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Arizona Department of Mines and Mineral Resources Mining Collection

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PRINTED: 09/12/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: ZONIA

ALTERNATE NAMES:

YAVAPAI COUNTY MILS NUMBER: 407

LOCATION: TOWNSHIP 11 N RANGE 4 W SECTION 12 QUARTER ALL
LATITUDE: N 34DEG 18MIN 05SEC LONGITUDE: W 112DEG 37MIN 40SEC
TOPO MAP NAME: PEEPLES VALLEY - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
COPPER OXIDE
SILVER
GOLD

BIBLIOGRAPHY:
CLAIMS EXTEND INTO SEC. 13 & 14
BLM MINING DISTRICT SHEET 291
ADMMR ZONIA MINE FILE
KUMKE,C.A. ZONIA COPPER MINE USBM RI4023 1947
USBM WAR MINERALS REPORT 1942 REPORT 38 & 120
USGS BULL 782 P 177
AZBM BULL 129 P 59, 62
MAPS UPSTAIRS - FLAT STORAGE DRAWER 2

Loc. S12, T11N, R4W

ZONIA MINE

YAVAPAI COUNTY

T11N R4W Sec12
Walnut GroveDist.

World Mining Dec. 1965 p. 68

Skillings Mining Review May 13, 1967 p. 16

War Minerals Reports 120 (1943)
CFW Library 38 (1942)

ABM Bull. 180, p. 136

SMR 5/5/73, p. 20

Arizona Mining Journal Jan. 15, 1922 p. 19

SMR December 22, 1973, p. 5
" March 23, 1974, p. 13
" April 27, 1974, p. 10

Arizona Legislative Review, 3-2-77
Application for authority to transact business
of McAlester Fuel Co.

ABM Bull. 129 p. 59, 62-64

USGS Bull. 782 p. 177

RI 4023

Contractor & Engineer 6/73, p. 37

MAPS - Upstairs in the flat storage area in drawer two

LUNDIN, R., 1985, CENTRAL AZ GEO. SOC. FIELD TRIP GUIDE
"THE ZONIA MINE AREA" (GEO FILE)

ROM: USGS DDS 20
MINERAL RES. DATA SYS.
(MRDS)
PRINTED 9/1998

RECNO M800384
REC_TYPE S
USER_FIELD *U94/6
REP_DATE 81 12
FIL_LINK USBM 004 025 0017, USBM 004 025 1639; CIMRI
REP ROTH, FRANCES A. (DEWITT, ED)
REP_AFF ABGMT
SYN ZONIA MCMAHON MINE, ZONIA GROUP, ZONIA, CLAIMS INCLUDE ZONIA GROUP, MCMAHON, BLACK PRINCE, SHAMROCK, DEFIANCE, CUPRITE, FAIRPLAY, COPPEROPOLIS
DIST ZONIA DISTRICT
COUNTY YAVAPAI
STATE_CODE AZ
CTRY_CODE US
PHYS 12 BASIN AND RANGE
DRAIN 15070103
LAND_ST 01
ELEV 4640 FT
UTM_N 3796800
UTM_E 349800
UTM_Z +12
TOWNSHIP 011N
RANGE 004W
SECTION 11, 12, 13, 14
SECT_FRACT S/2 OF SW; NW OF NW; NE OF NE
MERIDIAN GILA AND SALT RIVER
POSITION ABOUT 3 MILES EAST OF PARKER MESA; 8 MILES SE OF KIRKLAND.
LOCATION UTM LOCATION MEASURED TO POSITION OF MCMAHON SHAFT AS DETERMINED FROM MAP OF THE WORKINGS; OPEN PIT PORTION OF MINE TO SOUTH OF SHAFT.
SITE ZONIA
LAT 34.3033
LONG -112.6322
CTRY_NAME UNITED STATES
COMMOD CU AG AU PB
ORE_MAT MALACHITE, CHRYSOCOLLA, CHALCOCITE, CUPRITE, CHALCOCITE, MELACONITE, SILVER, GOLD
GAD SAMPLING INDICATED 0.2 TO 4.0% CU
MAJOR CU
MINOR AG AU PB
CLH_USE 94/09/12
PROD S
LOC_STRUCT MASSIVE SULFIDE LENSES, PARALLEL FOLIATION
STATUS 8
YR_DISC 1880
NAT_DISC B
YRFST_PROD 1880'S
YRLST_PROD 1974 OR 1975
OWNER MCALASTER INTERSTATE (1980)
OPER ANTIOCH RESOURCES (1986, VANCOUVER, BRITISH COLUMBIA; JOINT VENTURE WITH QUEENSTAKE RESOURCES); PHELPS DODGE CORP. (1986, PHOENIX, ARIZ.)
EXPL_COM USBM WORK IN 1942 CONSISTED OF DIAMOND-DRILLING 11 HOLES AT 100-FOOT INTERVALS ALONG STRIKE OF ORE BODY, SEVEN TRENCHES AT 100-FOOT INTERVALS, 5 FEET DEEP TOTALING 1795 FT. MCALASTER FUEL OPERATED THE PROPERTY IN 1975. IN 1986, ANTIOCH RESOURCES AND PHELPS DODGE CORP. HELD DIFFERENT PARTS OF THE CLAIM GROUP. ANTIOCH WAS LOOKING AT CU-AG-AU MINERALIZATION AND PHELPS DODGE WAS LOOKING AT COPPER OXIDES. ANTIOCH REHABILITATED THE UNDERGROUND WORKINGS AND

DID DETAILED MAPPING TO REVIEW THE PROPERTY'S PRECIOUS METAL RESOURCES. PHELPS DODGE WAS REVIEWING THEIR PROPERTY FOR OPERATION WITH A SOLVENT EXTRACTION ELECTROWINNING PLANT. TO PREPARE THE ORE BODY FOR IN SITU LEACHING, THE ORE BODY WAS SHOT USING 4,140,000 LB OF ANFO IN APRIL, 1973. THIS SHOTE IS ETIMATED TO HAVE BROKE MORE THAN 5,000,000 ST OF OR E.

DEP_TYPE	MASSIVE SULFIDE, DISSEMINATED/VEINS, HYDROTHERMAL
DEP_FORM	STRATIFORM, IRREGULAR, LENS, VEINLETS
DEPTH_BOT	874
D_B_U	FT
MAX_LEN	1600
M_L_U	FT
MAX_WID	874
M_W_U	FT
MAX_THICK	200
M_T_U	FT
DEP_SIZE	S
STRIKE	NE
DIP	55-60NW
DDESC_COM	DEPOSIT IS LOW GRADE, OXIDE AND SULFIDE FACIES MASSIVE SULFIDE DEPOSIT IN PROTEROZOIC METAVOLCANIC ROCKS. COPPER MINERALS DISSEMINATED IN SCHIST AND MONZONITE PORPHYRY INTRUSION REPORTED IN FILES. MINERALIZATION IN MONZONITE INTRUSION QUESTIONABLE AS SAME AGE AS ZONIA. MASSI VE.
QUAD250	PRESCOTT
DEPTH_WK	874
D_W_U	FT
LEN_WK	7000
L_W_U	FT
OV_LEN_WK	1700
O_L_U	FT
OV_WID_WK	200
O_W_U	FT
OV_AREA_WK	340000
O_A_U	SQ FT
DWORK_COM	MAIN WORKINGS INCLUDE THE MCMAHON SHAFT ON THE CUPRITE CLAIM AND AN OPEN PIT TO THE SOUTH OF THE SHAFT; ALSO THERE ARE SEVERAL INCLINED RAISES, WHICH CONNECT WITH THE MCMAHON UNDERGROUND AND TWO MAJOR LEACHING BASINS. FROM 1961 TO ITS CLOSING IN 1974, ZONIA WAS OPERATED AS AN OPEN PIT MINE, RETRIEVING COPPER ORE BY HEAP-LEACH TECHNIQUES
MIN_AGE	PROT
NORE_MINS	QUARTZ, PYRITE, SERICITE, CALCITE
ORE_CNTL	STRATIGRAPHY; ZONES OF PRONOUNCED SCHISTOSITY, SPARSELY DISSEMINATED THROUGHOUT SCHIST AND MONZONITE ALSO, FRACTURING.
REG_STRUCT	FOLIATION AND BEDDING IN METAVOLCANIC ROCKS TRENDS N 40 E
ALTER	SERICITIZATION, CHLORITIZATION
CONC	OXIDATION AND ENRICHMENT AT NEAR SURFACE
CONT_CODE	NA
GEOL_COM	IGNEOUS ROCKS OCCUR 0.4-0.6 MILES NORTH OF THE ZONIA MINE. THE IGNEOUS ROCKS ARE YOUNGER THAN THE METAVOLCANIC ROCKS AND ARE APPARENTLY UNRELATED TO THE MASSIVE SULFIDE DEPOSITS
GEN_COM	ZONIA AND MAMAHAN GROUPS OF CLAIMS. ZONIA CONSISTS OF 255.5 ACRES IN 14 PATENTED CLAIMS. MCMAHAN GROUP CONSISTED OF 175 ACRES OF UNPATENTED CLAIMS. MOST ASSESSMENT WORK DONE WITHIN THE UNION, BLACK PRINCE, SHAMROCK, UMPIRE, AND CUPRITE CLAIMS. MOST OF THE ORE BODY IS INDICATED WITHIN THE CUPRITE CLAIM. RECORD # M004613 BY K.H. JOHNSON AND S.C. CREASEY HAS BEEN INCORPORATED INTO THIS THIS RECORD AND

	DELETED FROM THE MRDS MASTER FILE. ; INFO.SRC : 1 PUB LIT; 2 UNPUB REPT
REF	ABGMT CLIPPINGS FILES|ABGMT -USBM FILE DATA|AZ DEPT OF MIN RESOURCES FILE DATA|USBM FILE DATA (REEL 4000-60).|USBM R.I. 4023 (1947).|NIEMUTH, N.J., 1987, ARIZONA MINERAL DEVELOPMENT 1984-1986: ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES DIRECTORY 29, 46 P.|SAWYER, M.B., GURMENDI, A.C., DALEY, M.R., AND HOWELL, S.B., 1992, PRINCIPAL DEPOSITS OF STRATEGIC AND CRITICAL MINERALS IN ARIZONA: U.S. BUREAU OF MINES SPECIAL PUBLICATION, 334 P.
CONT_NAME	NORTH AMERICA
STATE_NAME	ARIZONA
WORK_TYPE	B
AP_COM	POSSIBLY A FEW HUNDRED TONS OF HAND-SORTED ORE PRODUCED. NO PRODUCTION FIGURES (1947).
RPR_ITEM	ORE-DEM
RPR_ACC	EST
RPR_AMT	35000.
RPR_U	ST
RPR_YEAR	1987
RPR_GRADE	0.31% CU, OXIDE ORE
RPR_SOURCE	SAWYER AND OTHERS, 1992.
UPD_DATE	79 11; 93 02
UPDATER	JOHNSON, K.H. (CREASEY, S.C.); ORRIS, GRETA J.
COMMOD_TYP	M
QUAD24	PEEPLES VALLEY (1969)
DATE_ISSUE	95/5/18
UPD_AFF	USGS; USGS
PROF_ID	100
PROF_LOC	100
PF_COMMOD	100
PROF_EXPL	100
PFDESC_DEP	50
PFDESC_WRK	100
PROF_GEOL	64
PROF_REF	100
PPROD_RESV	20
PROF_ALL	81
HR_AGE_MV	PROT PROB >1750 M.Y.
HR_TYPE_MV	METARHYOLITE, METAANDESITE, METATUFF; SERICITE SCHIST
HR_NUMBER	1
AR_AGE_MV	PROT
AR_TYPE_MV	RHYOLITE, ANDESITE, TUFF, MONZONITE PORPHYRY
AR_NUMBER	1
HUC	15070103

PRINTED 09/14/98

ARIZONA COPPER RESERVES

COMPILED BY

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

PROPERTY:

ZONIA

OPERATOR\OWNER:

Arimetco International Inc.
335 N. Wilmot Road, #400
Tucson, AZ 85711
602-748-2600

LOCATION INFORMATION:

TOWNSHIP 11 N RANGE 4 W SECTION 12
COUNTY - Yavapai AZMILS - 407
DESCRIPTION - 30 miles north of Wickenburg

ORE TYPE AND RESERVE INFORMATION:

Acid Soluble - 30 MILLION TONS AT 0.38% Cu
Acid Soluble - 7 MILLION TONS AT 0.24% Cu (a)

RESERVE INFO. - (a) Material in existing leach heaps.

SOURCES:

Arimetco International Inc. Annual Report 1992.

COMMENTS:

Mine listed for sale in Northern Miner 9/15/97.

file - nothing else

* GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT CLIPPING FILES >

REFERENCE 2 F2 < ABGMT - USBM FILE DATA >

REFERENCE 3 F3 < AZ DEPT OF MIN RESOURCES FILE DATA >

REFERENCE 4 F4 < USBM FILE DATA (Reel 4000-60) >

F5 < USBM R.I. 4023 (1947) >

B50 < USBM-004 025 16397 >

L110 < SULFIDE SYSTEM >

M220 < TO ITS CLOSING IN 1974, ZONIA WAS OPERATED AS AN OPEN PIT MINE, RETRIEVING COPPER ORE BY HEAP-LEACH TECHNIQUES >

NBS < THAN THE METAVOLCANIC ROCKS AND ARE APPARENTLY UNRELATED TO THE MASSIVE SULFIDE DEPOSITS >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

RECORD NUMBER B10 < >

*RECORD TYPE B20 < X, 1, M >

DEPOSIT NUMBER B40 < >

REPORT DATE G1 < 8, 1, ✗, 1, 2 > (YR. MO.)

*INFORMATION SOURCE B30 < 1, 2 >

*FILE LINK IDENT. B50 < USBM-004 025 0017 >

REPORTER(SUPERVISOR) G2 < ROTH, FRANCES A. (last, first, middle initial) (DEWITT, ED (last, first, middle initial))

REPORTER AFFILIATION G5 < ABGMT >

*SITE NAME A10 < ZONIA MCMAHON MINE >

SYNONYMS A11 < ZONIA GROUP, ZONIA >

LOCATION

MINING DISTRICT/AREA A30 < ZONIA DISTRICT >

*COUNTY A60 < YAVAPAI >

*STATE A50 < A, Z >

*COUNTRY A40 < U, S >

*PHYSIOGRAPHIC PROV A63 < 1, 2, ✗ >

*DRAINAGE AREA A62 < 1, 5, 0, 7, 0, 1, 0, 3, ✗ >

*LAND STATUS A64 < 0, 0, ✗, ✗, ( ) >

*QUADRANGLE NAME A90 < PEEPLES VALLEY (1, 9, 6, 9) >

*QUADRANGLE SCALE A100 < 2, 4, 0, 0, 0 >

SECOND QUAD NAME A92 < ( ) >

SECOND QUAD SCALE A91 < >

*ELEVATION A107 < 4, 6, 4, 0, ✗, F, T >

UTM

*NORTHING A120 < 3, 7, 9, 6, 8, 0, 0 >

*EASTING A130 < 3, 4, 9, 8, 0, 0 >

*ZONE NUMBER A110 < +, 1, 2 >

*ACCURACY

ACCURATE ACC (circle)

ESTIMATED EST < >

GEODETIC

*LATITUDE A70 < - - N >

*LONGITUDE A80 < - - W >

CADASTRAL

*TOWNSHIP(S) A77 < 0, 1, 1, N, ✗, ✗, ✗ >

*RANGE(S) A78 < 0, 0, 4, W, ✗, ✗, ✗ >

*SECTION(S) A79 < 12, ✗, 13, ✗, 14, ✗ >

*SECTION FRACTION(S) A76 < S 1/2 OF SW ; NW OF NW ; NE OF NE >

*MERIDIAN(S) A81 < GILA AND SALT RIVER >

*POSITION FROM NEAREST PROMINENT LOCALITY A82 < ABOUT 3 MILES EAST OF PARKER MESA >

*LOCATION COMMENTS A83 < UTM LOCATION MEASURED TO POSITION OF MCMAHON SHAFT AS DETERMINED FROM MAP OF THE WORKINGS; OPEN PIT PORTION OF MINE TO SOUTH OF SHAFT. >

** ESSENTIAL INFORMATION

+ ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

Pb

COMMODITY INFORMATION

COMMODITIES PRESENT C10 < C,U, | A,G, | A,U, >

ORE MINERALS C30 < MALACHITE, CHRYSOCOLLA, CHALCOCITE, CUPRITE, CHALCOCITE

COMMODITY SUBTYPES C41 <

GEN. ANALYTICAL DATA C43 < Pb

COM. INFO. COMMENTS C50 <

* SIGNIFICANCE

	PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR < C,U, >	MAIN COMMODITIES PRESENT C11 < >
MINOR PRODUCTS	MINOR < A,G, | P,B | A,U, >	MINOR COMMODITIES PRESENT C12 < >
POTENTIAL PRODUCTS	POTEN < >	
OCCURRENCES	OCCUR < >	OCCURRENCES OCCUR < >

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION YES (circle) PRODUCTION SIZE SMLL MED LGE (circle one)	PRODUCTION UND NO (circle one)

*STATUS — EXPLORATION OR DEVELOPMENT

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20 < 4 >	STATUS AND ACTIVITY A20 < >

*DISCOVERER L20 <

*YEAR OF DISCOVERY L10 < > *NATURE OF DISCOVERY L30 < > *YEAR OF FIRST PRODUCTION L40 < 1880'S > *YEAR OF LAST PRODUCTION L45 < 1974

*PRESENT/LAST OWNER A12 < MCALASTER INTERSTATE (1980)

*PRESENT/LAST OPERATOR A13 < MC ALASTER FUEL (1975)

EXPL./DEV.COMMENTS L110 < CLAIMS INCLUDED THE ZONIA GROUP (14 CLAIMS), AND THE MCMAHAN GROUP. THE PRINCIPLE CLAIMS IN THE GROUPS ARE BLACK PRINCE, SHAMROCK, DEFIANCE, CUPRITE, FAIRPLAY, COPPEROPOLIS

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 < STRATIFORM, MASSIVE SULFIDE

DEPOSIT FORM/SHAPE M10 < IRREGULAR, LENS

*DEPTH TO TOP M20 < > *UNITS M21 < > *MAXIMUM LENGTH M40 < 1600 > *UNITS M41 < FT

*DEPTH TO BOTTOM M30 < 874 > *UNITS M31 < FT > *MAXIMUM WIDTH M50 < 874 > *UNITS M51 < FT

DEPOSIT SIZE M15 < SMALL > M15 < MEDIUM > M15 < LARGE > (circle one) *MAXIMUM THICKNESS M60 < 2.00 > *UNITS M61 < FT

*STRIKE M70 < NE > *DIP M80 < 55-60 NW

*DIRECTION OF PLUNGE M100 < > *PLUNGE M90 <

DEP. DESC. COMMENTS M110 < COPPER MINERALS DISSEMINATED IN SCHIST AND MONZONITE PORPHYRY INTRUSION REPORTED IN FILES. MINERALIZATION IN MONZONITE INTRUSION QUESTIONABLE AS SAME AGE AS ZONIA MASSIVE

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND M130 BOTH M140 (circle one) *OVERALL LENGTH M190 < 1700 > *UNITS M191 < FT

*DEPTH BELOW SURFACE M160 < 874 > *UNITS M161 < FT > *OVERALL WIDTH M200 < 200 > *UNITS M201 < FT

*LENGTH OF WORKINGS M170 < 7000 > *UNITS M171 < FT > *OVERALL AREA M210 < 240000 > *UNITS M211 < SQ FT

DESC. OF WORK. COM. M220 < MAIN WORKINGS INCLUDE THE MCMAHON SHAFT ON THE CUPRITE CLAIM AND AN OPEN PIT TO THE SOUTH OF THE SHAFT; ALSO THERE ARE SEVERAL INCLINED RAISES, WHICH CONNECT WITH THE MCMAHON UNDERGROUND AND TWO MAJOR LEACHING BASINS. FROM 1961

GEOLOGY

AGE OF HOST ROCK(S) K1 < P.R.O.T, UNDATED, PROBABLY OLDER THAN 1750 MILLION YEARS

HOST ROCK TYPE(S) K1A < METARHYOLITE, METAANDESITE, META TUFF

AGE OF IGNEOUS ROCK(S) K2 < P.R.O.T, AS LINE K1

IGNEOUS ROCK TYPE(S) K2A < RHYOLITE, ANDESITE, TUFF

AGE OF MINERALIZATION K3 < P.R.O.T, UNDATED, PROBABLY PRE-1750 MILLION YEARS

PERT. MINERALS (NOT ORE) K4 < QUARTZ, PYRITE, SERICITE, CALCITE

ORE CONTROL/LOCUS K5 < STRATIGRAPHY, IGNEOUS ROCKS

MAJ. REG. TRENDS/STRUCT. N5 < FOLIATION AND BEDDING IN METAVOLCANIC ROCKS TRENDS N 40E

TECTONIC SETTING N15 <

SIGNIFICANT LOCAL STRUCT. N70 < MASSIVE SULFIDE LENSES PARALLEL FOLIATION

SIGNIFICANT ALTERATION N75 < SERICITIZATION, CHLORITIZATION

PROCESS OF CONC./ENRICH. N80 < OXIDATION AND ENRICHMENT AT NEAR SURFACE

FORMATION AGE N30 < P.R.O.T, UNDATED, PROBABLY OLDER THAN 1750 MILLION YEARS

FORMATION NAME N30A < UNNAMED METAVOLCANIC UNITS

SECOND FM AGE N35 <

SECOND FM NAME N35A <

IGNEOUS UNIT AGE N50 < P.R.O.T, UNDATED, YOUNGER THAN METAVOLCANIC UNITS

IGNEOUS UNIT NAME N50A < UNNAMED QUARTZ MONZONITE - GLANODIORITE

SECOND IG. UNIT AGE N55 <

SECOND IG UNIT NAME N55A <

GEOLOGY COMMENTS N85 < DEPOSIT IS LOW GRADE, OXIDE AND SULFIDE FACIES MASSIVE SULFIDE DEPOSIT IN PROTEROZOIC METAVOLCANIC ROCKS. IGNEOUS ROCKS OCCUR 0.4-0.6 MILES NORTH OF THE ZONIA MINE. THE IGNEOUS ROCKS ARE YOUNGER

GENERAL COMMENTS

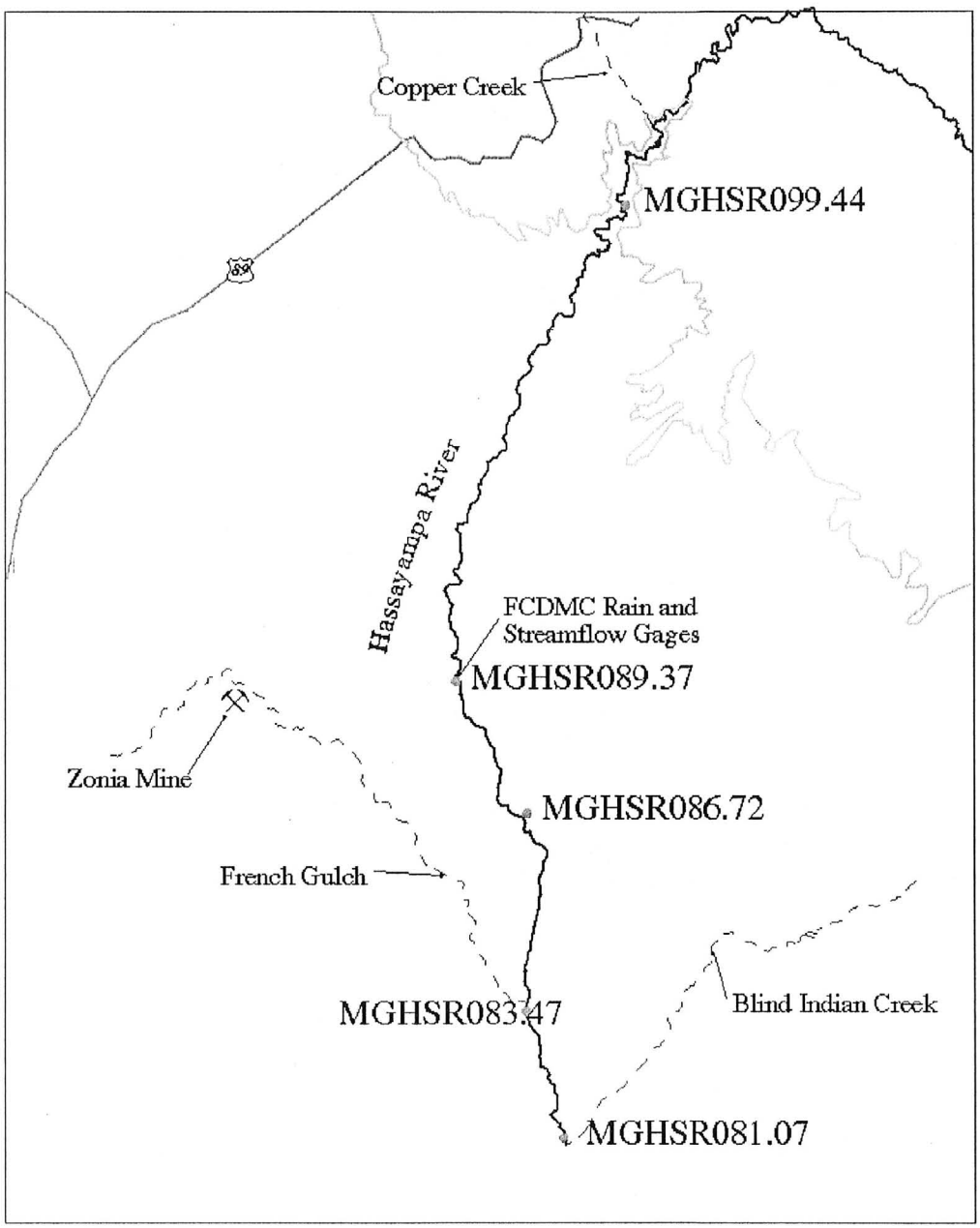
GENERAL COMMENTS GEN <

TMDLs FOR CADMIUM, COPPER, AND ZINC IN THE HASSAYAMPA RIVER HUC# 15070103-007

Prepared by:
Arizona Department of Environmental Quality
Water Quality Division
Hydrologic Support and Assessment Section/TMDL Unit

October 2, 2002

(ENTIRE PDF ON ADMMR SERVER NJN - 2004)



Legend:
- Sampling Sites
- Mines
- Rivers
- Ephemeral Streams
- Highways
- 5000' Contour

1 0 1 2 Miles

N

June 11, 2002

Figure 3b.
Lower Hassayampa River Sampling Sites
HUC#15070103-007B

3.4 Other Potential Sources

Zonia Mine is an inactive mine located on private land in the upper reaches of French Gulch (Sections 11, 12, 13, and 14, Township 11 N, Range 4 W) and is regulated under the Arizona Aquifer Protection Program. Seeps and springs near the Zonia Mine sometimes exceed the pH standard, the Partial Body Contact (PBC) standard for total manganese, and the A&W ephemeral (A&We) standards for cadmium, copper, and zinc. A sampling site (site MGHSR083.47) was established on the Hassayampa River downstream of the confluence of French Gulch; however, due to the ephemeral nature of French Gulch, contributing flow from French Gulch to the Hassayampa River was not observed during the sampling effort.

Numerous other historic mine shafts and smaller tailings piles exist in the watershed. As potential sources, ADEQ believes that these contribute minor loadings compared to the magnitude of dissolved cadmium, copper, and zinc loading from the Wetlands tailings pile, Maple Gulch drainage (McCleur tailings piles), and the Senator Mine adit and tailings pile.

No NPDES permitted point sources currently exist in the watershed of HUC#15070103-007.

4.0 TMDL CALCULATIONS

A TMDL is comprised of load allocations (LAs) for natural background loads and nonpoint sources, and wasteload allocations (WLAs) for point sources for a given waterbody. In addition, the TMDL must include a margin of safety (MOS) to account for any uncertainties in TMDL analysis. The sum of these components may not exceed the TMDL, conceptually denoted by the equation:

$$TMDL = \sum LAs + \sum WLAs + MOS \qquad \text{(US EPA, 1999)}$$

Only reasonably current, credible, and scientifically defensible data can be used in TMDL development (ARS, 2000). The use of historic water quality data was considered, however, these data were disregarded because 1) it was unclear whether lab data referred to total or dissolved metals concentrations, 2) the data lacked corresponding instantaneous flow measurements necessary to calculate loads, or 3) the data lacked sample hardness values necessary to calculate applicable standards. Data used in the calculation of the TMDLs were collected during spring, summer, fall, and winter in order to ensure consideration of any potential seasonal variation in the system.

Loads were calculated by multiplying the flow-weighted average or representative metal

File: Zonia Mine
Yavapai Co.

MAKE CHO. ANTIOCH RESOURCES

ANTIOCH RESOURCES

February 10, 1984

Mr. Donald L. Anderson
1182 W. Camino Sagasta
Green Valley, Arizona 85614
U.S.A.

Dear Don,

Thanks for your letter of January 24, 1984 giving an outline of your plans as well as your address and phone number.

For your information I attach a news release announcing the formation of our new Houston based precious metals exploration and development company. As you will note, our existing mineral asset is the former producing Zonia copper mine in Yavapai County, Arizona. We will be carrying out a modest exploration progam on this property this summer. The target will be volcanogenic massive sulfide deposits with, hopefully, significant precious metals values.

Please keep me posted of your activities.

Yours very truly,

C. Reynolds

for Richard C. Atkinson.

RCA/cr
Enclosure

708-850 West Hastings Street • Vancouver, B.C. • V6C 1E1 • (604) 684-6242 • Telex 04-508875

1CCh
ZONIA (A) YAVAPAI

PRESS RELEASE

March 26, 1993

Arimetco International Inc., is pleased to announce that it has completed pre-mine planning drilling at its Zonia Project near Prescott, Arizona. Prior drilling by other companies has been confirmed and reserves recalculated to determine minable reserves and grade. Column testing of the various ore types has been conducted and is on-going to determine expected recovery of copper from the various ore types.

A minable ore reserve of approximately 30 million tons has been defined at an ore grade of approximately 0.38% copper. Leach testing of run-of-mine ore indicates a recovery of approximately 70% during a sixty day leach cycle. In addition, the project has a total of 7 million tons of ore currently on leach heaps grading approximately 0.24% copper from prior mining and leaching activities.

The company has decided to commence development of the project and has begun the permitting process. It is anticipated that this phase of development will require no more than nine months since the mine has previously operated as a copper leaching operation.

Plant sizing will be approximately 35,000 pounds per day of cathode copper production, similar to the company's Johnson Camp Mine. Construction will require approximately eight months and development costs will be approximately $5.5 million, exclusive of mining equipment. The start date of construction will depend on the progress of permitting.

Drilling will recommence on the property in May since the orebody is open on strike.

For more information please contact:

H.R. Shipes
President
602-745-8882
602-745-0315 Fax

ANTIOCH RESOURCES

FOR IMMEDIATE RELEASE

HOUSTON, TEXAS — January 19, 1984 — At a special meeting of the directors of Antioch Resources, Inc. three new directors and officers were named to serve until the next annual meeting. Elected as new directors were Frank G. Woodruff, Peter B. Elliman, and T. McCullough Strother. They join Robert H. Allen, who is Chairman of the Board, Richard C. Atkinson, and Gregory B. Lipsker. Officers elected were Atkinson, President; Elliman, Executive Vice President; and R. Dean Graves, Vice President, Finance.

Antioch Resources became a publicly held corporation late in 1983 as a result of merging TBM Enterprises, Inc. into Antioch Resources at which time a group headed by Mr. Allen assumed control of the surviving company. Antioch Resources, whose principal asset is the Zonia Mine in Yavapai County, Arizona, will pursue a business course intended to place the company in the precious metals extraction industry.

Mr. Allen, who is also Chairman of the Board of Realm Resources, Inc., a director of First City National Bank of Houston and Federal Express Corporation, Messrs. Woodruff and Elliman were previously officers of Gulf Resources & Chemical Corporation. Mr. Allen was Chairman of the Board and Chief Executive Officer, and Mr. Woodruff was President and Chief Operating Officer and a director.

Mr. Atkinson is a graduate mining engineer with extensive experience in Canada, the United States and Australia. He is Chairman of the Board of Energex Minerals, Ltd., a Vancouver, B.C. exploration company where Mr. Allen serves additionally as a director. Mr. Graves, a Certified Public Accountant, was formerly with Arthur Andersen & Co.

— 30 —

For further information, contact R. Dean Graves (713) 951-0678

PORPHYRY COPPER MINERALIZATION ASSOCIATED WITH THE CENTRAL ARIZONA GREENSTONE BELT

CENTRAL ARIZONA GEOLOGICAL SOCIETY FIELD SYMPOSIUM

FEBRUARY 23-24, 1985

FIELD GUIDE

DAY 1

COMPILED AND WRITTEN BY:

RICHARD J. LUNDIN, PRESIDENT, WALLABY ENTERPRISES INC.

PHILLIP ANDERSON, PRECAMBRIAN RESEARCH AND EXPLORATION INC.

DR. PAUL GILMOUR, CONSULTANT

THE STAFF OF ANTIOCH RESOURCES LTD. AND QUEENSTAKE RESOURCES (USA)

THE ZONIA MINE AREA

BY THE STAFF OF ANTIOCH RESOURCES INC./QUEENSTAKE RESOURCES (U.S.A.) INC. AND RICHARD J. LUNDIN, PRESIDENT, WALLABY ENTERPRISES INC.

LOCATION, HISTORY AND PAST PRODUCTION:

The Zonia Mine Project holdings of Antioch Resources and Queenstake Resources (U.S.A.) Inc. are located in south-central Yavapai County in Townships 11 & 12 N, Ranges 3 & 4 W.(see figures 1 & 2)

The property consists of 721 acres of patented lode claims, 62 unpatented lode claims, 22 unpatented mill site claims and a one half interest in 52 unpatented lode claims all located in the Walnut Grove Mining District.

Mineral exploration and developement has been conducted since the 1890's with the location of oxide copper ore bodies and the possibility of delineating sulfide copper and gold ore zones. During this period an effort was made to smelt the near-surface high grade, oxidized copper ores. In 1910, the Shannon Copper Co. drilled a series of six churn drill holes in search of sulfide mineralization but were unsuccessful. The property was operated by a syndicate that sank the Cuprite or McMahan shaft to a depth of 874 feet and did developement work on five levels. Hammon Copper Company acquired the property in 1927 and planned to mine the oxide ore and process it via the acid leaching process. There was considerable underground developement on the 210 and 335 levels and a leaching plant with a projected capacity of 600 tons per day was constructed. The property was never put into major production and Hammon abandoned the venture in 1930 due to the onset of the Depression. During this 1927-1930 period, Hammon Copper Co. personnel extensively sampled areas north of the existing copper workings and encountered anomalous to near-ore grade gold values associated with extensive, silicious zones in the Precambrian felsic lithologies.

According to available U.S. Bureau of Mines Figures, the total production from the Zonia Mine is in excess of 50 million pounds of copper. Gold production from the various lode deposits within the holdings is thought to have been less than 500 ozs.

During the 1940's the Zonia property received considerable attention as a source of easily obtainable copper for the war effort. A loan application had been made to the War Production Board and Gold Fields Developement Co. entered into an agreement with owners to operate and manage the property if the loan was granted. The U.S. Bureau of Mines was called in on behalf of the government to conduct surface and underground sampling and drilling operation to evaluate the potential of the property as a near-surface producer of oxide copper material. The results of this program were generally negative and the property remained idle. Core, cuttings and sample material from this program were not extensively analysed by the U.S. Bureau of Mines for precious metals. According to the U.S. Bureau of Mines findings, the average grade of the Zonia ore was 1.15% Cu, .20 tr. oz. Ag/T. and .005 tr. ozs. Au/T.

Mc Alester Fuel Company acquired the property in 1964 and after an extensive drilling program and pilot leaching tests, started an open-pit mining and heap leaching operation. This work was followed by an in-situ leaching operation that continues to the present time. Between 1966 and 1975 McAlester produced 33,000,000 pounds of copper. Since 1964 several other major companies (Texasgulf, Phelps Dodge Corp., Homestake, Nerco, Quintana Minerals, Amselco and others) have had exploration programs on the property and have conducted extensive geological, geochemical, geophysical and drilling efforts.

Antioch Resources, Inc. and its joint venture partner, Queenstake Resources (U.S.A.) Inc. became interested in the Zonia property after the acquisition of the archival records of the Hammon Copper Company which indicated significant gold potential north of the oxide copper area.

REGIONAL GEOLOGY:

The Zonia Mine area lies in a region dominated by northeast trending Precambrian volcanic, volcaniclastic and sedimentary rocks which are locally disrupted by granitic intrusives. The entire Precambrian sequence has been subjected to folding and faulting, as well as regional metamorphism. Portions of the area are covered by younger basalts, fanglomerates and alluvial material.

Numerous copper-gold mineral occurrences have been recorded throughout the Precambrian sequence, as well a occurrences of lead, zinc, and silver. Much of the mineralization appears to have originated as syngenetic strata-bound sulfide deposits. Several companies, including American Selco, Texasgulf, Homestake, Quintana and Phelps Dodge, have devoted considerable time and money to the investigation of the ore potential of this Precambrian rock assemblage.

PROPERTY GEOLOGY:

Rocks at the Zonia property mainly consist of rhyolitic pyroclastic rocks with intercalated andesitic units, all generally altered to sericite schists, sandwiched between fine-grained green stones on the northwest and an iron-rich section of chloritized mafic volcanics rocks to the southeast. Another felsic rock sequence occurs southeast of the iron-rich mafic volcanics outside the Zonia property boundary.

The northern portion of the property is underlain by a slightly younger quartz monzonite to granodiorite intrusive rock which has consumed most of the layered volcanic rocks. Remobilization of siliceous material has occurred where volcanogenic horizons within the layered volcanic rock packkage intersect the intrusion.

The Precambrian rocks, which occur to the north, are covered with Tertiary fanglomerates. Fanglomerates are also preserved beneath a basalt flow cap in the hills between the Sunflower claim and the Mistake claims in the north-central part of the property. The extreme southern part of the Zonia claims is covered by basalt flows.

The rocks dip predominantly northwest and are overturned, to judge by overturned graded bedding, overturned channel and flute cuts, and probable pillow structure in overturned positions. In certain areas cleavage persistently crosses bedding direction with attitudes suggestive of an anticlinal axis to the southeast. In support of this premise, another felsic tuff sequence crops out southeast of the iron-rich mafic volcanic sequence and this may represent the southeastern upright limb of a broad northwestward closing overturned fold. If so, then silver-lead mineralization found in the southeast felsic section may be the distal volcanigenic deposits related to the same vent activity that deposited the copper mineralization in ;the more proximal settings at the Zonia property.

Through the years geologists have speculated about the character, appearance and possible volcanogenic/syngenetic origin of the mineralization. Copper mineralization on the Zonia property is confined to the felsic tuff section, and occurs as lenticular or lensoidal stratabound accumulations of chalcopyrite and pyrite at the contacts of individual rhyolitic units as disseminated minerals within the tuffs, and along the contact of the mafic and felsic sections. Oxidation has been pervasive and deep. In the main workings associated with the Cuprite or McMahon Shaft sulfide mineralization was not encountered to depths in excess of 500'.

Chrysocolla, malachite, azurite, melaconite and cuprite are the most common copper minerals. Quartz and "jasper" commonly accompany the ore minerals. Iron oxides after pyrite and chalcopyrite are ubiquitous in the mineralized zones.

ORE RESERVES:

McAlester Fuel Company, the previous owner of the mine, reported that there are 20,500,000 tons of drilled and aproven reserves of oxide copper ore grading 0.3 percent copper of which 37,000,000 pounds is considered recoverable by leaching. They also report that there are still 32,200,000 pounds of copper considered to be recoverable from the three leach basins and a further 18,000,000 pounds of copper deemed to be recoverable from the in-situ blast area.

The following table shows the reserves developed, reserves under leach, percent copper in ore, pounds of copper extracted, pounds of copper remaining in ore, and estimated pounds of recoverable copper remaining.

	Reserves Tons	%Cu	Lbs. Cu Extracted	Lbs. Cu Remaining	Est. Lbs Recoverable Cu Remaining
Mine-Oxide Reserves	20.5 MM	0.3	Nil	123.0 MM	37.0 MM
Leach Basins	7.1 MM	0.6	30.6 MM	55.1 MM	32.3 MM
In-situ area	7.7 MM	0.27	2.7 MM	38.6 MM	18.1 MM
	35.3 MM	0.31	33.3 MM	216.7 MM	87.4 MM

EXPLORATION POTENTIAL:

Several possibilities exist for future production:

1. Delineation and subsequent developement of an economic gold zone in one or more of the currently identified anomalous gold areas.

2. Continuation of mining of the existing developed copper reserves. This would be dependent upon improvements in copper prices, mining method and processing techniques.

3. Bulk underground mining of the downdip extension of the known copper reserves. Again, this would be dependent upon additional exploration/developement and an improvement in base metal markets.

4. Additional potential exists for the location and developement of additional oxide copper reserves along the mafic/felsic contact.

Exploration activities by the Antioch/Queenstake joint venture has consisted of confirming the existence of gold mineralization on the northern protions of the property. Reconnaissance geologic mapping, sampling and assaying have defined four principal volcanogenic zones of interest:

1. Mistake Zone;

2. Sunflower trend;

3. Zonia trend;

4. Arrastra trend.

These four volcanogenic horizons within the sericite schist/felsic volcanic were sampled systematically along strike and underground where possible.

Mistake Zone:

The westernmost incline, the Mistake Raise, was entered and sampled. Nine samples were taken, five of which assayed between 0.05 ozs./T. and 0.476 ozs./T. gold, however, this sampling did not establish continuity, and more detailed work is needed to determine the potential for this area.

Sunflower Trend:

A volcanogenic horizon traversing the Sunflower patented claim was called the Sunflower trend. Previous operators had sunk an inclined shaft on the claim in an area where quartz stringers and copper oxides were noted in a 3-foot wide zone. Hammon Copper Company data showed anomalous gold values underground. Antioch/Queenstake sampling corroborated the Hammon data giving a very close check and also revealed anomalous gold values occurring at the collar of the shaft. However, sampling along strike did not locate other anomalous areas.

Zonia Trend:

A zone of sericitic and clay altered schists enveloping poddy, discontinuous quartz with abundant iron-oxide development was intensively sampled both northeast and southwest of the Zonia 10 shaft. Previous sampling along this trend by Hammon and a major company gave anomalous gold values as high as 1.50 ozs./T. gold. Seven trenches or bulldozer cuts were constructed and sampled to test the zone in covered areas and between anomalous sufrace sample points. Slightly anomalous gold values were encountered as two samples ran 0.04 and 0.073 ozs./T. gold.

Two underground locations were sampled on the Zonia 10 claim. Four sampleswere taken in the lower level of the Z-10 shaft (at approximately 94 feet below the shaft collar) and two samples ran 0.166 and 1.34 ozs./T gold. The deeper workings were inaccessible at the time of this examination. Further underground rehabilitation work is planned which will provide access to lower workings.

Arrastra Zone:

Samples of siliceous and hematitic material stacked near an old arrastra on the Copper Crown claims gave consistently anomalous gold values, and a search for the source located nearby possibilities. The locations were sampled and all eliminated as sources with one exception, an old adit southwest of the arrastra. Portal face samples of a slightly altered andesite reported 0.354 ozs./T gold, and other surface samples of similar rocks along the arrastra trend reported anomalous gold values.

CONCLUSIONS (R. J. Lundin, Wallaby Enterprises Inc.)

The Zonia mine area contains several remobilized exhalite horizons/vein systems that have near-surface gold values in the amount underground sampling has confirmed the veracity of the Hammon sampling data. There exists and excellent potential at reasonable depths for intermediate-large tonnage gold deposits at the underlying contact with the felsic intrusive complex. In other areas of the Central Arizona Greenstone Belt, younger, underlying intrusive systems have supplied heat and hydrothermal fluids that have remobilized syngenetic base and precious metal mineralization into vein structures that can be economically exploited (e.g. Gladstone-McCabe, Crown King, Mt. Union area) for their enriched precious metal content. Such a situation may exist along the various exhalite/vein systems that have been identified on the Zonia property. In addition, there exists the potential that the entire felsic volcanic pile is mineralized at the underlying contact between the intrusive and the various favorable felsic and exhalite units. Finally, there exists an excellent potential for gold-richh settings in the immediate pit area associated with proximal volcanic features. In light of the results to date, a detailed mapping, underground sampling and eventual drilling effort is definitely warranted to test the precious metal potential of this type of hybrid system.

FIELD TRIP GUIDE

MILEAGE DESCRIPTION

0.00 CHECK IN AT THE MINE OFFICE FOR BRIEFING BY ANTIOCH/QUEENSTAKE PERSONNEL AND SIGNING OF RELEASES. AFTER SIGNING RELEASE FROMS RETURN TO VEHICLES. LEAVE PARKING LOT AND TURN RIGHT, Proceeding to the the Leaching Operations area.

0.70 Heap Leaching Operations area tour (STOP 1), The Heap Leaching Operation is recovering copper from waters draining from the dumps and the in-situ area. At the end of the tour, return to your vehicles and return along the same route past the Mine Office and the front gate.

0.90 Turn right on to access road to the northern end of the property.

1.50 Road intersection, take the left hand fork.

1.80 Go up the hill, at the road intersection, stay to the right hand side and continue on to the workings along the Mistake trend.

1.85 Mistake Trend Mine workings (STOP 2) PARK ON THE MINE DUMP AND ALONG THE ROAD. Note the mineralized gossan material outcropping directly adjacent to the shaft. This material was sampled by Wallaby personnel and contained greater that 4.0 ppm Au/T. Recent sampling of outcropping mineralization and the underground workings by AMSELCO, Phelps Dodge and Antioch/Queenstake personnel confirmed the Hammon Copper anomalous to near-oregrade gold values. The extensive trenching on the trend was done by AMSELCO in conjunction with a recent surface and drilling program. The tour will traverse up the hill along the ridge noting the variety of outcropping lithologies, the extent and types of alteration and mineralization and the various intrusives that outcrop along the ridge that may influence the amount and type of alteration/mineralization. After returning along the farthest AMSELCO trench, return to the vehicles and return along the route the we came in on.

2.00 Road intersection, turn right.

2.70 Adit alongside road (STOP 3). Mineralization exposed at this adit is typical of remobilized exhalite/vein mineralization that is commonly found at or near the contact of Older Precambrian volcanic units and younger intrusives. Note the composition and position of the intrusive relative to the extant workings. Continue along the road to the intersection with the main road from the Mistake Trend workings.

2.80 Rejoin access road from the Mistake Trend workings, bear left at intersection.

3.20 Road intersection, turn right. The intersection is well marked with a sign saying "Copper Crown Mine"

3.50 Road intersection, continue straight ahead on the main road.

3.60 Road intersection, take the right hand fork.

3.80 Road Intersection, take the right hand fork.

3.90 Cross small draw, windmill directly ahead on the left.

4.10 Road intersection, take the right hand fork. Continue up the hill to the Z-10 shaft area.

4.15 Z-10 shaft area (STOP 4). PARK ON THE NORTHEAST SIDE OF THE SHAFT. The Z-10 shaft is on the Zonia Trend and has recently been rehabilitated and sampled down to it's 84 Level. The workings are thought to be relatively deep and from the dump material, gold associated with gossan maerial and quartz veins was the principal commodity. Anomalous gold values reported by Hammon Copper Co. were confirmed and the surface exposures of the various exhalite horizons have been extensively trenched by Antioch/Queenstake. Note the relationship of the mine workings and the position of the remobilized exhalite/vein systems and the various intrusive bodies. The degree of alteration associated with these intrusives and the relationship of the various dikes systems and the underlying younger stock may be very important in ascertaining the location of bulk tonnage exploration targets. After examining the outcrops and the dump material, return to the vehicles and return to the road intersection below the shaft.

4.25 Road intersection, turn right.

4.60 Fork in road, take the right hand fork. WATCH OUT FOR THE WASHED OUT GULLY AREA.

4.65 Sunflower Shaft Area (STOP 5). PARK YOUR VEHICLES AND WALK UP THE CREEK TO THE SHAFT AREA. The Sunflower Shaft is on the Sunrise Trend. Recent sampling by Antioch/Queenstake personnel confirmed anomalous to nearly oregrade gold values from the workings but were unable to delineate any continuation of the gold mineralization along strike. Note the strong chloritic alteration associated with a fragmental unit in the felsic sequence. Strong sericitic alteration is also found in association with the felsic units. After examining the outcrops, in the general vicinity of the workings and along the adjacent ridge, return to the vehicles.

4.70 Road intersection, continue straight ahead.

4.80 Ruins of the old Townsite of Zonia and the Smelter off to the left.

4.90 Cross stream and park vehicles at bend in the road (STOP 6) At this location the variations in the various lithologic units are well exposed. Examine the section exposed in along the creek and then decide the relationship of the various intrusive units with the mineralization exposed in the roadcut and on the other side of the fence on th side of the hill. After examining the exposures on this side of the fence, cross under through the culvert and look at the nature of the gossan material associated with the fragmental chloritic unit. These exposures are nearly on line with the mineralization outcropping in the open pit and in-situ area. Return to the vehicles and continue along the road after making a sharp turn to the right.

5.35 Road intersection, continue going straight.

5.45 Junction with road, continue going straight.

6.10 Intersection with main access road, turn left and return back through the main gate to the office and Leaching operations area.

7.00 Leaching Operations Area, continue up the hill.

7.10 Road intersection, continue straight up the hill and to the Pit Overlook area.

7.70 Pit Overlook (STOP 7) PARK WELL AWAY FROM THE EDGE AS IT IS UNDERCUT.

7.90 Road intersection, turn left to the bottom of the pit.

8.30 Cuprite shaft area, (STOP 8) At this locality is exposed the core of the mineralization that the original shaft opoerations began on. The ore horizons are extremely well exposed as are the overlying Tertiary flow and fragmental lithologies. In other areas of the Central Arizona Greenstone Belt, younger proximal, Precambrian conglomerates that contain fragments of pyritic, felsic volcanics and exhalite units have anomalous to near-ore grade gold values. Continue on past the red hill.

8.40 Road forks, take the right hand fork to go down into the pit.

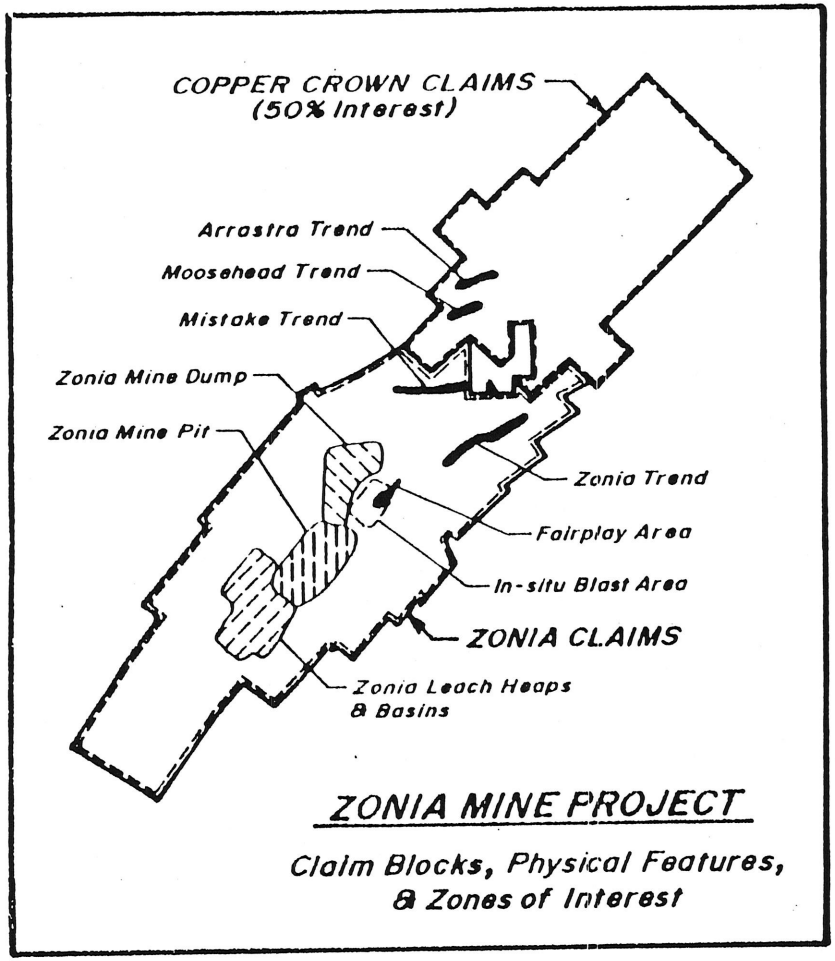
8.50 Go off the road and across the open area to the pit face.

8.60 Pit Area (STOP 9) Carefully examine the chloritic, fragmental units and the thin gossan zones in the Southeast pit wall. Wallaby/Quintana sampling of chloritic fragmental units in the pit area yielded anomalous gold values (.36-.80 ppm) Other companies have not extensively sampled this area for gold mineralization. Return to the lower road that goes around the in-situ blast/leaching area.

8.90 In-situ blast/leaching area. Off to the left is the location of the Copperopolis shaft. This area would be on a direct projection of the mineralization exposed in the outcrops in STOP 6.

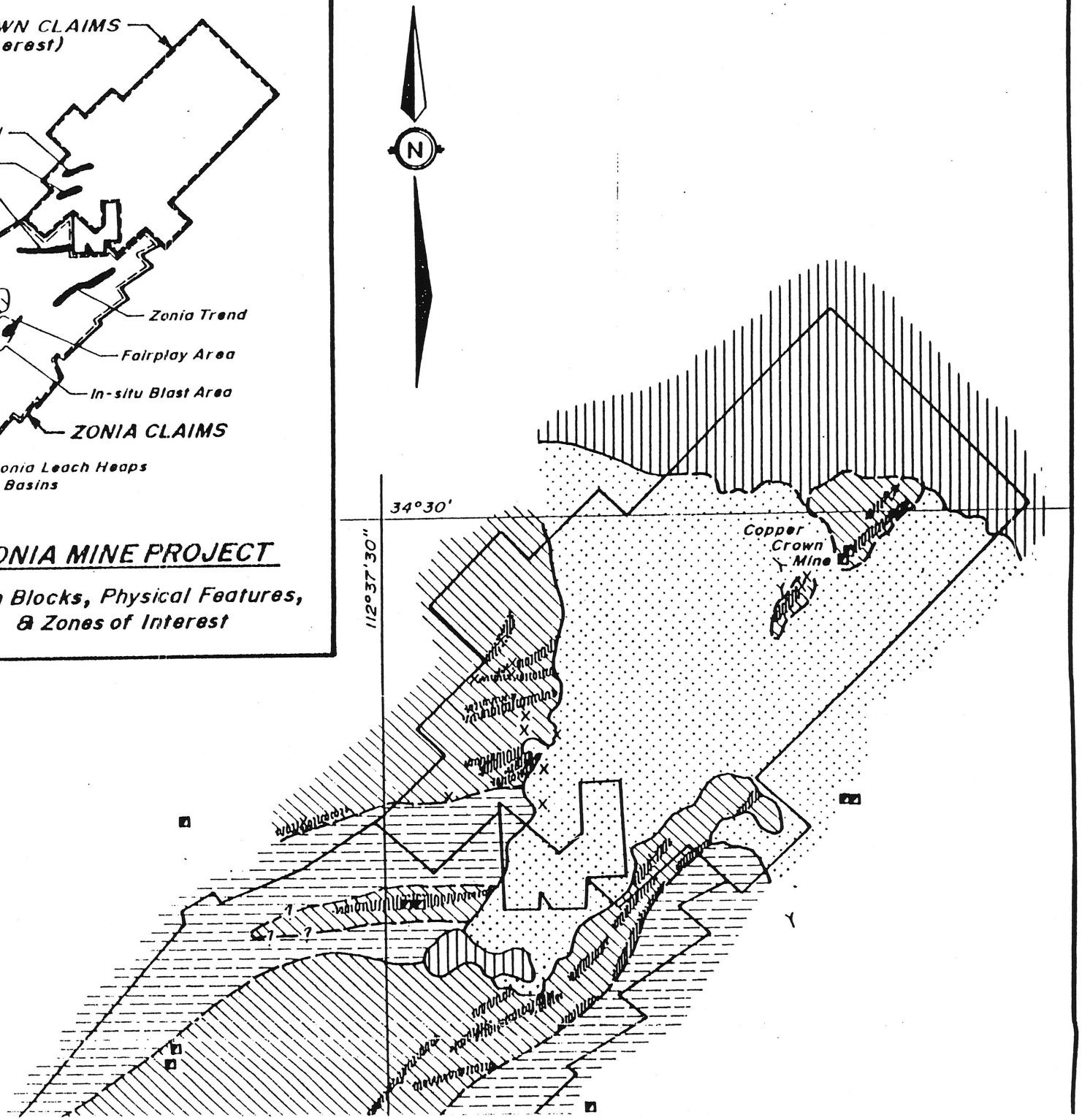
9.20 Road intersection, take the right hand fork.

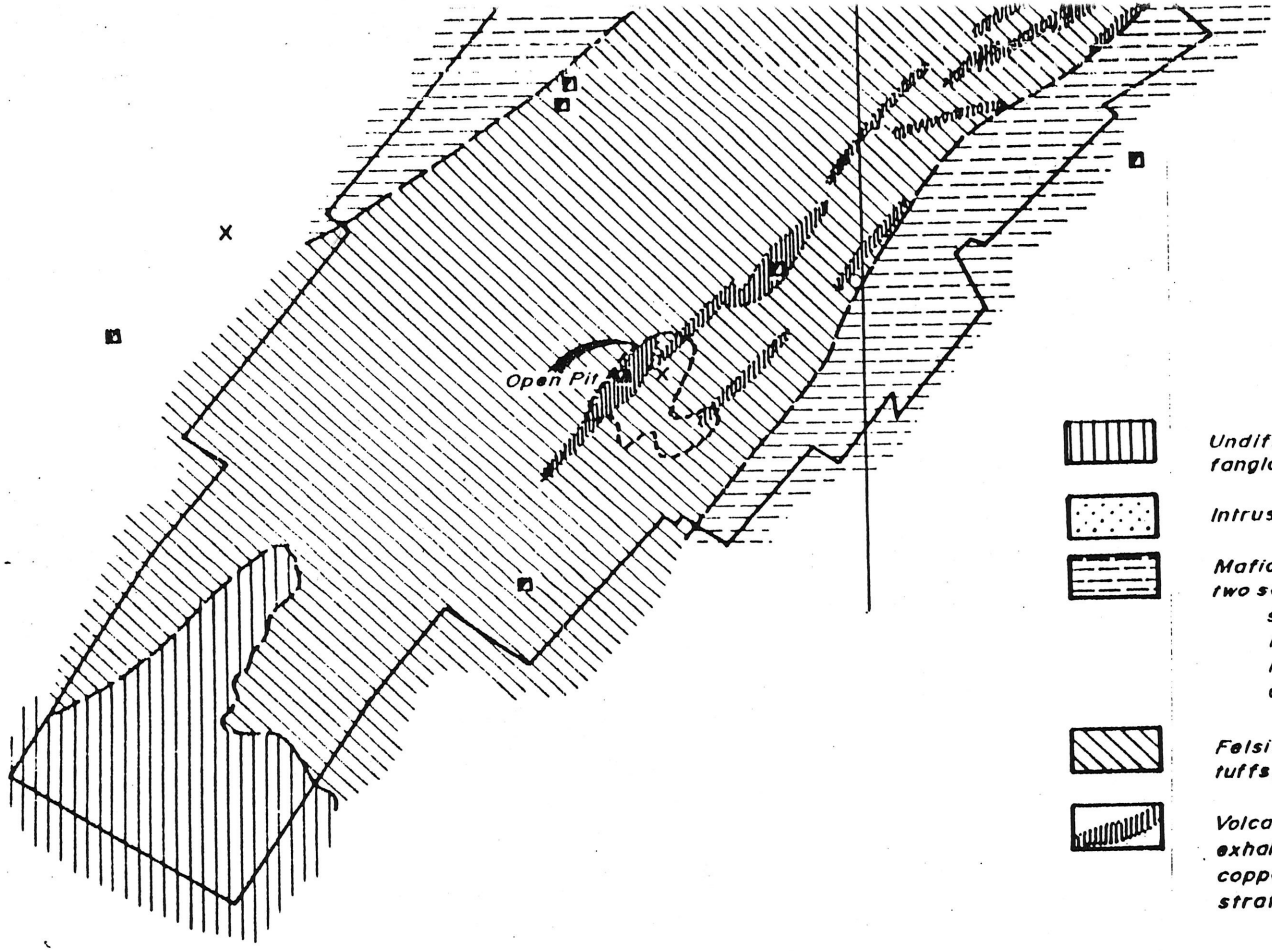
10.20 Road intersection, turn right and return to main office for checkout. RETURN TO THE JUNCTION OF ARIZONA 69 AND THE WALNUT CREEK-WAGONEER RD. TURN LEFT AND CONTINUE ON TO YARNELL. AFTER ENTERING THE MAIN BUSINESS DISTRICT, TURN RIGHT ON SHRINE ROAD AND GO THREE BLOCKS, THEN TURN RIGHT AND CONTINUE ON TO THE YARNELL COMMUNITY PARK FOR THE STEAK FRY, BEER BUST AND POSTER SESSION. END OF DAY 1.



ZONIA MINE PROJECT

Claim Blocks, Physical Features, & Zones of Interest





LEGEND

Undifferentiated capping rocks; includes basalt, fanglomerate, soil and alluvial deposits.

Intrusive quartz monzonite porphry.

Mafic volcanic rocks; undifferentiated; includes two sections:
southeast sequence — consists mostly of iron rich, fine-grained basalts.
northwest sequence.— includes basalt, basaltic andesite, tuffs and agglomerates.

Felsic volcanic rocks; includes rhyolitic to andesitic tuffs, flows, and agglomerates, commonly schistose.

Volcanogenic horizons; includes zones of exhalative quartz and massive iron formation, copper and copper-gold mineralization and stratabound hydrothermal alteration.

Antioch Resources Inc. / Queenstake Resources (U.S.A.) Inc.

ZONIA MINE PROJECT

Generalized Geologic Map

January, 1985

1000 0 1000 2000 3000 4000 5000 feet

Scale 1" = 2000'

North

ZONIA

A)

New Times Weekly
Sept 24-30 Pg. 3
~1983

Paydir August 1981

[redacted]

AZ/NM Contr. Engr. June 1973

[redacted] pression that [redacted]

[redacted] through the [redacted]

[redacted] is needed.

[redacted] recorded an quake of 3.5 [redacted] scale.

MINING RECORD Wednesday, July 4, 1973

[redacted]

PAY DIRT for February 25, 1974

[redacted]

Pink - Reading
Alpha - B
✓Subject - ~~X~~ McAlester Fuel Co.
Copper Report
Copy - GM

April 26, 1977

Mr. J. J. Brunner
Technical Director
Zonia Division
McAlester Fuel Company
Route #1
Kirkland AZ 86332

Dear Mr. Brunner:

The Department of Mineral Resources is compiling data for its annual report on the copper industry, A PROFILE OF ARIZONA'S PRIMARY COPPER INDUSTRY FOR 1976, VOLUME I. In your letter of April 26, 1976, you reported production of 619,263 pounds of copper for 1975 and that the mine ceased production in March of that year.

If production was resumed in 1976, we would greatly appreciate like figures for that year. Conversely, if there was no production at the Zonia for 1976, we would also very much appreciate that information.

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

GAM:klg

Zona mine fel

McALESTER FUEL COMPANY

APPLICATION FOR AUTHORITY TO TRANSACT BUSINESS OF McALESTER FUEL COMPANY

Pursuant to the provisions of Section 10-110 of the Arizona Business Corporation Act, the undersigned corporation hereby applies for authority to transact business in Arizona, and for that purpose submits the following statement:

FIRST: The name of the corporation is McALESTER FUEL COMPANY and it is incorporated under the laws of Delaware.

SECOND: The name which it elects to use in Arizona is McALESTER FUEL COMPANY.

THIRD: The date of its incorporation is August 9, 1976 and the period of its duration is perpetual.

FOURTH: The address of its principal office in the state or country under the laws of which it is incorporated is 100 West Tenth Street, Wilmington, Delaware 19801.

FIFTH: The address of its proposed known place of business in Arizona is c/o C T Corporation System, 14 North 18th Avenue, Phoenix, Maricopa County, Arizona 85007 and the name and address of its proposed statutory agent in Arizona is C T CORPORATION SYSTEM, 14 North 18th Avenue, Phoenix, Maricopa County, Arizona 85007.

SIXTH: The purpose or purposes which it proposes to pursue in the transaction of business in Arizona are: Development and operation of oil and gas properties and all other lawful purposes.

SEVENTH: The names and respective addresses of its directors and officers are: Don C. Phelps, Pres. & Dir.; Frank G. Edwards, V.P. & Dir.; M. C. Jones, V.P. & Dir.; Herbert S. Mayberry, V.P. & Secy.; Norris J. Welker, Treas.; Tom E. Garrard, Director (all located at 209 E. Wyandotte Street, McAlester, Okla. 74501); O. Charles Honig, Ch. of Bd. & Dir.; Wm. A. Anderson, Jr., Director (both located at 5051 Westheimer, Houston, Texas 77056).

EIGHTH: The aggregate number of shares which it has authority to issue, itemized by classes, par value of shares, shares without par value, and series, if any, within a class is: 1000 shares, Common Class, $1.00 Par Value per share.

NINTH: The aggregate number of issued shares itemized by classes, par value of shares, shares without par value, and series, if any, within a class: 1000 shares, Common Class, $1.00 Par Value per share.

TENTH: The amount of its stated capital, as defined in the Arizona Business Corporation Act is $1,000.00.

ELEVENTH: A brief statement of the character of the business which the corporation initially intends actually to conduct in Arizona is: Development and operation of oil and gas properties.

Dated January 17, 1977. McALESTER FUEL COMPANY by Don C. Phelps its President and Herbert S. Mayberry its secretary.

State of OKLAHOMA County of PITTSBURG. The foregoing instrument was acknowledged before me this 17th day of January, 1977 by Don C. Phelps and Herbert S. Mayberry of McALESTER FUEL COMPANY a Delaware Corpora-

3-9-77

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Az. Legislative Review
3/2/77
BR

ZONIA MINE OWNERS

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

July 20, 1976

COPY

Mr. J. J. Brunner
Technical Director
Zonia Division
McAlester Fuel Company
Route # 1
Kirkland, Arizona 86332

Dear Mr. Brunner:

Thank you very much for furnishing the Department of Mineral Resources with the 1975 production data for your Arizona mining operation.

Enclosed is a copy of the completed 1974-1975 tabulations for all large Arizona copper producers.

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

Sincerely,

Glenn A. Miller
Mineral Resources Specialist

Enclosure

GAM:jm File: McAlester Fuel Company (Zonia file)
Yellow Alpha "M", Copper Report, GAM file

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

April 21, 1976

COPY

Mr. J. J. Brunner,
Technical Director
Zonia Division
McAlester Fuel Company
Route # 1
Kirkland, Arizona 86332

Dear Mr. Brunner:

Last year your Mr. Sills reported production of 1,358,357 tons of copper at the Zonia operation in 1974, (see attached copy of Mr. Sills letter).

We would very much appreciate like figures for 1975.

Thank you very much.

Sincerely,

Glenn A. Miller
Mineral Resources Specialist

jm
cc: Pink Reading, Yellow Alpha "M"
Copper Report file
McAlester file

T. E. GARRARD, PRESIDENT
DON C. PHELPS, VICE PRESIDENT AND SECRETARY
CHAS. F. VIERING, TREASURER

McALESTER FUEL COMPANY

KIRKLAND, ARIZONA 86332

RECEIVED
DEPT. MINERAL RESOURCES
PHOENIX

ZONIA OPERATION

September 9, 1968

(602) 445-1950

Arizona Dept. of Mineral Resources
Fairgrounds
Phoenix, Arizona

Gentlemen:

The operating personnel of the Zonia Copper Mine of McAlester Fuel Company, Kirkland, Arizona, are listed below. Please change your records if needed.

Donald F. Anderson	Project Manager
George Sutherland	Office Manager
Max Hartle	Mine Foreman
David L. Spellman	Plant Foreman
Walter J. Cobey, Jr.	Mine Engineer

Very truly yours,

Donald F. Anderson

Donald F. Anderson
Project Manager

DFA/ns

cc: Office of Arizona State Mine Inspector

SHATTUCK DENN MINING CORPORATION
IRON KING BRANCH
HUMBOLDT, ARIZONA

H. F. MILLS
MANAGER

April 19, 1948.

Mr. C.H.Dunning, Director,
Department of Mineral Resources,
Phoenix, Arizona.

Dear Chuck:

We have spent several days down on the Zonia group, surveying and looking over the showings, as a result of which I would like, if possible to get the report you have on file there long enough to make a copy, after which it will be promptly returned. Can do?

Yours sincerely,

H.F.Mills.

April 21, 1948

Mr. H. F. Mills, Manager
Iron King Branch
Shattuck Denn Mining Corp.
Humboldt, Arizona

Dear Hap:

Herewith is the information we have on the Zonia.

You need not return the typewritten reports as we have plenty of copies, but we do not have other copies of the U. S. Bureau March 1947 report and cannot get any more. Therefore we need that back.

Yours sincerely,

R.D. 4023

Chas. H. Dunning
Director

CHD:mh
Encs.

1265 Weber Street,
Alameda, California.
June 19, 1946

DEPT. MINERAL RESOURCES
RECEIVED
JUN 24 1946
ARIZONA
PHOENIX

Dept. of Mineral Resources,
State of Arizona,
304 Home Builders Bldg.,
Phoenix, Arizona.

Gentlemen:

I am returning to you mine owner report form with such information as I believe pertinent without going into a vast amount of data.

In mining circles I believe by now the Zonia Group is fairly well known and I hear is the subject of considerable discussion as to whether it is or not another possibly big mine.. Quite apart from all the large, but I fear not too well considered, work that has gone on over a generation or so the main issue has never been tackled. At least what has happened has increased the concept of the wide-spread nature of the mineralization. The genesis and nature of the true ore body which doubtless exists and which has caused the extensive surface showings is yet to be determined, and I do not believe will be tremendously expensive.

I realize that your department is interested in furthering the development of the State resources and I can assure you that from the reading of many reports regarding the Zonia and from conversations I have had over the years with competent people , some of whom are now passed on, but who knew the property intimately, that there seems to be the possibility of a big future producer for the State. It seems to be an ore body very large and reasonably deep- or nothing. It is not a propertyfor an inexperienced small operator to tackle. There have been many such over the past few years who would have desired to work on different aspects of the surface showings, which in some cases carry high values. It is a job for an operator who can carry the exploration for the whole picture.

Very truly yours,

James L. Gillingham

November 19, 1943

Mr. James L. Gillingham
2040 Clinton Avenue
Alameda, California

Dear Mr. Gillingham:

I have submitted a report on your property, the Zonia Group, 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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

WASHINGTON 25, D. C. November 27, 1943.

OFFICE OF THE DIRECTOR

Hon. John R. Murdock,
House of Representatives,
Washington, D. C.

My dear Mr. Murdock:

Enclosed you will please find War Minerals Report No. 120, entitled "Zonia Mine Yavapai County, Ariz." This is the latest published War Minerals Report of the Bureau of Mines dealing with a property in your State.

Cordially yours,

R. R. SAYERS,
Director.

Enclosure 810

December 6, 1943

Honorable John R. Murdock
U. S. Congressman from Arizona
Washington, D. C.

Dear Congressman Murdock:

Thank you very much for your thoughtfulness and courtesy in sending us Director Sayers' communication to you of November 27th, enclosing War Minerals Report 120, entitled "Zonia Mine, Yavapai County, Arizona, Supplement to War Minerals Report 38", dealing with property in Arizona.

Sincerely,

Grace M. Sparkes, Secretary

GMS:ec

1265 Weber St., Alameda, Calif.
January 19, 1942

DEPT. MINERAL RESOURCES
RECEIVED
JAN 21 1942
PHOENIX, ARIZONA

Mr. J. S. Coupal,
Dept. of Mineral Resources,
Phoenix, Arizona.

Dear Mr. Coupal:

In discussing copper and brass conditions with Mr. Ralph Phelps, Bridgeport Brass and Copper Co., in his San Francisco office recently, I was shown a later bulletin, The Dependence of Arizona on the Mining Industry, which I believe he obtained from you when he was down in December. If you have an additional copy I would appreciate receiving one.

This past week seems as if it might have been of importance regarding the position of the marginal producers of strategic metals. I have filed with your office, as you possibly know, certain condensed information relative to the French Gulch group of claims, consequently am very much interested in copper affairs as they are moving to a solution. Have you had any interest in the property or indications of possible future interest if the price situation eased up a bit, as it now seems about to do?

I have been given to understand that the Miami Copper Co. might be a logical company to present our data to. Phelps Dodge and Inspiration seem to have their hands full, as is also the case of the Utah Copper Co. Miami Copper seems a possibility and I beg to inquire whether you may possibly have sent any information to them regarding the claims referred to. If, also, you have another extra copy of the form report on the Zonia claims in French Gulch I would appreciate one as mine has gone to Washington.

Thanking you for your attention.

Very truly yours,

James L. Gillingham

James L. Gillingham

21 January 1942

Mr. James L. Gillingham,
1265 Weber St.,
Alameda, California.

My dear Mr. Gillingham:

Complying with request contained in your letter of January 19, I am sending you under separate cover two copies of the "Production Possibilities of the Marginal Copper Mines in Arizona".

We did not submit a copy of the mine owner's report covering the ZONIA GROUP to the Miami Copper Company, and I should suggest that you do it personally. I am enclosing herewith several extra copies of the report filed with this office.

We have submitted this report to other individuals, who were looking for leaching copper ore, and you may hear from them.

Assuring you of my desire tobe helpful, and with best wishes, I am

Yours very truly,

J. S. Coupal

JSC-jrf
encls.

18-40
Sam:
I promised to telephone to you today from Washington. Return this for my file.
Sam

26 January 1942

Mr. Josef D'Havarda,
Hotel San Carlos,
Phoenix, Arizona.

Dear "Dee":

I am enclosing herewith a brief description of the ZONIA MINE owned by Mr. J. L. Gillingham, 2040 Clinton Avenue, Alameda, California. This property has a large tonnage of low-grade ore in sight ready for mining. Complete plans and estimates were made by W. J. Loring, who is an internationally known mining engineer of good reputation. Plans were made to install a 600 ton leaching plant, and I believe these plans and estimate for their installation are available.

In calling this property to your attention, I had in mind that it was still worthwhile trying to get a government loan for the erection of a large leaching plant. The new price for copper and the federal demand for additional copper makes it very attractive.

In order to carry out these plans, I believe it will be necessary to first contact the owner, which I believe should be done personally, then get all information available and properly present it to Washington for an application for a government loan. A plant of the size required will cost anywhere from one-half million to three-fourths million dollars.

I shall be pleased to give any additional help necessary in this connection.

With kindest personal regards, I am

Yours very truly,

J. S. Coupal

JSC-jrf
encl.

1265 Weber Street
Alameda, Calif.
Jan. 26, 1942.

DEPT. MINERAL RESOURCES
RECEIVED
JAN 28 1942
PHOENIX, ARIZONA

Mr. J. S. Coupal,
Dept. of Mineral Resources,
518 Title and Trust Bldg.,
Phoenix, Arizona.

copy sent 1-28-42

Dear Mr. Coupal :

Thank you for yours of the 21st. instant and reports under separate cover. Those I will keep as I have a use for them. What I really wished to see was the report or bulletin from your office on The Dependence of Arizona on the Mining Industry, which came out after the "letter to Henderson" on the Marginal Producers. If you have one I would appreciate it.

I am returning two Reports on the Yankee Mine enclosed by mistake.

Thank you for your courtesy and trouble.

Very truly yours,

James L. Gillingham

James L. Gillingham.

STANDARD TIME INDICATED

RECEIVED AT
11 HOWELL AVE.
BISBEE, ARIZ.
(COPPER QUEEN HOTEL)
TELEPHONE 63

TELEPHONE YOUR TELEGRAMS TO POSTAL TELEGRAPH

Form 16 Dbl.

Postal Telegraph

Mackay Radio · All America Cables · Commercial Cables · Canadian Pacific Telegraphs

TELEGRAMS · CABLEGRAMS · RADIOGRAMS

THIS IS A FULL RATE TELEGRAM, CABLEGRAM OR RADIOGRAM UNLESS OTHERWISE INDICATED BY SYMBOL IN THE PREAMBLE OR IN THE ADDRESS OF THE MESSAGE. SYMBOLS DESIGNATING SERVICE SELECTED ARE OUTLINED IN THE COMPANY'S TARIFFS ON HAND AT EACH OFFICE AND ON FILE WITH REGULATORY AUTHORITIES.

6SN A 53 3 EXA DL RC

SH CHICAGO ILL VIA GC PHOENIX ARIZ 134P FEB 18 1942

J S COUPLA

COPPER QUEEN HOTEL BISBEE

WIRE COLLECT IF POSSIBLE TO OBTAIN SELLING OR LEASE CONDITIONS WITHOUT SEEING OWNER PERSONALLY ABOUT PROPERTY REFERRING YOUR LETTER JANUARY 26TH. AM HERE DISCUSSING MATTER BUT GIVING NO DETAILS. WILL SEE RFC HERE. ADDRESS ME SHERMAN HOTEL. RETURNING MY DENVER RESIDENCE IN THREE DAYS. ADDRESS 967 MARION STREET APARTMENT 8.

JOSEF D'HAVARA

203PM

Zonia

February 21,1942.

Mr. J. L. Gillingham
2040 Clinton Avenue
Alameda, California.

Dear Mr. Gillingham;-

I am anxiously awaiting reply to my recent letter asking for price and terms on the Zonia property.

I have been in the field all week and am returning to the field again on Monday for at least a week but will instruct the office to forward your reply.

You may have had a wire from a Mr. Josef d'Havarda from Chicago regarding your property. He asked me to get price and terms also.

I have had another inquiry regarding your property but these people have in mind the application for an R F C loan. It takes considerable time and preparation to get R F C loans. The people I mention have excellent connections and feel sure that they could get the loan and provide the necessary preliminary money and also the operating staff.

You may have had such a plan under consideration yourself. To get an R F C loan the owner has to agree to the mortgaging of the property and under certain safeguards this could be done by the right parties holding a lease and option, if agreeable to you.

My only thought is that production from all properties, capable of producing, should be made at this time. When and if we will get the present price of 17 ¢ for copper again, on zero-quota properties, is quite problematic so that every effort should be now made on the low grade coppers.

I will greatly appreciate hearing from you both on the price and terms and also on the question of, under right conditions, your consent to an application for an R F C loan by parties agreeing to your price and terms.

Very truly yours,

J. S. Coupal.

February 21,1942.

Mr. Joeef d'Havarda
967 Marion Street
Apt. 8
Denver, Colo.

Jos.
Please Write

Dear Dee;-

I did not wire Mr. Gillingham on the Zonia as you requested as I had a letter in the mail asking for an air-mail reply which would give the price and terms he asks.

No reply has been received today and I am leaving instruction at the office to air mail you a letter giving you the price and terms as soon as they are received.

I feel quite certain that it will be necessary to have a personal visit with Mr. Gillingham before a proposal is put to him to take over the property under lease and option and then apply for an R F C loan. The owner has to agree to a mortgage on a property before a man holding a lease and option can get a start on a loan application.

The owner could apply for a loan in his own right so that it is a subject rather delicate to tackle by a wire.

I am going to write him a letter now stating that I have two groups in mind: one who would want to operate on private capital and the other who would spend what preliminary money was necessary and then apply for a loan.

When I get reply to this I will advise you.

I hope you were not disappointed in my reply by letter to your wire. One thing I want to impress upon you and that is this;* you cannot step into the mining business and pick things off like you pick fruit off a tree, expecially when it is some one elses tree; a certain amount of preparation and preliminary work and often expense must be done before a sound presentation can be made.

Best wishes to you and Gladys. (I smile when I think how unconciously she broke the ice and how embarassed she seemed.)

With all this government money loose we ought to be getting action.

Sincerely,

J. S. Coupal.

1265 Weber Street
Alameda, Calif.
February 24, 1942

Mr. J. S. Coupal,
Dept. of Mineral Resources,
Phoenix, Arizona

Dear Mr. Coupal:

I have been away and on my return I received both of your letters at once. I am sorry that you could not have heard immediately.

There has been a tremendous amount of inquiry regarding the Zonia since the change in price allowable was announced, and I have personally had the matter of development up with two strong groups. One I had to turn down as I could not get the conviction or assurance that matters were to be pressed for immediate production, the other group are still working on the matter and I hope to know within the week definitely just how they intend to proceed. I am obligated to hold any other discussions or presentations in abeyance until their decision is made. I will let you know if arrangements do not work out satisfactorily.

I appreciate your efforts in the behalf of the Zonia and I know that your first consideration is, as mine is, to get these properties producing, to make copper available.

Thanking you again, and I will advise you when the matter is open, I remain,

Very truly yours,

James L. Gillingham

James L. Gillingham

March 24, 1942

Mr. James L. Gillingham
1265 Weber Street
Alameda, California

Dear Mr. Gillingham:

Thank you for your letter of February 24.

I would be very much interested to know just what progress you have made on the Zonia and what your present plans are. Unless private capital is ready to go at your property I would suggest that you consider an application for an RFC loan to put this property into immediate production.

With best wishes, I am

Yours very truly,

J. S. Coupal

JSC:LP

Dear Sam:
He asked me to say thanks for your interest.
Bob

DEPT. MINERAL RESOURCES
RECEIVED
AUG 10 1942
PHOENIX, ARIZONA

August 8, 1942.

James L. Gillingham
1265 Weber Street
Alameda, California.

Dear Sir:

Thanks for your letter of August 4, 1942.

My clients, after examination, will make an offer for any property which they conclude offers possibilities, either on a term basis or an outright purchase and they will ask for an extended period for examination, say thirty days at least.

If and when you are in position to present the Zonia group, I hope you will do so, with every scrap of information you have and which you deem of interest to a possible purchaser.

In stating your prices (Cash $____; terms _____), please make allowance for a commission of five (5%) per cent for me.

I shall convey your message to Mr. Coupal.

Yours truly,

ROBERT RAE.

RR:n
c/o Mr. Sam Coupal
Mineral Resources.

September 8, 1942

Mr. J. L. Gillingham
1265 Weber Street
Alameda, California

Dear Mr. Gillingham:

My interest in the Zonia property still continues and I would like to know what progress you have made, if any, in either a deal or an arrangement for application for an RFC Mine Loan on this property.

Last week I was in touch with certain parties who are looking for a good copper leaching proposition and before saying anything definite about the Zonia or before referring them to you, I would to know if you are free to deal at this time.

With best wishes and kindest regards, I am,

Very truly yours,

J. S. Coupal,
Director

JSC:hal

DEPT. MINERAL RESOURCES
RECEIVED
SEP 17 1942
PHOENIX, ARIZONA

1265 Weber Street,
Alameda, Calif.
September 13, 1942

Mr. J. S. Coupal,
Director, Dept. of Mineral Resources,
413 Home Builders Bldg.,
Phoenix, Arizona.

Dear Mr. Coupal:

Your kind letter of the 8th. instant received. Your continued interest is greatly appreciated. I know that you feel the same way about the Zonia property as I do - that every effort must be made to get these know reserves produced into copper, everything else being secondary. Have gone a long way since last writing you and the property is now under option and examination with Federal interest behind it. I will know the result shortly I think, but cannot offer else where at present. I would appreciate it if you considered this information confidential. I am hopeful that before long we will have another producing Arizona property of magnitude.

I will plan to drop in to see you when I get over. Had hoped to spend the winter over there as I have a little ranch over near the Huachucas that I haven't seen for some time. With tire and gasoline rationings in the offing it would seem that there might be difficulties.

With kindest regards,

Very truly yours,

James L. Gillingham

James L. Gillingham

September 25, 1942

Mr. James L. Gillingham
1265 Weber Street
Alameda, California

Dear Mr. Gillingham:

Many thanks for your letter of September 13 and the information regarding the Zonia property

We have been asked to make a list of all of the potential copper producers in Arizona which are now idle, setting forth their problems and the reason they are idle with the amount of copper that they could possibly produce and the money it would take to get them into production. This list is being compiled at the request of the Army and Navy Munitions Board in order that they may assist in expediting all possible production.

If you would kindly drop me a letter stating briefly your problems, the production possible, the amount of money required, and so forth, I will attach the Mine Owner's Report of your property and include your letter in our compilation. With this information available it may be possible that your plans will get better attention and possibly allow your property to come into production at an early date.

With best wishes, I am

Very truly yours,

J. S. Coupal, Director

JSC:LP

6 October 1941

Mr. J. L. Gillingham,
2040 Clinton Avenue,
Alameda, California.

My dear Mr. Gillingham:

I am enclosing herewith a copy of mine owners report covering the ZONIA GROUP in the Walnut Creek Mining District, Yavapai County, Arizona, which has been filed with this department.

I shall be glad to submit a copy of this report to anyone making inquiry for a property such as yours.

Assuring you od my desire to be helpful, I am

Yours very truly,

Charles F. Willis
Chairman, Board of Governors

CFW-jrf
encl.

DEPT. MINERAL RESOURCES
RECEIVED
OCT 9 1942
PHOENIX, ARIZONA

1265 Weber Street,
Alameda, Calif.
October 7, 1942

Mr. J. S. Coupal,
Director, Dept. of Mineral Resources,
413 Home Bldrs. Building,
Phoenix, Arizona.

Dear Mr. Coupal:

Thank you for your letter of September 25. I have delayed answering hoping that investigation of the Zonia and adjacent ground might have progressed to the place where definite conclusions were available.

As I had previously written you the matter had been taken up with the Federal Government in order that these reserves if satisfactory might be available at the earliest possible moment. The Copper Division of the War Production Board after studying the data submitted has shown an active interest. A management-operating company has been contacted and for the past three weeks their engineers have been on the property. In the meantime the W. P. B. has requested the Bureau of Mines to make an independant investigation and possibly do some exploratory drilling to check certain blocks of ore now inaccessible underground. It is my understanding that a representative of the Dept. arrived on the property the latter part of last week.

I do not see what more we can do at the moment until the present investigations are completed. The War Production Board has been highly interested and cooperative and I think have quite a comprehensive understanding of the problems involved.

I greatly appreciate your interest and if it is necessary will take the liberty of calling on you for assistance.

With kindest regards, I am

Very truly yours,

James L. Gillingham

James L. Gillingham

Zonia

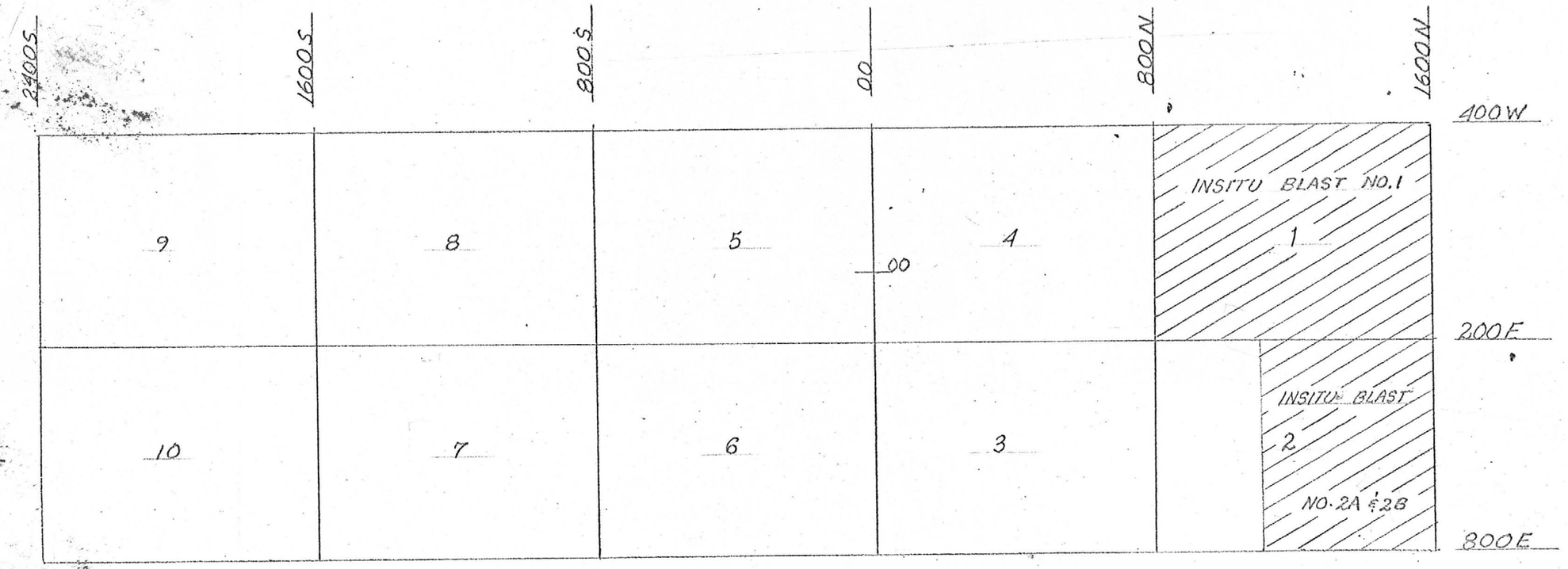
Name of Claim	Book of Offical Record	Page No.
Copper Crown No. 36	560	930
Copper Crown No. 37	560	931
Copper Crown No. 38	560	932
Copper Crown No. 39	560	933
Copper Crown No. 40	560	934
Copper Crown No. 41	560	935
Copper Crown No. 42	560	936
Copper Crown No. 43	560	937
Copper Crown No. 44	560	938
Copper Crown No. 45	560	939
Copper Crown No. 46	560	940
Copper Crown No. 47	560	941
Copper Crown No. 48	560	942
Copper Crown No. 49	560	943
Copper Crown No. 50	560	944
Copper Crown No. 51	560	945
Amended	706	403
Copper Crown No. 52	560	946

Name of Claim	Book of Mines	Page No.
* Copper King No. 1	57	176
* Copper King No. 3	57	178
* Copper King No. 4	57	179

Name of Claim	Book of Mines	Page No.
* Scott No. 1	294	17
* Scott No. 2	294	18

Name of Claim	Book of Offical Record	Page No.
* Copper Bar No. 2.	154	181

* Assement work should be done but not recorded.



BLOCKS 1 THRU 10 LOCATIONS ON ZONIA MINE COORDINATES

Yar Co

Scale: 1" = 400'

W.J.C. 4-23-75

Zonia

W.J.C. 4-23-75

BLOCK NO. 4

	+1.00%			+.60%			+.40%			+.20%		
LEVEL	SQ. FT.	AVR. SQ. FT.	CUBIC FT.	SQ. FT.	AVR. SQ. FT.	CUBIC FT.	SQ. FT.	AVR. SQ. FT.	CUBIC FT.	SQ. FT.	AVR. SQ. FT.	CUBIC FT.
4250	0			13,600			20,400			35,200		
		5,000	250,000		35,800	1,790,000		37,600	1,880,000		51,200	2,560,000
4200	10,000			58,000			54,800			67,200		
		25,400	1,270,000		61,400	3,070,000		62,400	3,120,000		87,600	4,380,000
4150	40,800			64,800			70,000			109,000		
		33,400	1,670,000		58,400	2,920,000		69,000	3,450,000		133,000	6,650,000
4100	26,000			52,000			68,000			158,000		
		13,000	650,000		26,000	1,300,000		34,000	1,700,000		99,000	4,950,000
4050	0			0			0			40,000		
											20,000	1,000,000
			3,840,000			9,080,000			10,150,000			19,540,000
	$\frac{3,840,000}{27}$ = 142,222.2 yards			$\frac{9,080,000}{27}$ = 336,296.3 yards			$\frac{10,150,000}{27}$ = 375,925.9 yards			$\frac{19,540,000}{27}$ = 723,703.7 yards		
		234,444.4 tons			672,592.6 tons			751,851.8 tons			1,447,407.4 tons	
ACCUM. Total: 3,156,296.2 tons		5,688,883.0 LBS. CU.			8,071,111.2 LBS. CU.			6,014,814.4 LBS. CU.			5,789,623.6 LBS. CU.	
ACCUM. Total: 25,564,443.2 LBS. CU.												
ACCUM. Total: .4050 % CU.												

Zomia

Prepared by W.J.C 4-22-75
Approved by

BLOCK NO.3

		+ 1.00%			+ .60%			+ .40%			+ .20%		
	LEVEL	SQ. FT.	AVR. SQ. FT.	CUBIC FT.	SQ. FT.	AVR. SQ. FT.	CUBIC FT.	SQ. FT.	AVR. SQ. FT.	CUBIC FT.	SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	0			0			0			66,400		
			0			0			0			33,200	1,660,000
	4200	0			0			0			0		
			1,800	90,000		16,800	840,000		62,300	3,115,000		125,800	6,290,000
	4150	3,600			33,600			124,600			251,600		
			1,800	90,000		18,400	920,000		108,700	5,435,000		257,200	12,860,000
	4100	0			3,200			93,800			262,800		
			0			1,600	80,000		50,400	2,520,000		324,400	16,220,000
	4050	0			0			8,000			386,000		
									4,000	20,000		193,000	9,650,000
				180,000			1,840,000			11,090,000			46,680,000
		180,000 / 27	= 6,666.7 yards		1,840,000 / 27	= 68,148.1 yards		11,090,000 / 27	= 410,740.7 yards		46,680,000 / 27	= 1,728,888.9 yards	
	4,428,888.8 tons		13,333.4 tons			136,296.2 tons			821,481.4 tons			3,457,777.8 tons	
ACCUM Totals	22,305,184.8 LBS. CU.		266,668.0 LBS CU.			1,635,554.4 LBS CU.			6,571,851.2 LBS CU.			13,831,111.2 LBS. CU.	
	.2518 % CU.												

Zonia

W.J.C. 4-22-75

BLOCK NO. 2

	LEVEL	+1.00% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.60% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.40% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.20% SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	0			0			0			0		
			2,000	100,000		1,000	50,000		400	20,000		2,200	110,000
	4200	4,000			2,000			800			4,400		
			4,000	200,000		12,200	610,000		12,400	620,000		4,200	210,000
	4150	4,000			22,400			24,000			4,000		
			2,000	100,000		13,800	690,000		26,400	1320,000		54,400	2,720,000
	4100	0			5,200			28,800			104,800		
			0			2,600	130,000		18,400	920,000		83,800	4,190,000
	4050	0			0			8,000			62,800		
									4,000	200,000		31,400	1,570,000
				400,000			1,480,000			3,080,000			8,800,000
		$\frac{400,000}{27}$ = 14,814.8 yards			$\frac{1,480,000}{27}$ = 54,814.8 yards			$\frac{3,080,000}{27}$ = 114,074.1 yards			$\frac{8,800,000}{27}$ = 325,925.9 yards		
	1,019,259.2 tons		29,629.6 tons/1.00%			109,629.6 tons/.60%			238,148.2 tons/.40%			651,851.8 tons/.20%	
Accum Totals	6,340,740.0 LBS. CU.		592,592.0 LBS. CU.			1,315,555.2 LBS. CU.			1,825,185.6 LBS. CU			2,507,407.2 LBS. CU	
	0.3110% CU.												

ZONIA

Unpantented Claims held by McAlester Fuel Co.

Assessment work due before September 1st of each year.

Name of Claim	Book of Offical Record	Page No.
Cuprite Amended	86	343
Black Prince	49	153
Shamrock	69	504

Name of Claim	Book of Mines	Page No.
Zonia No. 2	360	402
Zonia No. 5	360	405
Zonia No. 6	360	406
Zonia No. 7	360	407
Zonia No. 8	360	408
Zonia No. 9	360	409
Zonia No. 10	360	410
Zonia No. 11	360	411
Zonia No. 14	360	414
Zonia No. 15	360	415
Zonia No. 16	361	522
Zonia No. 17	361	524
Zonia No. 18	361	523
Zonia No. 19	361	525
Zonia No. 20	424	60
Zonia No. 21	458	388
Zonia No. 22	458	389
Zonia No. 23	458	390
Zonia No. 24	459	486
Zonia No. 25	464	547
Zonia No. 26	464	548
Zonia No. 27	464	549
Zonia No. 28	464	550

Name of Claim	Book of Offical Record	Page No.
Zonia Amended	573	813
Fraction Amended	573	812

Name of Claim	Book of Mines	Page No.
Lois No. 1	464	551
Lois No. 2	464	552
Lois No. 3	464	553
Lois No. 4	464	554
Lois No. 5	464	555
Lois No. 6	464	556
Lois No. 17	464	557
Lois No. 18	464	558
Lois No. 19	464	559
Lois No. 20	464	560

ZoMi.a

Department of Property Valuation - Report DPB Form No. 11A MIN

Producing Claims

Copper King No. 4	
Copper King No. 3	
Copper King No. 1	
Scott No. 1	
Scott No. 2	
Victory Copper	
Victory Copper No. 1	
Zonia Millsite No. 73 (replaces Zonia No. 27 Lode Claim)	
Black Prince	
Shamrock	
Zonia Millsite No. 70	
Zonia Millsite No. 71 (replaces Zonia Nos. 25 - 28 Lode Claims)	
Zonia Millsite No. 72	
Zonia Fraction	
Cuprite	Patented
Defiance	Patented
Sunrise No. 3	Patented
Sunrise No. 4	Patented
Sunrise No. 2	Patented
Sunrise	Patented
Fairplay	Patented
Copperopolis	Patented
Copper Glance	Patented
Tourmaline	Patented
Sunset	Patented
Yankee Girl	Patented
Georgia	Patented
Georgia No. 2	Patented
Georgia No. 3	Patented
Manilla	Patented
Richmond	Patented
Virginia	Patented
Polar Star	Patented
Arrastra	Patented
Iron Hat Millsite	Patented
Zonia No. 17	
Iron Hat	Patented
Zonia No. 18	
Fraction	Patented
Sun Flower	Patented
Lone Pine	Patented
Zonia No. 7	
Zonia No. 15	
Zonia No. 6	
Fountain	Patented
Quartetto	Patented
Zonia No. 5	
Zonia Millsite Nos. 1 thru 56	
Zonia Millsite Nos. 58 thru 68	
Zonia Millsite Nos. 70 thru 73	
Zonia No. 14	
Mistake Nos. 1 thru 15	
Mistake Fraction No. 1	
Mistake Fraction No. 2	

Zonia

Department of Property Valuation - Report DPB Form No. 11A MIN

Nonproducing Claims	Area Acres
Lois No. 1	19.84
Lois No. 2	10.87
Lois No. 3	15.73
Lois No. 4	20.66
Lois No. 5	20.66
Lois No. 6	16.04
Lois No. 17	20.66
Lois No. 18	20.66
Lois No. 19	17.91
Lois No. 20	20.66
Zonia No. 8	20.66
Zonia No. 9	20.66
Zonia No. 10	20.66
Zonia No. 11	20.66
Zonia No. 16	20.66
Zonia No. 21	20.66
Zonia No. 22	20.66
Zonia No. 23	20.66
Zonia No. 24	20.66
Zonia Millsite No. 69	4.82
Zonia Millsite No. 57	5.00
Copper Crown 1 thru 52	All 20.66 - 1,074.32
Gold Crown No. 1	20.66
Mistake No. 3	20.66
Mistake No. 4	20.66
Mistake No. 16	20.66
Mistake No. 17	20.66
Mistake No. 18	20.66
Last Mistake	20.66

ZONIA

Prepared by: W.A.C. 4-23-75
Approved by:

SUMMARY

	+1.00%		+.60%		+.40%		+.20%		Total		AVR.
	TONS	LBS.	TONS	LBS	TON	LBS	TONS	LBS	Tons	LBS	GRADE
BLOCK NO.1											
BLOCK NO.2	29,629.6	592,592.0	109,629.6	1,315,555.2	228,148.2	1,825,185.6	651,851.8	2,607,407.2	1,019,259.2	6,340,749.0	.3110%
BLOCK NO.3	13,333.4	266,668.0	136,296.2	1,635,554.4	821,481.4	6,571,851.2	3,457,777.8	13831,111.2	4,429,888.8	22,305,184.8	.2518%
BLOCK NO.4	284,444.4	5,688,888.0	672,592.6	8,071,111.2	751,851.8	6,014,814.4	1,447,407.4	5,789,629.6	3,156,296.2	25,564,443.2	.46
BLOCK NO.5	241,481.4	4,829,628.0	431,111.2	5,173,334.4	654,814.8	5,238,518.4	1,733,333.4	6,933,333.6	3,060,740.8	22,174,814.4	.3652%
BLOCK NO.6	0.0	0.0	260,000.0	3,120,000	814,814.8	6,518,518.4	1,943,703.6	7,774,814.4	3,018,518.4	17,413,332.8	.2885%
BLOCK NO.7	4,444.4	88,888.0	9,629.6	115,555.2	27,407.4	219,259.2	997,777.8	3,991,111.2	1,039,259.2	4,414,813.6	.2124%
BLOCK NO.8	11,851.8	237,036.0	11,111.0	133.332.0	125,925.8	1,007,406.4	1,887,407.4	7,549,629.6	2,036,296.0	6,927,404.0	.2192%
BLOCK NO.9	8,888.8	177,776.0	97,777.8	1,173,333.6	908,888.8	7,271,110.4	1,592,592.6	6,370,370.4	2,608,148.0	14,993,592.4	.2871%
BLOCK NO.10	0.0	0.0	0.0	0.0	29,629.6	237,036.8	114,074.0	456,296.0	143,703.6	693,332.8	.240%
TOTAL	594,073.8	11,881,476.0	1,728,146.0	20,737,776	4,362,962.6	34,903,703.8	13,825,925.8	55,303,703.2	20,511,110.2	122,826,656	.2994%

Zonia

W.J.C. 4-23-75

BLOCK NO. 10

	LEVEL	+1.00% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.60% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.40% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.20% SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	0			0			0			12,000		
			0			0			0			9,400	470,000
	4200	0			0			0			6,800		
			0			0			4,000	200,000		12,400	620,000
	4150	0			0			8,000			18,000		
			0			0			4,000	200,000		9,000	450,000
	4100	0			0			0			0		
			0			0			0			0	
	4050	0			0			0			0		
										400,000			1,540,000
								400,000 / 27 = 14,814.8 yards			1,540,000 / 27 = 57,037.0		
								29,629.6 tons /.40%			114,074.0 tons /.20%		
ACCUM TOTALS	143,703.6 tons.												
	693,332.8 LBS. CU.							237,036.8 LBS. CU.			456,296.0 LBS CU.		
	.2412 % CU												

Zomia

W.U.C. 4-23-75

BLOCK NO. 9

	LEVEL	+1.00% SQ. FT	AVR. SQ. FT.	CUBIC FT.	+.60% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.40% SQ. FT.	AVR. SQ. FT	CUBIC FT.	+.20% SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	4,800			35,200			59,600			96,000		
			2,400	120,000		19,800	990,000		59,600	2,980,000		107,000	5,350,000
	4200	0			4,400			59,600			118,000		
			0			4,400	220,000		81,800	4,090,000		109,000	5,450,000
	4150	0			4,400			104,000			100,000		
			0			2,200	110,000		78,000	3,900,000		112,000	5,600,000
	4100	0			0			52,000			124,000		
			0			0			26,000	1,300,000		82,000	4,100,000
	4050	0			0			0			40,000		
												20,000	1,000,000
				120,000			1,320,000			12,270,000			21,500,000
		120,000 / 27 = 4,444.4 yards			1,320,000 / 27 = 48,888.9 yards			12,270,000 / 27 = 454,444.4 yards			21,500,000 / 27 = 796,296.3 yards		
	2,608,148. tons	8,888.8 tons			97,777.8 ton			908,888.8 tons			1,592,592.6 tons		
ACCUM. TOTALS	14,992,590.4 LBS. CU.	177,776.0 LBS CU.			1,173,333.6 LBS. CU.			7,271,110.4 LBS CU.			6,370,370.4 LBS. CU.		
	.2874% CU.												

Zonia

W.J.C. 4-23-75

BLOCK NO. 8

	LEVEL	+1.00% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.60% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.40% SQ. FT.	AVR. SQ. FT.	CUBIC. FT.	+.20% SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	6,400			6,000			27,200			96,000		
			3,200	160,000		3,000	150,000		13,600	680,000		117,000	5,850,000
	4200	0			0			0			138,000		
			0			0			6,000	300,000		117,000	5,850,000
	4150	0			0			12,000			96,000		
			0			0			10,200	510,000		141,800	7,090,000
	4100	0			0			8,400			187,600		
			0			0			4,200	210,000		113,800	5,690,000
	4050	0			0			0			40,000		
												20,000	1,000,000
				160,000			150,000			1,700,000			25,480,000
		160,000 / 27	= 5,925.9 yards		150,000 / 27	= 5,555.5 yards		1,700,000 / 27	= 62,962.9 yards		25,480,000 / 27	= 943,703.7 yards	
	2,036,296.0 tons	11,851.8 ton	/1.00%			11,111.0 tons	/.60%		125,925.8 tons	/.40%		1,887,407.4 tons	/.20%
ACCUM TOTALS	8,927,404.0 LBS CU.	237,036.0 LBS. CU.				133,332.0 LBS. CU.			1,007,406.4 LBS. CU.			7,549,629.6 LBS. CU.	
	.2192 % CU.												

Zonia

W.J.C. 4-23-75

BLOCK NO. 7

	LEVEL	+1.00% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.60% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.40% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.20% SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	2,400			5,200			6,000			26,800		
			1,200	60,000		2,600	130,000		3,000	150,000		47,400	2,370,000
	4200	0			0			0			68,000		
			0			0			0			78,000	3,900,000
	4150	0			0			0			88,000		
			0			0			2,200	110,000		94,000	4,700,000
	4100	0			0			4,400			100,000		
			0			0			2,200	110,000		50,000	2,500,000
	4050	0			0			0			0		
				60,000			130,000			370,000			13,470,000
		60,000 / 27 = 2,222.2 yards			130,000 / 27 = 4,814.8 yards			370,000 / 27 = 13,703.7 yards			13,470,000 / 27 = 498,889.9 yards		
	1,039,259.2 tons	4,444.4 tons		/1.00%	9,629.6 tons		/1.60%	27,407.4 tons		/1.40%	997,777.8 tons		/1.20%
ACCUM TOTALS	20785184 4,414,813.6 LBS. CU. .2124 % cu.	88,888.0 LBS. CU.			115,555.2 LBS. CU.			219,259.2 LBS. CU.			3,991,111.2 LBS. CU.		

Zomia

W.J.C. 4-23-75

BLOCK NO. 6

	LEVEL	+1.00% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.60% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.40% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.20% SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	0			0			0			0		
			0			0			0			10,000	500,000
	4200	0			0			0			20,000		
			0			24,600	1,230,000		47,000	2,350,000		80,000	4,000,000
	4150	0			49,200			94,000			140,000		
			0			33,600	1,680,000		110,000	5,500,000		134,400	6,720,000
	4100	0			24,000			126,000			128,800		
			0			12,000	600,000		63,000	3,150,000		182,400	9,120,000
	4050	0			0			0			236,000		
												118,000	5,900,000
				0.00			3,510,000			11,000,000			26,240,000
					3,510,000 / 27	130,000	yards	11,000,000 / 27	407,407.4	yards	26,240,000 / 27	= 971,851.8	yards
					260,000.0	tons	/ .60%	814,814.8	tons	/ .40%	1,943,703.6	tons	/ .20%
ACCUM Totals	3,018,518.4 tons				3,120,000	LBS.	CU.	6,518,518.4	LBS,	CU.	7,774,814.4	LBS.	CU.
	17,413,332.8 LBS. CU.												
	.2884 % CU.												

Zonia

W.J.C 4-23-75

BLOCK NO.5

	LEVEL	+1.00% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.60% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.40% SQ. FT.	AVR. SQ. FT.	CUBIC FT.	+.20% SQ. FT.	AVR. SQ. FT.	CUBIC FT.
	4250	6,400			28,000			36,000			22,800		
			24,200	1,210,000		44,000	2,200,000		36,000	1,800,000		60,700	3,035,000
	4200	42,000			60,000			36,000			98,600		
			31,000	1,550,000		50,000	2,500,000		63,000	3,150,000		71,300	3,565,000
	4150	20,000			40,000			90,000			44,000		
			10,000	500,000		21,200	1,060,000		61,400	3,070,000		95,000	4,750,000
	4100	0			2,400			32,800			146,000		
			0			1,200	60,000		16,400	820,000		157,000	7,850,000
	4050	0			0			0			168,000		
												84,000	4,200,000
				3,260,000			5,820,000			9,840,000			23,400,000
		3,260,000 / 27 = 120,740.7 yards			5,820,000 / 27 = 215,555.6 yards			8,840,000 / 27 = 327,407.4 yards			23,400,000 / 27 = 866,666.7 yards		
	3,060,740.8 tons	241,481.4 tons 1.00%			431,111.2 tons 1.60%			654,814.8 tons 1.40%			1,733,333.4 tons 1.20%		
ACCUM Totals	22,174,814.4 LBS. CU.	4,829,628.0 LBS. CU.			5,173,334.4 LBS. CU.			5,238,518.4 LBS. CU.			5,933,333.3 LBS. CU.		
	.3622%												

Zonia

Name of Claim	Book of Offical Records	Page No.
Mistake Fraction No. 1	761	114
Mistake Fraction No. 2	761	115
Mistake No. 1	761	116
Mistake No. 2	761	117
Mistake No. 3	761	118
Mistake No. 4	761	119
Mistake No. 5	761	120
Mistake No. 6	761	121
Mistake No. 7	761	122
Mistake No. 8	761	123
Mistake No. 9	761	124
Mistake No. 10	761	125
Mistake No. 11	761	126
Mistake No. 12	761	127
Mistake No. 13	761	128
Mistake No. 14	761	129
Mistake No. 15	761	130
Mistake No. 16	761	131
Mistake No. 17	761	132
Mistake No. 18	761	133
Last Mistake	761	134

Name of Claim	Book of Mines	Page No.
Gold Crown No. 1	159	400
Copper Crown No. 1	147	155
Copper Crown No. 2	147	156
Copper Crown No. 3	147	157
Copper Crown No. 4	151	331
Copper Crown No. 5	151	332
Copper Crown No. 6	151	333
Copper Crown No. 7	151	334
Copper Crown No. 8	151	335

	Book of Offical Records	Page No.
Copper Crown No. 9	55	111
Copper Crown No. 10	7	186
Copper Crown No. 12	55	112
Copper Crown No. 13	560	929
Copper Crown No. 14	63	204
Copper Crown No. 15	64	179
Copper Crown No. 16	64	180
Copper Crown No. 17	64	181
Copper Crown No. 18	68	385
Copper Crown No. 19	68	386
Copper Crown No. 20	68	387
Copper Crown No. 21	68	388
Copper Crown No. 22	68	389
Copper Crown No. 23	68	390
Copper Crown No. 24	68	391
Copper Crown No. 25	68	392
Copper Crown No. 26	68	393
Copper Crown No. 27	83	74
Copper Crown No. 28	73	402
Copper Crown No. 29	73	403
Copper Crown No. 30	73	404
Copper Crown No. 31	73	405
Copper Crown No. 32	83	75
Copper Crown No. 33	112	374
Copper Crown No. 34	112	375
Copper Crown No. 35	112	376

War Minerals Report
United States Department of the Interior - Bureau of Mines

W.M.R. 38 - Copper November 1942

ZONIA MINE
Yavapai County, Ariz.

SUMMARY

The Zonia mine, Yavapai County, Ariz., is a potential small-scale producer of copper. The Gold Fields North American Development Co. has an option to mine surface ores and to leach them if ore reserves are large enough to justify exploitation of the deposit.

At the request of the War Production Board, the Bureau of Mines has undertaken to check-sample the outcrops of the deposit and to estimate the reserves of oxidized ores. The Bureau will diamond drill the southern portion of the deposit to confirm the quantity and grade of ore available for open-cut mining to a depth of 100 feet. It is possible that this work may indicate a maximum of 300,000 tons of oxidized ore containing 9,000,000 pounds of salable copper. In addition, the northern part of the ore zone presents possibilities for developing a maximum of 500,000 tons of oxidized ore containing 15,000,000 pounds of salable copper.

Exploration and sampling by the Bureau of Mines can be completed in 3 months at a cost of $17,500. If the results are favorable the company purposes to construct a leaching plant, for which a flow sheet has been determined from tests in the laboratory and in a pilot plant. Extraction of copper was established at 93 percent. Construction of this plant will require about 6 months. Thus, the minimum elapsed time from the beginning of exploration and check-sampling to the completion of the treatment plant would be 9 months.

Oxidized ore amenable to leaching could be mined from an open-cut at the rate of 500 tons a day. Cement copper precipitates would be produced for shipment to a custom smelter. The corresponding annual production of standard or electrolytic copper would be about 5,000,000 pounds.

INTRODUCTION

The Zonia mine is 12 miles southeast of Kirkland, a station on the Phoenix branch of the Santa Fe Railroad and 7 miles southeast of Kirkland Junction on paved U. S. Highway 89. A well-graded gravel road connects the mine with Kirkland.

The Gold Fields North American Development Co. has an option to mine surface ores and to leach them if ore reserves are large enough to justify exploitation of the deposit.

This report is based principally upon (1) information contained in a a report to the Hammon Copper Co. by F. A. Sizer, mining engineer, under date of October 24, 1930, and (2) upon correspondence with W. C. Hammon and W. J. Loring. No field report by an engineer from the Bureau of Mines is available at this time.

HISTORY AND REFERENCES

Some ore was mined from this deposit at an early date, and direct smelting was attempted. A syndicate sank the Cuprite shaft on the McMahon group of claims previous to 1920 but did not find commercial sulfide ore. The shaft produced more water than could be pumped by available equipment.

In the late 1920's the Hammon Copper Co. of San Francisco, Calif., acquired the mine and did a large amount of development on the shallow oxidized ore. E. L. Sweeney made preliminary leaching tests on this ore for the company. W. J. Loring directed the mine development and built a pilot leaching plant, where he confirmed the percentage of extraction obtained in the laboratory tests by Sweeney. James L. Gillingham owns the Zonia group of mining claims and has options on the McMahon group, title to which is held by Sophia O. McMahon.

The following groups of claims of the Zonia mine cover an area having a length of 11,000 feet and a maximum width of 3,600 feet.

Group	Acres	Remarks
Zonia	255.5	Patented
McMahon	171.7	
Metals	161.7	
Rolla Smith	100.5	
Shanefeldt	41.6	For tailings disposal
	731.0	

PHYSICAL FEATURES

The deposit is in the mountainous belt of Arizona, lying between the desert and the plateau. The altitude of the mine is about 3,800 feet. Water stands at 265 feet below the collar of the Cuprite shaft.

DESCRIPTION OF DEPOSIT

The ore zone strikes northeast and dips 55° to 60° northwest through pre-Cambrian sericitic schist intruded by monzonite. The ore zone outcrops 3,600 feet along the strike. The maximum width of the zone is 200 feet. Ore is found in both schist and monzonite. The schist ore body is oxidized to the 335-foot level and is rather soft. The physical character of the wall rock is unknown. A series of trenches across the southern part of the ore zone indicates ore of minable grade for a length of 700 feet and a width ranging from 26 feet to 145 feet. In places the ore is separated into several narrow bands by intervening areas of very low-grade material. Sporadic trenching and sampling show occurrences of copper for maximum distance of 425 feet southeast of the ore zone.

The northern part of the ore zone extends through a strike a distance of 400 feet and shows good copper assays across widths of 65 to 145 feet. These assays were on spot samples taken obliquely across the ore zone in three widely separated groups. The northern and southern parts of the ore zone are separated by a distance of 400 feet in which no samples were taken. The nature of this intermediate area between outcrops is not clarified in available field reports.

Underground, the ore zone was exposed on the 210-foot level by drifts

and crosscuts through a length of 1,550 feet and a maximum width of 300 feet. On this level the ore body has a length of 925 feet and a maximum width of 88 feet; it has an area of 65,000 square feet and contains 5,400 tons per foot of depth. The average copper content is 1.33 percent. A band of lean material, too low-grade for mining, bisects this block through a distance of 250 feet. Exclusion of this material would reduce the calculated tonnage but materially increase the average grade of ore mined. A strike drift near the McMahon shaft shows several short stretches of good ore. On the 335-foot level the ore zone that was 45 to 170 feet wide was followed for a distance of 430 feet northeast of the McMahon shaft. Ore was exposed at the north end of the level through a length of 57 feet and a maximum width of 20 feet.

Ore in monzonite outcrops on the Defiance claim east of the schist ore body, where surface trenching indicates a width of about 45 feet.

MINE WORKINGS

Old mine maps show the Cuprite shaft (also called the McMahon shaft) to be 874 feet deep. Drifts were run from this shaft on five levels.

THE ORE

The principal ore minerals are azurite, malachite, and chrysocolla, with slight amounts of cuprite and chalcocite. The ore also carries some limonite, specularite, and hematite, with minor amounts of siderite, pyrite and chalcopyrite,

It is possible that the low-grade copper assays in portions of the outcrop may be due to partial leaching of the copper at the surface and that the commercial ore may become wider with depth. Surface assay map is attached (fig. 1).

POSSIBLE ORE RESERVES

In his report Sizer estimates the ore reserves, from surface to a depth of 240 feet, to be 1,338,000 tons of developed ore containing 1.75 percent copper and 760,000 tons of probable ore containing 1.50 percent copper. Assays of surface trench samples indicate that the southern portion of the ore body contains 1.73 percent copper and will produce 3,440 tons of ore per foot of depth. Verification of the grade of this ore from surface to a depth of 100 feet waits on diamond drilling. Assuming that this block of ground can be mined by an open-cut to a depth of 40 feet at the narrow ends and to 125 feet at the middle, 300,000 tons of ore would be recoverable.

Should the ore be continuous throughout the northern portion of the ore zone, a maximum of 500,000 tons of commercial ore might be mined by an open cut.

EXPLORATION AND CHECK SAMPLING TO BE PERFORMED BY BUREAU OF MINES

As soon as men and equipment can be assembled, a program of exploration will be initiated by the Bureau of Mines to confirm the quantity and grade of

ore to a depth of 100 feet. This will consist of (1) check sampling that may seem advisable in surface trenches and underground on the 210-foot level, (2) cutting additional trenches across the outcrop of the ore zone, and (3) diamond drilling about 10 holes totaling 2,000 feet. The time required to complete this exploration and check sampling is estimated at 3 months.

ESTIMATED COST OF EXPLORATION AND SAMPLING

The cost of exploration and sampling to be performed by the Bureau of Mines is estimated to be $17,500. Details are below:

Item	Amount
Diamond drilling, 2,000 feet at $4 a foot	$ 8,000
Diamond-drill sampling	2,000
Surface trenching, 1,000 feet at $3 a foot	3,000
Check sampling, surface and underground, 300 samples at $5 each	1,500
Supervision and analyses	3,000
	17,500

ORE TREATMENT

The usual method of treating lean oxidized-copper ores is by leaching. A leaching process developed by Sweeney in the laboratory and checked by Loring in a pilot plant at the mine indicated an extraction of 93 percent of the copper from the ores of the Zonia deposit. For estimating purposes, an extraction of 90 percent is assumed for a full-scale plant at the Zonia mine. Construction of a leaching plant is planned by the Gold Fields North American Development Co. The Bureau of Mines can estimate construction costs after it has studied the treatment process and flow sheet developed for this ore.

Smelter payments for shipments of cement copper precipitates based on the schedule of the American Smelting & Refining Co., Hayden, Ariz., for precipitates containing 75 percent copper are estimated to be 13.375 cents a pound of copper recovered at the smelter after deducting freight from the mine plant.

TIME REQUIRED TO START PRODUCTION

Assuming that labor, supplies, materials, and equipment can be obtained as needed, the construction of a leaching plant with a capacity of 500 tons per day is estimated to require 6 months. Allowing 3 months for exploration, the minimum elapsed time from the initial exploration to the completion (1) of preparations for open-cut mining and (2) of the construction of a leaching plant would be 9 months.

CONCLUSIONS

The Bureau of Mines will

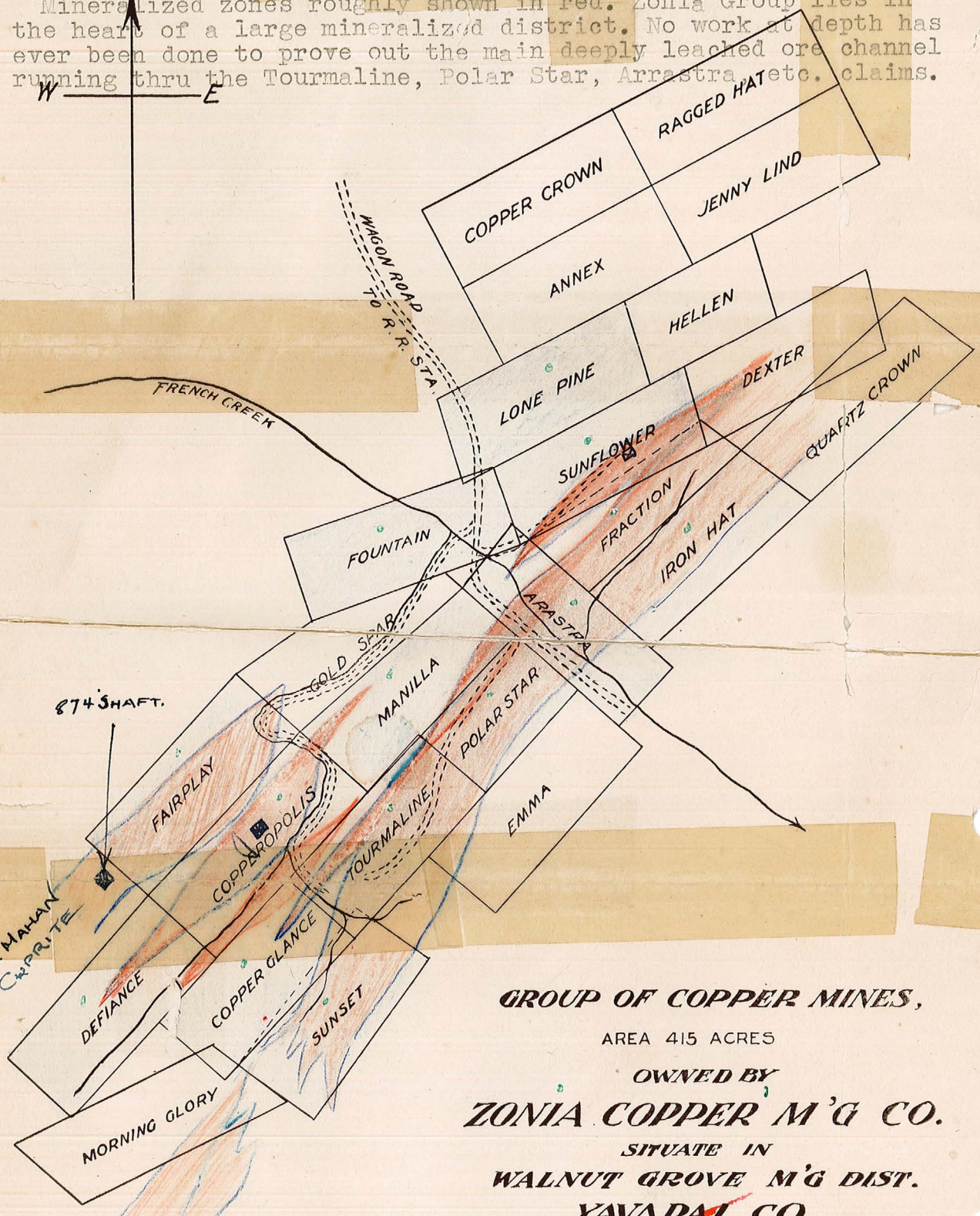
1. Cut additional trenches across outcrops of the deposit.

2. Check-sample surface and underground exposures of ore.
3. Diamond drill the deposit from surface to a depth of 100 ft.

Should this work indicate that adequate ore reserves are available for open-cut mining, the Gold Fields North American Development Co. purposes to construct a leaching plant for the treatment of the ore and to start production as soon as possible.

Old claims map showing approx. locations and extent. 14 Pat. claims - 255 acres. Live creek thru Arrastra Camp. Well and two or three buildings. No equipment on property.

Mineralized zones roughly shown in red. Zonia Group lies in the heart of a large mineralized district. No work at depth has ever been done to prove out the main deeply leached ore channel running thru the Tourmaline, Polar Star, Arrastra etc. claims.



GROUP OF COPPER MINES,

AREA 415 ACRES

OWNED BY

ZONIA COPPER M'G CO.

SITUATE IN

WALNUT GROVE M'G DIST.

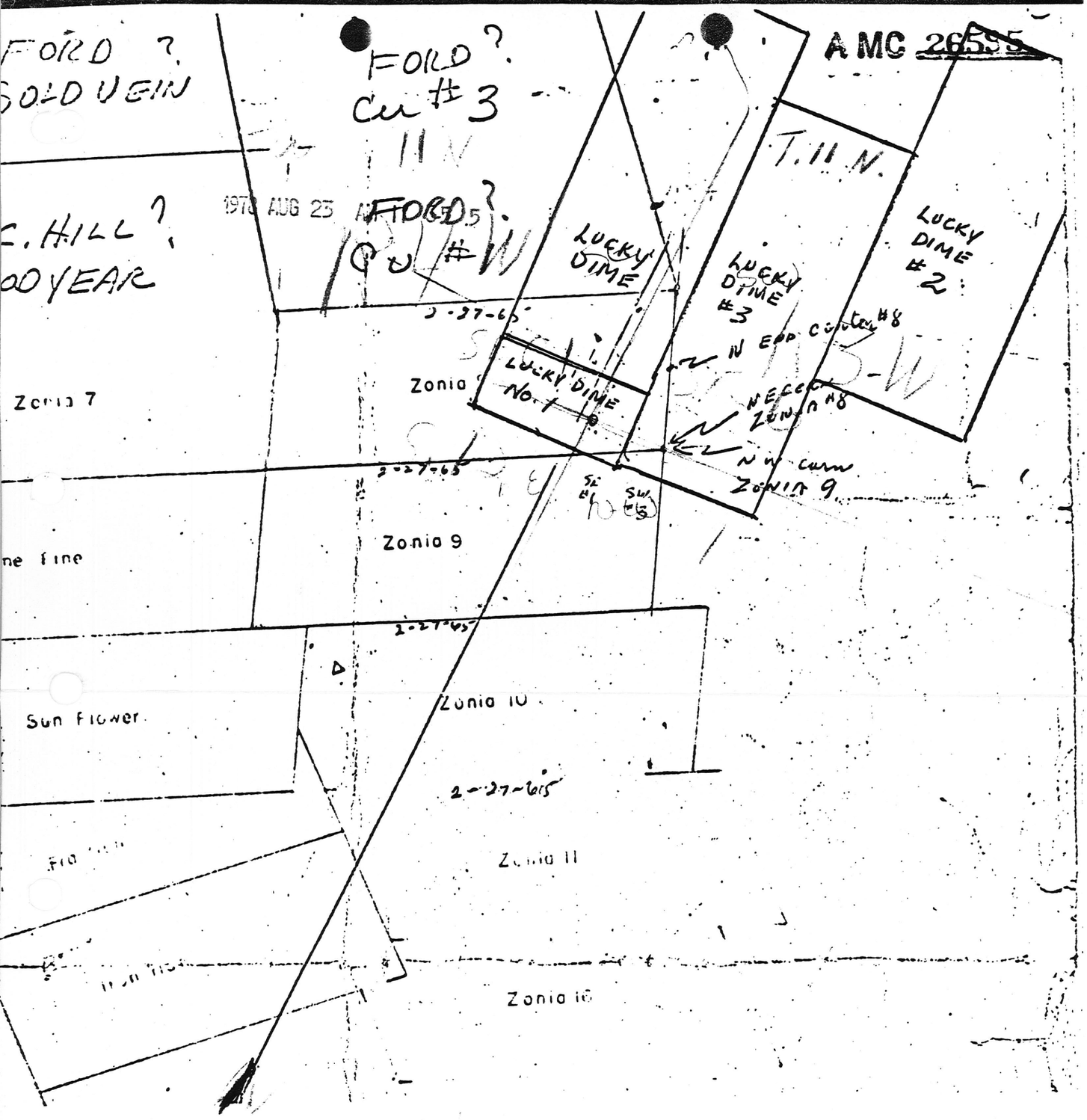
YAVAPAI CO.

ARIZONA

LAT. 34° 20' N.
LONG. 113 WEST

J. J. Fisher C.E.
U.S. DEPT. MIN. SURVEYOR.

1905 (?)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GOLD VEIN
FORD ?
Cu #3
T. 11 N.
1978 AUG 23
FORD ?
Cu #
C. HILL ?
GOODYEAR
LUCKY DIME
LUCKY DIME #3
LUCKY DIME #2
2-27-65
Zonia 7
Zonia
LUCKY DIME No. 1
N EDD corner #8
NE corner Zonia #8
N W corn Zonia 9
SE #10
SW #9
Zonia 9
ne Fine
2-27-65
Zonia 10
Sun Flower
2-27-65
Zonia 11
Zonia 16

Zonia f. 6

Zonia

R 4 W | R 3 W

AMC 17192

N

Scale 1" = 500'

Yavapai Co., Arizona

G&SRB&M

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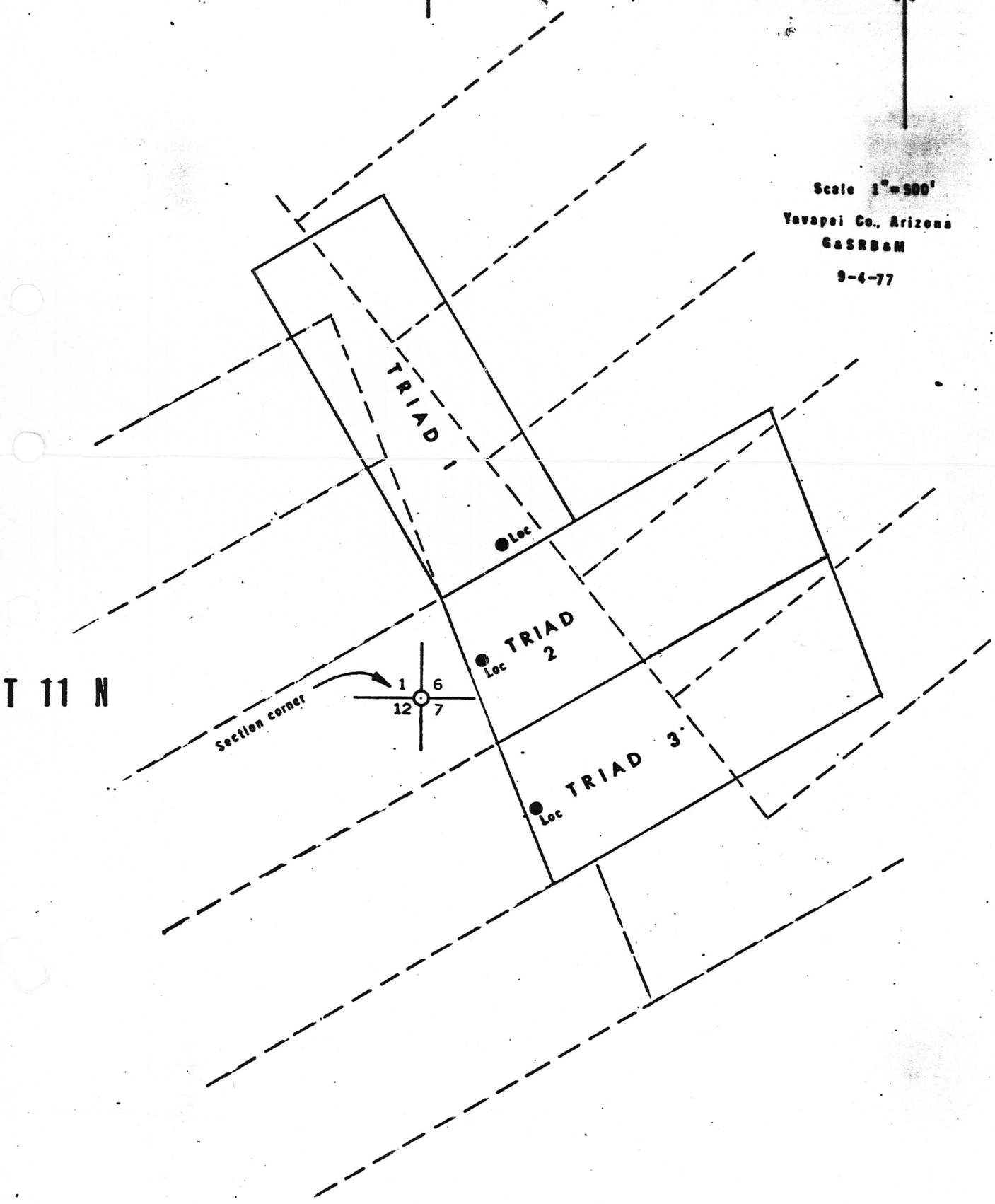

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