeter postings were appropriate.

4 Radioactive Waste Management (88035) Environmental Monitoring (88045)

4.1 Inspection Scope

The environmental and radioactive waste management programs were reviewed to assess the effectiveness of the licensee to control waste and monitor the effects of site activities on the local environment.

4.2 Observations and Findings

a. Semi-annual Effluent Reports

License Condition 12.2 states that the results of effluent and environmental monitoring shall be reported to the NRC in accordance with 10 CFR 40.65. The semi-annual environmental monitoring report for the first half of 2000 was submitted to the NRC on August 29, 2000 and reviewed during this inspection. The semi-annual report was submitted to the NRC in a timely manner and provided relevant data for the facility. The semi-annual environmental monitoring report for the second half of 2000 was not available for review and is due for submission by March 1, 2001. The environmental monitoring program consisted of air particulate, radon, groundwater, surface water, soil, and vegetation sampling. Measurements of ambient gamma exposure rates were also performed. All values reported were within acceptable limits.

b. Groundwater and Environmental Water Sampling

NRC inspectors reviewed groundwater monitoring well and effluent monitoring data. All required data was presented in the reports. Groundwater and surface water monitoring programs were implemented in accordance with Table 5.3 of the license application. The groundwater program consisted of sampling livestock or domestic wells within 1-kilometer of operating wellfields on a quarterly basis for natural uranium and radium-226.

The inspectors' review of data for the first and second quarter of 2000, indicated that the concentrations of natural uranium and radium-226 were below the 10 CFR Part 20, Appendix B, effluent concentration limit of 3.0 E-7 microcuries per milliliter(µCi/ml) and 6.0 E-8 µCi/ml for uranium and radium, respectively. During the first half of 2000, there was no flow in the sampling area (Sage Creek) for surface water, therefore, no analytical results were available for review.

c. Environmental Air Sampling

Air particulate sampling was continuously performed at three locations around the site in 2000. The samples were analyzed on a quarterly basis for their natural uranium, thorium-230, radium-226, and lead-210 concentrations. The results indicated that natural uranium was less than 1.0 percent of the limits. For thorium-230, the highest concentration measured 8.9 percent of the 10 CFR Part 20, Appendix B, effluent concentration limits during the second quarter of 2000. Radium-226 was measured at 1.3 percent of the limit for the same quarter. The lead-210 concentration was highest during the first quarter and was measured at 122 percent of the limit at the background monitoring location. The licensee determined that the Pb-210 values were elevated due to a nearby coal-fired power plant and active strip coal mine. If this increased concentration continues for the second half of 2000, the licensee would exceed effluent concentration limits. An inspection Followup Item was opened to evaluate subsequent sampling at this location to determine if significant adverse trends may be occurring (IFI 40-8964/0101-01).

The licensee was required to sample for radon at three monitoring stations at both upwind and downwind positions. Sampling was performed continuously using track etch detectors which were analyzed quarterly. The sample results indicated that the maximum radon concentration of 1.9 E-9 µCi/ml was measured at the station downwind of the restricted area boundary (fenceline) during the second quarter of 2000. The upwind station measured 8.0E-10 µCi/ml and the station at the nearest downwind residence measured 6.0 E-10 µCi/ml for the same quarter. All of the sample results were 19 percent or less of the radon-222 effluent concentration limit established in 10 CFR Part 20, Appendix B, of 1.0 E-8 µCi/ml.

d. Environmental Exposure Rates

The licensee deployed environmental thermoluminescent dosimeters to monitor ambient gamma readings. The dosimeters were placed at seven locations as specified in Table 5.3 of the license application and were changed out quarterly. The highest ambient reading measured 0.7 microRoentgen per hour (µR/hr) above background during the first quarter of 2000, at the evaporation pond. The background station, Dave's Waterwell, measured 11.7 µR/hr during the first quarter of 2000. For the first half of 2000, ambient gamma exposure rates were below the limits of 10 CFR 20.1301.

e. Soil/Vegetation

In accordance with Table 5.3 of the license application, the licensee is required to take soil and vegetation samples annually from the downwind air sampling station. The soil and vegetation samples are taken during the second half of the calender year and are analyzed for natural uranium, radium-226 and lead-210. The results will be presented in the semi-annual effluent report due by March 1, 2001.

f. Liquid Effluents

License Condition 10.8 provides restrictions for the control of liquid effluents. Liquid effluents were being returned to the process circuit, disposed of via deep-well disposal, or discharged to the evaporation ponds. Output flow to the deep-well disposal system was reported within the maximum allowable limits permitted by the Wyoming Department of Environmental Quality.

4.3 Conclusions

A review of the environmental monitoring and radioactive waste management programs revealed that the licensee was in compliance with the license and regulatory requirements. No effluents had been released into the environment exceeding regulatory limits. Reports related to groundwater and environmental monitoring programs had been submitted to the NRC as required.

5 Radiation Protection (83822)

5.1 Inspection Scope

The purpose of this portion of the inspection effort was to determine if the licensee's radiation protection program was in compliance with requirements established in the license and 10 CFR Part 20 regulations.

5.2 Observations and Findings

a. Personnel Monitoring and Surface Contamination Control

License Condition 10.17 states that process workers shall shower or monitor themselves with an alpha survey instrument prior to exiting the restricted area. Should the results of monitoring exceed an action level of 1000 disintegrations per minute per 100 square centimeters (dpm/100 cm^2) employees shall decontaminate themselves to less than the action level. Also, this license condition states that the licensee shall perform spot surveys for alpha contamination at least quarterly on all workers leaving the facility. A review of the licensee's records indicated that site employees were monitoring themselves with an alpha survey meter prior to exiting the restricted area and no individual had left the site (after self-monitoring) with contamination above the action level. During the site tour, the inspectors observed site workers scanning themselves prior to exiting the restricted area.

License Condition 11.9 stipulates that the licensee shall perform monthly alpha contamination surveys of the facility laboratory and offices and weekly surveys of eating areas and change rooms. The licensee had performed weekly and monthly surveys on a routine basis during this inspection interval. Sample results confirmed that contamination was below the respective license limits and action level.

b. Routine Ambient Gamma Surveys

License Condition 11.8 states that the licensee shall perform quarterly gamma radiation surveys in enclosed areas at the locations specified in the license application. In addition, the licensee shall conduct spot checks to confirm the adequacy of the gamma radiation monitoring plan. The gamma radiation survey records for this inspection interval were reviewed and found to be adequate.

During the site tour on February 7, 2000, ambient radiation levels were measured by the inspectors using an NRC microRoentgen meter (Serial Number 36514, calibration due date August 16, 2001). Readings taken within the central plant measured 100 µR/hr at the lead ion exchange columns, 10 µR/hr in the control room, and 50 µR/hr in the laboratory. The administrative offices measured 20 µR/hr. Surveys were taken in the yellowcake drum storage area. Measurements ranged from 1,500 - 3,000 µR/hr in the yellowcake drum storage area.

The inspectors' review of records verified that the licensee had performed the required routine surveys and spot checks as specified by the license. The inspectors did not identify any unexpected radiation levels during the site tour.

c. Airborne Natural Uranium and Personnel Exposures

License Condition 11.7 states that the licensee shall perform monthly surveys for natural uranium and radon progeny and conduct spot surveys to confirm the adequacy of the yellowcake and radon progeny monitoring plan.

Airborne natural uranium sample results were reviewed from the period of July-September 2000. No air sample results were found to be in excess of the derived air concentration (DAC) value. Some air sample results measured from 19-64 percent of a DAC for natural uranium (5.0E-10 µCi/ml). These samples contained uranium that was collected during yellowcake handling operations.

A review of personnel exposure records indicated that exposures were within the regulatory limits. Exposure records were based on external radiation, airborne uranium and radon daughters. The highest total effective dose equivalent (TEDE) was 583 millirem for 2000, which was well below the 10 CFR 20.1201 occupational dose limit of 5000 millirems.

d. Bioassays

The bioassay program was reviewed to determine compliance with License Condition 12.10. Action levels were defined in accordance with Table 1 of Regulatory Guide 8.22, "Bioassay at Uranium Mills," Revision 1. Evaluations were performed when bioassay results exceeded any action level and pertinent corrective actions were implemented. Bioassay samples were analyzed by a vendor laboratory. All sample shipments included blank and spiked samples for quality assurance. All process operators and laboratory personnel were sampled on a monthly basis, while personnel involved in dryer operations were sampled weekly. Since the last inspection, two

bioassays exceeded the lowest action level of 15 µg/l, but were less than the 35 µg/l action level. Repeat analysis was performed, corrective actions were taken, and weekly safety meetings reiterated how to minimize potential exposures. Additionally, annual refresher training due in March 2001, will include respiratory protection.

e. Radiation Work Permits

License Condition 10.12 states that where the potential for exposure to radioactive materials exists and for which no standard operating procedure (SOP) exists, a RWP shall be required. The license condition further requires the RWPs to contain the following information: (1) the scope of the work to be performed, (2) any necessary precautions to reduce exposures, and (3) any supplemental radiological monitoring and sampling requirements. The inspectors reviewed 10 RWPs written since the last inspection and noted that RWP instructions were adequately detailed.

f. Respiratory Protection

The licensee's respiratory protection program was reviewed during this inspection. The licensee had established a program which included a written policy statement, training, and issuance of positive and negative pressure respirators. During the site tour, the licensee's respirator checkout log was reviewed. If smears were over 100 dpm, respirators were cleaned and washed. The inspectors observed licensee personnel properly wearing full-face respirators and air purifying respirators within the yellowcake dryer operations area. The inspectors determined that this part of the program was adequate.

The licensee's training requirements were reviewed as detailed in the respiratory protection program manual. The licensee provided annual respiratory protection training which included respirator function and fit checks. Physical examinations, including spirometer tests and physician evaluations were conducted annually on appropriate personnel. Individuals had their own dedicated masks. Each mask was inspected at least quarterly by the RSO or his representative. Inspectors determined that the licensee had implemented a respiratory protection program that met the intent of 10 CFR 20.1703, "Use of Respiratory Protection Equipment."

g. Instrument Calibration

License Condition 10.18 states that all radiation monitoring, sampling, and detection equipment shall be recalibrated after each repair as recommended by the manufacturer, or at least annually, whichever is more frequent. The inspectors reviewed the licensee's calibration records and determined that survey instruments had been calibrated routinely. Also, during the inspection, it was noted that instruments in use had current calibration stickers affixed.

h. Release of Equipment for Unrestricted Use

In accordance with License Condition 9.9, the release of equipment or packages from the restricted area shall be in accordance with the NRC guidance document entitled,

"Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials," dated September 1984. The licensee's equipment release records completed during this inspection interval were reviewed. No items had been released with contamination in excess of the limits for fixed, average, and removable (15,000 dpm/100 cm^2, 5,000 dpm/100 cpm^2 and 1,000 dpm/100 cm^2 respectively) alpha contamination.

5.3 Conclusions

The licensee had implemented a radiation protection program that met the requirements in 10 CFR Part 20 regulations and the conditions of the license. Survey instrument calibrations and personnel monitoring were being performed as required. Occupational exposures were within the 10 CFR Part 20 limits during 2000.

6 Followup (92701)

(Closed) VIO 40-8964/0001-01: The licensee failed to use SOPs for calibrating instruments. License Condition 9.10 states, in part, that written procedures shall be established for non-operational activities to include in-plant monitoring and instrument calibration. On June 7, 2000, a radiation safety technician (RST) calibrated the alpha radiation counter without following the established written procedure entitled "Calibration of the Scintillation Counter." Consequently, the technician did not conduct the counter efficiency calibration or establish the instrument operating voltage as stated in the written procedure.

The licensee responded to this violation by letter dated September 8, 2000, with corrective actions recommended by the ORC. During this inspection, completion of the corrective actions were verified. The licensee conducted additional calibrations using a 1-minute count versus the 3-minute count intervals to re-verify efficiencies which resulted in no significant change in efficiencies (from 28.3 percent to 28.4 percent). The instrument calibration procedure was reviewed and revised on September 26, 2000, as recommended. Periodic planned task observations were recommended and performed on October 16 and October 20, 2000, to ensure that personnel were not deviating from written procedures. Additionally, the RST was observed counting samples by procedure during this inspection.

7 Exit Meeting Summary

The inspectors presented the inspection results to the representatives of the licensee at the conclusion of the inspection on February 8, 2001. Licensee representatives acknowledged the findings as presented. The licensee did not identify any material reviewed as proprietary.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Cash, Supervisor, Radiation Safety & Environmental Affairs
P. Drummond, Manager, Plant Operations
W. P. Goranson, Manager, Radiation Safety, Regulatory Compliance & Licensing
B. Ferdinand, General Manager
J. McCarthy, Radiation Safety Officer

ITEMS OPENED, CLOSED, AND DISCUSSED

Open

40-8964/0101-01	IFI	Review of licensee's environmental air sampling data during the next inspection to determine if increased lead-210 concentrations represents a trend if any, at the site.

Closed

40-8964/0001-01	VIO	The licensee failed to use SOPs for calibrating instruments.

Discussed

None

INSPECTION PROCEDURES USED

IP 83822	Radiation Protection
IP 88005	Management Organization and Control
IP 88035	Radioactive Waste Management
IP 88045	Environmental Monitoring
IP 89001	In-Situ Leach Facilities
IP 92701	Followup

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DAC	Derived Air Concentration
dpm/100 cm^2	disintegrations per minute per 100 square centimeters
gpm	gallons per minute
µCi/ml	microcuries/milliliter
µR/hr	microRoentgen per hour
pCi/l	picocuries per liter
PDR	Public Document Room
RG	Regulatory Guide
RSO	Radiation Safety Officer
RSO	Radiation Safety Technician
RWP	Radiation Work Permit
SOP	Standard Operating Procedure
URS	Uranium Recovery Section