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Docket No. 40-8084
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MEMORANDUM FOR: Docket File No. 40-8084

FROM: Candice C. Jierree, Project Manager
Licensing Branch 2
Uranium Recovery Field Office, RIV

SUBJECT: REVIEW OF SEMI-ANNUAL ALARA AUDIT PERFORMED FOR THE
RIO ALGOM MINING CORPORATION, MOAB URANIUM MILL

By letters dated February 20 and April 23, 1985, Rio Algom Mining Corporation submitted the semi-annual ALARA audit which was conducted on December 11 and 12, 1984 by an independent consultant, and subsequently by the Radiation Safety Officer (RSO) at Rio Algom. The audit included information generated from June 27 through December 31, 1984 and was provided in compliance with Condition No. 40 of Source Material License SUA-1119.

The ALARA audit evaluated the radiation safety program at Rio Algom and followed the format presented in Section 2.3.3 of Regulatory Guide 8.31. Each area is reviewed separately below:

Employee Exposure Records

A. Internal Exposures

Internal exposure records were maintained for personnel working in five areas of the mill and for a group of shifters, personnel who worked in various areas of the mill during different shifts. Exposures to ore dust and yellowcake were categorized quarterly for each area. For the third and fourth quarters of 1984, no employee exceeded 15% of the MPE for ore dust or 10% of the MPE for yellowcake except precipitator and dryer workers. One person received up to 25% of the MPE during each of the last two quarters

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of 1984 and three people received exposures up to 20% of the MPE during the fourth quarter 1984.

B. External Exposures

During the third quarter of 1984 eleven employees received exposures between 100 and 250 mrem. Sixty-five employees had measureable exposures of less than 100 mrem. The number of employees wearing a TLD decreased from 76 in the third quarter to 48 in the fourth quarter. This change resulted from implementation of the new NRC license received at that time. One fourth quarter external exposure was measured at 460 mrem. The TLD belonged to the Radiation Safety Officer who could not establish a reason for this elevated exposure. Although the licensee reported the exposure as being unusually high, it does not exceed the permissible quarterly limit for an occupational worker. All other fourth quarter exposures were less than 100 mrem except for five exposures which were less than 250 mrem each.

Bioassays

Twelve employees submitted monthly urine samples for evaluation. No urinalysis exceeded the action level of 15 ug/l U-nat. Urinalyses results above 10 mg/l U-nat were measured in six employees during the month of October and seven employees during the month of November. No in vivo analyses were performed during the third or fourth quarters of 1984.

Personnel Contamination

Employees were observed self monitoring prior to leaving the mill site. No contamination occurred in excess of the release limits (1000 dpm/100 cm²). Most surveys indicated that no contamination was present. Shoe surveys were lacking because most personnel change from work shoes to personal shoes before leaving the site.

Area Gamma Surveys

These surveys were performed monthly until the fourth quarter when the new license permitted a quarterly frequency. Thirteen areas were surveyed. No area exceeded 2.5 mR/hr including the inside of the

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yellowcake enclosure. This area did not exceed 1.2 mR/hr. No mill locations are designated as Radiation Areas.

Area Radon Progeny Surveys

Bimonthly surveys were performed in three areas until the new license changed the requirement to quarterly samples in nine areas. All values were less than 0.1 of the MPC for radon progeny. The highest value was found near a west sump filter bank which indicated 0.01 WL.

Area Surveys for Removable Alpha Activity

During the third quarter of 1984, seventeen areas per month were surveyed for removable alpha activity. With the receipt of the new license, weekly surveys were performed in seven locations. No value exceeded 1000 cpm/100 cm² for removable alpha activity. The highest value found was 11.3% of the limit above which decontamination must be performed.

Inspections

Daily inspections of all mill work areas did not begin until the week of October 27, 1984. This inspection is to be performed by a member of the radiation safety staff. Weekly inspections by the RSO were performed during the audit period. No recommendations were made as a result of the inspections performed by the RSO in the third or fourth quarters of 1984.

Training Activities

Radiation Safety Training has been performed on a weekly basis in conjunction with Industrial Safety Training. The sessions held during the last half of 1984 explained the theory of ionizing radiation and how it is measured. Although the ALARA report indicated that on-the-job-training has been initiated, no details were available.

Procedures Reviewed

All of the procedures related to radiation safety and personal protection were reviewed by the RSO. A new written procedure for disposal of

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contaminated materials into the tailings pond was submitted with the ALARA report. This procedure has not yet been reviewed, but is proposed as a license amendment.

Radiation Work Permits

During the last half of 1984, three radiation work permits were issued. The work performed was summarized in the ALARA report. During each of these jobs, no employees received exposures which exceeded the MPEs. Followup urinalyses were performed after two of the special jobs. No uptake of airborne uranium was indicated.

Annual Trend Analysis for Area Airborne Concentrations

The licensee submitted an annual summary of the monthly area airborne concentrations of U-nat and ore dust for ten general areas. Each area was averaged for the year. Mathematical consistency was evaluated for each area in order to identify any trends. Of three anomalies identified (where results were beyond two standard deviations from the mean) one area of possible concern was noted. The mill services area experienced two consecutive months of abnormally high concentrations of U-nat $1.53\text{E-}11$ and $1.39\text{E-}11$ uCi/ml, respectively. An investigation was initiated, but no conclusions have been reached as yet.

Conclusion

The licensee submitted an ALARA report which evaluated the areas required by Regulatory Guide 8.31. This action is in compliance with License Condition No. 40 of Source Material License SUA-1119. The ALARA audit revealed minor deficiencies in the training and inspection programs, identified one trend currently under investigation and proposed one new operating procedure.

This is the first ALARA report submitted by Rio Algom and a new RSO was hired during the fourth quarter of 1984. The staff will, however, look for improvement in future reports and followup in the trend investigation. Licensing action will be required for review and approval of the proposed procedure for disposal of materials in the tailings pond. This procedure, attached to the ALARA report, is being forwarded to the project manager of Source Material License SUA-1119 for action.

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Approved by:

Harry J. Pettengill, Chief
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