

CONTACT INFORMATION

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PRINTED: 11/29/2001

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: LAKESHORE MINE

ALTERNATE NAMES:

ARIZONA MS 3051, PAT. COPPER BELL MS 3051, PAT. LAKESHORE SLATE GROUPS TRANSARIZONA TROUT AND ATCHINSON PROPERTY DRAKE GROUP ATLAS DEV. CO. PROPERTY ISABELL CLAIM TREASURE STATE GROUP CASA GRANDE CYPRUS TOHONO CYPRUS TOHONO

PINAL COUNTY MILS NUMBER: 680E

LOCATION: TOWNSHIP 10 S RANGE 4 E SECTION 25 QUARTER SE LATITUDE: N 32DEG 31MIN 23SEC LONGITUDE: W 111DEG 54MIN 09SEC TOPO MAP NAME: SILVER REEF MTS - 15 MIN

CURRENT STATUS: DEVEL DEPOSIT

COMMODITY:

COPPER SULFIDE COPPER OXIDE GOLD SILVER MOLYBDENUM

BIBLIOGRAPHY:

ADMMR LAKESHORE MINE FILE BLM MINING DISTRICT SHEET 557 CLAIMS EXTEND INTO SEC. 26, 35, 36 RANSOM, T.M. INVESTIGATION OF THE LAKESHORE COPPER DEPOSITS PINAL CO. AZ. USBM RI 4706, 1950 ADMMR "U" FILE ANTHONY, J.W. "MINER. OF AZ", P 16; 1977

CONTINUED ON NEXT PAGE

TENNEY, JAMES, HISTORY OF MINING IN AZ, 1927-29, P. 337-338 TENNEY, J.B. ECONOMIC GEOLOGICAL RECONN. OF CASA GRANDE MINING DISTRICT AZBM 1934, P. 18-20 PANEK, L.A. - USBM RI 9049 ADMMR LAKE SHORE MINE COLVO FILE SEE: LAKESHORE #680B LAKESHORE MINE

War Minerals Report 58 (1943) (CFW Library)

.RI 4706 - Investigation of the Lakeshore Copper Deposits, Pinal County, by T.M. Tomslo, July, 1950

RI 5501 - Treat oxidized and Mixed Oxide-Sulphide Copper Ores by the Segregation Process by Carl Rampacek, W.A. McKinney and P.T. Waddleton, 1959

RI 6215 - Segregation of Copper Ores by Direct Firing Methods, 1963 - McKinney & Evans.

MAPS - Upstairs in the flat storage area in drawer two

Minerals Yearbook, Vol. 1, p. 484, 1963, refers to RI 6215

J.B. Tenny, Geological Reconnaissance of the Casa Grande District, Pinal, Arizona Bureau of Mines, Jan. 11, 1933

Drilling plan map - 1968 (tube in Mimeo room)

Drilling logs (wrapped roll-mimeo room)

ABM Bull. 129, p. 70, 71

E/MJ, November, 1960, p. 86 E/MJ, 11/75, p. 37 .. August, 1966, p. 131 .1 3176,1 ·1 11 October, , p. 106 .. December, , p. 128, 134 .. July, 1967, p. 115 March, 1973, p. 87 August, 1973, p. 21, 22 31 11 October, 1973, p. 21 .. November, 1973, p. 226, 227 11 May, 1974, p. 37 .. July, 1974, p. 116 (const.&dvlpt.) January, 1975, p. 138 (dev. & const. of the mine plant & related metallurgical .. facilities) p. 78 (mine & plant exp.)

Metals Week, July 5, 1974, p. 2

Mineralogy of Arizona p. 16

X

LAKESHORE MINE

Mining	World,	April, 1961, p. 28	
	н	June, 1962, p. 43-45	
**	**	September, 1962, p. 67	
11		Catalog, April, 1963, p.	78

Skillings	Mining	Review,	April 15, 1967, p. 10	SMR,	1/4/75, p. 9, 10 (ground sup-
"		**	April 15, 1972, p. 27		port with shotcrete)
11	11	**	April 28, 1973, p. 23	**	6/28/75, p. Jim Cuinlan is
			December 15, 1973, p. 19		now proj. mgr. for Kerr-McGee
	11	**	December 29, 1973, p. 21		at their Red Mt. project
	11		January 5, 1974, p. 17		
			February 9, 1974, p. 6		
••	41		March 9, 1974, p. 27		
11		**	June 15, 1974, p. 1, 8-11, 10	5, 17	
**	**		June 29, 1974, p. 38(const. c	of pla	nt)
н	**		November 30, 1974, p. 4 (Hec)	la & A	SARCO agreement on cu)
	11		November 23, 1974, p. 26 (tra	ining	; program)
11	••	**	Jan. 11, 1975, p. 13 (personn	nel)	AC 10 -

Pay Dirt, June 23, 1967, p. 12 " May, 1969

Mining Engineering, March, 1969, p. 6 """June, 1969, p. 21 """April, 1973, p. 42, 43 ""June, 1974, p. 50,5] "Dec., 1974, p. 35-40 (shortcrete methods and underground mining - personnel)

Mining Journal, June 7, 1974, p. 459

×

California Mining Journal, Dec., 1974, p. 15 (training program at Central Arizona College) " " March, 1975, p. 9 (will be put into regular prod.at least ½ of the year-ASARCO will Mining Annual Review 1974, p. 301 (gen. info.)treat the precipitates)

×

Mining Congress Journal, July, 1974, p. 11 (proposed plant surface facilities)

342

Mining Magazine, 5/75, p. 335 (gen. info. re: first production) " 7/75, p. 58 " 11 5/76, p. 355-361 (progress at Lakeshere)





Arizona Department of Mines and Mineral Resources

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA	MM 3193	BROCHANTITE
PTNAL COUNTY	3194	BROCHANTITE Slick and d
LAKESHORE MINE	3195	CHRYSOCOLLA, SLICK & SLIT
	3196	CUPRITE CHRYSOCOLLA MALAC
	3197	CHRYSOCOLLA ST THE SILT
C # 680 E	3108	CURPTTE PUPTTE CHPVSCOIL
mills	3100	COPDED ODE
D. ALAC	3200	
y-mine feel	3200	CHRYSOCOLLA
LAKESHORE	3201	
	3202	CURVE CURRITE MALACUTT
	3203	CORDER DORRIES, MALACHIII
	3204	COPPER PORPHRI
	003 (nalcopyrite
and the second		the second se

.¥. 1

From the desk of

FRANK P. KNIGHT

./26/60

1-26-60?

LAKE SHORE

' George Freeman and Dwight McClure, partners, original lessees.

Jim Mason, President, Trans-Arizona. 🗇

Mrs. West is to move and erect the 3C mill on the property, so is in the picture.

They have bought pipe for gas line

- Mrs. West is to put in power line but Mason had to dig up money for a commitment.
- They are disturbed because Mrs. West hasn't moved along with her end.

Trans-Arizona has purchased furnace materials.

(notes from Dye conversation)

Y LAKE SHORE MINE

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PINAL COUNTY CASA GRANDE DIST.

It is reported that the Shattuck Denn and Callahan Lead & Zinchave moved off the Lakeshore Mine, Slate Mountains, Pinal County. The results according to report were unsatisfactory as far as primary ore was concerned.

> L. A. SMITH W. Rep. 2-20-59

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1992

Cyprus Casa Grande Corp.

Casa Grande T10S R4E Sec. 25 P.O. Box C-9, Casa Grande, AZ 85222 - Phone 623-1539 - Employees: 179 - Insitu leach copper mine - Roast Leach - Solvent extraction-electrowinning plant - Acid plant - Located 32 miles south of Casa Grande. Vice President and General Manager Ronald Kellner General Manager Rana Medhi Robert Moon Administrative Manager Manager of Metallurgy John Kline Mine Superintendent Kermit Behnke RLA Supervisor Sam Yang Material Management/Cost Coordinator Joe Smith SX-EW Quality Assurance Supervisor Troy Pool RLA Quality Assurance Supervisor Dave Hamby Maintenance Supervisor Donald Berdine Human Resources Superintendent Jim Lewis Chief Metallurgist Dave Shade SX-EW Superintendent Jim Garvey

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Iskeshore Mine file Pinal County

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1991

CYPRUS COPPER COMPANY (A subsidiary of Cyprus Minerals Company)

P. O. Box 1126, Green Valley, AZ 85622 - Phone 628-4000.
Executive Vice President
Vice President Technical Services
Casa Grande T10S R4F Sec. 25
P.O. Box C-9. Casa Grande, A7 85222 - Phone $623-1539$ - Employees:
179 - In- situ leach conner mine - Roast Leach - Solvent extraction-electrowinning
nlant - Acid nlant - Located 32 miles south of Casa Grande
Manager
Ravi Modhi
Administrative Manager Dobort Moon
Plant Superintendent John
Vlino
Mine Superintendent Kermit Behnke
Motallungical Control Superintendent
Administrative Superviser
Administrative Supervisor
Quality Assurance Supervisor Iroy Pool
Quality Assurance Supervisor Dave Hamby
Human Resources Supervisor
RLA Superintendent Dave
Shade
SX-EW Superintendent

.2.1

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY 1990

CYPRUS COPPER COMPANY

(A subsidiary of Cyprus Minerals Company)

P. O. Box 1126, Green Valley, AZ 85622 - Phone 628-4000. Executive Vice President James C. Compton Vice President Technical ServicesRon Kellner Cyprus Casa Grande Corp. Casa Grande T10S R4E Sec. 25 P.O. Box C-9, Casa Grande, AZ 85222 - Phone 623-1539 - Employees: 179 - In- situ leach copper mine - Roast Leach - Solvent extraction-electrowinning plant - Acid plant - Located 32 miles south of Casa Grande. Manager Ravi Medhi Administrative Manager Plant Mine Superintendent Kermit Behnke Metallurgical Control Superintendent...... Sam Yang Administrative Supervisor Joe Smith Quality Assurance Supervisor..... Troy Pool Quality Assurance Supervisor Dave Hamby RLA Superintendent Dave Shade SX-EW Superintendent Jim Garvey

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ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1989

CYPRUS METALS COMPANY

(A subsidiary of Cyprus Minerals Company)

1855 La Canada, Green Valley 85622 - Phone 628-4000.

Senior Vice President C. J. Janes

Cyprus Copper Company

Senior Vice President - Operations Jake Timmers

Cyprus Casa Grande Corp.

Casa	Gra	nde 🕤									T10	S R4E	Sec.	25	
	P.O.	Box (C-9,	Casa	Grande	852	222 -	Phone	623	-1539	- Empl	oyees	162	- In	situ
	leacl	n cop	per m	ine	- Roast	Lea	ach -	Solve	ent e	extrac	tion-e	lectro	owinn	ing p	lant
2	-	Acid	plan	it -	Located	32	mile	s sout	h of	Casa	Grande	•			

Manager Ravi M	ledhi
Administrative Manager Carl McSpa	ıdden
Plant Superintendent John k	line
Mine Superintendent Kermit Be	hnke
Chief Metallurgist Sam	Yang
Administrative Supervisor Joe S	smith
Quality Assurance Supervisor Troy	Pool

19.0

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY 1988

CYPRUS SMELTING & REFINING

9100 E. Mineral Circle, P.O. Box 3299, Englewood, CO 80112 - Phone (303) 643-5000.

Casa Grande T10S R4E Sec. 25 P.O. Box C-9, Casa Grande 85222 - Phone 836-2141 - Employees 89 - In situ leach copper mine - Solvent extraction-electrowinning plant - Located 32 miles south of Casa Grande.

Manager	Ravi Medhi
Plant Superintendent	John Kline
Mine Superintendent Ker	mit Behnke
Chief Metallurgist	Troy Pool
Administrative Supervisor	Joe Smith

r	ZONA	DEPARTMENT OF MINEP RESOURCES	
		Mineral Building, Fairgrounds	
		Phoenix, Arizona	

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	*	
1.	1. Information from: Jim Quinlan & Visit	
	Address: Casa Grande	· · · · · · · · · · · · · · · · · · ·
2.	2. Mine: Lake Shore 3. No. of Claims - P	atented
	Unp	atented
4.	4. Location: Slate Mts South of Cise Grande	
5.	5. Sec 27-36 Tp 105 Range 4E 6. Mining District	
7.	7. Owner: Herla Mining Co & El Roso Nat Gos Co-	
8.	8. Address:	
9.	9. Operating Co.: El Paso at Prevent	
10.	0. Address:	
11.	1. President:12. Gen. Mgr.:	
13.	3. Principal Metals: Comper 14. No. Employed:	26
15.	5. Mill, Type & Capacity: 700 T. P. D(Now)	
16.	 6. Present Operations: (a) Down □ (b) Assessment work □ (c) Expl (d) Production ☑ (e) Rate 	oration 🗹 tpd.
17.	7. New Work Planned: Ste Pay Dirt	9-29-69
	Front Rege	·
		. *
18.	18. Miscl. Notes:	,
	б. 	*
	Active the inter Court of and one to be when a prove of	t Barrat Curve

Date: 10-22-69

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(Signature)

ZONA DEPARTMENT OF MINE 2 RESOURCES Mineral Building, Fairgr ds Phoenix, Arizona

1.	Information from: Jim Quinlan Hecla Geologist, Jim Snider & L. O. Davis.
	Address: Casa Grande
2.	Mine:Lake_Shore 3. No. of Claims - Patented Unpatented
4.	Location: Slate Mts. Pinal County.
5.	Sec Tp Range 6. Mining District
7.	Owner: El Paso Nat. Gas & Hecla Mining Co.
8.	Address:
9. 10.	Operating Co.: El Paso has five men working at the mine and 46 in the mill. Address:to this 51 men add, Quinlan, Snider & Davis for 54.
11.	President:12. Gen. Mgr.:
13.	Principal Metals:14. No. Employed:
15.	Mill, Type & Capacity:
16.	Present Operations: (a) Down (b) Assessment work (c) Exploration (a) (d) Production (a) (e) Rate 675 tpd. milling.
17.	New Work Planned: Joy has 6 drills working. El Paso is milling the oxide ore at approx 675 TPD, and will do so, including mining of the old pit until it interfere's with Hecla Operation.
18.	The first operation will probably be deep ore from underground, this should furnish enough sulfide to produce sulphuric acid in sufficient quantity to allow the treatment of oxide ores from the new pit, until it is deep enough to reach the oxide zone.
	(Above information is not to be quoted) and is only tenative.
	Pludance

Date: 9-17-69

 \star

(Signature)

C

	Mineral Building, Fairgrounds Phoenix, Arizona
1.	Information from: L. O. Davis, Supt.
	Address :
2.	Mine:3. No. of Claims - Patented Unpatented
4.	Location:
5.	Sec_25-36 te Tp 10 5 Range 55 6. Mining District Silver Rief
7.	Owner: El Paso Nortural gas Co. & Transarizona Recourses, June -
8.	Address:
9.	Operating Co.: EP12G
0.	Address:
1.	President:12. Gen. Mgr.:
3.	Principal Metals: Copper14. No. Employed: 50
5.	Mill, Type & Capacity: Segregation 800 tod
5.	Present Operations: (a) Down (b) Assessment work (c) Exploration (d) Production (e) Ratetpd.
7.	New Work Planned:
8.	Miscl. Notes: Plant running on stockfiled ore. M. M. Sundt is
	not working the pet. fley have improved segregation plant
	operation greatly - including copper seconery - and have plan
	for firsther hetterment.
	- No not effect decision on Herla deal until May
	· · · · · · · · · · · · · · · · · · ·
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Date: 4/17/69

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L_PARTMENT OF MINERAL RESOL..CES STATE OF ARIZONA FIELD ENGINEERS REPORT

Mine Lakeshore

District

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Date September 4, 1968

Engineer K. N. Garard

Subject: Mill and mine visit.

Examined the Lakeshore operation owned by El Paso Gas Company. Spent approximately $2\frac{1}{2}$ hours with Mr. Davis who is superintendent **a**t this time of both mill and mine. They are tearing out practically all of the original equipment and replacing with new and second hand from Tuba City mill. They have installed a new roaster which increased the length by almost one-third, thereby enhancing the recovery by retention in the bottom third of the tube.

From roaster they dump the calcine into a quench as they were encountering considerable difficulty with the hot ore drag. From the quench to the thickener where product is sized and there to ball mill wet grind to a set of cells. The process is quite orthodox with the possible exception of the salt and coal roast, which is recognized as the segregation procedure.

The entire operation is very efficient, practical and well financed.

Their production, of course, represents a big problem, as I believe from my knowledge of the Lake Shore operations a great deal of inferred potential was accepted and probably is not as satisfactory as contemplated. They are constantly drilling for new ore bodies and they feel that with their present results will eventually have ample ore reserves.

El Paso Natural Gas Co. representatives say it has 96-million tons of 0.9% copper sulphide ore at its Lake Shore property near Casa Grande, Arizona. Company officials also say that additional exploration and exonomic studies are needed to determine whether the find is of commercial worth.

In July, 1967 pl08, E.M.J. reported that El Paso had a fleet of 35-ton carry-alls and Cat dozers working on a two-phase, two-year program to expand its Papago Indian Reservation open pit and was to rebuild its 500 tpd segregation plant.

The new ore find is located on property owned jointly by El Paso and Narragansett Wire Co., which El Paso acquired in October 1967. The major sulphide body lies at depths from 700 to 1,000 ft and is capped by submarginal copper oxide which are too low in grade to work now. This new ore find may make it possible for El Paso to run its concentrator on the Papago Indian Reservation at greater capacity, after the new property has been evaluated and if it is developed.

E.M.J. October 1968 p13

Active Mine List October 1968 - 45 men working.

AI ONA DEPARTMENT OF MINER/ RESOURCES Mineral Building, Fairgrounds Phoenix, Arizona

	dress :		· · · · · · · · · · · · · · · · · · ·
Mi	ne:LAKESHORE	_ 3.	No. of Claims - Patented
Loc	cation:		
Sec	Tp Range	_ 6.	Mining District
Ô₩	/ner:		
Ad	dress:		
Ор	erating Co.:		``````````````````````````````````````
Ad	dress :		
Pre	esident :	_12.	Gen. Mgr.:
Pri	ncipal Metals:	_14.	No. Employed:
Mi	II, Type & Capacity:		× · · ·
Pre (d	esent Operations: (a) Down 🔲 (b) Asse) Production 🗌	ssmer (e)	t work 🔲 (c) Exploration 🗖 Ratetpd.
Ne	w Work Planned:		2
-			*
M Th At kr	iscl. Notes: <u>They have a supply</u> ne largest pile runs 1.6% copper. present time they are drilling a now the extent or grade.	of o The deep	re (300,000 tons) stock-piled. y started to heat up kiln 1/17/68 er ore body of which they do not
	s Sen lipsa Terro poly stref		

Date: 1/17/68

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(Signature) G. W. Irvin

(Field Engineer)

DEPARTMENT OF MINERAL RESOURCES STATE OF ARIZONA FIELD ENGINEERS REPORT

Mine Lakeshore Mine

Date September 20, 1967

District 30 mi. S of Casa Grande

Engineer Robt. F. Playter

Subject: Interviewed Jim Snider, Mine Supt., and L.O. Davis, Mill Supt. (Mine visit)

Mine: Open cut now formed and orebody exposed on 1760 level. In north end very little stripping was required, and in south end about 30 feet. A second level at 1740 has been started with truck road in north end and face advancing southward. About 100,000 tons of ore has been stockpiled with estimated grade 1.7% Cu, with 1.20% Cu lower limit. "Ore" estimated to run +0.6% and -1.20% is being stacked separately just in case it may eventually be economic. Orebody varies from 80 to 150 feet in width and dips quite steeply to east.

The ore available in the 20 ft. bench between 1760 and 1740 will last about a year, by which time the economics of the operation will be better understood and a reappraisal for the future will be made. The stripping ratio, waste to ore, will increase rapidly with depth because of the steep dip of the orebody, but the depth at which it will become prohibitive has not yet been determined.

Drilling is proceeding around the perimeter of the known orebody and sulfides have been found at depths of 1000-1200 feet. Along eastern edge of orebody holes are being drilled to 1800 feet, with rotary drill to +800 feet and core drill below that depth. Along western edge it is all core drilling. One hole drilled near center of pit passed through about 70 feet, at depth of about 800 feet, that carried considerable native copper. Below that they found sulfides but very little chalcocite. Nevertheless it lends hope that there may be a zone of secondary enrichment.

Mining is under contract to M.M. Sundt of Tucson on "bank yard" basis, who is using Gardner Denver Air Track Drills, International Harvester "Haugh" 400 Pay Loader (10 yd. dipper) and International Harvester 180 Trucks (about 50 tons). Contract calls for delivery of -20" material, and already a large pile of boulders has accumulated.

Mill: Mill construction is also under contract to M.M. Sundt. Nearly all heavy equipment is now in place, including the large kiln. It has yet to be lined with fire brick, which will take about 6 weeks, and completion of that will probably be the determining factor as to date of commencement of operation, which will probably be sometime in November. Although the metallurgical process is new, they have confidence it will work. Chrysocolla is the dominant copper mineral, and tests indicate leaching is impossible.

Employees	-	Mine	7
		Mill	9
		Contractor	-Mill 65-70
		11	Mine 12
		11	Drill crews 12

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•	DE RTMENT OF MINERAL RESOU ;ES FILED
	State of Arizona MAR 13 1967
	MINE OWNER'S REPORT
	Date 3/8/66
ι.	Mine AKESHERE
2.	Location: Sec 25 636 Twp/0.5 Range 5 F. Nearest Town CASA GRAMME Distance 30 MI
	Direction NoR 7th Nearest R.R. SAME Distance
	Road Conditions ALL BUT 2 19120 ARE PAVED
3.	Mining District and County:
4.	Former Name of Mine:
5.	Owner: TRANSARIZONIA RESOURCES, INC.
	Address: 5 UITE 1008, DHOENIX TITLE BLDG., TUCSON, HRIZ.
6.	Operator: FI PASO NATURAL GAS CO.
	Address: BUX 1492, EL PASO, TEXAI
7.	Principal Minerals: SECONDANY COPPOR MINGERMES
8.	Number of Claims: Lode
	Placer Patented Unpatented
9.	Type of Surrounding Terrain: CORNERALLY FLAT
3	
10	Geology and Mineralization: VEIN-LIKE DEPOSIT OF SECONDANT
0.	CONTRACTION ALLAND QUARTEITES
	NO LIMATONE ASSOCIATED WITH STRONG
	FAULTING NEAR A GRANITIC INTRUSIVE-
	· · · · ·
	175%
11.	Dimension and Value of Ore Body: 70-100 Infiling - 1300 Lerve
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Please give as complete information as possible and attach copies of engineer's reports, shipment returns, maps, etc. if you wish to have them available in this Department's files for inspection by prospective leasors or buyers.

Ore Probable	: <u>?</u>	
13. Mine Workir	ngs—Amount and Co	ondition: $OPE \sim PiT$
No.	Feet	Condition
Shafts		
Raises	· ·	
Tunnels	a a a	
Crosscuts	· . · . · . · . ·	
Change Ch		
Stopes	·····	
 Water- Supp Brief History 	ly: <u>АОЕ</u> <u><u><u></u> y:<u>Р</u>С</u><u>р</u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	4 TE 2 Total LUCATED IN ABOUT 1880, 280,00
 Water- Supp Brief History Brief Mistory Brief History Brief Hist	IN: ADEGUN Y. PROPERTZ COMPER 5 MALL	ATE LOCATED IN ABOUT 1880, 280,00 HIMPED PROT CANDERGRAMO UPEN DIT PRODUCTION A BOUT
14. Water- Supp 15. Brief History <u>LRS</u> <u>UPDER 710</u> 1960.	IN: ADEGUN Y. PROPERTY CAPPER 5 MALL	ATE LUCATED IN ABOUT 1880, 280,00 HIPPED PROT CASPERCENNO UPEN PIT PRODUCTION A BOUT
 14. Water- Supp 15. Brief History LRS UF UPDER TIC 1960. 16. Remarks:	IN: ADEGUN Y. PROPERTY CAPER 5 MALL	ATE LUCATED IN ABOUT 1880, 280,00 HIPPED PROT CASPERCENNO UPEN PIT PRODUCTION A BOUT
 14. Water- Supp 15. Brief History <i>LRS uf</i> <i>UPDER Tro</i> <i>1960</i>. 16. Remarks: 	IV: ADEGUN Y: PROPERTZ CAPPER 5 MALL	ATE LOCATED IN ABOUT 1880, 280,00 HIPPED PROT CANDERCUND OPEN DIT PRODUCTION A BOU
 14. Water- Supp 15. Brief History 15. Brief Mistory 16. Remarks: 	IN: ADEGUN Y: PROPERTY CAPPER 5 MALL	ATE LECATED IN ABOUT 1880, 280,00 HIPPED PROT CHAPPEGRAUNO GREN P.T. PRODUCTION A BOU
 14. Water- Supp 15. Brief History 15. Brief History 16. Remarks: 17. If Property 	Ily: ADEGUN y: PROPERTY CAPPERTY CAPPERTY SMALL for Sale, List Appro	A $T = \frac{1}{2}$ Leca $T = 0$ IN A Box T IBBO, 280, CO HIDDED PRET CONDERCEONS O OPEN DIT PRODUCTION A BOX Society Price and Terms:

mailed to D. Lewis 3/1/67 Reply 3/8/67 - From M-

FILED

MAR 13 1967

DEPARTMENT OF MINERAL RESOURCES STATE OF ARIZONA

FIELD ENGINEERS REPORT

Date

Mine LAKESHORE MINE AND MILL

District

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PINAL COUNTY, SLATE MOUNTAIN DIST

2/7/67

Engineer Lewis A. Smith

Subject: Visit and Conference with Jim Snyder (Drilling Supervisor) and D. Lewis (Mill Supt.) and Dennis Duffy (Supervisor for Sundt Construction Co. of Tucson) 2/7/67.

> According to Lewis, El Paso Natural Gas Co. is removing the old furnaces from the mill and will replace them with a 200-foot-long rotary furnace similar to cement plant rotary kilns. This rotary is designed for continuous operation at 1,500 deg. F. and will handle 600 to 800 tpd. The feed will probably be 6-8 mesh. The seggegation process will still be used (adding salt and carbon as coal or coke to the ore). The stationary older furnaces were heated from outside the hearth and it is believed, the heat transfer loss, through the comparatively thick walls was excessive. The new rotary will be internally fired. It is also calculated that the use of 6-8 mesh, instead of 12 will cut grinding costs some. A few other changes are contemplated in the crushing plant arrangement, particularly in the closing up the gaps between units.

> Meanwhile two Joy rigs are working around the pit area, especially around the mill, to see if ore might underlie any part of the mill, so that the mill might not have to be moved later on. A third drill is scheduled to be in shortly. It is planned to do some testing of other anomalies in the area.

Sundt Construction Co. is doing the mill reconstruction. Jey Mfg. Co. has contracted the drilling. Narragansett is not involved in the actual work at the Lakeshore, but is financially with the view to obtaining the copper output.

3.

ZPARTMENT OF MINERAL RESOL JES STATE OF ARIZONA FIELD ENGINEERS REPORT

Mine	LAKESHORE	MINE	Date	1/18/67
District	Slate Mtn.	Dist., Pinal Co.	Engineer	Lewis A. Smith

Subject: Visit and interview with Ted Lewis and Jim Snyder.

X

Two drills were working one about 400 feet south of the Pit and the other, 500 feet SE of the Pit. One hole 800 feet S of the Pit encountered some ore (mostly sulphides, chalcopyrite, bornite and pyrite, with some cuprite). A little chalcocite (sooty variety) was seen but this is not prevalent. It is not yet certain that operation of the mill is in the offing, but Lewis felt it now is definite possibility. The first hole material looks like quartzite. COPY

X

SHATTUCK DENN MINING CORPORATION

IRON KING MINE

P. O. DRAWER C :: HUMBOLDT, ARIZONA 86329

Humboldt

February 2, 1965

TRANS-ARIZONA RESOURCES

Mr. Willard La Morte New York

Enclosed are:

- 1. Notes from Paul Gilmour regarding ore body at Trans-Arizona.
- 2. Notes worked up by Mr. Pierce as to exploration interest by various companies.
- 3. Various estimate sheets regarding economics of the property.

El Paso Natural Gas Co. operated this plant as is from July 16 to August 6, 1963. The economic estimate as presented by us is based largely on the results of El Paso's test run. We have made adjustments of El Paso's figures as indicated below. Time did not permit a detailed evaluation of our own, and in any event, it was necessary to rely to a great extent on their test work. Mr. McConn of El Paso was most helpful to us and he asks that we keep the information within our inner circle.

The following comments are pertinent to the enclosed estimate:

Ore Reserves - We believe El Paso's figure of 1,450,000 tons at 1.75% Cu to be reasonable.

Recovery - El Paso believes that 85% is entirely possible. However, in their test work about 83% was the high. We feel 85% can be reached, however, for estimating we used 83%.

Smelter Returns - This was checked with Reed Welch of A. S. & R. and is as represented on enclosed estimate. There may be room for possible improvement in the smelter contract. We have shown income for 32¢ Cu and 33.6¢ Cu.

Stripping - El Paso's figures were used in this case. They have been reviewed and seem reasonable.

Mining - El Paso's figures, plus 5%, were used to allow for possible increases. Their figures were based on quotes from Isbell Construction Co.

Process Cost - We have reviewed these figures and come up with 26 cents per ton more than El Paso in the labor costs.

Mr. Willard J. Is Morte

Additional and

×

Page 2

February 2, 1965

Royalty - There remains \$345,500 to be paid in royalties. This pays out in third year.

Administration & General - \$60,000 per year seems reasonable.

Taxes - 1.5% sales tax plus property taxes.

Loans - The S. B. A. loan status is described in Mr. Owens' report. However, we have shown a pay out within the indicated life of the property.

It would be necessary for the buyer to provide a loan to Trans-Arizona Resources as follows, to bring capacity to 800 tons per day:

For unsecured creditors	\$200,000
Plant expansion	717,400
Working Capital	100,000
	\$ 1.017.400

The loan necessary to operate at 400 tons per day or 12,000 tons per month is as follows:

Additions to Plant	ors	\$ 72,66	5
Working Capital		75,00	0
a Triffic a		\$347,66	6

Interest - The S.B.A. loan carries 52% on 872%, and 6% on 122%.

Exploration Interest - Phelps Dodge have expressed a genuine interest in an exploration agreement. Other companies were non-committal.

The group of estimate sheets for a 400 ton/day or 12,000 ton per month was set up to see if a profit could be made on the present plant. This would indicate about a standoff with no provision for repayment of loans. It is evident that the expanded plant is necessary to be able to present a profit picture.

Considerable time was spent on the estimate statements for an 800 ton per day operation and we believe the figures are realistic. The plant expansion costs were based on El Paso's estimate.

C. R. SUNDEEN

STATE OF ARIZONA DEPARTMENT OF MINERAL RESOURCES MINERAL BUILDING, FAIRGROUNDS PHOENIX, ARIZONA 85007

Sala de la

April 21, 1976

J. H. Hunter, General Manager Hecla Mining Company Lakeshore Mine P. O. Box 493 Casa Grande, Arizona 85222

Dear Mr. Hunter:

Over the years, the Department of Mineral Resources has collected production figure data from Arizona's large copper producers. This data is then published in the Department's annual report on the copper industry, "The Copper Industry Statistics For 1975 Compared With Other Years - Arizona, The United States and the World."

We would appreciate having your 1975 production figures for (1) tons of ore mined. (2) pounds of recoverable copper and, (3) pounds of recoverable molybdenum. Please insert the data in the spaces provided on the attached tabulation sheet.

Similar requests are being sent to all large Arizona copper producers and a copy of the completed 1974-1975 tabulations will be returned to you.

22

Thank you very much.

Sincerely,

Glenn A. Miller Mineral Resources Specialist

Enclosures

CAM :pp

STATE OF ARIZONA

DEPARTMENT OF MINERAL RESOURCES MINERAL BUILDING, FAIRGROUNDS PHOENIX, ARIZONA 85007

July 20, 1976

Mr. J. H. Hunter, General Manager Hecla Mining Company Lakeshore Nine P. O. Box 493 Casa Grande, Arizona 85222

Ô

Dear Mr. Hunter:

I am enclosing a copy of the completed 1974-1975 tabulations for copper and molybdenum production of large Arizona copper mines.

I am looking forward to seeing Lakeshore's copper production reflected in Arizona's total copper output for 1976.

If the Department, or I, can be of assistance to you at any time, please contact us.

24.

Sincerely yours,

Glenn A. Miller Mineral Resources Specialist

Enclosure

GAM:pp

File: Hecla Mining Company, Pink Reading, Alpha "H" Copper Report, GAM File



HECLA MINING

LAKESHORE COPPER

COMPLEX

ΒΥ

Paul M. Musgrove, Jr.

COPIES OF THIS PAPER ARE BEING PRINTED AND WILL BE MAILED UPON REQUEST BY WRITING

> M. Paul Musgrove A Hecla Mining Company Lakeshore Mine P. O. Box 493 Casa Grande, Arizona 85222

Rever . white to m

File - Keadeng File - Mela Mining Co.

December 6, 1977

Mr. Paul M. Musgrove, Jr. Hecla Mining Company Lakeshore Mine P. O. Box 493 Casa Grande, Arizona 85222

Dear Mr. Musgrove:

We would appreciate receiving a copy of your paper entitled, "Hecla Mining Lakeshore Copper Complex." as presented at the Tucson AIME meeting.

24

Thank you.

Sincerely,

(Miss) Pennie Paynich Administrative Assistant

PP/bh

April 26, 1977

Mr. J. H. Hunter, General Manager Hecla Mining Company Lakeshore Mine P. O. Box 493 Casa Grande, Arizona 85222

Dear Mr. Hunter:

The Department of Mineral Resources is compiling data for its annual report on the copper industry, <u>A PROFILE OF ARIZONA'S PRIMARY COPPER</u> <u>INDUSTRY FOR 1976 VOLUME I.</u> We would appreciate having your 1976 production figures for: (1) tons of ore mined (2) pounds of recoverable copper and (3) pounds of recoverable molybdenum. Please insert the data in the space provided on the attached tabulation sheet.

12 1

Similar requests are being sent to all Arizona copper producers and a copy of the completed 1976 tabulations will be returned to you.

Thank you very much.

Sincerely,

Glenn A. Miller Mineral Resources Specialist

Enclosures

GAM/bh

File: Pink-Reading, Yellow "L", File-Eakeshore Mine Copper Report, GAM file

MEMORANDUM

To:John H. Jett, DirectorFrom:Richard R. Beard, Mineral Resources SpecialistSubject:Field Trip To Noranda Lakeshore actual muse fill

On April 14, 1980, I visited the Lakeshore property. I talked with Paul Musgrove, Metallurgical Manager; Russ Hoar, Plant Superintendent; and Ray McBeth, Vat Leach General Foreman.

J-260 Jug

They are planning to start production in July of this year. Initially they will start vat leaching the oxide ore. The pregnant solution will be sent directly to the tank house to produce impure cathodes by electrowinning. Sponge iron will be purchased to cement the bleed stream in the cementation plant. The cement copper will then be redissolved and electrowon.

Engineering has been started on a solvent extraction plant to upgrade the pregnant solutions from the vats so that high purity cathodes can be produced in the tank house. A total work force of approximately 500 employees will be required.

The sulfide ore body will be studied to determine the best method of extraction before any production of the sulfide ore can be contemplated.

Currently the vats are being emptied and repaired as required. The false floors are being removed so that the bottoms can be cleaned and inspected. A new lining is being tried in one vat.

Caving has been initiated in the first block and oxide ore is being hoisted. They expect to load the first vat this week to produce solutions to make starter sheets for the tank house.

Initially they will hoist the ore at the oxide shaft and haul to the coarse ore storage by truck. Eventually, however, they intend to haul to the underground crusher and utilize the conveyor belt up the incline to the coarse ore storage.

RRB:mw cc: DMR Tucson

1- J,

HECLA MINING COMPANY

P. O. Box 320

WALLACE, IDAHO 83873 (208) 752-1251

March 15, 1978

3-20-78 INFILING LADEDONKUES

TO THE SHAREHOLDERS OF HECLA MINING COMPANY

THE TEXT OF A PRESS RELEASE, JOINTLY MADE BY HECLA MINING COMPANY AND THE SUPERIOR OIL COMPANY ON TUESDAY AFTERNOON MARCH 14, 1978, FOLLOWS:

"In a joint release issued today, Howard B. Keck, President of The Superior Oil Company, and William H. Love, President of Hecla Mining Company, announced an agreement in principle under which Superior would acquire a participation in the Lakeshore copper mine near Casa Grande, Arizona, as well as a substantial stock interest in Hecla Mining Company.

"The Lakeshore mine is presently owned by El Paso Natural Gas Company and Hecla, with Hecla as operator. Under the terms of the agreement in principle, Superior would acquire Hecla's 50% ownership of the Lakeshore mineral interest in exchange for an advance royalty and additional future royalty payments contingent upon operating results or sale of the property. Superior would also lease Hecla's 1/2 interest in the Lakeshore plant and equipment for which it would pay Hecla an annual rental of \$3,000,000. Superior would also assume Hecla's obligations under the existing operating agreement to bear 50% of future operating costs and capital expenditures. Hecla would continue to manage the Lakeshore mine under a management contract. Further, Superior will purchase from Hecla 2,500,000 of its presently authorized but unissued common shares at a price of \$7.50 per share. The entire proceeds of the sale of such stock and all rentals received by Hecla will be applied by Hecla to reduce its long-term debt. Hecla will grant to Superior an option, effective until May 31, 1980, to purchase a block of 1,250,000 unissued common shares at a price of \$12.50 per share and an additional option, effective until May 31, 1982 to purchase 1,250,000 unissued common shares at a price of \$15 per share. At the time Superior purchases the initial 2,500,000 Hecla shares, McIntyre Mines, Ltd. a Canadian company affiliated with Superior, would purchase from a subsidiary of El Paso Natural Gas Company an additional 1,171,662 Hecla shares now owned by El Paso's subsidiary. McIntyre would purchase these shares at a price of \$7.50 per share.

"The agreement in principle is subject to the satisfactory completion by Superior of an investigation of the properties and operations of Hecla and the execution of a definitive contract approved by the Boards of Directors of Superior and Hecla, as well as the shareholders of Hecla."

PLEASE NOTE AS STATED ABOVE THAT THE TRANSACTION DESCRIBED IS SUBJECT TO APPROVAL OF HECLA SHAREHOLDERS, AS WELL AS APPROVAL OF THE BOARDS OF DIRECTORS OF THE SUPERIOR OIL COMPANY AND HECLA. ASSUMING THAT APPROVAL OF BOTH BOARDS WILL BE FORTHCOMING, AND IN ORDER TO AVOID THE EXPENSE OF A SPECIAL SHAREHOLDERS' MEETING, THE REGULAR ANNUAL MEETING SCHEDULED FOR MAY 3, 1978 WILL BE POSTPONED TO A LATER DATE TO ALLOW SUFFICIENT TIME FOR PREPARATION AND CLEARANCE WITH THE SECURITIES AND EXCHANGE COMMISSION OF THE NECESSARY PROXY MATERIALS WHICH WE WILL BE SUBMITTING TO YOU CONCERNING THE TRANSACTION. WE WILL ADVISE YOU OF THE DATE AND PLACE FOR THE ANNUAL MEETING OF SHAREHOLDERS VIA THE PROXY MATERIAL. THE 1977 ANNUAL REPORT TO SHAREHOLDERS IS NOW BEING PRINTED AND WILL BE MAILED NEXT WEEK.

> W. H. LOVE President and Chief Executive Officer

JUL 7 1981 CLERK COURT OF APPEALS Division Two

IN THE COURT OF APPEALS STATE OF ARIZONA DIVISION TWO

HECLA MINING COMPANY, a corporation, EL PASO NATURAL GAS COMPANY, a corporation, and NORANDA LAKESHORE MINES, INC., a corporation,

Wender C.

Plaintiffs/Appellants,

v.

DEPARIMENT OF REVENUE, a Department of the State of Arizona, BOARD OF TAX APPEALS, DIVISION ONE, an Agency of the State of Arizona, JIM L. TURNBULL, County Treasurer of Pinal County, C. E. McKFE, County Assessor of Pinal County, and PINAL COUNTY, a political subdivision of the State of Arizona,

Defendants/Appellees.

APPEAL FROM THE SUPERIOR COURT OF PINAL COUNTY

Cause No. 32054

Honorable Robert R. Bean, Judge

VACATED

Twitty, Sievwright & Mills by John F. Mills

Robert K. Corbin, The Attorney General

Phoenix

Attorneys for Plaintiffs/Appellants

Phoenix

Attorneys for Defendants/Appellees

HATHAWAY, Chief Judge.

by James D. Winter

2 CA-CIV 3896

OPINION
The appellants have brought this appeal to challenge the trial court's granting of summary judgment in favor of appellees and its denial of appellants' cross-motion for summary judgment. The case involves the classification of appellants' property by the appellee Department of Revenue as a "producing mine" for the year 1979.

Appellants Hecla and El Paso Natural Gas Company obtained the lease on the Papago Indian Reservation land from the Papago tribe on August 17, 1976, covering a portion of the reservation upon which the Lakeshore Mine, was situated. Production was commenced by appellants in April 1976, at Lakeshore Mine, was terminated in August 1977, and was never resumed. In addition to having the August 17, 1976, leased property, appellants owned the lot in the Valley Industrial Park for a railroad siding. The lot was situated near Casa Grande and was not a part of the reservation. On October 31, 1978, appellants Hecla and El Paso surrendered and terminated the August 17, 1976, lease and advised the Papago tribe that all property would be removed except buildings and other permanent improvements. On that same date, the tribe and Hecla and El Paso entered into an agreement whereby the tribe was granted an option to purchase the removable personal property and the Valley Industrial Park for \$9.45 million within a five-month period from the date of the agreement. In return, after the five-month period appellants had one year to remove the personal property.

Noranda Exploration, the parent company of appellant Noranda Lakeshore Mine, Inc., entered into an agreement with the Papago tribe and appellants Hecla and El Paso to purchase the removable personal property on March 7, 1979. On April 1, 1979, Noranda and the Papago tribe entered into a mining lease on the Lakeshore Mine and a business lease. Pursuant to their agreement, Hecla and El Paso and Noranda were to split the 1979 ad valorem taxes that were to be assessed by the department of revenue. The department assessed the removable personal property and the Valley Industrial Park as a "producing mine" at 60% of full cash value while appellants maintain that such property should be assessed as conmercial property at 25% of full cash value. The taxes for the 1979 year were paid under protest and appellants filed suit to recover those monies.

Appellants do not question the right of the department to tax their removable personal property. However, they argue that the classification of their property as a "producing mine" for 1979 is in error. The state bases its contention on the legislative definition of a "producing mine or mining claim," which is contained in A.R.S. Sec. 42-201(6), which was in effect at the time this matter arose. That subparagraph states:

-2-

"In this chapter, unless the context otherwise requires:

year." 1/

'Producing mine or mining claim' means any mine or mining claim from which any coal, mineral or mineral substance, other than clay, sand, gravel, building stone or any mineral or mineral substance normally processed into artificial stone has been extracted for commercial purposes at any time during a period of three years prior to the first Monday in January of the tax

In Arizona Department of Revenue v. Cyprus-Bagdad Copper Co., 122 Ariz. 505, 596 P.2d 31 (1979), the taxpayer mine had an operating mine, whereas appellants had no mine as of November 1, 1978. In the <u>Cyprus-Bagdad Copper Co.</u> mine situation, the department of revenue treated the personal property as part of the taxpayer's producing mine; this was upheld by our supreme court. The opinion states:

"The words of a statute will be interpreted in their ordinary sense unless it appears from context that a different meaning was intended. Castregon v. Huerta, 119 Ariz. 343, 580 P.2d 1197 (1978). The context in which the word 'mine' is used in the above statute does not suggest a meaning beyond that ordinarily conveyed by the words used. A 'mine' is any excavation made for minerals. (Citations omitted)" 122 Ariz. at 507.

The court pointed out that the statute defined a producing mine as any mine from which minerals had been extracted during a period of three years prior to the tax year. It was the court's holding that the size and method of extraction of ore are not relevant to the determination of what is a producing mine under the legislative definition. Implicit in that holding, however, is that there be a mine of some size and that there be some method of extraction of ore that would be relevant to the determination of what is a producing mine under to the determination of what is a producing mine under the legislative definition.

In Pima County v. American Smelting and Refining Co., 115 Ariz. 175, 564 P.2d 398 (1977), we stated that an entire piece of mine property could not be assessed as a producing mine inasmuch as only part of the property was being used in conjunction with a producing mine and that the rest of the property should be assessed at a commercial or industrial property rate. In the record before us, appellants did not use any of the property classified as a "producing mine" in relation to a mine, producing or otherwise, after October 31, 1978.

The question remaining, then, is the constitutionality of the application of A.R.S. Sec. 42-201(6), which classified appellants' property for the tax year 1979 as a "producing mine" by virtue of an irrebutable presumption that the property remained

-3-

 $[\]frac{1}{1}$ A.R.S. Sec. 42-201 has been amended and A.R.S. Sec. 42-201(8) now contains the definition of a producing mine or mining claim changing the three-year period to a one-year period.

a producing mine because it had been so used within the prior three-year period.

Without an adequate basis for the irrebutable presumption's existence, we find that it is in contravention of the due process clause of the Fourteenth Amendment. A state is forbidden to deny due process of law or equal protection of the law for any purpose whatsoever. Schlesinger v. Wisconsin, 270 U.S. 230 (1926). In Heiner v. Donnan, 285 U.S. 312 (1932), the supreme court held that where an irrebutable presumption attempts by legislative fiat to enact into existence a fact that does not exist in actuality, it cannot be upheld. The court said that more than once it had struck down a statute that created a presumption that operated to deny a fair opportunity to rebut, as violative of the due process clause of the Fourteenth Amendment. The threeyear irrebutable presumption that A.R.S. Sec. 42-201(6) established cannot be upheld in light of the facts of this case, which show that for the tax year in question appellants were not mining on the Lakeshore property. Appellees argue that the state has two rational bases to uphold the classification established in the statute: (1) To provide a measuring device to reduce the difficulty in determining when a mine has ceased as a producing mine, since confusion exists as to its status during the suspension of operations due to fluctuations in copper prices and labor problems; and (2) to reduce the financial burden upon a small community when a mine stops production and the community's tax base is affected. Such reasoning, we think, provides no rational basis to support the presumption.

The summary judgment in favor of appellees is hereby vacated and the cause is remanded with directions to <u>enter summary</u> jugment in favor of the appellants.

CONCURRING:

JAMES D. HATHAWAY, Chief Judge

LAWRENCE HOWARD, Judge

BEN C. BIRDSALL, Judge

2/ We note that the three-year valuation period now appears to be contained in A.R.S. Sec. 42-124(B), effective January 1, 1981.

1-

2/

Intra-Company Correspondence

SHATTUCK DENN MINING CORPORATION

and

SUBSIDIARIES

Humboldt Office

S

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30th January, 1965 Date

TO: MR. J. PIERCE

TRANSARIZONA SUBJECT:

BRIEF NOTES ON TRANSARIZONA

(These notes represent a synopsis of the comments submitted a week ago, plus some new information)

LAKESHORE PROPERTY

Ore Reserves

Transarizona estimated ore reserves at 2 million tons 1.83% Cu. Still and . Still arrived at 1 1/2 million tons grading 1.58% Cu. For the purposes of preliminary estimates, either the lower figures or an average - 1 3/4 million tons grading 1.7% Cu - could be used. When the plant was in operation a 30,000 ton sample graded 1.75% Cu (verbal communication).

El Paso apparently drilled four holes, in order to verify the presence of the ore, with satisfactory results. They also accepted ore reserves near the Transarizona figures (?).

Ore to Waste Ratio

accepted by Iroms aniz by shill (45°) Transarizona estimated an ore to waste ratio of 1 : 1.4. Still and Still postulated 1 : 1.8. The difference is attributable partly to the different ore reserves and partly to the steeper pit slopes (approx. 55), Again, either the less advantageous figure or an average - 1 : 1.6 - could be used for purposes of evaluating the property. El Paso is reported to have adopted a figure of 1 : 1.44

Before taking any definite steps, it would be advisable to re-check all of these figures, and we have the necessary data. Even if the figures so obtained did not differ significantly from the previous estimates, the knowledge gained from a close acquaintance with the data would be potentially valuable.

Exploration

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The exploration possibilities on the Transarizona property are of two kinds, namely:

"High-Grade", Oxidized Deposits.

There appear to be at least two areas on the Transarizona property where the

Mr. J. Pierce

chances of finding a relatively shallow, relatively high grade, oxidized copper deposit are fairly good. One of these lies approximately 2,500 feet southeast of the known orebody where one hole intersected 40 feet of 2.19% Cu and adjacent holes cut lower values. The other area lies a further 5,000 feet to the southeast. In that locality the only hole drilled intersected 11.8 feet of 1.83% Cu near the collar of the hole.

"Low-Grade", Sulphide Deposits.

Again, two areas seem particularly favourable for the occurrence of large, lowgrade deposits. The first lies about 1,000 feet north of the known orebody. A hole drilled in andesite near the quartz-monzonite contact averaged 0.46% Cu and 0.002% Mo Map over a core length of 290 feet. The second area of interest for a low-grade deposit lies about a mile southeast of the known deposit and plant where Callahan and Shattuck Denn drilled three holes in quartz monzonite which intersected low -< 0.2% - copper values.

It is reported that at least Phelps Dodge and Bear Creek are interested in acquiring the property for its "low-grade" potential. (This statement could be expanded to show the possible extent and value of P. D.'s interest).

PINAL PROPERTY

The Pinal property, situated some 22 miles west of the Lakeshore property, is presently under lease from the Pinal Copper Company. This property comprises some 52 claims and, as in the case of the Lakeshore property, is said to be of interest to a number of the major copper-mining companies, such as Anaconda. (This statement could also be expanded)

30th January, 1965

×

PAUL GILMOUR

ESTIMATE

24,000 Tons/Mo. - 288,000 Tons/Yr. 1.75% Cu - 83% Recovery 50% Cu Conc. 1,450,000 Tons : 288,000 = 5.03 Years 32¢ Cu and 33.6¢ Cu

7					
REVENUE FROM SALES			×.		
32¢ <u>288,000 x 1.75% x</u> 50%	<u>83%</u> = 8366	5 Tons x \$25	2.51 = \$2,112,	,500	
33.6¢	8366	6 Tons x \$26	8.19 = \$2,243	,600	
COST AND EXPENSE	lst Year	2nd Year	3rd Year	4th Year	5th Year
Dev. & Mng.					
Mining Process Royalty Adm. & Genl.	398,880 1,080,000 156,862 60,000	398,880 1,080,000 156,862 60,000	398,880 1,080,000 31,776 60,000	398,880 1,080,000 (Royalty Pa 60,000	398,880 1,080,000 ys Out) 60,000
Taxes (other than Income)	48,000	48,000	48,000	48,000	48,000
Amortization Plant Expan. 717,400 Strip Aluv. 80,050					
\$ 797,450					
\$797,450 - 1,450,000 = .55	/Ton				×
288,000 Tons/year	158,400	158,400	158,400	158,400	158,400
Interest					5 010
S.B.A. Loand	27,812	25,700	21,024	13,553	5,212
Buyer Loan	51,833	40,832	29,833	18,832	7,030
X Total	\$ 1,981,787 \$	3 1,968,674	\$ 1,827,913	\$ 1,777,665	\$ 1,758,322
Net Profit @ 32¢ Cu Net Profit @ 33.6¢ Cu	\$ 130,713 \$ 261,813	143,826 274,926	284,587 415,687	334,835 465,935	354,178 485,278

ESTIMATE

24,000 Tons/Mo. - 288,000 Tons/Yr.

Funds from Sales

32¢ Cu 8366 Tons concentrates @ \$252.51 = \$2,112,500/year 33.6¢ Cu (current price) 8366 T @ \$268.19 = \$2,243,600/year

FUNDS REQUIRED		lst Year	2nd Year		3rd Year		4th Year		5th Year
Dev. & Mng.							•		
Strip Alluvium Mining Process Royalty Adm. & Gen.	l	80,050 398,880 ,080,000 156,862 60,000	398,880 1,080,000 156,862 60,000	•	398,880 1,080,000 31,776 60;000	»	- 398,880 1,080,000 (Royalty 60,000	Pa	398,880 1,080,000 ys Out) 60,000
Taxes (other than Income)		48,000	48,000	х ^г • • •	48,000		48,000	×.	48,000
Repay Loans									
S. B. A. Buyer		200,000	75,000 200,000		125,000 200,000		150,000 200,000		150,000 217,400
Interest							•		
S. B. A. Buyer		27,812 51,833	25,700 40,832		21,024 29,833		13,553 18,832		5,212 7,830
Total	\$ 2	,103,437	\$ 2,085,274	\$	1,994,433	\$	1,969,265	\$	1,967,322
Bal. Cash on hand $(32\phi$ Cu)	\$	109,063	\$ 136,289	\$	254,356	\$	397,591	\$	542,769
Bal. Cash on hand $(33.6 \notin Cu)$	\$	240,163	\$ 398,489	\$	647,656	\$	921,991	`\$	1,198,269
Loans Outstanding - Year	-end	<u> </u>							
S.B.A.		500,000	425,000		300,000		150,000		0
Buyer		817,400	617,400		417,400		217,400		0

*

ESTIMATE

UNIT OPERATING COST - 30 Days

800 Tons/Day - 24,000 Tons/Month

5 years

Dev. & Mining

\$1.385/Ton

(\$1.3175 plus 5%)

Processing

*

Natural Gas Labor (incl. Fringes)	\$.85/T 1.06/T	(28 hourly, 6 salary Fringes)	@ \$25.00/day inc.
Power .65 Salt, Coke, Reagents Misc. (inc. Balls)	.65/T .74/T .45/T		•
	\$ 3.75/T		

ESTIMATE

SMELTER PAY

Cu Head 1.75% 83% Recovery 50% Cu concentrate grade .

Current - 33.6¢ Cu

50.0 - 1.0 = 49.0 x 2000 = 980 lbs.

980 lbs. x (33.6-3.713) - 29.887 = \$292.89 Less: Smelter Charge 15.00 Penalty 1.50 over 25% Cu (15¢/unit up to 1.50) 1.92 18.42 R. R. Freight 2.78 Trucking 3.50 24.70 Net \$ 268.19

At 32¢ Cu

980 x (32-3.7	13) 28.287	=	\$277.21
		w7	24.70
	Net		252.51

×

ESTIMATE

Improvements recommended to double capacity to 800 Tons/day, 24,000 T/Mo:

Crushing

- 1 Short head crusher
- 1 Conveyor
- 1 Set Rolls
- 1 Dust Collector

Furnacing

2 Furnaces (complete)

.

Flotation

2 Banks flotation cells 25,000 (complete with cones and pumps)

Miscellaneous

TOTAL

\$ 537,400

149,400

\$31,500

331,500

Material	\$537,400
Labor	90,000
Engineering	30,000
Contingency	60,000
Total	\$717,000

STATE OF ARIZONA

DEPARTMENT OF MINERAL RESOURCES

MINERAL BUILDING, FAIRGROUNDS PHOENIX, ARIZONA

0000000

March 28, 1960

To: Frank P. Knight, Director

From: Lewis A. Smith, Field Engineer

Subject: Weekly Report for week ending March 11, 1960

Office Inquiries 3 3 Telephone 12 2 Letters written 17 received 1 Conference - official (Casa Grande) (3)" - unofficial (2) (Casa Grande) (2) and at Lake Shore (4) 2 (Lake Shore, Silver Reef) Mine visits Mine reports 1 (Silver Reef) Mill N . 1 (Lake Shore)

The Lake Shore mill is progressing rapidly since all of the May West mill equipment (except one Simmons) is on the ground. The crusher, rolls, screens, conveyors and footings are all in place. Stripping at the mine has progressed well and has been discontinued for the present. Mr.'Freeman estimates that the mill will be ready in about 3 months. He also stated that only one furnace will be installed at first. After the process has been tested other units can be added, provided that the initial unit proves satisfactory, particularly as regards costs.

DEPARTMENT OF MINERAL RESOURCES STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Lakeshore Mine & Mill

Date September 12, 1961

District Slate Mountains, Pinal County

Engineer Lewis A. Smith

Subject: Interview with George Freeman

Mr. Freeman stated that Transarizona Resources is doing their assessment work by drilling. Some development drilling was done prior to this. At the present writing Freeman feels that the new furnaces for the Lakeshore Mill will be obtained before long. The mill is now idle.

' LAKESHORE MINE & MILL

PINAL COUNTY SLATE MOUNTAINS

Transarizona Resources, Inc. has negotiated a Small Business Administration loan with participating banks in the amount of \$650,000. Funds will be spent to install two new furnaces and coolers at Lake Shore oxide copper mine south of Casa Grande, Arizona. This new equipment will bring the daily furnacing capacity to 750 tons which will lower cost per ton treated to the point where a profitable operation is envisaged. Transarizona has developed more than 2,000,000 tons of open pit copper assaying about 1.8 percent. Since this is oxide copper with too much lime for economical acid leaching, the firm has perfected the long known segregation process and successfully operated one furnace to treat 250 tons daily. This proved the feasibility of the process in which ore, salt, and a solid carbon reducing agent are heated to about 750° C. Cuprous chlorides are formed which in turn are reduced to form metallic copper particles on the surface of the carbon. Calcine is then cooled, ground, and copper recovered by flotation. This is one of the first SBA loans granted to a mining company and the industry hopes that this will be a break through for further governmental loans to the minind industry. George A. Freeman of Casa Grande is general manager.

Taken from MINING WORLD, November, 1961, p 23

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JEPARTMENT OF MINERAL RESUJERCES STATE OF ARIZONA FIELD ENGINEERS REPORT

Mine Lakeshore Mine & Mill Date May 9, 1961 District Slate Mountain Dist., Pinal Co. Engineer Lewis A. Smith

Subject Interview with George Freeman and visit to Lakeshore with him.

1.

George Freeman stated that the Lakeshore ore runs 10-12 percent magnetite, so that tests have been run to see what could be done about extracting it, after flotation. These tests show a very good recovery of 65-66 percent iron concentrate by tabling and magnetic iron concentration. He is now running down data on nodulizing or extruding to see if the saving of the magnetite would pay. According to George, the market survey reveals that the Japs are not hurting for iron ore, although they will buy nodulized or pelletized material. The cost of nodulizing may be critical in the project.

A Joy rotary drill is now in operation at the mine, but it is too early to evaluate the results. The drill is now on the north end of the ore zone.

The new furnaces are in the process of manufacture.

PINAL COUNTY

MG WR 5/29/87: Learned that Cyprus Minerals Co is buying the Lakeshore Mine (file) Pinal County from Noranda. Leaching operations were suspended at the mine in March 1987.

RRB WR 5/29/87: On a tip from Mike Greeley, I called Nornada Lakeshore to confirm that they are shut down and that the property is being sold to Cyprus. Mr. John Cline, Chief Metallurgist at Lakeshore reported that Cyprus has completed negotiations with the Tribal Council and barring something unusual will have an agreement with Noranda to take over the property on July 1, 1987. He also reported they quit putting acid on the stopes in February but that they are still producing some copper from mine solutions. He also said that the in situ testing is now on hold but that it would probably resume with Cyprus since it is being done for the Bureau of Mines. Science Applications International Corporation (SAOC) out of McLean, Virginia is conducting this project.

PINAL COUNTY

KAP WR 12/31/82: Vince Gullette from the Phoenix Gazette requested information on the history of the Lakeshore Mine for a news media article.

NJN WR 8/26/83: Tomy Stokes with Noranda reported that they are letting 230 employees go at the Lake Shore Mine as the mine becomes an in-situ leach operation.

CJH WR 10/21/83: Grover Heinrichs (file) reports that Noranda Lakeshore is gearing to an estimated 10,000 T./yr Cu production using an in-situ gallery leach and electrowinning. In July 1983 the labor force was reduced from 250 to 65 people.

RRB WR 5/10/85: Ernest Ahrens, Chief Geologist, Noranda Lakeshowre Mines (f) Cas Grande, Az. visited the office as the first step toward locating large copper ore bodies that may be amenable to in situ leaching methods. Noranda is confident of its in situ leaching capabilities gained through its experience at Lakeshore and is starting a dilligent search for properties where they can apply their expertise. Also Congress has been asked to provide money for research into in situ leaching to be conducted by the Bureau of Mines and Senator DeConcini's office has asked them to estimate the tonnage of "ore" which may be exploited by this method. Nyal Niemuth assisted greatly by explaining to him the various forms of information available in the CRIB and MILS data bases and how to gain access to this information. Mr. Ahrens was expecting to spend months in tedious research that his visit to our office made unnecessary.

Hecla Mining Co. continues to probe their Lakeshore Cu deposit south of Casa Grande. GW Annual Report 6/29/73

MG/WR 3/12/79 - Talked to Mr. Addison Smith, Mining Eng. with Papago Tribe. He believes Noranda plans to produce cathode copper from oxide ore at Lakeshore initially; later the company will develop the sulfide ore body. 4/18/79 a.p.

RRB WR 8/1/80: Talked to John Cline, Chief Chemist at Noranda Lakeshore. He reports that they bedded 7 vats in July, plan to bed 10 more in August and expect to be in full production in October, if copper strike doesn't last long enough to cause an acid shortage. They are currently purchasing sponge iron for cementation and then redissolving the cement to produce pregnant solution to feed the electrowinning cells. Construction of an SX plant should begin about the first of the year and it should be in operation by this time next year.

Abstract from "Arizona Iron Ore Deposits" in IRON COMMODITY file: The Lakeshore Mine, Pinal County, is 30 miles south of Casa Grande and 3 miles east of the Casa Grande-Covered Wells Highway (Sections 24-25, TIOS, R4E). This is a contact metamorphic deposit in which sediments have been replaced by magnetite, chlorite, copper minerals, and others, between monzonite porphyry (possibly granodiorite) and andesite porphyry. The ore averages about 1.75 percent copper and 11-12 percent magnetite. The copper is being separated by the Segregation process. The magnetite may be separated by means of magnetic separation, or gravity concentration, from the flotation tailings. According to George Freeman the resultant iron concentrate of 65-68 percent iron. The tests were run by the Arizona Bureau of Mines, at Tucson. The cost of agglomeration, or pelletizing, as compared to extrusion costs is now being investigated and it appears that this cost may determine the marketability of the material. The Japanese had offered to buy agglomerated or extruded concentrates for around \$10.50 per ton, on board ship, at San Pedro, California. (Transarizona Resources Company, 201 - 4th Street, Casa Grande).

NJN WR 12/24/82: Heather Clisby with Pay Dirt Magazine reported that Noranda is going to an in-situ leach of the Lakeshore oxide ore body. Ms. Clisby will visit the office next week to gather some file data to use as background for her story.

When last visited, the two 15[°] inclined shafts of Hecla Mining Co. at the Lakeshore Mine were 4,800 ft. A station was being cut at 4,700 ft from which the muck will be hoisted to the surface in a 20 ton skip. Four core drills continue to operate west of the shafts and the El Paso Natural Gas Co. plant, which was closed December 31, 1970, is being rehabilitated by Hecla for use as a pilot-plant concentrator. Hecla has moved into the new office-changeroom bldg. GW QR 4-8-71

Went to the Lakeshore Mine of Hecla Mining Co. where Jim Quinlan said the declines were 6000 ft deep and that two development drifts are being driven. One is at the 500 ft level (500 ft above sea level) in the sulfide zone; the other is at the 950 ft level, in the ozide ore, and is being driven up-grade to the 1100 level. Jim showed the \$1,000,000.00 Robbins raise bores which is drilling a 12 ft diameter hole up from the 500 level to the surface for ventilation. Six of these holes will be drilled as development progresses. They will be drilled in pairs; the first two are about 150 ft north of the declines and 150 ft east of the ore body at the surface. Three surface core drills continue to operate and the pilot plant is in operation on sulfide development ore. GW WR 10/26/71

Dir. of Mining - August 1971 - 150 employees.

The Lakeshore Copper Mine of Hecla Mining Company and El Paso Natural Gas continued in development by sinking the two parallel declines and cutting two loading stations. The -15° declines were about 5800 ft. long; stations are being cut at the 500 and 950 levels (sea level elevation). GW QR 9/71

Returned via Lakeshore but due to tire trouble arrived there too late to see any of the supervisory people. GW WR 1/17/72

Development of the Lakeshore-copper deposit 35 miles south of Casa Grande continues by the H_ecla Mining Company. R_ecently an influx of hot water slowed operations until sufficient pumping capacity was installed. Presently two 12 foot diameter holes are being drilled from the mine workings to the surface for ventilation and to accommodate air, water and electrical lines. GW QR 2/72

Went on to Lakeshore where Jim Quinlan says they are drilling drifts and crosscuts in both the oxide and sulfide zones but sinking has stopped temporarily. The south decline is 6300 feet and the north 5900 feet. It was in the north one that the flow of hot water was encountered. 12 foot diameter bore hole has been completed and the second is up about 500 feet when the tool string broke and dropped the bit. This happened also in the first hole when it was up about 150 feet, at which time a new bit was designed. Hecla is milling the sulfide development ore and experiemnting with various Cu recovery processes (unconventional smelting). GW WR 9/28/72

PINAL COUNTY

Went to the Lakeshore mine of Hecla Mining Company. The new office is now occupied. Mr. Quinlen says the twin inclines are approximately 4800 feet and a station is currently being cut on the 4700 level. They are revamping mill for a pilot plant. GW WR 3-15-71

When last visited, the two 15[°] inclined shafts of Hecla Mining Co. at the Lakeshore mine were 4,800 ft. A station was being cut at 4,700 ft. from which the muck will be hoisted to the surface in a 20 ton skip. Four core drills continue to operate west of the shafts and the El Paso Natural Gas Co. plant, which was closed December 31, 1970, is being rehabilitated by Hecla for use as a pilot-plant concentrator. Hecla has moved into the new office-changeroom bldg. GW QR 4-8-71

May 28, 1971

TO: G. Walker

FROM: John H. Jett

SUBJECT:

Trip to Lakeshore mine, Capitol Wire and Cable Plant, ASMOA meetings at Casa Grande and Mesa – May 19 and 20, 1971

To Lakeshore mine of Hecla Mining Co., 30 miles south of Casa Grande. Visited with Herbert Harper, Vice President of Exploration and William P. Johnston, their consultant from Reno. Toured surface facilities with James Quinlan, chief geologist. Equipment noted -

Gardner Denver - 3 drill jumbo, 12 ft. booms with 11 ft. steel change Two Wagner haulage units - Scoop-dumps. Two Unimmog personnel carriers (Mercedes Benz Diesel) Several EIMCO and Wagner LHD Units 1-25 ton capacity inclined Skip

The inclines are down to 5,400 ft. A station was cut on the 3700 to drift into oxide ore body. A second station will be cut on 5700 in order to drift into Tactite (sulfide) ore zone.

The old El Paso plant is modified and ready to receive sulfide ore. Its capacity is approx. 850-1,000 tpd. Foundation is poured and erection started on processing pilot plant. This plant will receive 5 tpd of concentrates (balance of concentrates will be sold). Concentrates will be roasted sulfur pulled out and used for acid to leach resultant oxide. Not verified but assumed the oxide ores that are mined will be either pad or dump leached. Not fully decided as yet.

PINAL COUNTY

Visited Lakeshore, El Paso Office, visit with L.O. Davis. They are mining and treating stockpile material. Visited Hecla office - interviewed Bob Hendricks, project mgr. Shaft sinking is ahead of schedule. FTJ WR 4-10-70

Hecla has set up their plant and started sinking two inclines that will go under the Lakeshore orebody. El Paso Natural Gas Co. is continuing their mining and milling operations at the Lakeshore and will probably do so until they are in the way of Hecla operations. GWI QR 4-1-70

Both shafts are approximately 1500 ft. at this time. The shafts are approximately 100 ft. apart and extend in a westerly direction to the tactite ore horizon about 7200 ft. at an inclination of -15° . The south shaft will give access to two ore conveyor belts; the north one will have a conveyor and a man and material hoist. It is proposed to mine 8000 tpd from the tactite zone and 20,000 tpd from the open-pit working in the oxidized ore. GW WR 5-15-70

Active Mine List May 1970 - 48 men - El Paso - 30 men - Hecla

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The two inclined (-15°) shafts on the Lakeshore copper property were 1500 ft. Their total depth is to be about 7200 ft. These shafts give access to the sulfide zone and will convey about 8000 tons daily when completed. GW QR 7-1-70

Visited Lakeshore operation. Met Alan Disbrow, project geologist, who said the inclines were 2600 ft. deep. At El Paso Natural Gas met Sid Runke, chief metallurgist, who said the plant was handling about 500 tons per day and that it would be phased out in about a year as it is located on a portion of the ore deposit. GW WR 8-14-70

Miro F. Kowburg, senior chemical engineer. D.W. Trapp, has joined Lakeshore copper project in Arizona as senior engineer for the Hecla Mining Co. Skillings 9-26-70

Active Mine List Oct. 1970 - El Paso - 48 men - Hecla - 60 men L.O. Davis, Supt. for El Paso Natural Gas - Robert Hendricks, Mgr. Hecla Mining Co.

Visited Hecla Mining Co. Lakeshore mine where the two declines are about 4100 ft. The single drum hoist and 20 ton skip are now in operation in the north incline. A muckloading station has been cut at 3750 ft. where the skip is loaded by a front-end loader. Cross-cuts between the inclines have been driven at 1100 ft. & 2000 ft. According to Mr. Quinlan a main station and cross-cut will be driven thru the ore deposit at 500 ft. above sea level which would be approximately 5000 ft. down the incline; the shafts will however, be continued to 7200 ft. with crushers & loading pockets below the 500 sea level horizon. A new Butler building is being finished inside for offices & changeroom. The present shopwarehouse-engineering office is being added to for more warehouse space. GW WR 1-22-71

HECLA MINING COMPANY

After some disagreement with allied Golconda Mining Corp., the stockholders of the Hecla Mining Co. of Idaho approved the development with El Paso Natural Gas Co. of the Lakeshore properties south of Casa Grande. An enormous copper orebody has been indicated by drilling. JHS QR 8-1-69

The Hecla Mining Company has announced plans for development of the Lakeshore mine in the September issue of Pay Dirt. $GWI \ QR \ 9-1969$

Hecla Mining Co. was ahead of schedule in its shaft sinking at the Lakeshore mine. FTJ QR 4-3-70

Hecla has set up their plant and started sinking two inclines that will go under the Lakeshore orebody. GWI QR 4-1-70 -

Lakeshore - both shafts are approximately 1500 ft. at this time. The shafts are approximately 100 ft. apart and extend in a westerly direction to the tactite ore horizon about 7200 ft. at an inclination of 15°. The south shaft will give access to the two ore conveyor belts, the north one will have a conveyor and a man and material hoist. It is proposed to mine 8000 tpd from the tactite zone and 20,000 tpd from the open pit working in the oxidized ore. GW WR 5-15-7

When visited the two inclined (-15°) shafts of Hecla Mining Co. on the Lakeshore copper property were 1500 feet. Their total depth is to be about 7,200 feet. These shafts give access to the sulfide zone and will convey about 8,000 tons daily when completed. GW QR 7-1-70

Visited Hecla's Lakeshore operation and met Alan Disbrow, project geologist, who said the inclines were 2600 feet. Wrote Mr. Disbrow enclosing report on Standard Cu property. GW WR 8-14-70

Visited Hecla Mining Co. Lakeshore mine where the two declines are about 4100 feet. The single drum doist and 20 ton skip are now in operation in the north incline. A muck-loading station has been cut at 3750 ft. where the skip is loaded by a front-end loader. Crosscuts between the inclines have been driven at 1100 ft. & 2000 ft. According to Mr. Quinlan a main station and crosscut will be driven thru the ore deposit at 500 ft. above sea level which would be approximately 5000 ft. down the incline; the shafts will however, be continued to 7200 ft. with crushers & loading pockets below the 500 sea level horizon. A new Butler building is being finished inside for offices & changeroom. The present shop-warehouse-engineering office is being added to for more warehouse space. GW WR 1-22-71

Hecla still has 4 core drills operating in the proximity of the deposit and several geologist working in general area of Lakeshore. They are presently testing a water well on the west side of the Sells highway, approximately 3 miles from the mine. GW WR 1-22-71

PINAL COUNTY

Visited the Lakeshore Mine - short visit with L. O. Davis. Interview with mine foreman, they are milling stockpiled material at 600 tpd rate. Said they'd have to start mining soon. FTJ WR 12/5/69

James H. Hunter is manager of the Lakeshore Project., Robert S. Hendricks is Project Engineer, James Quinlan, Chief Geologist, assisted by Alan E. Disbrow, and Daniel L. Munter - on the site for several months has been David J. Ryzak, Junior Geologist.

Mining Engineers are Dave R. Shoemaker, James Lower and Peter A. Gillette. Supervisory personnel are Andy Kannegard, Grant Eslick and Kenneth Jensen. Taken from Pay Dirt 12/1969

El Paso has 45 men still mining and milling at Lakeshore - Mining by Sundt - intermittant. Hecla has 60 on payroll - shafts really going down. GWI Note 2/19/70

Mine Visit to Lakeshore Mine : El Paso operations may continue thru year. Hecla operations 1 mile SE of Pit. GWI WR 2/21/70

El Paso Natural Gas Company continues production from the Lakeshore mine. Announcement of management personnel by Hecla has been made. Two large inclined shafts minus 15 degrees will be started about a mile southeast of the present mine and driven under the orebody. GWI Quarterly Report 2/27/70

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PINAL COUNTY

After some disagreement with allied Goldonda Mining Corp. The stockholders of the Hecla Mining Co. of Idaho approved the development with El Paso Natural Gas Co. of the Lakeshore properties south of Casa Grande. An enormous copper ore body has been indicated by drilling/ JhS. 4th Quarterly Report 8/1/69

Active Mine List Oct. 1969 - 46 men - L.O. Davis Supt. for El Paso Natural Gas Co.

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An exploration shaft is to be put down at the copper discovery of El Paso Natural Gas Co. near Casa Grande, Ariz. late in 1969. The company reports that estimates of copper ore present have been increased to 150 million tons averaging 0.87 percent copper, up from a previous estimate of 96 million tons. The exploration shaft is expected to permit the company to better evaluate the deposit.

Taken from Mining Congress Journal Jan. 1969

Visited Lakeshore mine south of Casa Grande, Mill was running and 4 drills operating GWI WR 2/22/69

Active Mine List April 1969 - 50 men - L.O. Davis, Supt.

PINAL COUNTY

Mr. Horst called from El Paso, said that at the Lake Shore L. O. Davis is Supt. Darỳ Lewis is metallurgist and J. \mathcal{F} . Snider is in charge of pit operations. They have 45 men working had kiln trouble so are putting in a soaking plant. Address is Box JJ in Casa Grande.

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Note LP 7/31/68

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Active Mine List April 1968

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

FTJ WR 5/12/67

The southeastern part of the pit is being further stripped, the northeastern part having previously been completed. Sundt MM Construction Co., 440 S Park Ave., Tucson, is doing this work as well as the revamping of the mill. Much of the old Mill has been torn out and some of the replacement work completed. It is now thought that it will require at least 4 more months to ready the plant for operation. About the same labor force (as in February) is being used. El Paso has only 3 men on the ground. (Lewis is Metallurgist) and Jim Snyder is in charge of the exploration drilling which is contracted to Joy Mfg. Co. Two drills are operating in the Pit vicinity. This drilling is calculated to more closely evaluate the reserves.

According to Lewis, El Paso is closel(possibly 2 weeks away) to ready to begin leaching in the Kingman area. (Emerald Isle). The ore will be delivered from the pit to the mill by means of a belt conveyor.

LAS Visit and Conference with D. Lewis of El Paso Natural Gas Co. 5/17/67)

Visit and Conference with Darl Lewis and Frank Snyder (Exploration) 6/6/67

The stripping program is now completed but two Joy Mfg. Company drills (one is a rotary and the other is a diamond drill) is still working on the Pit-periphery.

Delays in the arrival of parts for existing equipment is slow and this has pushed the date of operations a month later. Parts for the crushing equipment, had just arrived. Nearly all new footings have been pured. The Rotary furnace (cement burning type) is ov er 200 feet long, and had to be sectionalized for shipment. It will have to be put back together by welding strap iron around to joints. Meanwhile, 6 conical steel ore bins have been erected ahead of the primary and secondary crushers and between the fine crushing unit (tornado) and the kiln. The old ball mill is being connected to a rod mill (this requires a new head that is now being cast). The work now is concentrated on several small jobs until the ball mill head and the rotary are received.

Lewis felt that it would be early fall before they could start operating. He also said that they were utilizing some equipment from the Tuba City Uranium Mill and that the rehabilitation of **e**ld equipment consumed much time with costs comparatively heavy. (This usually is the case where the labor cost is high).

MEMO LAS 6/6/67

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Active Mine List 4/1967 30 men working

PINAL COUNTY SLATE MOUNTAINS

Conference with watchman 6/7/66

According to him, the last work was done 3 years ago, by El Paso Natural Gas Co., when they check-drilled parts of the orebody and obtained a reserve figure of about 2,000,000 tons of minus 2 percent ore. They are also involved with Narraganset in the present setup. It has been rumored that El Paso would operate the mine and mill in event that something materializes. He said that Narraganset reputedly paid \$750,000 for it.

MEMO LAS 6/7/66

Mr. Harold Horst, Mining Engineer for El Paso Gas visited office and informed -El Paso Gas is involved in the Lake Shore property south of Casa Grande.

FTJ WR 8/5/66

Conference with John Reynolds, Chief Engineer, Minerals Division, El Paso Natural Gas Co., and watchman at Lakeshore 9/21/66.

John Reynolds said that his company had dome some geophysical work and had come up with a couple of interesting anomalies one of which had indicated sulphides. This may be drilled in the near future. According to the watchman at the Lakeshore, a survey party had been in area in the past few weeks.

MEMO LAS 9/21/66

Lakeshore Mine & Mill - Slate Mtns, Pinal Co.

Visit and Conferences with Jim Snyder, Field Engineer and Walter Tahrie, caretaker

Two drills are in use at the Lakeshore, one being down 740 feet in mineralized ground and the other just preparing to spud in soon. Both are Joy Mfg. Co., rigs and are operated by them. One hole (the 740 foot deep one) is just west of the primary crusher bin and ramp at the mill. The other is to be near the contactzone, and about 400 feet southeast. Both are apparently to see if there might be an ore extension to the SE of the present pit. Lakeshore has obtained their sought after leases from the Papago Reservation people and it is possible that some probing, in the near future, will be done on a few additional anomalies.

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MEMO LAS 12/6/66

DEPARTMENT OF MINERAL RESOURCES state of Arizona field Engineers Report

Mine	LAKESHORE MINE & MILL	Date	January 24, 1963
District	Slate Mountains District, Pinal County	Engineer	Lewis A. Smith
Subject:	Interview with Nate Coxon, City Marshall,	Casa G	rande, 1-23-63

According to Mr. Coxon, Transarizona Resources is reported to have been refinanced and is now involved in a court suit over transfer of stock that is contingent to the deal. It seems that a certain party agreed to transfer Transcanadian Resources stock to the parties who will finance the Transarizona. He has not done this to date so Transarizona will bring suit to force him to fulfill his agreement. This rumor was partly verified by the shovel runner at Orizaba. It was felt that once this is resolved, Lakeshore will resume operations.

Conference with George Freeman, at Casa Grande 5/20/64

According to Freeman, Lakeshore had a watchman at the plant. He also stated that he had two feelers from firms who appeared to be interested in taking over the operation, but he was not "counting chickens before they hatched."

MEMO Lewis A. Smith 5/20/64

Mr. Freeman reported that there were no new developments as regards Lakeshore.

LAS - Conference with George Freeman - Sept. 16, 1964.

Mr. George Freeman stated that the Lakeshore was idle.

LAS Conf. Casa Grande 1/19/66

Mr. Sherwood Owen reports, "that the Trans-Arizona Mortgage had been sold to a private outfit, and the SAB & T Co. and the U. S. Government were out".

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SEE: G. W. Irvin WR ending 2/5/66

According to Richard Clemans, Casa Grande attorney, 'Narraganset Wire & Cable Company had contacted him for some more legal work. They are reported to have offered \$750,000 for Lakeshore, but he did not know the conditions. G. W. Irvin reported on this earlier.

LAS MEMO 5/18/66

LIZONA DEPARTMENT (MINIAL RESOURCES Mineral Building, Fairgrounds Phoenix, Arizona

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	Address:Box 493 Casa Grande 85222
2.	Mine: Lakeshore 3. No. of Claims - Patented Unpatented
1 .	Location:Slate Mountains South of Casa Grande
5.	Sec ²⁵⁻²⁶⁻³⁵⁻³⁶ unsurveyed Tp_4 <u>&5E</u> Range_10S 6. Mining District
7.	Owner: Heela Mining Co & El Paso Nat. Gas.
3.	Address:Box 494 CasaGrande
Э.	Operating Co.:Hecla
).	Address: Same
	President:12. Gen. Mgr.:James Hunter
	Principal Metals: Copper 14. No. Employed: 60 Hecla 45 El Paso
5.	Mill, Type & Capacity:
). 7.	(d) Production (e) Development (e) Ratetpd. New Work Planned: The inclined drifts or flat shafts are down about 300' each.
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3.	Miscl. Notes: El Paso is still runing the mill & at times having Sundt mine ore
	from the Oxide pit, which will probably continue during 1970 until it is in
	the way of operations. James Hunter Mgr. Robert S. Hendicks Proj. Eng. Paul Kenyon Sr. Mech Eng. Allen Disbrow Sr. Geol. Jim Quinlan Ch. Geol., Dave Ryzak & Dan Mat Munter Jr.G Offives are in large trailers. A large building for shops has been constructed.
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Date:___

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(Signature)

(Field Engineer)

STATE OF ARIZONA

DEPARTMENT OF MINERAL RESOURCES MINERAL BUILDING, FAIRGROUNDS PHOENIX 7, ARIZONA

July 16, 1965

Mr. G. W. Draper, Bond Department, Manager Prudence Mutual Casualty Co 162 North State Street Chicago, 1, Illinois

Re: Lake Shore mine, approx. 30 mi So. Casa Grande, Ariz. Mining property owned by Trans-Arizona Resources, Inc.

Dear Mr. Draper:

Your letter of July 12th requests from us "any basic data. . . as to the potential of this mine in the matter of producing, or that would in turn develop copper concentrate." The letter also says that you have been asked to consider writing a surety bond in connection with the reactivation of this mining property.

It is likely that you have been given the following papers or references thereto:

Copper Segregation at the Lakeshore Mine by G.A.Freeman, Carl Rampacek, and L.G.Evans, a paper submitted at the annual meeting of the American Institute of Mining and Metallurgical Engineers in 1961.

Treating Oxidized and Mixed Oxide-Sulphide Copper Ores by the Segregation Process, by Carl Rampacek, W. A. McKinney, and P.T.Waddleton; U.S.Bur. of Mines Report of Invegtigations No. 5501, 1959.

Investigation of the Lake Shore Copper Deposits, Pinal County, Arizona; U.S.Bur. of Mines Report of Investigations No. 4706, July, 1950

You also may have a paper on segregation of Copper Ores by Direct-Firing Methods, by W. A. McKinney and L.G.Evans; U.S.Bur. of Mines Report of Investigations No. 6215, 1963.

In the Bureau of Mines Minerals Yearbook, 1963, Volume I, the first paragraph under Copper Technology reads, "The Bureau of Mines published results of research that demonstrated the **feas**ibility of recovering copper from oxidized ores by the segregation process using a direct-fired metractory lined rotary kiln.

Published and hearsay information which we have received, lead us to believe that in so far as the extraction of the copper from the mined ores is concerned, the segregation process promises reasonably low costs. We do not, however, have sufficient knowledge of the Lake Shore deposit and the costs of resumption of operations to be of much help to you.

We do have a copy of an old paper (1933) Economic Geological Reconnaissance of Casa Grande Mining District, by J. B. Tenney, published, by permission of the Arizona Bureau of Mines, by the Casa Grande Chamber of Commerce. Should you wish a copy of the three pages relating to the Lakeshore property we would photocopy them for you.

The U.S. Bureau of Mines reports are available, if in print, from the Publications Section, U.S. Bureau of Mines, Washington, D.C.

We suggest that your mining engineer be allowed sufficient time and money to thoroughly examine, study and report on all available data prior to your giving surety as to successful results of proposed reactivation of the Lakeshore property.

Yours very truly,

FRANK P. KNIGHT, Director.

FK:p

November 19, 1943

Mr. Frank M. Leonard Casa Grande, Arizona

Dear Mr. Leonard:

I have submitted report on your property, the Lake Shore Mine, to A. M. Riedesel, who, I believe, will be acting as a broker with particular clients looking for a good sized copper property.

Yours very truly,

J. S. Coupal, Director

JSC:LP

January 21, 1943

MEMORANDUM

SUBJECT: Lake Shore Mine

TO: Bill Broadgate FROM: J. S. Coupal

I am enclosing the reports on the Lake Shore copper. There is evidently a large tonnage of ore blocked out, but you will note in our production possibility survey by George Ballam that this is a long-time project and one that requires metallurgical research for ore treatment, as the ore contains the copper in the form of the carbonate and silicate.

I have called this property to the attention of private parties, but the metallurgical problem had them stumped. November 18, 1942

Mr. George F. Potts 737 South Cloverdale Avenue Los Angeles, California

Dear Mr. Potts:

At the request of Mr. J. S. Coupal I am enclosing a report on the Lake Shore Mine

which he hopes will be of interest to you. Mr. Coupal is out of town at the

present time.

Yours very truly,

Secretary

Enc.

' Lake Shore mine

MEMORANDUM

Po:	Director, George A.	Dept. Mineral Resources Ballam	
From:	George II.		

I have mailed, under separate cover, a copy of 'Economic Geological Reconnaissance, Casa Grande Mining District, J.B.Tenney' in which there is a complete report on the Lake Shore mine.

He Ballam

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DEPT. MINERAL GUROVEGES RECEVEN NOV 10 1942 PHOENIX, ANILONA

6-19-42	
0-19-40	DEPT. MINERAL RESOURCES
MEMORANDUM	RECF VEU LAKE SHORE
To: Director, Dept. Minera	I Resources ALIONA
From: George A. Ballam	PHUEN7/3)

This group of 47 claims is situated on the Covered Wells highway about 34 miles SW Casa Grande. It is owned by a company 95 percent of the stock of which is owned by Frank Leonard of Tucson. The principal values are copper.

There are four levels in the shaft, the lowest of which is under water. At least 1000' of drifts. Over one million tons of ore have been blocked out, averaging 2.4 Cu, chiefly chrysocolla and carbonates. Mr. Bishop of the U.S. Bureau of Mines recently completed an examination of the property. No work is being done at present. Buildings and equipment have been removed

Between 1917 and 1929 280,000 lbs. of Cu were produced with a value of \$65,000.

George a Dallam

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SELECTED NEW CONTRACTS, INVESTMENTS, EXPANSIONS, AND EXPLORATION ACTIVITIES: FOREIGN AUGUST - SEPTEMBER 1983 Minerals & Materials 1983

AUGUST - SEPTEMBER 1983

COUNTRY Commodity and Company Operation and/or Location		Action or Event	Notes	
SOUTH AFRICA, REPUBL	LIC OF			
MAGNESIUM				
Castle Lead Works (NATAL) (Pty.) Ltd.	Isithebe, 60 miles north of Durban.	A plant that will use an Israeli process for recovering secondary magnesium metal from scrap magnesium- aluminum alloys is reportedly under construction and expected to be operational by January 1984.	The plant will provide a large portion of South Africa's magnesium requirements.	
SOVIET UNION				
FERROMANGANESE Nikopol Steel Complex. Zestafon Steel Works.	4 furnaces in Ukrainian 5.5. R. 2 furnaces in Georgian S.S.R.	Installing 6 Japanese-made, 130,000- tpy submerged-arc furnaces close to the Soviet Union's largest manganese mines.	The expansion apparently will provide excess ferromanganese capacity for the Soviet Union and Eastern Europe and could add to the current oversupply of the manganese ferroalloy.	
THAILAND				
Sea Minerals Ltd.	Offshore Phuket Island.	Announced the discovery of a major offshore tin deposit. Tests are to be performed to determine ore grade and reserves.	Thailand is currently the 4th leading tin producer in the world. Discovery was made in deeper waters than usual. Exploitation would require very sophisticated dredges.	

SELECTED CLOSINGS, POSTPONEMENTS, LAYOFFS, AND PRODUCTION DECREASES: UNITED STATES AUGUST - SEPTEMBER 1983

Commodity and Company	Operation and/or Location	Action Taken, Employees Affected	Effective Date	Duration	Notes
ANTIMONY					
Antimony Processors, Inc.	Moscow, TN.	Shut down sodium antimonate facility.	July.	Permanent.	
COPPER					
Inspiration Consolidated Copper Co.	Inspiration, AZ.	Laid off 225 workers because of a lack of copper concentrate for the smelter.	August.	Indefinite.	Efforts are continuing to obtain material until January, when a Duval Corp. contract to supply Inspiration with a substantial amount of concentrate becomes effective.
Noranda Lakeshore Mines, Inc.	South of Casa Grande, AZ.	Shut down underground mine and vat leaching operation. Laid off 250 workers.	Sepbember.	do	About 65 workers remain to operate the in situ leaching operation and the solvent- electrowinning plant.
Heading	Sub-Heading	Category	Lakeshore Mine	Lower Ox-Hide Mine	Santa Cruz S
-------------------	--	------------------------------------	--------------------------	--	------------------------------
Technical factors	Geology	Tonnage	21,000,000	40,000,000	800,000,000
		Shape	?	elliptical wedge 1.800 ft by 1.400 ft	6,000 ft by
		Grade	1.3 total copper	0.3 pct total copper 0.15 pct acid sol. Cu	0.43 pct tot
		Depth	?	exposed at surface	1,500 ft to
		Thickness	? _	up to 500 ft	300 ft to 75
		Mineralogy	?	chrysocolla, malachite, azurite	chrysocolla, chalcocite.
	میر با	Mineral Distrib.	fracture fillings	fracture coatings and fillings, staining fldsor	ave. distanc broken fract
		Geol. Structure	?	?	5 fractures
	Fluid Flow Management	Permeability	?	?	?
	nanagement	Porosity	?	20 pct	?
		Solution contain- ment barriers	?	faults form barriers on east, west, and bottom	?
	Chemistry (laboratory tests)	Metal recovery	?	75 pct of acid soluble in dump leaching	74 pct to 90 leaching tes
	, and a set of the set	Metal Conc. vs time	?	1.6 gpl ave. for ferric cure process	?
		Acid consumption	?	8.3 to 9.5 1b H2SO4 per 1b of copper recovered	1.5 to 4.5 l lb of copper
Logistic factors	Access	Roads	yes .	yes	yes
		Power	yes	yes	?
		₩ater	yes	yes	?
	 Facilities	Pregnant sol. proc.	SX-EW	SX-EW and cementation plant	no
		Support capabilities	shop, warehouse, offices	shop, warehouse, office, assay, computer, acid	no
	Environmental	Baseline envir. monitor	?	?	?
		In situ mining permit	class V experimental	no	no

USEM DATA 1985

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SELECTED NEW CONTRACTS, INVESTMENTS, EXPANSIONS, AND EXPLORATION ACTIVITIES: UNITED STATES

Commodity and Company	Operation and/or Location	Notes
ALUMINUM		
Advanced Aluminum Products Inc.	Hammond, IN, and other locations.	Began production at its new minimill and announced plans to build 2 more aluminum minimills. Company owners hope to duplicate the success that the steel industry has had with this type of operation. Minimills typically obtain 90% of their raw material from scrap and produce a narrow product line. The company's new mills will have a capacity of 100 million lb/yr each and will produce coiled sheet for the building products industry. Construc- tion is expected to begin this year on 1 mill in the Southeast, and the 2d
		mill, to be built in the Southwest, should be in production in late 1988.
Commonwealth Aluminum Corp.	Lewisport, KY.	Announced that it will invest \$20 million to modernize the hot line at its 450-million-lb/yr rolling mill, converting the operation to full computer control. The mill primarily produces non-heat-treated sheet, plate and coil, and some rigid container stock. The project, expected to begin in May 1986, is scheduled to be completed in the fourth quarter of 1987.
Ohio River Associates.	Hannibal, OH, and Burnside, LA.	Agreed to buy Ormet Corp. from Consolidated Aluminum Corp. and Revere Copper and Brass Inc. Both companies had been seeking to sell their inter- ests in Ormet in order to stem losses resulting from high production costs. Ormet operates a primary aluminum smelter in Hannibal, OH, and an alumi- na plant in Burnside, LA. The smelter has been operating at 100% of its 27,000-st/yr capacity; production at the alumina plant was halted in December.
CEMENT		
Southwestern Sunbelt Cement.	Headquarters, Phoenix, AZ.	Southwestern Portland Cement Co. of Los Angeles, CA, has formed a joint venture with the Mexican firm, Cementos Mexicanos, the largest cement producer in Latin America, to market both Mexican and U.S. cement in the United States. The new company, owned equally by the two firms, will serve markets in San Diego, CA, Phoenix, AZ, Albuquerque, NM, and El Paso, TX.
Independent Cement Co.	Catskill, NY.	Announced plans to open up major new quarries in Catskill. The company plans to mine 590 acres of a 1,500-acre mining tract. The remainder would be used for stockpiling, a new aggregate processing plant, and ad- ministrative buildings. The company is drawing up a draft environmental statement.
CERAMICS		
Aluminum Company of America (Alcoa).	Latrobe, PA.	Purchased a majority interest of Pakco Industrial Ceramics Co. Alcoa plans to use its advanced ceramics technology developed over the past 2 yr at a cost of \$20 million to produce high-performance ceramics such as titanium diboride and silicon carbide.
CLAY		
Engelhard Corp.	Seneca, SC.	Began construction of a plant to produce custom catalysts for manufacturers of industrial, consumer, and pharmaceutical products. The \$25 million facil- ity is expected to employ 200 people.
Glen-Gery Corp.	Reading, PA.	Mining resumed after a 4-yr zoning dispute was settled. Glen-Gery agreed to restore mined land to its original condition, protect the ground water, and pay \$10,000 to Lower Heidelberg Township. The Township agreed to enlarge the area Glen-Gery is allowed to mine.
COPPER		
Copper Range Co.	White Pine Mine, White Pine, MI.	Started reheating the No. 2 reverberatory furnace, which had been shut down since 1982. The company plans to begin smelting concentrates from the mine, which is producing ore at the rate of 8 million lb/month recoverable copper.
Magma Copp e r Co.	San Manuel, AZ.	Announced plans to start its new \$70 million project by midsummer. The project includes a 22,000-mt solvent extraction electrowinning plant and associated 83-acre plastic-lined leach pad and drainage system. The plant incorporates new technology including stainless steel starter sheets and a patented gasket system for minimizing acid fuming.
Noranda Lakeshore. 4	Noranda Lakeshore Mine, AZ.	Announced plans to begin production by midsummer from experimental in situ leaching of oxidized copper ore from the deeper ore body. If successful, the new technique would give the mine a lifespan of 30 yr at current costs of less than 50¢/lb copper.

INRM " Annerals+ Materials" April /May 1986

Arizona Department of Mines and Mineral Resources Verbal Information Summary

Date: October 20, 1995

Engineer: Nyal Niemuth

Um.

Notes from talk by Jeff Clevenger President, Cyprus Climax Metals Co. to Maricopa Section SME on 10/19/1995.

The talk reviewed Cyprus' copper and molybdenum operations worldwide during the last couple of years, with a focus on cost cutting activities and modernization projects. Below are some comments on the Arizona operations.

General Comments: Cyprus company goal: to significantly increase productivity, reduce the number of employees. How? eliminate unproductive tasks, institute a bonus system for every employee, share cost/price information. At Sierrita the first year of this system resulted in a 20% bonus.

Other goals: 1) invest and modernize the mines. Replace the truck/shovel fleet with 240 ton trucks and 50 cubic yard shovels, 2) increase reserves, 3) produce copper at a cost of 60 cents per pound (at \$3 LB molybdenum credit.) Through the end of 1994 73% of the company's truck fleet has been replaced. 11 more trucks replaced since then. The company has achieved a 50% increase in tons milled per man shift and a 50% increase in copper produced per employee. Reserves were increased by raising the copper price used in 1992 from \$.65 to \$.90 per pound. and the purchase of El Abra in 1994. When the grade turned out to be lower at El Abra Chile, they got the Chilean government to triple the area of the concession (future exploration potential) and grant a huge water allotment to the mine. In moly they were able to cut out \$30 MM, mainly through the AMAX merger.

Comments on individual Arizona mines:

Bagdad (f) Yavapai Co. A 1 billion ton resource of 0.38 Cu and 0.028 Mo exists. A new technology, a water flush crusher was installed that takes 20% of oversize for autogenous mill, water flushes fines to floatation circuit. This increased capacity from 75,000 to 80,000 ton per day.

Sierrita (f) Pima Co. CRU International rates Sierrita as the most efficient copper mine in the world and it operates at the lowest grade for a milling operation, 0.28%. A current experiment at Sierrita is a 50-50 joint venture between Cyprus and the vendor. It involves one set of high pressure rolls used for crushing. With it a higher percentage of fines go directly to float cells without grinding. It appears 40% of product may bypass the ball mills. The cost of maintenance on the rolls is still unknown and will be a deciding factor in their success.

Cyprus received \$9 per pound for moly in the 2nd quarter of 95, resulting in a cash cost of producing copper of \$.07 per pound. Sierrita has both an moly roaster as well as a leach circuit to remove copper from off specification concentrates.

Twin Buttes (f) Pima Co. Cyprus is studying Twin Buttes as underground mine but its iffy as it is high cost even with the high 1.75% Cu grades. Part of the problem is that the ore isn't compatible with the ore at Sierrita so it requires a separate circuit or its own mill.

Lakeshore (f) Pinal Co. Cyprus bought the property to get the roaster due to a worldwide shortage of smelting capacity at the time, now the roaster is shutdown. The property has a 600 MM ton leach resource at 0.5% Cu, but it has a high acid consumption. As an open pit heap leach it can produce 40 to 50 MM lb. per year but at a high cost. A feasibility study is underway to see if it remains a permanent producer.

Inspiration [aka Miami (f)] Gila Co. Cyprus bought the property to acquire the smelter and refinery. When first operated SRP was able to provide cheap electric rates for the electric furnace. When the electric went up Cyprus installed a ISA melt furnace that initially had problems with the off gases hood. A redesign of the hood making it vertical (less heat build up) and increasing the temperature and pressure of the cooling tubes was completed in February of 95 and there have been no further problems. A \$280 MM was invested in ISA technology for the electrolytic refinery (annual capacity of 150 MM lb). It uses stainless steel starter sheets. The new technology results in a savings \$.02 per pound at the refinery and overall the refinery is now about \$.05 per pound cheaper than a custom facility.

Mineral Park (f) Mohave Co. Installed a portable SX-EW plant. In situ leach research project is underway.



MOMMON AKENDANE (4)

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Telephone 303-371-0380 Telex 45-0217

AMERICAN MINE SERVICES INC. MINE MISPECTOR

4705 PARIS STREET, DENVER, COLORADO 80230

OCT (4 1984

5810 E. 77TH AVE, COMMERCE CITY CO 80022 303-289-4281

October 1, 1984

OFFICE OF STATE MINE INSPECTOR 705 Capitol Tower Phoenix, AZ 85007

That!

ATTENTION: Mr. James H. McCutchen

Dear MR. McCutchen:

Pursuant to our phone conversation of 10/1/84, American Mine Services Inc. intends to have an underground core drill of our manufacture on site at the Noranda Lakeshore Mine near Casa Grande, Arizona on October 15, 1984.

DRILL SPECIFICATIONS:

CM SUPERDRILL NO. 333 - Diesel Hydraulic ENGINE MAKE: Deutz F6L912W, 78 HP at 2300 RPM, Serial #5847419 LAST APPROVAL DATE 3/30/82 at 11,000 CFM per ARS 27-365 NUMBER 21

SUPERDRILL MK II FEED FRAME Serial # 900-2 USA PAT 3951216 USA PAT 3992019

FIRE SUPPRESSION SYSTEM:

Deluge Type System (101) plus a 20# ABC dry type chemical extinguisher.

EXHAUST:

Englehard Platinum Wire PTX Converter Model 6 DF

The operator of this unit will be Mr. Ben Palin.

The President of American Mine Services, Inc. is Mr. John C. Folinsbee.

Mr. James H. McCutchen October 1, 1984 Page 2

I will be in touch with your office for the emission tests.

Sincerely yours,

AMERICAN MINE SERVICES; INC.

John Klundt

JOHN KLUNDT, Field Superintendent Diamond Drilling

JK:k

cc: A.T. Armstrong, Manager, Drilling

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88/16059 Joe-

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MAR 0 13 1988

February 29, 1988

FL#4199-03

Office of State Mine Inspector State of Arizona 1616 W. Adams Suite 411 Phoenix, Arizona 85007-2627

Attention: Mr. James H. McCutchan

Reference: Cyprus Casa Grande Corporation

Dear Mr. McCutchan:

Notice is hereby given that The Industrial Company of Steamboat Springs, Inc. (T.I.C.) has commenced work on the repair and refurbishment of the Roaster and Acid Plant Circuit at The Cyprus Casa Grande Corporation Mine located approximately 30 miles south of Casa Grande, Arizona.

The approximate duration of said job will be four to five months.

Sincerely,

Michael P. McGowan Field Engineer

MPM/s11

CC: Mike Garfield/Cyprus Bob Dusbabek/T.I.C. Jobsite File

P.O. Box 774848 Steamboat Springs, Colorado 80477 (303) 879-2561

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STATE MINE INST

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Office of State Mine Inspector

705 West Wing, Capitol Building Phoenix, Arizona 85007 602-255-5971

NOTICE TO ARIZONA STATE MINE INSPECTOR

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In compliance with Arizona Revised Statute Section 27-303; we are				
submitting this written notice to the Arizona State Mine Inspector				
(705 West Wing, Capitol Building, Phoenix, Arizona 85007) of our				
intent to start/stop (please circle one) a mining operation.				
COMPANY NAME Drilling Services Company				
CHIEF OFFICER James L. W.++				
COMPANY ADDRESS 9002 SHORDY Dr. Tempe Az				
COMPANY TELEPHONE NUMBER 602 - 893 - 2001				
MINE OR PLANT NAME Noranda Lakeshore Mines				
MINE OR PLANT LOCATION (including county and nearest town, as well as directions for locating by vehicle)				
Noranda Lake Shore Mine (A) South of Casa Grande.				
TYPE OF OPERATION Dr. II. PRINCIPAL PRODUCT				
STARTING DATE 11 15 85 CLOSING DATE				
DURATION OF OPERATION 4 To 8 Weeks				
PERSON SENDING THIS NOTICE James Witt				
TITLE OF PERSON SENDING THIS NOTICE District Manager				
DATE NOTICE SENT TO STATE MINE INSPECTOR				

*A.R.S. Section 27-303 NOTIFICATION TO INSPECTOR OF BEGINNING OR SUSPENDING OPERATIONS: When mining operations are commenced in any mine or when operations cherein are permanently suspended, the operator shall give written notice to the inspector at his office prior to commencement or suspension of operations.

ONE 271-5971

RECEIVED

OCT 02 1984

DEPT. MINERAL RESOURCES PHOENIX, ARIZONA

NORWON CARESTANCE MINE A

HOME PHONE 268-2447



State Mine Inspector

Verne C. McCutchan PHOENIX, ARIZONA 85007

STATE MINE INSPECTOR SEP 1 4 1984

NOTICE TO STATE MINE INSPECTOR

In compliance with Arizona Revised Statute 27-303, we are hereby submitting State Mine Inspector, of our intent to this written notice to start/stop a mining operation.

COMPANY NAME J. S. Redpath Corporation

MAILING ADDRESS P. 0. Box 27328

fani.

CHIEF OFFICER AT ABOVE ADDRESS R. S. Hendricks, Executive Vice President

.

PERSON SENDING THIS NOTICE B. F. Harvey, Safety Director

TYPE OF OPERATION Conveyor Removal

CLOSING DATE 9/21/84 approximately STARTING DATE 7/23/84

DURATION OF OPERATION Approximately two (2) months

NUMBER OF EMPLOYEES Seven (7)

Give exact description of location of this operation (including directions for locating by vehicle).

Noranda Lakeshore Mines, Inc.

Any operation found operating without sending this notice will be charged with a misdemeanor.



VERBAL INFORMATION SUMMARY

Date of Information: 02/08/93

AzMILSNumber:

By: Nyal J. Niemuth, Mining Engineer

Information from:	Don Hammer
Company:	Formerly Newmont exploration manager
Address:	P. O. Box 1120
City, State, ZIP:	Oracle, AZ
Phone:	602-896-9346
MINE:	Vekol Hills Project
ADMMR Mine File	Vekol Hills Project
County:	Pinal

SUMMARY

Disposition of Vekol Project Drill Core

Mr. Hammer reported that at the termination of Newmont's lease of the Vekol Hills property with the then Papago Indian Resevation that all drill core and cuttings were transferred to the tribe. The tribe had to provide a facility. Noranda had returned the Lakeshore deposit to the tribe and since there were buildings on the property they decided to have the core transfered there. Mr. Hammers staff moved all the material to the the Lakeshore mine's hoist house.

HECLA MINING COMPANY

P. O. BOX 320 WALLACE, IDAHO 83873 (208) 752-1251

May 31, 1978



TO THE SHAREHOLDERS OF HECLA MINING COMPANY

The text of a press release, jointly made by Hecla Mining Company and The Superior Oil Company on Tuesday afternoon May 30, 1978, follows:

"In a joint press release issued March 14, 1978, The Superior Oil Company and Hecla Mining Company announced an agreement in principle under which Superior would acquire a participation in the Lakeshore copper mine near Casa Grande, Arizona, as well as a substantial stock interest in Hecla Mining Company. The companies jointly announce today that Superior has elected, following completion of its investigation of Hecla's properties and operations, to withdraw from the proposed transactions outlined in the agreement in principle."

I was informed of The Superior Oil Company decision to withdraw from the transactions outlined in our Memorandum of Agreement, dated March 14, 1978, by telephone early yesterday afternoon.

My understanding of Superior's reason for termination of the agreement is that they are reluctant to assume cost of Hecla's obligations at the Lakeshore copper mine in Arizona.

Insofar as we have been informed by Superior, or have been able to determine ourselves, Superior's investigations did not disclose any factors which had material or adverse effect on the value of Hecla's assets as represented to Superior. On the contrary, and to the best of our knowledge, Superior's investigation found all facets of Hecla's business to be as Hecla had represented prior to the agreements reached March 14, 1978.

As we have previously related to you, the substantial losses at the Lakeshore Mine have resulted in a serious drain on the Company's financial resources. It was necessary in early April to reach an agreement with the Company's lending banks to amend the Credit Agreement to increase the credit line to \$56,339,000 and to defer the first payment of principal to July 1, 1978, when \$6,839,000 will be due. We will now request a further extension of this date from the Banks.

In view of its financial problems, Hecla has been engaged for more than a year in efforts to find a method by which the burden of its Lakeshore Mine expenditures could be eased and the debt servicing requirements under the Credit Agreement reduced. After exploring various alternatives, agreements were reached with The Superior Oil Company which appeared to be of benefit to both companies. It is unfortunate that Superior has now decided to withdraw.

Since verbal agreements were reached by Hecla and Superior, a period of nearly 3 months has elapsed. During this crucial time efforts have been directed toward working with Superior's investigative team, drafting agreements, preparing a proxy statement, and re-negotiating terms of the Bank Credit Agreement.

With continuing assistance from our financial advisors, Lehman Brothers Kuhn Loeb Incorporated, we must now consider what other actions may be taken by the Company. We will report to you promptly when decisions are reached.

W. H. LOVE President and Chief Executive Officer Hecla Mining Company

EXPLORATION DEPARTMENT-CASA GRANDE PROJECT 734 East Laurel Drive Casa Grande, Arizona 85222 May 2, 1978



Mr. John Jett Arizona Department of Mineral Resources Mineral Building, Fairgrounds Phoenix, Az.

Dear Mr. Jett:

Enclosed is your copy of the Custom Mill Project report. I have copied it; parts of the report will be helpful in my current exploration program.

Thank you for the information you have provided.

Sincerely yours,

Alan E. Disbrow



Mine Lake Shore

Date Sept. 30, 1942

District Casa Grande

Engineer

George A, Ballam

.

Production Possibilities Survey

Subject:

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47 claims at southwest end of Slate Mt., about 32 miles south of Casa Grande on Covered Wells highway. Principally owned by Frank M. Leonard of Tucson.

Two-compartment shaft about 300 ft. deep, thousands of feet of drifts, cross cuts, and winzes. Well over a million tons of ore blocked out averaging throughout 2.4% Cu. Since the values are in carbonates and chrysocolla, anth high calcite gangue, this can only be considered a possibility for ammonia leaching, or a combination of flotation and leach. However, owing to the large tonnage available in a compact ore body at low mining costs, it must be considered as one of the long-range possibilities, a good subject for metallurgical research with the newer chemical flotation reagents.

George & Ralla

From the desk of

Nov. 1957

FRANK P. KNIGHT

Cox of Manning & Cox said at AMC Convention that salt coke process 10oks good. Furnace economy is critical and not yet worked out.

File copy

SLATE MOUNTAIN

History and Production.

The small oxidized copper outcrop of this mine, exposed in the bottom of an arroya on the piedmont slope at the southwest end of the mountain, was first located in the early eightics by Trout and Atchinson. By the end of 1884 a shaft 112 feet deep had been sunk, and drifting had proved an ore body 700 feet long and 100 feet wide under the surface detritus south of the outcrop. The severe drop in the price of copper at the end of 1884, discouraged further work and the property was abandoned for many years.

About 1905 the mine was relocated by B. S. Wilson who shipped a little carefully sorted ore during the high copper market ending with the panic of 1907. The mine was acquired from Wilson in 1914 by the present owner, Frank M. Leonard. A new vertical shaft was sunk, about 200 feet south of the outerop, to a depth of 285 feet and the ore body was systematically blocked on three levels. It was bonded early in 1917 to the Atlas Development Company and ore was stoped from the richer northern part of the ore body and hauled to the Sasco smelter until July of that year when the option was surrendered. In 1919 Leonard sank five churn drill holes south of the underground workings to further prospect the ground and reported a blocked tonnage of over a million tons of three percent oxidized copper ore. Two winzes were also sunk from the 285 foot level to prospect the ore zone below water-level and some enriched sulphide ore was reported.

During the high copper market of 1929, a small tonnage of ore was sorted from the mine dumps, was hauled to Casa Grande and shipped.

The mine is owned by Frank M. Leonard of Casa Grande, and the production has been approximately 280,000 pounds of copper with a gross value of about \$64,000.

Location and Mining Proverty.

The mine is located at the southwest end of Slate Mountain on the piedmont slope of the range. It is connected to the Casa Grande-Covered Wells road by about three miles of fair desert road. The total distance to Casa Grande is about 35 miles.

The mining property consists of a group of 35 claims, three of which are patented. The camp is situated on the mesa east of the workings and consists of frame dwelling houses, boarding house, and power plant.

Mine Development.

The principal development on the property has been from a two-compartment vertical shaft sunk at a point about 200 feet south of the outcrop to a depth of 285 feet.

From this shaft several thousand feet of drifts, cross cuts, raises and winzes have been driven, from levels 115 feet, 170 feet, and 285 feet below the collar, and considerable stoping has been done above the 170-foot level, most of which was between the 115 foot level and the outcrop north of the shaft. From the bottom level two winzes were sunk which are now filled with water. The level work was done in a systematic manner and was pushed to a total distance of about 550 feet south and 150 feet north of the shaft and cross cuts developed the ground to a distance of about 300 feet east and 200 feet west of the shaft.

In addition to the work from the shaft, considerable work in the form of open cuts, small stopes and shallow shafts was done on the outcrop 200 feet north of the shaft, and other shallow prospect pits were sunk at scattered points on the property. Five churn drill holes south of the shaft were sunk several hundred feet deep.

Geology and Ore Occurrence.

The greater part of the surface is covered by surface cutwash. The only outcrop of ore or mineralized ground is in the bottom of a broad shallow southwestward-flowing arroya. This arroya heads in the mountains 1500 feet east where there outcrops a large granite mass classified in the field as biotite granodiorite about a mile long by 2000 feet wide which intrudes the pre-Cambrian schist which forms the core of the range. The ore outcrop consists of chrysocolla and calcite veinlets cutting a limonitized kaolinized schist. The schistosity strikes north 20 degrees west and dips 50 to 60 degrees to the east. The ore is closely associated with a strong fault zone partalel with the schistosity.

Underground development has proved this outcropping one to be the northwest end of an one body of similar material extending about 700 feet to the south with a width varying from 75 to 100 feet, all replacing schist.

On the bottom level, at a depth of 250 feet, the ore body is limited to the east by granodiorite. The contact is approximately n rth and south and dips 50 to 60 degrees to the west. The contact is about 50 feet east of the shaft. Winzes sunk on the ore close to the contact are said to have penetrated some sulphides of copper, both chalcopyrite and chalcocite. This work is now under water.

The mine has been thoroughly sampled and the results have been posted. The assays posted vary from one per cent to 4 per cent copper with a general average of about 2 percent. The values gradually fade on the upper level both east and west of the ore body through a distance of ten to twenty feet into slightly limonite stained schist and finally into fresh schist. The contact with the granodiorite and the ore on the bottom level is sharp and the alteration of the granodiorite is very slight. Well over a million tons is blocked out, the total amount depending on the minimum grade assumed as ore. All is thoroughly oxidized.

Possibilities.

There exists at the property a large tonnage of oxidized low grade ore in a compact ore body amenable to cheap mining costs. The ore presents a difficult metallurgical problem, as it is too low grade to smalt direct, is not readily amenable to concentration by gravity or flotation, and would be an expensive ore to leach by sulphuric acid due to the calcite present. It is possible that it would yield to ammonia leaching, or possibly a com-

KE SHORE MINE

bination of flotation and leaching. The comparatively high grade and size of the ore body warrant careful metallurgical testing.

The limiting of the ore on the bottom level by the granodiorite suggests the limiting of the ore in depth, and that the ore body occurs in the schist overlying a saucer-like depression at the top of the intrusive mass. However, the steep dip of the contact on the 250-foot level and the absence of granodiorite in the cross-cuts driven several hundred feet east in the upper levels are strong arguments against this. There is warranted a very considerable amount of work in prospecting below water level for possible extensions of the ore body depth into enriched or primary sulphide ore, more readily amenable to cheap concentration.

There is also a possibility that the granodiorite cut on the 285-foot level does not represent the main mass, but a narrow dike apophysis, and that one will be encountered on the eastern side.

From: Economic Geological Recommansance of Casa Grande Mng. Dist. Thy J. The Tenney January 1933

Mine	Lakes	nore - Slate	Groups	Date	November 10, 1959
District	Slate	Mtn. Dist.,	Pinal County	Engineer	Lewis A. Smith
Subject:	Mine '	Visit by Lewi	s A. Smith		
<u>Loca</u> Prop	tion:	T. 10 S., R. (1) [√] Lakeshor	. 4 E., Sections 11, 25, re: 3 patented claims	36	
		(2)' Slate: (3) Lease:	3 patented claims an 580 acres were lease of a 10% royalty on	d 19 unp d from t the net	atented claims he Indian Service on the basis smelter returns.
Owne	rs:	⁴ Transarizona Vancouver, H 917 East For	a Resources Co. (subsidi 3. C.) •t Lowell Road, Tucson,	ary of T: Arizona	ranscontinental Resources of
General Mgr. George Freeman, 201 4th Street, Casa Grande, Arizona (office of Transarizona)					
Field Supt. J. C. Ballam (lives at mine)					
Mine	eral:	$\sqrt{\text{Copper}}$			
$\frac{\text{Road}}{\text{to S}}$	ells H:	9 miles o ighway, then	of pavement and 19 miles ce 3 miles east.	of surf	aced road on the Casa Grande

<u>Work:</u> (1) Old work consisted of 2 shafts near the center of the Arizona claim of the Lakeshore Group and several shallow workings to the north of the Arizona shaft. The Arizona shaft is reported to be more than 285 feet deep with levels at 100', 150', 200' and 285' respectively. A smaller shaft, the "65", nearby is reported to be about 100 feet deep. Water is at about 152 feet below the collar of the Arizona shaft and the 150' level is open. Oxidized copper ore was found down to the water level but old data indicates that oxides persist near to the 285' level.

(2) Old drilling is reputed to have developed 1,000,000 tons of 2% copper ore. Recent drilling has indicated a reserve of more than 2 million tons at somewhat under 2% copper.

(3) Drilling has disclosed a long and narrow ore body which is 1500, or more, feet long and 125 to 150 feet wide and which trends about N 10 degrees E. The ore body tends to curve toward the west on the north end, where it has been step faulted toward the west.

(4) To the south the Shattuck Denn and Callahan Lead & Zinc Companies recently drilled two holes, one of which encountered sulphides at 65' while the other showed the oxide zone to be much deeper. The oxide ore appears to be commercial whereas the sulphides were submarginal in grade.

(5) New work consists of stripping of the Lakeshore ore body and the construction of a mill. The ore is covered by 10 to 20' of relatively recent gravels on top of a narrow mountain pediment. Thus far a pit 150' wide and over 400' long has been excavated by the Stancie & Richardson Co. (1911 W. Glendale Avenue, Phoenix) who have contracted the stripping. Some cupolas of ore have been uncovered at depths

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Lakeshore - Slate Groups

Page 2

of 3 to 15'. The contractors are using an Allis-Chalmers No. 20 Cat, two 10-12 ton Caterpillar Carry-alls and a motor blade for road work. Most of the waste, thus far moved, has been used to construct the mill ramp. The material, now being moved, will be used to construct a dike around the north and east border of the pit to control drainage. The contemplated pit rim will be about 600' wide and will be benched in 25' lifts. The overall slope will be 2 to 1.

Mill: The mill will consist of coarse and fine crushing and ball mill grinding. The toaster feed will be between 65 and 100 mesh. The ore will be roasted with coke and salt to reduce the copper oxides to copper. The calcine will be floated. The initial capacity will be about 250 tons which later may be increased to 500 tons. The May West flotation units will treat up to 500 tons daily. This mill is now being dismantled. Further increase in the mill capacity will depend upon how the process works and whether further prospecting develops adequate new ore reserves.

Geology: The Slate Mountains in the immediate area to the east and northeast consist of slates and schists domed by a long ovate mass of monzonite porphyry. The monzoniteschist contact dips flatly (40-45 degrees) to the east and northeast. The higher portions of the ridge are schist or slate sparsely intruded by andesite porphyry (?) dikes. No appendages of monzonite out into the schist-slate area were seen. However, in places stringers and blebs of marble were seen near the monzonite contact. No noteable mineral indications, other than thin iron oxide stringers and sparse areas containing chalcopyrite and pyrite have been reported. Along the west side of the dome the sediments (limestone and quartzite) were intensely metamorphosed to a mass of magnetite, garnet and epidote. This zone, in the Lakeshore ground, is well mineralized by copper minerals mainly chrysocolla and malachite, with very localized malaconite and cuprite. Chlorite is prevalent and along with the copper mineralization represents a post-metamorphism hydrothermal phase of the mineralization. The presence of these minerals in veinlets in the metamorphic complex indicates this. Locally the magnetite is ribboned with chrysocolla, malachite, and chlorite by stringers. This metamorphic zone butts against andesite of unknown extent. As exposed in the west side of the pit, this andesite is also mineralized by copper minerals and some epidote so is considered as pre-mineral. The area, comprising some of the Slate group is also metamorphosed to a considerable degree although in places less altered limestone areas are discernable. Underlying this limestone, in local areas, is quartzite which in turn is underlain by schist. The width of this contact zone has not been determined since most of the drilling has been confined to the immediate contact zone. Since the west or southwest contact pitches at about 50, or more, degrees, the gravel cover becomes correspondingly deeper, at a rapid rate. Drilling by Shattuck Denn and Callahan Lead & Zinc Companies showed that the old topographic relief in the Slate Group, must have been much \star sharper than was found on the Lakeshore to the northwest. One hole encountered sulphides at 65' while another showed much deeper oxides. Mr. Freeman stated that there were areas of metamorphic material within the Slate Group which showed strong anomalies and were considered to be favorable for prospecting. Altogether, including the Lakeshore area, several anomalies were found over a length of 2 miles of contact. Since the best ore is reported as associated with magnetite, these anomalies may possibly indicate ore zones. The geophysical contours were similar in intensity to the

Lakeshore - Slate Groups

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Page 3

anomaly over the Lakeshore. The Lakeshore anomaly clearly shows the outlines of the present ore body which have to a fair degree been verified by drilling. North of the Lakeshore, and on Indian lease ground, a large anomaly was interpreted to indicate good prospectable ground. The accompanying map sketches the general geological layout of the area. It is hoped that more drilling can be done to test the indicated anomalies.

Mine	Transarizona	(near Lakeshore)	Date	October 20, 1959
District	Slate Mtns.,	Pinal County	Engineer	Lewis A. Smith

Description of the area, etc. (summary of available data) Subject:

Approximately T 10 S, R 4 E (S 24-25) Location:

Owners:

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Transarizona Resources Co. (Subsidiary of TransContinental Resources of Vancouver, B. C.)

917 E. Ft. Lowell Road, Tucson, Arizona

(George Freeman, Tucson and Casa Grande, and Jim Mason (Canada) are said to be affiliated with this company.)

History: 1/ The Lakeshore Mine immediately north of the Transarizona, was discovered in the 1880s by Trout and Adkinson who sank a 100' shaft and did 700' of drifting. An orebody 700' long and 100' wide was reported to have been discovered. This operation ceased in 1885. The mine was relocated in 1905 by B. S. Wilson who shipped a little sorted ore between then and 1914., Later a 286' shaft was sunk by F. M. Leonard. The mine was later bonded by Atlas Dev. Co. which company shipped some ore during World War I. Leonard also drilled 5 churn drill holes and is said to have blocked out 1,000,000 tons of 2% oxide copper ore. He also sunk two winzes below the 285' level, and below the water level. This yielded some enriched sulphide ore consisting of chalcocitized chalcopyrite with accessory pyrite. The Lakeshore is reported by J. B. Tenny to have produced 280,000 pounds of copper valued at \$64,000. The Lakeshore is described since it may throw some light on the area immediately to the south.

The Transarizona property was recently drilled to a limited extent by Shattuck Denn and Callahan' Lead & Zinc Co. under the supervision of Still'& Still of Prescott. Little is known of the results obtained, but it was reported that oxides persisted to over 270' where low grade sulphides were encountered. It is known that geophysical prospecting indicated an anomalie.

Geology in Vicinity: 1/ J. B. Tenny of the Arizona Bureau of Mines, reported that a biotite-granodiorite mass, one mile long and 2000 feet wide, intruded pre-Cambrian schists which make up the core of the Slate Mountains in this area. The mineralization consists of chrysocolla and calcite veinlets cutting the strongly kaolinized schist. The schistosity strikes N 20° W and 50 to 60 degrees to the east. The Lakeshore ore is associated with a strong fault zone which parallels the schistosity and the developed ore is entirely in schist. On the bottom, or 250' level, the ore is limited on the east by the granodiorite contact which strikes N-S and dips 50-60 degrees west. This contact is 50 feet east of the shaft. Ore reserves are reported X at a million tons of 2 percent copper tenor, all of which is oxidized copper. Tenny recommended prospecting further to the east and south in the granodiorite area. He suggested that sulphuric acid leaching would be complicated by the calcite present.

Transarizona Resources plans to open pit the ore and reportedly will treat Plans:

Transarizona (continued)

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it by a direct reduction process followed by flotation. They recently are reported to have purchased the May West Mill at Oracle, and will move it down to the area. Further flotation units may be added at a later date. 200 tons of ore per day is rumored to be the initial operating rate.

A United States Bureau of Mines Publication (R.I. 5501) describes the process which may be applied at Transarizona.

1/ Tenny, J. B., "Geological Reconnaissance of the Casa Grande Mining District," Pinal County, Arizona. Arizona Bureau of Mines, January 11, 1933.

MineLakeshore MineDateJanuary 10, 1961DistrictSlate Mountains Dist., Pinal Co.EngineerLewis A. Smith

Subject: Interview with Jack Ballam at Lakeshore.

Mr. Ballam reported that two new furnaces and cooler tubes were on order. He stated that at 200 tons per day the operation was an even break. Therefore, the plant was shut down until the new units are in. It was felt that the larger tonnage would mean a profitable operation.

Mine Lakeshore Mine and Mill Date September 13, 1960

District Slate Mountains District, Pinal County Engineer Lewis A. Smith

Subject: Interview with George Freeman at Lakeshore.

The Lakeshore mill has largely overcome the bugs which beset the operation at first.

The heads have held up to well around the 1.75 percent copper estimated originally. The concentrates are running between 40 and 42 percent copper, and extraction is now estimated at about 86-90 percent.

The furnace operation at first hindered by temperature control difficulties, is now functioning well. The temperature at the head of the furnace runs around 400 degrees while the middle ranges between 1700-1800 degrees F., at the lower or discharge end it runs about 1500 degrees F. Some difficulty with caking, or sintering, was encountered, but the installation of automatic hammers on the furnace shell and better temperature control has largely eliminated this trouble. The furnace feed is carried at minus 20 mesh as compared to the first feed of 11 mesh. The plant is working three shifts.

The first bench in the mine is becoming established.

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See: "ARIZONA COPPER SILICATES RESPOND TO SEGREGATION" - E. & M. J. - Nov. 1960, p 86

Date

(SUPPLEMENTARY REPORT)

Mine 'LAKESHORE MINE & MILL

July 15, 1960

District SLATE MOUNTAINS, PINAL COUNTY

Engineer Lewis A. Smith

فكرمه معيدة والمرجع

Subject: Visit by Lewis A. Smith, July 12, 1960.

The mill has now had some trial runs and it has, on the whole, performed very well considering that all mills have their share of "bugs", especially where a new process is involved. The furnace has done quite well and Mr.'Freeman, Gen. Mgr., stated that the plant had exceeded his expectations to date. The concentrate, produced is good. Some problems, such as more insulation at key points and others are being worked out. The plant is now inclosed in part but some housing over the furnace and the cooler may yet be installed.

The first bench in the pit has been partly established so that the main problem, blasting, is becoming more evident. The variety of materials in the ground, immediately above the ore presents a knotty problem in placing holes to the best advantage. The materials vary in hardness as well as physical structure and consequently blasts differently. The bulk of the ore is fairly hard after the first few feet and its fracture patterns vary. It was felt that once certain bank face heighth was obtained, the blasting practice may be altered to include more sprung toe holes. The pit is not, however, considered to be ready for this. The holes should be staggard, and drilled a little deeper, so as to more thoroughly shatter the bench bottom, This would not require much more powder but it would more closely distribute the powder effect. (The blasting to date has produced quite a number of "nigger heads", or over size boulders, floor humps, and ridges). Closer spacing of the holes at the Orizaba silica mine proved beneficial. The fragmentation of the blast there was most satisfactory considering the eratic thickness and angle of dip of the quartzite beds and the presence of transverse softer seams. This problem however, is not too similar to that of Lakeshore where the ore more or less consists of ribs or areas of hard and soft material. The soft areas may blow "hard" while the harder areas may blow "soft" leaving ridges, humps and troughs in the bottom. Hard toes may also develop between holes. This condition, could in part, be eliminated by drilling the holes closer, deeper, and more below grade, thus placing the powder load under a heaver stemming load. This method would throw more latteral force along the bottom and cause less "blowouts". An uneven bottom and coarse ore can cause much more wear on loading equipment and thus more loading cost. The ore is now being loaded by $l_{\frac{1}{2}}^{\frac{1}{2}}$ yard front loader onto 5 yard trucks which haul it $\frac{1}{4}$ mile to the mill ramp bin, or for stockpiling on the ramp when the plant is idle.

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The ore is crushed in three stages: (a) crusher (b) Simms cone (c) and rolls to produce about 8 mesh. It is then mixed with salt and carbon which are introduced by automatic feeders from each bin so that the amount of salt and carbon is constant for a given ore. The furnace carries a temperature of about 1,100, or more, degrees depending upon the character of the mixture. The gas fuel and air are introduced through 15 feeders, equally spaced along the side of the furnace. Each feeder is connected with a panel which has 15 control buttons. The gas is lit by spark plugs. The chlorinated and reduced material is then passed through a water cooled cooled cylinder to reduce the temperature to 250-300 degrees. The cooler discharge is fed

Lakeshore Mine & Mill

Page 2

to ball mill which reduces it to around 60 - 65 mesh. This mill carries a load of $3 - 3\frac{1}{2}$ inch iron balls which are "rationed". The ball mill product is passed through a hopper where lime is added. The lime provides the P.H. control. This lime is purchased from Paul's Quarry in paper bags. The flotation unit consists of 3 batteries of Sub A Denver Machines with 8 cells to a battery. Among the reagents used are zanthate and methyl-amyl (404) the later being a product of Western Chemical Co. The concentrate is then pumped to a filter for dewatering.

Mine	Lakeshore	Date	May 10, 1960
District	Slate Mtn. Dist., Pinal Co.	Engineer	Lewis A. Smith

Subject: Mine and mill visit.

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The new mill is rapidly approaching completion and should be in operation in about 10 days or two weeks. Salt is being trucked from Carlsbad, New Mexico, in large semi's. The plant will use a car load a week.

The plant consists of: -

1. A wide ramp held by a timber bulkhead which is about 15 feet high. Trucks will dump into a hopper which will hold 20 tons or more.

2. The hopper discharges by feeder into a Iowa Manufacturing jaw crusher. The crusher opening is about 15×23 inches? A sloping grizzly lies above the crusher mouth. The grizzly spacing is about 1-3/4 inches. The crusher will produce a product of about this size.

3. A belt conveyor will deliver the crushed product to a bin which feeds in a Symonds cone crusher (Feederin diageter).

4. The Symonds discharge is belt conveyed into a large bin.

5. A shaking screen separates all material passing 3/8 inch. Oversize is returned to the Symonds bin.

6. The minus 3/8 inch material is fed to a set of rolls (30 inches in diameter and 16" wide.

7. The rolls product is classified and the 10 mesh material sent to a storage bin where it is fed to the chloridizing furnace. Here the copper is roasted with salt (NaCl) and oxidized to copper chloride. The salt must be in excess of 85% of NaCl. The furnace will operate at about 750°. About a carload of salt will be used per week. Heat is provided along one side of the furnace by natural gas jets. There are 15 or 16 jets throughout the furnace length.

8. The furnace discharge goes to a cooling and reducing cylindrical furnace (50 feet long and about 40 inches in diameter) where the copper chloride is reduced to copper by means of coal or coke.

9. This product is then sent to mixing rectors (3) where it is agitated with water.

10. The reefer product is sent to a large ball mill where it will be ground to 60-65 mesh for flotation cells.

11. A battery of flotation cells remove the copper. The tails are agitated and thickened. The copper is dehydrated on an Oliver filter. The present plant has a rated capacity of about 250 tons of ore per day.

A recent shot in the pit is calculated to knock off the high ore areas so as to level the bottom of the pit. Some excellent patches of ore were uncovered. Drilling of the first regular work bench is underway.

TRANS-ARIZONA MINE

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PINAL COUNTY SLATE MTNS.

Trans-Arizona has purchased Mary West's Mill and is moving it to their property near the Lake Shore Mine.

George Freeman and Jim Mason (Mason is from Canada) are two key men in this Arizona operation.

FPK 10-1959

See: SLATE MOUNTAIN MINE (file)

JIM MASON, President, Trans-Arizona - FPK 2-26-60

TRANSARIZONA RESOURCES 917 E. Ft. Lowell Rd. Tucson, Arizona. GEORGE FREEMAN, Gen Mgr. Casa Grande, Arizona.

BEN H. MARTIN, Consulting on mill design. 5334 E. Willard Ave. Tucson, Arizona Tel. EA 7-3154

Started building road Oct. 1st and now stripping by contract.

The above information from Ben H. Martin 10-20-59 ALJ

LAKESHORE MINE & MILL PINAL COUNTY SLATE MOUNTAINS

Transarizona Resources, Inc., Casa Grande, Arizona, has completed installation of the new recovery equipment at its Lakeshore mine and expects to be on a 500-ton-per-day production basis shortly. The original pilot reactor will be repaired and altered to give the plant a daily capacity of 750 tons. During installation of the new equipment, stripping at the pit was completed by the removal of 139,000 yards of waste capping from the east and north sides of the ore area, and approximately 1,000 tons of ore stockpiled on the mill ramp. Last fall Transarizona negotiated a Small Business Administration loan with participating banks in the amount of \$650,000,the funds to be used for installation of two new furnaces and coolers at the Lakeshore oxide copper mine to bring plant capacity to 750 tons daily. Pilot plant tests had demonstrated the feasibility of the segregation process for copper recovery from the highlime oxide ores, but increased capacity was needed for profitable operation. The Lakeshore ore body is said to contain more than 2,000,000 tons of oxide copper ore assaying about 1.8 percent. George A. Freeman is general manager.

Taken from Mining World - June 1962 - pp.43,44.

See: MINING WORLD, Sept. 1962, p 67

The mine and mill are closed at present. It was reported that the operation was able only to meet its pay roll but was unable to meet royalty payments. No one in authority could be contacted. Virgil Denning, who was in the office during my absence, reported to Red Williams that the demand for silica from Ajo has lessened.

MEMO-LEWIS A. SMITH - 10-9-62

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MEMORANDUM

May 8, 1962

Lakeshore Mine & Mill Slate Mountains Dist., Pinal County

Lewis A. Smith

George Bellam and George Freeman stated that the new plant began operations April 23. The plant operated quite well technically, giving excellent results. It is temporarily down for the repair of vents which deliver waste heat to the drier ahead of the retorts. The vents proved to be structurally weak at the 1550 degrees temperature of the gases as they come out of the retorts. The two new retorts worked quite well at 1550 to 1600 degrees. It is not known when the old retort will be remodeled. The present rate is 500 tons per day. The new flotation section has five batteries of Denver Cells as follows:-

> 3 batteries of 6 cells. 1 Battery of 8 cells. 1 battery of 5 cells.

A large crushed ore surge stock pile has been accumulated east of the main mill.

Two new 30-foot ore benches are taking form in the pit. A-yard Koehring shovel is doing the mucking, and transportation, as previously stated, is by Koehring end dump trucks (2). The two newer benches have been developed on the northeast outcrop of the ore body. Previously two rough benches were established on the southwest part of the outcrop. The ore fragments well.

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Lakeshore Mine

Slate Mountains, Pinal Co.

Conferences with George Freeman, General Manager of Transarizona Resources and George Ballam, in charge of construction, revealed that the reconstruction would be completed by March 31. The plant will reopen on a 500 TPD basis using the two new reactors. The old reactor will be repaired and altered, and when it is ready, 750 TPD will be run. The two new reactors, coolers, ball mill, new flotation cells and drier are set on foundations. The crushing and grinding portion of the plant is complete. The construction is now on a two shift basis.

The stripping at the pit has been completed after removing 139,000 yards of waste capping. This was taken from the east and north sides of the ore area. This portion of the pit is 600-700 feet long and varies from 0 to 300 feet wide (more or less triangular in shape). The waste was terraced by two 20-25 foot benches on the north, and h0-50 feet on the east. The pit now is equipped with a 600 Joy Manufacturing Co. compressor, Joy wagon drill mounted on a carriage which permits rotation and elevation so as to drill more than one hole from one setting. The drill makes a $2\frac{1}{2}$ inch hole and is nearly automatic until the hole is completed. It is suitable for long-holing if desired. Two new 15 yard Koehring dump trucks will do the hauling. A yard and a half Koehring shovel will do the mucking. An RD 8 and a caterpillar $1\frac{1}{2}$ yd. front loader are also available. Access roads have been developed in the stripped area, one entrance being from the northeast and the second being from the southwest. A maximum grade of about 10 per cent will be held. About one thousand tons of ore are now stockpiled on the mill ramp.

Mr. Ballam stated that the ore contains malachite, chrysocolla, melaconite and possibly some cuprite.

The crushing plant consists of a No. 2436 Pioneer crusher, followed by Ty-Rock shaking screen assembly, a Tornado impact machine and a screen asembly. The crushed rock discharged from the Ty-Rock vibrating screen will be serge stockpiled when not going into the circuit. The serge pile will hold about 1500 tons. A belt conveyor and weightometer will deliver and measure this material. A new bin ahead of the two new reactors will have 500 tons of capacity, will be constructed of sheet steel and will be circular. Otherwise the mill will be similar to the original pilot plant.

Memo - Lewis A. Smith - 3-14-62

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Mine 'Lakeshore Mine and Mill

Date January 9, 1962

District Slate Mountains Dist., Pinal County

Engineer Lewis A. Smith

Subject: Mine & Mill Visit

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The revision of the Lakeshore Mill is progressing well. The Pioneer 2436 crusher, 5-foot Tornado impact machine, Allis Chalmers ball mill (Williamson head type), revised screen plant, conveyor to stockpile, additional Denver flotation cells are placed. Foundations are in for an additional 500 ton bin for the new furnaces, one furnace, and excavations for foundations of new belt conveyor line and the preheater kilns are dug and are ready for pouring. The first new furnace should soon be in. The plant will be run for the time being at 500 tons per day capacity. Later, if it is deemed advisable, the third new furnace will be added, after the 500 ton operation has run for a while. The ball mill was purchased from Miami Copper Co. (The mill is 82 feet long and 12 feet in diameter.)

Dunlap Construction Co. of Phoenix is stripping the east face of the pit under a contract. They are employing 16 men and have 6 carry-alls (Le Tourneau Model B, 15 tons capacity), 5 - D-8 cats, 2 motor patrols, and a small front loader. The major portion of the stripping is on the northeast and east sides of the pit. This is calculated to clear mining of ore to the west and southwest. The muck nearest to the stripping limit is being drifted to the north and east by cats. The stripping area has been lowered about 10 feet over an area 600 feet long by 300-400 feet wide. The material consists of gravels and monzonite-porphyry (?). The carry-alls are loaded ahead of two pusher cats. Much of the material, so far handled, has been broken by a cat and rooter. The total amount of stripping is not now definitely known due to irregularities of the ore surface.

32 men are working at the mill, many of whom will not be dropped when the plant is complete.

DEPARTMENT OF MINERAL RESOURCES

MineLakeshore Mine and MillDateNovember 14, 1961DistrictSlate Mountain District, Pinal Co.EngineerLewis A. Smith

Subject: Interview with George Freeman and Mill visit.

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About 15 men are working on the alteration of the present mill in order to treble the capacity (to over 700 tons per day).

A $2h \ge 36$ inch Pioneer crusher will replace the smaller one previously used. The crusher product will be sent to a tornado impact crusher for fine sizing. The machine has a peripheral speed of 5000 R.P.M. The sized product from this machine will go to two driers after mixing salt and coke. The drier product will be screw conveyed to the furnaces. One drier will be used on the old furnace and the second will service the two new furnaces which will be installed on the west side of the original furnace. Two banks of four Denver flotation cells are being added to the flotation section. Heated waste gases from the furnaces will help dry the crushed ore.

Further stripping of the pit will probably commence next week. This will probably be contracted. Recent development drilling was deemed as satisfactory.

The first new furnace is now scheduled for delivery about the middle of December and the second will follow shortly thereafter.

. LAKESHORE MINE

PINAL COUNTY SLATE MTNS.

Two new furnaces and coolers will be installed and plant capacity increased to 750 tons per day at the Lake Shore copper mill of Transarizona Resources, Inc., south of Casa Grande, Arizona. The original large-scale pilot plant which uses the much-discussed segregation process, is reported to have performed satisfactorily. Mining has been suspended until new equipment is obtained and installed, to raise the plant capacity from its original 250 tons. The completed plant should be in operation within another six months. Reserves of the deposit, which will be mined by open-pit methods, have been estimated at some 2,000,000 tons grading about 1.8 percent copper. The structure is still open to depth and on strike. The company property also includes 12 other anomalous area which will be tested. These magnetometer anomalies are thought to contain magnetite, with which the copper values in the present deposit are associated. TRANSARIZONA RESOURCES LTD. of Canada / and associated companies have a controlling interest in the Arizona firm. George Freeman of Casa Grande is manager of the company.

Taken from MINING WORLD, April, 1961, p 28