CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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03/05/99

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: TUBA CITY MILL

ALTERNATE NAMES:

COCONINO COUNTY MILS NUMBER: 93

LOCATION: TOWNSHIP 32 N RANGE 12 E SECTION 17 QUARTER SW
LATITUDE: N 36DEG 08MIN 57SEC LONGITUDE: W 111DEG 08MIN 10SEC
TOPO MAP NAME: TUBA CITY - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
MILL URANIUM

BIBLIOGRAPHY:
ADMMR EMMETT LEG #1 MINE FILE
ADMMR TUBA CITY MILL FILE
HAVENS, R., & DEAN, K., USBM RI 7288
ORE FROM FOLLOWING MINES SENT TO MILL:
ORPHAN, RAMCO, HUSKON PROPERTIES, HOPE NO. 3
TWILIGHT, UTAH SOUTHERN OIL CO'S EMMETT LEE
NO. 1
PROCESS USED:ACID LEACHING & RESIN IN PULP PR

TUBA CITY MILL

Visited Tuba City Uranium Mill, Mr. Davis, Supt., was in Flagstaff, no information.

E. G. WILLIAMS WR 5/15/64

Visited Tuba City mill, interviewed Mr. L. O. Davis, Supt. The mill is taking 200-250 tpd and is now making a good copper saving.

EGW WR 9/15/64

Visited Tuba City - L. O. Davis, said all their mill feed comes from the Orphan. They are active, looking at various copper properties in White Mesa area, also the "strip" area.

FTJ WR 9/17/65

VISITED El Paso Natural Gas Tuba City mill - Mr. Davis, Supt. had left for a visit to Emerald Isle. 61 men employed and they will be finished milling Dec. 31 when their allotment will have been reached.

FTJ WR 5/14/66

Ore from the Orphan Mine is stockpiled at the Tuba City Mill where it will furnish mill feed to the end of 1966.

FTJ WR 5/14/66

Visit and interview with L.O.Davis and Herb Lewis at Tuba City Mill, they expected to have milled the last of their stockpile by Saturday the 17th. They are concentrating on a flow sheet to handle Emerald Isle ore. Disposal of plant etc., at Tuba City not determined.

FTJ WR 9/16/66

Tuba City Mill was shut down during the quarter and is still inactive.

FTJ Quarterly Report (2nd Quarter 1966-67)

Visited L. O. Davis, Supt. of El Paso Gas Mining Division at Tuba City. Most of the usable equipment has been moved to either the Lake Shore or Emerald Isle. Mr. Davis will be superintendent at the Lake Shore operation.

FTJ WR 5/12/67

RARE METALS CORP. OF AMERICA, operator of a uranium mill at Tuba City, Ariz., has successfully bid for three autoclave vessels and related equipment from the Atomic Energy Commission's Monticello, Utah, mill. The bid was $24,827.66. The Monticello mill has been closed for 1½ years and the property and equipment declared surplus. The AEC is selling the mill and equipment on a negotiated sales contract basis.

Taken from MINING CONGRESS JOURNAL - October, 1961 , p 109

Sept. 14, 1961 - Visited the Tuba City Mill. Carl Gommell, Supt. reported 6800 tons milled in August with grade of 0.32% U_3O_8 and lime content 16-17%. Of the total mill feed about 5950 tons came from the Orphan mine and 850 from 2 shippers in the White Canyon region of Utah. None was received from the Cameron district (also, none in July). 78 men employed, working "10 on - 4 off."

The mill currently faces many problems - all inter-related and requiring urgent early solution: the ore supply situation is critical due in large part to uncertainties regarding AEC's extension of the concentrate purchasing contract; the legal aspect of the Orphan mine's right to extract ore from the ore pipe on its dip into Park ground; the need for a changeover in the mill to a carbonate circuit made necessary by the increasingly high lime character of Orphan mine ore. Also, because of these uncertainties, prospecting and development is practically at a standstill in the region tributary to the mill. Because of the high lime content of the mill feed in August the circuit required 630 tons of acid. Acid has been obtained from a number of sources principally Southwest Agrochemical Corp. in Phoenix, the Kermac Uranium plant in New Mexico, and the Garfield smelter in Utah. Recently, because of strikes, and production and uncertainties in Phoenix supply source, the company has had to reach out for acid. Fortunately the newly completed 250 TPD Bagdad acid plant, with considerable surplus over Bagdad's needs, has become a supplier at a favorable cost rate. To date over 1000 tons has been delivered from Bagdad.

TRAVIS P. LANE - Weekly Report - 9-16-61

Jan. 8, 1962 - Learned that repairs necessary because of the bin failure at the Orphan mine will require a long but indeterminate time; meanwhile the Tuba City Mill has shut down retaining only a skelton crew for maintenance and receiving for stockpile a small amount of ore (about 300 tons monthly rate) from shippers in White Canyon area of Utah.

TRAVIS P. LANE - Weekly Report - 1-13-62

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30 men working Feb. 1962

4-12-62 Plant continues to operate on stockpiled ore - 17 men are employed in maintenance; 32 in operations and 15 others are on salary. 1p

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Sept/ 12 1963 - Visited Rare Metals uranium mill at Tuba City, interviewed L. O Davis, Supt. They are trying a new leaching system, not very successful so far.
E. G. WILLIAMS Weekly report 9/17/63

TUBA CITY MILL
RARE METALS CORP.

COCONINO COUNTY

Visited the Tuba City Mill of Rare Metals Corp. and obtained from Mr. Gommel, Supt., the August production figures, sources of mill feed, etc.

The milling rate and grade of ore milled in August was normal. Receipts of ore were as follows:

Orphan Mine	6576 tons	.28	U_3O_8
Ramco & Huskon properties	48 "	.30	
Hope No. 3 (H.C.Smith)	434 "	.48	
Twilight	91 "		
Utah Southern	105		
	7254		

The balance of the August mill feed (total 9300) was obtained from the mill stockpile. Cameron shipments were unusually low because of low production by Cameron Mining Co. during Blakemore's absence of more than 2 weeks from the district and because of equipment breakdown at another property. The Orphan output was low but is expected to be higher in September, perhaps 7500 tons or better.

Interviewed Ray D. Eicher, Land Operations Officer at the Tuba City Navajo sub-agency office. He reported no new leasing activity and no mine work in progress in the White Mesa region.

TRAVIS P. LANE - Weekly Report - 9-17-60

This property active 2-1961

April 12, 1961 - Visited the Rare Metals Co. Mill at Tuba City. Mr. Gommell discussed current activity and the outlook which is uncertain because of unsolved problems as between AEC - Rare Metals Co. - Orphan Mine - National Park Service. Another pressing problem is posed by the increasing lime content in the ore milled (over 21% C_aO in March). Milling costs due to this excessive lime have just about reached an economic limit and a changeover to a carbonate circuit is imperative. The present acid circuit would be maintained to handle the small amount of non-carbonate ore coming from the Cameron area.

TRAVIS P. LANE - Weekly Report - 4-15-61

April 13, 1961 - Visited the office of Cameron Mining Co. A Mr. George Bastedo together with Donald P. Wilson (notable author) bought Steinberger's half interest in the Co. and they are continuing work with Page Blakemore, owner of the other half.

TRAVIS P. LANE - Weekly Report 4-15-61

See: MINING WORLD, August, 1961, p 46.

April 14 Visited the Tuba City mill of Rare Metals Corp. Carl F. Gommell is the new Mill Supt. He recently replaced Sidney Runke who is now in the Salt Lake City administrative office of the company. The mill operations are continuing at the normal rate (i.e. 300 TPD approximately 0.30% U_3O_8). One supply is coming principally from the Orphan Mine and, in lesser proportion, from the Cameron region. The company's mines in the Cameron area produce about 2,000 tons per month, all of this being mined on contract by Cameron Mining Co. (Blakemore and Steinberger). Cameron Mining Co. also produces from a number of other mines in the area some of which it owns and others which it operates on contract. This with some independent production amounts to from 1500 to 2000 tons per month with grade abound .20% U_3O_8. The increased output of the Orphan mine has materially improved the Tuba City plant outlook. The small tonnage of stockpiled ore had been dwindling steadily for some time but now the situation is reversed and the company expects to add to stockpiles until a healthy balance is achieved. 85 men are employed of whom 75 are underground.
TRAVIS P. LANE - 4-16-60 - WR

TUBA CITY MILL - Rare Metals Corp. of America

RARE METALS CORP. OF AMERICA now places its reserves in the San Mateo Dome area of McKinley County at more than 1-million tons of ore.

The ore grade (0.20% U308) is higher than originally anticipated, shareholders were informed in interim statement.

The company has scheduled output at rate of 400 tpd by end of this year. A program to recover uranium values in waters of the ore-bearing Westwater formation is scheduled.

Currently Rare Metals is shipping ore to the Kermac Nuclear mill, pending allocations of ore by the Atomic Energy Commission.

Principal income source was the Tuba City, Ariz. uranium mill and the Weiser, Ida, mercury mine and reduction plant.

The statement disclosed that Rare Metals has leased a potential lead-zinc property near Colville, Stephens County, Wash., where a preliminary examination indicates "it may contain substantial values" of these metals.

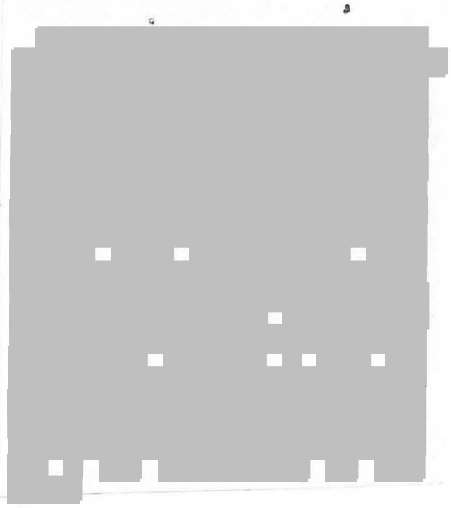
Full value can be established only by exploration and development. The properties were leased with a view toward ultimate improvement in the status of domestic lead zinc mining, E & MJ was told by an official of the firm's Salt Lake operating headquarters.

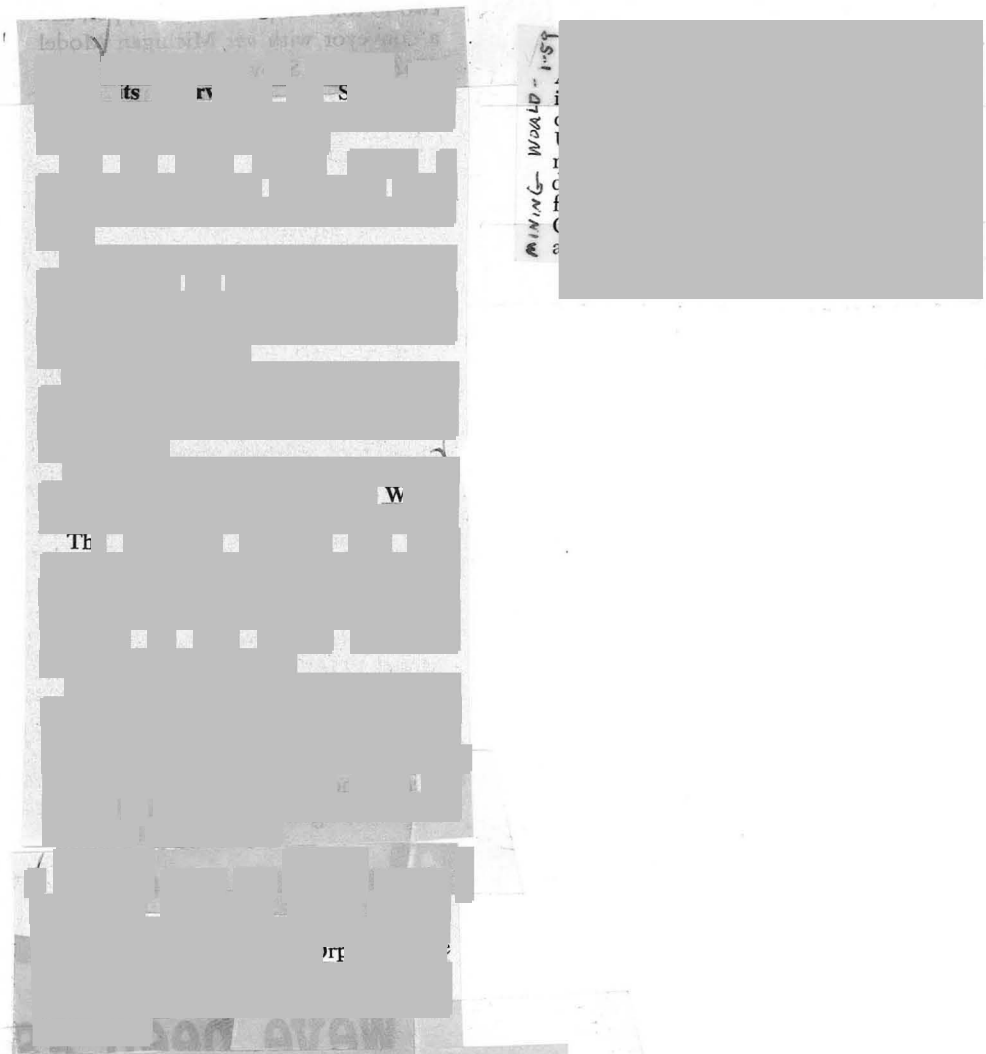
Extension of the mill contract for the Tuba City installation awaits completion of ore survey of firms shipping to that mill, principally the Orphan Mine of Western Gold & Uranium Co., located on south rim of the Grand Canyon in Arizona.

Taken from ENGINEERING & MINING JOURNAL - November 1959

HUSKON & RAMCO GROUPS file

MINING WORLD, July, 1960





Engineering and Mining Journal—Vol.160,No.11

November 1959

TUBA CITY MILL - Rare MetalsCorp.

Thursday: Visited the Tuba City mill of Rare Metals Corp. and discussed the company activity with Sid Runke, Mgr. The mill is operating normally at its authorized rate (300 TPD). The company has discontinued all mining operations on its own and controlled properties (principally in the Cameron area). Formerly the company operations supplied upwards of 50% of the mill feed (the balance was purchased ore). Now the company properties are leased or are being mined by contractors (mainly Cameron Mining Co.).

Sources and approximate tonnages of ore treated in August were as follows:

Cameron Area	1000 tons
Orphan Mine	2000 "
Monument Valley	1500 "
Cutter Stockpile (Globe)	2500 "
Stockpiles at mill	2000 "
Total	9000 tons

The company negotiated with and obtained from the AEC the Cutter Station stockpile containing some 20,000 tons. This was the amount remaining in the stockpile after the AEC had sold all the Uraniumaire (Anderson Mine) ore (some 4000 tons) to another mill. By tests the Uraniumaire ore had been determined "amenable" and the balance, mostly Dripping Springs quartzite was considered non-amenable, of the "cats and dogs" variety. The mill is blending this material into the feed at a slow rate and believes it is getting economical results due no doubt to a price concession in the AEC deal. Last spring the mill agreed to accept a certain amount of ore in stockpile at the Uraniumaire mine and after some 6000 tons had been delivered, deliveries were cut off (2 months ago) because of inability of the shipper to maintain an economic grade. 86 men are employed at the plant.

Travis P. Lane - WR - 9-19-59

AMCO GROUPS

COCONINO COUNTY
WHITE MESA DIST.

NG WORLD", June, 1957, p 93

S- Northern Dist" (file)
Geology file)

ILL OF
LS CORP.

COCONINO COUNTY

Tuba City Mill of Rare Metals Corp.
operating normally at 300 TPD with grade
it 0.25% U_3O_8. During March 65% of the ore
chased ore and the balance was from
d or controlled property.

T.P. LANE
4-18-59 WR

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ore, Cameron Mining Co. has taken over
of Rare Metals uranium mines.

Lee Hammons - 8-11-59

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Rare Metals Corp. Plant Date Sept. 29, 1958

District White Mesa, Coconino Engineer Travis P. Lane

Subject: Visit to Plant - Tuba City

Plant Supt. Sidney Runke

Asst. Supt. L. O. Davis

Office Mgr. Henry Shaffer

Master Mechanic: Bill Erlanger

The Tuba City uranium mill of Rare Metals Corp. jointly owned by El Paso Natural Gas Co. and Western Natural Gas Co., was operating normally at the time of this visit. Production averages 300 TPD with ore grade around 0.27% U_3O_8. The company purchases about 70% of its mill feed requirements from independent producers and obtains the rest from company-operated Indian leases (Huskon and Ramco) in the Cameron area.

The current independent ore shippers are : Industrial Uranium Co. (Moonlight, Daylight, etc.) and in leaser amounts Gibralter and Norgaard producers, all in the Monument Valley Region; Cameron Mining Co. (Kachina, Steinbeyer Drilling Co., Utah Southern, and Wells Cargo) in the Cameron District; and Western Gold and Uranium Co. (Orphan Lode) in Grand Canyon. The Woodson Exploration Company in the Cameron area, has completed a heavy strip job (105' overburden for 3 to 4 feet of ore thickness) and expects to begin shipping 800 to 1000 TPM to the Tuba City plant in October.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

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Date: Sept. 29, 1958
District: White Mesa, Coconino
Engineer: Travis P. Lane
Subject: Visit to Plant

Plant Supt. Sidney Runke

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STATE OF ARIZONA
DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX, ARIZONA

May 20, 1958

To: Frank P. Knight, Director

From: Travis Lane, Field Engineer

Subject: Weekly report for week ending May 17, 1958

Monday Office details, active mine list and files.

Tuesday Conferred with Jack and Arthur Still in Prescott re status of mines in the region. Drove to Fredonia for ASMOA Conference. Only "Klondie" Jensen was in attendence. He reported that no mining work was in progress in the area. Mr. Jensen supplied the following information re the Hack's Canyon Uranium Mine. The property is owned by a partnership composed of Jensen and Pierson of Fredonia, Ray Pointer of Safford and the G. C. Howard Estate of Phoenix. The owners operated for a time in 1951-1952, and shipped approximately 1100 tons of .20 U_3O_8 ore. Then Pointer leased from the other partners and performed some development, and made a small production. Next the property was leased to Wasatch Mining Co., who leased to U-rainbow Company. Each shipped about 50 tons of ore. The State Mine Inspector forced a shutdown of U-Rainbow, and when the company failed to correct unsafe working conditions and discontinued operations, the owners sued and after 3 years litigation recovered the property (in 1955). Rare Metals optioned the mine and drilled 6 holes (maximum depth 640') and relinquished in early 1958. At present Western Gold and Uranium Co. has a verbal option and is planning to make an economic evaluation. The road to the property is now impassable. The mine has been examined in the past by DMR and rather complete reports are available in the Department files.

Wednesday Stopped at Vermillian Cliffs and inquired re the Sun Valley Mine (formerly called Maggie Baker) now being actively developed by Bemco Mining Co. of Los Angeles. Phillip H. McCrary is manager, and Ralph Haines is superintendent. The mine is located 1½ miles by road north from a point on Highway 89, 12 miles west of Navajo Bridge. The steep dirt road was too wet to reach the mine and an appointment was made to return next day.

Visited the Copper Mine on White Mesa, 22 miles southerly from Page. The property, formerly operated by the Hardin Company and more recently by Able Mining Co., was idle. Returned to Vermillion Cliffs via the Gap and Navajo Bridge.

Thursday Visited the Sun Valley Mine (noted above). Drifting was in progress from a 45 foot level in a recently completed shaft. The objective is a cluster of holes said to indicate a body of about 5,000 tons of .24% U_3O_3 ore. The drift was in 195' with about 65' to go. The property comprises the Sun Valley claims 1 to 4, and the Jay Bird Claims 1 to 38. The mine is working 5 men. These people have applied for and expect DMEA assistance for further development.

Drove to Cameron and discussed activity in the area with Glenn Green, Supt. at the Jack Daniels Mine near Cameron, for Marcy-Shenandoah Corp. (formerly Marcy Exploration Co.) The mine has produced some 38,000 tons of ore and expects to exhaust its reserves in June with estimated shipments of about 1,000 tons for that month. Grade of ore .225% U_3O_8, average thickness 5 feet; and waste to ore ratio in the pit has been roughly $2\frac{1}{2}$ to 1. The working force is 6 men.

Visited the Tuba City mill and discussed active mines and recent shippers with Mr. Runke, Manager for Rare Metals Corp. Returned to Cameron and visited Jim McFarland, Mine Superintendent for Rare Metals. Drove to Flagstaff and met Page Blakemore and arranged with him to cover the Cameron area next day.

Friday Inspected all independent active properties in Cameron area and some of the more important workings of Rare Metals Corp. in the company of Blakemore. Blakemore, in partnership with Steinberger as the Cameron Mining Co., conducts an engineering service and mining contract business. Blakemore does some mining for his own account, and Steinberger also conducts a contract drilling business for his own account. Checked the Department's active mine list, dated February 15, with Blakemore and made deletions, changes and additions thereto, in accordance with information furnished by him. Returned to Phoenix.

Rare Metal Co. of America has taken
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Pa l

S. ENGIN. & MINING JNL-
4-55 - VOL. 156 - No. 4

April 1955

TUBA CITY MILL

See: AEC 172-479, pp 55, 56, 61, 62. Arrowhead Uranium Co. Huskon Claims - 1952. George E. Morehouse or Russel C. Cutter. In AEC files.

BLM R.I. 7288 - Chemical Stabilization of the Uranium Tailings at Tuba City, Ariz.

See: GJBX-220(82), "Summary History of Domestic Uranium Procurement Under U.S. Atomic Energy Commission Contracts Final Report", October 1982, Page A-3

16 JUN 1988

NOTICE OF PROPOSED ACTION

by the

U. S. Environmental Protection Agency
Region IX (W-5-1)
215 Fremont Street
San Francisco, California 94105

Application for issuance of a National Pollutant Discharge Elimination System (NPDES) permit to discharge pollutants to waters of the United States: The Environmental Protection Agency (EPA), Region IX, San Francisco, California is issuing the following notice of proposed action under the Clean Water Act (CWA).

The EPA, Region IX, San Francisco, California, has received requests for issuance of a National Pollutant Discharge Elimination System (NPDES) permit and has prepared a tentative determination regarding the permit.

On the basis of preliminary review of the requirements of the CWA, as amended, and implementing regulations, the Regional Administrator, Region IX, EPA, proposes to issue the following NPDES permit to the following discharger, subject to certain effluent limitations and special conditions:

Permittee: MK-Ferguson Company
P. O. Box 9136
Albuquerque New Mexico 87119

Discharge: UMTRA Project Site - Tuba City
US Highway 160 (6 miles east of Tuba City)
Tuba City, Arizona 86045
NPDES No. AZ0023213

The permittee will construct temporary drainage ditches to route stormwater runoff from comtaminated areas of the project site into lined retention basins. Accumulated runoff would be applied to the surface of the tailings to control dust and optimize compaction. An NPDES permit is required should there be at the completion of the project, an excess amount of water remaining in the retension basins. Prior to discharging, sampling will be required. Effluent limits for Chemical Oxygen Demand (COD), Radium 226, Radium 228, Uranium, pH, and various trace substances are included in the proposed permit. Monitoring of the flow is also required.

Persons wishing to comment upon, or object to the proposed action, or request a public hearing pursuant to 40 CFR 124.11, should submit their comments or requests in writing within thirty (30) days from the date of this notice, either in person or by mail to:

U. S. Environmental Protection Agency, Region IX
Permits Issuance Section (W-5-1)
Attn: Kenneth D. Greenberg
215 Fremont Street
San Francisco, CA 94105

Telephone: (415) 974-9748

The Administrative Record, which includes the draft NPDES permit, the fact sheet, comments received, and other relevant documents, is available for review and may be obtained by calling or writing to the above address.

All comments or objections received within thirty (30) days from the date of this notice, will be retained and considered in the formulation of the final determination regarding the permit issuance. When public interest warrants, the Regional Administrator may grant an extention of the thirty (30) day comment period for the submittal of comments or objections. If written comments indicated a significant degree of public interest in a proposed action, the Regional Administrator shall hold a public hearing in accordance with 40 CFR 124.12. A request for a public hearing must be in writing and state the nature of the issues proposed to be raised in the hearing.

If no public hearing is held, and the final determination of the Regional Administrator are substantially changed from the tentative determination, the Regional Administrator shall foward a copy of the notice of such determinations to the permittee and to any person who has submitted written comments regarding the permit action.

The permit issuance will become effective thirty-three (33) days following the date it is mailed, unless a request for an evidentiary hearing is granted. Requests for an evidentiary hearing must be filled within thirty-three (33) days following the receipt of the final determinations and must meet the requirements of 40 CFR 124.74. All written requests for and evidentiary hearing should be addressed to the Regional Administrator, U. S. Environmental Protection Agency, Region IX, Attn: NPDES Permits Clerk, (W-5-1), 215 Fremont Street, San Francisco, CA 94105.

If the Regional Administrator grants a request for an evidentiary hearing, public notice of such hearing will be given. Any person may submit a request to be admitted as a party within thirty (30) days after the publication date of the public notice of an evidentiary hearing. If no evidentiary hearing is requested, the permit will be issued or denied, as appropriate, and this action will be final.

Please bring the foregoing notice to the attention of all persons who you know would be interested in this matter.

Date: June 16, 1988

TUBA CITY MILL (fh)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

Certified Mail:007796760

13 JUN 1988

J.G. Oldham, Project Director
MK-Ferguson Company
P.O. Box 9136
Albuquerque, NM 87119

Dear Mr. Oldham:

Enclosed is a copy of the draft permit, statement of basis and public notice of our proposed action on your application for a National Pollutant Discharge Elimination System (NPDES) permit for:

MK-Ferguson Company
UMTRA Project
Tuba City, Arizona
NPDES Permit No. AZ0023213

The public comment period is from June 16, 1988 to July 16, 1988. Comments on the proposed action, or a request for a public hearing pursuant to 40 CFR 124.12, may be submitted to this office within 30 days following the date of this public notice.

If the Regional Administrator finds a significant degree of public interest exists with respect to the proposed permit, a public hearing shall be held. If no hearing is held, we expect to forward the permit containing the final determinations of the Regional Administrator shortly after the close of the 30-day comment period.

If you have any questions regarding the draft permit, please call Aaron Poentis of my staff at (415) 974-8286.

Sincerely,

Kenneth D. Greenberg

Kenneth D. Greenberg, Chief
Permits Issuance Section

Enclosure

cc: see attached mailing list

MK-Ferguson Company
UMTRA Project
Tuba City, Arizona
NPDES Permit No. AZ0023213

Robert Postle
Division of Mining, Reclamation and Enforcement
Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

Masud Zamon, Director
Dept. of Water Management
Navajo Nation
P.O. 308
Window Rock, AZ 86515

Butch Dowell, Director
Navajo Area Indian Health Service
P.O. G
Window Rock, AZ 86515

Coconino County Health Dept.
2500 North Fort Valley Road
Flagstaff, AZ 86001

Arizona Dept. Environmental Quality
Attn: Water Permits Unit, Rm. 202
2005 North Central Ave.
Phoenix, AZ 85004

Arizona Dept. of Environmental Quality
Northern Regional Office
2501 North 4th Street
Flagstaff, AZ 86001

AZ Dept. of Fish and Game
2222 W. Greenway
Phoenix, AZ 85004

Arizona Land Department
1624 W. Adams St., Rm. 421
Phoenix, AZ 85007

AZ Dept. of Water Resources
99 E. Virgina
Phoenix, AZ 85004

AZ Northern Assn. of Govs.
P.O. Box 57
Flagstaff, AZ 86002

AZ Dept. of Mineral Resources
Mineral Bldg., Fairground
Phoenix, AZ 85007

Melvin Shilling, Chief
Office of Surface Mining
Federal Program Div.
1020 - 15th St.
Denver, CO 80202

OEPAD/AZ Dept. of Commerce
1700 W. Washington, 4th Fl.
Phoenix, AZ 85007

USDA, Forest Service
Soil and Water Staff Unit
217 Gold Ave., SW
Albuquerque, NM 87108

Deborah Mann
US Dept. of Energy
5301 Central Ave., NE
Suite 1700
Albuquerque, NM 87108

US Fish and Wildlife Service
Ecology Service
3616 W. Thomas, Suite 6
Phoenix, AZ 85019

J.E. Williams, Construction Engineering Manager
MK-Ferguson Company
P.O. Box 9136
Albequerque, NM 87119

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

FACT SHEET

UMTRA Project - Tuba City
NPDES No. AZ0023213

BACKGROUND

On March 29, 1985, the Department of Energy, (DOE) and the Navajo Nation entered into a cooperative agreement to do remedial actions on a uranium mill tailings and the associated contaminated materials left abandoned at the inactive processing site in Tuba City, Arizona. The DOE has contracted the MK-Ferguson company to implement these remedial actions at Tuba City. As part of their cleanup operation, MK-Ferguson indicated its intent to apply for a National Pollutant Discharge Elimination System (NPDES) permit. Under the Clean Water Act, no facility can discharge to surface waters or their tributaries without an NPDES permit. NPDES permits for facilities in the Navajo Nations are issued by the U.S. Environmental Protection Agency (EPA) regional office in San Francisco, California.

In November 1986, the DOE published an environmental assessment of remedial actions at the Tuba City uranium mill tailing site (DOE/EA-0317) and recommended the encapsulation of the tailings at its present location.

The proposed facility would consist of constructing temporary drainage ditches to route stormwater runoff from contaminated areas of the project site into lined retention basins. Accumulated runoff would be applied to the surface of the tailings to control dust and optimize compaction. An NPDES permit is required should there be at the completion of the project, an excess amount of water remaining in the retention basin. Water remaining in the retention basin must meet federal and state water quality requirements prior to discharge. Treatment will be required if the water does not meet these requirements. No discharge would be allowed which did not meet the Arizona Water Quality standards and the EPA regulations governing uranium mine drainage.

The NPDES permit application, submitted on April 22, 1988, is for the possible discharge of excess collected stormwater. This NPDES permit if granted, would be valid for only a single event, as completion of the remedial actions at Tuba City will terminate the permit.

PROPOSED EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The effluent limits in the draft permit are based on the EPA effluent guidelines or state water quality standards, whichever are more stringent. The Protected Use Classification of the State of Arizona Water Quality Standards are also used since neither the EPA or the Navajo Nations have promulgated standards.

Remedial actions at an inactive uranium mill tailing site are regulated by 40 CFR Part 192. Section 40 CFR 192.32(3)(ii) states: Uranium by-product material shall be managed so as to conform to the provisions of Part 440 of this chapter, "Ore Mining and Dressing Point Source Category: Effluent Limitation Guidelines and New Source Performance Standards, Subpart C: Uranium, Radium, and Vanadium Ore Subcategory." The specific citation is 40 CFR 440.33(a) which define the limits as:

Effluent Characteristics	Daily Maximum	30-day Average
Chemical Oxygen Demand (COD)	200 mg/L	100 mg/L
Zinc	1.0 mg/L	0.5 mg/L
Radium 226 (dissolved)	10.0 pCi/L	3.0 pCi/L
Radium 226 (total)	30.0 pCi/L	10.0 pCi/L
Uranium	4.0 mg/L	2.0 mg/L

The applicable Arizona State Surface Water Quality Standards are those radiochemical standards which apply to all Arizona surface waters, and specific standards for trace substances which are based on the protected uses of the receiving waters. The radiochemical standards are found at R9-21-204.B and are based on federal drinking water standards. The protected uses of the receiving waters are those which are designated for the nearest downstream surface water segment listed in Appendix A of R9-21-208. The nearest designated surface water segment downstream of the proposed discharge point is the Little Colorado River. The protected uses of this segment are: Aquatic and Wildlife, Domestic Water Source, Full Body Contact, Agricultural Livestock Watering, and Agricultural Irrigation. The state standard for radiochemicals and trace substances which are more stringent than federal guidelines for uranium mine drainage are:

Effluent Characteristics	Daily Maximum
Radium 226 plus Radium 228	5.0 pCi/L
Zinc	0.5 mg/L
pH	within the range of 6.5 to 9.0 standard units

The proposed effluent limitations include the more stringent of the federal and state requirements. These limitations and the proposed monitoring requirements are listed in Table 1.

In addition, the permit contains Best Management Practices established pursuant to 40 CFR 125.103, to prevent or minimize the potential for release of uranium ore or waste by flooding or runoff. The permit requires that the facility be designed, operated, and maintained to prevent disturbances of the encapsulated sites, and runoff and flooding attributable to a storm with a recurrence interval of not less than ten (10) years. Operation of the remedial action will be executed such that runoff from areas of tailing embankment that have been covered will be diverted away from the retention basin therefore minimizing the volume of effluent in the pond as the project nears completion.

Persons desiring to comment upon, or object to the proposed action, or request a public hearing pursuant to 40 CFR 124.11, should submit their comments or request in writing within thirty (30) days from the date of the public notice, 16 JUN 1988 either in person or by mail to:

U. S. Environmental Protection Agency, Region IX
Permits Issuance Section (W-5-1)
Attn: Kenneth D. Greenberg
215 Fremont Street
San Francisco, CA 94105

Telephone: (415) 974-9748

The administrative record, which contains the draft NPDES permit, the fact sheet, comments received, and other relevant documents, is available for review and may be obtained by calling or writing to the above address.

All comments or objections received within thirty (30) days from the date of the public notice, will be retained and considered in the formulation of the final determination regarding the permit issuance. When public interest warrants, the Regional Administrator shall hold a public notice of such hearing and will be issued at least thirty (30) days prior to the hearing date. A request for a public hearing must be in writing and state the nature of the issues proposed to be raised in the hearing.

TABLE 1

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATION 30-day average	daily maximum	MONITORING REQUIREMENT measurement frequency	sample type
Flow (gallons/day)	NA	*	Continuous	NA
Chemical Oxygen Demand (COD)	100 mg/l	200 mg/l	**	Grab
Radium 226 (dissolved)	3.0 pCi/l	10.0 pCi/l	"	"
Radium 226 (total)	10.0 pCi/l	30.0 pCi/l	"	"
Uranium	2.0 mg/l	4.0 mg/l	"	"
Radium 226 plus Radium 228		5.0 pCi/l	"	"
Zinc		0.5 mg/l	"	"
Arsenic (dissolved)		0.05 mg/l	"	"
Barium (dissolved)		1.00 mg/l	"	"
Boron (total)		1.00 mg/l	"	"
Cadmium (total)		0.01 mg/l	"	"
Chromium (as Cr hex + trivalent)		0.05 mg/l	"	"
Copper (dissolved)		0.05 mg/l	"	"
Lead (dissolved)		0.05 mg/l	"	"
Manganese (total)		10.00 mg/l	"	"
Mecury (total)		0.0002 mg/l	"	"
Selenium (total)		0.05 mg/l	"	"
Silver (dissolved)		0.05 mg/l	"	"
Ammonia		0.02 mg/l	"	"
Cyanides (as cyanide ions & complexes)		0.02 mg/l	"	"
Phenolics		0.005 mg/l	"	"
Sulfides (total)		0.10 mg/l	"	"
pH	Within the range of 6.5 to 9.0 standard units		"	"

NA - Not Applicable
* Monitoring and Reporting Required
** Measurement of the effluent shall consist of a minimum of three equally spaced samples, one of which must be prior to the discharge, and one of which must be at the completion of the discharge.

Permit No. AZ0023213

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.: the "Act"),

MK-FERGUSON COMPANY
UMTRA PROJECT SITE - TUBA CITY
US HIGHWAY 160 (6 MI. EAST OF TUBA CITY)
TUBA CITY, ARIZONA 86045

is authorized to discharge from their retention pond, located in Coconino County, Arizona (Discharge Serial No. 001: Mine Drainage Water)

to receiving waters tributary to Moenkopi Wash, tributary to the Little Colorado River

Latitude: 36° 08' 33" N
Lontitude: 111° 07' 55" W

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight, (five years after the effective date).

Signed this day of

For the Regional Administrator,

DRAFT

Harry Seraydarian
Director
Water Management Division

1. Based upon a design capacity of 400 gallons/minute, the permittee is authorized to discharge from outfall number 001:

a. Such discharge shall be limited and monitored as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATION 30-day Ave	DISCHARGE LIMITATION Daily Max.	MONITORING REQUIREMENTS Measurement Frequency	MONITORING REQUIREMENTS Sample Type
Flow (gallon/day)	NA	*	Continous	NA
Chemical Oxygen Demand	100 mg/l	200 mg/l	**	Grab
Radium 226 (dissolved)	3.0 pCi/l	10.0 pCi/l	"	"
Radium 226 (total)	10.0 pCi/l	30.0 pCi/l	"	"
Uranium	2.0 mg/l	4.0 mg/l	"	"
Radium 226 + Radium 228 (total)		5.0 pCi/l	"	"
Zinc		0.5 mg/l	"	"
Arsenic (dissolved)		0.05 mg/l	"	"
Barium (dissolved)		1.00 mg/l	"	"
Boron (total)		1.00 mg/l	"	"
Cadmium (total)		0.01 mg/l	"	"
Chromium (as Cr hex + trivalent)		0.05 mg/l	"	"
Copper (dissolved)		0.05 mg/l	"	"
Lead (dissolved)		0.05 mg/l	"	"
Manganese (total)		10.00 mg/l	"	"
Mercury (total)		0.0002 mg/l	"	"
Selenium (total)		0.05 mg/l	"	"
Silver (dissolved)		0.05 mg/l	"	"
Ammonia		0.02 mg/l	"	"
Cyanides (as cyanide ions & complexes)		0.02 mg/l	"	"
Phenolics		0.005 mg/l	"	"
Sulfides (total)		0.10 mg/l	"	"
pH	Within the range of 6.5 to 9.0 standard units		"	"

NA - Not Applicable

* Monitoring and Reporting Required

** Measurement of the effluent shall consist of a minimum of three equally spaced samples, one of which must be prior to the discharge, and one of which must be at the conclusion of the discharge. If the total duration of the discharge is less than a full workday (eight hours continous), the minimum measurement amount of the effluent shall consist of two samples, one prior to the discharge, and at the completion of the discharge.

- Effluent shall be sampled at the discharge point from the lagoon prior to discharge to Moenkopi Wash, tributary to the Little Colorado River.

- Results of monitoring shall be submitted to EPA prior to discharge. EPA shall be notified in writing of anticipated discharge prior to the event. This report shall state projected date discharge begins, total volume, anticipated flow rate and duration.

- Trace substances shall be limited and monitored as specified. All metals limits are for total recoverable metals as specified in Methods for Chemical Analysis of Water and Wastes (EPA 600/4-79-020) method 4.1.4.

- "Grab Sample" is defined as any individual sample collected in a short period of time not exceeding fifteen (15) minutes.

b. Best Management Practices

In order to prevent the unnecessary mixture of clean runoff with contaminated runoff in the retention basin, the permittee is required to take the following measures:

1. Construct the surface runoff drainage and collection system such that only runoff from the tailings area is collected.

2. As areas of the tailings are capped the permittee is required to divert runoff from capped areas away from the stormwater collection basin. This should be done only after the cap has been completed to the point that contamination of surface runoff is guaranteed.

3. Within 60 days of the effective date of this permit, submit a report to EPA describing how requirements b.1 and b.2 will be accomplished.

EPA Region 9 - Standard Federal NPDES Permit Conditions

(Updated as of January 29, 1988)

1) Duty to Reapply [40 CFR 122.21(d)]

The permittee shall submit a new application 180 days before the existing permit expires.

2) Applications [40 CFR 122.22]

(a) All permit applications shall be signed as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principle business function, or any other person who performs similar policy- or decision-making functions for the corporation, or

(ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes: (i) The chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

(b) All reports required by permits and other information requested by the Director shall be signed by a person described in paragraph (a) of this Section, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described in paragraph (a) of this section;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) and,

(3) The written authorization is submitted to the Director.

(c) Changes to authorization. If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

(d) Certification. Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

3) Duty to comply [40 CFR 122.41(a)]

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

(1) The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(2) The Clean Water Act provides that:

(A) Any person who causes a violation of any condition in this permit is subject to a civil penalty not to exceed $25,000 per day of each violation. Any person who negligently causes a violation of any condition in this permit is subject to a fine off not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both for a first conviction. For a second conviction, such a person is subject to a fine of not more than $50,000 per day of violation, or by imprisonment for not more than two years, or both. [Updated pursuant to the Water Quality Act of 1987]

(B) Any person who knowingly causes violation of any condition of this permit is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than three years, or by both for a first conviction. For a second conviction, such a person is subject to a fine of not more than $100,000 per day of violation, or by imprisonment of not more than six years, or both. [Updated pursuant to the Water Quality Act of 1987]

(C) Any person who knowingly causes a violation of any condition of this permit and, by so doing, knows at that time that he thereby places another in imminent danger of death or serious bodily injury shall be subject to a fine of not more than $250,000, or imprisonment of not more than 15 years, or both. A person who is an organization and violates this provision shall be subject to a fine of not more than $1,000,000 for a first conviction. For a second conviction under this provision, the maximum fine and imprisonment shall be doubled. [Updated pursuant to the Water Quality Act of 1987]

4) **Need to halt or reduce activity not a defense** [40 CFR 122.41(c)]

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

5) **Duty to mitigate** [40 CFR 122.41(d)]

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

6) **Proper operation and maintenance** [40 CFR 122.41(e)]

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

7) **Permit actions** [40 CFR 122.41(f)]

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

8) **Property rights** [40 CFR 122.41(g)]

This permit does not convey any property rights of any sort, or any exclusive privilege.

9) **Duty to provide information** [40 CFR 122.41(h)]

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Director upon request, copies of records required to be kept by this permit.

10) **Inspection and entry** [40 CFR 122.41(i)]

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

(3) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(4) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

11) Monitoring and records [40 CFR 122.41(j)]

(1) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(2) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

(3) Records of monitoring information shall include:

(i) The date, exact place, and time of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) The date(s) analyses were performed;

(iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The results of such analyses.

(4) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

(5) The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained in this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both for a first conviction. For a second conviction, such a person is subject to a fine of not more than $20,000 per day of violation, or imprisonment for not more than four years, or both. [Updated pursuant to the Water Quality Act of 1987]

12) Signatory requirement [40 CFR 122.41(k)]

(1) All applications, reports, or information submitted to the Director shall be signed and certified. (See 40 CFR 122.22)

(2) The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or

by both for a first conviction. For a second conviction, such a person is subject to a fine of not more than $20,000 per day of violation, or imprisonment of not more than four years, or both. [Updated pursuant to the Water Quality Act of 1987]

13) Reporting requirements [40 CFR 122.41(l)]

(1) Planned changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(i) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or

(ii) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

(2) Anticipated noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(3) Transfers. This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act (CWA). (See 40 CFR 122.61; in some cases, modification or revocation and reissuance is mandatory.)

(4) Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(i) Monitoring results must be reported on a Discharge Monitoring Report (DMR).

(ii) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

(iii) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

(5) Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

(6) Twenty-four hour reporting.

(i) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or

planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(ii) The following shall be included as information which must be reported within 24 hours under this paragraph.

(A) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR 122.41(g).)

(B) Any upset which exceeds any effluent limitation in the permit.

(C) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in the permit to be reported within 24 hours. (See 40 CFR 122.44(g).)

(iii) The Director may waive the written report on a case-by case basis for reports under paragraph (6)(ii) of this section if the oral report has been received within 24 hours.

(7) Other noncompliance. The permittee shall report all instances of noncompliance not reported under paragraphs (4), (5), and (6) of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (6) of this section.

(8) Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

14) Bypass [40 CFR 122.41(m)]

(1) Definitions

(i) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(ii) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

(2) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (3) and (4) of this section.

(3) Notice-

(i) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, of possible at least ten days before the date of the bypass.

(ii) Unanticipated bypass. If the permittee shall submit notice of an unanticipated bypass as required in paragraph (a)(6) of section 13) (24-hour notice).

(4) Prohibition of bypass.

(i) Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(C) The permittee submitted notices as required under paragraph (3) of this section.

(ii) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph (4)(i) of this section.

15) Upset [40 CFR 122.41(n)]

(1) Definition.

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

(2) Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph (3) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

(3) Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(i) An upset occurred and that the permittee can identify the cause(s) of the upset;

(ii) The permitted facility was at the time being properly operated; and

(iii) The permittee submitted notice of the upset as required in paragraph 13)(6)(ii)(B)(24-hour notice).

(iv) The permittee complied with any remedial measures required under 40 CFR 122.41(d).

(4) Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

16) Existing manufacturing, commercial, mining, and silvicultural dischargers [40 CFR 122.42(a)]

In addition to the reporting requirements under 40 CFR 122.41(l), all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:

(1) That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(i) One hundred micrograms per liter (100 ug/l);

(ii) Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

(iii) Five times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or

(iv) The level established by the Director in accordance with 40 CFR 122.44(f).

(2) That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(i) Five hundred micrograms per liter (500 ug/l);

(ii) One milligram per liter (1 mg/l) for antimony;

(iii) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7);

(iv) The level established by the Director in accordance with 40 CFR 122.44(f).

17) Publicly owned treatment works [40 CFR 122.42(b)]

This section applies only to publicly owned treatment works as defined at 40 CFR 122.2.

(1) All POTW's must provide adequate notice to the Director of the following:

(i) Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; and

(ii) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

(iii) For purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

(2) [The following condition has been established by Region 9 to enforce applicable requirements of the Resource Conservation and Recovery Act] Publicly owned treatment works may not receive hazardous waste by truck, rail, or dedicated pipe except as provided under 40 CFR 270. Hazardous wastes are defined at 40 CFR 261 and include any mixture containing any waste listed under 40 CFR 261.31 - 261.33. The Domestic Sewage Exclusion (40 CFR 261.4) applies only to wastes mixed with domestic sewage in a sewer leading to a publicly owned treatment works and not to mixtures of hazardous wastes and sewage or septage delivered to the treatment plant by truck.

18) Reopener clause [40 CFR 122.44(c)]

This permit shall be modified or revoked and reissued to incorporate an applicable effluent standard or limitation under sections 301(b)(2)(C), and (D), 304(b)(2) and 307(a)(2) which is promulgated or approved after the permit is issued if that effluent standard or limitation is more stringent than any effluent limitation in the permit, or controls a pollutant not limited in the permit.

19) Privately owned treatment works [The following conditions were established by Region 9 to enforce applicable requirements of the Resource Conservation and Recovery Act and 40 CFR 122.44(m)]

This section applies only to privately owned treatment works as defined at 40 CFR 122.2.

(1) Materials authorized to be disposed of into the privately owned treatment works and collection system are typical domestic sewage. Unauthorized materials are hazardous waste (as defined at 40 CFR Part 261), motor oil, gasoline, paints, varnishes, solvents, pesticides, fertilizers, industrial wastes, or other materials not generally associated with toilet flushing or personal hygiene, laundry, or food preparation, unless specifically listed under "Authorized Non-domestic Sewer Dischargers" elsewhere in this permit.

(2) It is the permittee's responsibility to inform users of the privately owned treatment works and collection system of the prohibition against unauthorized materials and to ensure compliance with the prohibition. The permittee must have the authority and capability to sample all discharges to the collection system, including any from septic haulers or other unsewered dischargers, and shall take and analyze such samples for conventional, toxic, or hazardous pollutants when instructed by the permitting authority or by an EPA, State or Tribal inspector. The permittee must provide adequate security to prevent unauthorized discharges to the collection system.

(3) Should a user of the privately owned treatment works desire authorization to discharge non-domestic wastes, the permittee shall submit a request for permit modification and an application, pursuant to 40 CFR 122.44(m), describing the proposed discharge. The application shall, to the extent possible, be submitted using EPA Forms 1 and 2C, unless another format is requested by the permitting authority. If the privately owned treatment works or collection system user is different from the permittee, and the permittee agrees to allow the non-domestic discharge, the user shall submit the application and the permittee shall submit the permit modification request. The application and request for modification shall be submitted at least 6 months before authorization to discharge non-domestic wastes to the privately owned treatment works or collection system is desired.

20) Transfers by modification [40 CFR 122.61(a)]

Except as provided in section 21), a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued (under 40 CFR 122.62(b)(2)), or a minor modification made (under 40 CFR 122.63(d)), to identify the new permittee and incorporate such other requirements as may be necessary under CWA.

21) Automatic transfers [40 CFR 122.61(b)]

As an alternative to transfers under section 20), any NPDES permit may be automatically transferred to a new permittee if:

(1) The current permittee notifies the Director at least 30 days in advance of the proposed transfer date in paragraph (2) of this section;

(2) The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

(3) The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify or revoke and reissue the permit. A modification under this subparagraph may also be a minor modification under 40 CFR 122.63. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in the paragraph (2) of this section.

22) Minor modification of permits [40 CFR 122.63]

Upon the consent of the permittee, the Director may modify a permit to make the corrections or allowances for changes in the permitted activity listed in this section, without following the procedures of 40 CFR Part 124. Any permit modification not processed as a minor modification under this section must be made for cause and with 40 CFR Part 124 draft permit and public notice as required in 40 CFR 122.62. Minor modifications may only:

(1) Correct typographical errors;

(2) Require more frequent monitoring or reporting by the permittee;

(3) Change an interim compliance date in a schedule of compliance, provided the new date is not more than 120 days after the date specified in the existing permit and does not interfere with attainment of the final compliance date requirement; or

(4) Allow for a change in ownership or operational control of a facility where the Director determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittees has been submitted to the Director.

(5)(i) Change the construction schedule for a discharger which is a new source. No such change shall affect a discharger's obligation prior to discharge under 40 CFR 122.29.

(ii) Delete a point source outfall when the discharge from that outfall is terminated

and does not result in discharge of pollutants from other outfalls except in accordance with the permit limits.

(6) When the permit becomes final and effective on or after March 9, 1982, conform to changes respecting 40 CFR 122.41(e), (l), (m)(4)(i)(B), (n)(3)(i), and 122.42(a) issued September 26, 1984.

(7) Incorporate conditions of a POTW pretreatment program that has been approved in accordance with the procedures in 40 CFR 403.11 as enforceable conditions of the POTW's permit.

23) Termination of permits [40 CFR 122.64]

The following are causes for terminating a permit during its term, or for denying a permit renewal application:

(1) Noncompliance by the permittee with any condition of the permit;

(2) The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time;

(3) A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination; or

(4) A change in any condition that requires either a temporary or a permanent reduction or elimination of any discharge controlled by the permit (for example, plant closure or termination of discharge by connection to a POTW).

24) Availability of Reports [Pursuant to Clean Water Act Section 308]

Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Regional Administrator. As required by the Act, permit applications, permits, and effluent data shall not be considered confidential.

25) Removed Substances [Pursuant to Clean Water Act Section 301]

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

26) Severability [Pursuant to Clean Water Act Section 512]

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and remainder of this permit, shall not be affected thereby.

27) Civil and Criminal Liability [Pursuant to Clean Water Act Section 309]

Except as provided in permit conditions on "Bypass" (Section 14) and "Upset" (Section 15), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

28) Oil and Hazardous Substance Liability [Pursuant to Clean Water Act Section 311]

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

29) State or Tribal Law [Pursuant to Clean Water Act Section 510]

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the operator from any responsibilities, liabilities, or penalties established pursuant to any applicable State or Tribal law or regulation under authority preserved by Section 510 of the Clean Water Act.

TUBA CITY MILL (f)

KGR

United States Government

Department of Energy

memorandum

Albuquerque Operations Office

DATE: NOV 24 1986

REPLY TO
ATTN OF: UMTRA:WJA

SUBJECT: Monthly Activity Schedules

TO: Those on Attached List

Provided for your information are the monthly issuance of schedules for Uranium Mill Tailings Remedial Action (UMTRA) Project Sites. These schedules reflect a one year window of all key project activities in the areas of site characterization, NEPA compliance, design development, remedial action construction, certification, licensing, and surveillance and maintenance. Please refer any questions to the DOE UMTRA site engineer designated on attached listing or John D'Antonio (844-3941).

John G. Themelis, Project Manager
Uranium Mill Tailings Project Office

Attachment

PROJECT MILESTONE REPORT - TUBA CITY AZ.

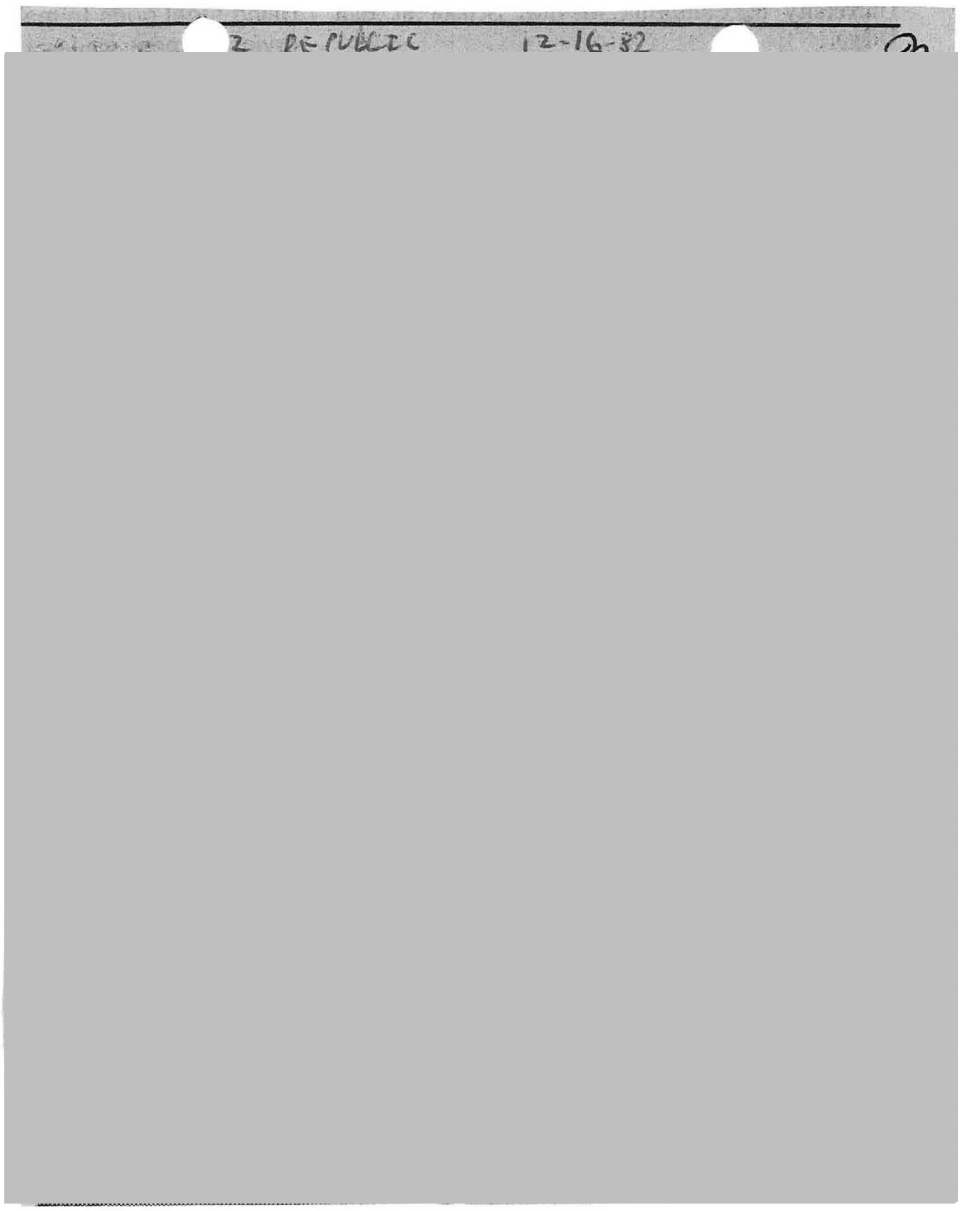
OPEN-PLAN REPORT PMT1 FOR NETWORK U:IPMSUM

RUN DATE: 24NOV86
DATA DATE: 01NOV86

ACTIVITY IDENTIFIER	ACTIVITY DESCRIPTION		WORKING START	WORKING COMPLETION
1000-18-021	PRELIMINARY DESIGN REVIEW MEETING		01OCT86 A	10OCT86 A
1000-18-013	TRIBES REVIEW PRELIMINARY DESIGN		18AUG86 A	30OCT86 A
1503-18-071	INC CMTS, REC APPROVAL AND EA	PUB	11JUN86 A	21NOV86 E
0505-18-041	INCORP CMTS/RAC DES & ISS RAP	FINAL	15MAY86 A	19DEC86 E
1000-18-061	FINALIZE DESIGN ***		24JUL86 A	19DEC86 E
1503-18-081	FINAL EA REVIEW		24NOV86	26DEC86
1000-18-081	RFP ISSUE		22DEC86	16JAN87
1000-18-062	NRC REVIEW FINAL DESIGN		22DEC86	23JAN87
1000-18-063	TRIBES REVIEW FINAL DESIGN		22DEC86	23JAN87
1503-18-091	PUBLISH FONSI ***		29DEC86	23JAN87
0505-18-051	NRC REVIEW FINAL RAP/DES		05JAN87	20FEB87
0505-18-053	TRIBES REVIEW FINAL RAP/DES		05JAN87	20FEB87
0505-18-061	FINAL RAP/DES REVIEW MEETING		23FEB87	06MAR87
1000-18-085	RECEIVE BIDS		19JAN87	19MAR87
1000-18-091	DOE APPROVE RA CONTRACT		20MAR87	02APR87
0505-18-071	FINAL RAP CONCURRENCE AND PUBLISH		23FEB87	03APR87
1000-18-101	AWARD CONTRACTS		03APR87	20MAY87
1000-18-111	VP ENGINEERING		01APR87	01JAN88
3000-18-011	PHASE II REMEDIAL ACTION		21MAY87	31OCT88
0501-18-200	MOUND RADON MONITORING		23JUL85 A	01MAY89 E

PROJECT MILESTONE REPORT - MONUMENT VALLEY AZ.

ACTIVITY IDENTIFIER	ACTIVITY DESCRIPTION	WORKING START	WORKING COMPLETION
0505-19-021	NRC REVIEW DRAFT SCD/RAP & COMMENT	29APR86 A	07OCT86 A
0505-19-023	TRIBES REV DRAFT SCD/RAP & COMMENT	29APR86 A	07OCT86 A
1503-19-071	INC CMTS AND PRINT EA	17JUN86 A	31MAR87 E
1503-19-073	PE/OGC APPROVE EA	01APR87	12MAY87
1503-19-075	INC COMMENTS AND PUBLISH EA	13MAY87	15MAY87
1000-19-001	PRELIMINARY DESIGN	01SEP85 A	19MAY87 E
1000-19-003	VALUE ENGINEERING REVIEW PREL DES	03JUN87	09JUN87
1503-19-081	FINAL EA REVIEW	18MAY87	19JUN87
1000-19-011	NRC REVIEW PRELIMINARY DESIGN	20MAY87	01JUL87
1000-19-013	TRIBE REVIEW PRELIMINARY DESIGN	20MAY87	01JUL87
1503-19-091	PUBLISH FONSI ***	22JUN87	24JUL87
1000-19-061	FINALIZE DESIGN	20MAY87	01DEC87
0501-19-200	RADON MONITORING	27AUG85 A	30OCT91 E



"Star"

TUCSON, THURSDAY, DECEMBER 16, 1982

THE TUBA CITY URANIUM MILLING OPERATIONS

BY
S. M. RUNKE, CHIEF METALLURGIST
EL PASO NATURAL GAS COMPANY - MINING DIVISION
EL PASO, TEXAS

AT THE NATIONAL WESTERN MINING CONFERENCE
OF THE COLORADO MINING ASSOCIATION
FEBRUARY 7, 1964, DENVER, COLORADO

Location and Ownership

The Tuba City Mill is located five (5) miles east of Tuba City, Arizona in the heart of the Navajo Indian Reservation, and approximately eighty (80) miles north of Flagstaff, Arizona. The plant is now owned and operated by El Paso Natural Gas Company. It was originally built and operated by Rare Metals Corporation of America; however, in July of 1962 El Paso Natural Gas Company succeeded Rare Metals Corporation of America by merger.

History

The Tuba City Mill was designed and built to process the uranium ores produced in the Cameron Mining District by acid leaching and the resin-in-pulp or R.I.P. process. The Cameron Mining District is located along the Little Colorado River about thirty (30) miles west of the mill site. The ore deposits were confined to the Chinle formation of the upper Triassic period, occurring as pods and pockets relatively close to the surface, so that the bulk of the mining was by open pit methods. The ores produced from these deposits were composed largely of bentonitic mudstones, and to a lesser extent, arkosic sandstones consisting of medium to fine-grained sand cemented with bentonitic clays, carbonates and carbonaceous materials. The average particle size of these ores fell into the silt size range; this feature coupled with the clay content, made them exceptionally slimy and very difficult to handle throughout the various milling operations. Carnotite and tyuyamunite were the principal uranium minerals present, although, some refractory uranium minerals were also present, as it was necessary to use both heat and an oxidant to obtain good leach extractions. Acid leaching and the resin-in-pulp process for treating these ores was chosen over other methods because of their low lime and poor filtration and thickening characteristics. In the Spring of 1955, they were successfully treated by this method in the A. E. C. pilot plant at Grand Junction, Colorado. The results and data obtained from the pilot plant testing were used in the design and construction of the Tuba City plant. The plant was completed in May of 1956; however, full production was not reached until late Fall due to many difficulties encountered in viscosity and flow rates throughtout the entire plant. The original designed capacity of the plant was 260 tons per day; however, once start up difficulties were overcome, the capacity was stepped up to 300 tons per day, and the plant operated continuously at this rate until April of 1962.

Ore Supply Past and Present

The bulk of the ore processed in the Tuba City Mill through the period ending in April of 1962 was obtained from the Cameron Mining District; however, during this period a wide variety of ores were treated. The major sources of ore, other than the Cameron District, were the Monument Valley area in northeastern Arizona, the stockpiled ore at the Cutter Buying Station near Globe, Arizona, the Anderson Mine located in the vicinity of Congress Junction, and the Orphan Lode Mine located near the village of Grand Canyon, Arizona. During 1961, the Orphan Lode Mine became increasingly important as a source of ore for the mill, until at the present time it is the only ore that is being processed. All other sources appear to have been exhausted.

All of these ores proved to be readily amenable to the process of acid leaching and resin-in-pulp, even though their physical character varied from the easily slimed, clay-bearing ores of the Cameron District to the hard, dense quartzites of the Cutter ore. In general, the lime content was low, less than 6.0 percent $CaCo_3$, with the exception of the Orphan Lode ore which ranged up as high as 25 percent $CaCO_3$. The uranium minerals contained in these ores consisted primarily of carnotite, autunite, tyuyamunite and uraninite, with many others not readily indentifiable.

Contract Renewal

In April of 1962, after processing all the ore stockpiled at the plant site, the mill was shutdown pending negotiations with the Atomic Energy Commission for contract to continue production of uranium concentrates, and with Western Equities,

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content. Fortunately, this material was amenable to acid leaching and ion exchange for the recovery of uranium, and also, since the sulfide minerals are predominately chalcocite, it was possible to produce a valuable by-product.

The Mill Flowsheet

The final flowsheet developed for processing the Orphan Lode ore consisted of crushing to minus 1/2 inch, grinding to approximately 65-mesh in a sodium carbonate solution, followed by sulfide flotation and thickening of the flotation tailing or nonfloat material. The thickened pulp is then leached and filtered, and the resulting solutions clarified, prior to precipitation of the uranium with caustic soda. The barren solutions are carbonated and returned for reuse. The sulfide concentrates are acid leached in three stages, filtered, and the uranium is extracted from the solutions by ion exchange. The uranium, eluted from the ion exchange process, is precipitated by neutralization with a combination of ammonia and magnesia.

Plant Conversion and Start Up

All phases of the construction involved in converting the plant from an acid leach to a carbonate leach were done by the operating staff and crews. The construction was handled in this manner in order to keep the experienced employees available for the resumption of milling, once a new contract for the production of uranium had been negotiated.

The bulk of the equipment installed in the plant was used equipment, and was acquired in 1961 and 1962 by competitive bidding from the A.E.C. during the dismantling of the Montecello Plant at Montecello, Utah. As the equipment became available and was purchased, it was dismantled and moved to the Tuba City Mill where it was repaired and made ready for installation. The actual construction of the plant did not begin in earnest until the new production contract with A.E.C. was signed late in November, 1962. The installation of the equipment proceeded smoothly and by the end of March, the plant was ready to commence milling operations.

The plant start up was somewhat difficult due to problems which involved thickening and filtering. Operating techniques were soon developed, and by June the plant was operating at the designed capacity of 200 tons per day. Since that time, there has been a steady improvement in the metallurgy. One other problem developed at the start up involving the acid leaching of the sulfide concentrates. While laboratory studies indicated that no problem should occur in this circuit, it was impossible in actual milling operations to obtain a reasonable uranium tailing in this product. It finally became necessary to filter and stockpile the sulfide concentrate, until this problem was resolved by multi stage leaching.

A detailed description of the flowsheet is as follows:

Ore Receiving and Crushing

The ore is delivered to the mill by truck and each load is weighed, sampled for moisture, and accumulated into lots of approximately 600 tons each. When a lot is completed, it is fed to the crushing plant by a 125 Michigan Loader. It is dumped on a 12-inch grizzly below which is a 50 ton coarse ore bin. The ore is discharged from this bin by a 36-inch x 60-inch Syntron vibratory feeder to the number one conveyor which transports it to a stationary grizzly with 4-inch openings. The minus 4-inch material passes through a chute to number two conveyor. The coarse material passing over the grizzly is discharged to a 18-inch by 30-inch jaw crusher set to crush to 4-inch.

The crusher also discharges on the number two conveyor which delivers the ore to a 3-foot x 6-foot vibrating screen equipped with 1/2-inch x 6-inch slotted type deck. The screen undersize passes through a chute to the number three conveyor. The oversize is delivered to a 3-foot standard Symons cone crusher set to crush to 1/2-inch, and is recombined with the screen fines on number three conveyor. Number three conveyor transports the ore to number four conveyor, and at the point of discharge the first sample cut is made for the ore lot sample. This sample goes through two additional stages of crushing and two additional cutters. All sample rejects are returned to the number four conveyor and the main ore stream, which is delivered to number five conveyor. Number five conveyor in turn delivers the ore to the fine ore bins via a tripper. There are six 300-ton ore bins available and one 50-ton truck bin. The ore may be blended into the six bins, or it may be delivered to any single bin as desired.

(OVER)

holding tank, the pregnant solution is pumped through a steam heat exchanger and into number one precipitation tank. The temperature of the solution is maintained between 170° and 180° F. The precipitation circuit consists of three mechanically agitated and insulated tanks, operating in series, each being 10-foot diameter X 12 foot. A 50 percent solution of sodium hydroxide is used for the precipitation of uranium, and is added to the number one precipitation tank and controlled in the number two tank, so that the sodium hydroxide concentration ranges between 3 and 5 grams per liter. The solution and the precipitated uranium flows from the number three tank to a 12-foot diameter X 10-foot insulated thickener, where the solids are allowed to settle. The thickener overflow, or barren solution, is pumped through one of two 30-inch X 30-inch filter presses for clarification. The solids recovered from the presses, being high-grade uranium, are repulped and fed back to the head of the precipitation circuit.

The barren solution from the filter presses flows through a 3-foot diameter by 12-foot Ozark-Mahoney submerged combustion unit for carbonation. All solution control for the mill is made in the precipitation and carbonation circuits, since these are the only points of reagent addition. The amount of sodium hydroxide added is sufficient not only to precipitate the uranium, but also to maintain the concentration of sodium carbonate in the barren solution at approximately 50 grams per liter. As previously mentioned, a sufficient amount of sodium hydroxide is added to the solution in this circuit to maintain the concentration between 6 and 7 grams per liter. The barren solution is then carbonated to a point where it contains 2 to 4 grams per liter of sodium bicarbonate.

Product Filtering, Drying and Packaging

The thickened uranium precipitate is pumped to a cone-bottom holding tank at the head of the product filtering circuit from where it is delivered as needed to 3-foot diameter X 2-foot Denver Drum filter. The resulting filter cake is repulped with water, and is refiltered in a 4-foot disk type filter. The filtrate from both filters is returned to the thickener in the precipitation section.

The final filter cake is repulped with water and pumped to a 24-inch X 36-inch double from Blaw Knox dryer. The dried product is very soft, and is screened through a 1/4-inch screen as it is loaded into drums. The drums of product are weighed, sampled and shipped by truck to the Atomic Energy Commission at Grand Junction, Colo.

Acid Leaching of the Sulfides and Uranium Recovery

The flotation concentrates or sulfide minerals are pumped directly from the last flotation cleaner cell, without thickening, to number one acid leach tank. Three mechanically agitated wooden tanks 10-foot diameter X 16-foot high, operating in series with two acid proof 4-foot X 28-foot Dorr-Oliver classifiers, and one 6-foot X 6-foot Eimco acid proof filter, comprise the acid leach circuit. The solids are advanced down through the circuit, and are filtered and washed after the third and final leach stage. This product constitutes the copper sulfide concentrate.

The acid solutions are advanced up the circuit, and are removed from the first leach stage as the overflow from classifier number one for processing in the RIP circuit for extraction of uranium. In the second and third leaching stages, a sufficient amount of sulfuric acid and manganese dioxide are added to maintain the solutions at 50 grams of H_2SO_4 per liter and a emf of minus 300 mv. In the number one leaching stage, these conditions are maintained at somewhat lower figures to more nearly approach the optimum PH of 1.7 for RIP, and to save on both acid and oxidant.

The uranium is extracted from the sulfuric acid solution by the resin, and is eluted from the resin with a nitric acid solution containing approximately 50 grams $H NO_3$ per liter. The nitrate solution is pumped to settling tanks for clarification, and the uranium is precipitated batchwise with a combination of ammonia and magnesia. Each batch of precipitated uranium is washed with fresh water by agitation and decantation within the precipitation tanks, and is then pumped to a 12-foot diameter X 10-foot thickener for storage. Periodically, this product is pumped to the repulper ahead of the dryer for drying and packaging.

As there is a considerable amount of copper dissolved, along with the uranium, during acid leaching of the sulfide concentrate, the RIP tailing is too valuable to discard without first recovering this metal. Recovery of the dissolved copper is accomplished by cementing it out of solution with powdered iron. The RIP tailing flows through two 2-foot X 4-foot mechanical agitators in series, and powdered iron

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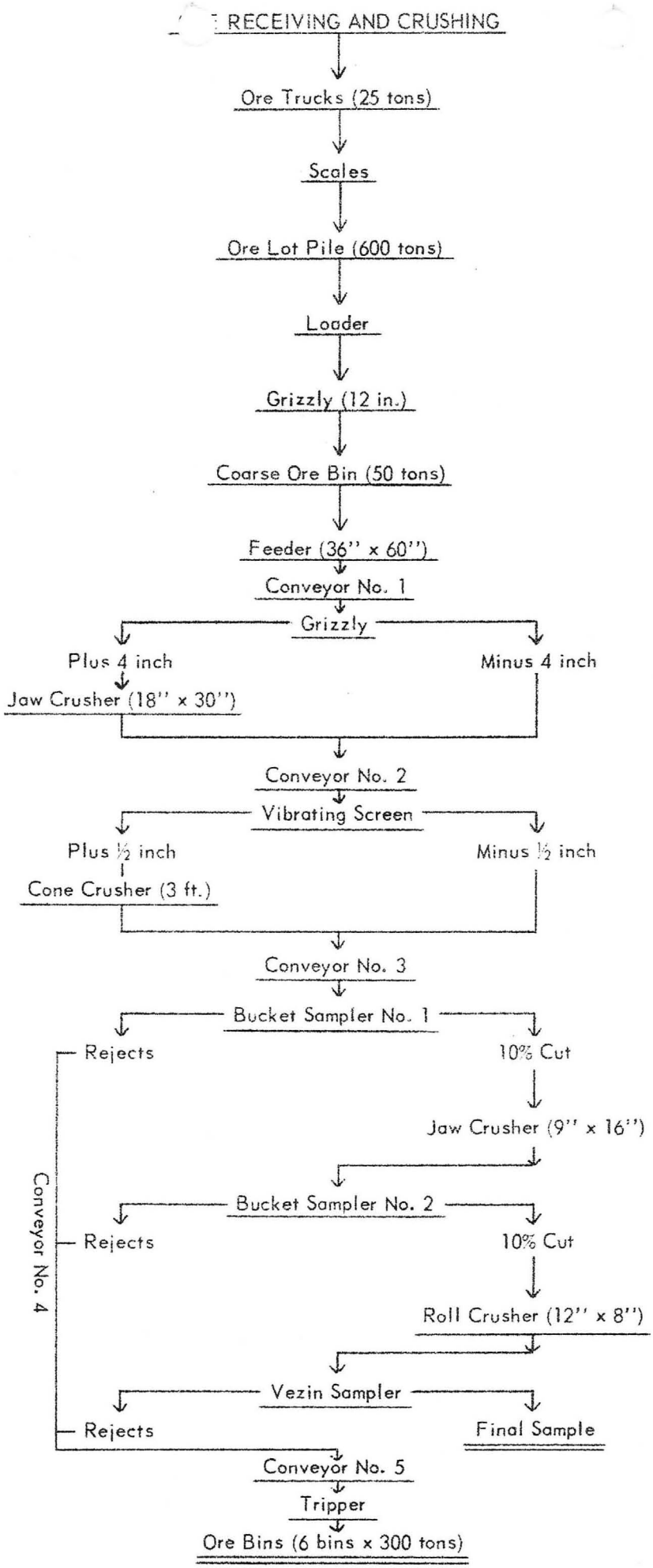
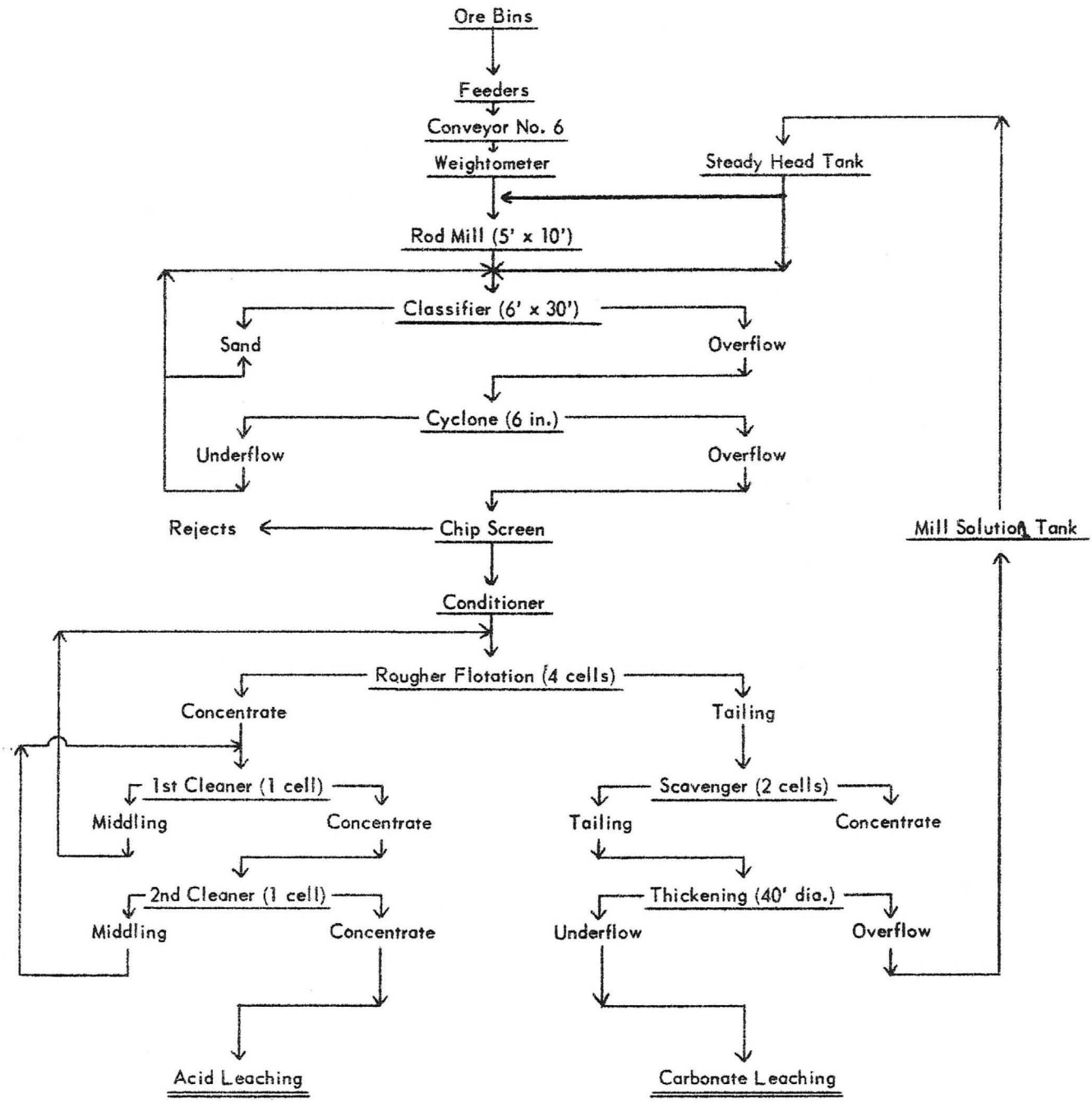
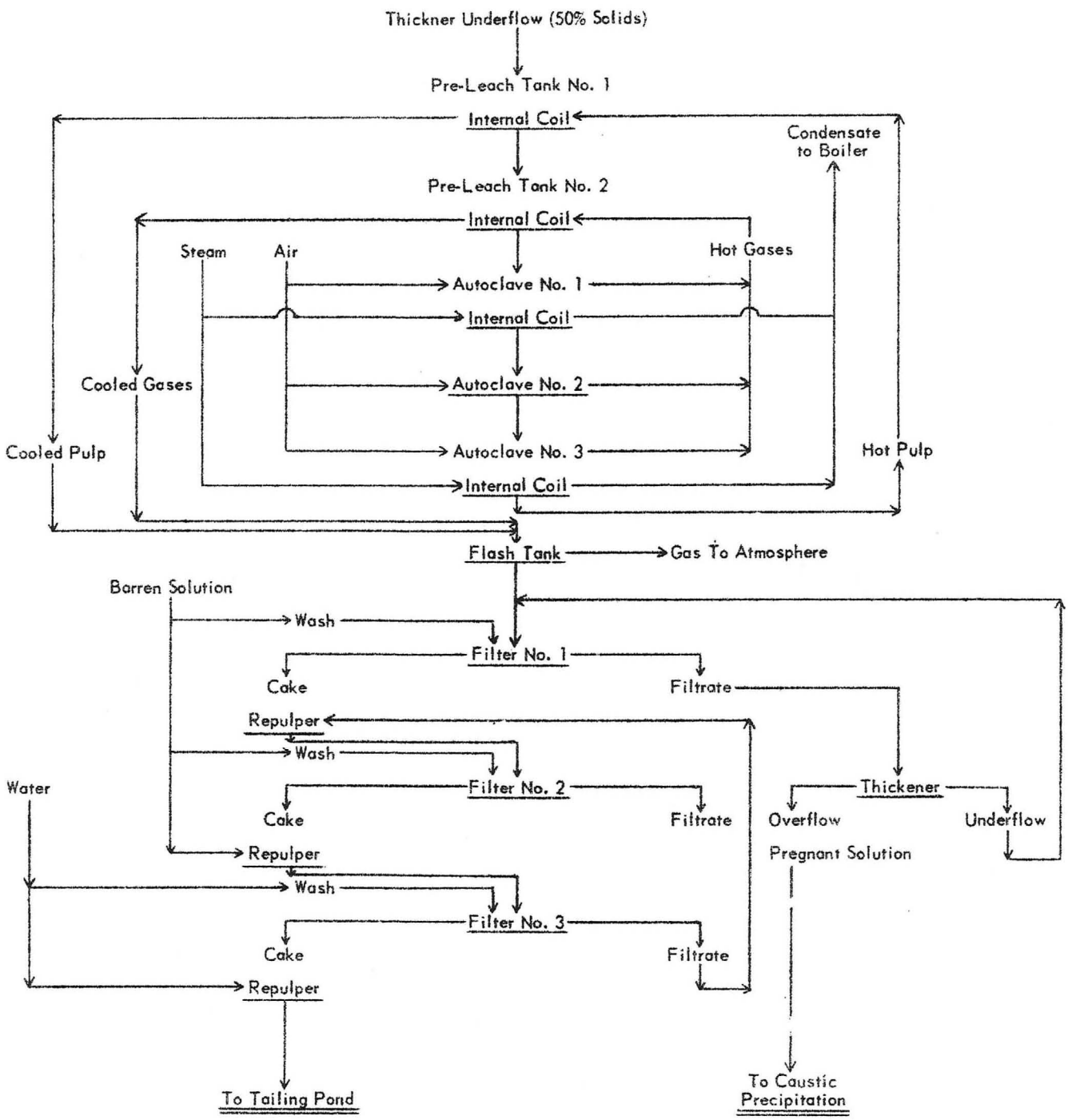

RECEIVING AND CRUSHING
Ore Trucks (25 tons)
Scales
Ore Lot Pile (600 tons)
Loader
Grizzly (12 in.)
Coarse Ore Bin (50 tons)
Feeder (36'' x 60'')
Conveyor No. 1
Grizzly
Plus 4 inch
Minus 4 inch
Jaw Crusher (18'' x 30'')
Conveyor No. 2
Vibrating Screen
Plus ½ inch
Minus ½ inch
Cone Crusher (3 ft.)
Conveyor No. 3
Bucket Sampler No. 1
Rejects
10% Cut
Jaw Crusher (9'' x 16'')
Bucket Sampler No. 2
Rejects
10% Cut
Roll Crusher (12'' x 8'')
Vezin Sampler
Rejects
Final Sample
Conveyor No. 4
Conveyor No. 5
Tripper
Ore Bins (6 bins x 300 tons)

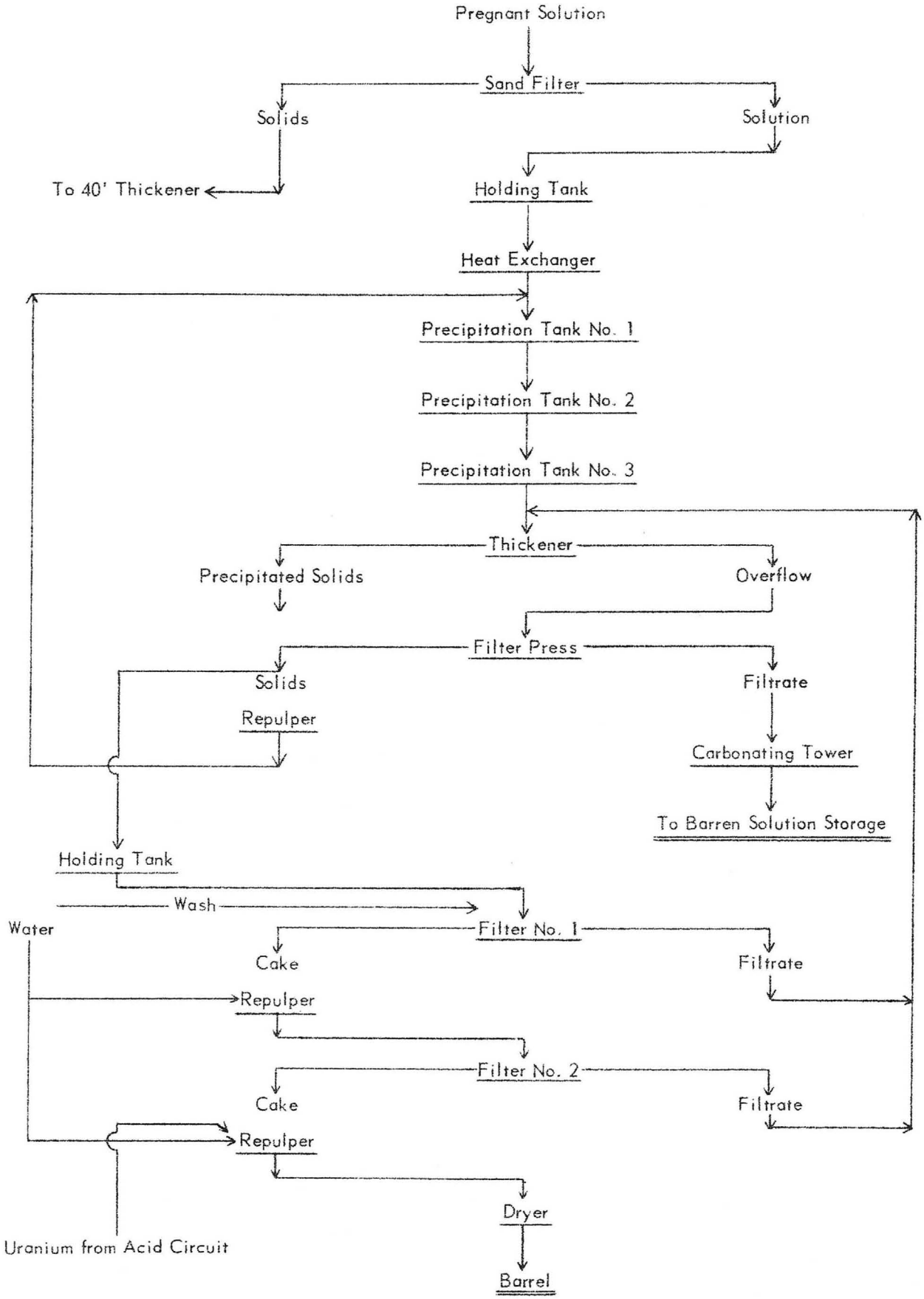
GRINDING, FLOTATION AND THICKENING



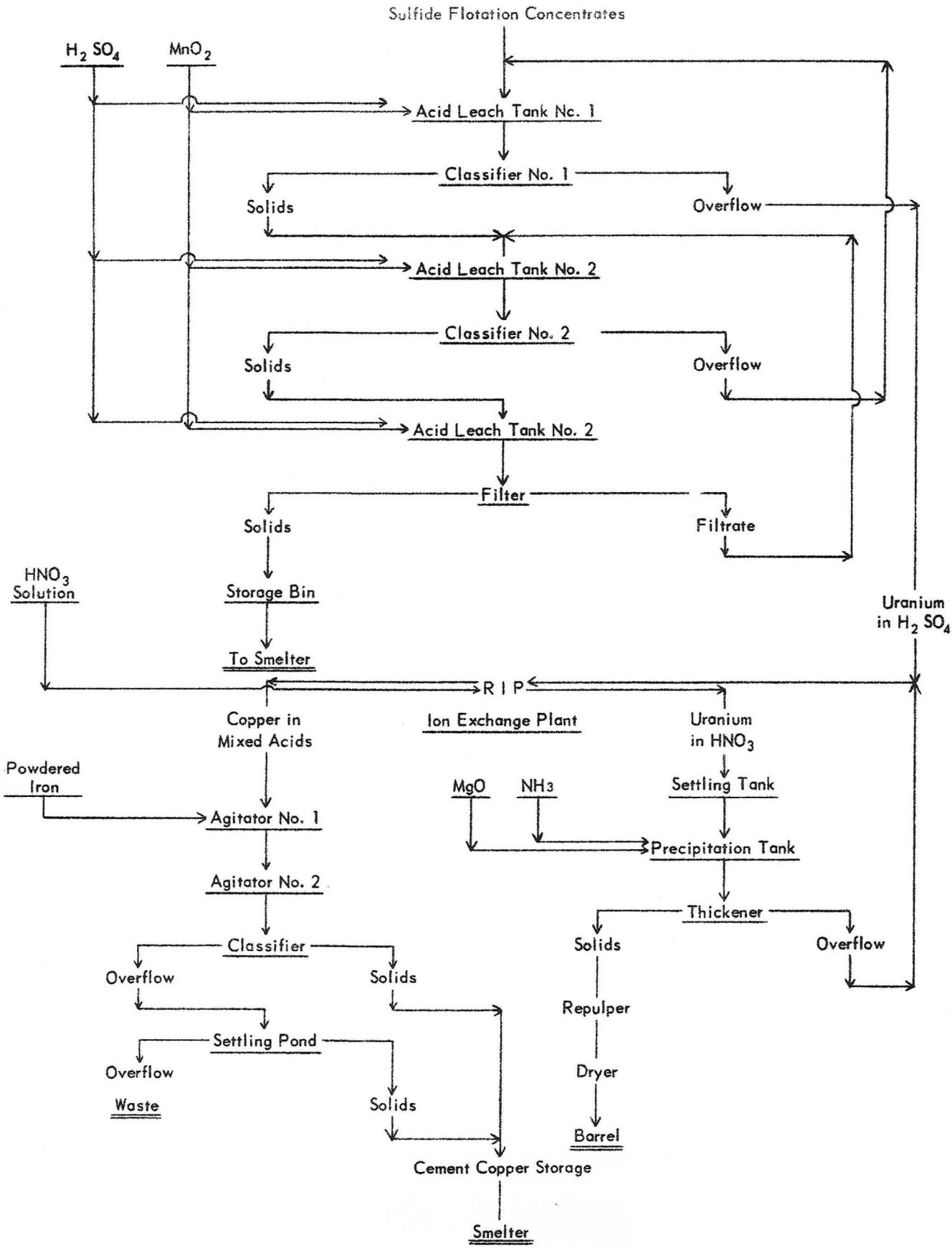
CARBONATE LEACHING AND FILTERING



CLARIFICATION, PRECIPITATION AND PACKAGING



ACID LEACH AND URANIUM RECOVER



Mining World 1955

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Mining World 9/1955

Rare

[redacted]

RARE METALS CORPORATION OF AMERICA

ARIZONA URANIUM OPERATIONS

MINES

NAME----------HUSKON AND RAMCO GROUPS
CLAIMS----------14 NAVAJO MINING PERMITS TOTALING 1226
LOCATION----------UNSURVEYED, 20 MILE RADIUS OF CAMERON,
OPERATION----------ANNUAL PRODUCTION 40,000 TONS URANIUM
MINING METHOD-----OPEN PIT
EMPLOYEES---------33
ADDRESS----------RARE METALS CORP. OF AMERICA, CAMERON,

MILL

NAME----------RARE METALS URANIUM MILL
LOCATION----------TUBA CITY, COCONINO COUNTY, ARIZONA
TYPE----------PRIVATE AND CUSTOM URANIUM PROCESSING PLANT
CAPACITY----------300 TONS PER DAY
EMPLOYEES---------109
PROCESS----------ION EXCHANGE
ADDRESS----------RARE METALS CORP. OF AMERICA, DRAWER E, TUBA CITY, ARIZONA

Mining World - 6/1951

[redacted]

This information taken from letter written by A. A. McKinney, Supt. Production Dept., Rare Metals Corporation of America, P. O. Box 1492, El Paso, Texas, dated Feb. 24, 1958.

RARE METALS CORPORATION OF AMERICA

ARIZONA URANIUM OPERATIONS

Mines

Name ---------- Huskon and Ramco Groups.
Claims ---------14 Navajo Mining Permits Totaling 1226 acres.
Location -------Unsurveyed, 20 mile radius of Cameron, Coconino County, Arizona.
Operation ------Annual Production 40,000 tons uranium ore.
Mining Method --Open Pit.
Employees ------33
Address---------Rare Metals Corp. of America, Cameron, Arizona.

Mill

Name ----------Rare Metals Uranium Mill.
Location -------Tuba City, Coconino County, Arizona.
Type ----------Private and custom uranium processing plant.
Capacity -------300 tons per day
Employees ------109
Process---------1 on Exchange.
Address --------Rare Metals Corp. of America, Drawer E, Tuba City, Arizona

This information taken from letter written by A. A. McKinney, Supt. Production Dept., Rare Metals Corporation of America, P. O. Box 1492, El Paso, Texas, dated Feb. 24, 1958.

RARE METALS CORPORATION OF AMERICA

ARIZONA URANIUM OPERATIONS

Mines

Name ---------- Huskon and Ramco Groups.
Claims ---------14 Navajo Mining Permits Totaling 1226 acres.
Location --------Unsurveyed, 20 mile radius of Cameron, Coconino County, Arizona.
Operation -------Annual Production 40,000 tons uranium ore.
Mining Method --Open Pit.
Employees -------33
Address----------Rare Metals Corp. of America, Cameron, Arizona.

Mill

Name ----------Rare Metals Uranium Mill.
Location --------Tuba City, Coconino County, Arizona.
Type ----------Private and custom uranium processing plant.
Capacity --------300 tons per day
Employees -------109
Process----------1 on Exchange.
Address ---------Rare Metals Corp. of America, Drawer E, Tuba City, Arizona