

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

The following file is part of the

Arizona Department of Mines and Mineral Resources Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

An Evaluation of the BHP Copper, Inc. - Florence Project

Prepared for the:

Arizona State Land Department

DRAFT

Prepared by:

Headquarters West, Ltd. 300 North Ash Alley Tucson, Arizona 85701

Executive Summary

Assignment Identification:	The assignment includes three basic tasks. These are an analysis and evaluation of the break-even copper price for the proposed BHP Copper, Inc. Florence Project, an estimate of the value of State of Arizona Mineral Lease 11-26500, and a market study of comparable royalty rates charged by entities having fiduciary responsibilities similar to those of the State of Arizona. I have completed the draft break-even evaluation which is represented by the content of this report. Work on the valuation and market study is ongoing and they will be submitted upon completion. The break-even segment of the assignment calls for an estimate of the copper price at which specific project yield requirements are attained, subject to the requirements of the State Land Department, and effective January 1, 1998, the first year of proposed production at Florence. The price is estimated in terms of 1996 dollars. The price that will be estimated then is the prospective modified break-even price.
Effective Date of Analysis:	The effective date of the analysis is January 1, 1998 which is the beginning of the first year of production proposed in the BHP Copper, Inc. (BHPCI) pre- feasibility study for the Florence project. This date proceeds all anticipated mining revenues yet is subsequent to the investment of the majority of the estimated mine capital. The break-even price is expressed in terms of 1996 dollars.
Property Identification:	The subject property is identified as the proposed BHPCI Florence Project, located in Pinal County, Arizona. Exploration and assessment activities conducted by Conoco in the 1970s revealed the presence of a potential copper ore body beneath the site west of Florence. Subsequent activities conducted by BHPCI and its predecessor Magma Copper in the 1990s have identified a proven geologic resource of over 279 million tons with an acid soluble (ASCu) grade of 0.243% at a 0.1% cutoff. A total oxide resource exceeding 368 million tons at 0.239% ASCu is possible. The BHPCI pre-feasibility analysis concludes that the most suitable approach to the resource is well-to-well in situ mining, followed by SXEW to produce copper cathode. In situ mining for copper is an emerging technology which is currently in use by BHPCI in conjunction with conventional mining methods at their other Arizona mines.

el re in fe un re			The evaluation includes this document as well as electronic spreadsheet files on an included diskette. By eference, the evaluation incorporates the additional information which is contained in the BHPCI Pre- easibility study for the Florence Project. Because of the unique nature of mining activities proposed, primary eliance is placed on the project-specific data generated by BHPCI. All of BHPCI's data is proprietary and access o the information is at the company's discretion.			
		15% ton,	Break-even prices are tested at discount rates of 14%, 15%, and 16% as well as acid (H ₂ SO ₄) prices of \$0 per ton, \$11.50 per ton, and \$20 per ton and the following table is generated:			
Discount Rate:	<u>14%</u>	<u>15%</u>	<u>16%</u>			
Copper Price \$/lb	.8353	.8555	.8763 (\$11.50/ton H ₂ SO ₄ , \$140M Initial Capital)			
Copper Price \$/Ib	.8002	.8204	.8417 (\$0/ton H ₂ SO ₄ , \$140M Initial Capital)			
Copper Price \$/Ib	.8613	.8814	.9021 (\$20/ton H ₂ SO ₄ , \$140M Initial Capital)			
The \$0.86 break-even price is judged to be best supported. This price is based upon acid cost of \$11.50 per ton, a discount rate of 15% and pre-production mine capital of approximately \$140 million. The estimate is based on BHPCI's after-tax constant dollar cash flow modified to meet the State Land Department's specifications. An effective date of 1/1/98 is used although the price is expressed in 1996 US dollars.						
Valuation of State Interests:		bre	To be furnished when complete. The findings of the break-even analysis are not dependent upon analysis which will be included in the valuation.			
Market Royalty Study:		bre	To be furnished when complete. The findings of the break-even analysis are not dependent upon information which will be included in the market study.			

ł

Contraction of the local division of the loc

and the second

10000

- Sullanson

Arizona Copper Reseves and Resources

Compiled by the Arizona Dept. Mines and Mineral Resources

Printed: 07/31/2002 Last Updated: 06/19/2002

POSTON BUTTE

Alternate name(s):

Company:

BHP Copper P.O. Box M San Manuel, AZ 85631 520-385-3100 www.bhp.com.au

Location:

Township 4 SRange 9 ESec.33Latitude/Longitude:33.05111.444 miles NW of Florence, Pinal Co.

Mineralization type and reserve/resource:

	Tons			
Туре	(millions)G	Grade (%)		
Acid Soluble	300	0.37	Cu	
Sulfide	500	0.39	Cu	

Reserve information and sources:

BHP predicted \$.43/lb direct cost by in situ. 64% recovery over 60 month leach period.

Magma Copper Co., "Copper Sense" August, 1992., Dan Ramey, BHP, 2000.

Comments:

500 million tons at 0.5% TCu from Conoco Annual Report 1972. Purchased from Conoco July 1992 for about \$20MM.

June 2001 Vanguard Properties Inc. bought 5,500 acres for \$14M from BHP. Portion of property sold to United Metro early 2002.

Poston Butte

Contacts:

2006-NJN

Roger Ames 480-596-0605 Poston Butte Florence Insitu Leach project, <u>rogerames@vanguardaz.com</u> summary pdf

Jarrell Southall at Brown and Caldwell

Vanguard Properties 2318 E. Lakecrest Dr., Gilbert , AZ 85324, Adrian Taylor Sr. VP 480-926-4710

Data may be viewed at State Land Dept. Minerals Div. But need letter of authorization to release it.



tila Poston BUTAR (FI PINA

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY Governor Jane Dee Hull

11.8

Jacqueline E. Schafer, Director

NOTICE OF DECISION TO ISSUE AN INDIVIDUAL AQUIFER **PROTECTION PERMIT NUMBER P-101704 WITH MODIFICATIONS**

Public Notice No. 89-99 APP M published on Thursday November 11, 1999

in the Florence Reminder and Blade Tribune

Pursuant to Arizona Administrative Code, Title 18, Chapter 9, Article 1, the Director of the Arizona Department of Environmental Quality is issuing individual Aquifer Protection Permit Number P101704 with modifications to the following permittee:

BHP Copper, Inc.

Florence Project

14605 East Hunt Highway Florence, Arizona 85232

The BHP Florence Project is located approximately 2.5 miles northwest of the Town of Florence, Arizona in Pinal County. The site is located over groundwater of the Pinal Active Management Areas as described below using the Gila and Salt River Base Line and Meridian:

Township 4 South, Range 9 East, Section 27 Township 4 South, Range 9 East, Section 28 Township 4 South, Range 9 East, Section 33 Township 4 South, Range 9 East, Section 34 Latitude 33° 02' 00" North Longitude 111° 25' 00" West

The Florence Project is authorized by Aquifer Protection Permit no. P101704 to operate an in-situ mining operation utilizing Class III injection and recover wells, production observation wells, monitor wells, a solvent extraction/electrowinning (SX/EW) plant, pregnant leach solution (PLS) pond, raffinate ponds, raffinate processing facilities, evaporation ponds, a non-stormwater containment impoundment and ancillary facilities according to the design and operational plans. Aquifer Protection Permit no. P101704 was signed and issued by the Arizona Department of Environmental Quality (ADEQ) on June 9, 1997.

Modifications to APP no. P101704 include the incorporation of calculated alert levels, clarification of certain sections and requirements, and revisions to reporting and closure requirements.

The modified permit, original permit, and related materials are available for public review, with 24 hour notice, Monday through Friday 8:00 a.m. to 5:00 p.m. at the Arizona Department of Environmental Quality, Records Management Center, Lower Level, 3033 N. Central Ave., Phoenix, AZ 85012.

Persons may submit written comments or request a public hearing on the proposed action within thirty (30) days from the date of this notice to: Karen Schwab, ex: 2256, Arizona Department of Environmental Quality, Aquifer Protection Permit Program, Mail Code M0401A, 3033 N. Central Ave., Phoenix AZ, 85012. Public hearing request must be in writing and include the reason for such a request.

Flor Az 620. Soc. Strust 96 Fuel ThisGeology and Project Overview of the BHP Florence (Poston Butte) Porphyry Copper
Deposit, Pinal County, Arizona
Corolla K Hoag, Senior Geologist, BHP Copper

Property History and Status

The Florence (Poston Butte) deposit is located two miles northwest of the Town of Florence in Pinal County, Arizona. From 1969 through 1975, Conoco geologists delineated an extensive, low grade porphyry copper resource near Poston Butte based on 605,857 feet of exploration and development drilling including 659 rotary drill holes and 396 diamond drill holes (Nason, Shaw, and Aveson, 1983). In 1974, Conoco mined 50,000 tons of ore from a single-level, underground, mine for metallurgical, mining, and geological testing. The mine was accessible via two 700-foot deep shafts and more than a mile of drifts and cross cuts; this pilot mine is now flooded. The Poston Butte operation as envisioned by Conoco included: 1) an oxide open pit mine delivering ore to vat and leaching facilities followed by solvent-extraction and electrowinning (SX-EW) treatment of solutions, and 2) open pit mining of the underlying sulfide material with ore delivered to a concentrator followed by smelting and refining to produce copper cathode (Magma, 1994). Conoco invested over \$27 million in this project. The relatively large capital investment cost (\$504 million), however, as well as low copper prices in the mid-1970s forced this project into dormancy.

Magma Copper Company acquired the property in July 1992 from Conoco and began a pre-feasibility study in 1993 focusing on the most appropriate mining method for developing the oxide resource. The conclusions of this study were that because of the deposit's relatively low grade (0.34% total copper, 0.24% acid soluble copper) and overburden depth (350 feet), an in-situ solution mining technique followed by SX-EW is the only economic way to extract the 368,160,000 so f copper oxide ore. The lithologic, mineralogical, and structural features are all favorable to solution mining because of the low gangue acid-consuming host rock, the presence of acid-soluble chrysocolla along fractures and in argillized feldspars, and the intense fracturing of the rock allowing solution migration.

Currently, BHP Copper (BHP purchased Magma in January 1996) is completing a feasibility study begun in 1995. During this phase, 52 pump, observation, and monitor wells were drilled for materials property testing to provide hydrologic data for the Aquifer Protection Permit Application and to characterize the aquifer in the hydrology computer model; the APP Application was submitted to the Arizona Department of Environmental Quality in February 1996. Archaeologists completed a reconnaissance survey of 350 acres and will soon begin clearing sites for infrastructure development. A 38-hole diamond drill program was conducted to confirm ore reserves in the deeper, western portion of the deposit, and to gather material for geological and metallurgical tests. Construction is planned to begin in 1997 with production of 75MM lbs/year cathode beginning in January 1998. Figure 1 shows the Florence site location and planned facilities.

٩

(a)

Printed on: 10/13/2000 Record updated: 01/01/1994

Arizona Copper Reseves and Resources

Compiled by the Arizona Department of Mines and Mineral Resources

Property:

POSTON BUTTE

Operator and/or Owner:

BHP Copper P.O. Box M San Manuel, AZ 85631 520-385-3100 bhp.com.au

Location:

Township 4 S Range 9 E Section 33 County - Pinal AZMILS - 296 Description - 4 miles NW of Florence, Pinal Co.

Mineralization type and reserve/resource:

Acid Soluble - 300 Million tons at 0.37% Cu Sulfide - 500 Million tons at 0.39% Cu

Sources:

Magma Copper Co., "Copper Sense" August, 1992.

Comments:

500 million tons at 0.5% TCu from Conoco Annual Report 1972. Purc hased from Conoco July 1992 for about \$20MM.



Pos n Butte Project-file J Pinal Co. State

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Fife Symington, Governor

Russell F. Rhoades, Director

NOTICE OF THE PRELIMINARY DECISION TO ISSUE AN INDIVIDUAL AQUIFER PROTECTION PERMIT

Pursuant to Arizona Administrative Code, Title 18, Chapter 9, Article 1, the Director of the Arizona Department of Environmental Quality intends to issue an individual Aquifer Protection Permit to the following applicant:

Public Notice No. 4-97AZAP Florence Project On or about January 30, 1997 3

BHP Copper Company Florence Project 14605 East Hunt Highway Florence, Arizona 85232

Aquifer Protection Permit No. P-101704

The proposed Florence Project will be located approximately 2.5 miles northwest of the Town of Florence, Arizona in Pinal County, Arizona. The proposed facility is located over groundwater of the Pinal Active Management Area as described below using the Gila and Salt River Base Line and Meridian:

Township 4 South, Range 9 East, Section 27. Township 4 South, Range 9 East, Section 28 Township 4 South, Range 9 East, Section 33 Township 4 South, Range 9 East, Section 34 Latitude 33° 02' 00" North Longitude 111° 25' 00" West

The Florence Project will be authorized to operate an *in-situ* mining operation utilizing Class III injection and recover wells, production observation wells, monitor wells, a solvent extraction/electrowinning (SX/EW) plant, pregnant leach solution (PLS) pond, raffinate ponds, raffinate processing facilities, evaporation ponds, a non-storm water containment impoundment and ancillary facilities according to the design and operational plans approved by the Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Program Section.

BHP Copper Co. will design, construct and operate the Florence Project, utilizing Class III injection and recovery wells for the solution mining of copper. The Florence Project will produce an average of about 72.6 million pounds of copper cathode per year over an operating life of 15 years. The *in-situ* mining area will consist of discrete mining blocks that will be solution mined sequentially. Solution mining will consist of the injection of dilute sulfuric acid solution (raffinate) into the oxide ore body. Recovery wells will pump the recovered solution (PLS) into the PLS pond and subsequently into the SX-EW facility for the production of copper cathode. The stripped PLS solution from the SX operation (raffinate) will be re-injected into the *in-situ* mine. Prior to re-injection, the Florence Project will decrease the concentration of sulfate in the raffinate by 'bleeding' a portion of the raffinate bleed stream will neutralize it prior to discharge to the evaporation ponds. The evaporation ponds will store the semi-solid precipitates from the neutralized raffinate on-site.

The Florence Project is located on 10,000 acres owned by BHP Copper Co. The in-situ leaching operation will cover about 300 acres of oxide mineralization approximately one half mile north of the Gila River. The PLS and raffinate pond will cover an area of one acre each. The eight evaporation ponds will cover a total area of 96 acres. All mining operations will be outside the 100 year floodplain of the Gila River. The Florence Project facilities will not discharge to surface waters. The Aquifer Protection Program (APP) permit issued to the Florence Project allows no discharge to subsurface waters from the SX-EW operation, PLS pond, raffinate pond, evaporation ponds, stormwater run-off pond, tanks, ditches or other ancillary facilities. The APP permit requires the Florence Project to maintain hydraulic control over the *in-situ* mining solutions during mine operation, closure and post-closure to ensure that aquifer water quality standards are met at the points of compliance.

5

The permit and related materials are available for public review Monday through Friday 8:00 a.m. to 5:00 p.m. at the Arizona Department of Environmental Quality, Water Protection Approvals and Permits Section, 3003 N. Central Avenue, 4th Floor, Phoenix, AZ 85012.

Persons may submit comments or request a public hearing on the proposed action, in writing, to:

Shirin Tolle Environmental Engineer Water Protection Approvals and Permits Section - Mining Unit Arizona Department of Environmental Quality 3033 N. Central Ave. Phoenix AZ, 85012

within thirty (30) days from the date of this notice. Public hearing request must include the reason for such a request.

ARIZONA COPPER RESERVES

COMPILED BY

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

PROPERTY:

POSTON BUTTE

OPERATOR\OWNER:

Conoco Inc. High Park Ridge Stanford, CT 06904 203-329-2300

LOCATION INFORMATION:

TOWNSHIP4SRANGE9ESECTION33COUNTY - PinalAZMILS -296DESCRIPTION - 4milesNW of Florence, Pinal Co.

ORE TYPE AND RESERVE INFORMATION:

Mixed - 800 MILLION TONS AT 0.4% TCu

SOURCES:

Copper Studies Inc., NYC, March 30, 1979 in ADMMR Poston Butte Pr oject file

COMMENTS:

500 million tons at 0.5% TCu from Conoco Annual Report 1972

SOLD IP 92 TO MAUMA LOPPER

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY (SHORT FORM) May be Reproduced May Be Inserted Into Mine File Or Added To "Rumor Page"

	hay be inserved into fine file of Added to "Rumor Page"					
1.	Information from: Norman Reber					
	Address:2361 W. Labriego Dr Tucson, AZ 85741					
2.	Phone: 888-5182					
3.	Mine:Pilot Mill					
4.	ADMMR Mine File: POSTON BUTTE					
	County:Pinal					
	MILS Number 296					
	Operational Status: Inactive					
8.	Summary of information received, comments, etc.:					
	Mr. Reber and Tom Young, both metallurgists, working in conjunction with					
	Blue Falcon Mines of Toronto (Canada) have leased the Conoco Poston Bu					
	pilot mill. The 60 tpd mill is to be modified and used as a custom mi The pair have formed a new company called Southern Arizona Smelting Co					
or SASCO. They also plan on researching new mthods of recovering s						
	from ores with high concentrations of manganese. Mr. Reber also stated					
1	that the owner would like to sell or lease the Poston Butte copper					
	deposit.					
	· · · · · · · · · · · · · · · · · · ·					
Dat	e: September 1, 1988 H. Materia					
	(signature) ADMMR					

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES <u>VERBAL INFORMATION SUMMARY</u>

1. Mine file: POSTON BUTTE PROJECT

2. Mine name if different from above: Poston Butte Mill

3. County: Pinal

 Information from: Norman Reber Company:

Address: 2361 W. Labriego Dr.

Tucson, AZ 85741

Phone: 888-5182

5. Summary of information received, comments, etc.:

Mr. Reber reported that he lost his backing from the Canadian company and that he therefore had to give it back to Conoco. He said it would be useful only as a pilot plant and consists of:

> 50 TPD flotation circuit 100 TPD Vat Leach-SX (ten 100 ton vats) 6 to 7 TPD Agitation Leach-SX

Date: 5/11/89

Richard R. Beard, Mining Engineer

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

<u>VERBAL</u> <u>INFORMATION</u> <u>SUMMARY</u> (SHORT FORM) May be Reproduced May Be Inserted Into Mine File Or Added To "Rumor Page"

- Information from: Sean Ellocker (Investment Agent) Address: Toronto, Canada
- 2. Phone:
- 3. Mine: Poston Butte
- 4. ADMMR Mine File: Poston Butte Project
- 5. County: Pinal
- 6. MILS Number: 296
- 7. Operational Status:
- 8. Summary of information received, comments, etc.:

Mr. Ellocker reported a group of Hong Kong investors have retained him to evaluate copper deposits or producers they might acquire or develop. He feels they are being heavily promoted to acquire what was once Conoco's property near Florence. However, his brief investigation has shown that that particular property has some unique problems that might make its development particularly expensive. He plans to bring the investors to Arizona and would like to have them visit with us.

a. Phillips

Date: <u>Sept.</u> <u>26,</u> <u>1988</u>

(Signature) AzDMMR

POSTON BUTTE

PINAL COUNTY

MG WR 7/19/85: The Poston Butte (Pinal County) copper deposit, owned by Conoco, is covered by the Flor claim group.

RRB WR 6/24/88: Stopped by Conoco's pilot plant at their Poston Butte project (file) north of Florence. No one was there but the mill appears to be intact.

CONTINENTAL OIL COMPANY

Poston Butte Project Tlorence Project Continental Oil has given a second drilling contract to Joy Drilling on its Empire Mountain property in Santa Cruz County. VBD WR 8/26/75

Mary Jacobson of Conoco, 2020 N. Forbes Blvd., called regarding their new exploration headquarters. GWI WR 1/9/76

John Kellogg, State Land Dept., said Conoco had applied for leases on several sections held by Sovereign Industries, Inc. GW WR 6/14/76

Visited Conoco's metallurgical plant. GWI WR 12/13/76

mine 32433 T 4 SR9E

Plant 28 THSR9E

RRB WR 4/14/80: Visited Conoco property north of Florence (Pinal County). All their pilot studies are completed and if and when they get the word from corporate headquarters to start operations, they are ready. Don't expect to start before mid-80's.

NJN WR 7/13/84: Jerry Haggard, an attorney with Evans Kitchel and Jenckes called and reported that Conoco had sold their Poston Butte Project (f) Pinal County and was trying to determine who the buyer was.

KAP WR 3/15/85: Stanley Golen (sp?) phone 933-2258 called requesting names of potential investors who would want to purchase blocks of ore in the ground. He went on to say that his group has purchased the pilot mill from Conoco that was used at the Poston Butte Project (file) Pinal County. Golen did not state where his ore deposit was.

CONTINENTAL OIL COMPANY

Conoco had asked for and been refused a prospecting permit on Section 32, a State section, by the Land Commissioner. Also that of four addresses helmentioned, only one was within Conoco's boundaries. Also told him that I had worked with the group that worked on the Tucson Mt. withdrawal and the Tucson area withdrawal in about 1962. That Dr. Lacy had given the Pima County Board of Supervisors a map of the area from Tucson Mts. to and including Sahuarita with suggestions for low density housing of the small rancher type with recognition that this area had a valuable mineral potential and that people living in this area would know of this and that they could expect to sell out to a mining company if the need arose. That this is not the same as government condemnation. Also that I would try to see if a copy of the report and map could be found. Conoco's interest: N_2^1 S29, S28, S27, S33, N_2^1 S34 W_2^1 S35, all in Tl4S Rl2E. The above is not precise but just an approximation. GWI letter dated June 11, 1973

Jerry Irvin called to say Conoco is drilling discovery holes on claims in N/2 Sec. 29, all Secs. 29, 33, 27, N/2 Sec. 34 and W/2 Sec. 35, T14S R12E west of Tucson. GW WR 6/19/73

Conoco Oil Company has a Cu mineralization north of Florence. GW Mnnual Report 6/29/73

Conoco has acquired much of the ground to the south of the Little Hill mine and have been drilling deep holes with four heavy duty rigs. REL WR 8/23/73

Field interview with Ray Barclay, Conoco, is transferring to Denver and will be in charge of uranium geology. Also that Conoco is probably thru on the Busterville area property. GWI WR 5-21-74

Went to Florence office of Conoco Oil Co. where Phil Nason said they had contracted with Teton Exploration Co., Casper to bore two holes 48" to 72" in diameter to 700 foot depth. These holes will be about 80 feet apart; the larger will be used as a shaft, the other an escapeway. Some drifting to drill holes will be done to not only sample the ore but also the quantity of water. GW WR 6-4-74

Continental Oil Company finished core drilling their large copper deposit 3 miles northwest of Florence and are now in the process of sinking 2-700 foot bored shafts into the ore deposit. This work will result in a better understanding of the water conditions and give bulk samples for ore dressing tests. GW AR 73-74

In the Tucson Mountains, Conoco in two areas was active. This has been well covered in the media. GWI AR 73-74

Ray Wallace reported Continental Oil is drilling in Empire Mountains. VBD WR 6/11/75

It has been reported that Continental Oil Co. will drill holes on the Hilton Ranch property in the Empire Mts. VBD WR 7/14/75

Continental Oil Co. has located a large number of mining claims around the Hilton Ranch in the Empire Mts. VBD WR 7/28/75

CONTINENTAL OIL COMPANY

Continental Oil Co. continues drilling on their copper discovery about three miles northwest of Florence. During the last visit a Mr. Scott said that the project would soon be turned over to their production department for evaluation and planning. GW QR 4-8-71

Continental Oil Co. has an option on and is drilling the Copper Hill property southwest of Winkelman. GWI QR 4-1-71

Visited Continental Oil Co. drilling project 3 miles northwest of Florence. Mr. Robert Anderson was unavailable but a young geologist said they had only 2 drill rigs presently in operation. He and 3 other geologists appeared to be working on ore reserve calculations. GW WR 7-26-71

Continental Oil Company is reported to be doing exploration near the Owl Head area. GWI QR 6-30-71

Continental Oil Company curtailed their exploratory drilling of their sizeable copper deposit 2 miles north of Florence and began evaluating the drilling results. Although considerable water was encountered they feel it is not excessive and can be handled at a minimum expense. GW QR 9/71

Continental Oil Company continues to evaluate their sizeable copper deposit 2 miles northeast of Florence. GW QR 2/72

Went on to Continental Oil Company drilling project 3 miles NW of Florence where 5 core rigs continue in operation. Although Robert Anderson was on vacation in Mexico, one of the men at the core shed said Getty Oil Company had drilled a few core holes north of Continental's ground and then pulled out. GW WR 4/3/72

Continental Oil announced it had proven a 500 million ton copper ore body about four miles north of Florence. FTJ 4 $\frac{1}{4}$ '72

Went to Continental Oil office north of Florence and talked to Robert Anderson, Project Chief. He said they had nine drills operating, 6 coring, 2 dry rotarys and one water well rig. They apparently have the ore deposit pretty well delineated but are now coring 100 feet on 1000 foot centers on two sections of State land which they wish to purchase for their plant site. GW WR 9/27/72

Mr. Anderson of Continental Oil Company wasn't in when his office was visited, however, his geologists previously seen at Red Hills said they were still drilling. GW WR 11/15/72

Visited with Robert Anderson of Conoco who said they continue to evaluate their big, wet copper deposit 2 miles north of Florence. He said GW WR 6-11-73

CONTINENTAL OIL CO. CONTINENTAL OIL BLDG. DENVER, COLORADO 80202

During 1968, Continental concentrates its uranium exploration program in six western states consisting of Arizona, Colorado, New Mexico, Texas, Utah and Wyoming, in which 365,000 net acres, or 412,000 gross acres, of prospective uranium lands were held at year-end. Last Year more than 1,000,000 ft. of exploration and definition drilling were completed by the company, which plans to accelerate its drilling effort in 1969. Taken from Skillings 4/26/69

Continental Oil drilling near Florence Hwy. Owl Head District. GWI WR 3/14/70

Raymond C. Barkley, Geologist, Continental Oil Co. 2534 W. Poppy Rd., 85705, Tel 887-0731. GWI WR 9/15/70

Visited Cross-Triangle ranch where the foreman, Mr. Barkley, said Continental Oil Co. had drilled several holes on and off the ranch but he knew of only two definite locations. However he gave directions to the Palo Verde ranch, about 5 miles south of Redrock road, where the owner, Mr. Rogers, said holes were drilled in Sections 17,18,20,29,31 & 32, T9S, R12E, Sec 13, T9S, R11E, Sec 5, T10S,R12E. He said the holes varied in depth from 20' to 1200' but he didn't know the exact number. He thought they found ore in 2 or 3 but, of course didn't know the grades; there is no evidence of cuttings left. He thought the rig was moved somewhere near Florence; but inquiries there turned up no information. Mr. Ray Barkley is the geologist for Continental Oil Co.

Location of new Cu strike of Continental Oil Co. is in Sec.15-34, T4S R9E northwest of Florence. Article in the Tucson star stated that the ore drilled out to date has averaged 0.5%, 8 rigs were counted, 6 of which were drilling for Continental Visited the Continental Oil discovery area about 3 miles northwest of Florence. Met Mr. Seay, field geologist who could any other information than was in the news release which was: 15 core drill holes had been drilled to depths varying from 400 to 1500 ft. the ore appears to average 0.5% Cu. GW WR 11/4/70

GW WK 11/4//0

ACTIVE MINE LIST 10/1970

Ray Barkley, Geologist 2534 W. Poppy St. Tucson.

Went to Continental Oil Co. drilling area northwest of Florence. The only one there was the core-splitter, he said Seay & Barkley were in Denver conferring with the main officials about the project. He couldn't or wouldn't give any information except to say they were continuing to drill and that Asarco had quit drilling. GW WR 1-15-71

Went

Continental Oil Co. continues to drill on their leases north of Florence. Mr. Clyde Scott said the project would soon be transferred to their production department. GW WR 3-3-71

Went to Continental Oil Co. drilling project north of Florence where Robert Anderson, project manager, said they have 3 core rigs running and expect to have the fourth going in the near future. Although he explained no details of the results he said they were encouraging and that the usual porphyry-type alteration was in evidence. When questioned about the excessive amount of water reported he said it really wasn't "excessive" as interpreted by an independent study, but that they expect to have to pump continuously. GW WR 5-10-71

Z. SIMPSON COX L.J. COX, JR. ALFRED S. COX STEPHEN L. COX LORNA E. LOCKWOOD

OF COUNSEL

COX AND COX ATTORNEYS AT LAW BUITE 300, LUHRS TOWER PHOENIX, ARIZONA 85003 TELEPHONE 254-7203

L.J. COX (1904-1943)

ALFRED C.LOCKWOOD

October 5, 1976

TO: Gila River Indian Community Council Resources Committee Water Resources Committee Interior Field Solicitor Phoenix Office, BIA Pima Agency, BIA

FROM: COX AND COX

We assume each of you are aware of the proposed open pit mining by Continental Oil Company (CONOCO) on the north side of the Gila River upstream from the Gila River Indian Reservation, of the preliminary agreement, correspondence. and the negotiations as to pumping of water by CONOCO. From the correspondence it is clear that the Department of the Interior insists that the Gila River Indian Community and CONOCO negotiate to attempt to settle any differences. We have also been informed that CONOCO has met with the Blackwater Community and with its representatives and also with Tribal officials in preliminary negotiations concerning the problems of each and mutual problems.

We have been asked by the Interior Solicitor as to our recommendations assuming both parties desire to settle. We feel that the enclosed draft could well be used as a basis for attempting such an agreement. If the Community does negotiate with CONOCO, we urge that Community representatives insist upon recognition of Community prior right to use of any water pumped by CONOCO.

We shall appreciate receiving any comments and suggestions or constructive criticism and shall be willing to discuss this draft with the Council or others on behalf of the Community, THIS AGREEMENT is made and entered into as of the _____day of ______, 197___, by and between GILA RIVER INDIAN COMMUNITY for and on behalf of itself and its members (INDIANS) and CONTINENTAL OIL COMPANY, a Delaware corporation (CONOCO).

WATER EXCHANGE AGREEMENT

Forton Butha QI

RECITALS:

1

2

3

4

5

6

7

8 1. CONOCO has established the existence of a copper 9 bearing deposit underlying land east of the Gila River 10 Indian Reservation on the north side of and adjacent to the 11 Gila River. CONOCO desires to construct an open pit to mine 12 this deposit and to process the ore therefrom. For such 13 operation it will be necessary to dewater the proposed mine 14 area by means of water wells. Mining operations and processing 15 of the ore will require use of water by CONOCO. The use 16 of water will also be essential to CONOCO for its agents, 17 employees, and the supportive industries, businesses and 18 other services and people directly and indirectly concerned 19 with CONOCO's mining operation.

20
2. All of the water to be pumped by CONOCO in dewatering
21 the area and all of the water to be used directly or indirectly
22 by CONOCO will come from the Gila River or the groundwater
23 in the vicinity of the Gila River. The waters of the Gila
24 River and the groundwater are so hydrologically connected
25 that use of groundwater directly effects and diminishes flow
26 of Gila River water which would be available to Indians by

COX AND COX ATTORNEYS AT LAW 300 LUMRS TOWER PHOENIX, ARIZONA 85003 YELEPHONE 254-7203 diversion or in recharging the groundwater under the Gila River Indian Reservation (RESERVATION).

1

2

200 LUNRS TOWER

DENIX. AAITONA 25003

PHONE 284-7203

3. From time immemorial by means of an extensive irrigation 3 system, INDIANS and their Hohokam ancestors farmed the fertile 4 5 lands of the Gila River valley in central Arizona, INDIANS have the longest continuous irrigation history in the United 6 States. As a result of INDIANS' appropriation and beneficial 7 use of Gila River water in their farming, INDIANS are entitled 8 to the use of not less than 210,000 acre-feet of Gila River 9 water per year with priority from time immemorial and ahead 10 of all non-Indian Gila River water users, including CONOCO, 11 CONOCO recognizes that all of its rights to the use of Gila 12 13 River water are junior in time and right to the prior appropriation rights of INDIANS to the use of not less than 210,000 acre-14 feet of Gila River water per annum. 15

4. The Reservation contains more than 372,000 acres within 16 Maricopa and Pinal Counties, Arizona, which the United States 17 set aside and reserved to INDIANS from a much larger area 18 which INDIANS from time immemorial had owned and possessed 19 to the exclusion of all others. Without irrigation all of 20 the Reservation land is arid and agriculturally nonproductive 21 There are more than 250,000 arable acres on the Reservation 22 which are practicably irrigable by water from the Gila River 23 and its tributaries. The United States reserved to INDIANS 24 the use of sufficient water to irrigate all of the arable 25 land on the Reservation. (Winters v. United States, 207 U.S. 26 564, 52 L.ed 340 (1908); Arizona v. California, 373 U.S. OX AND COX WAL TA BYZKROT

546, 10 L.ed 2d 542 (1963); Cappaert v. United States, ____U.S. _____48 L.ed. 2d 523, 96 S.Ct.____; and other cases). INDIANS' immemorial Winters rights to the use of Gila River water are prior and superior to all of CONOCO's rights to the use of Gila River water. All of CONOCO's rights to the use of Gila River water are junior and inferior to INDIANS' Winters rights to the use thereof.

1

2

3

Л

5

6

7

8

9

10

11

12

13

23

24

25

26

COX AND COX

ATTORNEYS AT LAW

100 LUHRS TOWER

PHOENIX, ARIZONA \$ 5003

TELEPHONE 254-7203

'a

5. The waters of the Gila River and the groundwater within the Gila River watershed above the Reservation are so hydrologically connected that use of groundwater within the watershed directly effects and diminishes flow of Gila River water which would be available to Indians by diversion or in recharging groundwater under the Reservation.

14 6. Water reserved by the United States included groundwater 15 under the Reservation and the recharge to these groundwaters (Cappaert v. United States, U.S. , 48 L.ed 523, 16 96 S.Ct. ; and other cases). INDIANS' rights to use of 17 18 groundwater is prior and superior to all non-Indian rights, 19 including all of CONOCO's rights to the use of groundwater, 20 7. Any use of water by CONOCO will adversely effect 21 rights of INDIANS and may frustrate purposes for which the 22 Reservation was established.

8. INDIANS believe that CONOCO's operations are economically eneficial to the State of Arizona. CONOCO believes that INDIANS farming all of the practicably irrigable acres on the Gila River Indian Reservation is economically beneficial to the State of Arizona,

-2-

9. A portion of the land proposed to be mined by CONOCO 1 2 is designated as San Carlos Irrigation and Drainage District 3 land within the San Carlos Indian Irrigation Project. CONOCO now owns or is in the process of acquiring all of the project 4 5 land east of the Gila River Indian Reservation and north of the Gila River. The Northside Canal traverses the area 6 7 proposed to be mined by CONOCO. Indians and CONOCO believe 8 that it is mutually beneficial for all non-Indian project 9 lands north of the Gila River to be eliminated from the 10 San Carlos Indian Irrigation Project, for the Northside 11 Canal to be eliminated as a joint work of that project 12 and for all water rights appurtenant to such lands to be 13 transferred to INDIANS.

14 10. It is anticipated that Central Arizona Project (CAP) 15 water will be available by 1985 and, subject to adjustment for its inferior quality, could be used as exchange water. 16 It is to the best interests of all that CONOCO contract for 17 18 and deliver to INDIANS' farm headgates CAP water (43 U.S.C.A. 19 1524(e)), and that in exchange therefor INDIANS permit 20 CONOCO to pump and use water in its operations and in the other 21 supportive uses necessary or convenient to its operations. 22 11. Prior to availability of CAP water CONOCO desires 23 to pump and use water which INDIANS need and to which INDIANS 24 have the prior right.

12. INDIANS recognize that requiring CONOCO to refrain from pumping and using water prior to receipt of CAP water

-4-

25

26

AND COX

TORNEYS AT LAW

DENIX. ARIZONA SSOOT

LEPHONE 254.7203

TOO LUHRS TOWER

would prohibit mining and would cause economic loss to 1 CONOCO the State of Arizona, its political subdivisions 2 and people. INDIANS, have always befriended non-Indians 3 within the area. INDIANS wish to use water to which INDIANS 4 are entitled with as little adverse effect on CONOCO and 5 6 others as possible. Upon proper terms, pending delivery of CAP water, INDIANS are willing to defer subjugating 7 8 and cultivating a portion of INDIANS' 250,000 irrigable 9 acres to allow CONOCO to proceed with developing mining and 10 processing its copper deposit.

11 13. It is believed that 4.59 acre-feet per acre per 12 year at the farm headqate or 5.4 acre-feet per acre per 13 year at CONOCO mine site is a reasonable duty of water for INDIANS irrigation requirements. Recognizing and adjusting 14 for anticipated inferior quality of CAP water, at such time 15 as CAP water is available the rate of exchange shall be 16 1.7 acre-feet of CAP water at INDIANS' farm headgates for 17 18 each acre foot of water pumped by CONOCO.

19 14. The measure of damages to INDIANS for wrongful use
20 of water by others is the value of the water for its highest
21 and best use.

COVENANTS:

22

23

24

25

26

COX AND COX

ATTORNEYS AT LAW

BOO LUHRS TOWER

TELEPHONE 234-7203

In consideration of the foregoing recitals and the following covenants and for other valuable consideration: 1. Until such time as CAP water is delivered to INDIANS pursuant to this agreement but in no event beyond January 1, 1990, INDIANS shall not cultivate by irrigation on the

-5-

Reservation more than the remainder of 250,000 acres less 1 the number of acres which could be irrigated with the water 2 used by CONOCO with a duty of water of 5.4 acre-feet per 3 acre. For example, if in any year prior to delivery of 4 CAP water to Indians CONOCO used 5,400 acre-feet of water, 5 INDIANS would refrain from cultivating 1,000 acres and would 6 7 not cultivate more than 249,000 acres of the irrigable Reservation land. 8

9 2. CONOCO shall measure and report monthly to INDIANS 10 and to the Secretary of the Interior the quantity of water 11 pumped and the quantity of water used by CONOCO. CONOCO 12 shall operate its mining as to keep all surface flow of the 13 Gila River from breaking into its pit area.

3. Beginning January 1, 1977 until CAP water is delivered 14 to INDIANS hereunder in sufficient quantity to replace 15 water pumped by CONOCO, but in no event beyond January 1, 16 1990, CONOCO shall pay to INDIANS a sum equal to \$ 17 per acre-foot for all water pumped each month by CONOCO. 18 Such payment shall be adjusted as of January 1, 1978, and 19 each year thereafter in accordance with the United States 20 Department of Commerce Cost of Living Index. Payment shall 21 be made within 60 days following the end of each calendar 22 23 month of pumping.

4. Pursuant to Section 304(e) of the Colorado River
Basin Project Act (Pub. L. 90-537, Title III, Section 304(e);
82 Stat. 891, 43 U.S.C. A 1524 (e) (1960)); CONOCO shall

-6-

TTORNEYS AT LAW

SCO LUHES TOWER

HOINIK, ASIZONA BSCOS

TILINANE 254.7803

immediately contract for sufficient CAP water to meet its obligations under this agreement. As soon as CAP water is available CONOCO shall deliver or cause to be delivered at INDIANS' farm headgates 1.7 acre-feet of CAP water for each acre-foot of water pumped by CONOCO, and in exchange therefor, INDIANS shall permit CONOCO to pump and use water in CONOCO's operations and any other supportive uses necessary to CONOCO's operations.

9 5. Any water pumped or otherwise developed by CONOCO 10 which is not used by CONOCO shall be delivered to INDIANS 11 through the Northside Canal or by such other means as may 12 hereafter be mutually agreed upon. CONOCO shall insure 13 that such water shall be of a quality as to be reasonably usable for irrigation or other beneficial purposes desired 14 by INDIANS and such quality as will in no way contaminate 15 domestic water sources on the Reservation. 16

17 6. In order to permit Reservation arable lands north of the Gila River to be served by gravity with Gila River 18 water diverted by Ashurst-Hayden Dam, Buttes Dam or other 19 20 means and the lands south of the Gila River to be served 21 with excess water delivered by CONOCO through the Northside Canal when such water is not needed on the north side 22 Reservation lands, CONOCO shall construct or cause to be 23 constructed such ciphons or other works as may be necessary 24 25 or convenient for such water delivery.

7. CONOCO shall acquire all San Carlos Indian Irrigation

COX AND COX ATTORNEYS AT LAW \$00 LUNRS TOWER PHOEKIX, ARIZONA #5003 TELEPHONE 254-7203

26

1

2

3

4

5

6

7

8

	이번 모님 동물을 다 가지 않는 것 같은 것을 많이 많은 것이 많은 것이 없다.		
1	Project lands east of the Reservation and north of the Gila	1	IN WITNESS WHEREOF, the parties hereto have set their
2	River and:	2	hands and seals as of the date first written herein,
3	a. transfer all water rights from such lands to INDIANS	3	
5	b. cause said lands to be eliminated from the San Carlos Indian Irrigation Project	5	
6 7	c. cause the Northside Canal to be eliminated from the joint works of the San Carlos Indian Irrigation Project	6	그는 것 다 같은 것 같아요. 그 것 같아요. 그런 가슴다. 나는 것이 아니는 것 같아요. 가 있는 것 같아.
8	8. Since CONOCO's operations may adversely affect the	8	
9	domestic water supply in District No. 1 of the Reservation	9	Socretary
10	(Blackwater), CONOCO shall assure said district of a supply	10	
11	of potable water adequate for domestic uses.	11	GILA RIVER INDIAN COMMUNITY
12	9. In order to permit maximum irrigation benefits to	12	
13	INDIANS from CAP exchange water, INDIANS shall be permitted	13	ByGovernor
14	to delay receipt of such exchange water by storage of the	14	ATTEST:
15	same behind Buttes Dam or other reservoir until such time	15	그 옷을 감독하는 것 같은 것을 것 것 같아요. 그는 것 같은 것 같아요. 그는 것
16	INDIANS may deem most advantageous for delivery to the	16	Secretary
17	Reservation.	17	STATE OF)
18	10. This Agreement for water exchange shall continue	18	
19	after January 1, 1990, so long as CAP water is delivered		
20	to INDIANS in sufficient quantity to be no less beneficial	20	
21	for irrigation purposes than if CONOCO had neither commenced	21	STATE OF ARIZONA)) ss.
22	mining, pumped any water nor used water within the Gila	22	
23	River watershed.	23	Acknowledment of GRIC, Governor Lewis
24		24	(Be sure to show acknowledged at Sacaton, Gila River Indian Reservation, Pinal County, Arizona
25		25	
26		26	
X AND COX DINEYS AT LAW DOLLARS TOWER NIK, ANIZONA SE003 PHORE 25 6-7203	-8-	COX AND COX ATTORNEYS AT LAW 300 LUHRS TOWER PHOENIX, ARITONA 85003 TELEPHONE 254-7203	-9-

.

۰.

.

1

1

10.00

0



VAT AND AGITATION LEACH PILOT PLANT OPERATIONS AT CONOCO'S FLORENCE COPPER PROJECT

J. J. Dworatzek Flant Superintendent

December, 1976

ABSTRACT

This paper describes the pilot test program for the treatment of oxide ores carried out by Continental Oil Company at their pilot plant in Florence, Arizona.

Ore feed to the pilot plant was obtained from the nearby underground pilot mine located close to the center of the orebody which contains about 500 million tons at 0.39 percent copper as sulfide ore and 250 million tons at 0.45 percent total and 0.32 percent acid-soluble copper as oxide ore.

Two conventional methods were employed to evaluate the oxide ore metallurgically. One was in vats in a 100 ton per day plant and the other by agitation leaching in a six ton per day plant. Results showed that both processes are viable for treatment of this ore. Agitation leaching resulted in a higher extraction of copper values.

The final process type for production decision will have to be based on a combined evaluation of metallurgical recoveries and projected capital and operating costs.

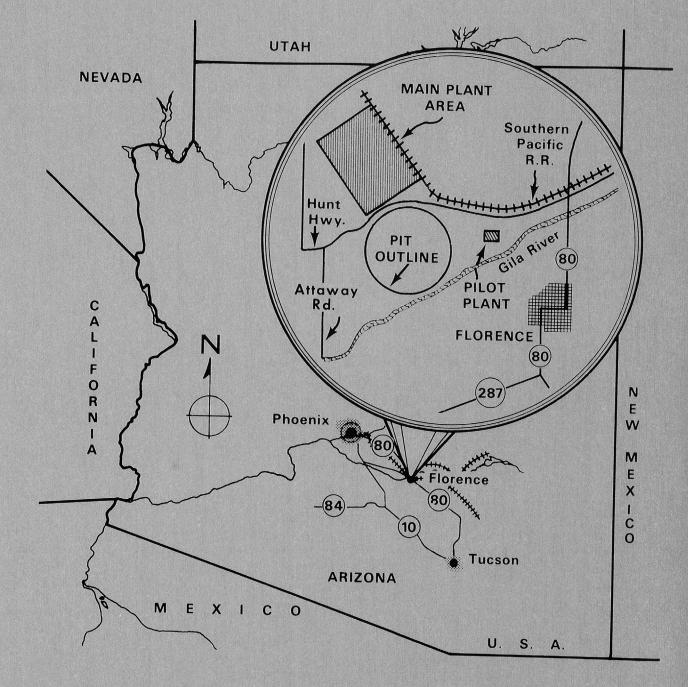
INTRODUCTION

Continental Oil Company owns a large low grade copper orebody approximately three miles northwest of the town of Florence in Pinal County, Arizona (see location map). The orebody is composed of about 250 million tons of oxide ore overlying 500 million tons of sulfide ore. The alluvium overburden is approximately three hundred and fifty feet thick. The copper content of the orebody amounts to 0.39 percent for the sulfide and 0.45 percent for the oxide ore. Of the latter, 0.32 percent is acid-soluble.

Ore grade mineralization is contained for the greater part in a Precambrian quartz monzonite and to a minor extent in Laramide granodiorite. Oxidation and weathering of the upper reaches of the sulfide deposit produced clays, iron oxides and

LOCATION MAP

CONOCO COPPER PROJECT



acid-soluble copper oxide minerals. The ore contains mainly chrysocolla, with minor amounts of cuprite, tenorite, malachite and copper-bearing clays. The sulfide minerals include chalcopyrite, pyrite, molybdenite and some bornite.

Both the oxides and the underlying sulfides are located in sharply defined discrete zones, with little evidence of mixing or secondary enrichment between zones.

Metallurgical testing of the ore began almost immediately after discovery in Conoco's research facilities in Ponca City, Oklahoma and in the laboratories of Hazen Research, Inc. and Mountain States Research and Development.

Results obtained from the laboratory work were very encouraging. Good recoveries and excellent finished products were obtained. Conoco therefore decided to continue with additional evaluations in a pilot plant. This work was conducted in 1975 and 1976.

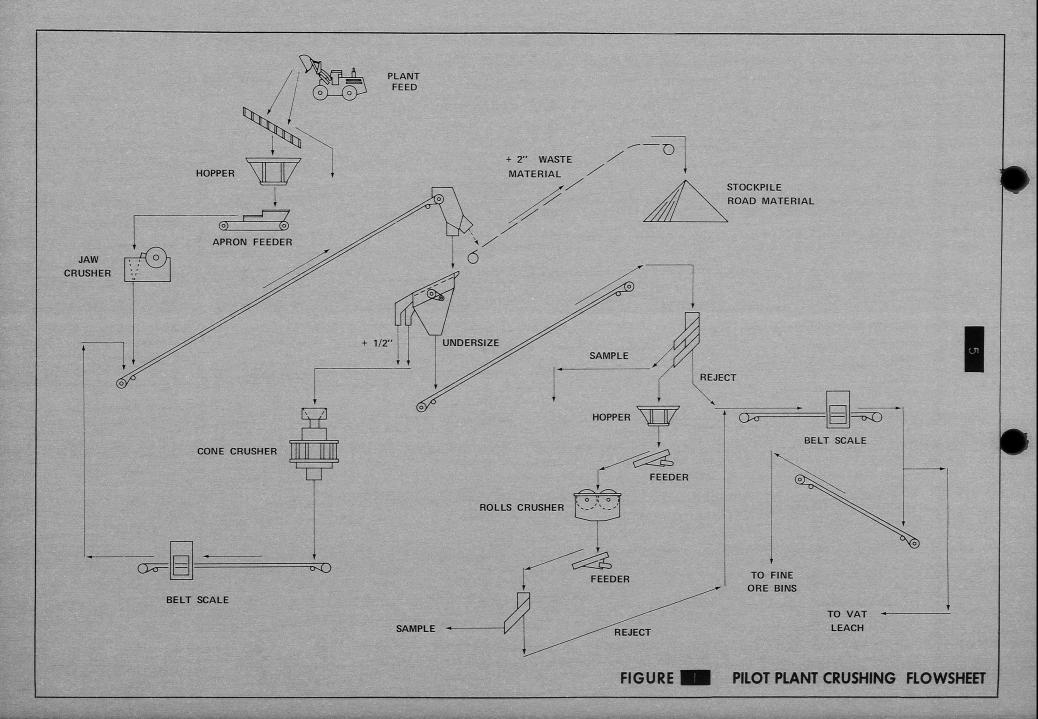
SUMMARY OF RESULTS

The pilot plant test program established that good extractions of copper can consistently be obtained from oxide ores processed by vat or agitation leach methods.

Treatment of ore in vats resulted in copper extractions ranging from 94 to 107 percent of the acid-soluble copper content. The average leach extraction was 100 percent when treating oxide ore crushed to pass through a 3/8-inch screen. Soluble copper loss averaged 2.13 percent. Acid-soluble copper recovery prior to solvent extraction amounted to 98 percent.

Sulfuric acid consumption during vat leaching with raffinate return was 50 pounds of 100 percent sulfuric acid per ton of ore leached. The pregnant liquor contained 7.41 grams of copper and 5.7 grams of free acid per liter.

Overall vat leaching plant recovery into cathode copper amounted to 96 percent of the acid-soluble copper in the feed.



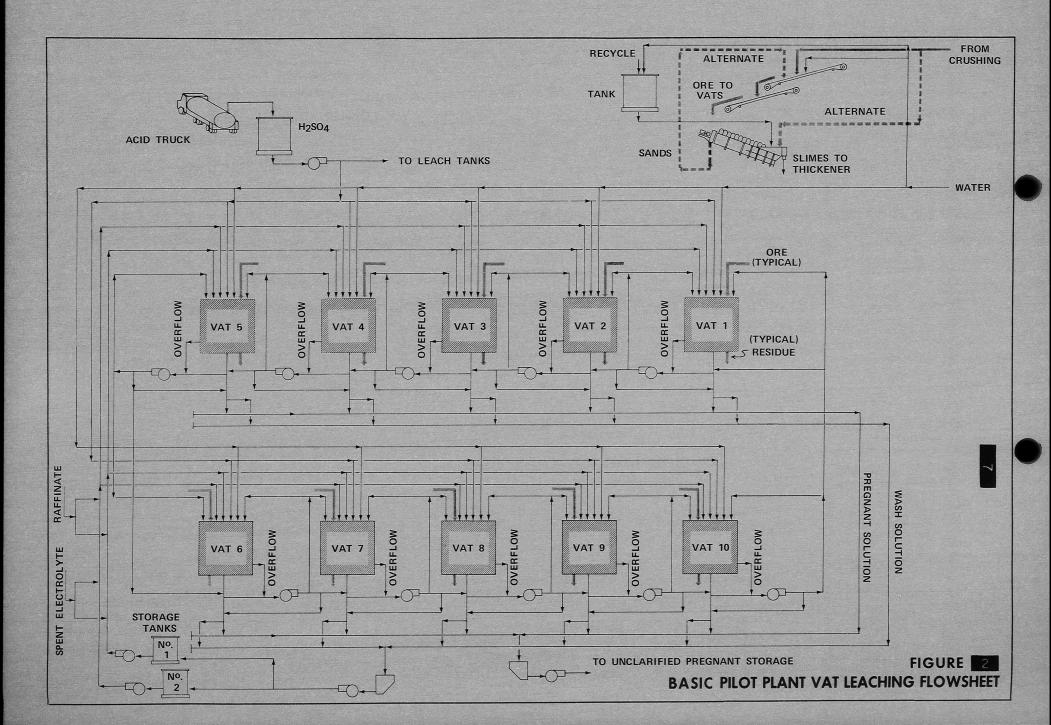
by front end loader to a hopper equipped with an apron feeder. The feeder transferred material at a controlled rate to the primary crusher which was installed at a minimum height above ground. Product from the primary crusher at minus $l_2^{\overline{l}''}$ discharged on to a belt conveyor having a magnetic head pulley for tramp iron removal. When waste material for roads was crushed, the discharge from this conveyor was diverted to a stockpile. After primary crushing, the conveyor discharged the ore on to a double-deck vibrating screen. Undersize material from the lower screen ranging from minus 3/8" to minus 5/8" in size was conveyed to the sampling tower. The oversize material from both decks fed the secondary crusher. A belt conveyor, equipped with a scale, returned the product from the secondary crusher to the primary crusher discharge conveyor. An automatic primary sampler cut the screen undersize product. This sample was further crushed in a rolls crusher and resampled to provide a final laboratory sample.

Provision had been made to divert part of the primary sample to a container for treatment elsewhere. The reject from the sampling tower was transferred to a conveyor and discharged via a rotary chute to the vat agglomeration conveyor or the fine ore bin feed conveyor.

The fine ore sampling system and the crushing plant chutes were designed for rapid self-cleaning because of the various ore types crushed. The crushing plant was not housed and a mobile crane was used for servicing the equipment. The fine ore bin feed conveyor was equipped with a rotary chute which discharged into the oxide or the sulfide bins.

VAT LEACHING PLANT

There were ten leaching vats, each measuring 10.75 by 10.75 feet inside by 19 feet deep. Crushed and sized oxide ore was fed directly from the crushing plant and distributed to the leaching vats by a shuttle conveyor. The ore was agglomerated by water sprays located at tumbling stations on the vat feed conveyor. A basic flowsheet for the vat leaching circuit is attached (see Figure 2).



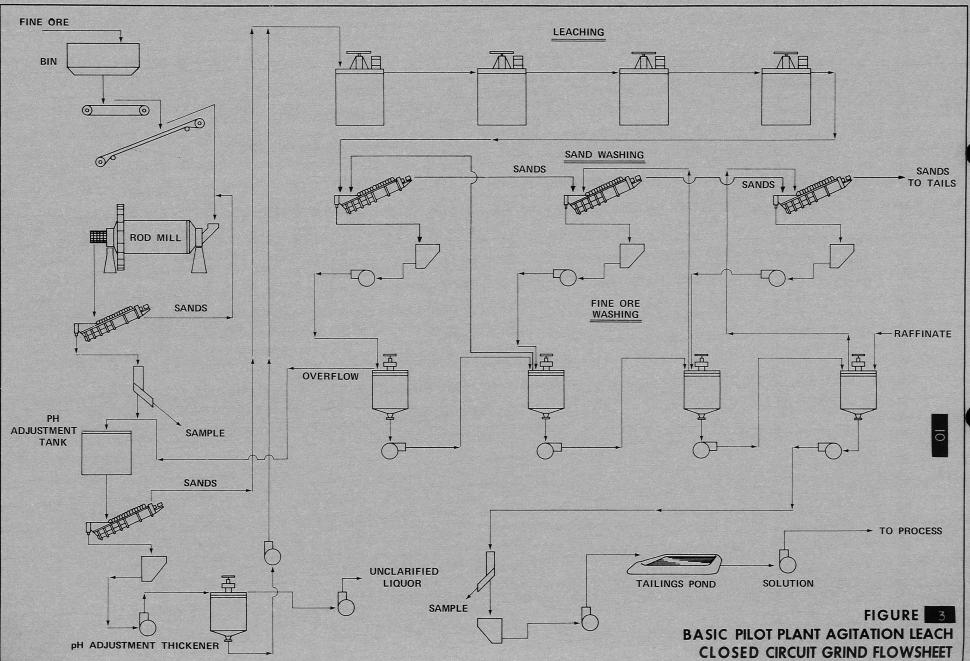
About 90 to 100 dry tons of ore were bedded evenly across a vat until the designed ore depth of 18 feet was reached. Loading was at the rate of 35 tons per hour. When a vat was completely filled, the shuttle conveyor was moved to the next one for loading.

Leaching vats were concrete. Three vats were unlined and the others were covered with various acid-resistant materials. Each vat had a false bottom of timbers and perforated planking. The ore rested on the planking. The spaces below the planking distributed the percolated leach solution to the vat outlet under downflow or to the ore under upflow conditions.

The vats had several pipe headers above and two lined concrete solution launders below. Two headers were used for the distribution of acid or water, the others distributed in sequence; raffinate, wash solution No. 1, wash solution No. 2, and water, in accordance with the vat leaching schedule. One launder was used to return wash solutions from the vats to either of the two separate wash solution storage tanks. The other launder was used to collect unclarified pregnant solution.

After a vat was loaded with ore, raffinate wash was introduced some six vats downstream. The solutions were displaced through the perforated false bottoms of all vats in the leaching cycle and through the newly ore-loaded vat and percolated up through the ore bed, covering it in about eight hours. During the next twelve hours, raffinate and wash water were added as indicated above and pregnant solution flowed from the newly loaded vat to the unclarified pregnant solution storage tank. The solution in each vat was then recirculated within the vat for four hours.

Leached ore was washed three times to remove copper-bearing solutions. Fresh water was used for the last wash. A vertical sump pump returned any spills to the leaching vats or to the oxide tailing pond. The vats were built on an acid-resistant coated slab which had solution launders and sumps cast into the slab. Operating platforms were made of steel and were coated with acid-resistant paint. Throughout the rest of the oxide plant, where corrosive service was encountered, fiberglass reinforced polyester or wood was used for tanks and polyvinyl chloride for piping. Platforms were wood and/or steel coated with acid-resistant paint.



TEST PROGRAM

VAT LEACHING OBJECTIVES

The major objectives for operating the pilot vat leaching plant were:

To confirm the favorable metallurgical results obtained during bench scale testing of drill core samples. Specifically, the work involved demonstrating on a continuous basis that a recovery of 98 percent of the acid-soluble content could be achieved.

To demonstrate that copper-bearing solutions obtained from vat leaching were amenable for the subsequent solvent extraction and electrowinning steps.

To demonstrate that high quality copper cathodes could be produced in the electrowinning cell on a continuous basis as direct feed to a rod plant.

To determine the size to which the ore has to be crushed for optimum copper extraction.

To determine the leaching time in days needed to achieve optimum copper recovery. The vat pilot plant had been built to determine if upward or downward solution flows were more advantageous in terms of copper recovery over a period of time.

To determine if excessive fines in the ore fed to the plant would have to be removed in a wash circuit and treated in a separate agitation leaching plant.

To determine the effect of solvent extraction raffinate return on copper solution losses.

To conduct concurrent laboratory tests as required to supplement data generated by the pilot plant.

To determine the effect of other operating variables such as acid consumption, stages of acid addition, flowsheet modifications and leaching time variations.

To determine which of several vat linings is best suited for concrete protection or if extra thickness of plain concrete is adequate and more economical.

CAMPAIGN No. 2, OCTOBER 15 to NOVEMBER 6

The ore fed to the vats was crushed to pass a 5/8-inch screen. Concern was mainly centered on reducing soluble copper losses in the residue. To effect this the pregnant solution was diluted to decrease the copper content from about 8 grams to 3.5 grams of copper per liter. In that range the solvent extractant LIX64N improves copper removal and raffinates containing much less copper are produced.

CAMPAIGN No. 3, NOVEMBER 6 to DECEMBER 1

The ore was crushed to pass a 1/2-inch screen before being fed to the vats. Main purpose of this campaign was to determine metallurgical results at this ore size. On November 24 a test with solutions flowing downwards through the vats was begun.

CAMPAIGN No. 4, DECEMBER 1 to DECEMBER 23

Since best copper recoveries had been obtained from ore crushed to pass a 3/8-inch screen, the vats were again fed with ore of that size. Sulfuric acid concentrations in solution were optimized to provide a low acid pregnant liquor for solvent extraction. Up to December 12 downflow of solutions in the vats was practiced.

CAMPAIGN No. 5, DECEMBER 23 to JANUARY 15

Certain parameters were rechecked and the test program was completed.

To confirm and consolidate the results obtained during the above period, the pilot agitation leaching operation was resumed on March 15th, 1976 and continued to June 29th, 1976.

In the evaluation of the metallurgical results obtained during the operation of the plant, the initial period from June 5th to July 30th was not included for the following reasons:

During that period inexperienced operators were being trained.

Minor modifications to the piping and pumping installations had to be carried out.

Additional acid and solution flowmeters had to be purchased and installed to obtain good metallurgical recording data.

The schedule achieved was as follows:

CAMPAIGN No. 1, JULY 30 to AUGUST 20

The ore was ground to 8 percent plus 35 mesh. Testwork was mainly conducted on optimizing acid addition, pulp densities and solution flows.

CAMPAIGN No. 2, AUGUST 20 to SEPTEMBER 10

Ore grind was maintained at 7 percent plus 20 mesh. Much the same testwork as in Campaign No. 1 was carried out, but at the coarser grind.

CAMPAIGN No. 3, SEPTEMBER 10 to SEPTEMBER 25

At 5 percent plus 10 mesh the ore was coarsened even more during this campaign. The impeller tip speed in the pH adjustment tank was increased to keep the solids in the pulp suspended. Other testwork concentrated on optimizing acid addition, pulp densities and solution flows.

METALLURGICAL RESULTS

VAT LEACHING OPERATING PROCEDURE

In this section pilot plant metallurgical results are presented and interpreted. The data include results of optimum size determination for the ore fed to the vats, acid requirements and leaching time needed.

Three ore sizes, 3/8, 1/2 and 5/8-inch, were tested during the program. The screen analyses which follow, show the sizes obtained when crushing through screens with the above mentioned openings:

Analysis		Crushing Screen Size,	in.
Weight, %	3/8	<u>1/2</u>	5/8
+0.525 inch			ni1
+0.371 inch		4.0	
+0.3125 inch	2.4		,
+4 mesh	25.2	36.4	42.5
+14 mesh	38.6	30.6	28.1
+65 mesh	17.9	15.2	15.3
+200 mesh	5.3	4.0	5.4
-200 mesh	10.6	9.8	8.7

TABLE 1: SCREEN ANALYSES OF CRUSHED ORE

The following table presents the vat processing sequence. It was used in the pilot plant until raffinate was returned as wash solution. When raffinate was returned, the circuit was modified as described later in this section.

The pilot plant incorporated solvent extraction for copper recovery and purification of vat leach liquors. A low acid-bearing leach solution was required for satisfactory recovery in solvent extraction. To obtain such a solution without neutralizing by chemical means, fresh ore was used to consume excess acid. After a vat was loaded, solution was advanced to cover the ore. Advance was then stopped and recirculation was begun. No sulfuric acid was added to the vat during the first recirculation and the reaction of excess acid with the ore in the advancing solution was relied upon to reduce the acid content for the subsequent pregnant liquor displacement. After this initial recirculation, advance was again begun and solution was displaced to the unclarified pregnant solution storage tank. Advance was continued with solution until the next vat, which had been newly loaded with ore, was covered and the second recirculation was then started. Thereafter, advance and recirculation steps were carried out in several twenty-four hour periods, until the washing step began. Washing was initiated with a copper-acid-bearing wash solution from the wash storage tank. Wash volume was equal to the amount required to cover new ore. After the first wash the vat was again recirculated. Water was used for the final wash. The initial 10,800 gallons, which were equal to the amount of pregnant liquor displaced, were advanced and the remaining 1,632 gallons approximately equalled the amount of water contained in the leach residue less the water added during agglomeration. The volume of water was varied to maintain the solutions in balance. Finally, the vat was drained to wash storage. Throughout the test program a constant 10,800 gallons of pregnant solution were displaced from each vat though the quantity of ore loaded into the vats varied slightly from day to day. A vat solution balance is presented on the following page.

The vat leaching test program was carried out for the greater part with ore passing a 3/8-inch screen. Once data from this size were obtained, coarser ore sizes were studied.

Acid addition to each vat was controlled by flowmeters. On September 10th, acid addition points and quantities were fixed and not altered until later in the program when raffinate was returned from solvent extraction. Ore loading to each vat averaged 94.3 tons per vat during the period September 2nd to October 15th. Acid was added during the second through sixth recirculation at a rate of 0.7 gallons per minute. Procedure for acid addition in the vats is shown below and in Figure 4. Total addition amounted to 57 pounds of 100 percent acid per ton of dry ore.

TABLE 4:PROCEDURE FOR ACID ADDITION TO VATS(Addition rate: 0.7 gpm)

Recirculation No.	Acid Addition			
물건 것을 물고 있을 것 같아. 것을 가지?	Gallons	% of Total		
2	63	16.7		
3	105	27.8		
4	105	27.8		
5	63	16.7		
6	42	11.0		
Total	378			

Metallurgical accounting of copper and acid for each vat was monitored daily by sampling and analyses of solutions in and out of each vat. Though day to day accountabilities fluctuated widely, over an extended period of time they agreed very closely.

A 2.5 percent weight loss of the ore during leaching was allowed for throughout the pilot plant program.

OPERATING RESULTS

During the period of September 2nd to October 15th, 1975, the dry ore had a bedded bulk density of 87.2 pounds per cubic foot and assayed 0.43 percent total copper and 0.31 percent acidsoluble copper. An acid-soluble copper extraction of 102.0 percent was obtained, when adding 55.8 pounds of acid per ton of ore. With a 4.5 percent soluble loss leach recovery was 97.5 percent. Soluble losses gradually decreased to two percent after the circuit came into balance.

Some compaction of the ore occurred during processing and the bedded bulk density of the leach residue was 92.3 pounds per cubic foot.

The pregnant liquor assayed 6.5 grams copper per liter and 9.3 grams acid per liter. Copper accountability was calculated as 101.4 percent during this period.

The highest copper recoveries obtained during the complete program occurred during the period September 25th to October 15th. Copper extraction amounted to 106.4 percent of the acid-soluble copper and after a 2.2 percent soluble loss, overall recovery was 104.2 percent.

Copper and acid concentrations of the solutions leaving the vats (off solutions) are shown as follows for the September 25th to October 15th, 1975 test period (also Figures 5 and 6).

TABLE 5: COPPER AND ACID ANALYSES OF VAT OFF SOLUTIONS 9/25 to 10/15/75

Day	Off Solution	<u>g_Cu/1</u>	g Acid/1
1	To Pregnant	7.14	7.2
1	To Cover	6.06	12.0
2	Advance	4.53	21.0
3	Advance	2.27	22.9
4	Advance	1.22	18.4
5	Advance	0.79	11.3
6	Advance	0.57	6.5
7	Advance	0.47	3.6

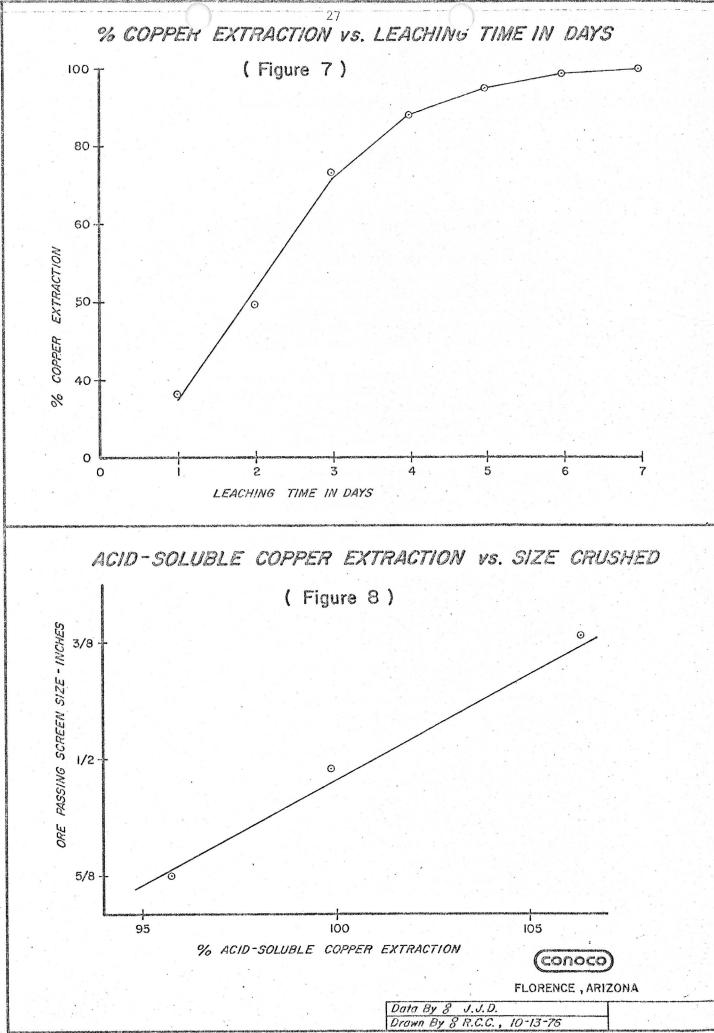
Although the acid concentration in the pregnant liquor was too high for satisfactory recovery in the subsequent solvent extraction step, the acid gradient attained in the individual vats was close to the desired level. Highest acid strengths existed after the second, third and fourth day of leaching. A 50 percent raffinate return to the vats as wash was started on October 10th, 1975. Since the raffinate contained acid nearly equal to the quantity added during the sixth recirculation, the addition of acid at this point was discontinued and total acid addition was reduced to about 50 pounds per ton of ore.

With the addition of raffinate to the vats (5,400 gallons) the total wash water volume was decreased from 12,432 to 7,032 gallons. The raffinate was added just after the seventh recirculation and was then followed by a water wash. Raffinate return was continued for the remainder of the test program.

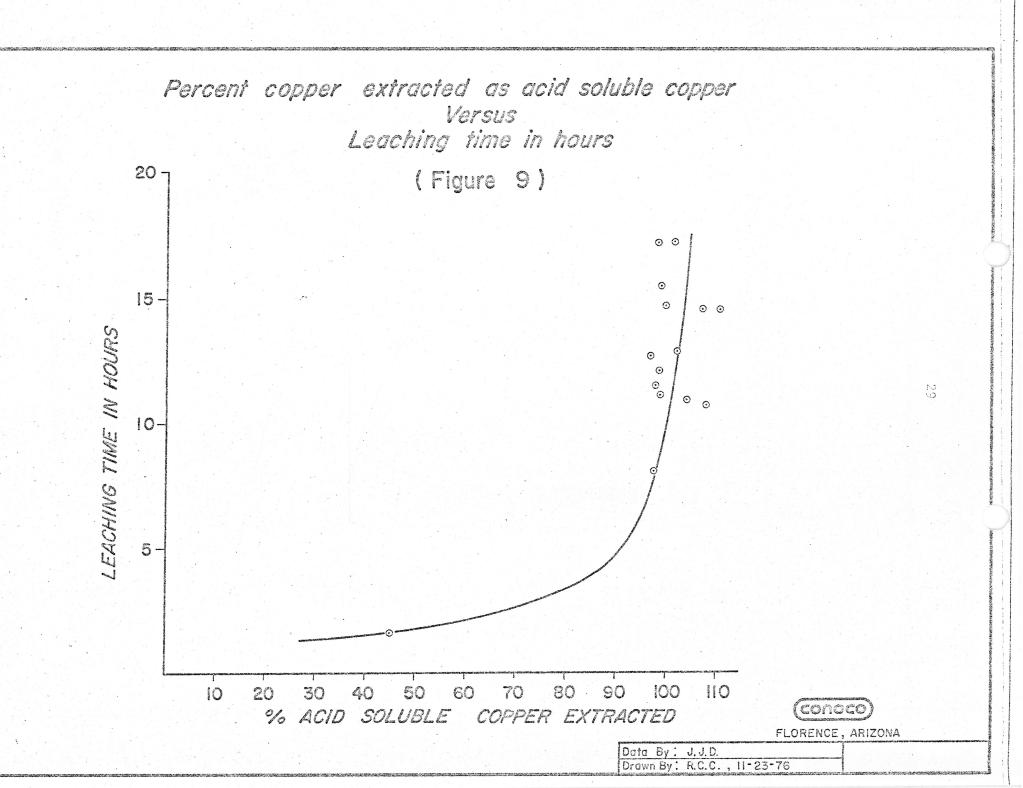
During the period of October 15th to November 6th, 1975, ore which passed a 5/8-inch screen was leached in the vats. Copper extraction amounted to 95.7 percent of the acid-soluble content. Soluble losses were high and copper recovery decreased to 89.3 percent. This was due partly to a high copper content in the raffinate and possibly due to not returning raffinate to a more advanced point in the washing cycle.

Researching published information on the use of LIX64N showed that improved copper extractions could be obtained when processing a lower grade pregnant liquor feed. It was therefore decided to produce a pregnant liquor of 3 to 3.5 grams copper per liter. This was to allow an additional 10,000 gallons of water to be used for washing the soluble copper from the residue. As a result more copper would be recovered. This concept was followed for the remainder of the program. The desired solvent extraction feed solution was produced by combining pregnant liquor as obtained from the vats with an equal volume of wash solution from the last vat. The vat leach operating schedule was changed and after the sixth recirculation 10,800 gallons of raffinate were introduced into the vat. This was followed by the normal wash and recirculation sequence and then by 12,432 gallons of water from which 10,800 gallons of solution were subsequently mixed with pregnant liquor.

From November 6th to November 26th, 1975, leaching was carried out with ore crushed through a 1/2-inch screen. During this period higher grade ore was treated which made it difficult



Britaniananana



The pregnant liquor assayed 1.54 grams copper per liter with a pH of 1.5.

From September 10th to September 25th leaching was conducted on a very coarsely-ground ore (4.6 percent plus 10-mesh). During the course of this testwork, agitation intensity in the pH adjustment tank decreased to the point where essentially no agitation was occurring. The agitator speed was therefore increased by 65 percent to a peripheral speed of 1,843 fpm and suitable particle suspension was again attained. Pulp density in the first stage of leaching was 28.4 percent solids. The overflow of each leach tank was raised two inches to force the leach slurry up through the risers and reduce short-circuiting. Leaching time was thereby increased to 17.3 hours. On September 22nd an open-circuit grind with 70 percent solids was begun and was retained for the remainder of the program.

A final leach residue containing 0.115 percent copper was obtained from ore which assayed 0.43 percent total copper and 0.31 percent acid-soluble copper. Leach extraction amounted to 102 percent of the acid-soluble copper (see Figure 11). Acid addition was 44.3 pounds per ton of ore. The results showed the same extraction for either 13.0 or 17.3 hours of leaching. Percent solids in the first and the second stage leach averaged 29.6 and 60, respectively. PH of the first-stage leach was 1.7

Since by this time all leaching results with a coarse grind had shown good copper dissolution and a substantial reduction in acid consumption, it was decided to attempt to grind to a coarser mesh size (2-3 percent plus 6-mesh). However, this grind could not be consistently achieved. Coarse ore particles did not flow through the leach tanks and intensity of agitation became extremely poor. All leach tanks had to be emptied on several occasions. Failure to maintain the coarse grind continuously made it impossible to gather reliable leaching data and after nineteen days of effort this test was discontinued. Although the results for this period showed good leach extraction (99.4 percent of the acid-soluble copper), the data could not be considered as representative because of inconsistent operating conditions.

As of October 20th all raffinate from the solvent extraction circuit, which previously had been discarded, was returned as a wash solution to the countercurrent decantation circuit. The raffinate was metered into the last stage of washing at a

31

rate equal to the volume of pregnant liquor removed. Since this solution contained acid, its effect on the acidity of the pregnant liquor was closely followed. It was recognized that the oxide ore might not have sufficient acid consuming constituents to neutralize the acid and produce a pregnant liquor suitable for solvent extraction. It was also realized that the energy required to suspend a slurry of 27 to 32 percent solids with no segregation of coarse and fine ore particles would be much higher than that required for a slurry of 50 to 55 percent solids. Soon after the raffinate return was begun, the density in the pH adjustment tank was increased by diverting a part of the advancing wash solution to the pH adjustment thickener. It was felt that the by-passed solution would react in the pH adjustment thickener, and the resulting increased leach time obtained in the first-stage leach tank would provide adequate conditions to produce a pregnant liquor of low acidity for solvent extraction. However, with a first-stage leach time of 3.7 hours at 50 percent solids the pregnant liquor had a pH of 1.4. This was too acidic for acceptable copper recovery in solvent extraction and would require addition of a neutralizing agent. It was therefore decided to carry out single-stage leaching tests for comparison with two-stage leaching (see Figure 12).

During the period of October 20th to November 10th, 1975 a coarse grind (3.9 percent plus 8-mesh) was maintained with an acid addition of 41.3 pounds per ton (terminal leach pH = 0.9). Leach extractions of 95.7 and 97.7 percent of the acid-soluble copper were obtained in 12.9 and 17.2 hours respectively. The ore contained 0.47 percent total copper and 0.38 percent acidsoluble copper and the final leach residue assayed 0.10 percent copper.

SINGLE-STAGE LEACHING

For a successful leaching and solvent extraction operation it is most desirable to return raffinate to recover copper contained in this solution. Also of importance is consuming the acid contained in the raffinate on the ore during treatment and thus reducing the amount of acid required for leaching. In two-stage leaching of this ore, sufficient acid was not consumed by the ore when operating with the time and temperature conditions prevailing in the firststage leach. The only practical method of returning raffinate was as wash to the countercurrent decantation circuit. In so doing a portion of it became part of the tailing solution and the remainder advanced and, along with the balance of acid from the secondstage leach, contacted the ore in the first-stage of the two-stage leach system.

Single-stage leaching followed by limestone neutralization of pregnant solution could possibly result in a more economic method for copper recovery. This circuit would eliminate the complete first-stage leach capital and operating costs connected with a two-stage leach system.

The single-stage leaching circuit was placed into operation on November 10th and the first three leach tanks were used for leaching. The fourth tank was used for neutralization with 97.5 percent calcium carbonate. The lime was supplied as a 70 percent minus 200-mesh product. Part of No. 1 countercurrent decantation thickener overflow was added to the rod mill discharge.

Results showed the same acid-soluble copper extraction of 97.4 percent in either 8.1 or 12.1 hours of leaching. Acid addition amounted to 49.8 pounds per ton of ore at a terminal leach pH of 0.9. Adding 30 pounds of limestone per ton of ore to the neutralization tank resulted in a pregnant liquor with a pH of 1.6. The pH of the neutralization tank was 2.9. The ore assayed 0.58 percent total copper and 0.39 percent acid-soluble copper, which was higher than the ore previously processed. The leached residue contained 0.21 percent copper.

Since the extraction of copper was too low with 12.1 hours of leaching time, a fourth leach tank was added and single-stage leaching was continued until operations were terminated on January 14th, 1976. The results of this last leach study showed copper extractions of 95.8 and 98.8 percent of the acid-soluble copper in 11.6 and 15.5 hours of leaching time, respectively. Sulfuric acid addition amounted to 62.1 pounds per ton of ore. Terminal pH was 1.0 and after addition of 34.3 pounds of limestone per ton of ore the pregnant liquor had a pH of 1.8. The ore contained 0.50 percent total copper and 0.35 percent acid-soluble copper. The leach residue assayed 0.16 percent copper.

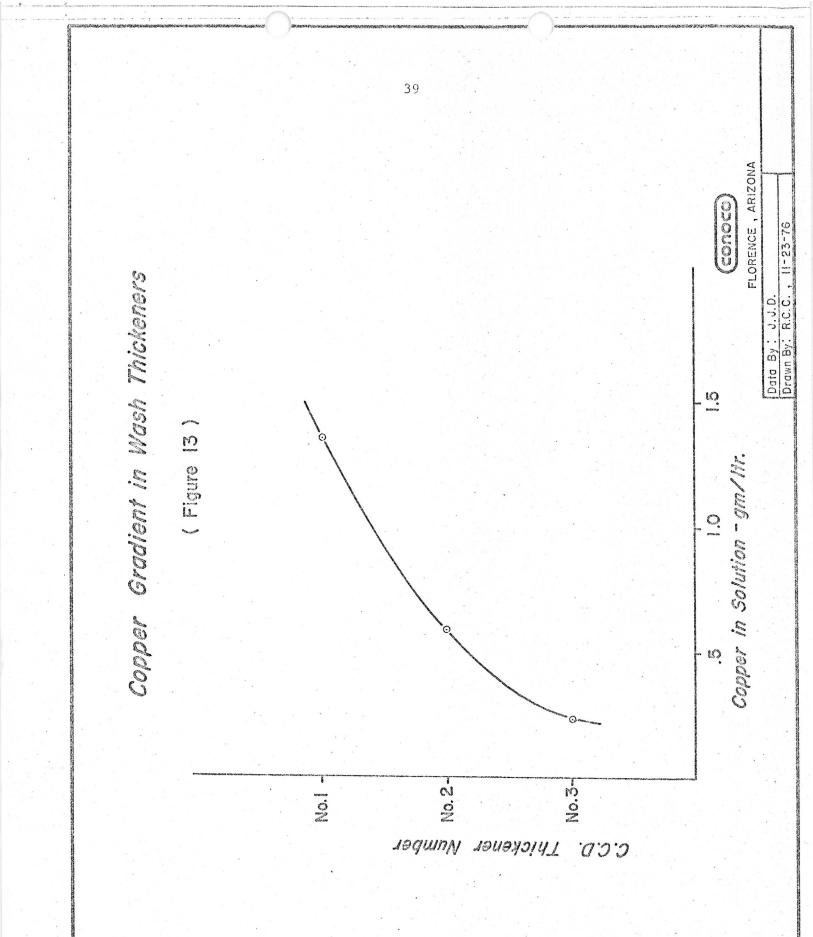
The reason 62.1 pounds of acid per ton of ore were required during this period compared to the 49.8 pounds per ton used in the previous test could not be determined definitely, but was probably due to an increase in acid-consuming constituents in the ore.

TABLE 6: PILOT PLANT TAILING DATA	TABLE	6:	PILOT	PLANT	TAILING	DATA
-----------------------------------	-------	----	-------	-------	---------	------

	Coarse Tailing	Fine Tailing	<u>Total Tailing</u>
Wet Weight, 1bs.	176,406	415,971	592,377
% Solids	81.0	31.9	46.5
Dry Weight, 1bs.	142,843	132,653	275,496
% of Total	51.8	48.2	100
% Total Copper	0.088	0.191	0.138
Total Copper, lbs.	125.84	254.14	379.98
Solution, g Cu/1	0.20	0.12	0.13
1bs. of Copper	6.79	34.07	40.86
Soluble Loss,			
% of Total Copper	0.54	2.73	3.28
% of Acid Soluble Copper	0.76	3.79	4.55

Discarding of leach slurry during the coarse grinding tests which was previously mentioned in the Two-Stage Leaching section, has been accounted for. The results showed that of the total dry solids in the tailing, 51.8 percent was in the coarse fraction and 48.2 percent was fines. The wet coarse and the wet fine fraction contained 81.0 and 31.9 percent solids, respectively. This resulted in a combined tailing of 46.5 percent solids. The averages of hourly underflow solid determinations of the No. 4 thickener showed 1.0 to 1.5 percent higher solids content than the analytical determination. All four washing thickeners had essentially the same underflow solids content. The pH adjustment thickener underflow, however, had a higher solids content which resulted in a 55 percent solids content in the second-stage leach.

Leach extraction of the acid-soluble copper during the period of September 22nd to October 20th, 1975, as determined from the final leach residue was 99.7 percent. The tailing analyses showed close agreement at 101.0 percent extraction. An even closer correlation of



laboratory work showed a slight improvement in clarity of thickener overflow solutions and the same settling rate of the solids as with the MG200, while flocculant dosages were the same.

Initially about 0.1 pound of flocculant per ton of ore was added to the thickeners. Later on recycling of thickener overflows to mix and dilute the flocculant solution reduced this to 0.01 pounds per ton of ore.

The eight-foot diameter thickeners in the pilot plant had an area of 50.2 square feet. With a nominal feed rate of 6 tons of ore per day the unit settling area was 8.37 square feet per ton per day. It was soon recognized that the thickeners were too large to obtain scale-up data. A four-foot diameter thickener was therefore purchased and installed in place of the No. 1 CCD thickener. This smaller No. 1 thickener was capable of settling the ore on a unit area of 2.2 square feet per ton per day, when adding 0.01 pounds of flocculant per ton of ore.

A concentrated effort was made during the single-stage leach test period to establish thickener area requirements. Good data were acquired during a fifteen-day period when ideal thickener operations prevailed. Adding 0.012 pounds of Superfloc 127 per ton of ore, a thickener unit area requirement of 2.2 square feet per ton per day was determined. It was indicated that 0.01 pound of flocculant per ton of ore would be adequate. Additional settling rate determinations were carried out by Eimco Envirotech representatives.

Screen analyses were performed on various slurries during the test program. Analyses of the pH adjustment thickener feed and the No. 1 thickener feed showed a very high percentage of minus 325mesh material, 63 to 64 percent, and only 9 to 10 percent of minus 200- and plus 325-mesh material. These analyses were performed when the ore was being ground in the rod mill to about two to four percent on 10-mesh.

Screen analyses of these same two slurry streams were also made on November 7th, 1975, when a 10 percent plus 10-mesh grind was being studied. These also showed a high percentage of minus 200-mesh material. Although minus 325-mesh analyses were not carried out, it can be assumed that most of the minus 200-mesh material was in the minus 325-mesh fraction.

TABLE 7: AGITATION LEACH PILOT PLANT - SUMMARY OF RESULTS 1976 Test Program

RUN	Start	1	2a	2b	2c	(Totals)	3	4	5	6	7
VARIABLES											
Grinding Leach, pH Sand/Slime	10-M 1.0 63/37	10-M 1.0 63/37	10-M 0.9 63/37	10-M 0.9 63/37	10-M 0.9 63/37	10-М 0.9 63/37	10-M 0.7 63/37	14-M 0.7 56/44	14-M 0.9 56/44	14-M 0.8 56/44	10-M 0.8 63/37
ORE TREATED											
Dry Wt., Tons Tot. Cu, 1bs A.S. Cu, 1bs Head, % Tot. Cu % A.S. Cu	59.0 531 406 0.45 0.34				442 332 0.45						
LEACHING											
Acid, 1bs/Ton Ore Lime, 1bs/Ton Ore Leach Sol., g/1 Cu Leach Solids, % Tot. Cu % Solids Temperature,°C Pregnant Liquor, g/1 Cu	35.8 - 0.14 47 24 1.6	35.6 - 2.6 0.15 49 25 1.6	37.2 - 2.8 0.16 54 29 2.0	41.1 - 3.3 0.15 55 29 2.0	34.9 - 2.8 0.15 55 27 1.9	37.7 - 3.0 0.15 55 27 1.9	47.6 4.26 2.5 0.13 57 31 1.7	47.6 4.75 2.5 0.14 56 32 1.8	2.6	41.5 - 3.3 0.14 60 32 1.7	42.3 2.9 0.13 58 34 1.6
METALLURGICAL RESULTS											
Insol. Loss, 1bs Cu % Tot. Cu % Insol. Loss Soluble Loss, 1bs Cu % Tot. Cu % A.S. Cu	149 0.13 28.00 82 16 20	211 0.13 29.48 36 5 7	107 0.12 20.53 35 7 9		115 0.12 25.85 28 6 8		106 0.10 22.95 20 4 6	108 0.11 23.65 21 4 6	131 0.12 24.34 21 4 5	132 0.12 26.23 18 4 5	116 0.11 24.68 20 4 6
Total Loss, 1bs Cu	230	247	141	181	143	465	126	129	152	151	136
Cu Extraction Dissolved, 1bs Cu % Overall Recovery % of Total Cu % of A.S. Cu	382 56.6 72.0 94.2	504 65.4 70.5 92.0	413 72.8 79.5 104.7	399 66.6 73.5 98.4	327 67.8 74.2 98.6	69.1 75.7		76.4	406 71.8 75.7 101.6	369 70.0 73.7 101.3	355 71.1 75.3 100.2

43

TABLE 10: COMPARISON OF PROCESSES C. Typical Direct Operating Cost Estimate (cents per 1b Cu)

	Vat Leaching	Agitation Leaching
Primary Crushing	1.2	1.2
Fine Crushing	2.9	2.6
Grinding	-	5.6
Leaching	14.7	11.5
SX	3.8	5.0
Electrowinning	9.9	9.8
Acid Handling & Storage	0.1	0.2
General Area	0.2	0.2
		Print State State State State
Total:	32.8	36.1

CONCLUSIONS

Metallurgical results obtained in the pilot plant indicate that agitation leaching and vat leaching are viable processes for the treatment of Florence oxide ores.

Copper recoveries were higher from ores treated by agitation leaching methods.

A compilation of the capital investment requirement for a 30,000 tons per day operating plant indicates the costs for a vat leaching plant to be slightly higher than those for an agitation leaching plant. On the other hand an estimate of plant operating costs shows them to be higher for agitation leaching.

The final decision on which process to employ in the production plant will have to be based on the combined effect of metallurgical recoveries and capital and operating costs.

ACKNOWLEDGMENTS

The author wishes to thank the metallurgical and operating staffs who worked so diligently to achieve the satisfying metallurgical results which were obtained.

The author also wishes to thank the management of Continental Oil Company for their permission to present this paper.

47

PERT INT BIA SAN CARLOS PROJECT 0. GILA RIVER P. SMAL CARCOS INCREMENTED INGIMA AND DRAINAGE COMMUNITY DISTRICT Conoco



D-6537

United States Department of the Interior

BUREAN-QFAMINES 2401 E STREET, NW.FFICE WASPANGTON, D.C. 20241 8 A/O: 36

A/D: 36_{November 29}, 1976

PHOENIX, ARIZONA

Memorandum

In Reply Refer To: EBM-MMSDA-AD-FO

To: Commissioner, Bureau of Indian Affairs Through: Assistant Secretary-Energy and Minerals DEC 1 1976 From: Director, Bureau of Mines Subject: Proposed copper mine, Florence, Arizona For your interest, we are enclosing copies of correspondence from

Mr. A. F. Bissett that explain some of the background of the problems involved in getting development started at Conoco's proposed copper mine near Florence, Arizona. If the opportunity presents itself, perhaps your office could assist in improving communications between the parties involved that might lead to a resolution of differences.

Refing J. D. Morgan

Director

Enclosures

cc: Solicitor w/enc.

FILES-MASDA-AD-FO, Rm. 1002, CP Secretary File Secretary's Reading File (2) AS--EM (2) Director's Reading File (2) MMSDA R.L. Lowrie, Chief, IFOC LO, Arizona S.P. Wimpfen, Rm. 1054-A, CP W.L. Dare, Rm. 1002, CP EBM;WLDare:ab 11/29/76

Alex F. Bissett Project Manager Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

November 15, 1976

Dr. Thomas V. Falkie Director, Bureau of Mines U. S. Department of Interior 2401 E. Street NW Washington, D. C. 20241

Dear Sir:

Mr. Joe Arrendale, Liaison Officer of the U. S. Bureau of Mines in Phoenix, has suggested that I write your office to provide you with background information on the Conoco Copper Project near Florence, Arizona. The enclosed letter to Reid Chambers of the Interior Solicitor's Office provides a good overall background of the mine development and problems arising from the necessity to dewater the mine area to permit an open-pit development.

This dewatering program has been a complicating factor since the inception of the project in 1969, inasmuch as although the mine site is some five miles outside the reservation boundaries of the Gila River Indian Community, a portion of the lands included within the mine site were included within the so-called "white lands" of the San Carlos Indian Irrigation Project, which project is administered by the Bureau of Indian Affairs.

Because of this factor, an accommodation must be reached between Conoco and the San Carlos Project (including its various constituent parts), and meetings and discussions to that end have been ongoing for several years.

During the past several months, a number of meetings have been held between myself and members of the Gila River Indian Community and the San Carlos Irrigation and Drainage District, and at a joint meeting on September 28th of this year it appeared that the basic issues had been resolved and a memorandum of our understanding prepared. However, on October 11, 1976, a memorandum and proposal prepared by Cox & Cox, legal counsel for the Gila River Indian Community, has again complicated the situation by proposing many items which are completely unacceptable to the non-Indian participants in the San Carlos Project,

-6537

Dr. Thomas V. Falkie November 15, 1976 Page Two

and would also appear to be in violation of the federal court decree that fixed the initial rights to the waters of the Gila River and paved the way for the establishment of the San Carlos Project. This development has been most disappointing and frustrating.

Conoco has also been notified that if the issues are not resolved in the immediate future, proceedings will be instituted in federal court by the Justice Department in an attempt to prevent Conoco from developing its proposed mine. The matter is now in the hands of the Interior Field Solicitor in Phoenix, who has been very helpful in attempting to determine if there is sufficient ground for settlement of this particular matter.

The purpose of this letter is for your information only in light of the new copper stockpile objective which has been recently set. I would be happy to supply any additional information that your office might desire concerning this matter.

Very truly yours,

A. F. Bissett

AFB:ct

enc.

cc w/enc.: Mr. Jack O. Horton Assistant Secretary of Land & Water Resources

> Dr. William L. Fisher Assistant Secretary of Energy & Minerals

> > 21 3 1

Mr. Joe Arrendale Liaison Officer

Alax F. Bissett Project Manager

Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-8852

December 24, 1975

Mr. Reid P. Chambers Associate Solicitor U. S. Department of the Interior Interior Building Washington, D. C.

Dear Mr. Chambers:

Thank you for meeting with our Conoco group on December 3. I hope the discussions in your Washington office will be useful in clarifying the issues and helping find the way toward an amicable solution.

As you know, Conoco is in the final stage of studying the feasibility of developing a major open-pit copper mine near Florence, Arizona. Decisions soon must be made either to go ahead with project development, or to suspend or delay it, and thereby defer realization of substantial economic benefits.

The Conoco ore deposit is completely concealed beneath a few hundred feet of alluvium and water-bearing conglomerate. Conoco proposes to drill a pattern of wells near the mine to prevent scepage from these shallow zones from flooding the excavation, and to maintain its safety and stability. Being able thus to protect the mine from ground water incursion is an essential element for any decisions to go ahead with the project.

The deposit was discovered by Conoco about five years ago. Detailed engineering and hydrological studies since then have shown it is technically feasible and economically practical to develop the mine inside the pattern of wells. These studies showed no effects of the pumping would be seen beyond a few miles from the mine.

Conoco's ore deposit is mainly within the lands owned by Conoco, party beneath desert land and partly beneath irrigated agricultural land. Part of the irrigated acreage was designated Mr. Reid P. Chambers December 24, 1975 Page 2

for participation in the San Carlos Project many years ago when the Project was established to provide water for irrigated farming in the region.

Because Conoco's planned mine pumping program will affect these San Carlos-designated lands, we have been seeking to work out with them a fair and equitable agreement whereby Conoco could proceed with its mine development, and deliver all water in excess of Conoco's needs into San Carlos irrigation canals where it can be distributed for beneficial agricultural use. Since 1972 we have discussed these ideas in numerous meetings with representatives of the San Carlos Project and with representatives of its constituent groups, the Gila River Indian Community and the San Carlos Irrigation and Drainage District. We have been told the ideas are generally acceptable, but so far we have been unable to get all three groups together for the substantive discussions which are essential to a solution.

Conoco's attempts to develop an agreement have been directed mainly to the San Carlos Project which has responsibility for the communality of Indian and non-Indian interests. Conoco is willing to meet as needed with any or all of these groups in a sincere effort to build the climate of understanding which is necessary to resolve the issues. Least progress has been made with the Indian group, and, therefore, Conoco's recent efforts have been especially in that direction.

Conoco's problems with the Gila River Indian Community are those of communication, and can be traced to lack of understanding on both sides. Somehow we have failed adequately to explain to the Indian Community the solid engineering and technical evidence that Conoco can develop its mining operation without detriment to the Indian interests. We have failed effectively to show the substantial economic benefit which will come from the new mine. Somehow we have failed to understand their apprehensions, and the Indian group seems to have misunderstood Conoco's proposals. Both sides have not yet developed the essential close and continuing dialogue which must come if we are to find a solution.

Water is a sensitive and emotional issue in Arizona. Without careful study and full understanding of the hydrological data, it would be easy to presume that pumping to keep ground water from flooding Conoco's planned mine excavation would lower the water table over a wide area and diminish water availability Mr. Reid P. Chambers December 24, 1975 Page 3

to present users. Over the past three years we have held numerous meetings with local civil leaders, with the San Carlos Project, with representatives of the San Carlos Irrigation District, and with leaders of the Gila River Indian Community. We have furnished these groups with copies of all hydrological studies, and have repeatedly reviewed all our work in detail. We can show solid scientific evidence that the pumping can be accomplished and the mine developed without impairing availability of ground water for present users.

With the San Carlos Project we have sought to formulate a fair and equitable accommodation under which Conoco could develop the wells necessary to dewater the mine site, and deliver to the Project at no cost all water pumped from wells on San Carlos-designated lands, plus all surplus water beyond Conoco's essential needs. The substance of Conoco's proposal is unchanged from the very first discussions in 1972. Our most recent restatement of that proposal was communicated to the Project in Conoco's August 29, 1974 letter, and was reviewed point by point with representatives of all groups shortly thereafter. The proposal is still outstanding, and we believe it is a sound basis for reaching an accommodation with the San Carlos Project. Since the August, 1974 meeting we have been rebuffed repeatedly in our continuing efforts to open any avenue for discussion or response to the Conoco proposal.

In May, 1975, we were disappointed to learn that the Gila River Indian Community had passed a resolution, requesting the Attorney General to begin legal action to prevent Conoco from proceeding with its planned mine development. We sought to learn details of the petition, but it was not until two months later that we finally were able to obtain, indirectly, a copy of a letter restating the resolution.

Since then we have tried again and again to open some avenue of communication. In October I proposed formation of a factfinding group where representatives of the San Carlos Project, San Carlos Irrigation and Drainage District and the Gila River Indian Community all could meet with Conoco to explore areas of differences and uncertainty as a basis for opening the way for more formal discussions. These attempts were rebuffed, too. Responses from the Phoenix BIA Office and from tribal leaders all seemed irrevocably committed to litigation rather than discussion or negotiation. They are saying there can be no discussions, pending disposition of the Indian Community's request for legal action. Mr.' Roid P. Chambers December 24, 1975 Page 4

In our view the answer cannot be found in litigation. The interests of the Indian community will be best served only if we first explore every reasonable avenue of discussion and negotiation toward an acceptable accommodation with Conoco. Given patience and understanding on all sides, we are certain a fair and friendly solution can be found.

The May 23, 1975 letter to the Attorney General asserts that Conoco's planned operations would adversely affect Indian lands by pumping the underflow of the Gila River and by using waters belonging to the San Carlos Project. We have irrefutable evidence showing that tribal lands cannot be affected because there is an impermeable rock barrier which completely isolates those lands from any possible effects from Conoco's pumping. We also can show how Conoco's operations probably will increase rather than decrease availability of water to the San Carlos Project. Moreover, we can show that with the accommodations proposed by Conoco, the San Carlos Project and the Gila River Indian Community will gain substantial cost savings and significant economic benefits.

Conoco's 30-month program of final feasibility evaluation for the new mining project is nearing completion. Early in 1976 the completed studies and recommendations will be ready for consideration by Conoco's management. They will be facing decisions either to suspend or delay the project, or to go ahead with commitment of many hundreds of millions of dollars needed to begin development. An important consideration in these decisions will be how successful we have been in reaching suitable accommodations with the San Carlos Project, the San Carlos Irrigation and Drainage District, and the Gila River Indian Community, whereby Conoco can drill and pump a number of wells near the mine so as to assure safety and stability of the mining excavation.

The mine will be developed mainly within lands owned in fee by Conoco, but portions of those lands are designated to the San Carlos Project. It is possible to dewater the mine by pumping only from non-designated lands, but in the interest of water conservation and efficient operations, we would like the flexibility to locate some of the wells on Project lands. For this reason we believe a formal accommodation is essential.

Conoco stands ready to meet at any time with your office, with tribal leaders, with the San Carlos Project and with other concerned Arizonans in a sincere effort to resolve the problems Mr. Reid P. Chambers December 24, 1975 Page 5

of misunderstanding and to seek fair and equitable accommodations for the mine to proceed. We are certain reasonable solutions can be found if only we can open the way to substantive discussions. What we want is the opportunity to present our evidence that water wells in the Indian Community cannot be affected by any Conoco mine pumping; to show how Conoco's mine development will not reduce availability of water to the San Carlos Project, including the Gila River Community; to show how important operating cost benefits will come to the San Carlos Project; and to show how economic benefits will come to the Gila River Indian Community through creation of hundreds of well-paying, permanent job opportuni-

We want and need your help to initiate the discussions which are essential to help find the way to a solution.

In the attached pages, I have restated the situation as we see it, and outlined again Conoco's position. Perhaps this additional clarification will be useful in beginning a pro-

Yours very truly,

A. F. Bissett Project Manager

AFB:ct

cc w/enc.:

Mr. John Artichoker Area Director Bureau of Indian Affairs P. O. Box 7007 Phoenix, Arizona 85001

Mr. Andrew L. Bettwy State Land Commissioner State Land Department State Office Building 1624 West Adams Street Phoenix, Arizona 85007 Mr. Reid P. Cham. Irs December 24, 1975 Page 6

cc w/enc.: The Hon. Raul H. Castro Governor of Arizona Arizona State Capitol 1700 West Washington Phoenix, Arizona 85007

> The Hon. John Conlan U. S. Congressman U. S. House of Representatives 130 Cannon House Office Building Washington, D. C. 20515

The Hon. Paul J. Fannin U. S. Senator U. S. Senate Washington, D. C. 20510

Mr. William Hauff Project Engineer San Carlos Project Bureau of Indian Affairs 225 W. Roosevelt Avenue Coolidge, Arizona 85228

Governor Alexander M. Lewis, Sr. Gila River Indian Community Council Sacaton, Arizona 85247

9

Mr. C. L. Skousen, President Board of Directors of San Carlos Irrigation & Drainage District Route #1, Box 77 Coolidge, Arizona 85228

Conoco Copper Project, Florence, Arizona

Background and Status of the Project

Conoco discovered copper mineralization near Florence in 1969. Since then we have completed two progressively more detailed programs of exploration and technical study to determine if it is feasible to develop the ore deposit into an operating mine. Results of the studies seemed favorable, and preliminary plans showed how the mine could be developed with minimum effects on the nearby water table. Preliminary discussions with the San Carlos Project beginning in 1972 indicated suitable accommodations probably could be reached to allow the mine development to proceed.

Based on these conclusions, Conoco began work in 1974 on a final comprehensive feasibility study and cost estimate. A small underground pilot mine was developed to test mining conditions and produce small quantities of ore, and a pilot plant was built to treat the ore and define process criteria. More drilling was done to precisely define the orebody, environmental studies were initiated, and a comprehensive hydrology and pumping program is underway to verify earlier predictions of effects on the local water table.

The thirty-month program is nearing completion, Within the first few months of 1976 we will present the results to Conoco's management, along with recommendations for a plan and timetable for developing the mine. From a technical view, all the results seem very favorable. Our success by then in resolving the water issues will have an important bearing on Conoco's decisions either to suspend or delay the project, or to commit the hundreds of millions of dollars needed to begin mine development.

The Conoco Ore Deposit

The deposit is mainly within fee lands owned by Conoco. A smaller part lies beneath State land held by Conoco under a mining lease, which when mined will produce substantial royalty revenues to the State of Arizona.

The orebody is a large mass of igneous rock into which has been disseminated a small percentage of copper-bearing mineralization. Geologists call it a porphyry copper deposit, and it is very much like several others being mined in Arizona today. The Conoco deposit is unusual in that is completely concealed beneath about 200 feet of alluvium and 150-200 feet of water-bearing conglomerates. It will take more than 30 years to extract all the copper ore, and in the process it will be necessary to open a large, roughly circular excavation which eventually will be about one and one-half miles across and nearly one-half mile deep. This too is fairly typical for Arizona mines.

Conoco's Mining Project

Mining and treating the ore to recover its small copper content can only be done in high volume, low-cost operations. Each ton of ore contains less than eight pounds of recoverable copper metal and 1,992 pounds of waste rock. This is significantly lower than most Arizona mines. An additional three tons of overburden and barren waste must be mined for each ton of ore exposed and mined. Over the thirty-year mine life we will excavate about two and one-half billion tons of waste rock and overburden, plus nearly 800 million tons of copper-bearing ore. When mining is completed sometime after the turn of the next century, the excavation which remains will become a unique and valuable asset as a large permanent reservoir for storage and utilization of Gila River stream flow from rainfall runoff and occasional flood flow which is now lost to beneficial use.

Mining and treating Conoco's low-grade ore, and economically recovering its small copper content, will require more than one-half billion dollars investment by Conoco for equipment and production facilities. It will provide well-paying permanent jobs for more than 1,600 Arizonans in Conoco's operations, plus hundreds more jobs in service and supply industries, and in local businesses, schools and government. All these people will live in nearby towns or in the Gila River Indian Community.

Mine Dewatering

Before the mine can be developed, a safe, practical and reliable method must be found to prevent ground water seeping in from the shallow overlying sediments and flooding the mine. After extensive measurement and continuing study by eminently qualified hydrologists and engineers beginning in 1970, it was determined that wells could be drilled near the edge of the mine, and by pumping them continuously, a kind of pumping fence would be created in the shallow conglomerate to keep the mine dry. Our studies showed that the mine pumping would have some drawdown effects on water wells very near the mine, but low permeability of the water-bearing conglomerates causes rapid attenuation of these effects. At a distance of two miles from the edge of the mine excavation, average water level declines will be about two feet per year. Nearly all private wells are much farther away, and would observe progressively smaller effects. Beyond six miles there will be no measurable effect from Conoco's pumping.

Conoco's very localized pumping has no effect on the overall regional water table decline which will occur regardless of whether the mine development goes ahead. Currently this regional decline is about five feet per year in the San Carlos area.

Conoco has established a network of observation wells throughout the area where water levels are being frequently measured. Such measurements will continue throughout the life of the mine to monitor actual effects of future mine pumping.

There are no Indian wells within the area which will be affected by mine pumping. For wells within the affected area, Conoco has offered each well owner a plan and contract for protection against added costs as a consequence of Conoco's mine pumping. This includes reimbursement of extra lifting costs and rehabilitation of the well if necessary for continued production.

Tribal Lands Will Be Unaffected By Mine Pumping

in

Geological mapping and hydrological surveys by Conoco, plus information available from other sources, including records of the Southern Pacific Railroad Company, shows a bedrock barrier at very shallow depths completely across the Gila stream channel near Cholla Mountain between the proposed Conoco mine and the Gila River Indian Community. This feature is shown on the map we handed you on December 3. Present ground water levels are below this bedrock divide. It is therefore an effective and impermeable dam which has totally cut off any percolation of ground water onto the Gila River Indian Reservation. Thus it is impossible for any pumping of ground water by Conoco or any other upstream user to have any effect at all on water levels in the reservation downstream from Cholla Mountain. Any water pumped by Conoco and discharged into the irrigation canals will benefit the Indian group by delivering ground water for their use which otherwise would never be available from their pumping beyond Cholla Mountain.

- 3 -

No Net Increase in Withdrawals from Conoco Pumping

Conoco has acquired in excess of 5,000 acres of irrigated land near the mine for use in plant facilities and for other purposes. More water is now being pumped to irrigate these lands than would be used in Conoco's planned mine facilities. Conoco would retire part or all of these lands from farming so the net total basin withdrawals of groundwater probably will decline rather than increase when and if Conoco's mining project goes ahead.

Conoco Will Not Pump Gila River Underflow

Many decades ago the Gila River did flow as a year-round This was long before intensive irrigated farming stream. At that time there may have been a certain definable began. "underflow" associated with the river's surface flow, However, today the Gila is essentially a dry stream bed, running only a few days each year as the result of rainfall runoff, or when water is released from dams upstream. Conoco's hydrological measurements and testing shows conclusively that all water in the area of the proposed mine is percolating ground water, with only slow nearly imperceptible movement through the weakly permeable sediments. Conoco shares the same position as all other owners of non-San Carlos Project dedicated wells with respect to any assertion that the ground water in question was or should have been adjudicated in United States v. Gila Valley Irrigation District, et al., (Globe Equity No. 59, June 29, 1935), the so-called "Gila Decree." The May 23, 1975 letter to the Attorney General and your comments seem to indicate a wish to relitigate some of the matters covered by the Gila Decree. But in view of the fact that Conoco's operations likely will result in a net decrease in water usage, plus tangible cost benefit to the San Carlos Project, there seems little merit in using Conoco's pumping as a facutal basis for such litigation.

Conoco Pumping of San Carlos Project Water

The tribal resolution requested injunctive action to prohibit Conoco from using waters of the San Carlos Project. We have never intended to take or use water belonging to the San Carlos Project. The basis of our formal proposal put forward in August, 1974 was to return into the San Carlos Project canals, free of cost, a volume of water equivalent to that pumped from wells being operated by Conoco on land dedicated to the San Carlos Project. Beyond that, Conoco has offered to deliver

- 4 -

into Project canals, also free of cost, all water developed from non-Project land which is surplus to our essential needs.

5

Employment and Economic Benefits

The Conoco project will create an estimated 1,600 new opportunities for well-paying permanent employment. All these jobs will be filled by people who live in the local area, and many will come from the Gila River Indian Community. This should help fulfill the announced goals of the Community to develop the kinds of new job opportunities which will be provided by the Conoco mine.

Conoco plans and intends to recruit and train the maximum possible number of Indians and other local residents to fill these new jobs. We hope a large number of these jobs always will be filled by Indians, and to that end special efforts will be made to seek out and train people from the Gila River Indian Community.

Still more jobs will become available from service and supply firms who will become established in the area to support the mine and the growing community, plus more employment in government, schools, community services, and local businesses. Conoco's project will bring into the local economy from \$50 to \$75 million annually in new permanent payrolls and in purchases of goods and services, plus up to \$12-million additional in the form of taxes and royalties to the State of Arizona. This will benefit the community directly, and the state and nation in terms of developing a new source for essential

¥

OFFICE OF THE DIRECTOR



United States Department of the Interior -

USBM-LIAISBORGKEIGEF MINES 2401 E STREET, NW. 76 DEC 8WAAHNGJON, D.C. 20241

In Reply Refer To: EBM-MMSDA-AD-FO D-6537

November 29, 1976

PHOENIX, ARIZONA

Alex F. Bissett Project Manager Continental Oil Company P.O. Box 627 Florence, Arizona 85232

Dear Mr. Bissett:

Thank you for your November 15, 1976, letter which, with its enclosures, lays out the complicated issues that now confront development of Conoco's copper mine near Florence, Arizona. The information you provided should prove useful to us if the issues are raised in the Department.

We have sent a copy of your letter and the background material to the Commissioner, Bureau of Indian Affairs, by the enclosed letter.

Sincerely yours,

J. D. Morgan Acting

Director

Enclosure

cc: FILES-MMBDA-AD-FO, Rm. 1002, CP MMSDA R.L. Lowrie, Chief, IFOC LO, Arizona S.P. Wimpfen, Rm. 1054-A, CP W.L. Dare, Rm. 1002, CP EBM:WLDare:ab 11/29/76 OFFICE OF THE DIRECTOR



United States Department of the Interior

BUREAU OF MINES 2401 E STREET, NW. WASHINGTON, D.C. 20241

November 29, 1976

Memorandum

To: Commissioner, Bureau of Indian Affairs

Through: Assistant Secretary--Energy and Minerals

From: Director, Bureau of Mines

Subject: Proposed copper mine, Florence, Arizona

For your interest, we are enclosing copies of correspondence from Mr. A. F. Eissett that explain some of the background of the problems involved in getting development started at Conoco's proposed copper mine near Florence, Arizona. If the opportunity presents itself, perhaps your office could assist in improving communications between the parties involved that might lead to a resolution of differences.

Acting

Director

J. D. Morgan

Enclosures

cc: Solicitor w/enc.



Interoffice Communication

To A. V. MITTERER

From A. F. BISSETT

Date OCTOBER 27, 1976

Subject SAN CARLOS NEGOTIATIONS

Meeting - October 11, 1976

On October 11, I met with representatives of the Indian Community. Prior to that date it appeared that the basis for a final agreement had been worked out between Conoco, the Gila River Indian Community, and the San Carlos Irrigation & Drainage District.

ON.

Unfortunately, Z. Simpson Cox, attorney for the Indian Community, is now in the picture, and he has prepared and circulated a proposed agreement which, in my opinion, would be unacceptable to Conoco, and would almost certainly be unacceptable to the District. The Cox proposal recites Indian rights dating from "time immemorial" and refers to the Winters doctrine and the Cappaert (pupfish) decision. Specifically, Cox has proposed the following key points beyond what has already been agreed:

- 1. That Conoco pay the Indians for all water pumped by Conoco, both on and off San Carlos designated land, at an unspecified rate.
- 2. That Conoco deliver to the Indians CAP water, when it becomes available, equivalent to 1.7 times the amount pumped.
- 3. That Conoco construct siphons or other works necessary to deliver gravity water to lands north of the Gila River and pumped water to lands south of the Gila River.
- 4. That Conoco acquire all remaining Project lands east of the reservation and north of the Gila River, remove these lands from the Project, and transfer the water rights to the Indians.
- 5. That Conoco assure the Blackwater District of the reservation a supply of potable domestic water.

A. V. Mitterer October 27, 1976 Page Two

Of the above, items 1 and 2 would be prohibitively expensive, and could lead to demands from the District that both payment and water deliveries be shared with them.

Item 3 would also be extremely expensive and complicated, and would be difficult to work out between the Indians and the District.

Item 4 would be in violation of the San Carlos Landowners' Agreement, and would be unacceptable to the District. It would also be extremely expensive, and probably impossible, for Conoco to acquire all remaining Project lands east of the reservation and north of the river.

The difficulty is in determining how seriously the Indians take any of the Cox proposals. They have told us that the Cox proposal now represents the Indian position, but that they are willing to negotiate.

Cox has a reputation for being among the most radical of all the lawyers representing Indians. It is commonly believed that he is the co-author of the Kennedy Indian Water Bill, which if passed, would allow the federal government to buy through condemnation 1,700,000 acres of land in Arizona and transfer the water rights from that land to five South Central Arizona Indian Reservations. Cox, of course, is highly motivated from a personal standpoint to drag out negotiations as long as possible.

Meeting - October 26, 1976

On October 26, John Lacy, Marvin Young and I met with Bill Lavell, Interior Field Solicitor, in his Phoenix office.

Earlier in the day, Lavell had met with Sam Thomas and Z. Simpson Cox concerning our negotiations.

Lavell stated that he was very interested in settling the matter, and, of course, was concerned over the recent turn of events relative to the Cox proposal. Lavell stated that he thought much of the Cox proposal was rhetoric, but that they were serious on two points:

- (a) That all Conoco pumped water go to the Indians.
- (b) That payment for or replacement of water pumped by Conoco be made by Conoco.

Lavell thought that they were probably not very serious on the

A. V. Mitterer October 27, 1976 Page Three

proposal that Conoco insure a domestic water supply to Blackwater. Probably our guarantee that mine pumping would not affect the water table at Blackwater, along with the conditions of the Compensation Agreement, would be sufficient on that point.

I told Lavell that we were neutral on the problem of who gets the water, and that particular problem would have to be settled between the District and the Indians. I also told him that we would be willing to discuss the proposal calling for Conoco to pay for or replace with CAP water a portion of the dewatering water.

Lavell intends to talk first to Bob Hurley, counsel for the District, and then to Tribal and District representatives together.

In my opinion, Lavell will be doing everything possible to make meaningful progress in negotiations prior to November 9, which was the deadline given to the parties by the Interior Solicitor's Office in Washington. Sam Thomas has indicated that the Tribe will ask the Solicitor to defer action as long as meaningful discussions are being carried out.

A. F. Bissett

ct

cc: Elmer Coker Len Halpenny John Lacy Wes Pokluda John Wimbish Marvin Young

(co()co)

Alex F. Bissett Project Manager Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

September 15, 1976

Mr. Hugh Garner Acting Solicitor United States Department of the Interior Washington, D. C. 20240

Dear Mr. Garner:

I am in receipt of your letter of September 10th, which refers to a proposed dewatering plan which will enable Conoco to develop an open-pit copper mine near Florence, Arizona.

Over the past few months I have met with representatives from the Gila River Indian Community and the San Carlos Irrigation & Drainage District to discuss various ways an accommodation between the parties could be reached. I am pleased to report that these discussions have been fruitful and the parties have agreed in principle to a plan which would allow Conoco to pump for dewatering purposes and deliver water from designated lands and that which is surplus to Conoco's needs into San Carlos Project irrigation canals. There are a few details to be resolved, however, one of which is the sizing of a pipe to be installed to deliver water into the Florence-Casa Grande Canal. The sizing of this pipe is essentially an engineering problem, and we hope to have a proposal worked up within a week or so.

It is the intention of the parties to work out a non-binding memorandum of understanding to be signed by the representatives who have been involved in the discussions. This memorandum of understanding will then be forwarded for ratification to the Tribal Council, the Governing Board of the San Carlos Irrigation & Drainage District, and the Conoco Board of Directors. By ratifying the memorandum of understanding, the parties would be, in effect, recommending its acceptance by the Secretary of Interior. Mr. Hugh Garner September 15, 1976 Page Two

I sincerely believe that the development of this copper mine will be beneficial not only to the parties involved in these discussions, but to neighboring communities, the State of Arizona - and to our country. The mine will eventually employ more than 1,600 workers, will pay millions of dollars annually in state, federal and local taxes, and will help to assure that the United States does not fall into a deficit position in the production of copper - a strategic metal.

Mr. William Lavell, Area Field Solicitor, will be kept advised of our progress.

Very truly yours,

A. F. Bissett

AFB:ct

cc: Mr. William G. Lavell w/enc.

Gila River Indian Community w/enc. San Carlos Irrigation & Drainage District w/enc.

bcc:

Elmer Coker w/enc. Len Halpenny w/enc. John Lacy w/enc. A. V. Mitterer w/enc. Wes Pokluda w/enc. John Wimbish w/enc. Marvin Young w/enc.



UNITED STATES DEPARTMENT OF THE INTERIOR OFFICE OF THE SOLICITOR WASHINGTON, D.C. 20240

Mr. Alec F. Bissett Project Manager . Continental Oil Company P.O. Box 627 Florence, Arizona 85232

10 SEP 1976

Dear Mr. Bissett:

This office has prepared a full and complete proposal for litigation seeking to enjoin your company from any further unauthorized pumping, both on San Carlos Irrigation Project (SCIP)- designated lands and upon non-SCIP lands where the pumping is pursued for purposes of dewatering designated lands, and to further prevent you from any pumping operation which would adversely affect the groundwater level in surrounding SCIP-designated lands or other lands in which the federal government claims a water right. We are prepared to sign this litigation request, and forward it immediately to the Department of Justice for filing in District Court in Phoenix.

Nowever, my staff has reported to me that there are currently underway negotiations between your company and the Gila River Indian Community and the San Carlos Indian Irrigation Project in which possible compromise solutions are being explored. Because of this, we are prepared to delay the filing of this lawsuit against CONOCO for a final period of sixty days from the date of this letter, during which period you may work out a satisfactory settlement with all interested parties, including but not limited to the Department of the Interior's Phoenix Field Solicitor, the Phoenix Area Director of the BIA, SCIP, and the Gila River Indian Community. If, in the judgment of the Field Solicitor, meaningful progress among the above parties has not been made by the end of the sixty day period, he will so notify me and I will then request the Department of Justice to initiate litigation against CONOCO.

ALUOLUTION BIOENTEAN NOILEINA NACHOLUTION BIOENTEAN NACHOLUTION BIOENTEAN NACHOLUTION BIOENTEAN NACHOLUTION BIOENTEAN NACHOLUTION BIOENTEAN If, however, the Field Solicitor notifies me that substantial progress has occurred within sixty days, I will extend the initial period so as to accomodate the negotiations. This additional period of time will be subject to the same scrutiny by the Field Solicitor as the initial sixty day period, and if he determines that no meaningful progress is being made therein, he will so advise me and I will then request that the Department of Justice file litigation.

Sincerely,

Milanner

Hugh Garner Acting Solicitor

an.

1

Alex F. Bissett Project Manager Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

CONFIDENTIAL

July 29, 1976

Mr. Sam Thomas c/o Gila River Indian Enterprises P. O. Box 1436 Coolidge, Arizona 85228

Dear Sam:

This letter will confirm various items discussed over lunch with you and Jay Morago on July 29th.

Our main topic of discussion concerned a compromise proposal put forth to both the District and your group as an alternative to your proposal of completely taking the Northside Canal out of Joint Works. As you know, District representatives are opposed to taking the Northside Canal out of Joint Works as they feel this would result in serious administrative problems. In my conversations with you and Jay, I understand that your proposal is for mainly economic reasons; i.e., you feel the Indians have not been getting a fair shake and have been paying more than a proportionate amount for the operation and maintenance of the Northside Canal.

The compromise proposal I discussed with Norris Soma and with you at lunch was simply to leave the canal under the jurisdiction of the Project Engineer for administration purposes only. From an economic standpoint the Northside Canal operation and maintenance would be divided at approximately the center line of the pit, with the District being responsible for operation and maintenance charges for that portion of the canal lying to the east of the mine and the Indian Community being responsible for operation and maintenance charges for that portion west Norris Soma is still having problems with this of the mine. modified proposal, but I believe that I can overcome them with Conoco making some concession involving our being responsible for extraordinary maintenance in the event of a wash-out or similar occurrence on the east portion of the canal. I also got the impression from you and Jay that you would not be opposed to this proposal as a compromise.

Mr. Sam Thomas July 29, 1976 Page Two

Another item discussed concerned the use of the pipeline that would lead from the pit dewatering system to the Florence-Casa Grande Canal. Jay asked that Conoco consider designing the pipeline so that it could eventually be used to return water to the Northside Canal from the Florence-Casa Grande Canal. I agreed that we would take a look at this and would not be opposed to it. I have since started one of our engineers looking at the economics involved. We are agreeable to the concept of a pipeline from the pit to the Florence-Casa Grande Canal, but we would be reluctant to build a pipeline of a size that would cost more than the actual value of the water to be delivered. After we have had time to do an engineering analysis of this problem I will get back to both parties. I am sure this particular problem can be resolved in a manner that will be acceptable to all.

The last issue discussed involved Conoco's hiring policies toward Indians. I will recommend to our management that as part of this final agreement that we agree to adapt and maintain hiring and training practices with the goal of achieving a total work force with a number of Indian employees that would be at least equal to the proportion of Indians living within a reasonable driving distance of the mine.

I hope this letter accurately reflects our conversation of the 29th. If you have any problems with it, or if there are any errors or omissions, please let me know.

Very truly yours,

A. F. Bissett

AFB:ct

bcc: Mr. John Lacy Mr. A. V. Mitterer Mr. M. D. Young



Alex F. Bissett Project Manager Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

July 28, 1976

Mr. Norris Soma, District Manager San Carlos Irrigation & Drainage District P. O. Box 711 Coolidge, Arizona 85228

Dear Norris:

The following are minutes of our meeting of July 22nd, as per my notes:

Present:

Conoco

San Carlos I & DD

A. F. Bissett M. D. Young Norris Soma Clyle Skousen Buster Holland

Bissett reviewed the meeting held with Conoco and the Indian group on June 24th, and explained their latest position:

- 1. The Indian group indicated that they would probably agree to the basic contention that additional water from the mine become part of the common water supply to be apportioned to each group as equitably as possible.
- 2. Concerning the eventual construction of a siphon to carry water from the Pima lateral to reservation lands and the construction of a holding pond on the reservation the Indian group suggested that these items could be kept out of the Conoco/San Carlos negotiations.
- 3. The Indian group stated a basic position that the Northside Canal be taken out of joint works jurisdiction, with the portion west of the pit being put under Indian jurisdiction and the portion east of the pit being put under District jurisdiction.

Mr. Norris Soma July 28, 1976 Page Two

Bissett suggested that if District representatives were opposed to the Indian proposal concerning taking the Northside Canal out of joint works that perhaps Conoco could provide some capital improvements to the canal that would make the Indian proposal more acceptable. Bissett proposed that a small portion of the Northside Canal on the eastern extremity be lined with concrete for a distance of about two miles, which would provide deliveries of water to parcels owned by James Jones and Dan Palmer. A small secondary canal could then be constructed along the existing canal right-of-way to supply water to the farms of Hector Celaga and Emmett Rankin.

District representatives stated that this proposal would be unacceptable and that any final agreement would have to include having the Northside Canal kept fully open from its source to the reservation. This is necessary so that when gravity water was available a means would be provided to get it to lands west of the pit, including the reservation. District representatives also stated that pumped water could not be substituted for this gravity water.

Bissett conceded that the canal would be kept open for its entire length at its existing capacity.

District representatives stated that they would be opposed to the Indian proposal that the Northside Canal be taken out of joint works.

Bissett then asked if Conoco were willing to provide additional upgrading of the Northside Canal if they would be willing to reconsider their position. Specifically, Bissett suggested that if they would be willing to go along with the Indian proposal to take the Northside Canal out of joint works that he would recommend to Conoco management that at the time an announcement was made that the mine was to proceed that Conoco would provide upgrading, probably in the form of canal lining, to portions of the Northside Canal east of the pit in an amount equivalent to that done west of the pit.

District representatives stated that they felt taking the Northside Canal out of joint works was unacceptable and that the matter did not concern Conoco/San Carlos negotiations. Bissett stated that while that may be true that Conoco was caught in the middle - that without an agreement between the Mr. Norris Soma July 28, 1976 Page Three

District and Indian Community there could be no agreement between the San Carlos Project and Conoco - and consequently no mine. He further stated that if the mine were to go ahead with an agreement with San Carlos that additional water would be made available to the Project in the form of (a) pumped mine water, (b) water that would not be used on Project designated land owned by Conoco and (c) water that would be saved from seepage by concreting the Northside Canal.

Bissett stated that while he could understand and appreciate the position of the District, that he could also appreciate the position of the Indian group. He explained that there was a strong opposition to the mine by the Indian Community based on an unfounded fear that the pumping would somehow affect the water table on the reservation. In order for the committee representing the Indian Community to be able to sell an agreement to the Community, they would have to take something back in the way of a concession. If the District would agree to taking the Northside Canal out of joint works this would solve what the Indians view as a long-standing problem.

Bissett asked the District representatives if they would consider accepting the Indian proposal as a way to settle the matter and get on with the job of developing the mine, which would not only benefit San Carlos Project water users, but also be a great benefit to the local community, county, and state.

Norris Soma brought up the issue of the amount of surplus water that would be available each year. He stated that as surplus water decreased, the Project would expect minimum deliveries to be equivalent to that being pumped from Conoco wells located on Project designated land. Bissett stated that Conoco would be agreeable, but in the event enough water was not available to run the process, Conoco would reserve the right to use water from wells on designated land equivalent to Conoco's apportionment - if Conoco was successful in petitioning the court to have its apportionment approved for industrial use.

Arrangements were made for Norris Soma to meet with Marvin Young on Friday morning to examine the portion of the Northside Canal east of the pit and to go over the feasibility of making improvements that were discussed at the meeting. Mr. Norris Soma July 28, 1976 Page Four

Norris Soma stated that he would contact Bissett on either July 26th or 27th to let him know what the recommendations of the District representatives would be to the District Board on August 2nd. (At a brief meeting on July 26, Bissett and Soma discussed a compromise on the Northside Canal whereby operation of the canal would remain under joint works, but operation and maintenance costs would be divided as per the Indian proposal.)

Very truly yours,

A. F. Bissett

AFB:ct

cc;	Mr.	Buster Holland
	Mr.	A. V. Mitterer
	Mr.	Clyle Skousen
	Mr.	M. D. Young
bcc:	Mr.	Elmer Coker
	Mr.	Len Halpenny
	Mr.	John Lacy
	Mr.	Wes Pokluda
	Mr.	John Wimbish

(conoco)

Alex F. Bissett Project Managar Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

June 28, 1976

Mr. Sam Thomas, Chairman Water Conservation Committee Gila River Indian Community Sacaton, Arizona

Dear Sam:

Following are the minutes of our meeting of June 24th, as per my notes:

Present:

Conoco

Water Conservation Committee

A. F. Bissett M. D. Young Harry Cruye Jay Morago Sam Thomas

Sam Thomas corrected an item from the minutes of the previous meeting. The Water Conservation Committee had not intended to leave the impression that they wanted Conoco to be responsible for the cost of constructing a regulating sump on the reservation.

Bissett discussed the meeting he had with the District representatives on June 4th, including the position of the District on water distribution.

The Water Conservation Committee representatives, while not making a firm commitment, indicated that they might agree to the basic contention of the District that additional water from the mine be delivered to the distribution system of the San Carlos Project as a part of the common water supply to be apportioned annually to each acre as equitably as possible.

Water Conservation Committee representatives stated that they believed the Bureau would be willing to construct a siphon to carry water from the Pima lateral to the North Side Canal in the vicinity of the east section line of Sections 9 & 16, T4S, R8E. This siphon would for the most part eliminate the need Mr. Sam Thomas June 28, 1976 Page Two

for carrying water in a ditch around the south side of the pit. The Indian group, however, would agree to the construction of a ditch, which would be used to carry gravity water only to District land west of the pit.

Water Conservation Committee representatives felt that the North Side Canal should be taken out of joint works jurisdiction, with the maintenance of the portion west of the pit being the responsibility of the Indians and the maintenance of the portion east of the pit being the responsibility of the District.

Bissett gave Sam Thomas a copy of Halpenny's final report. Sam Thomas stated that Bill Gookin would review the Halpenny report, and it was very possible that the request for a third party hydrologist to review Halpenny's work would be with-

Bissett will prepare a summary of estimated mine pumping, process usage and water surplus, which will be sent to the Water Conservation Committee.

If you have any additions, corrections or omissions to these minutes, please advise.

Very truly yours,

A. F. Bissett AFB:ct

cc: Mr. Harry Cruye Mr. Jay Morago Mr. M. D. Young Alex F. Bissett Project Manager

Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

June 21, 1976

Mr. Norris Soma, District Manager San Carlos Irrigation & Drainage District P. O. Box 711 Coolidge, Arizona 85228

Dear Norris:

Following are the revised minutes of our meeting of June 4th, as per your letter of June 14th:

Conoco

A. F. Bissett M. D. Young Clyle Skousen Norris Soma Ed Wildermuth Buster Holland

San Carlos I & DD

Bissett opened the meeting by reviewing the background information leading up to a discussion held with the Indian group under the leadership of Sam Thomas on May 26th. Bissett also reviewed discussions with the Department of Interior Field Solicitor, Bill Lavell, indicating that a period of 90 days will likely soon be set to allow Conoco and the Indian Community to resolve problems relating to water. If no substantial progress is made within that 90-day period, the U. S. Department of Justice will be requested to proceed with an injunctive action, seeking to stop the Conoco operation.

Bissett presented the primary position of the Indian group: (a) That all surplus water from Conoco's pumping is to go into the Northside Canal up to its present capacity, but not to exceed at any time the amount that can be used on reservation lands; (b) that Conoco line the existing Northside Canal with concrete from the western limit of the pit to the eastern border of the reservation; (c) that Conoco construct a holding reservoir in an area northwest of Cholla Mountain, capable of storing 5,000 acre feet of water, and also install a means of transporting water to this holding reservoir from the Northside Canal; (d) that all water surplus to Conoco's need and not being put into the Northside Canal under (a) be delivered by pipeline to the Florence-Casa Grande Canal.

10/5

Mr. Norris Soma June 21, 1976 Page Two

All present acknowledged that, assuming Conoco lines the existing Northside Canal with concrete (from the pit to the reservation border), that additional water will be made available for the San Carlos Project because of the following: (a) Surplus water from Conoco's operation would initially put about 30,000 GPM into Project canals, although this amount would diminish over a period of years to an estimated amount of approximately 6,000 GPM after about 1983; (b) lining approximately seven miles of the Northside Canal would result in a substantial savings of water that is now seeping from the canal, (c) Conoco now either owns or has options on approximately 3,000 acres of Project designated land. During mine operations Conoco will not accept its apportionment for these lands, thereby allowing the unused apportionment to be reapportioned to all other Project acres on an equal basis.

A. The District representatives agreed to proposal (a) of the Indian group, with the condition that water delivered to Indian lands not exceed their yearly apportionment to which the designated acres on the reservation served by the Northside Canal are entitled.

1.00

B. District representatives agreed that the Northside Canal from the pit to the reservation border be lined at Conoco's expense. They pointed out that it would be necessary for Conoco to reestablish a canal connection around the south side of the Conoco proposed pit to supply additional water to the western end of the Northside Canal as required.

C. District representatives objected to a holding reservoir being constructed on reservation lands, pointing out that if the Indian side were not to receive water in excess of their . yearly allotment that no reservoir would be required.

D. District representatives agreed that a pipeline be constructed from the east side of the Conoco pit to the Florence-Casa Grande Canal.

The basic stand of the District representatives was that whereas the Conoco operation would result in additional irrigation water being made available to both Indian and non-Indian lands, that this additional water be delivered to the distribution system of the San Carlos Project as a part of the Project's common water supply to be apportioned annually to each acre as equitably as physically feasible, Mr. Norris Soma June 21, 1976 Page Three

District representatives reminded Conoco that it would be expected to continue O & M and construction payments for the Conoco portion of designated land even though it was not expected that Conoco would accept water deliveries on that land.

Bissett stated that a discussion had been held with Otis Keller, San Carlos Power Manager, concerning the possibility of the San Carlos Porject supplying power for the mine operation.

Very truly yours,

A, F. Bissett

AFB:ct

cc:	Mr.	Buster Holland
	Mr.	A. V. Mitterer
	Mr.	Clyle Skousen
	Mr.	Ed Wildermuth
	Mr.	M. D. Young

(conoco)

Alex F. Bissett Project Manager

Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

May 27, 1976

Mr. Sam Thomas, Chairman Water Conservation Committee Gila River Indian Community Sacaton, Arizona

Dear Sam:

Following are the minutes of our meeting of May 26th, as per my notes:

Present:

Conoco

Water Conservation Committee

A. F. Bissett

Harry Cruye Jay Morago Sam Thomas

Bissett asked what authority had been given to the Water Conservation Committee in regard to discussions with Conoco. Sam Thomas stated that the Water Conservation Committee had been given authority by the Tribal Council to enter into discussions with Conoco regarding all aspects of the Conoco operation and its effect on reservation lands, the distribution of surplus water and the hiring of a hydrologist to review Conoco's hydrological studies.

Bissett stated that in a recent discussion with the BIA Field Solicitor, Bill Lavelle, that he had been told that letters will soon be sent to Conoco and to the Tribal Council, indicating that a period of 90 days will be allowed for the Indian Community and Conoco to resolve any problems relating to water. If substantial progress is not made within the 90-day period, the U. S. Department of Justice will be requested to proceed with an injunctive suit, in an attempt to stop the Conoco operation.

All present agreed that the hydrologist to represent the Indian Community would be jointly chosen by Bill Gookin and Len Halpenny. After a hydrologist is selected, he will be asked to meet with Bissett and the Water Conservation Committee to discuss the basic questions to be answered and the time and funding limits. Mr. Sam Thomas May 27, 1976 Page Two

All present agreed that the basic questions to be answered by the hydrologist, tentatively, were (a) what effect, if any, will Conoco's pumping have on reservation lands; (b) how much water will Conoco pump over the life of the mine,

All present tentatively agreed that the Indian Community, through the Water Conservation Committee, would be billed for the hydrological study. The amount billed would be reimbursed by Conoco to the Indian Community.

Bissett asked, in view of the shortness of time remaining for Conoco to make start-up decisions, and in view of Bill Lavelle's statement, if the Water Conservation Committee would be willing to discuss the distribution of water at the same time that a hydrologist is being chosen and a hydrological study is being conducted. Members of the Water Conservation Committee indicated that they would be willing to enter these discussions.

All present discussed various means of distribution, and members of the Water Conservation Committee established the following as their primary position: (a) That all surplus water from Conoco's pumping is to go into the Northside Canal up to its present capacity, but not exceed at any time the amount that can be used on reservation lands; (b) that Conoco line the existing Northside Canal with concrete from the western limit of the pit to the eastern border of the reservation; (c) that Conoco construct a holding reservoir in an area northwest of Cholla Mountain, capable of storing 5,000 acre feet of water, and also install a means of transporting water to this holding reservoir from the Northside Canal; (d) that all water surplus to Conoco's need and not being put into the Northside canal under (a) be delivered by pipeline to the Florence-Casa Grande Canal.

A discussion was held concerning the possibility of the San Carlos Project selling power for the mine operation. Conoco expects to use power with a demand that will eventually reach approximately 100 megawatts and could result in a substantial economical benefit to the San Carlos Project.

Bissett stated that he would take the water distribution proposal of the Water Conservation Committee to the San Carlos Irrigation & Drainage District Board to get their reaction and possible counterproposal. Mr. Sam Thomas May 27, 1976 Page Three

If your recollection of our meeting differs from the above, please advise.

Very truly yours,

A. F. Bissett

AFB:ct

ADDENDUM: :

10 A 10

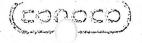
As per phone conversation between Sam Thomas and Alex Bissett 5/27/76, the joint report from Leggette, Brashears and Graham, and Water Development Corporation (Len Halpenny) will be sent to the Water Conservation Committee as soon as it is available. The selection of a hydrologist to review Halpenny's 1972-73 report will be deferred until the Water Conservation Committee has had a chance to review the recent report.

AFB

bcc: A. V. Mitterer Marvin Young

CONOCO COPPER PROJECT ESTIMATED WATER BALANCE GPM

YEAR	PUMPING RATE	USAGE	SURPLUS
1	21,900	400	21,500
2	19,500	400	19,100
3	18,000	1,800	16,200
4	15,400	1,800	13,600
5	14,200	1,800	12,400
6	13,500	1,800	11,700
7	12,800	1,800	11,000
8	12,200	5,300	6,900
9	18,800	8,800	10,000
10	17,200	8,800	8,400
11-15	14,700	8,800	5,900
16-20	14,500	8,800	5,700
21-25	14,500	8,800	5,700
26-30	14,500	8,800	5,700
31-33	14,500	8,800	5,700



Alax F. Bissatt Project Managar Continental Oil Company P. O. Box 627 Florence, Arizona 85232 (602) 868-5852

December 24, 1975

Mr. Reid P. Chambers Associate Solicitor U. S. Department of the Interior Interior Building Washington, D. C.

Dear Mr. Chambers:

Thank you for meeting with our Conoco group on December 3. I hope the discussions in your Washington office will be useful in clarifying the issues and helping find the way toward an amicable solution.

As you know, Conoco is in the final stage of studying the feasibility of developing a major open-pit copper mine near Florence, Arizona. Decisions soon must be made either to go ahead with project development, or to suspend or delay it, and thereby defer realization of substantial economic benefits.

The Conoco ore deposit is completely concealed beneath a few hundred feet of alluvium and water-bearing conglomerate. Conoco proposes to drill a pattern of wells near the mine to prevent seepage from these shallow zones from flooding the excavation, and to maintain its safety and stability. Being able thus to protect the mine from ground water incursion is an essential element for any decisions to go ahead with the project.

The deposit was discovered by Conoco about five years ago. Detailed engineering and hydrological studies since then have shown it is technically feasible and economically practical to develop the mine inside the pattern of wells. These studies showed no effects of the pumping would be seen beyond a few miles from the mine.

Conoco's ore deposit is mainly within the lands owned by Conoco, party beneath desert land and partly beneath irrigated agricultural land. Part of the irrigated acreage was designated



Mr. Reid P. Chambers December 24, 1975 Page 2

for participation in the San Carlos Project many years ago when the Project was established to provide water for irrigated farming in the region.

Because Conoco's planned mine pumping program will affect these San Carlos-designated lands, we have been seeking to work out with them a fair and equitable agreement whereby Conoco could proceed with its mine development, and deliver all water in excess of Conoco's needs into San Carlos irrigation canals where it can be distributed for beneficial agricultural use. Since 1972 we have discussed these ideas in numerous meetings with representatives of the San Carlos Project and with representatives of its constituent groups, the Gila River Indian Community and the San Carlos Irrigation and Drainage District. We have been told the ideas are generally acceptable, but so far we have been unable to get all three groups together for the substantive discussions which are essential to a solution.

Conoco's attempts to develop an agreement have been directed mainly to the San Carlos Project which has responsibility for the communality of Indian and non-Indian interests. Conoco is willing to meet as needed with any or all of these groups in a sincere effort to build the climate of understanding which is necessary to resolve the issues. Least progress has been made with the Indian group, and, therefore, Conoco's recent efforts have been especially in that direction.

Conoco's problems with the Gila River Indian Community are those of communication, and can be traced to lack of understanding on both sides. Somehow we have failed adequately to explain to the Indian Community the solid engineering and technical evidence that Conoco can develop its mining operation without detriment to the Indian interests. We have failed effectively to show the substantial economic benefit which will come from the new mine. Somehow we have failed to understand their apprehensions, and the Indian group seems to have misunderstood Conoco's proposals. Both sides have not yet developed the essential close and continuing dialogue which must come if we are to find a solution.

Water is a sensitive and emotional issue in Arizona. Without careful study and full understanding of the hydrological data, it would be easy to presume that pumping to keep ground water from flooding Conoco's planned mine excavation would lower the water table over a wide area and diminish water availability Mr. Reid P. Chambers December 24, 1975 Page 3

to present users. Over the past three years we have held numerous meetings with local civil leaders, with the San Carlos Project, with representatives of the San Carlos Irrigation District, and with leaders of the Gila River Indian Community. We have furnished these groups with copies of all hydrological studies, and have repeatedly reviewed all our work in detail. We can show solid scientific evidence that the pumping can be accomplished and the mine developed without impairing availability of ground water for present users.

With the San Carlos Project we have sought to formulate a fair and equitable accommodation under which Conoco could develop the wells necessary to dewater the mine site, and deliver to the Project at no cost all water pumped from wells on San Carlos-designated lands, plus all surplus water beyond Conoco's essential needs. The substance of Conoco's proposal is unchanged from the very first discussions in 1972. Our most recent restatement of that proposal was communicated to the Project in Conoco's August 29, 1974 letter, and was reviewed point by point with representatives of all groups shortly thereafter. The proposal is still outstanding, and we believe it is a sound basis for reaching an accommodation with the San Carlos Project. Since the August, 1974 meeting we have been rebuffed repeatedly in our continuing efforts to open any avenue for discussion or response to the Conoco proposal.

In May, 1975, we were disappointed to learn that the Gila River Indian Community had passed a resolution, requesting the Attorney General to begin legal action to prevent Conoco from proceeding with its planned mine development. We sought to learn details of the petition, but it was not until two months later that we finally were able to obtain, indirectly, a copy of a letter restating the resolution.

Since then we have tried again and again to open some avenue of communication. In October I proposed formation of a factfinding group where representatives of the San Carlos Project, San Carlos Irrigation and Drainage District and the Gila River Indian Community all could meet with Conoco to explore areas of differences and uncertainty as a basis for opening the way for more formal discussions. These attempts were rebuffed, too. Responses from the Phoenix BIA Office and from tribal leaders all seemed irrevocably committed to litigation rather than discussion or negotiation. They are saying there can be no discussions, pending disposition of the Indian Community's request for legal action. In our view the answer cannot be found in litigation. The interests of the Indian community will be best served only if we first explore every reasonable avenue of discussion and negotiation toward an acceptable accommodation with Conoco. Given patience and understanding on all sides, we are certain a fair and friendly solution can be found.

it as in in in it in it

The May 23, 1975 letter to the Attorney General asserts that Conoco's planned operations would adversely affect Indian lands by pumping the underflow of the Gila River and by using waters belonging to the San Carlos Project. We have irrefutable evidence showing that tribal lands cannot be affected because there is an impermeable rock barrier which completely isolates those lands from any possible effects from Conoco's pumping. We also can show how Conoco's operations probably will increase rather than decrease availability of water to the San Carlos Project. Moreover, we can show that with the accommodations proposed by Conoco, the San Carlos Project and the Gila River Indian Community will gain substantial cost savings and significant economic benefits.

Conoco's 30-month program of final feasibility evaluation for the new mining project is nearing completion. Early in 1976 the completed studies and recommendations will be ready for consideration by Conoco's management. They will be facing decisions either to suspend or delay the project, or to go ahead with commitment of many hundreds of millions of dollars needed to begin development. An important consideration in these decisions will be how successful we have been in reaching suitable accommodations with the San Carlos Project, the San Carlos Irrigation and Drainage District, and the Gila River Indian Community, whereby Conoco can drill and pump a number of wells near the mine so as to assure safety and stability of the mining excavation.

The mine will be developed mainly within lands owned in fee by Conoco, but portions of those lands are designated to the San Carlos Project. It is possible to dewater the mine by pumping only from non-designated lands, but in the interest of water conservation and efficient operations, we would like the flexibility to locate some of the wells on Project lands. For this reason we believe a formal accommodation is essential.

Conoco stands ready to meet at any time with your office, with tribal leaders, with the San Carlos Project and with other concerned Arizonans in a sincere effort to resolve the problems Mr. Reid P. Chambers December 24, 1975 Page 5

of misunderstanding and to seek fair and equitable accommodations for the mine to proceed. We are certain reasonable solutions can be found if only we can open the way to substantive discussions. What we want is the opportunity to present our evidence that water wells in the Indian Community cannot be affected by any Conoco mine pumping; to show how Conoco's mine development will not reduce availability of water to the San Carlos Project, including the Gila River Community; to show how important operating cost benefits will come to the San Carlos Project; and to show how economic benefits will come to the Gila River Indian Community through creation of hundreds of well-paying, permanent job opportunities.

We want and need your help to initiate the discussions which are essential to help find the way to a solution.

In the attached pages, I have restated the situation as we see it, and outlined again Conoco's position. Perhaps this additional clarification will be useful in beginning a productive dialogue.

Yours very truly,

A. F. Bissett Project Manager

AFB:ct

cc w/enc.:

Mr. John Artichoker Area Director Bureau of Indian Affairs P. O. Box 7007 Phoenix, Arizona 85001

Mr. Andrew L. Bettwy State Land Commissioner State Land Department State Office Building 1624 West Adams Street Phoenix, Arizona 85007 Mr. Reid P. Chambers December 24, 1975 Page 6

cc w/enc.: The Hon. Raul H. Castro Governor of Arizona Arizona State Capitol 1700 West Washington Phoenix, Arizona 85007

> The Hon. John Conlan U. S. Congressman U. S. House of Representatives 130 Cannon House Office Building Washington, D. C. 20515

The Hon. Paul J. Fannin U. S. Senator U. S. Senate Washington, D. C. 20510

Mr. William Hauff Project Engineer San Carlos Project Bureau of Indian Affairs 225 W. Roosevelt Avenue Coolidge, Arizona 85228

Governor Alexander M. Lewis, Sr. Gila River Indian Community Council Sacaton, Arizona 85247

3

Mr. C. L. Skousen, President Board of Directors of San Carlos Irrigation & Drainage District Route #1, Box 77 Coolidge, Arizona 85228

Conoco Copper Project, Florence, Arizona

Background and Status of the Project

Conoco discovered copper mineralization near Florence in 1969. Since then we have completed two progressively more detailed programs of exploration and technical study to determine if it is feasible to develop the ore deposit into an operating mine. Results of the studies seemed favorable, and preliminary plans showed how the mine could be developed with minimum effects on the nearby water table. Preliminary discussions with the San Carlos Project beginning in 1972 indicated suitable accommodations probably could be reached to allow the mine development to proceed.

Based on these conclusions, Conoco began work in 1974 on a final comprehensive feasibility study and cost estimate. A small underground pilot mine was developed to test mining conditions and produce small quantities of ore, and a pilot plant was built to treat the ore and define process criteria. More drilling was done to precisely define the orebody, environmental studies were initiated, and a comprehensive hydrology and pumping program is underway to verify earlier predictions of effects on the local water table.

The thirty-month program is nearing completion, Within the first few months of 1976 we will present the results to Conoco's management, along with recommendations for a plan and timetable for developing the mine. From a technical view, all the results seem very favorable. Our success by then in resolving the water issues will have an important bearing on Conoco's decisions either to suspend or delay the project, or to commit the hundreds of millions of dollars needed to begin mine development.

The Conoco Ore Deposit

The deposit is mainly within fee lands owned by Conoco, A smaller part lies beneath State land held by Conoco under a mining lease, which when mined will produce substantial royalty revenues to the State of Arizona.

The orebody is a large mass of igneous rock into which has been disseminated a small percentage of copper-bearing mineralization. Geologists call it a porphyry copper deposit, and it is very much like several others being mined in Arizona today. The Conoco deposit is unusual in that is completely concealed beneath about 200 feet of alluvium and 150-200 feet of water-bearing conglomerates. It will take more than 30 years to extract all the copper ore, and in the process it will be necessary to open a large, roughly circular excavation which eventually will be about one and one-half miles across and nearly one-half mile deep. This too is fairly typical for Arizona mines.

Conoco's Mining Project

Mining and treating the ore to recover its small copper content can only be done in high volume, low-cost operations. Each ton of ore contains less than eight pounds of recoverable copper metal and 1,992 pounds of waste rock. This is significantly lower than most Arizona mines. An additional three tons of overburden and barren waste must be mined for each ton of ore exposed and mined. Over the thirty-year mine life we will excavate about two and one-half billion tons of waste rock and overburden, plus nearly 800 million tons of copper-bearing ore. When mining is completed sometime after the turn of the next century, the excavation which remains will become a unique and valuable asset as a large permanent reservoir for storage and utilization of Gila River stream flow from rainfall runoff and occasional flood flow which is now lost to beneficial use.

Mining and treating Conoco's low-grade ore, and economically recovering its small copper content, will require more than one-half billion dollars investment by Conoco for equipment and production facilities. It will provide well-paying permanent jobs for more than 1,600 Arizonans in Conoco's operations, plus hundreds more jobs in service and supply industries, and in local businesses, schools and government. All these people will live in nearby towns or in the Gila River Indian Community.

Mine Dewatering

Before the mine can be developed, a safe, practical and reliable method must be found to prevent ground water seeping in from the shallow overlying sediments and flooding the mine. After extensive measurement and continuing study by eminently qualified hydrologists and engineers beginning in 1970, it was determined that wells could be drilled near the edge of the mine, and by pumping them continuously, a kind of pumping fence would be created in the shallow conglomerate to keep the mine dry. Our studies showed that the mine pumping would have some drawdown effects on water wells very near the mine, but low permeability of the water-bearing conglomerates causes rapid attenuation of these effects. At a distance of two miles from the edge of the mine excavation, average water level declines will be about two feet per year. Nearly all private wells are much farther away, and would observe progressively smaller effects. Beyond six miles there will be no measurable effect from Conoco's pumping.

e de regione de la compañía de

Conoco's very localized pumping has no effect on the overall regional water table decline which will occur regardless of whether the mine development goes ahead. Currently this regional decline is about five feet per year in the San Carlos area.

Conoco has established a network of observation wells throughout the area where water levels are being frequently measured. Such measurements will continue throughout the life of the mine to monitor actual effects of future mine pumping.

There are no Indian wells within the area which will be affected by mine pumping. For wells within the affected area, Conoco has offered each well owner a plan and contract for protection against added costs as a consequence of Conoco's mine pumping. This includes reimbursement of extra lifting costs and rehabilitation of the well if necessary for continued production.

Tribal Lands Will Be Unaffected By Mine Pumping

Geological mapping and hydrological surveys by Conoco, plus information available from other sources, including records of the Southern Pacific Railroad Company, shows a bedrock barrier at very shallow depths completely across the Gila stream channel near Cholla Mountain between the proposed Conoco mine and the Gila River Indian Community. This feature is shown on the map we handed you on December 3. Present ground water levels are below this bedrock divide. It is therefore an effective and impermeable dam which has totally cut off any percolation of ground water onto the Gila River Indian Reservation. Thus it is impossible for any pumping of ground water by Conoco or any other upstream user to have any effect at all on water levels in the reservation downstream from Cholla Mountain. Any water pumped by Conoco and discharged into the irrigation canals will benefit the Indian group by delivering ground water for their use which otherwise would never be available from their pumping beyond Cholla Mountain.

No Net Increase in Withdrawals from Conoco Pumping

Conoco has acquired in excess of 5,000 acres of irrigated land near the mine for use in plant facilities and for other purposes. More water is now being pumped to irrigate these lands than would be used in Conoco's planned mine facilities. Conoco would retire part or all of these lands from farming so the net total basin withdrawals of groundwater probably will decline rather than increase when and if Conoco's mining project goes ahead.

Conoco Will Not Pump Gila River Underflow

Many decades ago the Gila River did flow as a year-round stream. This was long before intensive irrigated farming At that time there may have been a certain definable began. "underflow" associated with the river's surface flow. However, today the Gila is essentially a dry stream bed, running only a few days each year as the result of rainfall runoff, or when water is released from dams upstream. Conoco's hydrological measurements and testing shows conclusively that all water in the area of the proposed mine is percolating ground water, with only slow nearly imperceptible movement through the weakly permeable sediments. Conoco shares the same position as all other owners of non-San Carlos Project dedicated wells with respect to any assertion that the ground water in question was or should have been adjudicated in United States v. Gila Valley Irrigation District, et al., (Globe Equity No. 59, June 29, 1935), the so-called "Gila Decree." The May 23, 1975 letter to the Attorney General and your comments seem to indicate a wish to relitigate some of the matters covered by the Gila Decree. But in view of the fact that Conoco's operations likely will result in a net decrease in water usage, plus tangible cost benefit to the San Carlos Project, there seems little merit in using Conoco's pumping as a facutal basis for such litigation.

Conoco Pumping of San Carlos Project Water

The tribal resolution requested injunctive action to prohibit Conoco from using waters of the San Carlos Project. We have never intended to take or use water belonging to the San Carlos Project. The basis of our formal proposal put forward in August, 1974 was to return into the San Carlos Project canals, free of cost, a volume of water equivalent to that pumped from wells being operated by Conoco on land dedicated to the San Carlos Project. Beyond that, Conoco has offered to deliver into Project canals, also free of cost, all water developed from non-Project land which is surplus to our essential needs.

- 5 - .

Employment and Economic Benefits

The Conoco project will create an estimated 1,600 new opportunities for well-paying permanent employment. All these jobs will be filled by people who live in the local area, and many will come from the Gila River Indian Community. This should help fulfill the announced goals of the Community to develop the kinds of new job opportunities which will be provided by the Conoco mine.

Conoco plans and intends to recruit and train the maximum possible number of Indians and other local residents to fill these new jobs. We hope a large number of these jobs always will be filled by Indians, and to that end special efforts will be made to seek out and train people from the Gila River Indian Community.

Still more jobs will become available from service and supply firms who will become established in the area to support the mine and the growing community, plus more employment in government, schools, community services, and local businesses. Conoco's project will bring into the local economy from \$50 to \$75 million annually in new permanent payrolls and in purchases of goods and services, plus up to \$12 million additional in the form of taxes and royalties to the State of Arizona. This will benefit the community directly, and the state and nation in terms of developing a new source for essential copper production.