



UNITED STATES

ML16113A258

NUCLEAR REGULATORY COMMISSION

REGION IV

**URANIUM RECOVERY FIELD OFFICE
BOX 26326
DENVER, COLORADO 80226**

MAR 16 1993

**Docket No. 40-8905
License No. SUA-1473**

**Quivira Mining Company
ATTN: Bill Ferdinand
6305 Waterford Blvd., Suite 325
Oklahoma City, Oklahoma 73118**

SUBJECT: NRC INSPECTION REPORT 40-8905/93-01

This refers to the inspection conducted by Ms. Miller-Corbett and Mr. Garcia of this office on February 23-24, 1993. The inspection included a review of activities authorized by the license for the Ambrosia Lake Mill. At the conclusion of the inspection, the findings were discussed with facility personnel identified in the enclosed report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examination of procedures and representative records, interviews with personnel, and observation of activities in progress.

No violations were identified during the inspection. However, one major concern was identified. The inspectors noted that a mill corrective order issued by the radiation safety staff for cleanup of contamination near the slurry loading station was not closed until two weeks following issuance of the corrective order. Further, a mill corrective order issued by the radiation safety staff on December 9, 1992 for cleanup of contamination observed on the leach area floor near yellowcake holding tanks had not been closed at the time of the inspection. Although we recognize that manpower limitations exist at a facility basically in a standby mode, we feel that the failure to implement timely corrective actions in the instances described above reflect a decreased management sensitivity to housekeeping and ALARA issues. Based on discussions held during the exit meeting on February 24, 1993, it is our understanding that the contamination in the leach area will be cleaned before any work is performed in the area and as soon as reasonably possible. It is also our understanding that future deficiencies identified by the radiation safety staff will be corrected in a timely manner. This issue will be reviewed during our next inspection.

In accordance with 10 CFR Part 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC's Public Document Room.

OFFICIAL DOCKET COPY

Quivira Mining Company

2

MAR 16 1993

Should you have any questions regarding this inspection, we will be pleased to discuss them with you.

Sincerely,

A handwritten signature in black ink, appearing to read "Ramon E. Hall", written in a cursive style.

Ramon E. Hall
Director

Enclosure:

Appendix - NRC Inspection Report
40-8905/93-01

cc:

A. Gebeau, Quivira
E. Montoya, NM
B. Garcia, RCPD, NM

Quivira Mining Company

3

MAR 16 1993

Case Closed: 04008905720E
X60657

bcc:

Docket File No. 40-8905

LFMB

PDR

Suspense File

URFO r/f

LJCallan, RIV

GSanborn, RIV

RITS Operator

RSTS Operator

NMIS

MIS System

DDChamberlain, RIV

JLMilhoan, RIV

RWise, RIV

MRodriguez, OC/LFDCB (4503)

DMB (IE-07)

LLUR Branch, LLWM

O:\INSPECT\89059301.RPT

PM:URFO <i>PJG</i>	PM:URFO <i>for CMC</i>	DD:URFO <i>EBH</i>	D:URFO:RIV	
PJGarcia/db	CDM Corbett	EFHawkins	REHall	
03/9/93	03/15/93	03/15/93	03/16/93	

APPENDIX

**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE**

Inspection Report: 40-8905/93-01

License: SUA-1473

**Licensee: Quivira Mining Company
P.O. Box 218
Grants, New Mexico 87020**

Facility Name: Ambrosia Lake Mill

Inspection At: McKinley County, New Mexico

Inspection Conducted: February 23-24, 1993

**Inspectors: Pete J. Garcia, Jr., Project Manager
Cynthia D. Miller-Corbett, Project Manager**

Approved:


Edward F. Hawkins, Deputy Director
Uranium Recovery Field Office

3/14/93
Date

Inspection Summary

Areas Inspected: Routine announced inspection of uranium milling operations and radiation safety program including: Management Organization and Controls; Operations Review; Operator Training and Retraining; Radiation Protection; Transportation of Radioactive Materials; Radioactive Waste Management; Environmental Protection; and Emergency Preparedness.

Results:

- Corrective actions in response to recent housekeeping deficiencies identified by the radiation safety staff were not performed in a timely manner (Section 2).
- Deficiencies were identified in the procedure used to obtain ground water samples. This led the inspectors to question the representativeness of the samples obtained (Section 8).

Summary of Inspection Findings:

- Violation 40-8905/9201-01 was closed (Section 10).
- Open Item 40-8905/9101-01 was closed (Section 11).

Attachment:

Persons Contacted and Exit Meeting

DETAILS

1 PLANT STATUS

Conventional ore processing sections of the Ambrosia Lake Mill remain on standby. The licensee has continued to produce yellowcake by extracting uranium from mine water in the mill ion exchange (IX) building. The yellowcake is then precipitated, stored, and eventually shipped as a slurry to the Sequoyah Fuels Corporation uranium conversion facility. The licensee has also continued to receive shipments of alternate feed materials from Sequoyah Fuels. The alternate feed materials were washed and stored in thickener tanks to await further processing. The licensee was in the process of placing radon barrier soils on the outcrops of Tailings Pond No. 1 at the time of the inspection.

2 MANAGEMENT ORGANIZATION AND CONTROLS (88005)

The licensee described the organization of the radiation safety staff at the site. The General Manager is the highest ranking corporate official onsite. The Environmental Engineer, who also serves as facility Radiation Safety Officer (RSO), reports directly to the General Manager. The RSO is assisted by a staff of two technicians. At the time of the inspection, there were a total of 37 employees at the facility.

The inspectors reviewed the records of audits and inspections performed by licensee staff since the previous NRC inspection. The RSO prepared a monthly report for the General Manager which summarized occupational exposure records, environmental data, inspection results, and operational activities. The monthly reports were noted to be thorough. An annual ALARA audit was performed by the licensee and submitted to the NRC as required by the license. Daily walkthrough inspections of the mill were performed by a member of the radiation safety staff. Weekly inspections were performed by the RSO. All inspections were properly documented.

The inspectors identified a recent program deficiency concerning the response of operations personnel to inspection findings by the radiation safety staff. The inspectors noted that mill corrective order (MCO) 92-015, issued by the radiation safety staff on November 30, 1992 for cleanup of contamination near the slurry loading station, was not closed until December 14, 1992. Further, MCO 92-016, issued by the radiation safety staff on December 9, 1992 for cleanup of contamination on the leach area floor, had not been closed at the time of the inspection. Discussions with facility personnel indicated that specific decisions had been made by management to postpone remedial actions for the MCOs based on a shortage of facility manpower and no planned employee occupancy in the areas. The inspectors felt these decisions indicated a lack of management sensitivity to housekeeping deficiencies, control of licensed material, and ALARA concepts. Although specific time limits for completion of corrective actions are not specified in facility procedures, the inspectors recommended that the licensee implement more timely corrective actions in response to findings by the radiation safety staff.

The inspectors reviewed the Standard Operation Procedures (SOPs) established for routine site activities and the RWPs prepared for nonroutine jobs. The SOPs generally contained adequate detail concerning the activity to be performed and had been reviewed by the RSO at least annually. The inspectors noted that a new cover sheet had been generated to document the RSO's review of health and safety procedures. RWPs were found to contain adequate detail regarding the nonroutine jobs to be performed and the precautions to be taken to minimize employee exposures. The RWPs were issued by the RSO or a radiation safety technician, although all RWPs were reviewed by the RSO prior to issuance. No deficiencies were identified.

Access to the restricted area was controlled by a barbed-wire fence. Security was provided 24 hours per day by a contract security service. The inspectors noted that the fence was appropriately posted and that notices required by 10 CFR 19.11 were posted on employee bulletin boards.

The inspectors concluded that the licensee's program in this area was functioning adequately, with the exception of the issue of timely corrective actions in response to findings by the radiation safety staff.

3 OPERATIONS REVIEW (88020)

The inspectors toured the yellowcake portions of the mill circuit and the mill IX building. Several deficiencies regarding the control of process solutions were observed. The first involved the procedures used during the storage of yellowcake which resulted in the contamination addressed by MCO 92-016. Following the precipitation of the yellowcake, it is transferred as a slurry to one of a series of holding tanks in the leach area. After the yellowcake is allowed to settle out, the liquid used to transfer it is decanted onto the sloped floor where it runs to a sump for collection and reuse. Although the liquid does not contain much yellowcake, the yellow appearance of the floor and the results of radiation surveys conducted by the radiation safety staff indicate that a buildup of uranium on the floor has occurred.

The licensee has considered this situation and has committed to install piping to achieve contained transfer of the decant solutions before any additional solution is decanted. In addition, the leach area floor will be decontaminated before any work in the area is conducted. The inspectors concluded that the proposed modification will satisfactorily resolve the issue of the uncontained transfer of the decant solution.

The inspectors also observed a buildup of contamination in a sink in the peroxide control booth. The sink is used to return process solutions extracted from the circuit for testing back into the circuit. The buildup occurred because of the configuration of the sink, which does not allow adequate drainage of solutions. In addition, there is currently no way to effectively wash the sink. Licensee staff stated that modifications would be made to eliminate the buildup of contamination in the sink.

During the tour of the Mill IX building, the inspectors noted the licensee has modified process equipment to reduce radon daughter concentrations in the building, and is considering further changes. The concrete channel which

transfers water which has been stripped of uranium in the IX columns to an outside storage pond has been covered to convey radon outside the building. Licensee staff also stated that the tops of the IX columns will be covered in the near future to further reduce radon daughter concentrations.

The inspectors observed, however, that the discharge of the water from the IX columns into the concrete channel was not performed in a closed system. The inspectors noted that the transfer system would allow the discharge water to aerate and therefore could result in a significant release of radon gas into the building environment. The inspectors recommended that the licensee consider modifying the transfer system to provide containment and thereby further reduce concentrations of radon daughters in the building.

The inspectors concluded that the licensee's program in this area is functioning adequately. The process modifications discussed above should result in increased control of radioactive materials.

4 OPERATOR TRAINING AND RETRAINING (88010)

The Radiation Safety Training program is administered by the site RSO. New employees are required to attend an introductory, 40-hour radiation protection training course. All employees are required to attend an 8-hour annual refresher course. A review of employee records indicated employees attended the refresher training for 1992, and the next refresher course is scheduled for March 1993. A review of the test to be given showed test questions focus on the workers' understanding of potential radiological hazards, precautions to minimize radiation exposure, and the purpose and functions of protective devices. The extent of the questions is commensurate with potential radiological health problems in the restricted area.

The inspectors noted there is no pass/fail criterion for the written test following the training course. The inspectors recommended the licensee implement such a criterion so that a person who fails the test would be required to review the appropriate material and retest until adequate comprehension of the material is demonstrated.

The site RSO's training is current. A new person recently filled the position of Environmental Technician. This position includes, in part, responsibilities for assisting the site RSO with administering the radiation safety program. The site RSO provided on-the-job training for the new Environmental Technician. In anticipation of taking on more radiation safety program responsibilities, the new person filling the Environmental Technician position is scheduled for a Radiation Safety Technician course in March 1993.

A review of job responsibilities indicated job tasks were assigned commensurate with the person's experience and training. The inspectors noted, however, a minor deficiency in documentation of on-the-job training. Facility records show that the new technician was assigned to inspect, clean, and survey respirators before training documentation indicated he had been certified by the RSO to perform the job. The RSO stated that the individual had been trained to perform the job prior to the assignment, but the documentation had not been completed in a timely manner. The inspectors

recommended that future documentation be completed to clearly show certification to perform a specific task before the employee is assigned the task.

The inspectors concluded that the training program was conducted in accordance with license requirements.

No violations or deviations were identified by the inspectors.

5 RADIATION PROTECTION (83822)

5.1 In-Plant Air Sampling

The inspectors reviewed the in-plant air sampling program implemented by the licensee. Weekly samples for airborne uranium were collected from 12 locations in the yellowcake area using pumps calibrated to draw about 20 cubic feet per minute. Breathing zone samples were collected during RWP jobs using lapel samplers calibrated to draw 1.7 liters of air per minute (lpm). Filters were counted using an alpha scintillation counter.

Radon daughter samples were collected weekly at about 16 locations throughout the mill and the IX building. The samples were collected using pumps calibrated to draw 1.7 lpm and analyzed using an instant working level meter.

The review of the procedure used to calibrate the higher volume pumps revealed several potential deficiencies. The pumps were calibrated using a manometer which itself has not been calibrated for years. In addition, the procedure for calibrating the pumps calls for puncturing the sample filter one to nine times to attempt to create different flow conditions by changing the differential pressure. The flow rates determined using the manometer were compared to the flow rates measured using the flow gauge on the pump to calculate correction factors, and the correction factors averaged to obtain an overall correction factor. The change in the air sampling train could invalidate the calibration.

The inspector recommended that the licensee review manufacturer's literature for both the manometer and the sampling pumps to determine calibration requirements for both pieces of equipment. Calibration procedures in use at the site would then be modified to reflect the manufacturer's recommendations, if necessary. The licensee committed that these actions would be taken.

The inspector's review of air sampling data showed that all concentrations of airborne uranium were small percentages of the maximum permissible concentration (MPC). Radon daughter concentrations were also very low, with the exception of concentrations in the Mill IX, which averaged 15 percent of MPC for 1992. The modifications to process equipment discussed in Section 3 are being implemented to attempt to lower radon daughter concentrations in the building.

5.2 Exposure Determination

The determination of internal exposures to airborne radioactive materials was conducted by utilizing air sample concentration data, time cards for hours worked in various areas, and respiratory protection factors. The radiation safety staff also performed a time study in June 1992 for the purpose of determining occupancy times for various locations within the yellowcake precipitation area. Breathing zone sampling was performed to determine exposures during RWP jobs.

The inspectors' review of internal exposure data showed that all exposures were small fractions of the regulatory limit.

5.3 Respiratory Protection and Bioassay

The licensee implemented a respiratory protection program which included the use of negative pressure half-mask, powered air purifying, and supplied air respirators. Credit for the use of the respirators in estimating employee exposures was taken for certain RWP jobs. Respirator issuance records were maintained in a log book, and annual fit testing, training, and medical certifications were performed for all personnel required to wear respirators.

Bioassay samples were collected from all mill employees on a quarterly basis and submitted for analysis by a vendor laboratory. Quality control samples were submitted for analysis along with the specimen samples. The inspector's review of the bioassay data revealed that all results since the previous inspection were less than the lower limit of detection of 5 ug/l uranium.

5.4 External Exposure and Contamination Control

Thermoluminescent dosimeters (TLDs) were issued to all mill employees and exchanged quarterly for men and monthly for women. The highest external exposure incurred during calendar year 1992 was 390 mRem, or 7.8 percent of the maximum permissible exposure. The licensee also performed semiannual surveys for external radiation in 68 locations.

The licensee performed weekly surface contamination surveys in all eating areas and lunch rooms. Results were all well below the action level specified in the license. The licensee's personnel contamination control program requires that all employees working in the yellowcake area wear smocks, boots, and gloves and shower prior to leaving the site. All other employees must either shower or monitor with a survey meter before leaving the site. The radiation safety staff also performed weekly random surveys of workers leaving the restricted area.

5.5 Conclusion

The inspectors concluded that the licensee's radiation safety program was being conducted in accordance with license requirements. The only area of concern identified involved the procedure for calibration of high volume air sampling pumps. The licensee committed to look into the issue.

6 TRANSPORTATION OF RADIOACTIVE MATERIALS (86740)

The licensee made two uranium slurry shipments in November, 1992, and regularly received raffinate shipments during the period covered by this report. A review of transportation records revealed the necessary documentation is in order. Shipping and receiving papers including manifests, bill-of-ladings, and DOT/NRC Form 741 were completed as required. Exclusive use designation was verified.

The licensee performed radiation surveys as required. All survey results were well below regulatory limits. A review of shipping and receiving records showed vehicles were checked for the required seals and placards.

No areas of concern were identified during the inspector's review of transportation activities.

7 RADIOACTIVE WASTE MANAGEMENT (88035)

The inspectors observed current operations for tailings impoundment (pile) cover placement and compaction for the slopes of Pond 1. At the time of the inspection, the 12-inch thick alluvium interim cover was being compacted and the overlying impermeable shale layer was being laid in areas where the interim cover passed compaction tests. The licensee expects to complete placement of the impermeable layer by about December 31, 1993. The licensee stated Pond 2 had a 6-inch alluvium cover, a 1-foot impermeable lift, and another 6-inch alluvium lift, in ascending order. Ponds 4, 5, 6, and 8 have been cleaned up and vegetated. The licensee is waiting for the results of soil tests to begin vegetation of Pond 7.

Moisture and compaction tests were performed based on a test:area ratio of 1:2500 yd² and 1:1000 yd² for alluvium and shale cover, respectively. The test:lift thickness ratio is 1:6 inches. Test data reviewed by the inspectors showed that any area failing the moisture and/or compaction test was reworked if necessary, recompacted, and then retested. This procedure was followed until the area passed the quality criterion.

The inspectors concluded that the licensee's radioactive waste management program is functioning adequately. The licensee is making excellent progress in reclaiming Pond 1.

8 ENVIRONMENTAL PROTECTION (88045)

The inspectors reviewed environmental monitoring data submitted by the licensee on August 31, 1992, and a supplement submitted on September 8, 1992. The submittals showed that environmental monitoring was performed in accordance with the license requirements.

The inspectors reviewed the data and determined that all values were well below the respective MPC with the exception of several radon values. The mill is located in an area heavily impacted by previous mining activities and includes several mine ventilation shafts near the site. Based on the fact that the licensee has completed covering all exposed tailings, the inspectors

concluded that the elevated concentrations were due primarily to contributions from mining and not NRC-licensed activities. In addition, no anomalous trends were noted during the inspector's review of the data.

There have been no changes in sample analytical methods since the last inspection. A review of the licensee's standard operating procedures (SOPs) for the ground-water sampling program raised questions concerning whether the samples collected were representative. It appears the licensee's ground-water sampling techniques would not meet NRC guidance (WMUR Branch Position, Addendum to Regulatory Guide 4.14, April 1980) for ensuring ground-water sample quality. Furthermore, the licensee has no written procedure for rejecting or accepting ground-water analytical data. These determinations are now made subjectively. Finally, there is no provision for review and evaluation of program results to ensure deficiencies and trends are recognized and evaluated, and that timely corrective actions and followup actions are taken. This issue will be further reviewed under separate licensing action.

The inspectors identified a concern regarding the licensee's procedure for collecting ground water samples, and questioned whether the procedure resulted in the collection of representative samples. Other minor program weaknesses were also identified. These concerns will be resolved in a licensing context.

9 EMERGENCY PREPAREDNESS (88050)

The inspectors reviewed the licensee's emergency preparedness program. First aid emergency kits were equipped as necessary for industrial accidents. A review of industrial safety training records reveals employees received fire protection training and the annual Mine Safety and Health Administration refresher course as required.

The licensee maintained an ambulance and fire truck on site. The last fire drill was held in November 1991. The licensee indicated they were aware they are delinquent in performing a fire drill, and have scheduled a drill for March 1993. A specific frequency for performing fire drills is not included in the license. The licensee also stated the insurance carrier has requested the site fire hydrants be checked for adequate water pressure. This task also is scheduled for March 1993. A spot check of fire extinguishers showed the extinguishers were checked on a monthly basis.

The inspectors noted the licensee had not coordinated emergency planning with the local hospital to ensure the hospital was prepared to receive an injured person who might be contaminated with radioactive material. The licensee informed the inspectors that in the past there had never been a problem with admitting an injured employee to the hospital. Notwithstanding, the inspectors recommended the licensee contact the local hospital to verify the hospital was aware of the potential contamination hazards associated with the mill site, and to confirm the hospital had accommodations or procedures to ensure an injured mill site worker would receive proper medical attention.

The licensee's emergency preparedness program appeared adequate and in accordance with license requirements.

10 FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS (92702)

(Closed) Violation 40-8905/9202-01: Failure to obtain medical certification of the ability of employees to safely use respiratory protection equipment.

The inspectors determined that medical certifications had been obtained for all employees required to wear respiratory protection equipment and the certifications documented on a new form.

11 FOLLOWUP (92701)

(Closed) Open Item 40-8905/9101-01: Inadequate documentation of the review of SOPs for nonoperational activities.

The inspectors noted that the licensee has implemented a new form for documenting the review of nonoperational SOPs which lists the specific procedures reviewed.

ATTACHMENT

1 PERSONS CONTACTED

Licensee Personnel

- *A. Gebeau, General Manager
- *P. Luthiger, Environmental Engineer/Radiation Safety Officer
- *T. Fletcher, Superintendent-Maintenance and Reclamation
- G. Ross, Reclamation Engineer
- F. Meyer, Solution Mining Foreman/Safety Officer

*Denotes personnel that attended the exit meeting

2 EXIT MEETING

An exit meeting was held on February 24, 1993. During this meeting, the inspectors reviewed the scope and findings of the inspection. The inspectors discussed a concern with the lack of timely corrective actions in response to findings of the radiation safety staff. The licensee committed to close the remaining open finding discussed in Section 3 of this report before any work is done in the area and as soon as possible, and to implement more timely corrective actions in response to future findings.