

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer by product, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below, to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 2.3 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee

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1. Quivira Mining Company	3. License number
2. 6305 Waterford Blvd., Suite 325 Oklahoma City, Oklahoma 73118 [Applicable Amendments: 12]	SUA-1473, Amendment No. 25
	4. Expiration date
	February 28, 1976
	5. Docket or Reference No.
	40-8905

6. Byproduct, source, and/or special nuclear material

7. Chemical and/or physical form

8. Maximum amount that licensee may possess at any one time under this license

Uranium

Any

Unlimited

9. Authorized Place of Use: The licensee's Ambrosia Lake facility located in McKinley County, New Mexico
10. The licensee is authorized to process uranium ore at a nominal throughput of 7000 tons per day in accordance with statements, representations, and conditions contained in submittal dated August 30, 1990, and January 31, 1991. Anywhere the word "will" is used in the documents referenced above, it shall denote a requirement.
- Any changes to the mill circuit as described in Section 6 of the August 30, 1990, submittal shall required approval by NRC in the form of a license amendment.
- [Applicable Amendments: 4, 10, 11, 21]
11. The licensee shall designate a Radiation Safety Officer (RSO) who will be responsible for the establishment and maintenance of a facility radiation protection program including personnel and environmental monitoring programs. The RSO shall possess minimum qualifications as specified in Section 2.4.1 of Regulatory Guide 8.31.
12. The licensee is authorized to possess byproduct material in the form of uranium process tailings and other byproduct wastes generated by the licensee's uranium processing operations. Mill tailings, other than small samples for purposes such as research or analysis, shall not be transferred from the restricted area without prior approval of the NRC in the form of a license amendment.

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13. The licensee is authorized to operate mine water uranium recovery treatment facilities at Ambrosia Lake, New Mexico. These facilities include treatment plants at the main facility, Section 35-36, and individual ion exchange units located above or underground at the Quivira Mining Company mine sites. The radiological effluent monitoring and radiological safety program in effect at the licensee's mill shall include these water treatment facilities. All U.S. DOT requirements shall be followed in the transport of the ion exchange resin. A listing of the individual ion exchange units currently in operation shall be provided by January 1, 1987, and shall be updated at least annually thereafter.
14. Written standard operating procedures (SOPs) shall be established for all operational process activities involving radioactive materials that are handled, processed or stored. These procedures shall specify radiation safety practices to be followed. An up-to-date copy of each written procedure shall be kept in the mill area to which it applies for employee reference. All SOPs shall be reviewed annually to update procedures and be approved by the RSO to ensure that proper radiation protection principles are being applied.
15. The licensee shall be required to use a Radiation Work Permit (RWP) for all work where the potential for significant exposure to radioactive material exists and for which no SOPs exist. All RWPs shall be approved by the Radiation Safety Officer (RSO) or his designee, qualified by way of specialized radiation protection training. The RWP shall describe the following:
 - A. The scope of the work to be performed.
 - B. Any precautions necessary to reduce exposures to radioactive materials.
 - C. Supplemental monitoring required prior to, during, and after the completion of the work.
16. The licensee shall establish written procedures for all surveillance activities including in-plant and environmental monitoring, bioassay analysis and radiation monitoring instrument calibration. These procedures shall be reviewed and approved by the RSO annually to ensure that proper and current radiation protection principles are being applied.
17. Occupational exposure calculations shall be performed and documented within one (1) week of the end of each regulatory compliance period as specified in 10 CFR 20.103(a)(2) and 10 CFR 20.103(b)(2). Routine airborne ore dust and yellowcake samples shall be analyzed in a timely manner to allow exposure calculations to be performed in accordance with this condition. RWP ore dust and yellowcake samples shall be analyzed and the results reviewed by the RSO or his designee within two (2) working days after sample collection.
18. DELETED by Amendment No. 4.
19. The results of all effluent and environmental monitoring required by this license shall be reported semiannually and in accordance with 10 CFR 40, Section 40.65,

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with copies of the report sent to the NRC, Uranium Recovery Field Office. Monitoring data shall be reported in the format shown in the attachment to SUA-1473 entitled, "Sample Format for Reporting Monitoring Data." [Applicable Amendments: 25]

20. The results of sample analyses, monitoring surveys, equipment calibration, reports of audits and inspections, meetings, and training sessions required by applicable regulations or this license and any subsequent reviews, investigations, and corrective actions shall be documented. Unless otherwise specified in this license or in NRC regulations, all documentation shall be maintained for a period of five (5) years.
21. The licensee shall operate the tailings retention systems in accordance with the "Tailings Stabilization Report" submitted October 1, 1986, as approved by the NRC and in compliance with 10 CFR 40, Appendix A. Any changes in the tailings retention system that would significantly deviate from the above shall require the licensee to provide a written evaluation of the changes and obtain approval from the NRC in the form of an amendment to the license.

In addition, the licensee shall implement a tailings dam inspection program as specified in Section A3 of the submittal dated November 12, 1986, with the exception that annual technical evaluations of embankment performance need not be performed.

[Applicable Amendments: 4, 21]

22. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination of the mill and mill site, reclamation of any tailings or waste disposal areas, ground water restoration as warranted, and the long-term surveillance fee.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to the NRC by June 30 of each year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency fee, changes in engineering plans, activities performed, and any other conditions affecting estimated costs for site closure. The basis for the cost estimate is the NRC approved reclamation/decommissioning plan as supplemented by the NRC assumptions identified in License Condition No. 37, or NRC approved revisions to the plan. The attachment to this license, entitled "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates" outlines the minimum considerations used by the NRC in the review of site closure estimates. Reclamation/decommissioning plans and annual updates should follow this outline.

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The licensee's currently approved surety, a Parent Company Guarantee issued by Rio Algom Limited, shall be continuously maintained in an amount no less than \$16,646,000 for the purpose of complying with 10 CFR 40, Appendix A, Criteria 9 and 10, until a replacement is authorized by the NRC. The use of a parent company guarantee necessitates a complete evaluation of the corporate parent by the NRC as part of the annual surety update. In addition to the cost information required above, the annual submittal must include updated documentation of the (1) letter from the chief financial officer of the parent company, (2) auditor's special report confirmation of chief financial officer's letter, (3) schedule reconciling amounts in chief financial officer's letter to amounts in financial statements, and (4) parent company guarantee document if changes are required.

[Applicable Amendments: 18, 19, 22, 24]

23. Prior to termination of this license, the licensee shall provide for transfer of title to byproduct material and land, including any interests therein (other than land owned by the United States or the State of New Mexico), which is used for the disposal of such byproduct material or is essential to ensure the long-term stability of such disposal site to the United States or the State of New Mexico, at the State's option.
24. The licensee shall have a contingency plan for responding to unexpected releases of liquids or tailings from the mill facility, tailings impoundments, and lined evaporation ponds and for the accidental release of uranium concentrates during shipment and transport.
25. Release of equipment or packages from the restricted areas for unrestricted release or disposal shall be in accordance with the attachment to SUA-1473 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.
26. Before engaging in an activity not previously authorized by the license, the licensee shall prepare and record an environmental evaluation of such activity. Should the evaluation indicate that such activity may result in a significant adverse environmental impact that was not previously assessed or that is greater than that previously assessed, the licensee shall provide a written evaluation of the activity and obtain prior approval of the NRC in the form of a license amendment.
27. The licensee shall implement an interim stabilization program for tailings areas as specified in the "Tailings Stabilization Report" submitted October 1, 1986, as modified by Section 4.6 submitted by letter dated March 20, 1987. This program shall include written operating procedures and shall prevent or minimize dispersal of blowing tailings to the extent reasonably achievable and in accordance with Criterion 8 of 10 CFR 40, Appendix A. The effectiveness of the control methods used shall be evaluated in accordance with the procedure submitted by letter dated June 17, 1987. Corrective actions taken shall be documented in response to inspection findings.

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The licensee shall adhere to the interim stabilization schedule for cleanup of contaminated areas as addressed in the submittal dated October 15, 1987.

[Applicable Amendments: 4, 7]

28. The licensee is hereby exempted from the posting requirements of 10 CFR 20.203(e)(2) for areas within the mill provided that at all entrances to the mill are conspicuously posted in accordance with Section 20.203(e)(2) and with the words, "Any area within this mill may contain radioactive material."
29. The licensee shall submit a detailed decommissioning plan to the NRC at least six (6) months prior to the planned start of decommissioning activities.
30. Damaged yellowcake drums may be returned for disposal in Tailings Pond No. 2 as described in the licensee's submittals dated January 2 and March 5, 1987, and October 6, 1989. All such disposal shall be documented. In addition, no drums shall be disposed within 150 feet of the dam crest. [Applicable Amendments: 2, 14]
31. The licensee is authorized to process alternate feed materials (raffinate and calcium fluoride sludges) from Sequoyah Fuels Corporation's Gore, Oklahoma facility in accordance with the submittals dated March 31, July 15, and August 6, 1987, and May 15, 1990, with the exception that the yellowcake product shall be maintained in slurry form. [Applicable Amendments: 3, 5, 17]
32. The licensee is authorized to dispose and bury contaminated waste materials resulting from past milling operations into tailings ponds No. 1 and No. 2, in accordance with submittals dated June 10 and August 5, 1987. In addition, the licensee shall adhere to the following requirements. The licensee will maintain detailed disposal records indicating quantities and locations of all waste material disposed in tailings ponds; prior to the disposal of any wastes the licensee shall establish a detailed procedure to describe the handling, preparation, placement and covering of wastes in the specified disposal location; and the licensee shall restrict any disposals in tailings pond No. 2 to locations greater than 150 feet from the dam crest. [Applicable Amendments: 6]
33. The licensee is hereby authorized to inject chemically fortified mine waters in accordance with their July 14, 1987 submittal. The following upper control limits shall be observed: calcium = 35 mg/l, sodium = 253 mg/l, sulfate = 450 mg/l, carbonate/bicarbonate = 303 mg/l, pH = 10.0 standard units. Should any of these limits be exceeded, based upon monthly sampling, the licensee shall immediately suspend injection of chemically fortified waters, notify the NRC, Uranium Recovery Field Office, in writing within 5 days sample for the above parameters on a weekly frequency, and within an additional 25 days, submit a plan to remediate the situation. [Applicable Amendments: 8]
34. The licensee shall implement a ground-water compliance monitoring program containing the following:

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- A. Sample Dakota Sandstone wells 17-01, 30-02, 30-48, 32-45, and 36-06 for antimony, arsenic, beryllium, cadmium, cyanide, lead, molybdenum, nickel, selenium, combined radium-226 and -228, natural uranium, thorium-230, lead-210, gross alpha, chloride, sulfate, nitrate, pH, and electrical conductivity.

Sample Tres Hermanos A wells 31-01 and 33-01 for cyanide, molybdenum, nickel, selenium, radium-226 and -228, natural uranium, thorium-230, lead-210, gross alpha, chloride, sulfate, nitrate, pH, and electrical conductivity.

Sample Tres Hermanos B wells VH19-2, 31-66, 31-67, 36-01, and 36-02 for cyanide, molybdenum, nickel, selenium, combined radium-226 and -228, natural uranium, thorium-230, lead-210, gross alpha, chloride, sulfate, nitrate, pH, and electrical conductivity.

Sample alluvium wells 5-03, 32-59, 31-61, and MW-24 for molybdenum, nickel, selenium, combined radium-226 and -228, thorium-230, natural uranium, lead-210, gross alpha, chloride, sulfate, nitrate, pH, and electrical conductivity.

- B. Comply with the following ground-water protection standards at Dakota Sandstone point of compliance wells 30-02, 30-48, 32-45, and 36-06, with background being recognized at well 17-01: antimony = 0.05 mg/l; arsenic = 0.1 mg/l; beryllium = 0.01 mg/l; cadmium = 0.01 mg/l; cyanide = 0.04 mg/l; lead = 0.14 mg/l; molybdenum = 0.06 mg/l; nickel = 0.03 mg/l; selenium = 0.04 mg/l; gross alpha = 56 pCi/l; combined radium-226 and -228 = 5.0 pCi/l; natural uranium = 0.02 mg/l; thorium-230 = 2.3 pCi/l; lead-210 = 1.9 pCi/l.

Comply with the following ground-water protection standards at Tres Hermanos A point of compliance well 31-01, with background being recognized at well 33-01: cyanide = 0.01 mg/l; molybdenum = 0.03 mg/l; nickel = 0.05 mg/l; selenium = 0.03 mg/l; gross alpha = 18.0 pCi/l; combined radium-226 and -228 = 5.0 pCi/l; natural uranium = 0.01 mg/l; thorium-230 = 4.3 pCi/l; lead-210 = 4.14 pCi/l.

Comply with the following ground-water protection standards at Tres Hermanos B point of compliance wells 31-66, 31-67, 36-01, and 36-02, with background being recognized at well VH19-12: cyanide = 0.01 mg/l; molybdenum = 0.08 mg/l; nickel = 0.06 mg/l; selenium = 0.04 mg/l; gross alpha = 21.0 pCi/l; combined radium-226 and -228 = 7.4 pCi/l; natural uranium = 0.02 mg/l; thorium-230 = 2.2 pCi/l; lead-210 = 0.9 pCi/l.

Comply with the following ground-water protection standards at alluvium point of compliance wells 32-59, 31-61, and MW-24, with background being recognized at well 5-03: molybdenum = 0.06 mg/l; nickel = 0.06 mg/l;

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selenium = 0.05 mg/l; gross alpha = 57 pCi/l; combined radium-226 and -228 = 5.0 pCi/l; thorium-230 = 3.1 pCi/l; natural uranium = 0.06 mg/l; lead-210 = 4.9 pCi/l.

- C. Implement a corrective action program as described in the September 25, 1989, submittal with the objective of returning the concentrations of hazardous constituents to the concentration limits specified in Subsection (B). The program shall, at a minimum, consist of mine dewatering and maintenance and operation of the interceptor trench.
- D. Submit, by August 1 of each year, a review of the corrective action program and its effect on the aquifers.

[Applicable Amendments: 9, 11, 13, 15, 25]

35. The licensee shall submit to the NRC, Uranium Recovery Field Office, copies of all correspondence with the New Mexico Environmental Improvement Division.
[Applicable Amendments: 11]

36. The licensee is authorized to dispose of byproduct material waste from the Rio Algom Mining Corp. Smith Ranch in-situ leach facility in accordance with the submittals dated February 19, 1990, and September 26, 1991, with the following modifications or additions:

- A. The written procedures included in the February 19, 1990, submittal shall be reviewed and revised in accordance with License Condition No. 14.
- B. Prior to disposal of drums containing sludge material, the licensee shall obtain written confirmation from Rio Algom Mining Company that the drums have been verified to be full or the verification shall be performed by Ambrosia Lake personnel.
- C. Drums containing wastes other than sludges shall be opened and the wastes disposed directly into excavated trenches.
- D. All disposal activities shall be documented.

[Applicable Amendments: 16, 23]

37. The licensee shall reclaim the disposal area as stated in the September 24, 1990, submittal as supplemented by the following conditions. Though recognized as conservative, these conditions were assumed when evaluating the acceptability of the reclamation plan as submitted, and are identified pending submittal of acceptable design alternatives. Justification for any design alternatives must be submitted for NRC review and approval prior to implementation.

- A. The radon barrier shall be constructed as specified in the licensee's September 28, 1990, submittal. Prior to placement of any material onto

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the interim cover, the procedure defined in the licensee's October 4, 1990, submittal for establishing the integrity of the in-place material must be performed.

- B. DELETED by Amendment No. 19.
- C. The relocated contaminated material shall be placed in lifts not to exceed 12 inches and compacted to at least 90 percent of the maximum standard dry density after a stable work base has been established.
- D. In place density and moisture, laboratory compaction, soil classification, and rock quality testing shall be performed in accordance with the licensee's September 24, 1990, submittal. If test procedures other than the sand cone test or oven dry moisture are used in the construction quality control, procedures that will be used to establish correlation between the tests must be submitted for NRC review and approval prior to implementation.
- E. A detailed cover design for Ponds 11-21 must be submitted for NRC review and approval. All contaminated materials in Pond 3 that are not covered by the reclaimed Pond 1 outslope shall be relocated to Pond 2 unless an erosion protection plan is submitted for NRC review and approval.
- F. The settlement survey data shall be submitted for NRC review and approval prior to placement of the radon barrier on the interim cover.
- G. The fresh water dam (mill reservoir) must be breached during final reclamation activities.
- H. Settlement monuments shall consist of a steel bar welded to a 1-foot square steel plate, or equivalent, placed at least 3 feet below the surface.
- I. The fill associated with the Pond 1 spillway shall be constructed to the same specifications and quality control program as the radon barrier material.
- J. If a rock source is selected other than the La Cuchilla Ridge source, the licensee shall submit the results of durability tests as outlined in the draft Staff Technical Position on Design of Erosion Protection, August 1989, for NRC review and approval prior to placement of any of the material.
- K. All riprap shall be placed in a manner that prevents segregation of the material. The material placed shall be reasonably well graded and shall be within the following gradation specifications.

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$D_{50} = 1"$

$D_{50} = 2"$

Sieve Size	Percent Passing (by weight)
2 inch	100
1 inch	16-50
3/4 inch	2-30
1/2 inch	0-10

Sieve Size	Percent Passing (by weight)
4 inch	100
3 inch	66-100
2 inch	18-50
1 inch	0-10

$D_{50} = 2.8$ inch

$D_{50} = 3.2$ inch

Sieve Size	Percent Passing (by weight)
5 inch	100
4 inch	50-100
3 inch	25-58
2 inch	2-28
1 inch	0-5

Sieve Size	Percent Passing (by weight)
6 inch	100
5 inch	78-100
4 inch	35-100
3 inch	12-45
2 inch	0-20

$D_{50} = 7.7$ inch

Sieve Size	Percent Passing (by weight)
13 inch	100
12 inch	80-100
10 inch	49-100
8 inch	26-54
6 inch	7-32
4 inch	0-13

- L. A minimum 6-inch bedding layer with a D_{50} of 1 inch shall be placed under all riprap on the disposal area having a D_{50} of two (2) inches or larger.

The bedding material shall be reasonably well graded to prevent migration of the base material into the riprap. The quality of the bedding material shall be equivalent to that of the riprap.

- M. A riprap filled toe trench shall be placed on the west side of Pond 2 where the existing steep slopes transition onto the flatter surface of Pond 2.

The licensee shall submit a proposed design of the trench for NRC review and approval prior to construction.

- N. The spillway riprap shall be extended 45 feet onto the top of Pond 1 to prevent erosion.

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0. Riprap with a D_{50} of one (1) inch shall be placed in all areas of the South Diversion Ditch which are not excavated in rock.

[Applicable Amendments: 18, 19]

38. The licensee is authorized to perform yellowcake drying in accordance with the submittal dated October 22, 1990. In addition to commitments contained in the October 22 submittal, the licensee shall comply with the following:

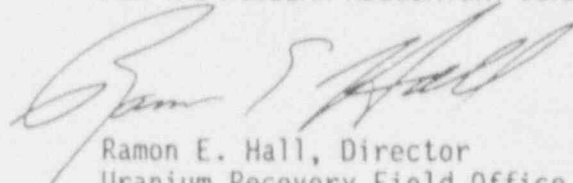
- A. Air sampling used to determine the exposure of yellowcake operators to airborne uranium shall include breathing zone sampling at the yellowcake barrelling station.
- B. Water flow rates for the wet scrubber servicing the yellowcake dryer shall be checked and recorded hourly during operation and a range of flow rates established which assure optimum performance of the scrubber.
- C. Detailed inspection, cleaning, and needed preventive maintenance shall be performed and documented at least annually on all yellowcake area emission control equipment.
- D. Written procedures shall be reviewed and approved in accordance with License Condition No. 14.

[Applicable Amendments: 20]

39. The licensee shall conduct an annual survey of land use (grazing, residences, water supply wells, etc.) in the area within two miles of the mill and submit a report of this survey annually to the NRC, Uranium Recovery Field Office. This report shall indicate any differences in land use from that described in the licensee's previous annual report, and shall specifically address occupancy of the Berryhill Ranch. The report shall be submitted by July 1 of each year.

[Applicable Amendments: 21]

FOR THE NUCLEAR REGULATORY COMMISSION


Ramon E. Hall, Director
Uranium Recovery Field Office
Region IV

Dated: 7 Dec. 1992