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08/28/89

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: PRUDENTIAL GROUP

ALTERNATE NAMES:

GREYHOUND GROUP  
BELL FISSURE GROUP  
ROCHELLE GROUP  
NEW ROCHELLE GROUP  
SANTA MONICA GROUP  
BELL  
HORNEL GROUP  
HAPPY CAMP

PINAL COUNTY MILS NUMBER: 65A

LOCATION: TOWNSHIP 1 S RANGE 12 E SECTION 21 QUARTER C  
LATITUDE: N 33DEG 19MIN 43SEC LONGITUDE: W 111DEG 08MIN 10SEC  
TOPO MAP NAME: PICKETPOST MTN - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

SILVER  
LEAD  
COPPER  
GOLD LODE  
LEAD SULFIDE  
MOLYBDENUM  
VANADIUM  
SILVER NATIVE  
LEAD CARBONATE

BIBLIOGRAPHY:

ADMMR PRUDENTIAL FILE  
WADWELL, HENRY R., "AERIAL GEOL POTTS CANYON  
MNG AREA" 1941, PLATE I-ADMMR MISC AREA MAPS  
ADMMR IBERRIAN & CAMEROON CLAIMS FILE, MAP  
ADMMR "U" FILE  
CLAIMS EXTEND INTO SEC 20, 22, 29 & 30  
WADWELL, HENRY, "GEOL POTTS CANYON MNG AREA  
NEAR SUPERIOR, AZ" UOFA THESIS, 1941, P 76

PRUDENTIAL GROUP

PINAL COUNTY

Plate I, II, III - Aerial Geology on Potts  
Canyon Mining Area By Henry R. Wadwell (1941)  
Map Cabinet

(geol. file)

missing  
8/67

→ misc. areamaps

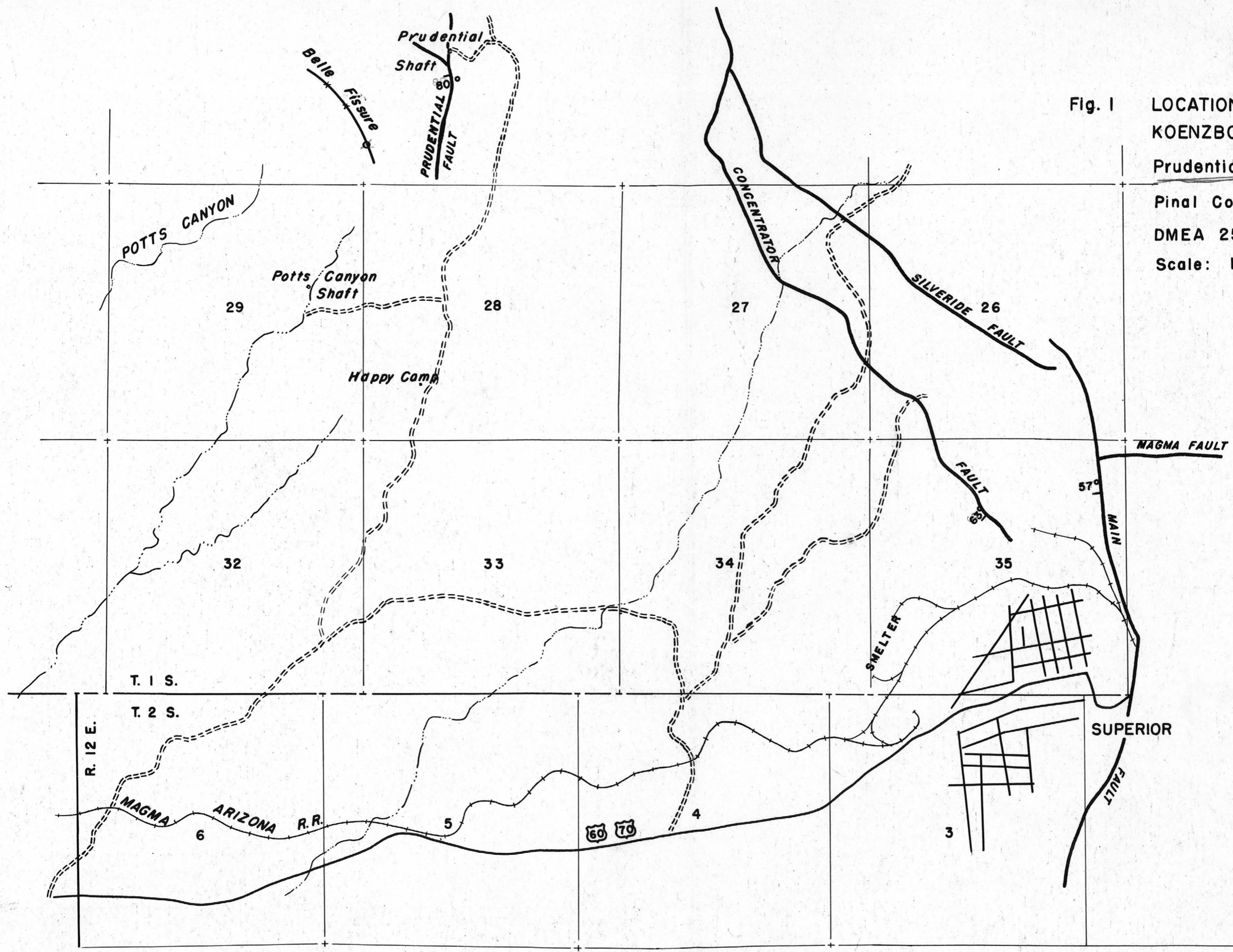


Fig. 1 LOCATION MAP  
 KOENZBOCK and JACKSON  
 Prudential Mines  
 Pinal County, Ariz.  
 DMEA 2569  
 Scale: 1" = 2000'

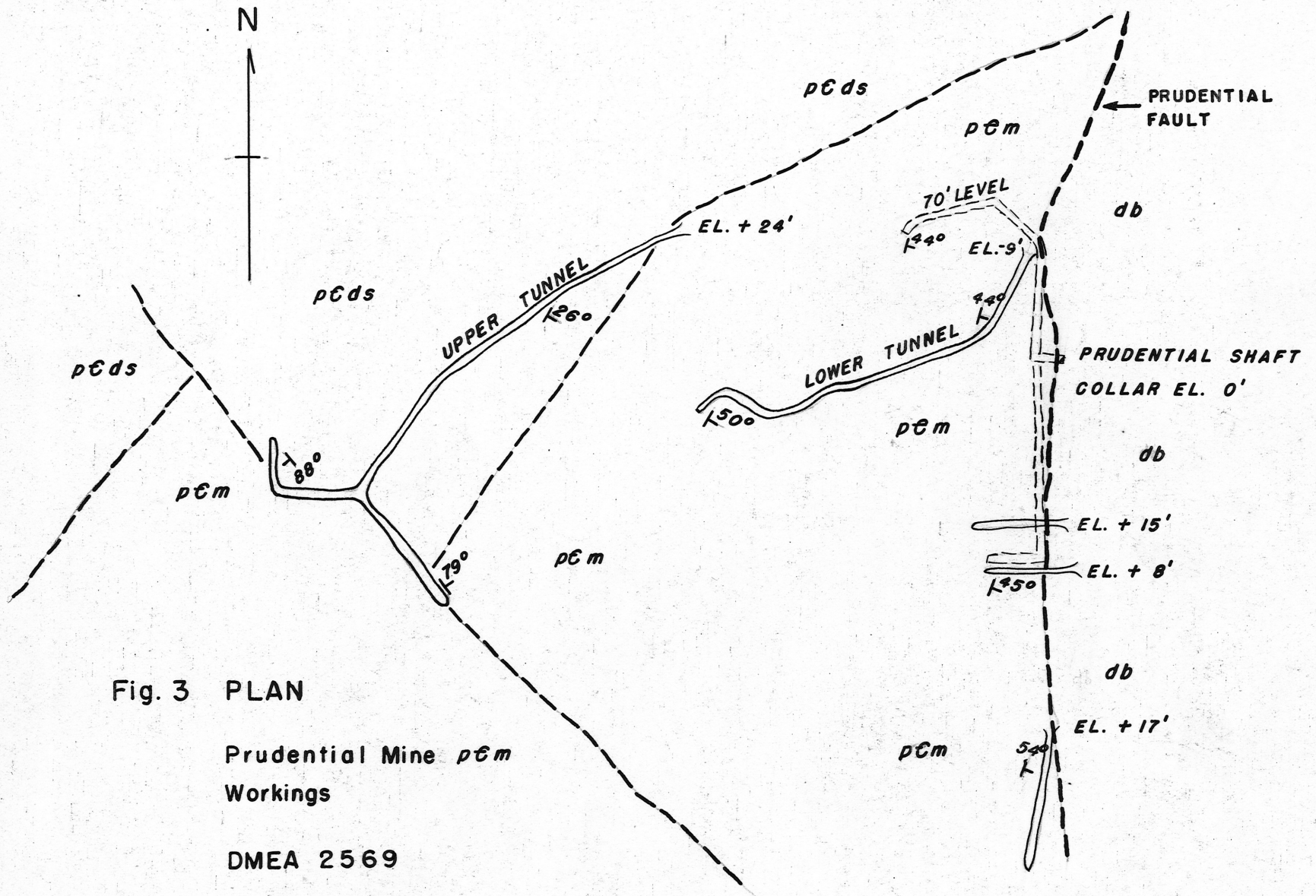


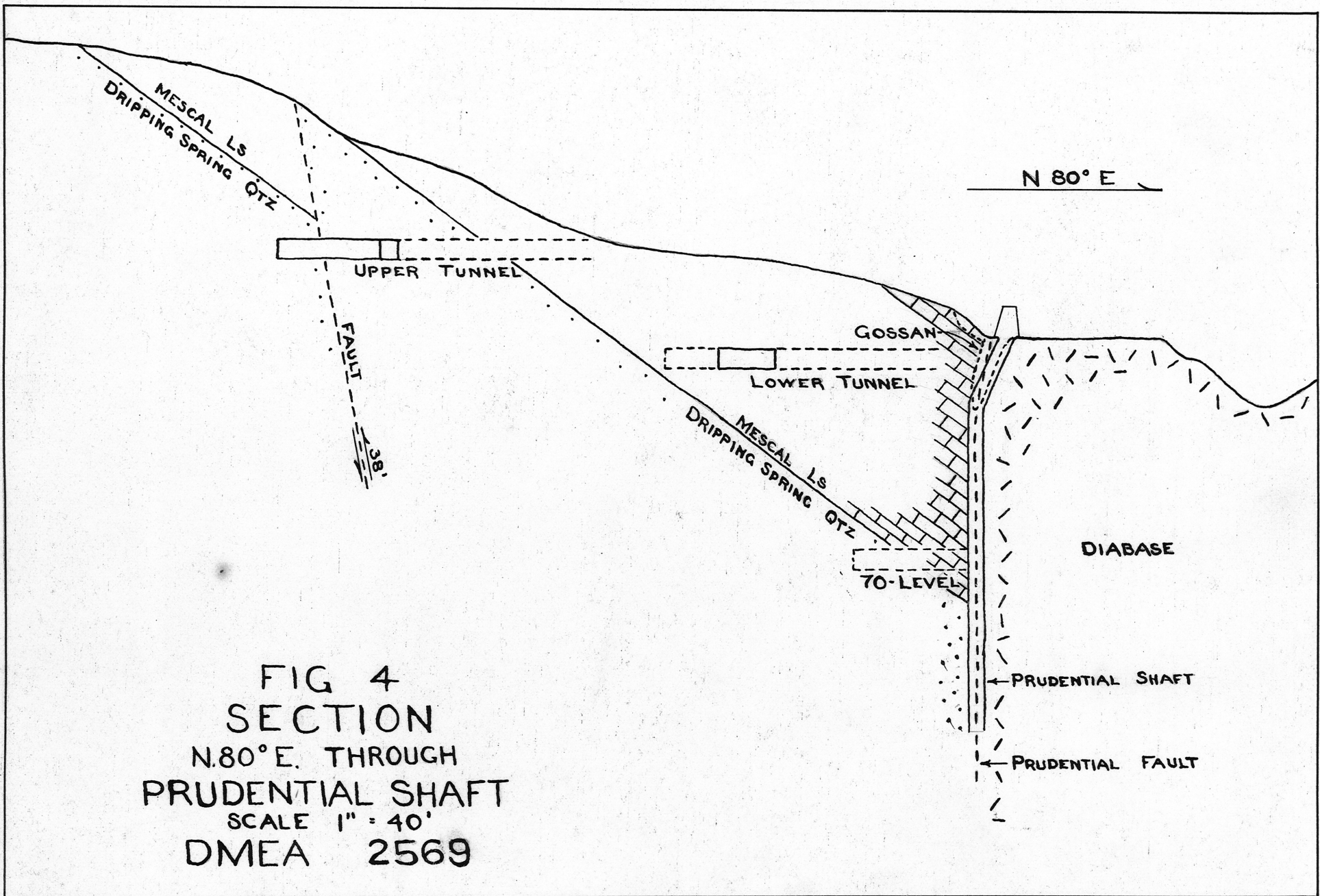
Fig. 3 PLAN

Prudential Mine *pCm*  
Workings

DMEA 2569

Scale: 1" = 40'

Diabase (db)  
Mescal Limestone (*pCm*)  
Dripping Springs Quartzite (*pCds*)



DEPARTMENT OF MINERAL RESOURCES

News Items

Date 5-28-58

Mine Prudential (Potts Canyon Area)

Location Potts Canyon, Sec. 21, T1S, R12E

Owner Mary V. Edeline & George R. Edeline

Address 235 S. Marshall Ave., Scottsdale

(Loloma Apts.)

Operating Co. "

Address "

Pres. "

Genl. Mgr. "

Mine Supt. "

Mill Supt. "

Principal Metals Pb - Ag - Cu

Men Employed -

Production Rate -

Mill, Type & Capacity -

Power, Amt. & Type -

Signed *Lewis A. Smith*

(Over)

Prudential Mines Incorporated (Ariz.Copr.1952)

President ;Kurt Koenzback, Superior

V.Pres. L.P.Jackson, Superior.

Secy-Treas: Mrs Lillian C,Robson,  
2316 North Cornell, Phx

Made application for DMEA loan June 6th,notice  
that examination had been ordered 7-14-52



DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA  
FIELD ENGINEERS REPORT

Mine Prudential Group

Date December 14, 1959

District Mineral Hill (Pioneer)

Engineer Lewis A. Smith

Subject: Supplementary Report

The previous report on the Prudential Group was made on June 19, 1958, but dealt to a very limited extent with the lead-silver deposits of the Greyhound division, or the most southerly group. The Prudential group now consists of 30 unpatented claims, but 2 of the New Rochelle claims are still under contest. The principal lead-silver deposits are in the area comprising parts of the Greyhound, Greyhound #1, Greyhound #3, and Greyhound #4 claims.

Owners: Mr. & Mrs. George Edeline, Box 833, Scottsdale, Arizona.

Access: The Greyhound and Greyhound #3 & #4 claims are connected to the paved highway by  $3\frac{1}{2}$  miles of good graded road, and  $1/4$  mile of country road, in three directions.

Work: Consists of: -

- (1) 20' shaft and 10' crosscut to vein on the Greyhound #1 vein segment.
- (2) 1 cut 75' long, 20' wide and 0-8' deep immediately surrounding the shaft. (Greyhound #1)
- (3) A bulldozer cut 75' long, 15' wide and up to 4 feet deep at a distance of 100' west of the shaft (Greyhound #4).
- (4) A 15' inclined (45 degrees) shaft on the Greyhound #3, dipping south.
- (5) Several cuts and shallow pits on the Greyhound #3.

Geology: The Apache geological series here consist of: -

- (1) Pinal Schist (west)
- (2) Scanlan Conglomerate
- (3) Pioneer shale
- (4) Barnes Conglomerate
- (5) Dripping Spring Quartzite
- (6) Mescal Limestone
- (7) Pre-Basalt (usually present)
- (8) Diabase Sill (contacts either Mescal or Pre-Cambrian Basalt)
- (9) Andesite porphyry
- (10) Dacite

The series is disrupted by the Prudential (north-south) major fault and by numerous transverse faults ranging from east-west to N 70° W. Four of these transverse faults have appreciably offset the rock series and the Prudential Fault. The vein is severely disjointed by these faults.

The mineralization is most extensive at the fracture intersections and lies wholly within the diabase. Prospect work appears to be limited by the location of these intersections. The vein pinches between the cross-faults and swells against them, varying from 4" to 14" in width. The strike varies from N 20° E to N 30° E depending upon which fault block it traverses. The average dip is about 25° SW. A second vein on the Greyhound 2 and 4 claims trends N 10° E and dips steeply to the SE. The two veins intersect near the NW corner of the #1 Claim.

The vein consists of about 4-8 inches of quartz with included breccia fragments of

Prudential Group (cont.)

diabase. This "zone" lies on the footwall. Mineralization into the hanging wall from the footwall zone extends a distance of a few inches up to 14 inches. The footwall is closely sheared and is mineralized along the shear planes over an unknown width. The 4-8 inch zone carries 300-700 ounces of silver and up to 50% lead. The hanging wall zone was sampled, but the samples have not been run so far. It appears to be lower grade ore, however. The footwall shear zone was sampled in places and carries \$15.00 in lead and silver. The lead minerals are zoned within the vein. Galena is in the center and is altering to anglesite, vanadinite, cerussite, and wulfenite in about this order, outward. Cerussite is relatively uncommon. Some massicot was seen in the footwall zone. Iron oxide halos form the border between the anglesite and the other oxidized lead minerals. Silver minerals appear to be argentite (in the galena) and embolite (with the oxidized lead minerals). Calcite and some manganese oxide are uncommon but locally present. The longitudinal extent of the veins will be determined by transverse cuts in the near future. Much sampling will be necessary to determine the value of the deposit. The lenticular (pinch and swell) character of the veins is unfavorable to large operations. Should these pockets, or lenses, develop in depth, the economic aspects may change from a small "chloriding" type of mining to a larger scope.

MEMORANDUM

PRUDENTIAL GROUP, MINERAL HILL DIST., PINAL CO.

Mrs. George E. Edeline, 235 South Marshall, Scottsdale, Ariz., reported a new lead-silver discovery at a short distance south of the Prudential Group. Two or three claims will be added to the Prudential Group to the south, to cover the new area.

The material contains anglesite, vanadinite and wulfenite along with a little native silver and quartz crystals. The minerals are in massive form, with a distinct zoning which, from the inside out, consists of anglesite, vanadinite and wulfenite. An occasional bleb of cerussite was seen. According to Mrs. Edeline, a cut disclosed two veins, each a foot wide, which are parallel and are separated by 3 to 4 feet of low grade material. The vein samples showed several hundred ounces of silver together with 30-40% of lead and a little gold. The material between the veins was much lower grade. Dirt overlying the veins carries about \$15.00 in lead and silver. The vein is believed to cut limestone. Much large float, similar to the vein material, is scattered through the detritus on the downhill side of the veins. Some float pieces are up to one foot in diameter.

The Edelins propose to cut several trenches across the suggested strike of the veins, in order to determine the longitudinal extent of the mineralization, and also to determine how many claims to acquire. Mrs. Edeline stated that some evidence indicates that at least 500 feet of veins is present since they outcrop again at about 500 feet from the discovery. It was suggested that the detritus below the veins be screened to determine how the values may be distributed.

A visit will be made to the property as soon as the trenches are cut.

Report by

Lewis A. Smith  
Field Engineer

12-8-59

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Prudential, Bell and Happy Camp

Date May 15th, 1952

District Pioneer

Engineer A.L. Flagg

Subject: Inspection of thirty-two claims belonging to Kurt Koenzbock in the Potts Canyon area north of Superior.

Limited amount of work, mostly in bad condition. Prudential shaft cannot be entered but can be repaired. Happy Camp shaft completely caved. Bell Fault tunnel open but in bad condition.

Koenzbock proposes to apply for DMEA loan to explore these three workings. Two most important projects are diamond drill holes on (1) Bell Fissure and (2) north of Prudential shaft. These were suggested by Henry R. Wadwell who made extensive structural geology survey of the Potts Canyon area in 1941 to test the zones at depths of 500-ft.

DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA  
MINE OWNER'S REPORT

23. Geology & Mineralization

1. Mine  Prudential
  2. Location  Superior, Arizona.
  3. Mining District & County  Pioneer, Pinal County
  4. Former name
  5. Owner  Kurt F. Koenzbach, C. K. Pomeroy
  6. Address (Owner)  Superior
  7. Operator  Antilla Bros.
  8. Address (Operator)  "
  9. President, Owning Co.
  - 9A. President, Operating Co.
  10. Gen. Mgr.
  14. Principal Minerals  Copper and silver
  11. Mine Supt.
  15. Production Rate
  12. Mill Supt.
  16. Mill: Type & Cap.
  13. Men Employed
  17. Power: Amt. & Type
  8. Operations: Present
  9. Operations: Planned
  20. Number Claims, Title, etc.  18 claims
  21. Description: Topography & Geography  Limenite out cropping, also ore follows quartz porphyry contact
  22. Mine Workings: Amt. & Condition  Shaft 120 feet, short cut and drift on 70 foot level
- Kurt F. Koenzbach  
Operator, Antilla Bros.

24. Ore: Positive & Probable, Ore Dumps, Tailings

24A. Dimensions and Value of Ore Body

25. Mine, Mill Equipment & Flow-Sheet

26. Road Conditions, Route

27. Water Supply

28. Brief History

29. Special Problems, Reports Filed

30. Remarks

31. If property for sale: Price, terms and address to negotiate.

32. Signature

33. Use additional sheets if necessary.

23. Geology & Mineralization

24. Ore: Positive & Probable, Ore Dumps, Tailings

24A. Dimensions and Value of Ore body

25. Mine, Mill Equipment & Flow-Sheet

26. Road Conditions, Route

Seven miles northwesterly from Superior, branches out from Silver King road, mile from highway

27. Water Supply

Good

28. Brief History

29. Special Problems, Reports Filed

30. Remarks

31. If property for sale: Price, terms and address to negotiate.

32. Signature..... Kurt F. Koenzbach  
Superior, Ariz.

33. Use additional sheets if necessary.

DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA  
OWNERS MINE REPORT

Date

Mine Prudential

Location Superior, Ariz.

District Pioneer, Pinal County

Former name

Owner Kurt F. Koenzbach, C. K. Pomeroy

Address Superior

Operator Antilla Bros.

Address Superior

President

Gen. Mgr.

Mine Supt.

Mill Supt.

Principal Metals Copper & Silver

Men Employed

Production Rate

Mill: Type & Cap.

Power: Amt. & Type

Operations: Present

Antilla Bros.

Operations Planned

Number Claims, Title, etc. 18 claims

Description: Topog. & Geog. Limestone out cropping, also ore follows quartz porphyry contact

Mine Workings: Amt. & Condition Shaft 120 feet, short cross out and drift on 70 ft. level

(over)

Geology & Mineralization

DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA  
OWNER'S MINE REPORT

Date

Ore: Positive & Probable, Ore Dumps, Tailings

Location Superior, Ariz.

Mine, Mill Equipment & Flow Sheet

Address

Address

Road Conditions, Route

Seven miles northwesterly from Superior, branches out from  
Silver King road, mile from highway

Water Supply Good

Brief History

Special Problems, Reports Filed

Remarks

If property for sale: Price, terms and address to negotiate.

Signed Kurt F. Koenzbach  
Superior, Ariz.

Use additional sheets if necessary.



DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA  
OWNERS MINE REPORT

Mine *Confidential*  
District *Pomer, Pinal County*  
Former name  
Owner *Hart J. Graylock, & F. Pomeroy*  
Operator *Antilla Bros.*  
President  
Mine Supt.  
Principal Metals *Copper & Silver*  
Production Rate  
Power: Amt. & Type  
Operations: Present  
*Antilla Bros.*

Date  
Location *Superior, Ariz*  
Address *Superior*  
Address *Superior*  
Gen. Mgr.  
Mill Supt.  
Men Employed  
Mill: Type & Cap.

Operations Planned

Number Claims, Title, etc.

*18 Claims*

Description: Topog. & Geog.

*Limonite sup. rhyolite, also one follows quartz porphyry contact*

Mine Workings: Amt. & Condition

*Shaft 120 feet, shaft cross cut one drift on 70ft level*

Geology & Mineralization

Ore: Positive & Probable, Ore Dumps, Tailings

Mine, Mill Equipment & Flow Sheet

Road Conditions, Route

Water Supply

Brief History

Special Problems, Reports Filed

Remarks

If property for sale: Price, terms and address to negotiate.

Signed Kurt F Goenzbach

Use additional sheets if necessary.

Superior Ariz

Seven miles north-westerly from Superior, branches out  
from state highway road, mile from Highway

Good,

Mine  
District  
Former name  
Owner  
Operator  
President  
Mine type  
Production rate  
Power, Amt & type  
Operations Present

Operations Planned

Number Claims Title

Description, Force & Case

Mine Manager, Amt & Location

MEMORANDUM

PRUDENTIAL GROUP, MINERAL HILL DIST., PINAL CO.

Mrs. George E. Edeline, 235 South Marshall, Scottsdale, Ariz., reported a new lead-silver discovery at a short distance south of the Prudential Group. Two or three claims will be added to the Prudential Group to the south, to cover the new area.

*file*  
The material contains anglesite, vanadinite and wulfenite along with a little native silver and quartz crystals. The minerals are in massive form, with a distinct zoning which, from the inside out, consists of anglesite, vanadinite and wulfenite. An occasional bleb of cerussite was seen. According to Mrs. Edeline, a cut disclosed two veins, each a foot wide, which are parallel and are separated by 3 to 4 feet of low grade material. The vein samples showed several hundred ounces of silver together with 30-40% of lead and a little gold. The material between the veins was much lower grade. Dirt overlying the veins carries about \$15.00 in lead and silver. The vein is believed to cut limestone. Much large float, similar to the vein material, is scattered through the detritus on the downhill side of the veins. Some float pieces are up to one foot in diameter.

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Lewis A. Smith  
Field Engineer

12-8-59

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Prudential Group  
District Mineral Hill (Pioneer)  
Subject: Supplementary Report

Date December 14, 1959

Engineer Lewis A. Smith

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Owners: Mr. & Mrs. George Edeline, Box 833, Scottsdale, Arizona.

Access: The Greyhound and Greyhound #3 & #4 claims are connected to the paved highway by  $3\frac{1}{2}$  miles of good graded road, and  $1\frac{1}{4}$  mile of country road, in three directions.

Work: Consists of: -

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- (4) A 15' inclined (45 degrees) shaft on the Greyhound #3, dipping south.
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Geology: The Apache geological series here consist of: -

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- (5) Dripping Spring Quartzite
- (6) Mescal Limestone
- (7) Pre-Basalt (usually present)
- (8) Diabase Sill (contacts either Mescal or Pre-Cambrian Basalt)
- (9) Andesite porphyry
- (10) Dacite

The series is disrupted by the Prudential (north-south) major fault and by numerous transverse faults ranging from east-west to N 70° W. Four of these transverse faults have appreciably offset the rock series and the Prudential Fault. The vein is severely disjointed by these faults.

The mineralization is most extensive at the fracture intersections and lies wholly within the diabase. Prospect work appears to be limited by the location of these intersections. The vein pinches between the cross-faults and swells against them, varying from 4" to 14" in width. The strike varies from N 20° E to N 30° E depending upon which fault block it traverses. The average dip is about 25° SW. A second vein on the Greyhound 2 and 4 claims trends N 10° E and dips steeply to the SE. The two veins intersect near the NW corner of the #1 Claim.

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Prudential Group (cont.)

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DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Prudential Group

Date 6-19-58

District Pioneer (Mineral Hill) (Pinal County)

Engineer Lewis A. Smith

Subject: Mine Visit

Location: Sec. 20-22, 29-30, T 1 S, R 12 E.  $5\frac{1}{2}$  miles by road from Superior and  $4\frac{1}{2}$  miles by road to Perlite Industries Mill railroad siding. One half of road is well graded and the other half is country road.

Claims: 36 total, of which several are in litigation and 3 are being located on the new lead area. (The accompanying map shows these.)

Owners: Mr. and Mrs. George Edeline, 325 North Marshall Ave., Scottsdale, Arizona.

Previous Owner: Kurt Koenzbock of Superior, Arizona. (now deceased)

Metals: Silver, lead and copper.

Mine Workings: Cluster of tunnels and 3 shafts on the Rochelle claim. The three shafts are the Prudential (100' plus), and 2 that are about 25'. The Prudential shaft is caved below 35'. 3 tunnels are not more than 20' long. A large bulldozer cut is now being made on a cross fissure, 500' northwest of the Prudential shaft, on the Rochelle No. 2 & 3 claims. This fissure trends NW. At the beginning of this cut a 25' shaft (sunk by Edeline) disclosed some sporadic and narrow copper "stringer" mineralization. South-east of the Prudential (about 2000') are two shallow shafts, now partly filled with detritus, which showed strong sheeting in the diabase, the openings of which were filled by lead minerals.  $\frac{3}{4}$  of a mile south of the Prudential, a shaft 25' deep and a ten foot cut (bulldozer) disclosed a stringer lode with galena and other lead minerals in a quartz gangue. The owners are now driving a drift from the shaft bottom toward the "stringer" lode with the hope that the stringers will coalesce or widen with depth.

Geology: The accompanying geological and claim map, compiled by Henry Wardwell, ably shows the areal geology, and his report describes the structure and general geological relations of this area to that of the Magma Block. In the Potts Canyon area the cross-hatched and circled areas indicate localities where mineralization was observed. These are largely to indicate areas of oxidized iron capping, since copper indications are quite meager. Near the surface lead-silver areas are in solid circles. Inspection of the oxidized capping areas indicates that these are mainly located where transverse fractures come up to the Prudential Fault from the west. No evidence of these east of the Prudential Fault could be found, and no such extensions are indicated on the map. They generally trend about N  $45^{\circ}$ W and are variable in the direction of dip. At the Prudential shaft an area of not more than an acre showed iron oxide mineralization in halos and bands in shattered diabase. No copper minerals were found in the dump material from two shafts and two tunnels. Much of the dump was composed of relatively unaltered diabase. The Prudential shaft is on the Prudential Fault, which strikes, on this segment, nearly N-S, and dips westward and has a down throw on the west side of about 1200'. In several other places, south for  $\frac{3}{4}$  mile from the Prudential shaft, iron oxide blowouts (largely from pyrite) occur on minor breaks against or west a short ways from the Prudential fault. Further south the Edelines are developing a stringer lode consisting of quartz veins ( $\frac{1}{2}$ " to 2" wide). The entire zone is indefinite in width but appears to be about  $2\frac{1}{2}$ '. It strikes NE-SW and dips SE at an angle approximating  $50^{\circ}$ . This has been exposed 200' south of the discovery shaft by a bulldozer cut (150' long and 6-8' deep at the deepest point). The discovery shaft is about 25' deep and lies N-E of the lode. The quartz contains

blebs of galena halved by oxidized lead minerals (wulfenite and cerussite). The entire exposure is in severely sheeted diabase. 150' south of the bulldozer cut the lode was cut by a NE-SW transverse fault and moved to the NE about 300'. South of this cross fault the lode is again picked up for a short ways, but could only be traced intermittently from there on for a few hundred feet.

Should the stringers widen or combine in depth, a fair deposit could result. In a cut, back of the shaft, they widen from  $\frac{1}{2}$ " to as much as 2" in 8 feet of depth.

The area north of the new lead discovery appears to be sporadically mineralized and this mineralization shows a tendency to concentrate in limited spots at fracture intersections. The fractures, as shown on Botwell's map, are widely spaced. Wardwell suggested that deep drilling would be required to prospect the gossan area.

DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA  
FIELD ENGINEERS REPORT

Mine Prudential, Bell and Happy Camp

Date May 15th, 1952

District Pioneer

Engineer A.L. Flagg

Subject: Inspection of thirty-two claims belonging to Kurt Koenzbock in the Potts Canyon area north of Superior.

Limited amount of work, mostly in bad condition. Prudential shaft cannot be entered but can be repaired. Happy Camp shaft completely caved. Bell Fault tunnel open but in bad condition.

Koenzbock proposes to apply for DMEA loan to explore these three workings. Two most important projects are diamond drill holes on (1) Bell Fissure and (2) north of Prudential shaft. These were suggested by Henry R. Wadwell who made extensive structural geology survey of the Potts Canyon area in 1941 to test the zones at depths of 500-ft.



Geologic Report

✓  
POTTS CANYON MINING AREA

by

Henry R. Wardwell, Geologist

August 15, 1951

C  
O  
P  
Y

**GEOLOGIC REPORT**  
Concerning Portions of the  
POTTS CANYON MINING AREA  
Near Superior, Arizona

August 15, 1951

Henry R. Wardwell, Geologist

Location and Accessibility

This area lying three miles northwest of the town of Superior, Arizona in Pinal County may be reached by road turning north from U.S. Highway 60-70 at the Superior Airport. A rough graded country road leads directly to Potts Canyon in the vicinity of the Prudential Mine.

Ownership

A series of thirty-one contiguous claims are held by right of location with assessment performed for the year 1951 by Mr. Kurt Koenzbock. These claims include the Greyhound group, the Belle Fissure group, the Rochelle and New Rochelle groups, the Santa Monica group, the Hornell group, the Gertrude, Nettie, Florence and Emma claims.

Most of these claims lie within Section 21, Tier 1 South, Range 12 East, Gila and Salt River Meridian and Base Line.

Topography and Stratigraphy

Potts Canyon, draining southwestward into Queen Creek, has been formed by erosion of a tilted fault block striking roughly north-south and dipping about 30° east. North of the Prudential mine the floor of the canyon is wide and flat where a thick sill of diabase was intruded into the preCambrian sediments chiefly in the Dripping Spring Quartzite. South of the mine the sediments, containing only a thin sill of diabase, were steeply eroded into a box canyon.

The formations exposed in the localities here described are late pre-Cambrian Pioneer shale, Dripping Spring quartzite and Mescal limestone capped by a basalt flow and variously intruded by post-Cambrian diabase.

Structure

Both pre-mineral and post-mineral faults are found in this area.

The Belle Fissure is a pre-mineral fault which served as a channelway for the intrusion of diabase into the sedimentary layers. The Prudential shaft was sunk on the post-diabase pre-mineral Prudential fault. The Concentrator fault, which crosses Potts Canyon one mile north of the Prudential Mine, is a post-mineral fault.

The Concentrator fault striking north-south near Superior is the major feature of the formations in the district. The west end of the Magma mine is bounded by this fault and its accessory the Main fault. The throw (nearly vertical displacement) of this fault is greater than 3500 feet. The horizontal movement along the fault is not known because of the fact that no markers such as earlier veins or dikes have been correlated on opposite walls of this break. As a result the west extension of the east-west striking Magma fault, in which is replaced the Magma vein, has never been found on the west or down-dropped side of the Concentrator fault. If the Magma fault was mineralized beyond the known limits at the west end of the Magma mine then there is somewhere on the west side of the Concentrator fault an extension of the Magma vein.

The area immediately west of the Concentrator fault two miles northwest of the Magma mine and more than three miles south of the Magma mine is covered by post-mineral lava flows and conglomerates which cover and conceal any possible vein extension on the west side of the fault in its vicinity. The Potts Canyon area is the nearest exposure of pre-mineral formations not covered by post-mineral rocks on the west wall of the Concentrator fault.

The Belle Fissure in Potts Canyon is one structure that has been believed to be the west extension of the Magma vein. The displacement of the formations north and south of the Belle Fissure coincides with the movements of the formations on opposite walls of the Magma vein. The Belle Fissure strikes north-west-southeast which is not an excessive variation from the east-west strike of the Magma vein. One notable difference between the structures is the occurrence of the diabase. In the Magma mine diabase is one of the more favorable wall rocks of the vein i.e. pre-mineral whereas in the Belle Fissure diabase has filled the fracture itself. There is, however, evidence of post-diabase faulting along the walls of the Belle Fissure indicating that subsequent to intrusion of diabase in

the fissure further faulting occurred.

The Prudential fault crosses Potts Canyon with a generally north-south strike. This fracture is a normal tensional fault which down-drops the sediments on the west wall about 1200 feet. It is likely that this fault contributed to the post-mineral regional tilting to the east of the sedimentary blocks whereby the same formation is now encountered four times between Potts Canyon and Apache Leap at Superior. The Prudential is not entirely post-mineral in movement. In the vicinity of the Prudential mine the hanging wall of the fault is mineralized and abundant gooson occurs along the fissure.

The Lead and Silver workings which are up the steep ridge in the diabase east of the Potts Canyon road are not characterized by vigorous structural origin. The diabase sill contains sheeting planes similar to bedding planes in sedimentary formations. These sheeting planes dip eastward in general parallel with the sedimentary beds into which the diabase was intruded as a thick sill. Mineralization occurs along a series of these sheeting planes in the diabase under the top of the ridge capped by Dripping Spring quartzite.

#### Mineralization

A drift on the west bank of Potts Canyon in the 60-foot wide diabase-filled Belle Fissure exposed a lens of oxidized copper minerals chiefly malachite and chrysocolla with some tenorite. The diabase host rock in the fissure contains numerous slickensides and abundant gouge confirming the observation that, subsequent to initial faulting and intrusion of the diabase, later faulting and eventually mineralization occurred within the diabase filling the fissure.

The outcrop of the Magma vein in Superior was occupied by a dike of porphyry which immediately preceded mineralization in age whereas the diabase dike occupying the Belle Fissure is considerably older in age than the mineralization. Nevertheless the north and south walls of both faults, the Magma and the Belle Fissure, are displaced in the same relative direction approximately the same distance horizontally. Furthermore the presence of post-diabase faulting and mineralization in the Belle Fissure makes possible chronological correlation between the Magma and Belle

Fissure in spite of the diabase filling in the Belle Fissure which has never been observed in the Magma mine.

The Prudential shaft was sunk on the Prudential fault with diabase foot wall and Mescal limestone for a hanging wall. In the vicinity of the shaft on the surface the limestone beds have been crosscut in several places revealing intense alteration of the limestone beds and low grade mineralization chiefly copper with abundant iron in the form of hematite, limonite and magnetite. Surrounding the shaft is an area of considerable alteration approximately 10 feet in width from diabase footwall into the limestone. Here a light brown and maroon iron gooson was developed. North and south from the shaft evidence of mineralization along the Prudential fault is lacking primarily because of the alluvial cover which has not been stripped outside the immediate vicinity of the Prudential shaft. To the north this fault becomes obscured in the wash of Potts Canyon and to the south it loses identity where the hanging wall limestone gives way to pre-Cambrian basalt. Crosscut development along the length of this fault is one of the post-mineral north-south faults of the Superior district or is an exception to the general rule at east-west pre-mineral faults.

The mineralized sheeting planes of the Lead and Silver Group are not characterized by steep angle vein walls. Rather the mineralized stringers containing galena, quartz and calcite with varying amounts of hematite in vugs follow the prevalent east dip of the diabase sill. Three inclined shafts sunk down the dip of the diabase from the mineralized outcrops on the ridge are partially filled with slough such that the galena-bearing stringers evidently exposed down the foot wall of the inclines some thirty to forty feet are now obscured by fill.

### Exploration

The Belle Fissure as a possible west extension of the Magma vein offers a highly speculative chance to develop a strongly mineralized fissure. The encouraging evidence is primarily structural. The character of the outcrop of the Belle Fissure is not necessarily convincing with regard to economic concentrations of metals since the strike length of more than one-half mile reveals only several lenses of oxidized copper mineralization. A 500-foot diamond drill hole

reaching a depth of 400 feet below Potts Canyon in the Belle Fissure could be drilled at a steep angle to the north from the west bank of Potts Canyon wash about 150 feet south of the Belle Fissure. At this depth primary mineralization could be reached and a fair test of the ore-bearing possibilities of the Belle Fissure below oxidation would be achieved.

The Prudential mine requires more surface exploration work along the Prudential fault before diamond drilling could be recommended. The hanging wall limestone alteration zone should be crosscut the entire width. Several cross-cuts further south from the shaft should be driven across the Prudential fault. If the intense alteration and wall-developed iron oxide gossan are exposed over a greater strike length along the Prudential fault the possibilities of commercial ore in this north-south contrary-striking fissure are greatly increased.

The Lead and Silver Group mineralized stringers are in their attitude well positioned for diamond drilling. Several 100-foot holes drilled steeply down to the west from the ridge above the outcrops would intersect the series of sheeting planes where mineralization occurs well down the dip from the outcrop. Such drilling is again highly speculative but for a different reason in this instance the lack of strong vein structure. Nevertheless it is possible that the thin scattered seams of galena exposed on the surface improve with depth but it is indicated that such was not the case in the thirty to forty-foot inclines now obscured by fill. Any diamond drilling of these galena-bearing sheeting planes in the diabase should be preceded by a general repair and cleaning of the partially filled inclines in order to evaluate the persistence of the stringers with that much depth.

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