40-8905

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 19, 1996

Mr. Frank C. Thorley
Regulatory Affairs Manager
Envirocare of Utah, Inc.
46 West Broadway, Suite 240
Salt Lake City, Utah 84101

SUBJECT: DISPOSAL OF BYPRODUCT MATERIAL AT AMBROSIA LAKE SITE

Dear Mr. Thorley:

I am responding to your letters to Mr. Stuart Treby, dated May 2 and June 27, 1996, as discussed in Mr. Treby's letter to you dated July 29, 1996. Your letters requested information pertaining to Quivira Mining Company's (QMC) November 20, 1995, request to amend Materials License SUA-1473 to dispose of 11e.(2) byproduct material at its Ambrosia Lake site near Grants, New Mexico.

The U.S. Nuclear Regulatory Commission staff is presently reviewing QMC's amendment request, and has not yet arrived at any decision concerning the amendment. At this time, it is the staff's intention to prepare an Environmental Assessment for the amendment, and the staff is waiting on data requested from QMC.

Based on the staff's discussions with QMC, an average volume limit for all generators of 100,000 yds^3 per year of byproduct material, excluding in-situ material, has been proposed by QMC (QMC letter dated May 9, 1996). No specific limit on the total amount of material which could be accepted by QMC has been determined at this time. It is the staff's understanding, based on discussions with QMC, that "generator" for the purposes of the 10,000 yds^3 per year per generator means specific facility generating or possessing the material.

The requirements and regulations for licensing the disposal of 11e.(2) byproduct material have not changed since the licensing of the Envirocare facility, and the same licensing standards will be applied to the QMC amendment request. However, it is not the staff's intent to require QMC to repeat the licensing process for activities previously reviewed and approved, and covered by its present license.

Copies of QMC's November 20, 1995, letter requesting a license amendment to accept and dispose of byproduct material, and QMC's May 9, 1996, letter responding to NRC staff questions concerning the amendment, are enclosed for your information.

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If you have any questions regarding the content of this letter, please contact Kenneth Hooks, the NRC Project Manager for QMC's Ambrosia Lake facility, at (301) 415-7777.

Sincerely,

/s/ Daniel Gillen For J. Holonich

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket 40-8905
License SUA-1473

Enclosures: As stated

cc: W. Ferdinand, QMC
J. Curtiss, Winston & Strawn
R. Ohrbom, NMED

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Quivira Mining Company

May 9, 1996

Certified Mail
Return Receipt Requested P 144 785 067

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:

Please find enclosed clarification to the items noted by NRC during our public meeting of April 10 and NRC's letter dated April 18. These clarifications are indexed to the items included to the April 18 letter along with questions presented during discussions with NRC representatives Mr. Ken Hooks and Ms. Elaine Brummett.

We continue to appreciate your attentiveness on this matter and if you have any questions regarding these clarifications, please contact me at (405) 842-1773.

Sincerely,

Bill Ferdinand

Bill Ferdinand, Manager
Radiation Safety, Licensing &
Regulatory Compliance

140175

Attachments: As Stated

xc: J. Curtiss (Winston & Strawn-Washington D.C.)
R. Draper (Winston & Strawn-Washington D.C.)
T. Fletcher (QMC-Ambrosia Lake)
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QUIVIRA MINING COMPANY
CLARIFICATION REQUEST
REGARDING DE-MINIMIS BYPRODUCT DISPOSAL

NRC Clarification #1

Maximum average Ra-226 level per two foot layer, assuming the uranium chain in equilibrium.

Clarification

NRC staff indicated during the April 10 meeting that they had thought the material was to be spread out in the disposal area and subsequently covered with earth. Thus, the reason for this request.

Please note however, that this is not the primary mechanism proposed for placement and disposal of the material within the disposal area. As stated in our April 10 meeting and presented in Quivira's November 20, 1995, amendment application, most of the byproduct material is expected to be received in sealed 55 gallon drums and/or crates as Low Specific Activity (LSA) exclusive use shipments. The material to be included within these sealed containers includes such items as uranium/thorium processing residues, contaminated soils, or other similar earthen Section 11e.(2) byproduct materials. These sealed drums and crates will normally be placed intact with their contents directly into the proposed disposal area.

The types of material which Quivira does not expect to be contained within sealed drums or crates within the disposal area, are contaminated solid byproduct items such as pumps, process equipment, cement, pipes, and similar non-earthen byproduct materials. As stated in the application, this material will be crushed, dismantled, and/or spread within the disposal area in a tight compact manner to assure voids are minimized.

To minimize voids, all pipes or other conduits which exceed 6 inches in diameter and which cannot be compressed or crushed by dozer equipment (i.e. thin walled material such as aluminum pipes and conduit) will be cut open to minimize voids. The material will then be placed flat within the burial area where they will be crushed to the extent possible by a dozer. When such material reaches a thickness of two (2) to three (3) feet, clean fill will be brought in and worked into the material to fill the voids. This process will be utilized for each layer of this type of equipment/material to be disposed.

As provided for and discussed as part of the disposal application (see Appendix B, Standard Operating Procedure for Handling Byproduct Material), in the event that a package is damaged during transportation or placement within the disposal area, to the extent that significant radionuclide release is possible, the waste material will be immediately covered with a minimum topping of one (1) foot of clean cover material.

NRC Clarification #2

Radon flux estimate.

Clarification

As indicated during the meeting, due to the disposal procedures to be employed by Quivira, the radon flux during disposal operation is anticipated to be negligible since the material will be contained in sealed drums and crates preventing radon emanation into the atmosphere or will be covered with soil as discussed above.

In regards to long term reclamation and final disposal radon flux evaluations, Quivira states in its application that the byproduct material will generally have an estimated weighted average concentration of radium-226/radium-228 of approximately 400 pCi/gram. In comparison, the average slime areas within the impoundments have an average radium-226 concentration in excess of 1100 pCi/gram. Because this is only an estimate of the average concentration of the material to be disposed, Quivira states in its application that it will submit a final reclamation plan for the disposal area to the NRC for its review and approval prior to the placement of the final radon attenuation cover. This reclamation plan would contain the actual characteristics of both the cover and waste material to assure the appropriate long term disposal design to meet the radon flux standard. Information submitted as part of the proposed design would included the characteristic analyses of materials (including radium/thorium content), geotechnical calculations such as the modelled radon flux, rock protection designs and other necessary engineering analysis, reclamation drawings and other necessary support information.

NRC Clarification #3

Cost estimate for decommissioning surety.

Clarification

As stated during our meeting, Quivira is already specifically required by license condition #22 to provide for the necessary reclamation/decommissioning surety to cover the estimated reclamation costs if performed by a third party. Condition #22 specifically

states that the surety update is required for the *"reclamation of **any** tailings or waste disposal areas."* [emphasis added]. Thus, Quivira would revise the estimated surety costs as part of the annual update to the surety as required by license condition #22.

The surety update would be based on Quivira's disposal application which states that the material to be disposed would have an activity level no greater than the material already disposed at the Ambrosia Lake tailings impoundments. Therefore, the estimated reclamation costs to construct the appropriate radon attenuation blanket would be based on using the existing average slime radium-226 content of the tailings impoundments (1100 pCi/gram) and using the same radon attenuation cover materials and armor protection already approved by the NRC for reclamation of the tailings impoundments.

NRC Clarification #4

Yearly volume and activity limit (only for Ra-226 if equilibrium and no radionuclides)

Clarification

As proposed, the quantity of material would be limited to 10,000 yards^3 per year per generator, except for in-situ leaching facilities, for which there would be no limiting quantity. This is consistent with NRC previous policy and licensing actions on de-minimis disposal applications. Quivira, however, would have no objection to NRC including as a condition for the amendment, an average volume limit of 100,000 yards^3 per year, excluding in-situ leaching facilities.

The activity limit of the material to be disposed as stated in the application, would be similar to that already found at the Ambrosia Lake facility. Thus, the material to be disposed would have a maximum average activity concentration of 1100 pCi/gram (or less) of radium-226, which is the average activity of slime material within the tailings impoundments.

NRC Clarification #5

Any changes to existing health physics and material handling site operating procedures

- Additional receipt inspection/radiation surveys
- Storage time of material
- Criteria for posting any areas as radiation areas

Clarification

As provided in Appendix B of the application, material to be disposed of at the Ambrosia Lake facility will be handled in accordance with Quivira's Standard Operating Procedure (SOP) for handling/disposal of byproduct material. This SOP is used for handling and disposing of approved byproduct material as already authorized by NRC in license conditions #30 (damaged yellowcake drums), #32 (contaminated wastes) and #36 (Smith Ranch ISL wastes).

Please also note that the application states that upon approval of this request by NRC, this SOP would be revised to address any new transportation routes and to incorporate other changes as needed to maintain the program and exposures ALARA.

Specifically however, in regards to additional receipt inspection/radiation surveys, Quivira will continue to conduct and retain for future review, the receipt inspection and radiation surveys that it performs for the conveyance of Low Specific Activity (LSA) exclusive use shipments to assure compliance with the Department of Transportation (DOT) regulations at 49 CFR §173.441 and §173.443. As part of these surveys, as provided by the SOP, should contamination be found upon arrival based upon these receipt surveys, all contamination on the transportation vehicle will be cleaned to comply with NRC Regulatory Guide 8.30.

Please note the containers received for final disposal will have been cleaned so as to meet the DOT conveyance requirements for LSA material for exclusive use transportation. As such, the possibility of contamination release should be minimal.

Quivira will also continue to perform release inspection/radiation surveys to assure that if the transport is to remain as an exclusive use vehicle, the vehicle is not released or returned to service until it is below the prescribed contamination limits as dictated by 49 CFR §173.443. If the carrier has completed its contractual obligations as an exclusive use carrier and is being released for other unconditional use, the contamination limits for release will be as specified in Regulatory Guide 8.30.

In regards to storage time of material, the SOP provides for unloading the laden directly into the approved disposal site or when temporary storage is necessary, within the designated storage area located within the security fenced area of the warehouse. Access into the locked storage area is controlled by Quivira personnel 24 hours a day. For

convenience, a copy of Plate 1 from the byproduct handling SOP showing the temporary storage area, is attached in Enclosure 1 of this package.

As indicated by the SOP, if containers are to be temporarily stored rather than placed in the disposal area when unloaded, the materials are disposed at the discretion of the general manager. Typically, this will be within 90 days from the initial unloading.

Lastly, regarding the criteria for posting any areas as radiation areas, this is a specific NRC regulatory requirement as prescribed at 10 CFR §20.1902 (a). As such, any areas which could result in an individual receiving a dose equivalent in excess of 5 millirem per hour at 30 centimeters from the source would be posted as a "Radiation Area". This would also include posting the temporary storage area if the material meets this requirement.

NRC Clarification #6

Additional requirements for ground-water monitoring for new material.

Clarification

Quivira does not propose any additional groundwater monitoring for the reasons presented in the application and subsequently approved by the New Mexico Environment Department (NMED). Additional groundwater monitoring is unnecessary in consideration of the fact that; (1) the disposed material will normally be contained in sealed drums and crates which will be free of any standing liquids; (2) the disposal area will be lined with 1 foot of impermeable clay material (Mancos shale) preventing any solutions from infiltrating into the tailings material; (3) upon closure of the disposal area, the area will be encapsulated with a layer of impermeable material (Mancos shale or other similar clay material) to prevent any infiltration into the reclaimed cell; and (4) the existing and approved NRC groundwater monitoring system for the tailings impoundments will fully encompasses the disposal and already provides for the necessary monitoring.

Due to these considerations, and recognizing that the facility already has an active groundwater monitoring program, additional sampling should not be necessary.

NRC Clarification #7

Potential for increased off-site releases due to disposal of dry materials.

Clarification

As noted in the application, there is little or no additional potential for off-site releases from the proposed activity as the material will normally be contained in sealed drums and crates thereby preventing dusting conditions. Further, in the event that earthen material is not from sealed drums or crates, or must be removed from its container, as noted within the application's SOP, such material would be covered with approximately 1 foot of clean fill material at the end of the work day. Thus, Quivira believes there is little potential for increased off-site release due to the disposal of the material.

NRC Clarification #8

Procedure for ensuring no free standing liquids are in material received.

Clarification

Quivira would employ the Environmental Protection Agency's Paint Filter Liquid Test (SW-846, Method 9095) to ensure there are no free standing liquids for de-minimis shipments received under this proposal.

NRC Clarification #9

Procedure/tests for assuring that the material is 11e.(2).

Clarification

Prior to contracting for the disposal of any material at the Ambrosia Lake site, the material's owner would be required to demonstrate through documentation or through NRC concurrence that the material is classified under the Atomic Energy Act as Section 11e.(2) material, as amended by the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), as specifically being 11e.(2) byproduct material. Under the AEA statute, Section 11e.(2) material is defined as:

> *"tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content."*

If there are questions in regards to its official classification, the material will not be accepted nor placed in the disposal area until sufficient documentation is provided or NRC has concurred in the Section 11e.(2) designation.

Quivira would like to re-iterate that the only materials which will be accepted for permanent disposal at the Ambrosia Lake facility will indeed be Section 11e.(2) byproduct material including items such as:

- Uranium and thorium ore processing residues;
- Contaminated uranium/thorium soils from the processing of these ores;
- Contaminated plant equipment including structural steel, pipes, cement, etc. resulting from the processing of uranium/thorium ores;
- Groundwater restoration residues from NRC approved Corrective Action Programs.

NRC Clarification #10

Demonstration that current Environmental Report (ER)/ ER Supplement bound new operations.

Clarification

Quivira wishes to reference its Supplemental ER presented to NRC on February 12, 1993. As demonstrated in the supplemental ER, the proposed action is clearly de-minimis and is more than adequately "bounded" by the supplemental ER review.

The supplemental ER and its analysis were based on 18 years of additional operation with a mill throughput of 7000 tons per day of tailings to the impoundments at 340 days per year which results in an additional generation of 42,840,000 tons of tailings material.[1] In the analyses this additional byproduct material was added to the existing tailings impoundments, which at the time, contained nearly 31 million tons of tailings,[2] thereby resulting in a "bounded quantity" total of nearly 74 million tons of byproduct material. To date, the facility has only disposed a total of approximately 33 million tons of tailings, leaving an additional remaining "bounded" capacity of nearly 41 million tons as depicted in the Supplemental ER ultimate dam design.[3]

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[1] Quivira Mining Company, Ambrosia Lake Mill, License Renewal and Environmental Report, March 1981, Revised 1983, Revised February 12, 1993, See Executive Summary page 1; Section 5.0 "Radiological Impacts of Operation" page 5-1; and Section 10.1.2 "Design Criteria" page 10-7.

[2] Id. at page 4-6.

[3] Id. at Section 15 "Maps", See Ultimate Tailings Ponds configuration, Map 4.

Quivira, in its de-minimis byproduct disposal application recognizing that disposal will only occur on tailings impoundment #2 rather than both tailings impoundments, cites only the remaining disposal capacity for tailings impoundment #2, or 16 million tons. As clearly demonstrated, the supplemental ER analysis more than sufficiently "bounds" the proposed licensing action.[4]

NRC Staff Discussion Question #1

Are the empty drums crushed?

Clarification

As indicated in the application, byproduct materials which are contained in full barrels will be placed intact within the disposal cell. Barrels which are not full of bulk (earthen) material will be opened and either filled with additional material, or emptied and appropriately covered as previously discussed at "NRC Clarification #7". The emptied drums will be crushed consistent with the procedures as required by license condition #30 for the disposal of damaged yellowcake drums.

NRC Staff Discussion Question #2

What is meant by groundwater restoration residues as indicated on page 2 of the application?

Clarification

Groundwater restoration residues would be 11e.(2) byproduct material from NRC approved groundwater Corrective Action Programs.

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[4] While we conclude that the proposed activity is more than adequately "bounded" by the ER and Supplemental ER, we specifically wish to note that, as detailed in the 1995 license amendment application and in these clarifications, the proposed activity is a "categorical exclusion" as defined by the criteria in 10 CFR §51.22(c)(11) and is consistent with amendments issued to other licensees as "categorical exclusions" under the provision. Where a proposed action constitutes a categorical exclusion, no NEPA analysis (EA or EIS) is required. 10 CFR §22.(b) In addition, where a categorical exclusion applies, the licensee in not required to submit an environmental report for the proposed activity. See, e.g., National Institutes of Health, DD-95-5, 41 NRC 227 (1995). Neither Section 51.22(c)(11) nor any of the other categorical exclusions requires a showing that the proposed action is "bounded" by an existing environmental analysis. In fact, to require such a showing would render the categorical exclusion concept essentially meaningless, since an ER or NEPA analysis would then not be avoided at all. If anything, a showing that a proposed action is "bounded" by an existing environmental analysis and a showing of categorical exclusion should be an alternative means of satisfying one's Part 51 obligations. The analysis in the ER and Supplemental ER certainly supports the determination that the categorical exclusion criteria are satisfied in this case. We simply point out that the two matters are distinct and that the "bounding ER" inquiry is not necessary to a determination of categorical exclusion.

NRC Staff Discussion Question #3

What is the sampling and volume frequency of the material being disposed?

Clarification

Quivira will at a minimum, sample all incoming waste material for characterization at a rate of one test per each 5,000 yards^3 of material received per generator. The sample program will also include a minimum of one test per generator when the disposal volumes are less than this amount per generator.

The material will be sampled for the following constituents pursuant to NRC's recommended sampling constituent policy;[5]

- Arsenic, barium, beryllium, cadmium, chromium, cyanide, fluorine, lead, mercury, molybdenum, nickel, radium-226, radium-228, selenium, silver, thorium-230, thorium-232, uranium, diethyl phthalate, methylene chloride, acetone, chloroform, carbon disulfide, 2-butanone, naphthalene, 2-methylnaphthalene, and 1, 2-dichloroethane.

NRC Staff Discussion Question #4

How will the radon attenuation cover be designed?

Clarification

First, for surety purposes only, Quivira will be using the radon attenuation cover characteristics and thicknesses already approved by NRC for slime material at the Ambrosia Lake facility.

However, as indicated in the application, upon final closure of the disposal cell, the actual characteristics of the material including radium and thorium concentrations and its placement within the disposal area will be used in the development of the final radon attenuation cover. That design will be submitted for NRC's review and approval.

NRC Staff Discussion Question #5

What is the impermeable material referred to in the application?

Clarification

The reference to the 1 foot of compacted impermeable clay material on the bottom of the disposal cell refers to a minimum total thickness of Mancos shale material which has

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[5] U.S. Nuclear Regulatory Commission, Groundwater Monitoring of Appendix A, Criterion 13 Constituents, Mr. Ed Hawkins (NRC), December 15, 1987.

already been approved by NRC as part of Quivira's reclamation of tailings impoundment #1 and #2. In regards to the placement of an impermeable layer on top of the cell to prevent infiltration upon closure refers to Mancos shale or other suitable clay material whose hydraulic conductivity generally ranges from 10^{-6} to 10^{-8} cm/sec.

NRC Staff Discussion Question #6

What type of clean fill material will be used during the disposal operation?

Clarification

Quivira anticipates using a SM-SC-CL material similar to that used in the facility's approved tailings reclamation plan.

NRC Staff Discussion Question #7

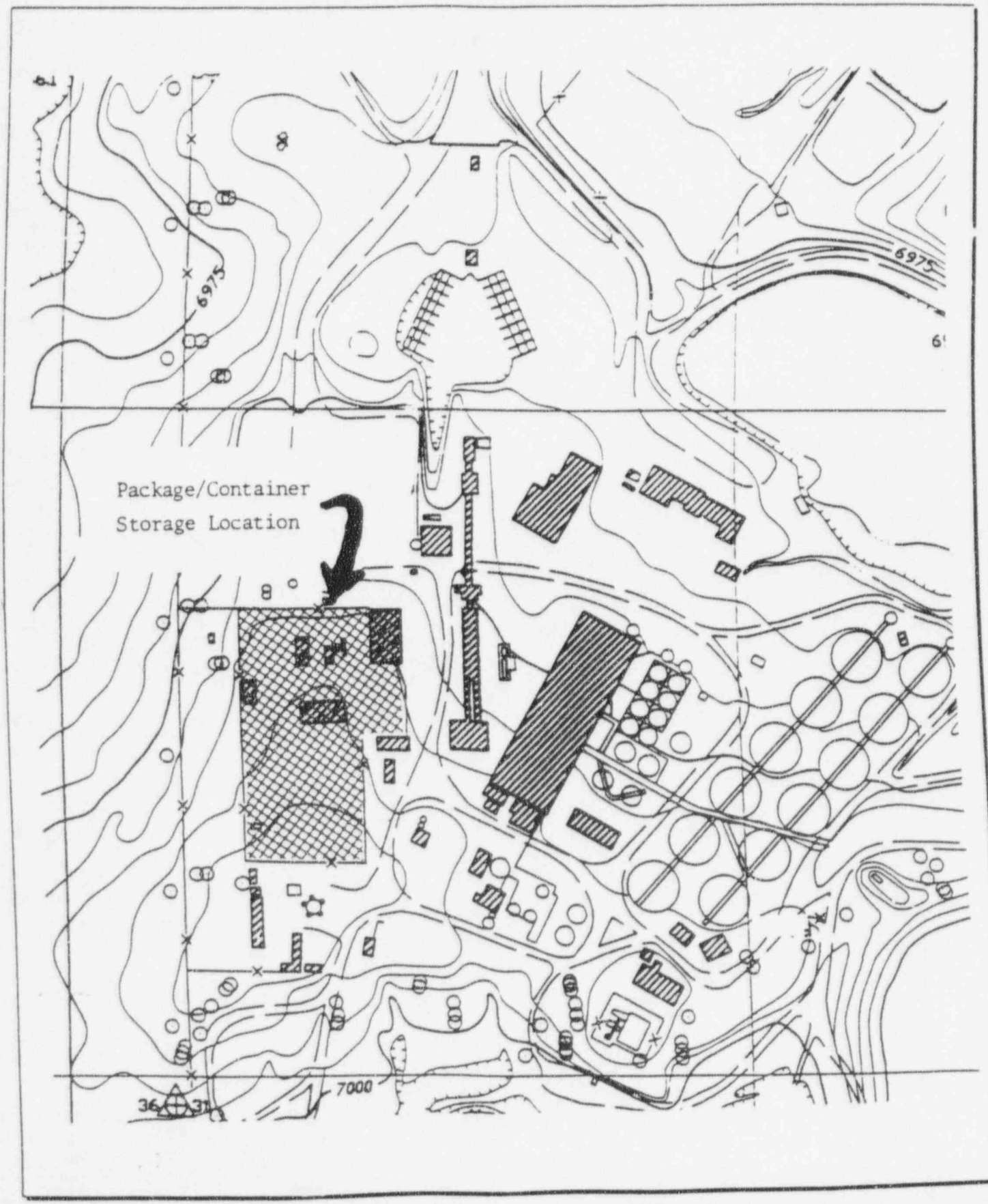
Can you provide Plate 1 of the SOP?

Clarification

Attached as part of this submittal is a copy of Plate 1 from the byproduct handling/disposal standard operating procedure that was enclosed as Appendix B of the November 20, 1995, original application.

ENCLOSURE 1

PLATE 1
PACKAGE/CONTAINER STORAGE LOCATION



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.

NMSS/

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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
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QUIVIRA MINING COMPANY

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

BYPRODUCT DISPOSAL REQUEST

November 1995

QUIVIRA MINING COMPANY
AMBROSIA LAKE, NEW MEXICO - SUA-1473, DOCKET 40-8905
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 mir imum 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.

Transportation

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

license conditions #30, #32, and #36. Most of the material is expected to be received in sealed 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.

material into tailings impoundments is neither necessary nor appropriate as NRC 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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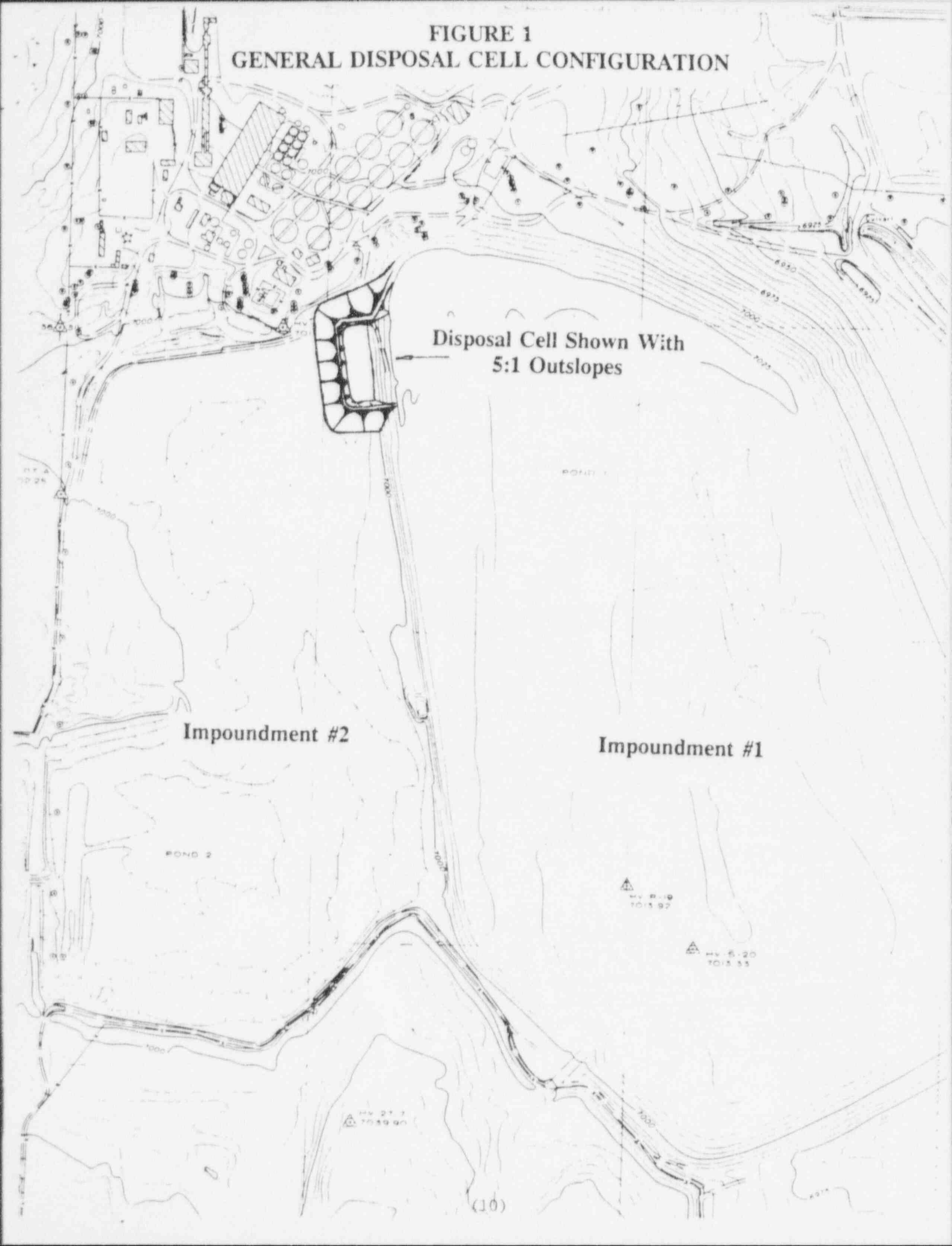
[7] Letter from Mr. Ralph Lightner, Director, Office of Environmental Restoration, Department of Energy, to Mr. Paul Lohaus, Chief, Operations Branch, Division of Low Level Waste and Management and Decommissioning, Nuclear Regulatory Commission, dated December 21, 1990.

FIGURE 1
GENERAL DISPOSAL CELL CONFIGURATION



APPENDIX A

TRANSPORTATION ACCIDENT RESPONSE GUIDE