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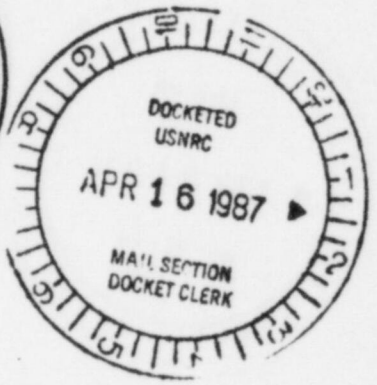
40-8905

QUIVIRA MINING COMPANY

POST OFFICE BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

RETURN ORIGINAL TO PDR, HQ.

April 14, 1987



Mr. Greg Lewis
Environmental Improvement Division
Water Quality Bureau
State of New Mexico
P.O. Box 0968
Santa Fe, NM 87504-0968

RE: NMEID Groundwater Discharge Plan #DP-71 & #DP-264

Dear Mr. Lewis:

As discussed in our April 3, 1987 meeting in which we outlined Quivira's license amendment application to NRC for processing alternative source material feed for uranium recovery, attached is our notice of intent to modify the effluent for Discharge Plan #71 as required by Section 1-201 of the New Mexico Water Quality Control Commission Regulations. The License amendment application to NRC is also attached to provide you with the nature of the raw materials, effluent stream and process procedures.

The change in the discharge to the section 4 ponds is comprised of a washwater stream containing components listed on Table 2 of the NRC admendment request. This change will not require modification of the discharge plan monitoring and reporting requirements now in effect. Two of the lined ponds on Section 4 will be dedicated to the receiving of washwater, which will be evaporated. The remaining lined ponds will continue to receive and evaporate mill leach solutions discharged from the mill process through the normal tailings disposal system.

The barren leach solutions and solids generated from processing the alternate uranium source material in the existing mill circuit will be pumped to the #2 tailings pond after processing and uranium recovery. These leach solutions and solids contain constituents present in uranium ores; indeed, they are the impurities present in the yellowcake that was produced at a mill. These materials will not result in any change in the characteristics of the materials already deposited or to be deposited in the tailing pile from processing of ores. (Tables 1 and 2, NRC License Application). No revisions to the tailing impoundment Discharge Plan #DP-264 requirements will be required.

DESIGNATED ORIGINAL

FEE NOT REQUIRED

Add Info
87-535

Certified By Stacy C. Hook

If you have any questions please contact me at (405) 270-2623.

Sincerely,

John C. Stauter

John C. Stauter, Director
Nuclear Licensing &
Regulation

JCS:ms

Attachment as stated

xc: H. Pettengill - USNRC-URFO

NOTICE OF INTENT

1. Name and address of the person making the discharge.

Quivira Mining Company

P.O. Box 25861

Oklahoma City, OK 73125

Telephone:

2. Location of the discharge (in Township, Range and Section, ¼,¼,¼, if available).

Section 4, T 13 N, R 9 W - McKinley County, N.M.

Lined Ponds covered by Groundwater Discharge Plan #DP-71

3. The means of discharge (To a lagoon, Flowing Stream, Water Course, Arroyo, Septic Tank-Leach field, Other - Specify.

Lined lagoon for evaporation

4. The estimated concentration of contaminants in the discharge.

See attached License Amendment Application Table 3

showing estimated wash water concentrations

(based on laboratory feasibility testing results)

5. The type of operation from which the discharge is derived.

Processing source material in accordance with

U.S. NRC - License #1473 Docket #40-8905

6. The estimated flow to be discharged per day.

26,000 to 33,000 Gpd. (9.6 million to 12 million GPY)

7. The estimated depth to ground water (if available).

40 to 60 ft.

Signed: Date:

QUIVIRA MINING COMPANY

POST OFFICE BOX 25861 • OKLAHOMA CITY OKLAHOMA 73125

March 31, 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Harry Pettengill, Chief
Licensing Branch 2
Uranium Recovery Field Office
U.S. NRC - Region IV
Box 30225
Denver, Colorado 80225

RE: License SUA-1473
Docket 40-8905
Alternative Uranium
Source Material Processing

Dear Mr. Pettengill:

Quivira Mining Company requests amendment of its Ambrosia Lake, New Mexico Facility License No. SUA-1473 for processing of alternative uranium-containing feed materials as described in the attached application. To institute prompt review of the request, a check for $150.00 is attached in accordance with 10 CFR 170.

Your early approval of this Amendment application will be appreciated. Quivira personnel are available to meet with you to discuss any items or to provide any additional information that may be helpful. Please contact me at 405-270-2623 if you have questions or wish to meet with us.

Sincerely,

John C. Stauter

John C. Stauter, Director
Nuclear Licensing &
Regulation

Enclosure as stated

JCS:lj

xc: NMEID - Dr. Margo Keel, Radiation Protection Bureau
NMEID - Mr. Greg Lewis, Groundwater Protection Section

~~8704150343~~ 4p

ALTERNATIVE FEED MATERIALS PROCESSING

AMENDMENT REQUEST

LICENSE SUA - 1479

QUIVIRA MINING COMPANY

OKLAHOMA CITY, OKLAHOMA

DOCKET NO. 40-8905
U. S. NUCLEAR REGULATORY COMMISSION

March 1987

Introduction

Quivira Mining Company requests amendment of its Ambrosia Lake Milling Facility Materials License SUA-1479 to authorize receiving, possessing, storing and processing of alternative uranium-containing feed materials compatible with the current milling circuit. Typical alternative feeds will consist of uranium residues resulting from purification and conversion processes in the nuclear fuel cycle. The initial feed material to be processed under this amendment will be a solid uranium-containing residue generated at the Sequoyah Fuels Corporation's UF6 Conversion Plant at Gore, Oklahoma. Processing of this feed source material will not result in additional environmental impacts nor require significant changes in mill operational procedures, and health physics, industrial hygiene and environmental programs.

Alternative Feed Characteristics

The alternative feed material is generated in the yellowcake purification step in which uranium is recovered by a solvent extraction process. The extraction residue contains some unrecovered uranium and other yellowcake impurities. The uranium content of the residue ranges from 0.03-1.0 percent dry basis, with an average content of 0.61 percent. The chemical constituents of this source material residue are listed in Table 1.

The natural uranium series radionuclide distribution in the residue is shown in Table 2. On an activity basis, one ton of the residue is equivalent to about 33 tons of ore.

Receipt of the Residue

The residue will be delivered to the mill as a settled slurry transported in DOT approved tanker vessels. The slurry will be unloaded at a covered receiving station that will be constructed immediately south of the mill "B" thickener circuit. The location of the receiving station is shown on Figure 1, a schematic of the mill. The slurry will be pumped from the transport vessel directly to the B-1 and B-2 thickener tanks for storage and preparation for processing.

Processing

The source material residue has been demonstrated through testing to be compatible for processing in the mill circuit. The processing will be in accordance with the steps shown in Figure 2, which is the process flow sheet. The various steps are briefly described below.

The slurry will be washed while in the B-1 and B-2 thickeners to remove the contained nitrogen compounds. The thickened slurry will be pumped to the B-3 thickener and the decant wash solution, containing the nitrates, will be pumped directly to dedicated lined ponds located at Section 4 for evaporation. The constituents in the wash solution are listed in Table 3.

The washed, thickened slurry will be pumped from the B-3 thickener to the mill leach tank area for addition of sulfuric acid. The process will be a batch operation using four dedicated leach tanks. Each 10,000 gallon leach tank will have a nominal 12,000 pounds (dry weight basis) of slurry feed to which a nominal 6,000 pounds of acid will be added. The leaching process is conventional, but unlike the leaching of ore, an oxidant will not be required due to the ferric iron content of the slurry and the process will be at ambient temperature.

After leaching, the slurry will be pumped to the B-4 thickener for conventional process washing and settling. The uranium bearing pregnant liquor will be transferred for final clarification and solvent extraction of the uranium in the mill solvent extraction circuit. The barren leach solution and leached solids will be pumped to tailings impoundment 2.

Following solvent extraction recovery, the uranium will be conventionally stripped from the solvent in a two-stage process and the purified product precipitated and collected as a slurry. This yellowcake slurry may be dried and drummed or kept in slurry form.

As shown in the Figure 1 schematic, the mill has two identical process trains. One process train will be dedicated to the batch processing of the alternate source material residue. The solvent extraction and product precipitation sections can be operated on a reduced scale for accomodating the leach system output.

Health Physics and Environmental Monitoring Programs

The alternative source material residue components are comparable in all respects, except for nitrate content, to the components in conventional ore feed materials. Moreover, the alternative feed material is received and handled as a slurry, which eliminates the grinding and crushing steps and thus the possibility of generating airborne particulates. Therefore, the existing standard operating procedures for all operational process activities involving radioactive materials that are handled will apply and will be followed.

These procedures include surveillance activities for in-plant and environmental monitoring, bioassay analysis, radiation monitoring instrument calibration, occupational exposure calculations and environmental surveys in accordance with the license conditions and 10 CFR 20.

Environmental Impact

The alternative source material feed processing will not result in additional environmental impacts at the mill facility. The uranium series radionuclides are comparable to those contained in conventional uranium-bearing ores. The estimated quantity of alternative feed material to be processed under this amendment is equivalent to about 525,000 tons of ore, or less than 85 days of conventional mill operation at the rated capacity of 6500 tons per day.

There will be no impact to surface or groundwater from the nitrate in the alternative feed material. The nitrate-containing wash solution will be evaporated in dedicated, lined ponds. These ponds are monitored by in-place wells and visual inspections. No changes will be required in the mill groundwater discharge plans with the New Mexico Environmental Improvement Division for the Section 4 ponds (DP-71) or the tailings impoundment (DP-169).

Table 1

Typical Chemical Constituents
Of
Alternative Uranium Feed Material
(Dry Basis, Percent)

Uranium	0.03 - 1.0*
Aluminum (Al)	10
Calcium (Ca)	9
Iron (Fe)	8
Silicon (Si)	7
Fluorine (F)	9
Arsenic (As)	< 1
Boron (B)	< 1
Chlorine (Cl -- including Bromine, Br, and Iodine, I)	< 1
Potassium (K)	< 1
Magnesium (Mg)	< 1
Molybdenum (Mo)	1
Sodium (Na)	4
Phosphorus (P)	1
Sulfur (S)	5
Vanadium (V)	< 1
Zirconium (Zr)	< 1
Manganese (Mn)	< 1
Lead (Pb)	< 1
Nickel (Ni)	< 1

*Average U_3O_8 content is 0.61 percent.

TABLE 2

Typical Radionuclide Contents
of
Alternative Uranium Feed Material

Radionuclide	uCi/gm
Uranium-238	0.002
Uranium-234	0.002
Thorium-230	0.089
Radium-226	0.002
Lead-210	0.003

For comparison, the specific activities of the alternative feed material, yellowcake and uranium ore are provided:

Material	uCi/gm
Alternative Feed Material	0.098
Yellowcake	0.550
Uranium Ore	0.003

On an activity basis, one ton of the alternative feed material is equivalent to approximately 33 tons of ore.

TABLE 3

ESTIMATED* WASH WATER COMPONENTS

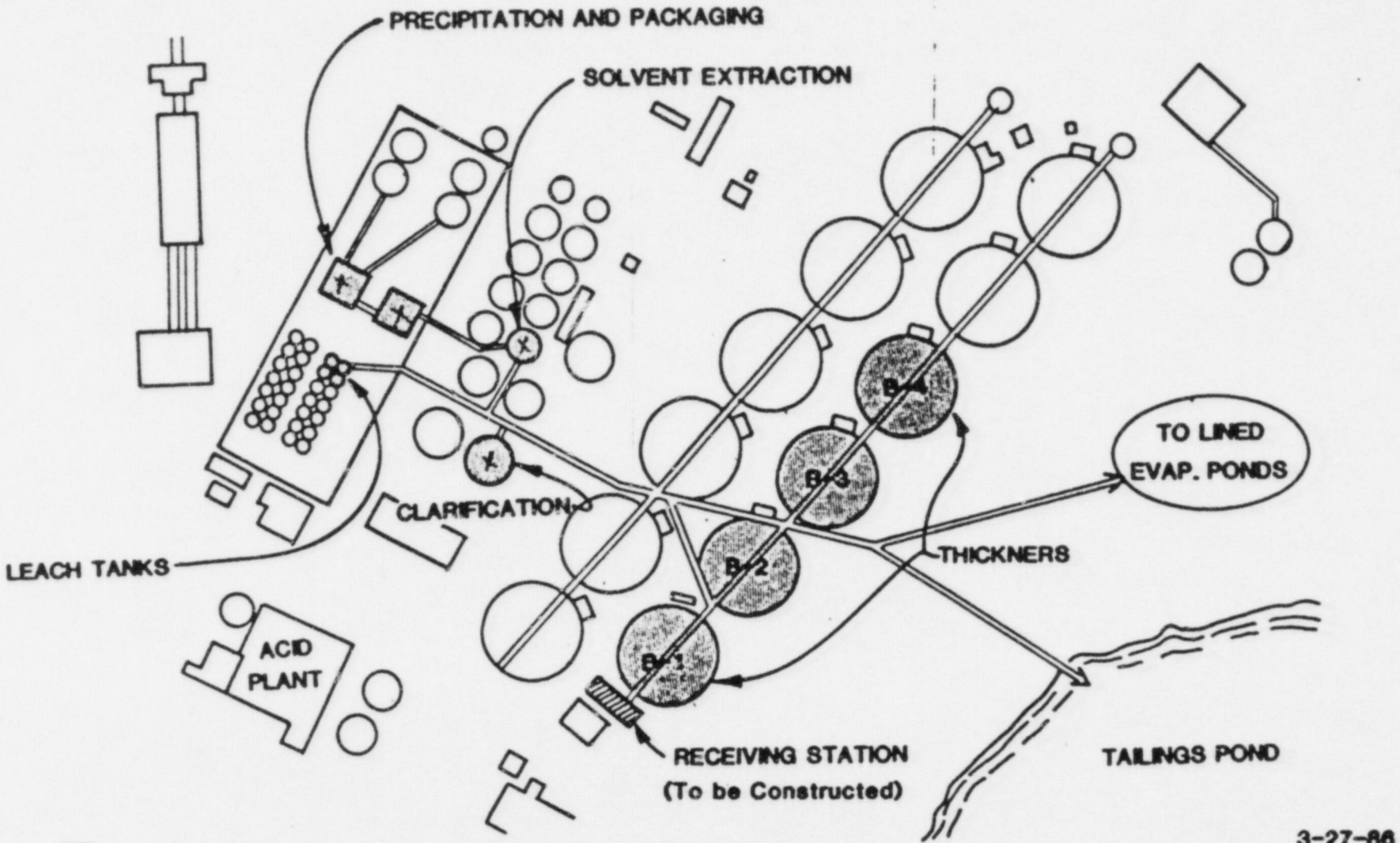
(Based on 3 gallons water per pound of residue)

Component	Range (mg/l)
Silver (Ag)	0.025 - 0.031
Aluminum (Al)	7.7 - 9.6
Arsenic (As)	0.7 - 0.875
Boron (B)	0.5 - 0.625
Barium (Ba)	0.15 - 0.19
Cadmium (Cd)	0.05 - 0.06
Chlorine (Cl)	53. - 66.
Cyanide (CN)	0.02 - 0.03
Cobalt (Co)	0.024 - 0.30
Chromium (Cr)	<0.02 - <0.03
Copper (Cu)	0.34 - 0.42
Fluorine (F)	8.9 - 11.1
Iron (Fe)	0.13 - 0.16
Mercury (Hg)	0.001 - 0.002
Manganese (Mn)	6. - 8.
Molybdenum (Mo)	6.6 - 8.25
Nickel (Ni)	1.5 - 2.0
Lead (Pb)	0.03 - 0.04
Selenium (Se)	0.10 - 0.13
Uranium (U)	0.07 - 0.09
Zinc (Zn)	1.5 - 1.9
Sulfate (SO_4)	2,250 - 2,813
Ammonia (NH_4)	768 - 960
Nitrate (NO_3)	2,432 - 3,040
Total Dissolved Solids (TDS)	15,260 - 19,075

Radioactivity	Range (pCi/l)
Radium-226 (Ra-226)	7 - 9
Radium-228 (Ra-228)	7 - 9
Thorium-230 (Th-230)	425 - 535
Lead-210 (Pb-210)	<2.5 - <3.1
Gross Alpha (Gross α)	640 - 800

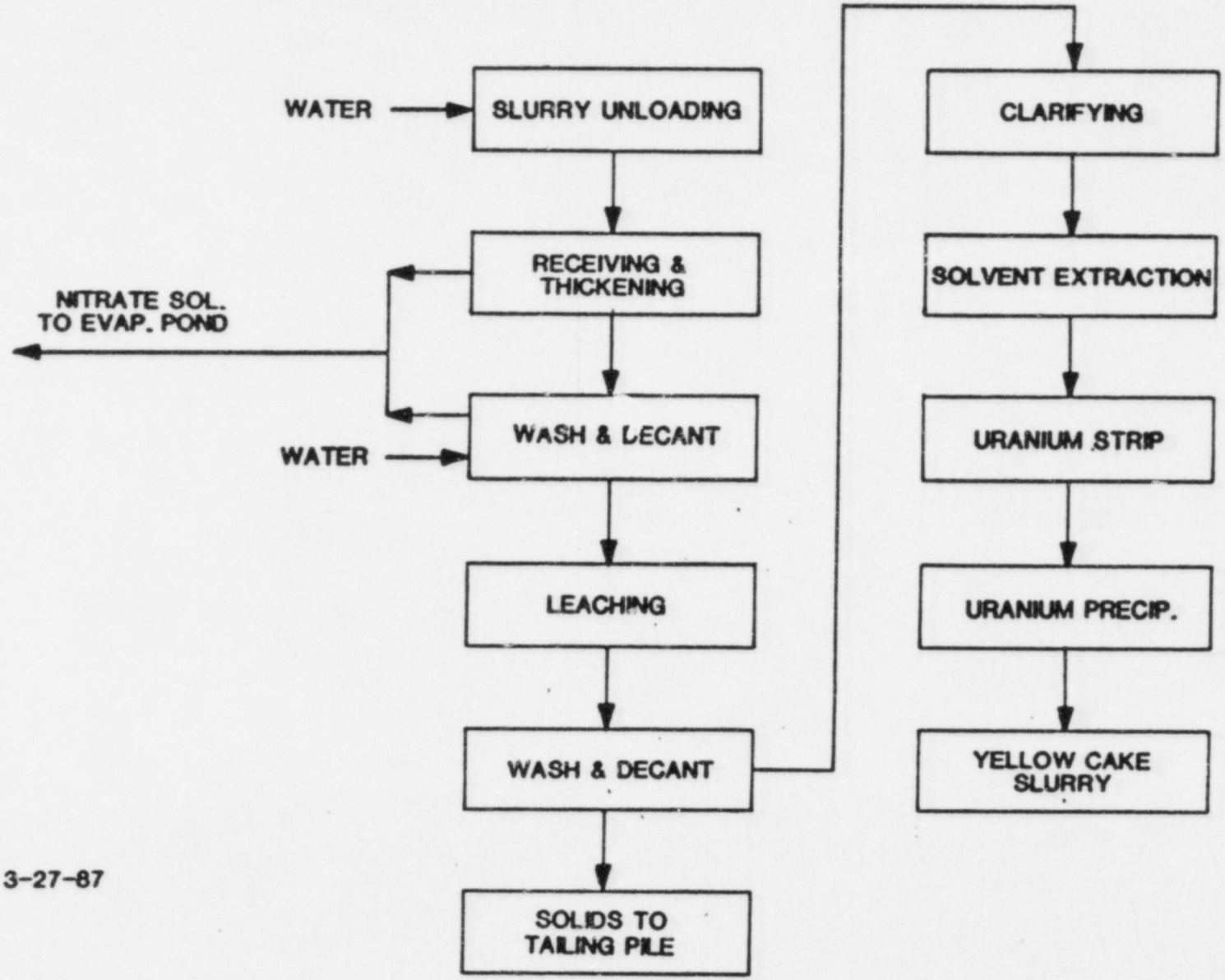
* Based on laboratory tests.

FIGURE 1
MILL SCHEMATIC



☐ Mill Components Isolated for Raffinate Sludge Process

FIGURE 2
ALTERNATE FEED MATERIAL



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