Quivira Mining Company

November 20, 1995

Certified Mail
Return Receipt Requested Z 442 636 852

Mr. Joe Holonich
Uranium Recovery Branch
Division of Low Level Waste Management & Decommissioning
Mail Stop T7J9
11555 Rockville Pike
Rockville, MD 20850

Re: Ambrosia Lake Facility
License SUA-1473, Docket No. 40-8905
Byproduct Disposal

Dear Mr. Holonich:

Quivira Mining Company requests an amendment to the above referenced license to accept and dispose of byproduct material as defined by Section 11(e)(2) of the Atomic Energy Act. The purpose of this amendment is to allow authorization to receive and dispose of de-minimis quantity of byproduct material on tailings impoundment #2. Quivira proposes that the de-minimis disposal quantity for a generator of byproduct material, other than in-situ leaching facilities, be limited to 10,000 yard^3 per year.

As described in detail in the attached enclosure, all materials will be properly managed, placed, and disposed with no significant adverse environmental impacts. The addition of a generator's 10,000 yard^3 per year quantity is minimal in comparison to the 16 million tons of capacity available for storage on tailings impoundment #2 and in comparison to the 33 million tons of tailings material already at the site.

This amendment request is consistent with NRC's goals to avoid the proliferation of small waste disposal sites pursuant to Criteria 2, disposal of wastes with similar physical, chemical and radiological characteristics pursuant to 6A of 10 CFR §40, Appendix A; and with NRC's position regarding byproduct material from in-situ leach facilities.(1)

Thus, consistent with Commission policy, goals and regulations, Quivira proposes a new amendment, condition #41, to read as follows to provide for the disposal of byproduct materials at the Ambrosia Lake facility:

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(1) U.S. Nuclear Regulatory Commission, Final "Position on Disposal of In Situ Wastes", September 13, 1991.

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*"41. In accordance with the licensee's submittal dated November 20, 1995, the licensee is hereby authorized to dispose of byproduct material or such materials that are similar in physical, chemical, and radiological characteristics to the tailings material and associated wastes already within the impoundment subject to the following:

A. The facility is authorized to dispose of up to a cumulative quantity of 10,000 cubic yards of material per year from each generator other than in-situ leach facilities, provided Quivira obtain written approval from NRC on a individual basis for each specific generator whose material has a higher total activity level than the Ambrosia Lake mill tailings. Information submitted in support of a specific disposal request shall include the physical, radiological, and chemical characteristics of the byproduct material and shall address potential impacts to the tailings reclamation plan.

Disposal of byproduct material from in-situ facilities does not require specific authorization from the NRC.

B. All contaminated equipment shall be dismantled, crushed, perforated or placed to minimize void spaces. Barrels shall be verified to be full prior to disposal. Barrels not completely full shall be either filled or emptied prior to final disposal.

C. All disposal activities shall be documented. The documentation shall include a description of the byproduct material and the disposal locations."*

Quivira would appreciate your short term attentiveness on this matter. If you have any questions regarding this amendment request, please contact me at (405) 842-1773.

Sincerely,

Bill Ferdinand

Bill Ferdinand, Manager
Radiation Safety, Licensing &
Regulatory Compliance

Attachments: Three (3) Copies

xc: T. Fletcher (QMC-Ambrosia Lake)
M. Freeman (QMC-OKC)
P. Luthiger (QMC-Ambrosia Lake)
R. Ohrbom (NMED-Santa Fe)
R. Powell (QMC-Ambrosia Lake)
NRC - (Division of Radiation Safety and Safeguards) Arlington, Texas
file

QUIVIRA MINING COMPANY

AMBROSIA LAKE, NEW MEXICO
SUA-1473, DOCKET 40-8905

BYPRODUCT DISPOSAL REQUEST

November 1995

BYPRODUCT DISPOSAL REQUEST

Introduction

Quivira Mining Company requests NRC's approval to accept and dispose of byproduct material as defined by Section 11(e)(2) of the Atomic Energy Act, at its Ambrosia Lake tailings facility. In conjunction with this proposal, Quivira proposes that the annual de-minimis quantity for each generator, other than for in-situ leaching facilities, be established as 10,000 yards^3. There would be no limiting quantity from in-situ leaching facilities.

The approval of this request is consistent and in conformance with NRC regulations to avoid the proliferation of small waste disposal sites and disposal of wastes with similar physical, chemical, and radiological characteristic as stated within Criteria 2 and 6A respectively, along with NRC's position regarding byproduct disposal from in-situ leach facilities.(1)

Material Types

Quivira's facility at Ambrosia Lake is the nation's largest uranium ore processing facility and was supported by nine (9) underground uranium mines with additional custom toll milling. Due to sustained depressed market conditions however, the Ambrosia Lake mill and mines have been placed on standby status pending better market conditions. The facility is licensed to possess byproduct material in accordance with condition #12 in the form of uranium process tailings or other wastes generated by the licensee's uranium processing operations. To date, the facility has produced approximately 33 million tons of tailings that were placed in two (2) tailings impoundments.

The facility is also authorized by condition #36 to accept and dispose of byproduct wastes from the Company's Wyoming in-situ leach facility as well as damaged yellowcake drums from Sequoyah Fuels Corporation pursuant to condition #30. The materials proposed to be accepted for disposal would be similar to these materials and to the tailings already found at the Ambrosia Lake facility.

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(1) U.S. Nuclear Regulatory Commission, Final "Position on Disposal of In Situ Wastes", September 13, 1991.

The materials to be accepted for permanent disposal at the Ambrosia Lake facility will be byproduct material as defined by Section 11 (e)(2) of the Atomic Energy Act. Material which could be defined as "mixed waste" will not be accepted for disposal at the Ambrosia Lake facility. Byproduct material that may be accepted for disposal at the Ambrosia Lake facility includes but is not limited to:

1. Uranium and thorium ores and their processing residues;
2. Contaminated soils;
3. Contaminated plant equipment including structural steel, pipes, cement, etc.
4. Evaporation pond liners and associated residues;
5. Groundwater restoration residues.

Quivira proposes the quantity of byproduct materials other than in-situ leaching material, be limited to 10,000 yard^3 per year per facility generating such materials, unless specific NRC approval is granted for accepting larger quantities. All material accepted for disposal at the facility will be free of all standing liquids. The acceptance and disposal of the non in-situ leaching byproduct wastes or other material similar in physical, chemical and radiological characteristics of the tailings will be conducted on a case by case basis to assure compatibility at the Ambrosia Lake facility. NRC approval will be obtained prior to receipt and disposal of any such material that has an activity level greater than the Ambrosia Lake mill tailings.

Radiological Characteristics

The material accepted for disposal will be radiologically compatible with the tailings material at the Ambrosia Lake facility. It is anticipated the radiological components of the byproduct material will be primarily natural uranium and thorium products including their decay products such as radium-226/228. Quivira estimates the material will generally have a weighted average concentration of radium-226 and radium-228 of approximately 400 pCi/gram. The activity based on a 10,000 yd^3 quantity at this radium concentration is equivalent to approximately 5.0 Curies per year. For comparison, at the Ambrosia Lake site, the slime areas within the 33 million tons of tailings have an average radium-226 concentration in access of 1100 pCi/gram.

Put into perspective, an additional 10,000 yd^3 of the material when added to the existing tailings impoundments represents only a 0.0003 fraction of the total existing radium activity within the tailings impoundments. Further, the additional 10,000 yd^3 represents only a 0.0006 fraction of remaining disposal capacity at the facility. As clearly indicated, the activity and amount added to the existing tailings impoundments in the de-minimis 10,000 $yard^3$ quantities would be relatively immeasurable and upon reclamation would be indistinguishable from present activity.

Reclamation Considerations

NRC approval to accept the material for disposal at Ambrosia Lake will not impede or delay on-going reclamation activities at the site pursuant to the U.S. Environmental Protection Agency's (EPA) and NRC's Memorandum of Understanding (MOU) for final closure of existing tailings impoundments.[2]

The material being proposed for disposal at the Ambrosia Lake site will be placed in earthen cells constructed on top of the finished NRC approved radon attenuation cover system on impoundment #2. A general disposal cell plot schematic with a final 5:1 outslope is shown on Figure 1. The location of the earthen cell(s) will be on the east side of tailings impoundment #2 and abut tailings impoundment #1. For economics considerations during cell construction, the cell will be generally built to contain more than a single de-minimis quantity.

Prior to constructing any of the earthen cells to receive the material, the approved radon cover system that has been constructed on impoundment #2 will be tested using Method 115 or other acceptable methodology to determine compliance with the radon flux standard of 20 pCi/m^2/second, in accordance with NRC's regulations at 10 CFR §40, Criteria 6 and 6A,[3] and EPA's 40 CFR §192 regulations.[4]

Although a conceptual reclamation plan is described below, upon cessation of disposal activities, a final reclamation plan for the disposal areas will be submitted to NRC for approval

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[2] Federal Register, Friday, October 25, 1991, Volume 56, Number 207, Page 55434.

[3] Id. at 1.

[4] Federal Register, EPA Final Rule, Health and Environmental Standards for Uranium and Thorium Mill Tailings, November 15, 1993, Volume 58, Number 218, Page 60340.

prior to placement of the final cover. Information which will be submitted includes drawings, calculations, analyses, and a list of materials placed in the disposal areas.

At present, since the surface of tailings impoundment #2 is approximately 20-25 feet below the surface of impoundment #1, the final reclamation plan conceptually consist of placing disposed material into the cell leaving room for placement of the final radon attenuation cover. This includes the placement of an impermeable layer on top of the material to prevent infiltration of precipitation into the underlying material.

Upon placement of the appropriate radon attenuation cover, the reclaimed disposal cell will have a relatively flat grade dipping towards the west. This will assure that all run-on from precipitational events will flow onto tailings impoundment #2 rather than tailings impoundment #1. This will assure that there will be no change in the runoff quantities on the surface of either tailings impoundment #1 or #2. This will eliminate any need to change or modify the NRC approved reclamation run-off designs for tailings impoundment #1 and #2 since there are no changes in flow characteristics or the precipitational run-on quantities.

All outslopes on the constructed cell(s) upon final reclamation will have a minimum grade of at least 5:1 and be appropriately protected with the necessary long term erosion cover.

There will be no groundwater impacts as the material accepted for disposal will be free of any standing fluids. Additionally, as a further precaution to minimize the potential for any groundwater impact, the bottom of the disposal cells will have at a minimum, a total layer of 1 foot of impermeable clay. This will prevent any solutions from infiltrating into the tailings material which could potentially recharge the tailings and mobilize some of its constituents. Thus, the disposed material will be encapsulated with a layer of impermeable material to prevent any infiltration into or from the constructed cell.

Bulk byproduct material such as ISL sludges, contaminated soils, or other similar material which are contained in full barrels will be placed within the disposal cell. Barrels which are not full of the bulk material will be opened and either filled with additional material or emptied with the material placed within the cell in a manner to assure voids are minimized so it will not impact final reclamation of these areas. Barrels containing material such as pipes, valves or other such items will be opened and crushed, dismantled or spread within the disposal area in a tight and compact manner to assure voids are minimized. A record of all materials received and disposed will be prepared and maintained on-site for inspection and for future reference.

All material accepted for disposal under this amendment will be delivered to the Ambrosia Lake facility in exclusive use vehicles. The shipper and carrier will assure that all applicable Department of Transportation (DOT) regulations for the transport of Low Specific Activity (LSA) material will be used in loading, surveying, transport and unloading of the byproduct material. In the unlikely event of a transportation accident, Quivira maintains an "Accident Response Team" that may be used in assisting the remediation of such an event, using the procedures outlined in Quivira's "Transportation Accident Response Guide". A copy of this guide is attached in Appendix A.

Unloading of the packages and material at the Ambrosia Lake site will be by Quivira personnel. After unloading of the material and prior to release, the transport vehicle will be surveyed for radioactive contamination. If the vehicle is being maintained as an exclusive use vehicle, the vehicle shall be released or returned to service only if the external dose rate at the accessible surfaces of the vehicle are below 0.5 millirem/hour and removable radioactive surface contamination is below 2,200 dpm/100 cm^2 as required by DOT regulations at 49 CFR §173.443.

If the carrier has completed the contractual obligations as an exclusive use carrier and is being released for other unconditional use, contamination limits as specified in Regulatory Guide 8.30 shall apply. Specifically, these limits are:

Average	
5,000 dpm alpha per 100 cm^2	Averaged over no more than 1 $meter^2$
Maximum	
15,000 dpm alpha per 100 cm^2	Averaged over no more than 100 cm^2
Removable	
1,000 dpm alpha per 100 cm^2	Determined by smearing with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the smear.

If decontamination procedures are needed to reduce the contamination to acceptable levels, the decontamination will be performed on-site by personnel designated by the facility RSO. Appropriate protective measures including the use of radiological respirators, protective clothing, lapel samplers, and bioassays shall be determined by the RSO based on the nature and

severity of the contamination. All transportation documents and records will be stored on-site for future reference.

The potential risks associated with a transportation accident would be minimal. An independent and conservative dose assessment conducted by Pacific Northwest Laboratory analyzing an application for disposing of 500,000 tons per year of similar material indicated a negligible dose to an off-site resident of only 5e-7 mrem, well below the general public limit of 100 mrem/year.[5]

Handling of Byproduct Material

Material to be disposed of at the Ambrosia Lake facility will be handled in accordance with the Quivira's Standard Operating Procedure entitled "Handling/Disposal of Byproduct Material and Contaminated Waste". A copy of this SOP is attached in Appendix B. This SOP is used for handling byproduct material and for ISL waste from the Company's ISL project in Wyoming which NRC has approved for disposal at the Ambrosia Lake facility.

Upon approval of this request by NRC, this SOP will be revised to address any new transportation routes and to incorporate other changes as needed to maintain the program and exposures ALARA.

Health Physics and Environmental Monitoring

Quivira personnel are experienced and knowledgeable in the handling and disposal of byproduct material as noted by our present license conditions #30, #32, and #36. These NRC approved license conditions provide for the disposal of damaged yellowcake drums, the disposal of contaminated waste materials from uranium milling operations, and the acceptance and disposal of ISL wastes from the Smith Ranch facility respectively. Further, Quivira was authorized and managed, with NRC's approval, to receive and dispose of uranium mill tailings from Hecla Mining Company's Johnny M mine near San Mateo, New Mexico.

The materials for which approval is being requested by Quivira for disposal are very similar and analogous to the tailings material already at the site and the materials approved in

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[5] Final Environmental Impact Statement to Construct and Operate a Facility to Receive, Store and Dispose of 11e.(2) Byproduct Material Near Clive, Utah, Docket No. 40-8989

55 gallons drums and sealed crates. Since contamination should be absent on the external surfaces of the containers, we do not expect an increase in occupational exposures resulting from the disposal of the requested materials. Thus, the existing health physics and environmental programs presently in-place will be used in the handling of the materials as they provide the necessary monitoring and reporting requirements to assure the material is disposed of safely. Additionally, in the unlikely event of contamination, existing SOP procedures along with the facility's health physics policies will maintain exposures ALARA.

Environmental Impact

The disposal of the requested material at the Ambrosia Lake facility will not result in any significant adverse environmental impacts nor result in the delay or hinderance of on-going reclamation activities. The potential for groundwater problems are negligible and pose no threat to the environment as the material will be free of standing liquids coupled with the fact that the bottom of the disposal cells will be constructed with a minimum 1 foot impermeable clay layer. Further, the disposed material will be capped and additionally protected with an impermeable layer as part of the final radon attenuation layer.

In regards to the radiological characteristics of the material, the quantity and activity added to the existing impoundment would be relatively immeasurable with the additional material presenting no significant adverse affect to the environment.

There should be no increase in the radon releases from the site since the material will be; (1) disposed over the reclaimed tailings; (2) contained in seals drums or crates; and (3) capped with the appropriately designed and placed final radon attenuation and erosion protection cover to assure compliance with the radon flux standard of 20 pCi/m^2/second. Thus, it is believed approval of the proposed action will not adversely impact the environment or detract from on-going reclamation activities.

Conclusion

Quivira believes this license amendment request is in conformance with NRC regulations and policies. The NRC's approval of the Quivira's request to accept byproduct material at the Ambrosia Lake facility would be in accordance with and would further the intent of Criteria 2

regulations in Appendix A of NRC's 10 CFR §40, namely to avoid the proliferation of small waste disposal sites. Criteria 2 states:

> *"Criterion 2 - To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contamination control processes, and wastes from small remote above ground extraction operation must be disposed of at existing large mill tailings disposal sites; ..."* [Emphasis Added]

Further, we believe NRC's approval to accept and dispose of byproduct material which is similar in physical, chemical, and radiological characteristic to that of tailings would be in conformance with NRC's regulations at Criteria 6A that:

1. The disposal will have no significant additional effects on public health and safety, and the environment;

2. The disposal will not compromise the reclamation of the tailings impoundments and will comply with the reclamation and closure requirements in 10 CFR §40, Appendix A;

3. The disposal will not result in the tailings impoundment becoming subject to the Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); and

4. The U.S. Department of Energy (DOE) or the State is obligated to take title to the site upon completion of reclamation. DOE is on record and has stated that material similar in physical, chemical and radiological characteristics should be authorized for disposal at uranium mill tailings sites stating the technical, economic, and health and safety considerations justify this action and that DOE would accept remediated sites containing these wastes.[6] DOE has subsequently stated to NRC that DOE's specific concurrence on disposal of such

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[6] Letter From Mr. R.P. Whitfield, Associate Director, Office of Environmental Restoration, Department of Energy, to Mr. Richard Bangert, Director, Division of Low-Level Waste Management and Decommissioning, Nuclear Regulatory Commission, dated November 16, 1990.

can determine the appropriateness of the waste material for placement into existing impoundments.[7]

The approval of Quivira's request to dispose of ISL wastes, other similar byproduct wastes, and materials which are similar in physical, chemical, and radiological characteristic will not result in a significant adverse impact to the environment nor significantly change the type of material presently on-site. Further, the disposal of this material at the facility is consistent with the impoundment's original design capacity to dispose of such materials. As such, the placement of this de-minimis quantity of material will not change the approved radiological or environmental impact considerations for Ambrosia Lake disposal facility.

Further, there will be no significant change or increase of radiation exposures to the members of the public and our employees. Based on these considerations and others previously discussed, Quivira requests NRC's approval of the proposed license amendment and a finding that this action falls within the categorical exclusion contained with 10 CFR §51.22 (c)(11) and does not meet the requirements of the criteria of 10 CFR §51.60(b)(2).

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[7] Letter from Mr. Ralph Lightner, Director, Office of Environmental Restoration, Department of Energy, to Mr. Paul Lohaus, Chief, Operations Branch, Division of Low Level Waste and Management and Decommissioning, Nuclear Regulatory Commission, dated December 21, 1990.