ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	40-8084
License No.:	SUA-1119
Report No.:	40-8084/96-01
Licensee:	Rio Algom Mining Company
Facility:	Former Lisbon Mill Facility
Location:	La Sal, San Juan County, Utah
Dates:	September 4-5, 1996
Inspector:	Robert J. Evans, P.E., Health Physicist Nuclear Materials Inspection and Fuel Cycle/Decommissioning Branch Division of Nuclear Materials Safety
Approved By:	Charles L. Cain, Technical Assistant Division of Nuclear Materials Safety

Attachments:

Attachment 1:	Partial List of Persons Contacted List of Items Opened, Closed, and Discussed List of Acronyms
Attachment 2:	Photographs Taken at the Lisbon Mill Facility

EXECUTIVE SUMMARY

Former Lisbon Mill Facility
NRC Inspection Report 40-8084/96-01

This inspection included a review of site status; management organization and controls; site operations; and the licensee's radiation protection, waste management and environmental protection programs. The licensee was noted to have continued to decommission the site in accordance with NRC regulations and the conditions of the license.

Management Organization and Controls

- The licensee's organizational structure was found to be in compliance with the license requirements. Adequate oversight had been provided for site activities. Procedures had been established at the site and were deemed adequate for the work in progress (Section 2).

Operations Review

- Site activities were conducted in accordance with applicable license and regulatory requirements. Site fences were in good condition, and perimeter postings were appropriate. No significant health or safety concern was identified during site tours. An inspection followup item was issued to ensure that pumping capacity is restored to support the ground water corrective action program (Section 3).

Radiation Protection

- The licensee had implemented a radiation protection program that met the requirements established in 10 CFR Part 20 and the license, with one minor exception. A non-cited violation was identified involving the licensee's failure to perform a baseline bioassay analysis of one site worker. Records of occupational exposures at the site indicated small fractions of the limits established in 10 CFR 20. Program areas deemed satisfactory included the training, contamination control, equipment release, and the ALARA programs (Section 4).

Radioactive Waste Management/Environmental Protection

- A review of the licensee's environmental and ground water monitoring program, and the annual land use survey, indicated that the licensee was in compliance with license requirements. All reports related to the ground water and environmental monitoring programs had been submitted to the NRC as required, and the reports were thorough and technically accurate. A review of the reports and the original laboratory documentation revealed that releases of radioactive materials to the environment were within regulatory limits during 1995 (Section 5).

- Discrepancies were identified with selected parameters listed in a semi-annual effluent report. The licensee planned to implement corrective actions as needed to resolve the discrepancies. An inspection followup item was issued to verify that the discrepancies have been resolved (Section 5).

Report Details

1 Site Status

The Rio Algom-Lisbon mill began operating in May 1972. In 1989, mining operations were suspended, and mill operations were discontinued the following year. The construction of the final radon barrier was completed on the upper tailings impoundment in 1991 and on the lower tailings impoundment in 1992. In addition, evaporation ponds were installed on top of the two tailings impoundments. Five pumpback wells were in service during the inspection, extracting ground water at an average flow rate of 68 gallons per minute.

Decommissioning of the mill began on November 27, 1995. The mill process building, electrical power center, compressor building, steam generator plant, and all in-plant processing tanks and vessels were removed. Mill material and components were either released from the site or buried in the toe of the upper tailings impoundment in accordance with the NRC-approved reclamation plan. The bulk of the decommissioning work had been completed by April 1996. At the time of this inspection, the mill had been fully reclaimed, but the soil on which the mill was formerly situated had not been fully remediated. Also, windblown material had not been fully remediated.

Site structures still in place included the office building, geology shack, shop (attached to the headframe), warehouse, trailer, and the headframe structure. The headframe was scheduled to be removed in the near future. The licensee expects that portions of the headframe will be released as salvage material, while the remainder of the structure will be buried on site. Other activities planned in the future included continuation of the ground water remediation activities, final contouring of the site property, completion of site diversion ditches, and installation of rip-rap material.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organizational structure was reviewed to ensure that the licensee had established an organization with defined responsibilities and functions. The site standard operating procedures were reviewed, and the licensee's implementation of these procedures was assessed to evaluate the effectiveness of the licensee's control of site activities.

2.2 Observations and Findings

a. Management Organization

Site staffing requirements are established in License Condition 11. At the time of the inspection, site staffing consisted of three individuals, the radiation safety officer, an administrative supervisor, and a summer student. During June 1996, the licensee transferred the former administrative supervisor to a different location and restaffed the position. The onsite staffing was comparable to the structure in place during the previous inspection and complied with license requirements.

During mill decommissioning, about 15 contractors were on site. These individuals arrived in late November 1995 and left the site by early April 1996. None of the contractors were on site during the inspection.

Security was provided by a local off-duty law enforcement official who made random inspections of the site. Also, the licensee routinely kept the access gate closed to prevent unauthorized access. Finally, site perimeter fences appeared in good condition and properly posted.

b. Management Controls

License Condition 33 states that standard operating procedures shall be established for non-operational activities to include in-plant and environmental monitoring, bioassay analyses, instrument calibrations, and emergency response. The procedures were reviewed during the inspection. Overall, site procedures had been established and were adequate for the amount of work in progress at the site. Records existed that indicated that site procedures had been reviewed on an annual basis by the radiation safety officer during April 1995 and August 1996.

License Condition 29 states that the licensee shall decommission the mill in accordance with the decommissioning plan submitted to the NRC. The licensee had developed procedures for implementation of the decommissioning plan. The inspector reviewed these procedures and found them to be adequate.

2.3 Conclusions

The licensee's organizational structure was consistent with structures in place during previous inspections, and it appeared that adequate oversight had been provided for the current mode of plant operations.

Procedures had been established at the site. These procedures had been adequately documented and were appropriate for the amount of work in progress.

3 Operations Review (88020)

3.1 Inspection Scope

A facility 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 the workers and members of the general public.

3.2 Observations and Findings

During the plant tour, site buildings, fences, gates, and operating equipment were observed. The area where the former mill had been located was vacant. Some components of the mill had been released from the site, while the remainder had been buried on site. Site fences were in good condition and were properly posted in accordance with License Condition 14. Overall, no health or safety hazard was identified during the site tour.

The inspector obtained gamma exposure rate measurements at several locations around the site property. The exposure rates were measured using a Ludlum Model 19 microroentgen meter calibrated to a cesium-137 source. With a background of 15-18 microroentgen per hour (μR/hr), ambient exposure rate readings of 150-200 μR/hr were measured over the former mill area. In addition, elevated readings were observed near the headframe and the former ore pad area. The elevated readings at the ore pad and head frame were most likely the result of exposed ore material, and not tailings material. The licensee plans to continue the remediation of the soil in the near future.

Annual gamma surveys are required by License Condition 11 and by the licensee's standard operating procedures. The licensee had performed the gamma surveys twice during 1995. Also, the licensee was performing the 1996 gamma survey as part of the soil cleanup verification program. The sample results obtained during 1996 were reviewed and compared to the gamma measurements taken by the NRC inspector during the plant tour. The ambient gamma exposure readings taken during the tour were comparable with the measurements taken by the licensee during the soil verification program.

License Condition 53.D requires the licensee to implement a ground water corrective action program that consists of pumping wells at a combined flow rate of approximately 100 gallons per minute (gpm). During the inspection, five pumpback wells out of six were in service. The pumps' combined flow rate was noted to be 68 gpm. The sixth pump, EF-3, was lost during December 1995 and could not be repaired. The loss of this pump also resulted in the loss of access to its well; therefore, another well was required to be drilled to restore the pumping capacity. State approval was required for the licensee to drill and install a replacement well and had not been received at the time of the inspection; therefore, the licensee

could not implement the corrective actions that were necessary to restore the flowrate to the limit established in the license. When the sixth pump is placed into service, the licensee expects to be able to pump ground water at a combined flow rate of 100 gpm. In addition, the licensee is contemplating the installation of additional wells as necessary to speed up the ground water remediation process.

An inspection followup item (40-8084/9601-03)is being issued to assure that the licensee takes prompt action to restore the ground water corrective action program to full capacity upon receipt of State approval to drill and install the sixth well.

The two evaporation ponds were in service during the inspection. The lower pond had an enhanced evaporation system installed in it. This system consisted of a recirculation pump, spray nozzles, and associated distribution piping. The enhanced evaporation system was not in service at the time of the inspection because the motor on the pond water pump was broken. Also, a pond-to-pond transfer system was available on an as-needed basis to control pond level in either pond. At the time of the inspection, the transfer system was not operable; however, the licensee did not plan to transfer pond water to either pond during the immediate future.

License Condition 44.E states that an annual technical evaluation of the tailings impoundments and the Bisco Lake embankment for their stability shall be conducted under the direction of a registered engineer. The licensee submitted the annual technical evaluations to the NRC on August 7, 1995, and July 2, 1996. The reports concluded that the evaluation findings indicated the continued stability and safety of the impoundments and embankments.

3.3 Conclusions

Site activities generally appeared to have been conducted in accordance with applicable license and regulatory requirements. Site fences were in good condition, and perimeter postings were appropriate. No significant health or safety hazards were identified. An inspection followup item was issued to ensure that pumping capacity is restored to support the ground water corrective action program.

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 the requirements established in the license and 10 CFR Part 20 regulations.

4.2 Observations and Findings

a. Employee Exposures

To ensure that personnel had been properly monitored for potential exposures to radioactive materials, the licensee's internal and external monitoring programs were reviewed. The licensee's personnel monitoring program consisted of issuance of thermoluminescent dosimeters (TLDs), sampling for airborne natural uranium, annual external gamma surveys, and obtaining bioassay samples from site workers.

TLDs were issued to the two permanent site employees during 1995. The highest dose for the year to one individual was 15 millirems deep dose. The contractors who had performed the decommissioning work were issued TLDs also. For the first half of 1996, when the bulk of the decommissioning work was performed, the highest total effective dose equivalent for one contractor was 61 millirems. During the decommissioning work, three workers lost their TLDs. The radiation safety officer assigned doses to these workers. One worker was conservatively assigned a dose of 55 millirems.

The licensee is required to implement a bioassay program consistent with the requirements established in License Condition 42. Bioassays were performed on site workers between November 1995 to March 1996. None of the sample results exceeded the lowest action level of 15 micrograms per liter of uranium. The highest sample result, 9.5 micrograms per liter, was subsequently determined to be a laboratory error. This sample was reanalyzed and was determined to be less than 5 micrograms per liter.

License Condition 42.A states that a baseline urinalysis shall be performed for all new employees prior to the start of work. Based on a records review and discussions with the licensee, the inspector concluded that the summer student working at the site did not submit a baseline urinalysis sample prior to starting work at the site. The licensee's failure to perform a baseline urinalysis sample all site employees prior to the start of work was identified as a violation of License Condition 42.A (40-8084/9601-01). This failure constitutes a violation of minor significance and is being treated as a Non-Cited Violation, consistent with Section IV of the NRC Enforcement Policy. Although the licensee had failed to require the summer student to submit a urinalysis sample prior to the start of work, this individual had not been actively involved in the decommissioning work that had been performed at the site. The licensee plans to submit a request to the NRC in the near future to revise or delete License Condition 42.

General area air samples are required to be obtained quarterly by the licensee's standard operating procedures. The samples were analyzed for their natural uranium concentrations. The inspector reviewed sample results for 1995 and 1996. The highest sample result measured (1.0 E-13 microcuries per milliliter) was obtained in the shop. This sample was well below the occupational limit (2.0 E-11

microcuries per milliliter) established in 10 CFR 20, Appendix B. The samples were being taken to demonstrate that exposures were less than 10 percent of the occupational exposure limits as required by 10 CFR 20.1502.

Breathing zone samples were obtained during decommissioning activities. The highest sample result obtained was 14.4 percent of the derived air concentration limit established in 10 CFR 20 for natural uranium. The sample was taken for a worker who was torch cutting on the autoclaves during December 1995.

Sampling for radon daughters had been previously performed prior to mill entries and monthly during decommissioning. All sample results were less than 0.007 Working Levels. The radon daughter sampling program was not required to be implemented by the license, and the licensee has since permanently discontinued this program.

Based on these results and the amount of time personnel spend in the decommissioning of the mill, the licensee had determined that the permanent and contractor employees had received less than 10 percent of the occupational dose limits established in 10 CFR 20.1201 from either external or internal exposures.

b. Contamination Control

License Condition 29 states that the licensee shall decommission the mill in accordance with the NRC-approved decommissioning plan. The decommissioning plan states that designated eating areas, change rooms, and offices within the restricted area will be surveyed on a weekly basis. The licensee maintained documentation of the weekly surveys. The licensee's records for the period of March 1995 through July 1996 were reviewed. No contamination above the action levels were identified in the weekly surveys. In addition, weekly checks of the alpha survey meter were being performed in accordance with License Condition 43 requirements.

License Condition 39 states that the radiation safety officer or designee shall conduct monthly documented inspections of all active work areas. Also, the inspection frequency shall be increased to weekly during mill decommissioning. The licensee had maintained records that demonstrated that the monthly inspections had been performed as required. During the decommissioning activities, the licensee performed the inspection on a daily basis to comply with the requirements of the decommissioning plan. The licensee reverted to the monthly frequency once decommissioning had been completed in early April 1996.

c. Employee Training

License Condition 41 states that all workers shall be provided on-the-job training on the radiation safety aspects of the job to be performed prior to beginning work and annually thereafter. New employee training was provided to all new workers, and

refresher training was provided to site employees. All workers successfully completed the radiation safety training quiz. The radiation safety officer was scheduled to receive offsite refresher training during 1996.

d. Equipment Calibrations

License Condition 15 states, in part, that the calibration of equipment shall be documented. The inspector reviewed the licensee's instrument calibration records. The components being calibrated by the licensee included the environmental monitoring air samplers, general area air sampler, lapel air samplers, and the radiological survey instruments. The licensee had documentation that revealed that all equipment had been properly calibrated at the associated frequencies.

During the inspection, the licensee stated that they had discontinued the use of the general area sampler and would no longer maintain the sampler's calibration up-to-date. The use of the general area sampler was not required by the conditions of the license. The licensee would use the lapel air samplers in the future to demonstrate compliance with the requirements of 10 CFR 20.1502.

e. Respiratory Protection Program

Respirators were used during the decommissioning process. From a radiological standpoint, the licensee did not take credit for the protection factors associated with the use of respirators. At the time of the inspection, the licensee still had a written respiratory protection program, although the licensee did not have any full-face respirators on site. The licensee did have some half-face respirators on site for industrial use only.

f. Release of Equipment for Unrestricted Use

The requirements for the release of equipment from the site for unrestricted use are provided in License Condition 18. During the mill decommissioning process, equipment was released for both restricted and unrestricted use. Some of the used mining and milling components were released as restricted material to a licensee located in the State of Colorado. This material included the yellowcake precipitation tanks, motors, and pumps. The material was transported via exclusive use shipments between December 1995 and February 1996.

Equipment was last released for unrestricted use from the site in early April 1996. This equipment included the components used in the mill demolition process. The licensee's equipment release records were reviewed, and releases of equipment for unrestricted use were found to be within the limits established in License Condition 18.

g. Annual ALARA Audit

License Condition 40 states that the licensee shall submit a copy of the annual "as low as reasonably achievable" (ALARA) audit to the NRC. The most recent audit submitted to the NRC on April 30, 1996, was reviewed during the inspection. The report was noted to be a comprehensive document that met the intent of the license.

4.3 Conclusions

The licensee had implemented a radiation protection program that met requirements established in 10 CFR Part 20 and the conditions of the license, with one minor exception. A non-cited violation was identified involving the licensee's failure to perform a baseline bioassay on all site workers. Other program areas deemed satisfactory included the training, contamination control, equipment release, and ALARA programs. Records for the licensee's personnel monitoring program confirmed that occupational exposures were well below 10 percent of the Part 20 limits.

5 Radioactive Waste Management (88035) and Environmental Protection (88045)

5.1 Environmental Protection

a. Inspection Scope

The environmental monitoring program at the site was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects, if any, of site activities on the local environment.

b. Observations and Findings

Environmental monitoring program requirements are identified in License Condition 51. Also, the licensee is required to submit the environmental sample results to the NRC on a semi-annual basis in accordance with License Condition 22. The program in place at the site at the time of the inspection consisted of airborne particulate, radon gas, direct radiation, ground water, surface water, soil, and vegetation sampling. Overall, the licensee had obtained the required samples at the specified frequency and reported the sample results to the NRC in a timely manner. In addition, the sample results for 1995 were noted to be comparable to the 1994 environmental monitoring sampling results.

Four sample stations were used by the licensee, including one located at the nearest residence and one background control station. Each sample station consisted of an air particulate monitor, a radon gas canister, and a thermoluminescent dosimeter. Air particulate samples were analyzed quarterly for their natural uranium, thorium-230, radium-226, and lead-210 concentrations. The results indicated

concentrations less than four percent of the limits established in 10 CFR 20, Appendix B. Radon gas sample results indicated that the radon concentrations were under 6 percent of the limits.

Thermoluminescent dosimeters were used to measure the ambient gamma radiation levels at the four sample stations. During 1995, the highest annual measurement (91.4 millirems) was obtained at the onsite station EM-2. However, the measurement at station EM-2 was only 16.5 millirems above the background station's measurement of the ambient gamma radiation level.

Surface water samples were obtained twice during 1995 at one offsite location. The samples were analyzed for dissolved and suspended natural uranium and radium-226 concentrations. The sample results indicated that the natural uranium and radium-226 concentrations were less than 3 percent of the 10 CFR 20 limits.

Soil samples were obtained once at the four sample stations during 1995. Also, a sediment sample was obtained at one offsite location. The soil and sediment samples were analyzed for their natural uranium, radium-226, and lead-210 concentrations. Also, vegetation samples were obtained once at three locations during the grazing season. The samples were obtained and analyzed for their radium-226 and lead-210 concentrations. No limit has been established by the NRC for the vegetation samples. The vegetation and soil sample results were noted to be comparable to the results obtained during the previous year.

During the review of the vegetation sample results, several errors were identified by the inspector in the semi-annual report for the second half of 1995. The radionuclide concentrations listed in the report did not agree with the sample results provided to the licensee by the laboratory. In addition, the lower limits of detection (LLD) listed in the semiannual effluent report for the second half of 1995 for the vegetation samples were less conservative than the LLDs specified in License Condition 51.E. During the inspection, the licensee was not able to provide a clear explanation for the LLD discrepancies. However, the licensee planned to review the data and take corrective actions as necessary to resolve the discrepancies. Therefore, an inspection followup item (40-8084/9601-02)is being issued to ensure that the corrective actions have been effectively implemented by the licensee.

5.2 Ground Water Compliance Monitoring Program

a. Inspection Scope

The ground water compliance monitoring program was reviewed to verify that the program was consistent with the requirements specified in the license.

b. Observations and Findings

A ground water compliance monitoring program is required to be implemented by License Condition 53. The program consists of sampling 17 wells, measuring the water level in 33 wells, and operating six ground water extraction pumps. The licensee was noted to have implemented the program in compliance with the requirements of the license.

The 17 wells were sampled on a quarterly basis. In addition, the licensee sampled an 18th well, RW-2, although not required to do so by the license. Eleven wells were located in the north aquifer while seven wells were located in the south aquifer. Two point-of-compliance wells and one background well were located in each of the two aquifers. The wells were sampled on a semi-annual frequency for arsenic, molybdenum, selenium, and water level, and on a quarterly frequency for natural uranium, chloride, sulfate, pH, and conductivity.

The sample results for 1995 were submitted to the NRC in the semi-annual effluent reports dated August 30, 1995, and February 29, 1996. The sample results indicated that the natural uranium concentrations remained above the protection standard limits in all four point-of-compliance wells during 1995. In addition, the arsenic, molybdenum, and selenium levels were over the limits in selected wells. The licensee continues to operate the extraction wells in an attempt to remediate the ground water.

An annual ground water corrective action program review is required by License Condition 53.D to be submitted to the NRC by July 1 of each year. The last review was submitted to the NRC on June 28, 1996. The report provided an adequate amount of information related to the progress towards attaining the ground water protection standards.

5.3 Annual Land Use Survey

License Condition 21 stipulates that a land use survey be performed annually. The most recent annual land use survey was submitted to the NRC on April 10, 1996. The report listed a number of changes in land use since the last survey. A spot check was performed to confirm the accuracy of the report. No discrepancies were identified during the spot check.

During an inspection conducted in April 1995 and documented in NRC Inspection Report 40-8084/95-01, the annual land use survey submitted to the NRC on April 3, 1995, was reviewed. At that time, the land use survey map was noted to not be up-to-date. The survey map attached to the April 10, 1996, land use survey was noted to have been upgraded and was generally up-to-date.

5.4 Conclusions

A review of the annual land use survey, ground water, and environmental monitoring programs indicated that the licensee was in compliance with license and regulatory requirements. All reports related to the ground water and environmental monitoring programs had been submitted to the NRC as required. The reports were thorough and technically accurate.

An inspection followup item was issued to ensure that the discrepancies related to the vegetation sample results, and the vegetation sample LLDs, are corrected by the licensee.

Exit Meeting Summary

The inspector presented the inspection results to the representatives of the licensee at the conclusion of the inspection on September 5, 1996. Licensee representatives acknowledged the findings as presented.

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

L. Axtell, Administrative Supervisor
F. Fossey, Radiation Safety Officer
J. Young, Summer Student

State of Utah

G. Ripley, Environmental Scientist, Division of Radiation Control

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

40-8084/9601-01	NCV	Failure to perform a baseline urinalysis sample of all site employees; a violation of License Condition 42.A
40-8084/9601-02	IFI	Ensure the corrective actions taken in response to the environmental monitoring sample discrepancies are appropriate
40-8084/9601-03	IFI	Ensure that actions are taken to restore pumping capacity required for the ground water corrective action program.

Closed

40-8084/9601-01	NCV	Failure to perform a baseline urinalysis sample of all site employees; a violation of License Condition 42.A

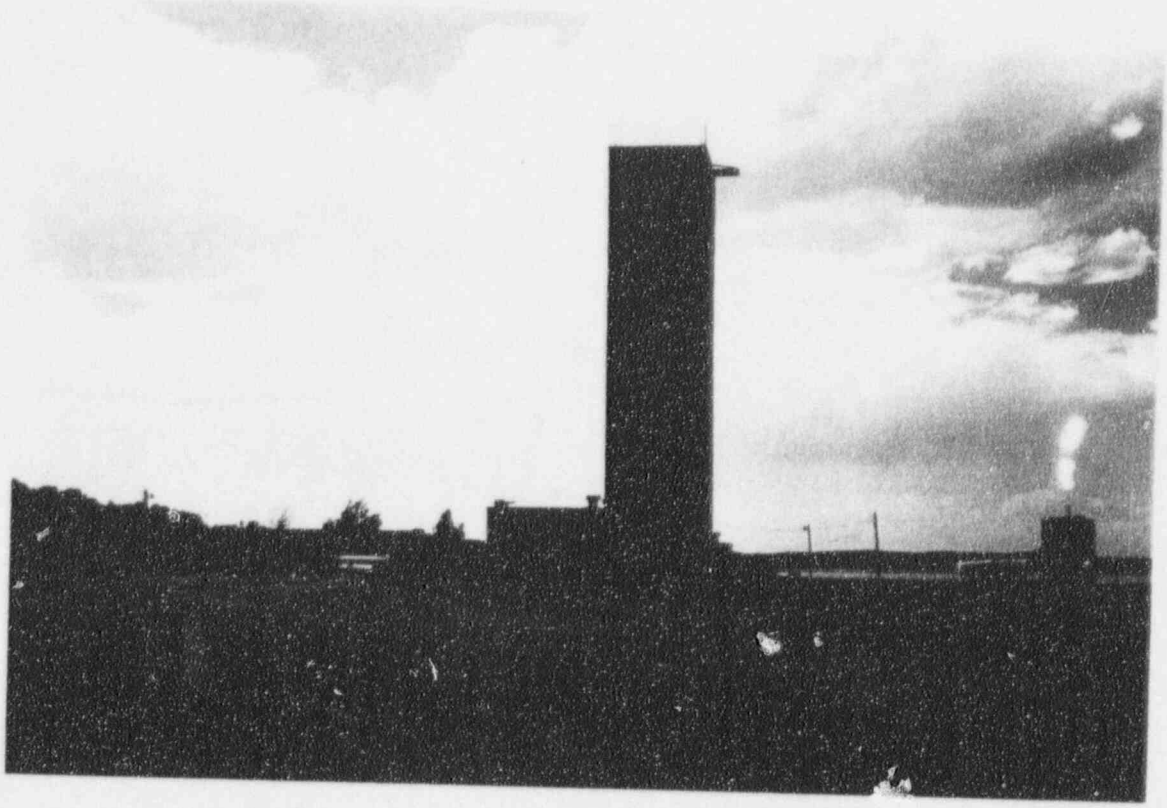
Discussed

None

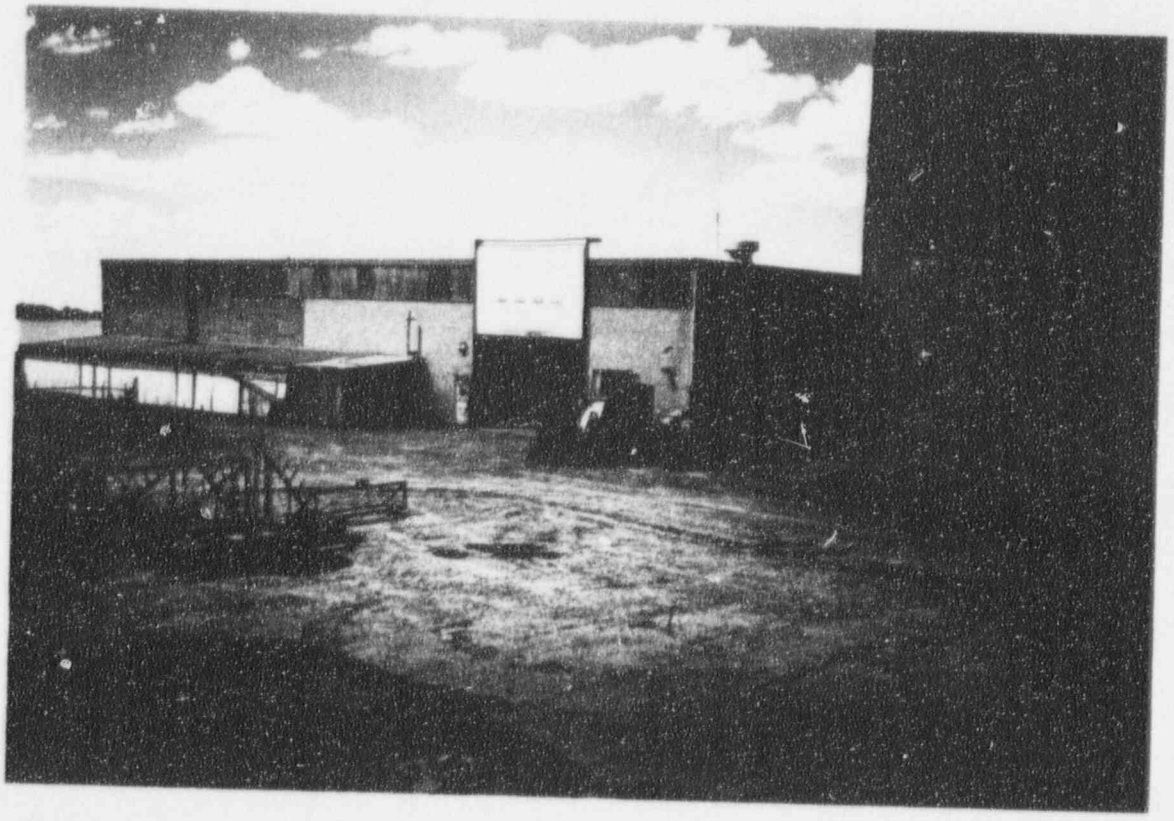
LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
gpm	gallons per minute
LLD	lower limit of detection
μR/hr	microroentgens per hour
TLD	thermoluminescent dosimeter

PHOTOGRAPHS TAKEN AT THE LISBON MILL FACILITY



Photograph 1 - Rio Algom-Lisbon site structures (as seen from the area of the former mill).



Photograph 2 - Headframe on right and warehouse/shop on left; area where former crusher building was located is in the foreground.

Photograph 3 - Former mill area; the mill has been decommissioned (looking northeast).

Photograph 4 - Area of former laboratory and cold storage buildings; Bisco Lake (dry) retainer wall in background.

Photograph 5 - Outslope of upper tailings impoundment; the location where the former mill was buried.