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

May 17, 2002

Bruce A. Law, President
Rio Algom Mining Corporation
6305 Waterford Blvd., Suite 325
Oklahoma City, Oklahoma 73118

SUBJECT: NRC INSPECTION REPORT 40-8964/02-01

Dear Mr. Law:

This refers to the routine inspection conducted on April 29-30, 2002, 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, and environmental monitoring. The inspection findings were discussed with your staff at the exit briefing on April 30, 2002. 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. No violations or deviations were identified; therefore, no response to this letter is required.

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/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8221 or the undersigned at (817) 860-8186.

Sincerely,

/RA/

Charles L. Cain, Chief
Nuclear Materials Licensing Branch

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

Enclosure:
NRC Inspection Report
40-8964/02-01

(cc listing on next page)

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	40-8964
License No.:	SUA-1548
Report No.:	40-8964/02-01
Licensee:	Rio Algom Mining Corporation
Facility:	Smith Ranch In-Situ Leach Facility
Location:	Converse County, Wyoming
Dates:	April 29-30, 2002
Inspectors:	Louis C. Carson II, Health Physicist Nuclear Materials Licensing Branch
	John H. Lusher, Health Physicist Uranium Processing Section Fuel Cycle Facilities Branch Division of Fuel Cycle Safety and Safeguards Office of Nuclear Material Safety and Safeguards
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Approved By:	Charles L. Cain, Chief Nuclear Materials Licensing Branch

EXECUTIVE SUMMARY

Smith Ranch In-Situ Leach Facility
NRC Inspection Report 40-8964/02-01

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

Management Organization and Controls

- The organization structure and staffing levels were determined to be acceptable for the work in progress at the facility. The licensee had an organization and procedures in place for implementing the performance based license and Safety and Environmental Review Panel (Section 2).

In-Situ Leach Facilities

- Routine site activities observed during the site tour were conducted in accordance with applicable license and regulatory requirements. No yellowcake product spills were observed in the central processing plant or the satellite plant (Section 3).

Radiation Protection

- The licensee had implemented a radiation protection program that met the requirements in 10 CFR Part 20 and the conditions of the license. Survey instrument calibrations and radiation surveys were being performed as required (Section 4).

Environmental Protection and Radioactive Waste Management

- A review of the groundwater compliance program revealed that the licensee is in compliance with the license and regulatory requirements. Mechanical well integrity re-testings were performed in an acceptable manner (Section 5).

- Groundwater monitoring for 2001 did not measure any exceedances in prescribed upper control limits (Section 5).

- A review of records and data indicated that no effluents were released into the environment exceeding regulatory limits. Reports related to groundwater and environmental monitoring programs had been submitted to the NRC as required (Section 5).

Report Details

1 Site Status

In March 1992 a commercial license was issued 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 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 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, and currently has 12 operating mine units (wellfield header houses). A satellite facility was completed in August 1998, which supports mining operations from both wellfields. The satellite facility has sufficient capacity to support all mine units in Wellfields 3 and 4.

2 Management Organization and Controls (88005)

2.1 Scope

The organization structure was reviewed to ensure that the licensee had maintained an organization with defined responsibilities and functions. The site standard operating procedures (SOPs) were reviewed to evaluate the effectiveness of the licensee's control of site activities.

2.2 Observations and Finding

a. Organization and Staff

The licensee’s organization structure is illustrated in Figure 9-5 of the September 27, 2000, license application. During this inspection, the licensee’s functional organization was compared to the organization chart as referenced in the license application. As of April 1, 2002, the position of Executive Vice President, Rio Algom Mining Corporation was eliminated. Currently, the Manager, Radiation Safety, Regulatory Compliance, and Licensing reports directly to the President, Rio Algom Mining Corporation. This organization change was incorporated into the license application by the Safety and Environmental Review Panel (SERP) process in agreement with License Condition 9.4.

Approximately 59 individuals, including 5 well drillers, were employed at the site during this inspection. The general manager remained the highest ranking official on site, and the radiation safety officer (RSO) continued to report directly to the general manager. In summary, the licensee had maintained a site staff that adequately supported commercial operations.

b. As Low As is Reasonably Achievable (ALARA) Controls

License Condition 12.2 requires that the licensee conduct an annual ALARA review. The inspectors reviewed the licensee's Year 2001 Annual ALARA Review, which was submitted to the NRC on April 1, 2002. The current ALARA review was found to be thorough and comprehensive.

c. Safety and Environmental Review Panel

The licensee was issued a Performance-Based License (PBL) on May 8, 2001. License Condition 9.4 of the PBL requires the licensee to establish a Safety and Environmental Review Panel (SERP) process. The SERP is required to ensure that changes to the facility, procedures, and tests or experiments, which have not been reviewed by the NRC, do not have adverse affects on systems, structures, components, and the operation of the facility. The licensee had established an Operational Review Committee (ORC) for pre-screening of work orders/radiation work permits, and to determine if SERP action is required for proposed changes. The inspectors reviewed 10 work orders that had been reviewed by the ORC. Two work orders were determined to require that a SERP review be conducted. The inspectors determined that the licensee's implementation of the PBL and SERP was adequate.

d. Standard Operating Procedures

License Condition 9.3 requires that standard operating procedures (SOPs) be established for non-operational activities to include environmental monitoring, instrument calibrations, and emergency response. Records indicated site procedures had been reviewed on an annual basis by the RSO. The latest RSO procedure review occurred on September 27, 2001. The inspectors reviewed selected site procedures during the inspection. Generally, the quality of the SOPs were determined to be adequate for the work in progress at the site. SOP 3040, "External Radiation Surveys," Section 4.3.1, requires that restricted area and gamma surveys be conducted as shown in Appendix C of the procedure. Appendix C only required that the central processing plant, the pilot plant, and the satellite plant have the radiation surveys. The licensee had not incorporated routine facility surveys of the Wellfield 4 header houses as part of SOP 3040. However, the licensee had been conducting period surveys of Wellfield 4 bag filters as part of the material surveys program. The RSO agreed that the SOP would be updated based on Wellfield 4 operations.

2.3 Conclusions

The organization structure and staffing levels were determined to be acceptable for the work in progress at the facility. The licensee had an organization and procedures in place for implementing the performance based license and Safety and Environmental Review Panel.

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 Findings

During the guided site tour it was noted that Wellfields 3, 4, and 4A were in production, and Wellfield 1 was not. Wellfield 1 was being recirculated and awaiting restoration to begin; no wellfields were in restoration. Wellfield 2 was under construction and development. During the site tour, plant buildings, equipment, fences, and gates were reviewed. The status of new wellfields 4 and 4A were observed. Wellfields 4 and 4A header houses had new oxygen metering instrumentation installed. The inspectors reviewed the following operations and activities: satellite facility, central processing plant, deep disposal well No. 2 near the satellite plant, and routine monitoring well sampling in wellfield 4. Each activity appeared to be conducted in accordance with established licensee procedures. The yellowcake dryer was operating during the tour of the central processing plant. The inspectors observed the dryer operations and confirmed that no yellowcake product leakage was observed in the central processing plant.

License Condition 10.1 states that commercial processing plant operations shall not exceed an average monthly flow rate of 12,000 gallons per minute (gpm), and that the annual yellowcake production shall not exceed 2 million pounds. At the time of the site tour, the production flow rate was 4,500 gpm. The inspectors determined that the year 2001 yellowcake production was below the 2 million pound limit.

3.3 Conclusions

Routine site activities observed during the site tour were conducted in accordance with applicable license and regulatory requirements. No yellowcake product spills were observed in the central processing plant or the satellite plant.

4 Radiation Protection (83822)

4.1 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.

4.2 Observations and Findings

a. Personnel Monitoring and Surface Contamination Control

Section 9.11 of the license application requires that process workers 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. 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.

Section 9.10 of the license application requires the licensee to perform monthly alpha contamination surveys of the facility laboratory and offices and weekly surveys of eating areas and change rooms. Licensee records indicated that the licensee had performed weekly and monthly surveys on a routine basis during this inspection interval. Sample results obtained by the inspectors confirmed that contamination was below the respective license limits and action level.

b. Routine Ambient Gamma Surveys

Section 9.11 of the license application requires the licensee to perform specified quarterly gamma radiation surveys in enclosed areas and to conduct spot checks to confirm the adequacy of the gamma radiation monitoring plan. The inspectors' review of records verified that the licensee had performed the required routine surveys and spot checks as specified by the license. During the site tours, ambient radiation levels were measured by the inspectors using an NRC microRoentgen meter (Serial Number 33542, calibration due date December 10, 2002). Radiation survey results taken within the satellite facility, central process plant and the yellowcake drum storage area were consistent with the results from previous inspections. No Radiation Areas, as defined by 10 CFR 20.1003, were identified in these facilities.

During the previous inspection, the inspectors noted that radiation levels in some of the Wellfield 4 header houses measured 20 milliRoentgen per hour (mR/hr) on contact. Consequently, the licensee initiated an investigation into the causes of the unexpected radiation levels and the impact to personnel exposures. Based on the investigation results, the licensee had posted all 12 header houses in Wellfield 4 as Radiation Areas. Additionally, the licensee posted the entrance to Wellfield 4 with "Caution-Radioactive Material" signs in accordance with License Condition 9.8. Several of the Wellfield 4 header houses, where the inspectors conducted radiation surveys, measured in excess of 5 mR/hr. However, the licensee was not controlling access into the header houses. The inspectors noted that the licensee was not authorized to control the access to Wellfield 4, but they could control the access to each header house by locking the door. Due to the low population and traffic density in the area, there was a low likelihood that individual workers or members of the public would occupy one of the header houses for

an extended period. Nevertheless, the licensee decided to evaluate in the future the merits of this matter using the ORC process.

c. Airborne Natural Uranium and Personnel Exposures

License Condition 11.7 states that the licensee shall perform monthly surveys for natural uranium and radon. Airborne natural uranium sample results were reviewed for the period July 2001 to April 2002. Only the air sample results from the yellowcake dryer and packaging areas routinely had measurable natural uranium. Most air sample results measured less than 10 percent of a derived air concentration (DAC) value for natural uranium (5.0E-10 µCi/ml).

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 1,080 millirems for 2001, 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 Conditions 11.2 and 11.3. 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. During year 2001, the licensee had analyzed 304 bioassay samples. Since the last inspection, two worker samples had exceeded the lowest action level of 15 µg/l with results of 30.5 µg/l and 59.4 µg/l. The inspectors noted that the licensee had adequately investigated the causes of the elevated bioassays and had implemented corrective actions. So far, in year 2002, over 100 bioassay samples had been analyzed, and no sample had exceeded the action level of 15 µg/l.

e. Instrument Calibration

Section 9.6 of the license application requires the licensee to implement the license application dated November 15, 1999, which requires that all radiation monitoring, sampling, and detection equipment 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, it was noted that instruments in use had current calibration stickers affixed. The inspectors reviewed radiation instrument functional check records prepared since the previous inspection and determined that the licensee had complied with the license.

f. Release of Equipment for Unrestricted Use

Section 9.11 of the license application requires that 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 inspectors reviewed the licensee's equipment release records completed since the last inspection. No items had been released with contamination in excess of the limits for fixed, average, and removable alpha contamination (15,000 dpm/100 cm^2, 5,000 dpm/100 cpm^2 and 1,000 dpm/100 cm^2, respectively).

4.3 Conclusions

The licensee had implemented a radiation protection program that met the requirements in 10 CFR Part 20 and the conditions of the license. Survey instrument calibrations and radiation surveys were being performed as required.

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

5.1 Inspection Scope

The groundwater, 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.

5.2 Observations and Findings

a. Groundwater Protection Compliance

(1) Mechanical Well Integrity Tests

License Condition 10.3 requires that mechanical well integrity tests (MITs) be conducted on all production and injection wells before they are placed into service and periodically thereafter. Any well casing that fails the pressure test (125-150 pounds/square inch [psi]) is required to be repaired and retested or plugged and abandoned.

An objective of the MIT on injection and production wells is to ascertain that the joints that connect each segment of well casing does not leak lixiviant [injection fluid] or contaminants [radium, uranium, chloride or selenium] into native groundwater supplies. Such leaks are also referred to as well excursions.

The inspectors reviewed records of well MITs performed in Wellfields 1, 3, 4, and 4A. The licensee performed 382 MITs in 2001. Of those, 8 wells failed the MITs and were taken out of service. Wellfield 2 was under construction, and no MITs have been performed on injection or production wells for this wellfield. The inspectors examined

the field records for the MITs to confirm the tests had been performed in accordance with the established standard operating procedure (SOP) 2710, “Mechanical Well Integrity-Testing LU4," which was revised in September 2001. The inspectors verified that MITs had been performed within the prescribed re-testing period of every five years for Wellfield 1. The inspectors noted that the MITs for Wellfield 1 were tested at pressures slightly below the 150 psi required in SOP 2710; however, the MIT pressures were held for the prescribed time. The pressures used in Wellfields 3, 4, and 4A were performed in conformance with the licensee’s standard operating procedure. The licensee indicated that the Wellfield 1 MIT procedure required testing to 125 psi. This was allowed because Wellfield 1 was an older wellfield, and the well materials were not as robust as the materials now in use. The licensee agreed to revise the SOP to indicate the exception for Wellfield 1. The inspectors determined the MITs were performed in an acceptable manner to assure well integrity.

(2) Upper Control Limits and Tracking Data

The inspectors also examined year 2001 water quality sampling records for perimeter monitoring wells in Wellfields 1, 3, 4, and 4A. No sample results had exceeded the prescribed upper control limits (UCLs) for specific conductivity, chloride, and alkalinity during the four quarterly sampling periods in 2001.

The licensee maintains all routine groundwater monitoring data, schedules, and MIT schedules on a computer database. The database is programmed to alert the licensee when sampling results potentially exceed the prescribed license limits, and also the upcoming schedules for well sampling and MIT re-testing.

b. Liquid Effluents

The inspectors noted that this facility is considered a zero liquid effluent facility based on the design of the central process plant and License Condition 10.7, which provides restrictions for the control of liquid effluents. Based on the licensee’s records, liquid effluents were being returned to the process circuit, disposed of via deep disposal well, or discharged to the evaporation ponds. During 2001, the licensee discharged 27.4 million gallons of liquid effluents into both deep disposal wells. For the first quarter of 2002, 7.9 million gallons of liquid effluent was injection into deep Disposal Well 2. Disposal Well 1 was not operating during the first quarter of 2002. No liquid effluents were discharged to surface water during the last half of 2001 or the first quarter of 2002. The inspectors determined that the licensee was meeting regulatory requirements regarding liquid effluents.

c. Semiannual Effluent Reports

License Condition 12.2 requires that the results of effluent and environmental monitoring be reported to the NRC in accordance with 10 CFR 40.65. The semiannual environmental monitoring report for the second half of 2001 was submitted to the NRC on February 28, 2002, and reviewed during this inspection. The semiannual report was submitted to the NRC in a timely manner and provided relevant data for the facility. 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.

d. Groundwater and Environmental Water Sampling

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

The inspectors' review of data for the third and fourth quarters of 2001 indicated that the concentrations of natural uranium and radium-226 were below the 10 CFR Part 20, Appendix B, effluent concentration limits of 3.0 E-7 microcuries per milliliter(µCi/ml) and 6.0 E-8 µCi/ml for uranium and radium, respectively.

e. Environmental Air Sampling

This facility is considered a zero gaseous and particulate effluent facility based on the design of the central process plant and the yellowcake dryer system. However, the licensee had continuously performed air particulate sampling at three locations around the site during 2001 and so far in 2002. The samples were analyzed on a quarterly basis for their natural uranium, thorium-230, radium-226, and lead-210 concentrations. The air sample results indicated that these radionuclide concentrations were fractions of the 10 CFR Part 20, Appendix B, effluent concentration limits during year 2001 and so far in 2002.

The licensee was required to sample for radon at three monitoring stations upwind and downwind from the site. Sampling was performed continuously using track etch detectors which were analyzed quarterly. During the third and fourth quarters of year 2001 the maximum radon concentration at the nearest downwind residence measured 2.1 E-9 µCi/ml. Both the fence line station and the farthest downwind station measured 8.0E-10 µCi/ml during the second half of year 2001. All of the sample results were less than the radon-222 effluent concentration limit established in 10 CFR Part 20, Appendix B, which is 1.0 E-8 µCi/ml.

f. Environmental Exposure Rates

The licensee used 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. During the second half of year 2001, the highest ambient reading measured was 2.6 µR/hr above background at the fence line restricted area boundary. The background station, Dave's Waterwell, measured 13.5-16.0 µR/hr during the second half of year 2001. All data indicated no upward trend compared to the previous years.

g. 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 were presented in the semiannual effluent report dated February 28, 2002. No upward trends were noted.

5.3 Conclusions

A review of the groundwater compliance program revealed that the licensee is in compliance with the license and regulatory requirements. MIT re-testings were performed in an acceptable manner. Groundwater monitoring for 2001 did not measure any exceedances in prescribed UCLs. A review of records and data indicated that no effluents were released into the environment exceeding regulatory limits. Reports related to groundwater and environmental monitoring programs had been submitted to the NRC as required.

6 Exit Meeting Summary

The inspectors presented the inspection results to the representatives of the licensee at the conclusion of the inspection on April 30, 2002. 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

None

Closed

None

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

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
MIT	mechanical well integrity testing
µCi/ml	microcuries/milliliter
µR/hr	microRoentgen per hour
mR/hr	milliRoentgen per hour
ORC	Operational Review Committee
PBL	Performance-Based License
PDR	Public Document Room
psi	pounds/square inch
RG	Regulatory Guide
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
SOP	standard operating procedure
UCL	Upper Control Limit
UPS	Uranium Processing Section