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

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Arizona Department of Mines and Mineral Resources Mining Collection

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PRINTED: 01/17/2003

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: COPPER MTN.

ALTERNATE NAMES:
COPPER KING
COX AND ROSS CLAIM

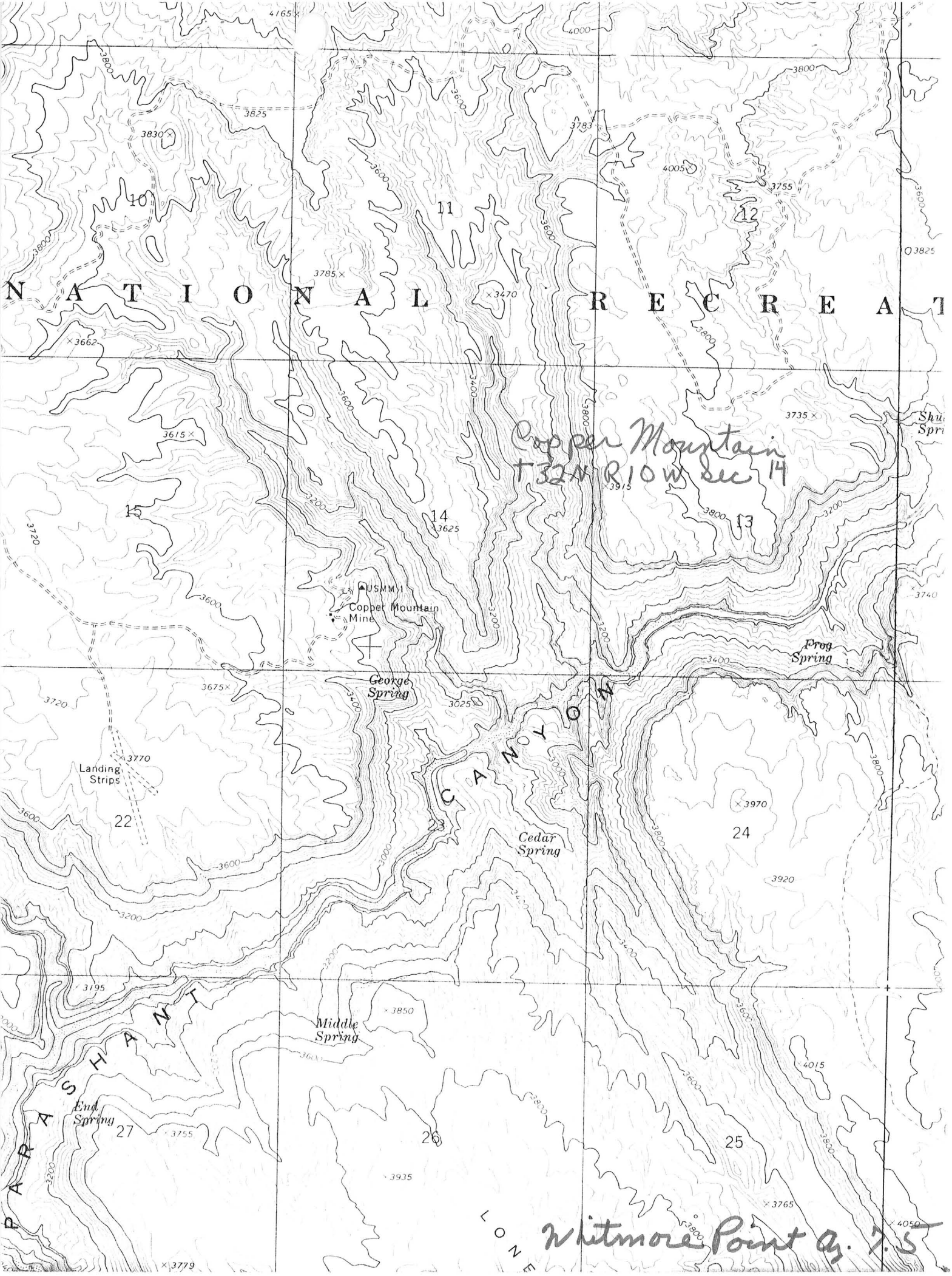
MOHAVE COUNTY MILS NUMBER: 230A

LOCATION: TOWNSHIP 32 N RANGE 10 W SECTION 14 QUARTER SW
LATITUDE: N 36DEG 10MIN 11SEC LONGITUDE: W 113DEG 20MIN 09SEC
TOPO MAP NAME: WHITMORE POINT - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
COPPER OXIDE
LEAD
ZINC
URANIUM
GOLD
SILVER

BIBLIOGRAPHY:
"MINERAL & WTR. RES. OF AZ" AZBM BULL 180, P 287-8, 1969
ADMMR "U" FILE CU 11
MALACH, R "THE AZ. STRIP", 1975
"ADJACENT LAND STUDY", GRAND CANYON, AZ MARCH 1981
ADMMR COPPER MOUNTAIN FILE
ECONOMIC GEOLOGY, VOL. 80, 1985, PP 1722-1735


NATIONAL RECREA
Copper Mountain
T32N R10W Sec 14
Copper Mountain Mine
George Spring
Frog Spring
Cedar Spring
Middle Spring
End Spring
Landing Strips
CANYON
PARASHANT
LONE
Whitmore Point Q. 7.5

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Information from: Bill Houston

   Company: Uranerz USA Inc. (c)

   Address: 165 S. Union Blvd., #280

   Denver, CO 80228

2. Phone: (303) 985-1511

3. Mine: COPPER MOUNTAIN

4. ADMMR Mine File: Same

5. County: Mohave

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

He reports that during their exploration of the property they discovered a geologic resource of 5-15,000 oz Au that is surface mineable. The resource was too small for them and their deal with the owners. He believes the material would be amenable to heap leaching. The property is within Lake Mead National Recreation Area so permission would have to be obtained to mine it. About 5 miles away is a possible heap leach site with water.

Date: September 12, 1988

Nyal J. Niemuth, Mining Engineer

COPPER MOUNTAIN MOHAVE COUNTY

Rockhound Record Mineralogical Society of Arizona, Oct 1980-
"The road to the Copper Mountain Mine starts at Mule Point Pond and gois down Parashant Canyon. For several hours we drove on one very rough road but finally reached our destination. At the Copper Mountain Mine there are several buildings, including two cabins plus many piles of discarded equipment. There is no mountain -- it is on the side of the Grand Canyon. The mine itself is a deep shaft with ladders part way down; several tunnels at different levels down the mountain side; and the usual small pits over the surface. I was hoping there would be some interesting minerals like at the Grandview Mine. I found some malachite, azurite, and one lighter blude mineral which I haven't identified as yet. But a good search of all the workings did not reveal any worthwhile specimens, and my dreams of giant cyanotrichite needles soon vanished...."

---

njn wr 6/18/82: Nick Scratish, a National Park Service Historical Researcher visted. He was investigativng Golden Mile, Golden Gate and Copper Mountain Mines, Mohave County, to see if they are of sufficient value to place on the register of Historic Sites. Following his research this week, he will visit them next week with a Park Service.

MG WR 8/16/85: Learned that Uranerz U.S.A. Inc, is rehabilitating the shaft and adit at the Copper Mountain mine in Parashant Canyon (Mohave County). The company plans to sample the workings for uranium.

HAMM

STATE MINE INSPECTOR

OCT 21 1985

Office of State Mine Inspector

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

NOTICE TO ARIZONA STATE MINE INSPECTOR

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 Uranerz U.S.A., Inc.

CHIEF OFFICER Paul Adamek, Vice President, Exploration

COMPANY ADDRESS 445 Union Blvd., Suite 230, Denver, CO. 80228

COMPANY TELEPHONE NUMBER (303) 985-1511

MINE OR PLANT NAME Copper Mountain (f) MOHAVE CO.

MINE OR PLANT LOCATION (including county and nearest town, as well as directions for locating by vehicle)

SW¼ of Section 14; Township 32N; Range 10W; Mohave County, Arizona.

The site is north of the Colorado River on the Arizona Strip accessible by unimproved roads from St. George, Utah 90 miles to the north - maps previously provided

TYPE OF OPERATION Mineral Exploration PRINCIPAL PRODUCT U, Cu

STARTING DATE _____ CLOSING DATE Oct. 25, 1985

DURATION OF OPERATION Underground work completed 10-4-85, demobilization to be completed 10-25-85 - NO ACTIVITY PLANNED UNTIL JULY 1986

PERSON SENDING THIS NOTICE W.G. Houston

TITLE OF PERSON SENDING THIS NOTICE Operation Manager

DATE NOTICE SENT TO STATE MINE INSPECTOR Oct. 17, 1985

RECEIVED
NOV 20 1985
DEPT. OF MINES & MINERAL RESOURCES

*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 therein are permanently suspended, the operator shall give written notice to the inspector at his office prior to commencement or suspension of operations.

Revised 7/84

COPPER MOUNTAIN MOHAVE COUNTY

production

BG&MT 1913-1974, 1700 tons
Copper 633,800 lbs; Silver 7200 oz; Gold 184 pz;
Lead 6,00 lb; Zinc 16,500 lb.
Production occured from 1913 - 1974 with the bulk of that coming during 1913-1918. Some uranium was also produced.

Name of Mine or Prospect:	Township	Range	Section	Priority
Copper Mountain Mine (Breccia Pipe - 216)	32N	10W	14 cca	A

Principal Minerals:	1:250,000 Quad	7.5' - 15' Quad
Malachite, azurite, unidentified uranium mineralization	Grand Canyon	Whitmore Point
Associated Minerals:	**District**	**Principal Product**
Quartz, calcite, hematite, limonite, silver	Colorado Plateau	Copper
Type of Operation:	**County / State**	**Type of Deposit**
Underground; shaft, drifts	Mohave / Ar.	Breccia Pipe

Ownership or Controlling Interest:
Arizona-American Copper Company (1914) USBLM mining claim record

Access: From Mt. Trumbull, proceed south into Trail Canyon, turn left and continue south into Parashant Canyon. Mine is approximately 25 miles south of Mt.Trumbull and is shown on topographic quadrangle.

Structural Control or Geological Association:
"Breccia pipe structure contained within the Pennsylvanian/Permian Supai Formation. The structure is composed of medium to large, angular to subangular clasts of medium to fine-grained sandstones. The clasts appear to be altered and bleached equivalents of the Supai Esplanade Sandstone within a matrix of fine-grained hematite and limonite. Malachite and azurite mineralization occurs in vugs within the matrix and in irregular veinlets along fractures and bedding planes. The alteration halo is roughly elliptical in plan and is approximately 600 feet in diameter." [1]

Age of Mineralization: Unknown

Production History

Protection Lode T32N-R10W Section 14
Winona Claims T32N-R10W Section 15

(1953) 210 foot shaft, with stopes; total production 250 tons.

(1913) Known as Copper King Mine: ½ carload per month carrying 23 to 26% copper and from $3 to $4 a ton silver.

SEA Photography, Inc.
Peach Springs Survey - 225 PS
Photos 03-08, 03-09

Geochemical Analyses

Radioactivity [1] Background: 15-25 cps
High: 100 cps

Geochemical Assay

U_3O_8:	0.022%
Ag:	15.31 oz/ton
Au:	0.011 oz/ton
Cu:	10.31%
Mo:	0.0145%
Pb:	0.084%
Zn:	1.06%
Co:	0.07%
Ni:	0.081%
Cr:	0.003%

Assay [4]

	$\%U_3O_8$
3953 "Grab"	14.1%
3954 "Hanging Wall"	2.75%
3955	0.54%
3956	0.13%

References

1) Exploration Research Associates, Inc. (1980) August, field reconnaissance.
2) Hill (1913) USGS Bull. 580, p. 56.
3) Huntoon and Billingsley (1978) Map 15.
4) AEC (1970) p. 79.
5) ABM (1969) Bull. 180, p. 183-205.
6) Billingsley, in Breed and Roat (1974) p.172.
7) Exploration Research Associates Inc. (1980) 29 Sept., memo to W.H. Crutchfield, Jr.

Name of Mine or Prospect	Township	Range	Section	Prospect
Copper Mountain Mine	32N	10W	14 cbd	A

Principal Minerals:	1:250,000 Quad	7.5' - 15' Quad
Chalcocite, Malachite	Grand Canyon	Whitmore Pt.
Associated Minerals:	District	Principal Product
"Unidentified Uranium Minerals"	Lake Mead Rec	Copper, Uranium
Type of Operation:	County / State	Type of Deposit
Underground	Mohave / Ar.	Sedimentary Host

Ownership or Controlling Interest:
James Wulfenstein, 172 E. 3rd South, St. George, Ut. (1955)[1]

Access: From St. George, Ut., proceed south on Highway 64, turn right at fork and travel 15 miles; continue on this road through Box Canyon about 30 miles. Mine is shown on topographic quadrangle.

Structural Control or Geological Association:

"Gently sloping valley floor cut by a deep wash (600 feet, vertical), faulting, fracturing and leaching; brecciated zones in gently diping Supai Sandstone. Radioactive minerals at the bottom of the mine, 210 feet level."[1]

Age of Mineralization:

Production History	Geochemical Analyses
(1953) 210 foot shaft, with stopes total production 250 tons	Radioactivity Background: 30 cps High (at water table): 4750 cps $\%U_3O_8$ 3953 "Grab" 14.1% 3954 "Hanging Wall" 2.75% 3955 0.54% 3956 0.13%

References

1) AEC (1970) p. 79.
2) ABM (1969) Bull. 180, p. 183-205.

COPPER MOUNTAIN

MOHAVE C
T32N R10W Sec 14 SE

AKA: Cox and Ross, Copper King

MILS Index # 230A

The Arizona Strip, Malach, 1975
"Radioactive Occurrences and Uranium Production in Arizona"

Az. BM Bull 180, Mineral and Water Resources of Arizona, p. 287
1969

USBM "U" file

USGS Whitmore Point 7.5 (Included in file)

Adjacent Lands Study, Grand Canyon, Az. March 1981

MINERAL PROPERTY FILE

463.1/27

Present file No. DMEA-3075
New file No. ~~21.52~~ 21.52

UNTY Mohave STATE Arizona

IP 32 N RANGE 10 W SECS. --- 14 SW

Main Commodity Copper
Others Uranium

ROPERTY NAME Copper Mt. Mine

THER NAMES Cox & Ross claims

WNER Mary Etta Cox et al ADDRESS St. George, UT

ESSEE James & McMurrin Wulfenstein ADDRESS St. George, UT

OCATION 96 Miles south of St. George, UT. Located on Andrus Spring Wash,

ACCESS

TYPE OF DEPOSIT:

Disseminated x Bedded ____ Contact ____ Placer ____
Vein ____ Lenses or pods ____ Residual ____ Other ____

WORKINGS:

Underground x ACCESSIBLE: Yes ____ No ____ Unknown x

Drift, X-cut x Shaft ____

Total Length: Less than 200' ____ 200' to 1,000' x More than 1,000 ____

Surface ____

Open pit ____ Small ____ Large ____ Trenches ____ Test pits ____

Drill holes ____

Undeveloped ____

PLUS 500 TON PRODUCTION: Yes x No ____ Unknown ____

DATE OF INFORMATION 1/28/54

TYPE OF REPORT:

Standard Examination x DMEA or OME ____ WMR ____ Correspondence ____
Summary Report x Access Road ____ MRB ____ Other ____
Map ____ Non Bureau ____

FURTHER WORK RECOMMENDED Exploration NOT RECOMMENDED ____

RHP

6-803
(March 1949)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINING DIVISION
SUMMARY REPORT OF MINERALS EXAMINATION

State Arizona County Mohave Mineral Products Copper-Uranium

Name of property or deposit Copper Mt. Mine (Cox and Rose claims) DMEA 3075

Date examined 12/1/53 Engineer W. E. Young Date of this report 1/28/54

Engineer accompanied by C. G. Tillman ~~James Wulfenstein~~ Address U.S.G.S., Salt Lake City, Utah ~~St. George, Utah~~

Extent of property 2 lode claims

Owner Mary Etta Cox, et al. Address St. George, Utah

Leased or optioned to James Wulfenstein McMurrin Wulfenstein Address St. George

Location of property (be specific) T. 32 N., R. 10 W., Mohave County, Arizona, 96 miles south of St. George, Utah. Located on Andrus Spring Wash, a tributary of the ~~Colorado River.~~

Type of deposit and mineralogy (brief description) Copper-uranium mineralization in sandstone. Principal copper minerals are malachite and azurite with cuprite and bornite. The chief uranium mineral is saunerite.

Known dimensions of the deposit Length 30' Width 5' Depth 210 feet

Attitude of the deposit (strike, dip, etc.) Pipelike body dipping steeply to the southeast.

Possible extensions; correlation of known showings ——

Mine workings (brief description or attach map or sketch) (indicate whether accessible) Steeply inclined shaft 210 feet deep. Several drifts and stopes along the dip of the main ore shoot.

(over)

and one copy to Washington office.

6-993

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Report Nos. _____

REVIEW OF EXAMINATION REPORT

State Arizona County Mohave Mineral products Copper-Uranium

Name of property Copper Mountain Mine (Cox and Ross claims)

Owner Mary Etta Cox, et al. Address St. George, Utah

Lessee or Operator James Wulfenstein
McMurrin Wulfenstein St. George, Utah

Location T. 32 N., R. 10 W., Mohave County, Arizona, 96 miles south of St. George, Utah. Located on Andrus Spring Wash, a tributary of the Colorado River.

Examined by W. E. Young December 1, 1954

Apparent quality of examination and Adequate

Discussion and review: The Copper Mountain Mine was examined by the Bureau of Mines and Geological Survey as a result of a request for DMEA loan assistance. The property has produced a small tonnage of high-grade copper ores during intermittent periods of operation. Recent discovery of uranium in the ores has increased the interest in exploration. The ores occur in a pipelike mass in sandstone and in some way appear to be related to a prominent zone of alteration noted at the surface. An inclined shaft 210 feet deep roughly follows the dip of the ore shoot. Ores have been mined from levels near the shaft. Further exploratory work is recommended to determine the continuity of mineralization below the 210-foot level. Proposed exploration will consist of rehabilitation of the shaft, sinking the shaft 100 feet, and drifting on the 310-foot level.

(DMEA-3075)

DATE	ACTION	BY

Jan. 28, 1954

Reviewed by Stephen R. Wilson
Stephen R. Wilson, Chief
Minerals Development Branch
Mining Division, Region IV

Date

U. S. GOVERNMENT PRINTING OFFICE : 1952 O - 208207

Mining and milling equipment on property Equipment for small mining operation is on property. No milling equipment.

Past production (if any) A few thousand tons of relatively high-grade copper ore is reported.

Present rate of production (if any) None.

Sampling (describe briefly, or attach sketch) None. Sampling and scintillometer investigation made by AEC.

Tentative Estimate of Reserves
(Subject to revision when assays are received or after engineering calculations

Measurable ---- tons ---- Grade ----

Indicated ---- tons ---- Grade ----

Inferred ---- tons ---- Grade ----

Mining method (actual or suggested) Open stope.

Milling or processing method (actual or suggested) ----

Processing tests suggested ----

Tentative conclusion and decision Additional shaft sinking and drifting will probably disclose continuation of ore shoot mined to an inclined depth of 210 feet. Exploration recommended.

To be accompanied by brief letter giving examining engineer's general impression of the deposit, his impression of the owner, and any other confidential informatic he may care to submit. May be executed in pencil. Should be mailed within 24 hours after examination is completed.

Send original and one copy to Washington office.

6-993

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Report Nos. .....
.....
.....
.....

EXAMINATION REPORT

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

TUCSON, ARIZONA

Re road application [illegible]
[illegible] and there is necessar[illegible]
[illegible] of stripping ore-House[illegible]
[illegible] estimate is $20000 - which I
[illegible] myself agree with having
[illegible] $3000.00

2nd - The owner is east. The resident
[illegible] is appropriation of the

3rd - The [illegible] is very promising - Devel-
[illegible] should be done before road is

4th - [illegible] 24 - Prospect has commenced
[illegible] print before road is necessary
[illegible] cost of construction.
[illegible] Angels later

Sincerely
Price

426 Federal Building, San Francisco, California
(address)

annexed
Supp. Series

ear Sir:

The provision of access road (s) to a source of raw materials in

Mohave County, Arizona (State) is considered to

e of importance to the war effort. The raw materials source is known as

Copper - 35% Assay
entlay Mining District and is situated SW¼ Sec. 14, T32N, R10W.

Copper Mountain Mine
nformation can be obtained locally from V. Lorraine Cox

St. George, Utah (Name), Co-owner (Title)

Investigation by Bureau of Mines - Geological Survey (Bureau of Mines - Geological Survey)

hows Agent - interested to make arrangements
to conduct if at this time.
(information as to ore, content, extent, etc.)

Study by Grazing Service, Dept. of Interior (Service - Office) shows that 27

iles of Bulldozer-Grader type 2 type road between Section 14, T32N

R. 10 W. and Sec. 10, T34 N, R. 12 W.

will be required, estimated to cost $ 35,000.00.

Upon completion of the access road(s), the property will be

leveloped by H. W. Patterson, General Manager, Buffalo, New York
(Name, title, address)

Request is made for cooperative 15 mi. Construction, 8 miles maint. and 4 miles Imprv.
(construction, maintenance, improvement)

by the Grazing Service, Dept. of Interior.
(Service or office)

By L R Brooks
Name
L. R. Brooks, Regional Grazier
Title
503 Heard Building, Phoenix, A.
Address

The _____ considers the proposed
(Bureau of Mines - Geological Survey)
work to be justified by the potential production from this source of raw material.

By _____, _____
Name Title

_____
Address

(August 1948)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

PERMANENT INDIVIDUAL MINE RECORD

(METAL OUTPUT—OVER)

Copper Mountain or Cox - Ross
(Name if group, give individual holding)
Arizona (State) Mohave (County) Kingman (District)

CLAIMS: Copper Mountain

CHARACTER OF DEPOSIT:

SEC. TWP. RANGE: 100 Mi. So. of St. George. B. M. #47101

16—18750-1

YEAR	OWNER (Name and address)	OPERATOR (Name and address)	DAYS OPERATED	DEVELOPMENT AND OTHER DATA
1934	E. J. McMasters, St. Petersburg, Fla.	F. L. Cox, St. George, Utah		
1937	Frank Cox, St. George, Utah			
1949		Leland O. Whitmore, Overton, Nev.		
1950	Warren Cox	R. L. Whitney, Lessee, Box 114 St. George, Utah		
1951		Wayne Knob, " " " "		
1952	L. V. Cox	J. H. Middlemiss " " "		
1953	V. Lorane Cox	Do. Do.		

Copper Mountain or Cop-Ross page 1

PRODUCTION

16—12550-1 U. S. GOVERNMENT PRINTING OFFICE

Year	Objection to Publication	Crude Ore Produced									Concentrates Produced								Recovered in Bullion	
		Dry Tons		Class	Treatment	Gross Metal Content					Dry Tons	Class	Gross Metal Content							
		Ore	Old Tailings, etc.			Gold (Ounces)	Silver (Ounces)	Copper (Pounds)	Lead (Pounds)	Zinc (Pounds)			Gold (Ounces)	Silver (Ounces)	Copper (Pounds)	Lead (Pounds)	Zinc (Pounds)		Gold (Ounces)	Silver (Ounces)
1934		16		Cu	Smr.	40	81	5,779	—	—										
1937		6		Cu	Smr.	—	20	1,750	—	—										
1949		26		D.G	Smr.	18	79	227	156	3,733										
		63		Cu	"	28	1,041	10,953	5,457	11,500										
		106		Zn	"	117	608	1,448	2,774	22,861										
1950		151		Cu.	Smr.	2	476	94,000	—	—										
1951		23		Cu.	"	—	47	4926	—	—										
1952		21		Cu.	"	—	31	4,774	—	—										
1953		133		Cu	"	—	28	3,814	—	—										

6-844
(January 1969)
DOMR

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

PERMANENT INDIVIDUAL MINE RECORD

(METAL OUTPUT—GIVEN)

COPPER MOUNTAIN DUMP
(Name of group. Alphabetical listing)

CLAIMS:

ARIZONA (State) MOHAVE (County) BENTLEY (Grand Washington Cliffs) (District)

CHARACTER OF DEPOSIT:

SEC. 14 TWP. 32N RANGE: 10W

B. M. #47101

YEAR	OWNER (Name and address)	OPERATOR (Name and address)	DAYS OPERATED	DEVELOPMENT AND OTHER DATA
1969		Strip Copper Inc., 308 E. 2S, Salt Lake City, Utah		

Copper Mountain dump - page 2

PRODUCTION

GPO 638 / 987

Year	Objection to Publication	Production of Crude Ore and Concentrates									Recovered Metal Content							Recovered in Bullion	
		Dry Tons		Class	Treatment	Gross Metal Content of ore &/or cts					Dry Tons	Class	Gold (Ounces)	Silver (Ounces)	Copper (Pounds)	Lead (Pounds)	Zinc (Pounds)	Gold (Ounces)	Silver (Ounces)
		Ore	Old Tailings, etc.			Gold (Ounces)	Silver (Ounces)	Copper (Pounds)	Lead (Pounds)	Zinc (Pounds)									
1969	no	108		cu	smelter	--	58	9,732	--	--			--	58	9,700	--	--		
												value		104	4,611				

MINERAL PROPERTY FILE

463.1/27

UNTY Mohave STATE Arizona Present file No. DMEA-3075
New file No. ~~21.52~~ 21.52

IP 32 N RANGE 10 W SECS. --- Main Commodity Copper
Others Uranium

ROPERTY NAME Copper Mt. Mine

THER NAMES Cox & Ross claims

WNER Mary Etta Cox et al ADDRESS St. George, UT

ESSEE James & McMurrin Wulfenstein ADDRESS St. George, UT

OCATION 96 Miles south of St. George, UT. Located on Andrus Spring Wash,

ACCESS

TYPE OF DEPOSIT:

Disseminated	x	Bedded		Contact		Placer	
Vein		Lenses or pods		Residual		Other	

WORKINGS:

Underground x ACCESSIBLE: Yes ____ No ____ Unknown x

Drift, X-cut x Shaft ____

Total Length: Less than 200' ____ 200' to 1,000' x More than 1,000 ____

Surface ____

Open pit ____ Small ____ Large ____ Trenches ____ Test pits ____

Drill holes ____

Undeveloped ____

PLUS 500 TON PRODUCTION: Yes x No ____ Unknown ____

DATE OF INFORMATION 1/28/54

TYPE OF REPORT:

Standard Examination	x	DMEA or OME		WMR		Correspondence	
Summary Report	x	Access Road		MRB		Other	
Map		Non Bureau					

FURTHER WORK RECOMMENDED Exploration NOT RECOMMENDED

[illegible] Division
[illegible] Region IV

[illegible] New Customhouse
Denver 2, Colorado

February 10, 1954

Memorandum

To: Paul Kinner, Chief, Minerals Division
Through: J. H. Rhet, Jr.
Regional Director, Reg. IV

From: Chief, Mining Division, Region IV

Subject: Summary Report of Examination and Review of Examination Report

Enclosed please find the original and one copy each of the Summary Report of Examination and Review of Examination Report prepared in connection with the examination of Copper Mountain Mine (Cox and Ross Claims), Mohave County, Arizona, DMEA 3075.

W. H. KING

W. H. King

Enclosures
cc: S. R. Wilson
H. M. Connors
Sub
Chron
WHK:bh

6-803
(March 1949)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINING DIVISION
SUMMARY REPORT OF MINERALS EXAMINATION

State Arizona County Mohave Mineral Products Copper-Uranium

Name of property or deposit Copper Mt. Mine (Cox and Ross claims) DMEA 307

Date examined 12/1/53 Engineer W. E. Young Date of this report 1/20/54

Engineer accompanied by C. G. Tillman ~~James Wulfenstein~~ Address U.S.G.S., Salt Lake City, Utah ~~St. George, Utah~~

Extent of property 2 lode claims

Owner Mary Etta Cox, et al. Address St. George, Utah

Leased or optioned to ~~James Wulfenstein~~ McMurrin Wulfenstein Address St. George

Location of property (be specific) T. 32 N., R. 10 W., Mohave County, Arizona, 96 miles south of St. George, Utah. Located on Andrus Spring Wash, a tributary of the ~~Colorado River.~~

Type of deposit and mineralogy (brief description) Copper-uranium mineralization in sandstone. Principal copper minerals are malachite and azurite with cuprite and bornite. The chief uranium mineral is meunerite.

Known dimensions of the deposit Length 30' Width 5' Depth 210 feet

Attitude of the deposit (strike, dip, etc.) Pipelike body dipping steeply to the southeast.

Possible extensions; correlation of known showings ---

Mine workings (brief description or attach map or sketch) (indicate whether accessible) Steeply inclined shaft 210 feet deep. Several drifts and stopes along the dip of the main ore shoot.

(over)

Mining and milling equipment on property Equipment for small mining operation is on property. No milling equipment.

Past production (if any) A few thousand tons of relatively high-grade copper ore is reported.

Present rate of production (if any) None.

Sampling (describe briefly, or attach sketch) None. Sampling and scintillometer investigation made by ASC.

Tentative Estimate of Reserves
(Subject to revision when assays are received or after engineering calculations

Measurable ---- tons ---- Grade ----

Indicated ---- tons ---- Grade ----

Inferred ---- tons ---- Grade ----

Mining method (actual or suggested) Open stope.

Milling or processing method (actual or suggested) ----

Processing tests suggested ----

Tentative conclusion and decision Additional shaft sinking and drifting will probably disclose continuation of ore shoot mined to an inclined depth of 210 feet. Exploration recommended.

To be accompanied by brief letter giving examining engineer's general impression of the deposit, his impression of the owner, and any other confidential informatic he may care to submit. May be executed in pencil. Should be mailed within 24 hours after examination is completed.

Send original and one copy to Washington office.

6-993

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Report Nos. _____

REVIEW OF EXAMINATION REPORT

State Arizona *County* Mohave *Mineral products* Copper-Uranium

Name of property Copper Mountain Mine (Cox and Ross claims)

Owner Mary Etta Cox, et al. *Address* St. George, Utah

Lessee or Operator James Wulfenstein
McMurrin Wulfenstein St. George, Utah

Location T. 32 N., R. 10 W., Mohave County, Arizona, 96 miles south of St. George, Utah. Located on Andrus Spring Wash, a tributary of the Colorado River.

Examined by W. E. Young December 1, 1954

Apparent quality of examination and Adequate

Discussion and review: The Copper Mountain Mine was examined by the Bureau of Mines and Geological Survey as a result of a request for DMEA loan assistance. The property has produced a small tonnage of high-grade copper ores during intermittent periods of operation. Recent discovery of uranium in the ores has increased the interest in exploration. The ores occur in a pipelike mass in sandstone and in some way appear to be related to a prominent zone of alteration noted at the surface. An inclined shaft 210 feet deep roughly follows the dip of the ore shoot. Ores have been mined from levels near the shaft. Further exploratory work is recommended to determine the continuity of mineralization below the 210-foot level. Proposed exploration will consist of rehabilitation of the shaft, sinking the shaft 100 feet, and drifting on the 310-foot level.

(DMEA-307S)

DATE	ACTION	BY

Jan. 28, 1954

Reviewed by Stephen R. Wilson

Stephen R. Wilson, Chief
Minerals Development Branch
Mining Division, Region IV

Date _____

U. S. GOVERNMENT PRINTING OFFICE : 1952 O - 209207

Western Region
[illegible]

Disallowed

NOV 2 8 1942

November 24, 1942

#-7

bjl

Mr. L. R. Brooks
Regional Grazier
503 Heard Bldg.
Phoenix, Arizona

Dear Mr. Brooks:

We are returning to you the PR-DA-1 forms for an access road to the Copper Mountain Mine, Bentley Mining District, Mohave County, Arizona.

This road cannot be approved at this time. According to our District Engineer, Mr. J. M. Hedges, an examination by the Bureau of Mines shows that no work has been started at the mine and that no plans have been made for future work.

Very truly yours,

S. R. ZIMMERLEY,
Regional Engineer

cc S. L.
W. R.
Mr. Hedges

#127

Tucson, Arizona
November 18, 1942

ACCESS ROAD APPLICATION RECOMMENDATION

Our Application No. 27

Identification: Through Grazing Service, their application No. 10, dated August 24, 1942. Metal - copper; property - Copper Mountain Mine, in SW 1/4, Sec. 14, T. 32 N., R. 10 W., Mohave County, Arizona; owners - V. Lorraine Cox, St. George, Utah, and others. A purchase option on the mine is held by H. W. Patterson of Buffalo, New York.

Proposal: 27 miles (15 miles construction, 4 miles improvement, and 8 miles maintenance) of bulldozer-grader, type 2 road from Sec. 10, T. 34 N., R. 12 W., to the mine. Estimated cost $35,000.

Comment: The option has run for six months and no work has been started at the mine. The mine is on a terrace on the north rim of the Grand Canyon, 1600 feet or more below the rim of the plateau. A Bureau of Mines engineer was examining mines in the area north of the Grand Canyon for a week in late October. Mr. Cox reported that it is 5 miles by trail down the canyon rim from the end of the road to the mine. The trip from St. George to the mine requires three days and the use of saddle horses. Mr. Cox was working and did not wish to contribute the time and expense necessary to accompany the engineer to the mine.

Type of Deposit and Production: Some high grade copper ore was sorted and shipped during the last war. That was carried out on pack animals. The deposit is said to be similar to the Grand Gulch mine, but of smaller extent. The ore at the Grand Gulch mine is secondary copper carbonate and chalcocite in brecciated sandstone. Some high grade ore is produced there by selective mining and sorting.

Conclusion: The expenditure of $35,000 on a road to this mine while no effort is being made to produce ore there is not justified. If an appreciable tonnage of good ore is later developed, then other means of transportation up the canyon rim, such as an aerial tramway, should be considered.

Recommendation: Approval of the application is not recommended at this time.

J. H. HEDGES

J. H. Hedges,
District Engineer.

Examined by Price, Oct. 23, 1942.

26, 27, 4, 24

OCT 26 1942

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

SOUTHWEST EXPERIMENT STATION
BOX 4097
UNIVERSITY STATION

TUCSON, ARIZONA

Tucumcari Area
Col 23-1

Re road application be
the property boundary and there is involved
Thousand feet of bluffing one-hundred
The application estimate is $2000. provided
the owners and improved agree at least
not exceed $3000.00

Application #27 - The owners must sign the road
certificate acceptance of the application
Items.

Application #4 - The mining - development should be done before road is necessary.

Application - #24 - Project has some merit
More development before road is necessary
Estimate below cost of construction
Report and Project Letter

Sincerely

R

Form No. FR-DA-1

...ona--Copper Mountain

...ice Phoenix, Arizona

Date August 24, 1942

Mr. C. H. Sweetser District Engineer, Public Roads Administration No. 18

426 Federal Building, San Francisco, California
(address)

Dear Sir:

The provision of access road (s) to a source of raw materials in

Mohave County, Arizona (State) is considered to be of importance to the war effort. The raw materials source is known as Copper - 55% Assay Bentley Mining District and is situated SW¼ Sec. 14, T32N, R10W. Information can be obtained locally from Copper Mountain Mine V. Lorraine Cox

St. George, Utah (Name), Co-owner (Title)

Investigation by Bureau of Mines - Geological Survey

shows Agent is interested to make arrangement for development at other time.
(information as to ore, content, extent, etc.)

Study by Grazing Service, Dept. of Interior (Service - Office) shows that 27 miles of Bulldozer-Grader type 2 type road between Section 14, T32N R. 10 W. and Sec. 10, T34 N. R. 12 W. will be required, estimated to cost $ 35,000.00.

Upon completion of the access road(s), the property will be developed by H. W. Patterson, General Manager, Buffalo, New York

(Name, title, address)

Request is made for cooperative 15 mi. Construction, 8 miles maint. and 4 miles Imprv.
(construction, maintenance, improvement)
by the Grazing Service, Dept. of Interior.
(Service or office)

By L R Brooks
Name
L. R. Brooks, Regional Grazier
Title
503 Heard Building, Phoenix, A.
Address

The _____ considers the proposed
(Bureau of Mines - Geological Survey)
work to be justified by the potential production from this source of raw material.

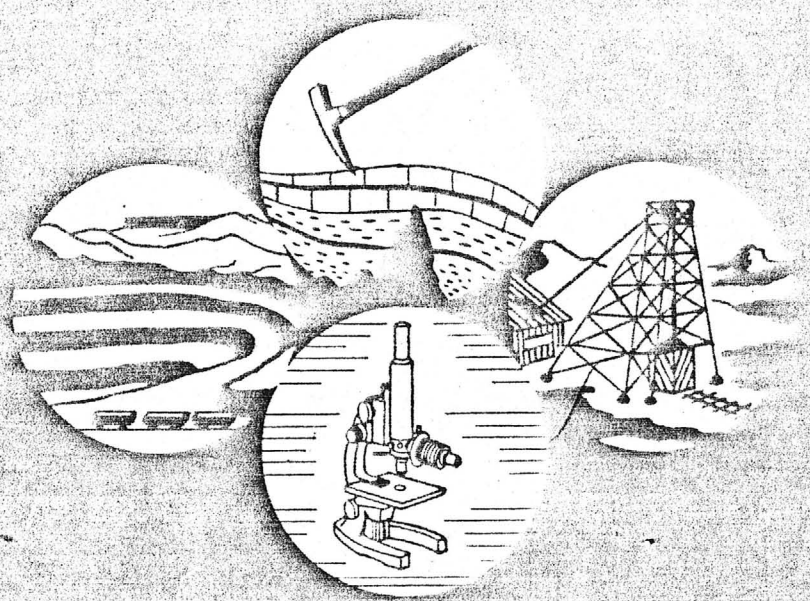
By _____, _____
Name Title

_____
Address

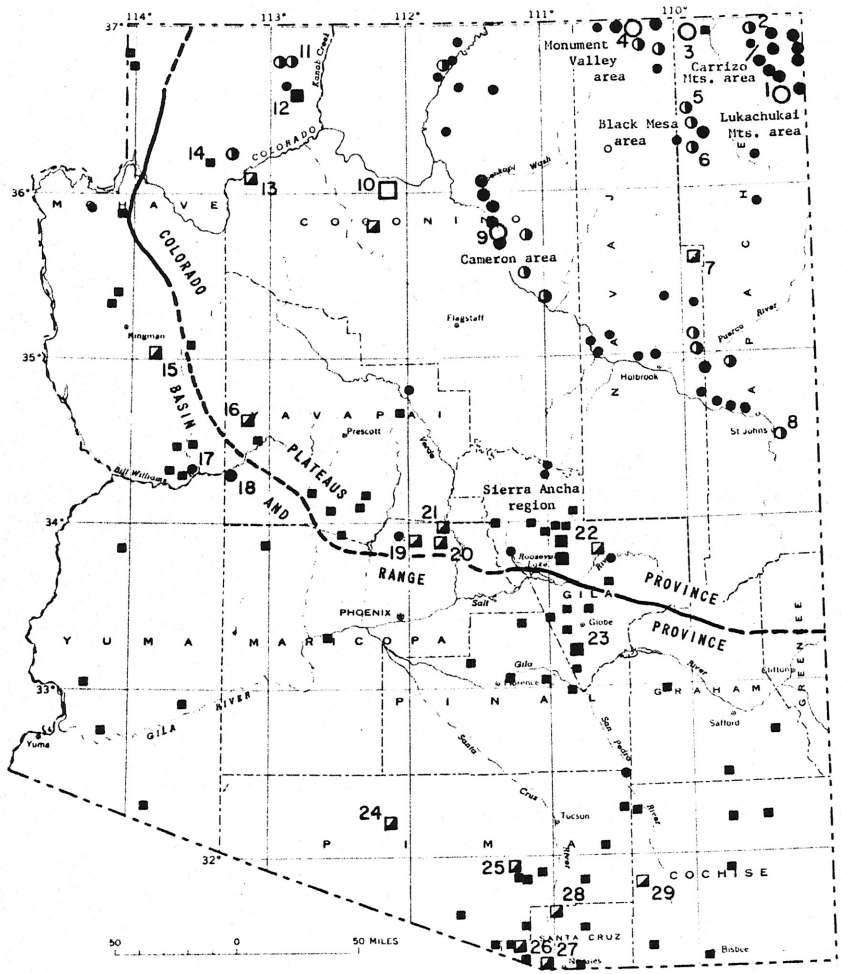
MINERAL AND WATER RESOURCES OF ARIZONA

THE ARIZONA BUREAU OF MINES

Bulletin 180
1969



THE UNIVERSITY OF ARIZONA
TUCSON



EXPLANATION

Deposit or group of deposits

Size in tons of "ore" (production plus reserves) containing at least 0.1 percent U_3O_8

More than 100,000	1,000 to 100,000	1 to 1,000
○3	●18	◑8

Deposits peneconcordant with sedimentary features of enclosing rocks

□10 ■23 ◪15

Veins, breccia zones, and related types of deposits

(Numbers refer to localities mentioned in the text or listed in table 24)

Occurrence

Rock contains at least 0.01 percent U_3O_8 and no more than 1 ton of it is known to contain as much as 0.1 percent U_3O_8

Peneconcordant type ■ Vein type

Province boundary; dashed where approximately located

Map modified from Butler, Finch, and Twenhofel (1962)

FIGURE 43.—Uranium in Arizona.

graphically, and each averages about 2.5 feet in thickness. Only the upper bed has been productive. The ore is vanadiferous and carnotite is the only identified uranium mineral.

The Masterson group (No. 17, fig. 43) (Reyner and Robison, 1956) and the Lucky Four deposit (No. 17) (Robison, 1956b) are similar to the Uranium Aire but less well explored and probably smaller.

Other mostly minor concentrations of uranium minerals are present in beds of tuff, tuffaceous mudstone, and sandstone at several localities in the Basin and Range province. Their characteristics are summarized by Finch (1967, table 1) and their positions are shown by unnumbered symbols in figure 43.

In addition to the peneconcordant deposits, one vein-type deposit has yielded a large amount of ore, and several others collectively have yielded an appreciable amount. Deposits of this type include fracture fillings, stockworks, mineralized breccias, and mineralized rock adjacent to fractures.

The most productive deposit, the Orphan Lode (No. 10, fig. 43) and a number of other smaller deposits are in the western part of the Colorado Plateaus province. The greatest number of productive deposits is in Gila County in the Sierra Ancha region in adjoining parts of the Colorado Plateaus and Basin and Range provinces. A few small productive deposits and numerous other small deposits are widely scattered elsewhere in the Basin and Range province as shown by symbols on the map (fig. 43).

The Orphan mine ranks among the five most important vein deposits of uranium in the United States. It is on the south rim of the Grand Canyon on a patented claim, originally located for copper. The deposit is in a nearly vertical, generally oval, pipelike body of collapse breccia that transects the Coconino Sandstone and Hermit Shale of Permian age and the Supai Formation of Pennsylvanian and Permian age (Granger and Raup, 1962, p. A8) and extends downward into the Redwall Limestone of Mississippian age. (C. G. Bowles, oral commun., 1968).

The rocks in the structure are fractured, disoriented, and displaced from their normal stratigraphic position. Blocks of Coconino Sandstone are displaced downward at least 275 feet. Much of the ore is at the stratigraphic position of the upper, cliff-forming part of the Supai Formation. The larger part of the ore is in the arcuate body generally concordant with the north wall of the collapse, where it is partly in fractured rocks of the pipe wall and partly in adjoining pipe filling material. A smaller part of the ore is in more poorly defined bodies in the ring-fracture zone along the southeast wall and in sandstone in the interior of the pipe.

Uraninite is the principal ore mineral. It is accompanied by pyrite and other sulfide and sulfosalt minerals that contain copper, silver, lead, zinc, cobalt, nickel, and molybdenum and have been a source of some copper and silver.

The Hack's Canyon mine (No. 12, fig. 43) (Granger and Raup, 1962) and the Ridenour mine (No. 13, fig. 43) (Miller, 1954) are deposits similar to the Orphan but smaller, and some uranium ore has been mined from them. Other similar deposits that contain uranium but have not been mined for it are the Copper Mountain mine,

which was a source of high-grade copper ore (King and Henderson, 1953; Hill, 1913), and the Copper House prospect (No. 14, fig. 43) (Meehan, R. J., 1953). At the River View deposit in the Cameron area (No. 9, fig. 43) uranium has been mined from brecciated sandstone of the Shinarump Member of the Chinle Formation which collapsed downward to fill a pipelike structure at the stratigraphic position of the underlying Moenkopi Formation (Chenoweth and Blakemore, 1961, p. 112).

Uranium is concentrated locally in rocks which fill some diatremes among the Hopi Buttes in Navajo County (Shoemaker, Roach, and Byers, 1957). At the Morale claim (No. 7, fig. 43), from which some ore has been mined, uranium in unidentified form occurs in laminated siltstone and tuff where they are flexed over slumped blocks of slightly older tuff near the southeast wall of the diatreme. The deposit is thought to be related to hot spring circulation late in the evolution of the diatreme and hence is grouped with the veins.

Vein deposits in the Basin and Range province and marginal areas of the Colorado Plateaus province are in a variety of rocks that range in age from Precambrian to Tertiary. The most abundant and productive of these are in Gila County in the Dripping Spring Quartzite of Precambrian age.

Almost all the deposits in the Dripping Spring Quartzite are in the Sierra Ancha region north of the Salt River (No. 22, fig. 43). A few are in the Mescal Mountains (No. 23). Individual deposits have been the source of a few tons to several thousand tons of ore. Collectively about 25,000 tons of ore have been produced from them. Granger and Raup (1959) have studied the deposits and the following summary is drawn from their descriptions.

All the deposits are in thinly stratified arenaceous siltstone in an interval between 45 and 150 feet above the base of the upper member of the Dripping Spring Quartzite. The Dripping Spring Quartzite and overlying and underlying formations are intruded by sills and dikes of diabase. All the deposits are less than one-half mile from diabase and some are in rock bordering diabase.

Most of the deposits are veinlike zones generally less than 5 feet wide, a few to 15 feet high, and a few tens of feet to a few hundred feet in length. Some are manto shaped, nearly concordant with the bedding and some are combinations of veins and manto shapes. Many deposits follow directions which are defined near the surface by limonite-filled fractures and joints that trend either about N. 70° W. or about N. 20° E. In some deposits the exposed fracture fades out with depth, but the ore body continues along the same trend; in others the fracture diverges from the trend of the ore body.

Uraninite has been identified in a few deposits near diabase. In other deposits the uranium minerals are either secondary minerals or are unidentified. Pyrite, marcasite, chalcopyrite, and less abundant galena and sphalerite occur in nearly all deposits. Pyrrhotite and molybdenite are present in a few near diabase.

Other small vein deposits are widely distributed in and adjoining the Basin and Range province. The ore produced from about a dozen totals less than 1,000 tons. These deposits are identified and their main

TABLE 24.—*Miscellaneous uraniferous vei*
and Range prov

Locality No. in fig. 43	County and name of deposit	
	Cochise	
29	Star No. 1	Uranium-bea mafic dik brian age
	Windmill	Gouge zone uranophan uraninite
	Maricopa	
19	Horseshoe group	Mineralized near-vert granite; identifie
21	Lucky Find group	Mafic dike is brecci intersect present.
20	Manley and Bickle group	Mineralized section o shears in tains flu uranium m
	Mohave	
15	Democrat mine	Vein in fau gneiss, a age conta bearing a minor cha uraninite ore miner
	Pima	
25	Black Dike claims	Altered zon granite a contains accompany fluorite.
24	Linda Lee claims	Steeply dip contact w tains hem torbernit
	Santa Cruz	
28	Duranium claims	Arkosic san glomerate displaced seminated and autun tion ques
26	Santa Clara mine	Veinlets of metal vei Cretaceou
27	White Oak property	Steeply dip rhyolite age conta secondary kasolite
	Yavapai	
16	Hillside mine	Fissure vein of Yavapai Serie pitchblende, carbonates.

DMEA REPORT
DOC 405130 Reel 4057 -337

DMEA Docket 3075
GG Tillman USGS 1/28/45

EXPLORATION

The J. and M. Mining Company of St. George, Utah applied for a lease, dated August 1951, May 15, 1953 to cover 24 mining claims and the Iron and Iron claims, Mohave County, Arizona (Fig. 1).

The property was examined December 2, 1953 by U. S. Williams, U. S. Geological Survey and W. E. Young, U. S. Bureau of Mines. No drill hole information due to most exploration previous to this date. Mr. J. M. Williamson and Mr. Bill Williamson, the applicants, were present during the examination.

Surface conditions did not permit more than a very brief examination of the surface and subsurface workings.

Location and accessibility

The Copper Mountain mine is at the southeast edge of the Colorado Plateau on Sandstone Wash about five kilometers southwest of Fredonia, Arizona. Paved highway connected to join the Centennial Valley Highway a short distance north of the Colorado River.

The claims are presently in secs. 2 or 3, T. 32 N., R. 3W N. & R. E. and M. and may be reached by driving north from St. George, Utah on Utah Highway 64 for 24 miles to the Utah-Ariz. line, thence south and southeast 10.6 miles, then turn southeast off the state road onto a dirt access road and continue approximately 25 miles by way of Jolene Utah to the mine. The part of the road in Jolene Utah is washed out during every heavy rain storm or thaw. The engineering report by W. E. Young discusses this matter in detail. The continued profitable operation of the mine will depend in large part on the expense required to keep this road open.

-2-

History and production

The Copper Mountain mine has probably produced somewhat thousand tons of ore-grade copper ore although no production figures are available. Although underground was discovered recently when the A.E.C. opened the mine and made a thorough underground survey of the surface and underground workings. Surface data accompanies the A.E.C. map. The lode deposit by several operators and 200 tons of ore which averaged 10.4 percent copper.

GEOLOGY

The Colorado Plateau is a part of the Colorado Plateau province bounded on the north by the Colorado River, on the west by the Hurricane Cliffs, and on the east by the Grand Wash Cliffs. Northward, in the vicinity of the Utah-Arizona border south of St. George, Utah, it loses its identity along a low monoclinal escarpment.

The oldest sedimentary rocks underlying the platform are exposed along the Colorado River. Outcrop rocks at the canyon bottom include the Supai sandstone, Redwall Supai shale, Mauv limestone, and unnamed Paleozoic limestone. Overlying these rocks are the Moenkopi Triassic Petrified Limestone, the Shinarump Jurassic Limestone, the Pennsylvanian Gallatin Limestone, the Jurassic Carmel sandstone, Navajo sandstone, Cretaceous sediments, Kaibab Limestone and Moenkopi formation. The Triassic Moenkopi formation is found along the west side of the Hurricane Fault and on the north edge of the platform. Large areas of Kaibab formation in the central part of the platform and Moenkopi formation on the north edge of the platform are overlain by Tertiary and Cretaceous lavas. All of these beds have a small regional dip to the east. Along the western, downfaulted side of the Hurricane Fault they dip as much as 10° to the east.

-3-

Copper-sulfide mineralization occurs, it is believed, either in the upper part of the Shinarump sandstone or the lower part of the Moenkopi formation. In areas where these formations cannot be differentiated, they are known collectively as the Chinle formation. Along the South Fredonia claims, the Shinarump sandstone consists of about 400 feet of massive, generally thick-bedded, cliff and ledge-forming, cross-bedded to slightly-bedded, gray to pink, fine-grained sedimentary sandstone in which the overlying clays outcrop (Gilluly, 1932, p. 110). The Moenkopi formation, which overlies the Shinarump with gradational contact, is about 700 feet thick and consists of gray to red, fine- to very fine-grained, thick- to thin-bedded sandstone with the fine-grained, thinner-bedded sequence being darker red in color and softer than underlying more massive Shinarump.

The Moenkopi formation is stripped back off the top of the Shinarump on a mesita, the Triassic forms the upper canyon slopes.

The generally north-striking, steeply west dipping Moenkopi-Chinle beds to present in Centennial Valley about 6 miles east of the mine area.

STRUCTURE

At the surface the shaft is seen to be collared on the south central part of an apparently circular zone of copper mineralization which has a diameter of perhaps 600 feet [1]. The central part of the circular zone is cut to a depth of more than 200 feet by a steep-walled gully. Copper mineralization is known on the northern continuation of the circular trend and on the northeastern side as well. The sandstone outside this zone is almost free from secondary pale reddish color to white or tan.

The Copper Mountain ore bodies appear to be localized along south, east, to northeast-striking, steeply dipping faults and northeasterly to...

1/ For a description of what may be a structurally similar copper deposit in this area, see Hill, J. M., 1914, the Grand Gulch Mining Region, Mohave County, Arizona: U. S. G. S. Bull. 598-B, p. 29-30.

-4-

unreplaced Kaibab sandstone breccia of the Permian Shinarump sandstone or Moenkopi formation. The faults and stopes appear to curve northeastward away from the shaft, being curves to the southeast. There is an apparent tendency for the stopes to steepen with depth or to dip irregularly. This may be due to the fact that in some places upper stoped sandstone extends out from the fault or breccia zone along the nearly flat or gently east-dipping beds of unbrecciated sandstone whereas in other places it follows more steeply dipping fault and breccia zones. The stopes between the 100- and 200-foot levels, with the exception of the stope nearest the shaft, dip regularly at about 30 degrees southeast (Fig. 2). The largest of these measures approximately 80' x 40' x 5'. The large stope between the 200- and 300-foot levels dips approximately 45 degrees southeast and measures approximately 50' x 20' x 5'. Copper mineralization is more or less continuous, though may a narrower width, from the shaft to the face on the various levels. Copper-bearing faults may be offset by oblique cross faults.

Copper minerals appear along northeast-striking faults, as replacements of sandstone and some fragments of sandstone breccia, and to a limited extent as replacements of unbrecciated sandstone adjacent to faults and breccia zones. Bornite appears to be the most abundant sulfide and the principal ore mineral. Chalcocite and possibly covelite are the principal secondary copper minerals. The green, siliceous appearing, secondary uranium mineral accompanies some fractures surfaces and is reported to form veinlets in copper ore. A black uranium mineral may also be present.

A small pod of ore-grade uranium mineralization occurs on the 250-foot level in the hanging wall of the vein near the unbrecciated stope. The

-5-

shaft an additional 100 feet to the 300-foot level. If the shaft does not follow the mineralized fault zone, crosscut 25 to 50 feet southeast to intersect this zone. Drift along the mineralized zone to the east and northeast 200 feet.

The plan is designed to test the downward continuation of the most promising uranium showing in the mine as well as the downward continuation of copper mineralization.

CONDITIONS AND RECOMMENDATIONS

An additional 20 feet of drifting northeastward along the copper-uranium vein on the 250-foot level has carried the work beyond the zone of uranium ore exposed on the uppermost stope. To determine the vertical extent of this uranium mineralization the shaft should be deepened 100 feet after shaft rehabilitation. From the foot of the shaft a crosscut should be driven, if necessary, to the copper-uranium bearing fault zone and a drift should be driven northeastward along this zone under the ore-grade mineralization of the 250-foot level. It is estimated that the following work will be required: 100 feet of shaft sinking, 25 feet of crosscutting, and 200 feet of drifting.

It is recommended that allowance be made for the services of a consulting geologist for 30 days to aid the applicant in the proper execution of this work, to describe and map the work done with DMEA aid, and to do such other detailed geologic mapping on the surface and/or underground as the may allow or as will be conducive to the successful exploration of the property.

Considering that this exploration has a good chance of discovering a small tonnage of copper ore and a fair chance of discovering a small tonnage of uranium ore it is recommended that funds be granted for 75 per-

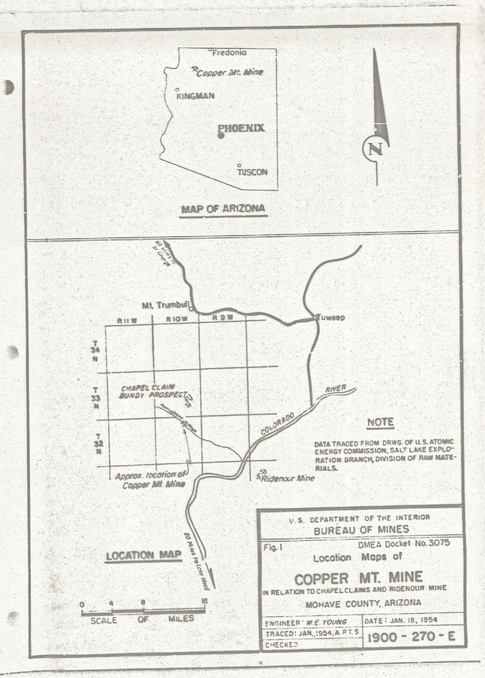
-6-

cent of the total cost of the project; i.e. the average of 50 percent government participation for copper and 50 percent government participation for uranium.

Approval of the modified exploration program described herein for the Copper Mountain mine is recommended provided the acceptability of the access road to Jolene is not rejected by DMEA on a request for denial of the application.

Bibliography cited

Gilluly, J. B., 1932, Geology and ore deposits of parts of northwestern Arizona: Publ. Arts, vol. 16, no. 2, p. 103-224, March, 1932.



INTRODUCTION

The J. and M. Mining Company of St. George, Utah applied for a loan, DMEA Docket 3075, May 29, 1953 to aid in exploration for uranium ore on the Cox and Ross claims, Mohave County, Arizona (fig. 1).

The property was examined December 1, 1953 by C. G. Tillman, U. S. Geological Survey and W. E. Young, U. S. Bureau of Mines. It had been inaccessible due to road washouts previous to this date. Mr. J. M. Goldenstein and Mr. Phil Goldenstein, the applicants, were present during the examination.

Weather conditions did not permit time for more than a very brief examination of the surface and underground workings.

Location and accessibility

The Copper Mountain mine is at the southeast edge of the Shivwits Plateau on Parashont Wash near its junction with Andrus Wash. Parashont Wash drains southeastward to join the Queantoweap Valley drainage a short distance north of the Colorado River.

The claims are probably in secs. 2 or 3, T. 32 N., R. 10 W., G. & Sl. B. and M. and may be reached by driving south from St. George, Utah on Utah Highway 64 for 50 miles to the Walking X Ranch; here south and continue 18.6 miles, then turn southeast off the state road onto a dirt access road and continue approximately 36 miles by way of Andrus Wash to the mine. The part of the road in Andrus Wash is washed out during every heavy rain storm or thaw. The engineering report by W. E. Young discusses this matter in detail. The continued profitable operation of the mine will depend in large part on the expense required to keep this road open.

History and production

The Copper Mountain mine has probably produced several thousand tons of medium- to high-grade copper ore although no production figures are available. Abnormal radioactivity was discovered recently when the A.E.C. mapped the mine and made a thorough scintillometer survey of the surface and underground workings. Sample data accompanies the A.E.C. map. The last shipment by present operators was 125 tons of ore which averaged 15.4 percent copper.

GEOLOGY

The Shivwits Plateau is a part of the Colorado Plateau province bounded on the south by the Colorado River, on the east by the Hurricane Cliffs, and on the west by the Grand Wash Cliffs. Northward, in the vicinity of the Utah-Arizona border south of St. George, Utah, it loses its identity along a low north-facing escarpment.

The oldest sedimentary rocks underlying this plateau are exposed along the Colorado River. Canyon rocks at the canyon bottom include the Toroweap sandstone, Bright Angel shale, Muav limestone, and unnamed dolomitic limestone. Overlying these rocks are the Devonian Temple Butte limestone, the Mississippian Redwall limestone, the Pennsylvanian Callville limestone, the Permian Queantoweap sandstone, Hermit formation, Coconino sandstone, Toroweap formation and Kaibab formation. The Triassic Moenkopi formation is found along the west side of the Hurricane fault and on the north edge of the plateau. Large areas of Kaibab formation in the central part of the plateau and Moenkopi formation on the north edge of the plateau are overlain by Tertiary and Quaternary lavas. All of these beds have a small regional dip to the east. Along the western, downdropped side of the Hurricane fault they dip as much as 14° to the east.

Copper-uranium mineralization occurs, it is believed, either in the upper part of the Queantoweap sandstone or the lower part of the Hermit formation. In areas where these formations cannot be differentiated, they are known collectively as the Supai formation. Along the South Hurricane Cliffs, the Queantoweap sandstone consists of about 400 feet of massive, generally thick-bedded, cliff and ledge-forming, cross-bedded to regularly-bedded, gray to pink, fine-grained calcareous sandstone in which the crossbedding dips southeast (McNair, 1951, p. 527). The Hermit formation, which overlies the Queantoweap with gradational contact, is about 930 feet thick and consists of grey to red, fine- to very fine-grained, thick- to thin-bedded sandstone with the finer-grained, thinner-bedded intervals being darker red in color and softer; thus yielding more readily to erosion.

The Hermit formation is stripped back off the top of the Queantoweap; as a result, the latter forms the upper canyon floors.

The generally north-striking, steeply west dipping Hurricane fault is present in Queantoweap Valley about 6 miles east of the mine area.

ORE FEATURES

At the surface the shaft is seen to be collared on the south central part of an apparently circular zone of copper mineralization which has a diameter of perhaps 600 feet 1/. The central part of this circular area is cut to a depth of more than 100 feet by a steep-walled gully. Copper mineralization is known on the northern continuation of the circular trend and on the northeastern side as well. The sandstone within this area is altered from its normal pale reddish color to white or tan.

The Copper Mountain ore bodies appear to be localized along small, east- to northeast-striking, steeply dipping faults and particularly in

1/ For a description of what may be a structurally similar copper deposit in this area, see: Hill, J. M., 1914, the Grand Gulch Mining Region, Mohave County, Arizona: U. S. G. S. Bull. 580-D, p. 39-58.

serpentined lenticular sandstone breccia of the Permian Queantoweap sandstone or Hermit formation. The faults and stopes appear to curve northeastward away from the shaft, being nearest to the southeast. There is an apparent tendency for the stopes to steepen with depth or to dip irregularly. This may be due to the fact that in some places copper mineralization extends out from the fault or breccia zone along the nearly flat or gently east-dipping beds of undisturbed sandstone whereas in other places it follows more steeply dipping fault and breccia zones. The stopes between the 155- and 200-foot levels, with the exception of the stope nearest the shaft, dip regularly at about 50 degrees southeast (fig. 2). The largest of these measures approximately 40' x 40' x 5'. The large stope between the 100- and 155-foot levels dips approximately 40 degrees southeast and measures approximately 50' x 30' x 5'. Copper mineralization is more or less continuous, though over a narrower width, from the shaft to the face on the various levels. Copper-bearing faults may be offset by oblique cross faults.

Copper minerals appear along northeast-striking faults, as replacements of groundmass and some fragments of sandstone breccia, and to a limited extent as replacements of undisturbed sandstone adjacent to fault and breccia zones. Bornite appears to be the most abundant sulfide and the principal ore mineral. Malachite and possibly cuprite are the principal secondary copper minerals. The green, micaceous appearing, secondary uranium mineral autunite coats fracture surfaces and is reported to form veinlets in copper ore. A black uranium mineral may also be present.

A small pod of ore-grade uranium mineralization occurs on the 210-foot level in the hangingwall of the vein near the underhand stope. Two

U. S. C. samples taken under water in the underhand stope averaged more than 0.10 percent U_3O_8. An additional twenty feet of drifting along the vein to the northeast on the 210-foot level exposed no ore-grade uranium mineralization. High scintillometer readings were obtained by the A. E. C. at several places in the stopes between 155- and 210-foot levels. Abnormal, but low, radioactivity is present throughout the mine.

Oxidation extends to the lowest level as indicated by the presence of abundant iron oxide stains and malachite. Water was encountered on the lowest level and now stands several inches deep near the water-filled underhand stope.

ORE RESERVES

There is insufficient sample data to make a reliable copper and uranium ore reserve estimate.

PROPOSED EXPLORATION

The applicants propose to explore the ore-grade uranium showings exposed on the 210-foot level by deepening the inclined shaft an additional 200 feet and by driving two 250-foot exploratory drifts along the vein at the 300- and 350-foot levels. A 100-foot crosscut to the north from the drift on the 300-foot level is proposed to ensure testing the mineralized zone.

In addition, it is proposed to crosscut 300 feet southwest on the 210-foot level to explore the projected position of a northeast striking, vertical fracture which is exposed at the surface 250 feet southwest of the shaft. This fracture shows iron-oxide and copper carbonate stain and abnormal radioactivity over a width of a few inches and a strike length of several hundred feet at the surface.

The examining team recommends that part of the applicants' plan of exploration be approved as follows: Rehabilitate and deepen the inclined

shaft an additional 100 feet to the 300-foot level. If the shaft does not follow the mineralized fault zone, crosscut 25 to 50 feet southeast to intersect this zone. Drift along the mineralized zone to the east and northeast 200 feet.

The plan is designed to test the downward continuation of the most promising uranium showing in the mine as well as the downward continuation of copper mineralization.

CONCLUSIONS AND RECOMMENDATIONS

An additional 20 feet of drifting northeasterly along the copper-uranium vein on the 210-foot level has carried the work beyond the zone of uranium ore exposed at the underhand stope. To determine the vertical extent of this uranium mineralization the shaft should be deepened 100 feet after shaft rehabilitation. From the foot of the shaft a crosscut should be driven, if necessary, to the copper-uranium bearing fault zone and a drift should be driven northeasterly along this zone under the ore-grade mineralization of the 210-foot level. It is estimated that the following work will be required: 100 feet of shaft sinking, 50 feet of crosscutting, and 200 feet of drifting.

It is recommended that allowance be made for the services of a consulting geologist for 20 days to aid the applicant in the proper execution of this work, to describe and map the work done with DMEA aid, and to do such other detailed geologic mapping on the surface and/or underground as time may allow or as will be conducive to the successful completion of the project.

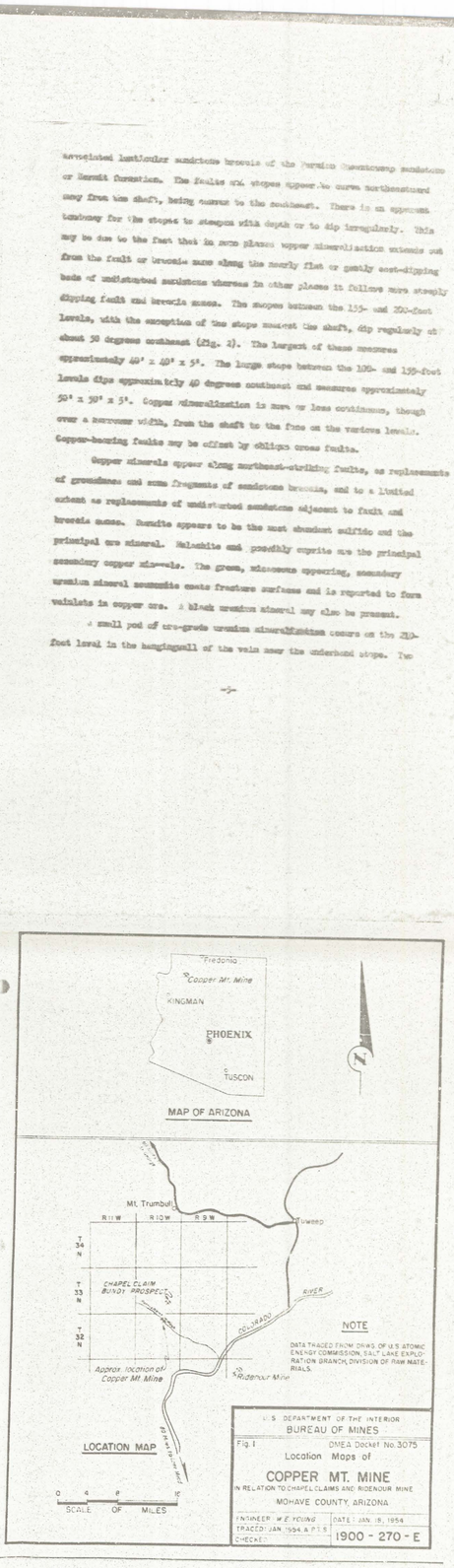
Considering that this exploration has a good chance of discovering a small tonnage of copper ore and a fair chance of discovering a small tonnage of uranium ore it is recommended that funds be provided for 70 per-

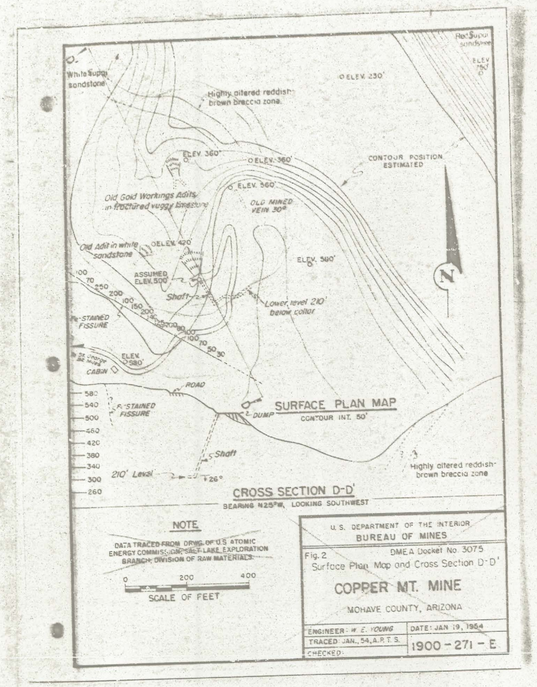
cent of the total cost of the project; i.e. the average of 50 percent government participation for copper and 90 percent government participation for uranium.

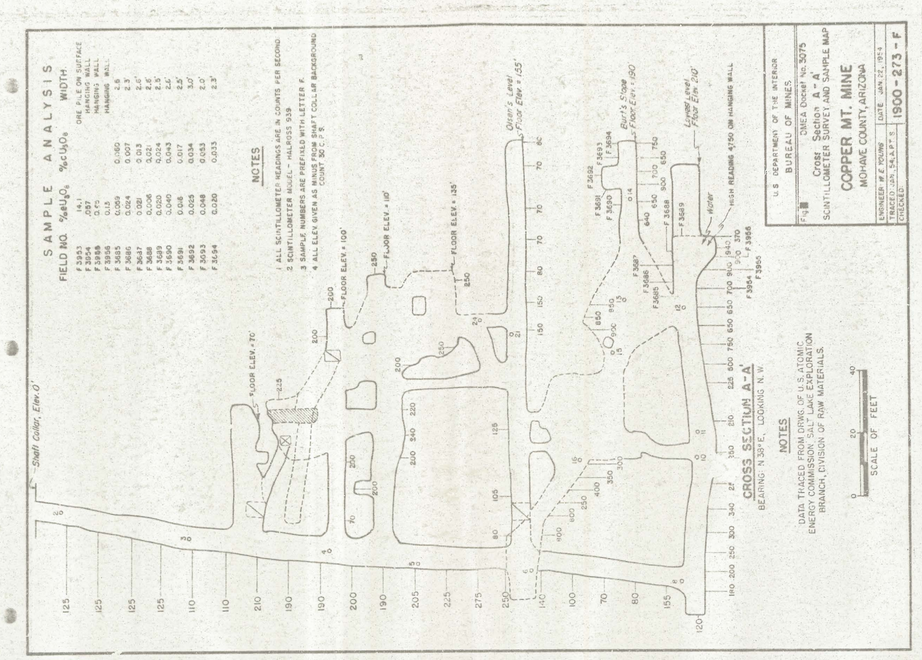
Approval of the modified exploration program described herein for the Copper Mountain mine is recommended provided the susceptibility of the access road to washout is not regarded by DMEA as a reason for denial of the application.

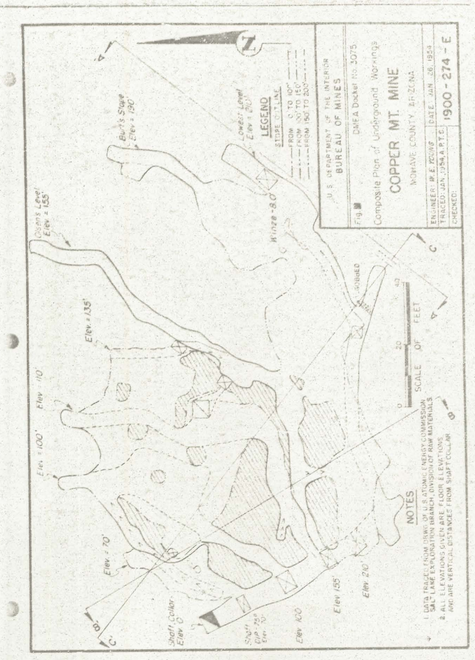
References Cited:

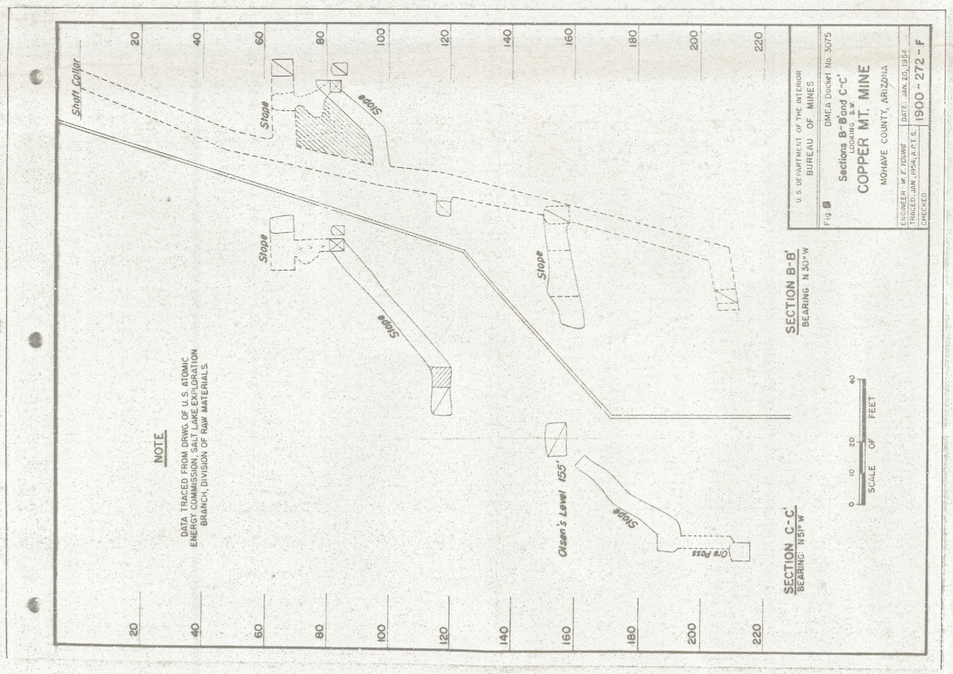
McNair, A. H., 1951, Paleozoic stratigraphy of part of northeastern Arizona: Bull. AAPG, vol. 35, no. 3, p. 503-541, March, 1951.

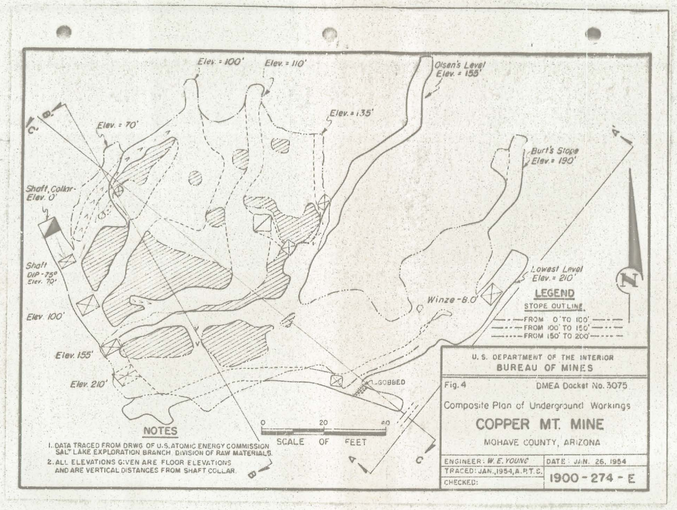


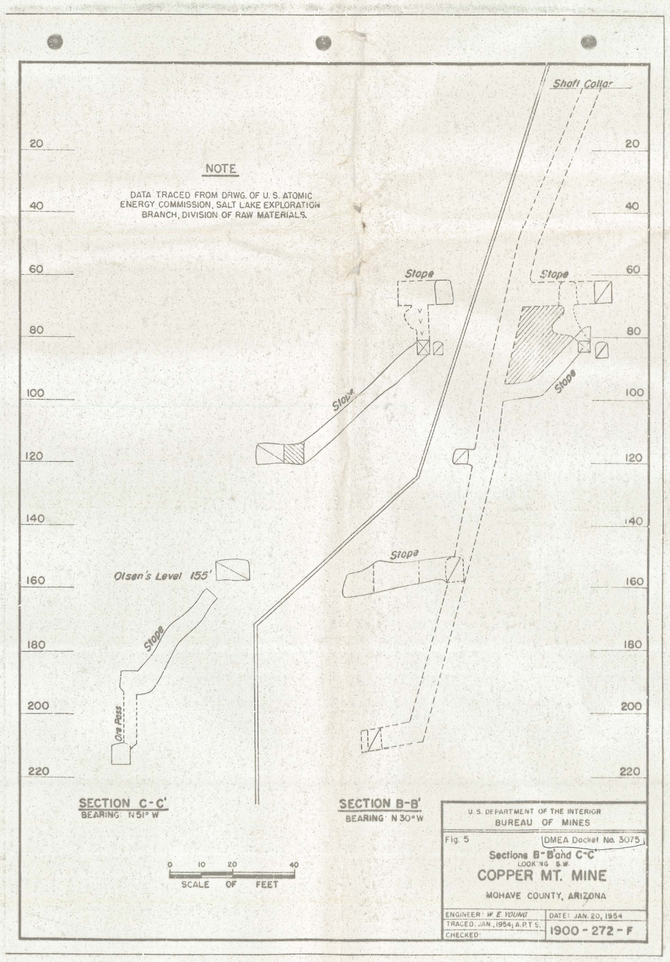












J. AND M. LEASING CO.
COX AND ROSS CLAIMS
MOHAVE COUNTY, ARIZONA
DMEA-3075
Copper-Uranium

Engineering Report

By W. H. Young
Mining Engineer
Bureau of Mines

J. AND M. LEASING CO.
COX AND ROSS CLAIMS
MOHAVE COUNTY, ARIZONA

CONTENTS

ILLUSTRATIONS

SUMMARY

The Cox and Ross claims, held by J. & M. Leasing Co., were examined on December 1, 1953, in response to a DMEA application for Government assistance. The claims include the Copper Mountain mine, an old property which has been worked intermittently over a long period for high-grade copper ores. The small size of the ore body in conjunction with inaccessibility of the property has undoubtedly limited development at an earlier date. The mine has been opened to the 210-foot level by an inclined shaft with levels at various intervals driven into the main ore shoot.

Access to the property is via a deep, narrow canyon, typical of the plateau country. Road maintenance in the canyon is costly and impractical. Further development of the area is dependent upon construction of an access road over the Kaibab-Coconino rim to eliminate the canyon road.

Recent discovery of uranium in the copper ore has enhanced the value of the property and interest therein. The Atomic Energy Commission mapped the underground workings of the Copper Mountain mine and is now studying the surrounding area. A project to make the area accessible by a road over the rim is under consideration by this agency.

Recommendation is made that a DMEA loan be granted. Proposals submitted by the loan applicants, however, are considered too ambitious and a modified program is recommended. The recommended program consists of construction of a headframe, rehabilitation of 210 feet of shaft, 100 feet of shaft sinking, and 250 feet of drifting and crosscutting. The estimated cost of this work is $24,253. It is recommended that Government participation be at the rate of 70 percent of the cost of the project. This is an average of the participation of 50 percent for copper and 90 percent for uranium. It is suggested that a short-form contract be drawn covering the recommended work.

INTRODUCTION

The Cox and Ross claims were examined December 1, 1953, by a geologist of the Geological Survey and an engineer of the Bureau of Mines. The examination was made in response to a request from the Field Team, Region IV, for appraisal of an application under docket No. DMEA 3075.

Examination of the underground workings of the Copper Mountain property was greatly facilitated by the use of maps supplied by the Atomic Energy Commission. Examination of the surface was limited to a short period because of inclement weather.

LOCATION AND PHYSICAL FEATURES

The Cox and Ross claims are in Mohave County, Arizona, on the north side of the Colorado River (fig. 1). The mine area lies in Andrus Spring Wash, approximately 6 miles northwesterly from the point where this drainage empties into the Colorado River. The specific

location appears to be Secs. 2 or 3, T. 32 N., R. 10 W., G. and S. R. B. and M.

The property is reached by driving south from St. George, Utah, on Highway 64 for 50 miles to the Walking X Ranch. At this point the road branches. The left-hand road leads to the town of Mt. Trumble (Dandyville). The right-hand road, which leads to the mine, continues south--a slightly improved county road. At a point 18.6 miles from the above fork, another poorly marked road branches to the left. This road leads to the head of Andrus Spring Wash and down the wash to the mine. The total distance from St. George to the mine is 96 miles.

The last 14 miles of the road in Andrus Spring Wash is subject to washout during flash floods. Over part of this distance, the road is in the bottom of a straight-walled, narrow canyon. Over much of the remaining distance, the road is on a wide, gravel-bottomed flood plain, strewn with coarse boulders of all sizes. Any shifting of the gravels by flood waters in either section completely obliterates any trace of the road. The nature of the terrain is such that any permanent improvement of the existing road is impossible. The yearly cost of keeping the existing road open has undoubtedly exhausted most of the profits from sale of the ores hauled from the property. The only permanent solution to the road problem lies in the construction of a road over the Kaibab-Coconino rim. Such a project is under consideration by the Atomic Energy Commission to make accessible this property and two other similar properties in the area.

The nearest shipping point is Cedar City, Utah. This point, on a branch line of the Union Pacific Railroad, is 150 miles from the mine. Shipment by rail from Cedar City to Garfield, Utah, is approximately 265 miles.

HISTORY AND PRODUCTION

Little is known of the early history of the mine. The first ore produced is reported to have been packed out on burros. Later, attempts were made to haul the ore in wagons through Andrus Spring Wash. The present lessees have attempted to keep this route open for trucking by use of a bulldozer. The small tonnage mined will not justify the expense for the use of this type equipment.

No figures are available for the tonnage and grade of ore mined previous to the period of the present lease. Smelter records for 1953 show the lessees shipped 125 tons which had an average grade of 15.4 percent copper. Although records are incomplete, the size of the stoped areas indicate that in excess of 3,000 tons of ore has been mined. There is very little waste material on the dump. The small amount present may be accounted for by the various drifts driven from the shaft. There is little or no material used as fill in the mine; thus most of the broken material from the stopes must have been shipped. It is unlikely that ore assaying below 15 percent copper could be mined because expenses incidental to mining, shipping and processing would preclude any profits. Reference is made by Hill of shipments from this property in 1913 which were said to carry 23 to 26 percent copper and from $3 to $4 per ton in silver.

1/ J. M. Hill, U.S.G.S. Bull. 580, p. 54, Copper King Mine.

Recent discovery of uranium in the ore has interested the Atomic Energy Commission. This agency has mapped the mine and made a scintillometer survey of the surface and underground workings.

OWNERSHIP AND EXTENT

The original property consists of two claims, the Cox and Ross Mine Claim and the Cox and Ross Mine Claim No. 1. Owners of an undivided three-fourths interest in these claims are: Mary Etta Cox, V. Loraine Cox, Anna G. Cox, Kenneth Cox, and Anna F. Cox, all of St. George, Utah. Donald M. Carter of Chicago, Illinois, is owner of one-fourth interest. Owner's consent to lien has been secured from the undivided three-fourths interest only.

James Wulfenstein and Mackarrin Wulfenstein of St. George, Utah, have a lease on the two claims. In addition, the lessees hold by right of location four other claims surrounding the two held under lease (fig. 6).

DESCRIPTION OF THE DEPOSIT

The rocks of the area are Pennsylvanian sandstone and shales of the Supai formation. The mine area is situated midway on the long bench between the steep-walled canyon of the Colorado and the Kaibab-Coconino rim which has been eroded and stepped back to the north. The sandstone beds are essentially flat lying in the area. The ore body occurs on the periphery of a circular zone of alteration. Within the zone the flat-lying sandstone beds are apparently undisturbed, but have been altered to a tan or buff color from the pink-to-reddish hues seen in the surrounding rocks. The alteration zone is probably 500 to 600 feet in cross section. Surface pits and diggings are seen on the south and east edges. It is reported that occurrences of copper mineralization encircle the zone. No copper is known to have been found within the zone of alteration, although it is reported that a small amount of gold ore has been mined from the central area.

The outcropping mineralization on which the shaft is sunk is on the southeast edge of the zone. The ore shoot dips steeply to the southeast. A slightly radioactive, iron-stained fissure which strikes N. 60° W., passes 200 feet south of the shaft (fig. 2).

ORE DEPOSITS

Copper mineralization has been worked at several points on the surface. The outcrop at the location of the shaft is the only one that has been developed to depth. The shaft is 210 feet deep and mineralization appears to have been persistent from the surface to the bottom level. Any separation between the zone of alteration and the surrounding sandstones is relatively indistinct. Minor breaks or faults may be mapped and brecciated sandstone is seen, but, for the most part, both are local. Structural control, in the form of

a break or wall between the altered sandstone and the unaltered sandstone, while not entirely lacking, is certainly not a marked feature of this deposit.

The shaft dips to the southeast about 75 degrees. A divergence in direction exists between the course of the shaft and the rake of the ore shoot. The distance between the mineralized zone and the shaft increases with each succeeding level. The distance from the shaft to the ore shoot on the 210-foot level is about 120 feet. At the 310-foot level it is estimated that the ore shoot is 150 feet northeast of the shaft.

The principal copper minerals are malachite and azurite with smaller amounts of cuprite and bornite. The ore was recently found to be radioactive and to contain uranium. A scintillometer survey and sample map (fig. 3) prepared by the Atomic Energy Commission shows a concentration of uranium mineralization on the 210-foot level in line with the zone of high copper mineralization. The uranium mineral has been identified as meta-autunite.

All work has been done within the zone of oxidation. The increase of uranium mineralization at the same elevation at which the workings encountered water may be significant. The present work has not progressed far enough to indicate the effect a water table may have on copper mineralization. A criterion for depth of mineralization for

this type of deposit is not known. A deposit in the area which may be of similar occurrence has been described by Hill.[2] Mineralization in this deposit was limited to a depth of 250 feet.

ORE RESERVES

There are no developed ore reserves on the property. The ore has been mined from the stopes between the surface and the 210-foot level (fig. 4). The present lessees attempted to sink on the ore below this level, but encountered water and were forced to abandon the work at a depth of 8 feet. The ore appears to continue below the 210-foot level.

No information is at hand regarding the grade of other outcrops on the periphery of the altered zone.

PROPOSED EXPLORATION

The applicant proposes to explore the deposit by deepening the shaft 200 feet and drifting to intersect the ore shoot at 100-foot intervals. The drifts proposed will bear northeast from the shaft and are to be driven 250 feet on the 300-foot level and 250 feet on the 400-foot level. In addition, the applicant proposes two crosscuts. One is to be driven on the 200-foot level in a S. 65° W. direction in order to intersect a projection of the radioactive, iron-stained fissure seen on the surface. This crosscut will be 300 feet in length. It is also proposed to crosscut from the 300-foot level in a N. 25° W. direction for a distance of 100 feet to intersect the main mineralized zone.

2/ See reference cited in footnote 1, p. 46, Grand Gulch Mine.

Incidental to doing this work, the applicant asks for assistance in rehabilitating 210 feet of shaft and in construction of a headframe, hoist house, ore bin, and combination boarding house and bunk house. The estimated cost of the project is $34,508.

The application lists the following equipment available for use on the project:

1 1941 Ford 1½-ton truck
1 1948 International 2½-ton truck
1 1949 Studebaker ½-ton truck
1 Gardner-Denver compressor, 105-cfm.
1 hoist
1 HD7W Allis Chalmers caterpillar
4 jackhammers
1 steel bar and column
1 stoper
Hoses - 300 feet
Steel and bits for machines.

The application states that the applicant proposes to furnish his share of the project costs by depreciation from use of the above equipment. The applicant has given no figure regarding the values of the above pieces of equipment. It is estimated that the value of all the equipment is not in excess of $15,000. Only part of the equipment will be used in the proposed project.

The following part of the applicant's plan of exploration is recommended by the examining team:

1. Construct small headframe over shaft, with skip chute.
2. Rehabilitate shaft from surface to 210-foot level.
3. Sink shaft an additional 100 feet.
4. Crosscut from bottom of shaft to intersect mineralized zone -- 25 to 50 feet.
5. Drift along mineralized zone in a northeast direction 200 feet.

The above plan is designed to test the downward continuation of the uranium-copper mineralization and to serve as a basis from which to appraise the property for development on a larger scale.

The examining team does not recommend more than 100 feet of shaft work at this time because it appears the property can be developed at depth to better advantage by driving an adit 600 to 1,000 feet. The increased distance between the bottom of the shaft and the ore shoot, as each succeeding level is reached, limits the serviceability of the shaft.

Because of the remoteness and inaccessibility of the property, it is estimated that 9 months will be required to complete the above work. It is recommended that construction of a bunk house, hoist house and ore bin be held up pending completion of the recommended project work. Construction of the headframe is necessary to accomplish the proposed work. The steepness of the area at the shaft collar will

necessitate a headframe of unusual design. Rehabilitation of the 1½-compartment, inclined shaft from the surface to the 210-foot level is also a necessity. The timber has rotted and fallen out in places and the shaft is now considered unsafe. The applicant stated his intention of retimbering with a full set and lagging solid all around the shaft. This is not considered necessary because of the good condition of the wall rock. It is recommended that timbering consist of 6" x 6" wall plates, spaced at 6-foot intervals along the footwall. These are to be lined vertically with two 2" x 12" lagging on which the skip rails are to be placed. A 2" x 4" ladderway is to be installed on one side of the shaft. The shaft was timbered in this manner previously. It is recommended that bulkheads be installed at 50-foot intervals in the shaft with necessary clearance openings for skip and manway.

It is believed that any water encountered in sinking the shaft can be bailed from the shaft. No pumping equipment is believed necessary.

The hoist now located on the property is makeshift equipment powered by an International truck engine. It is doubtful if it would be adequate to sink to the 300-foot level. It is recommended that a hoist be rented to complete the project work.

ESTIMATE OF COSTS

Construction of headframe and skip dump

(Time for completion - one month)

Labor and supervision		
3 men - 25 days at $14 per day	$1,050.00	
1 supervisor, $400 per month	400.00	
1 bookkeeper (part time) $50 per month	50.00	
Payroll taxes, liability insurance, etc., at 12 percent of above, 1,500 x .12	180.00	$1,680.00
Operating materials and supplies		
1,500 board feet lumber, 8" x 8" at $130 M	$ 195.00	
500 board feet lumber, 3" x 12" at $130 M	65.00	
500 board feet lumber, "dimensional" at $130 M	65.00	
Nails, bolts, etc.	25.00	
Miscellaneous small tools, gas, oil, etc.	150.00	$ 500.00
Operating equipment - depreciation		
Trailer house	$ 25.00	
1 International 2½-ton truck	33.33	
1 Studebaker ½-ton truck	25.00	83.33
Total		$2,263.33

Rehabilitation of 210 feet of shaft

(Time for completion - one month)

Labor and supervision		
3 men - 25 days at $14 per day	$1,050.00	
1 supervisor, $400 per month	400.00	
1 bookkeeper (part time) $50 per month	50.00	
Payroll taxes, liability insurance, etc., at 12 percent of above, 1,500 x .12	180.00	$1,650.00

Operating materials and supplies		
1,000 board feet lumber, 6" x 6" at $130 M	$130.00	
1,000 board feet lumber, 2" x 4" at $130 M	130.00	
500 board feet lumber, 2" x 4" at $130 M	65.00	
Nails, blocks, wedges, etc.	35.00	
Rails, 12-lb., 225 feet at $770 M, complete	173.25	
Miscellaneous small tools, gas, oil, etc.	250.00	$ 783.25
Operating equipment - purchase		
Skip, 1-ton capacity	350.00	$ 350.00
Operating equipment - rental		
1 gasoline-driven, single-drum hoist	$ 63.00	$ 63.00
Operating equipment - depreciation		
Trailer house	$ 25.00	
1 105-cfm. compressor	50.00	
1 International 2½-ton truck	33.33	
1 Studebaker ½-ton truck	25.00	133.33
		$3,009.58

Shaft sinking 100 feet

(Time for completion - 4 months)

Labor and supervision		
3 men - 100 days at $14 per day	$4,200.00	
1 supervisor, $400 per month	1,600.00	
1 bookkeeper (part time) $50 per month	200.00	
Payroll taxes, liability insurance, etc., at 12 percent of above, 6,000 x .12	720.00	$6,720.00

Operating materials and supplies		
1,750 board feet lumber at $135 M	$236.25	
Explosives, 100 feet at $2.50 per foot	250.00	
Pipe, 100 feet 2-inch black, at $0.40 per foot	40.00	
Trunk, 100 feet 12-lb., complete, at $770 M	77.00	
Drill steel and bits, 100 feet at $1.00 per foot	100.00	
Nails, bolts, etc.	50.00	
Miscellaneous small tools, gas, oil, etc.	1,400.00	
Repairs to equipment	330.00	$2,453.25
Operating equipment - rental		
1 gasoline-driven, single-drum hoist	$252.00	$ 252.00
Operating equipment - depreciation		
1 trailer house	$100.00	
1 105-cfm. compressor	200.00	
1 International 2½-ton truck	133.33	
1 Studebaker 1/2-ton truck	100.00	
1 HD7W Allis Chalmers tractor	109.76	
1 jackhammer, mounted	40.00	
1 bar and column	24.00	
1 mine car	13.32	$ 720.41
Total		$10,145.66

Drifting and crosscutting 250 feet

(Time for completion - 3 months)

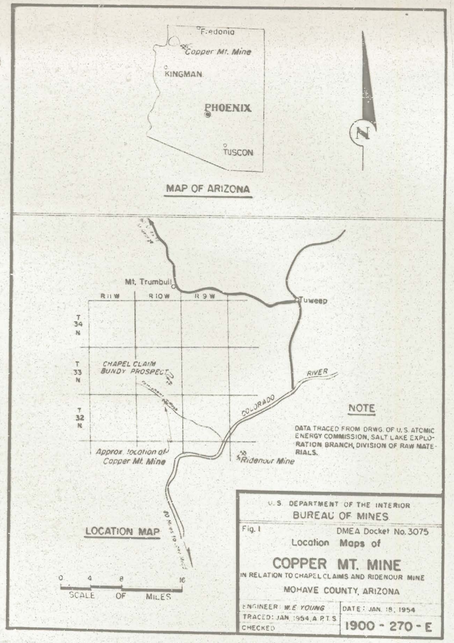
Labor and supervision		
3 men - 75 days at $14 per day	$3,150.00	
1 supervisor, $400 per month	1,200.00	
1 bookkeeper (part time) $50 per month	150.00	
Payroll taxes, liability insurance, etc., at 12 percent of above, 4,500 x .12	540.00	$5,040.00

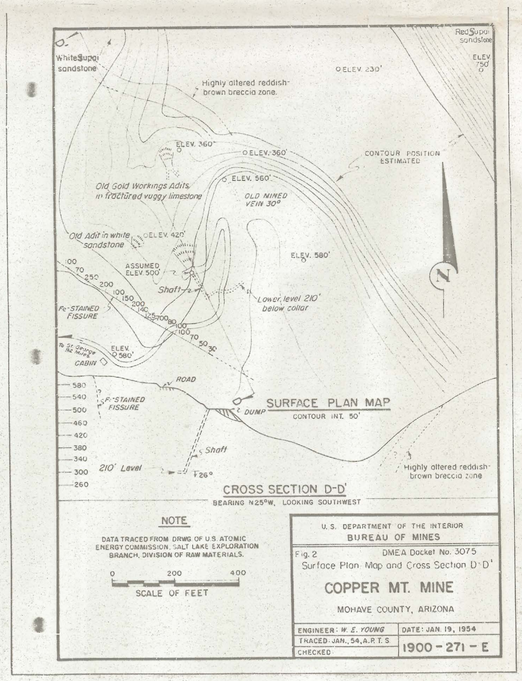
drifting and crosscutting		3,550.00
1 superintendent, $400 per month, 9 months		3,600.00
1 bookkeeper (part time) $50 per month, 9 months	450.00	
		$13,500.00

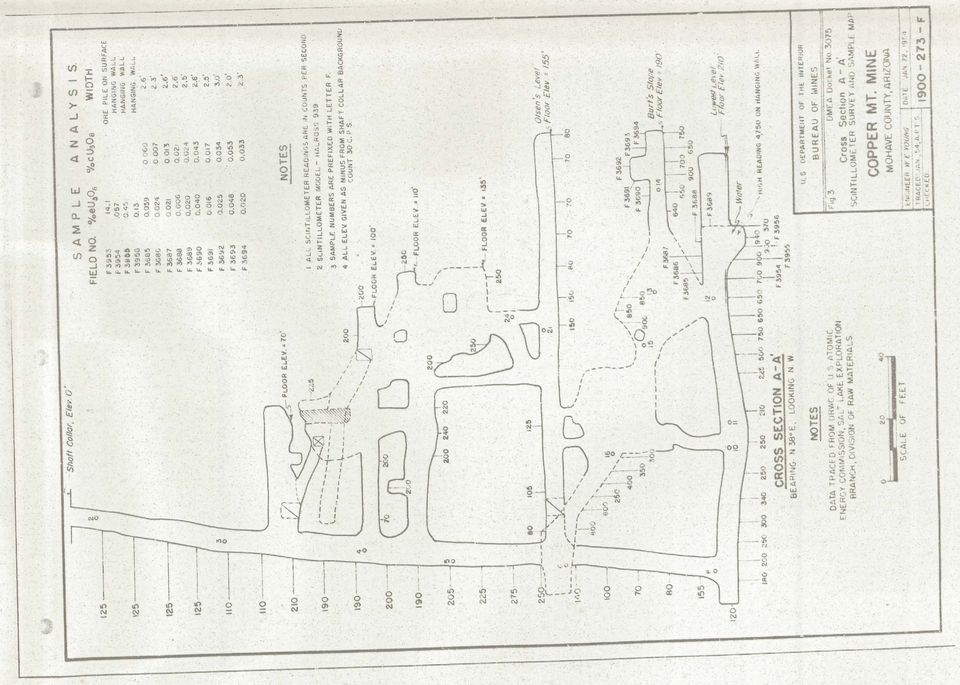
Total equipment cost ——— $2,329.07

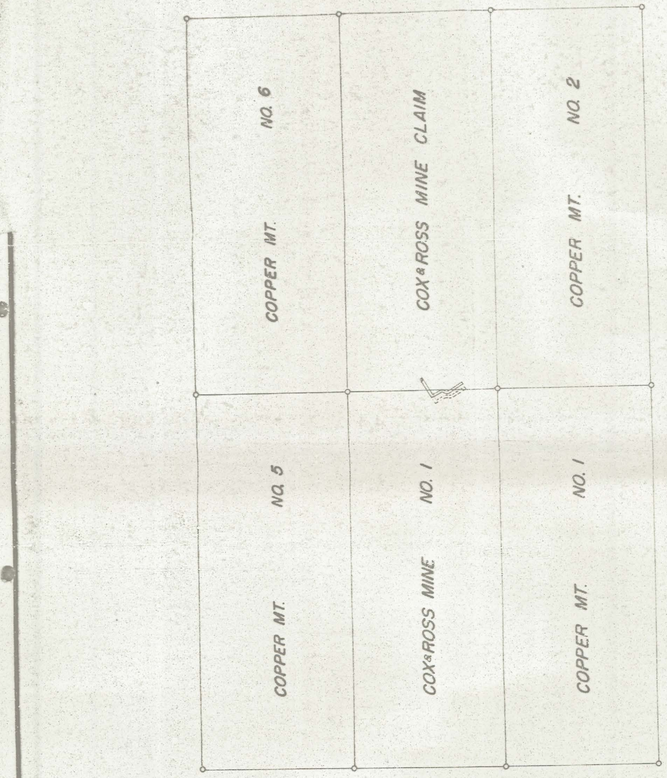
*Allow for use 1/3 of the time. Superintendent to serve as operator.

and to aid in execution of the work.







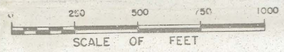


LEGEND

EXISTING UNDERGROUND WORKING.

PROPOSED UNDERGROUND WORKING.

SHAFT.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

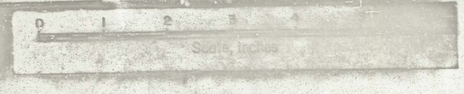
Fig. ■ DMEA Docket No. 3075

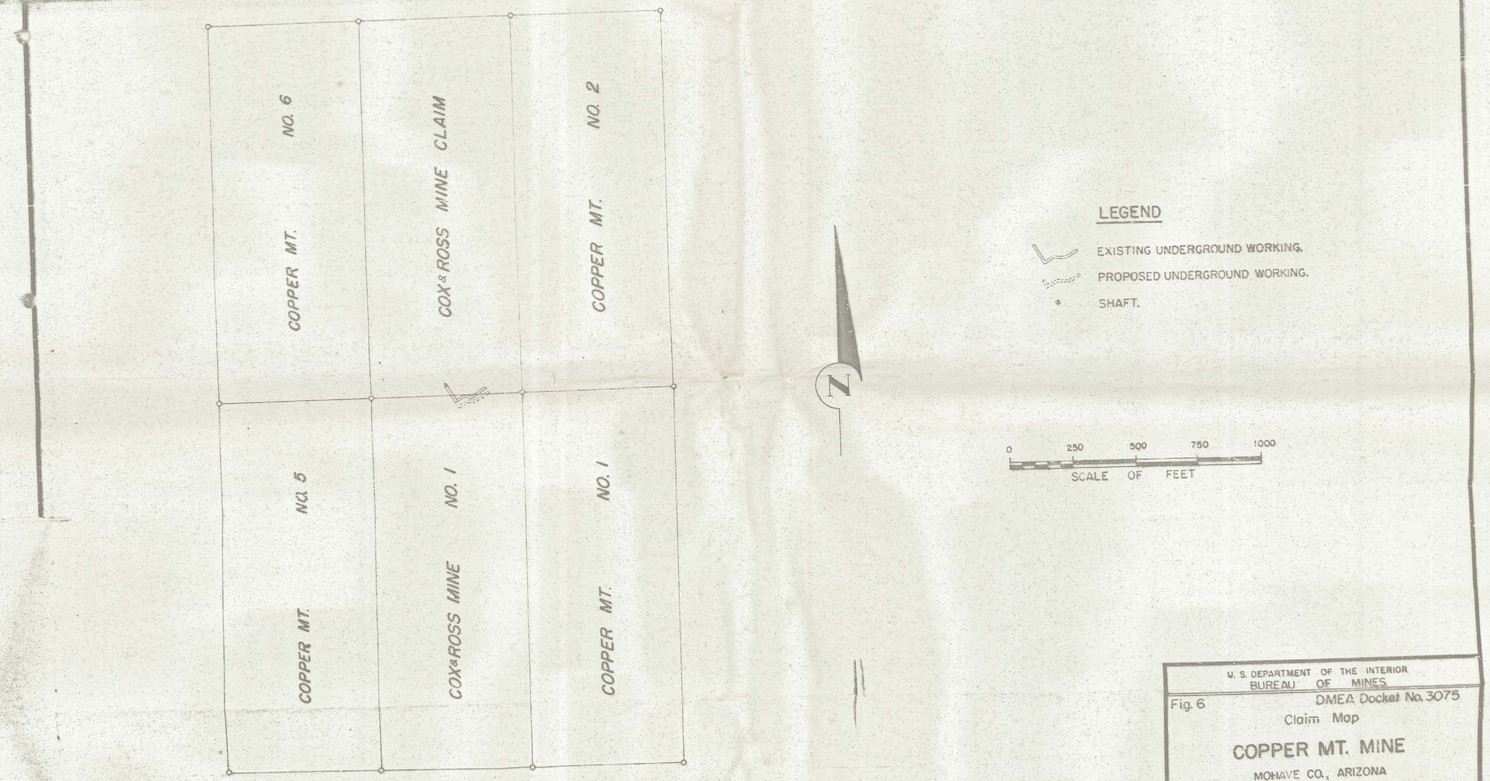
Claim Map

COPPER MT. MINE

MOHAVE CO., ARIZONA

ENGINEER: W. E. Young	DATE: JAN. 31, 1954
DRAWN: JAN., 1954; BY: A. P. T. S.	1900 - 277 - D
CHECKED:	





U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Fig. 6 DMEA Docket No. 3075

Claim Map

COPPER MT. MINE

MOHAVE CO., ARIZONA

ENGINEER: W. E. Young	DATE: JAN. 31, 1954
DRAWN: JAN., 1954, BY: A. P. T. S.	1900 - 277 - D
CHECKED:	