ROY R. CELLAN
CORPORATE MANAGER
RECLAMATION

ENVIRONMENTAL, HEALTH, SAFETY
AND GOVERNMENT AFFAIRS

July 26, 2000

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U.S. Nuclear Regulatory Commission
Division of Fuel Cycle Safety & Safeguards
Fuel Cycle Licensing Branch, MS T-8A33
11545 Rockville Pike
North Bethesda, MD 20852

Attn: Mr. Philip Ting, Branch Chief

Re: Docket No. 40-8903
License No. SUA-1471
2000 Annual ALARA Audit

Dear Mr. Ting:

Homestake Mining Company of California (HMC) is pleased to submit, as per license condition 32C of License SUA-1471, the 2000 Annual ALARA Audit Report.

The audit was conducted on June 26, 2000 and the report finalized on July 11, 2000. Activities at the site during this report period have been limited to normal operation of the ground-water restoration program and routine maintenance of top of the large tailings pile.

If you have any additional questions regarding this report, please contact me at the Grants site, 505-287-4456. Thank you.

Sincerely,

Enclosure

Cc: Mr. Ken Hooks, NRC Project Manager
Mr. Blair Spitzberg, NRC Arlington, TX
Mr. Harold F. Barnes, HMC SF0 w/o report
Mr. Dean Williams, HMC SF0 w/report

HOMESTAKE MINING COMPANY
P.O. BOX 98 • GRANTS, NM 87020-0011

NMSSOIPublic

Annual ALARA Audit

June 26, 2000

Grants Operations
Homestake Mining Company
P. O. Box 98
Grants, New Mexico 87020

Prepared by:

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Environmental Restoration Group, Inc.
12809 Arroyo de Vista NE
Albuquerque, NM 87111

1.0 Introduction

On June 26, 2000, Kenneth R. Baker, consultant to Homestake Mining Company (HMC), conducted the 2000 Annual ALARA Audit for the Grants Uranium Mill site. The audit was conducted in accordance with the United States Nuclear Regulatory Commission (NRC) Regulatory Guide 8.31, "Information Relevant to Ensuring That Occupational Exposure At Uranium Mills Will Be As Low As Reasonably Achievable."

The following topics were covered in the audit:

Follow up on prior ALARA audit
ALARA policy
Radiation exposures
Bioassay results
Self audits
ALARA planning activities
Worker training
Radiation safety meetings
Radiation surveys
Overexposures
Health physics staff
Procedures, Data Collection, and Management

All mill buildings have been removed and the off-pile tailings cleanup was completed in 1995. The side slopes of the main tailings pile and the mill yard area have a permanent radon barrier and an erosion protection cover. An interim cover is being maintained on the top of the large tailings pile and that portion of the small tailings pile that is not covered with the evaporation pond.

Activities at the site during late 1999 and 2000 included the operation of a reverse osmosis (RO) unit that supports the groundwater restoration program, dewatering the large tailings pile, some additional well drilling, and maintaining the groundwater restoration system. The groundwater restoration consists of the pumping the groundwater collection wells, operating the evaporation ponds, injecting clean water into the contaminated aquifer, and operating the RO plant.

The primary potential radiation exposure results from maintaining the pumps, valves, and piping associated with the tailings dewatering and groundwater collection systems.

2. Discussion

The audit process involved scoping the audit, gathering relevant information, review of information, interviewing appropriate personnel, and writing the report. The reviews are briefly summarized below.

2.1 Follow-up on Previous Audit Recommendations
The last ALARA audit was conducted on October 5, 1999. No recommendations were made.

2.2 ALARA Policy
The corporate ALARA policy statement is included in Standard Operating Procedure HP-6. This policy has been implemented as evidenced by the incorporation of ALARA in discussions in worker training and radiation work permits.

2.3 Radiation Exposures
Data for the third and fourth quarter 1999 and first quarter 2000 were reviewed. A total of 45 badges were issued during the last two quarters of 1999. Only one badge had a reported value other than zero, which was 20 mrem. For the 1999 calendar year, the TDL vendor reported 200 exposures less than 10 mrem with only 3 exposures from 10-100 mrem.

During the first quarter of 2000, 26 people were badged, none of which had a measurable exposure.

A few situations where badges were lost were reviewed. HMC assigns a dose based on the measured dose to similar workers. It appears to this reviewer that the assignments were made appropriately. Annual exposure reports for 1999 were sent to all employees on March 2, 2000.

This low exposure reflects the effort that management and the workers have expended in maintaining exposures ALARA as well as the low radiation work environment.

HMC does not routinely require airborne particulate monitoring since there are no exposed tailings. Invasive activities normally involve the use of water to suppress any dust that may be generated. HMC has a "spot check program" where the most exposed individual working under an RWP will be monitored for a day, normally one per month. Occasionally, a personal air sampler will be placed on the most exposed individual. A review of the records indicated that a few samples had been taken and all measurements were at the counter background level

A review of the environmental monitoring TLD, radioactive particulate, and radon data revealed that the results were similar to results from prior years when there was little site work involving tailings.

2.4 Bioassay Results
Procedures call for a semi-annual routine urine-sampling schedule for employees. This was done in July 1999 and January 2000. Contractor employees were sampled at the beginning and end of short-term projects. In addition, some HMC employees were sampled more frequently if they were involved in field activities.

Bioassay results are reflective of the uptake of radionuclides in the body. HMC's urine-sampling program was reviewed. From July 1999-March 2000, 78 routine samples and 11 spiked samples were analyzed. The vendor laboratory is required to have a lower limit of detection (LLD) of 5 μg/l for uranium. Any measured value of 15 μg/l must be investigated and appropriate mitigation measures taken. Persons with urine samples exceeding 35 μg/l must be placed on work restrictions to limit further intakes of uranium. No workers submitted samples that measured above the LLD. The spiked samples were within the tolerance limit.

The results for the bioassay program support the conclusion that the worker uptake of uranium is very low and probably insignificant. These results are also consistent with the perimeter air sample data.

2.5 Self Audits

The RPA requires that the technicians (Venable/Vigil) prepare a monthly ALARA report. The report consists of radiation protection data reflective of the operations as well as an accounting of the major activities for the month. Any problems encountered are also presented. After reviewing several of the reports, the auditor concluded that the reports provide the RPA with adequate detail to assure that exposures are being maintained ALARA. The RPA indicated that he reads and reviews the data presented in the reports. The RPA had initialed the reports, indicating that he or his designee had reviewed them.

2.6 ALARA Planning Activities

HMC conducts most work under a radiation work permit (RWP). A few of the RWPs were evaluated and determined to be appropriate. Requirements in the RWP are explained to the workers in morning meetings. When contract laborers are used, spot checks are conducted to assure that the requirements are appropriate and being followed. These spot checks include frisking working personnel and equipment to determine the levels of contamination, performing exposure rate measurements in the work area, and taking air samples. Monthly safety meetings are held where radiation protection problems are addressed. Since the levels of exposure have been demonstrated to be low, the ALARA planning activities are adequate.

Investigations of radiation exposures in the new RO building have been made during pre-operations, startup, and continuing operations. Of particular concern to the staff is the potential for elevated radon working levels (WL) within the building and possibly buildup of scale in components, which could produce a direct radiation exposure. WL measurements were made on June 10, 1999 and October 5, 1999 with the results being 0.002 WL and 0.012 WL, respectively. A consultant recently conducted a staff training session on WLs and WL measurements. During the practicum, WL measurements for thoron and radon daughters were made. A working level measurement was made on May 19, 2000 in the building while doors were closed and the unit operating to fully characterize the work environment. The value was 0.1 WL, which was considered too

high to be consistent with HMC's ALARA policy. HMC immediately took action to require that upon entering the building in the morning, the doors will be opened to provide ventilation and the ventilation fan will be operated for at least 10 minutes. The ventilation fan was designed to run to remove heat from the building. HMC is redesigning the control system so that it will come on periodically to remove the radon. This auditor believes that this effort is appropriate and consistent with a good ALARA program.

Another ALARA planning activity is associated with assuring that adequate clean cover exists on top of the large tailings pile to control the tailings and also reduce gamma exposure rates to workers. The pile has been divided into 12 segments where a radiation survey is done on one segment per month. Additional clean cover is applied to areas exhibiting an exposure rate of greater than 15 μR/h above background.

2.7 Worker Training

All radiation workers receive formal classroom radiation safety training. Workers must pass a written examination. Annual refresher training is required and generally is a repeat of the course material given initially. Dr. Kenneth Baker conducted the last annual training in December 7, 1999. The RPA or Adrian Venable normally gives the contractor training. Use of videotapes developed for HMC by a consultant is incorporated into the contractor employee training.

2.8 Radiation Surveys

A review of the instrument maintenance and calibration records was made. All instruments in use had been calibrated. A calibration schedule is prepared for use in tracking calibrations. The records were found in good order.

Radiation surveys are conducted on all personnel and equipment leaving the radiation control area. This has been defined as the boundary of areas where invasive work is being done. Work area radiation levels are reported in the RWPs and the spot checks reports.

Clean area surveys are being conducted in the office, maintenance shop, and laboratory quarterly. Since the data show that the contamination is well below limits, HMC is changing to a semiannual schedule.

As mentioned earlier, working level measurements are being conducted in the new RO building. In addition, exposure rates are being recorded at two points within the building each month.

A review of the release surveys was done. Procedures are being followed and all released items were within the release limits.

2.9 Health Physics Staff
The current health physics staff consists of:

Roy Cellan, Radiation Protection Administrator
Ron Waterland, Assistant Radiation Protection Administrator
Adrian Venable, Senior Health Physics Technician
Joe Vigil, Senior Environmental Technician

A review of the education and experience of the RPA, assistant RPA, and technicians indicated that all meet or exceed the requirements of NRC Regulatory Guide 8.31 for working in uranium mills.

2.10 Overexposures
No personnel were overexposed to date during this audit period.

2.11 Procedures, Data Collection, and Management
The RPA reviewed all procedures in January 2000. A license condition requires this to be done at least annually. No procedures are currently under revision or preparation.

The staff data specialists, Mrs. Joyce Gleadle, maintains a schedule of required tasks. This is supplemented by an additional detailed plan for the groundwater restoration program, where well sampling frequencies and required analyses are listed for each well. There is evidence that management is using the schedule to prepare individual assignments. Sign-offs by technicians after completion of tasks are being done. There appears to be an improvement in task management and accountability when compared to last year.

In order to assess whether employee-related health physics tasks are being done at the proper time and documented, the auditor traced all activities associated with the hiring and termination of an employee, Mr. Robert Boyd. He was hired on January 19, 1999 and he terminated on May 31, 2000. Files were searched for radiation training records (including exams), spirometry exam, entrance and exit bioassays, and TLD issue and retrieval records upon hiring and termination for the duration of his employment. All tasks were completed in a timely manner and the records were complete and readily available. While this is only one employee, the results of the exercise support the belief that the radiation protection program is being implemented effectively.

3.0 Recommendations

This radiation protection program is effective in reducing exposures to as low as reasonably achievable. The staff is continuing to take additional measures to assure that the ALARA policy is implemented. There are no recommendations as a result of this audit.