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PRINTED: 03-05-2013

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: PINAL COPPER GROUP

ALTERNATE NAMES:
KICK BACK CLAIM 10 & 11

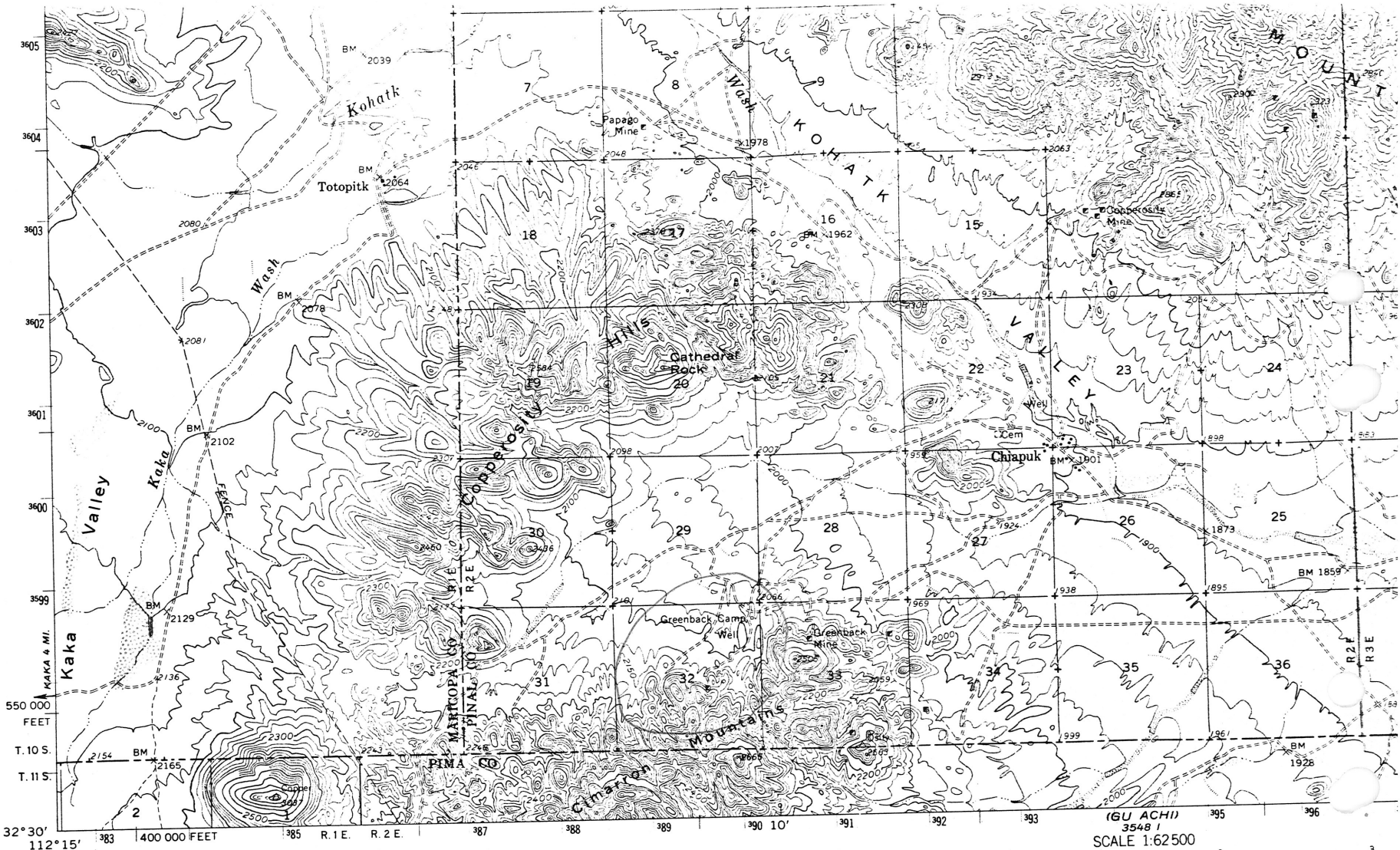
PINAL COUNTY MILS NUMBER: 692

LOCATION: TOWNSHIP 10 S RANGE 2 E SECTION 32 QUARTER SE
LATITUDE: N 32DEG 30MIN 46SEC LONGITUDE: W 112DEG 10MIN 31SEC
TOPO MAP NAME: VEKOL MOUNTAINS - 15 MIN

CURRENT STATUS: UNKNOWN

COMMODITY:
COPPER OXIDE
COPPER SULFIDE

BIBLIOGRAPHY:
BLM AMC FILE 66362
ADMMR PINAL COPPER GROUP FILE



SCALE 1:62500

CONTOUR INTERVAL 25 FEET
DATUM IS MEAN SEA LEVEL

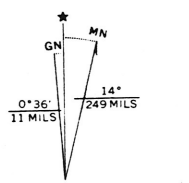
Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by planetable surveys 1938–1939. Revised 1963

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks,
zone 12, shown in blue

Where omitted, land lines have not been established



UTM GRID AND 1963 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 25, COLORADO OR WASHINGTON
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

PINAL COPPER GROUP PINAL COUNTY

HM WR 3/18/88: A report on the Pinal Copper Prospect, written for Miami Copper Company in 1955 by J.W. Allan was obtained for addition to the files. The Pinal County MILS # is 692. Although the 1955 examination was for copper, the report describes alteration features which may also be attributed to disseminated gold deposits. Since the prospect is in the Tohono O"Odham Reservation requests to explore should be made to Mr. Addison Amith, Director of Mining, Tonono O'Odham Nation, 201 N. Stone Ave., Tucson, AZ phone 623-1312. Only reputable established mining companies are generally considered for mineral leases on the Reservation. A report on Mining with the Tohono O'Odham Reservation is included in the file.

PINAL GRANDE COPPER PROSPECT

Metal of Interest

Copper and possibly some molybdenum.

Location

About 35 miles southwest of Casa Grande in the extreme southwestern corner of Pinal County, Arizona. The major part of the property is included in Sections 31 and 32, T10S, R2E. The area is shown on the Vekol Mountains Quandrangle topographic map.

Accessibility

The property is easily accessible from Casa Grande by 8.1 miles of paved road, 18.4 miles of graded road, and 16.0 miles of dirt road. (See sketch map).

Owners

Pinal Copper and Uranium Company,
431 B No. Central,
Phoenix, Arizona.

Pres: Edward Hopkins.
V. Pres: H. A. Ferrin.
Sec.-Treas: [illegible] Mann

Paul Henshaw, Director and original owner of property, and associates own one-half of the Company's stock, Hopkins and Ferrin own the other one-half. No stock has been sold to the public.

Size

About 150 unpatented lode mining claims.

Guide

Ira W. Wagnon, part owner of the southern portion of the property.

Development

Mine openings consist of a deep (800 ft. reportedly) inclined shaft and an unknown amount of underground workings at the Greenback mine; two or three shallow shafts; and

numerous prospect pits.

One churn drill hole, drilled about 1920 as a water well, was sampled but no reliable assay results are available. Assays of samples from 0 to 289 ft. in depth sent to G. M. Butler by Paul Henshaw just after the hole was drilled are included under Assays. As near as can be learned from recent and old reports, the hole was later deepened to a depth of 600 ft. Reported results on the hole are included in this report.

Recently, about 30 diamond drill holes have been drilled on the property. Complete and reliable assay results on these holes are not presently available. The general area drilled is shown on the Geologic Sketch Map.

Past Production

Although the Greenback gold mine may be credited with the production of some gold, the Pinal Grande property has never produced any significant amount of copper. One 30-ton carload containing 2.8% copper was reportedly shipped to the A. S. & R. Co. smelter at Hayden, Arizona, in April, 1952.

Current Production

None.

Terms of Acquisition

Only "fringe" claims of the property are presently available. Terms of acquisition were not discussed with the owners.

GEOLOGY

Summary

Diorite porphyry and pre-Cambrian crystalline rocks host disseminated copper mineralization at the Pinal Grande prospect. Surface exposures and shallow workings reveal chrysocolla, malachite, and turquoise. Diamond drill core containing chalcopyrite and pyrite is the only direct evidence as to the nature of hypogene copper mineralization. No singular, well-defined structural element was seen to be associated with the copper mineralization; rather, structural control seems to be a stockwork of minor fractures in the mineralized rocks. Hydrothermal alteration in the copper-bearing zones ranges in intensity from a slight corrosion of biotite to complete destruction of all ferro-magnesium minerals and argillation of

Pinal Grande Copper Prospect

feldspars accompanied locally by strong silicification. On the basis of alteration intensity, the prospect may be divided into two distinct units, one slightly altered and generally unfavorable appearing, the other strongly altered and promising.

Surface fractures in the area of strongest hydrothermal alteration indicate the possibility that enriched sulfides may be found at depth. No known exploration of depth has been undertaken on this, the most favorable-appearing area on the prospect.

Rock Types.

A pre-Cambrian complex of schist, gneiss, and granite is intruded by a stock of diorite porphyry. The diorite porphyry is the dominant rock type on the prospect.

Pre-Cambrian complex.

The sericite schist and quartzite-derived gneiss, prior to the diorite porphyry intrusion, were invaded by a medium to fine-grained granite, presumably during late pre-Cambrian time. Abundant disoriented xenoliths of schist, gneiss, and quartzite were noted in the granite.

These metamorphic rocks are well exposed along the southern edge of the prospect and are, as shown on the State Geologic Map, the "backbone" of the Cimarron Mountains to the south.

Several small dikes of a medium-grained, equigranular quartz diorite were seen on the extreme western reaches of the property. These dikes cut the schist and are in turn intruded by narrow, fine-grained granite dikes.

Diorite porphyry.

Diorite porphyry of undetermined age comprises the main rock type on the prospect. Dikes of this rock, seemingly radiating from the central diorite porphyry stock, cut the pre-Cambrian complex at numerous places near the obscure, major porphyry-complex contact.

Several facies of the diorite porphyry were observed. The rock wherever seen is a porphyry and the recognizable textural differences are due mainly to variations in phenocryst size and abundance. Phenocrysts, in order of decreasing abundance, are of plagioclase, biotite, and hornblende. In the coarser-grained facies hornblende is more abundant than biotite.

Recent gravel.

Along the northern edge of the prospect, the diorite porphyry is overlapped by bolson gravels. Exposures in this area are small and widely scattered, occurring only where recent stream action has stripped the gravel away from the underlying porphyry.

Further north, outcrops of bedrock are completely lacking. Seemingly, the northern edge of the mineralized area occurs in a mountain pediment which is now being bared by erosion.

Mineralogy.

Ore minerals seen on the prospect are as follows:

(1) Chalcopyrite was seen as scarce minute blebs in a quartz vein in the schist along the southern edge of the prospect and in banded, chalcedonic vein quartz, from the dump of the Greenback gold mine. Several small grains of chalcopyrite were seen in the core from Diamond Drill Hole No. 20 at a depth of about 380 ft.

(2) Covellite occurs as a partial, peripheral replacement of the first mentioned chalcopyrite above.

(3) Chrysocolla occurs in abundance in the vicinity of the drilled area and in lesser amounts elsewhere on the property.

(4) Malachite occurs with, but in lesser amount than, the chrysocolla.

(5) Turquoise was seen only in an intensely altered area of porphyry which is described in detail under "Hydrothermal Alteration."

Quartz and pyrite were the only hypogene gangue minerals noted. Gangue minerals derived through oxidation include limonite, jarosite, and rare gypsum.

Structure

No singular, well-defined structural element to which mineralization can be related was seen. Several narrow quartz veins and zones of intense silicification traverse the eastern and central part of the prospect; however, considerable mineralization occurs independently of these structures, or so it seems.

Structurally, the mineralization may be classed as of two types; (1) Quartz veins containing minor amounts of sulfides,

and (2) veinlets and disseminations of quartz, pyrite, and chalcopyrite. The types are not separated in space; numerous quartz veins cut the stockworks of veinlets and disseminations.

Veinlets and disseminations of quartz-copper mineralization embrace an area about 2000 ft. square. Pyrite, chalcopyrite, and quartz, and the oxide minerals chrysocolla, malachite, rare turquoise, jarosite, and limonite occur in an intricate network of minor fractures and to a lesser degree as disseminated particles in the rock. The limits of the stockwork is roughly indicated on the accompanying sketch map.

The quartz veins have yielded most of the property's past production which has in the main been gold. The abandoned Greenback mine exploited such a vein. Most of the quartz veins seen on the prospect contain oxide copper minerals; however, these veins offer little hope of any future production. The veins strike generally east-west and dip steeply south.

Hydrothermal Alteration

Hydrothermal alteration in the copper-bearing zones ranges in intensity from a slight corrosion of biotite to complete destruction of all ferro-magnesian minerals and argillation of feldspars accompanied locally by strong silicification. Two definite altered zones possessing strikingly different degrees of alteration were noted. Each is shown on the sketch map.

The least altered zone is just east of the intensely altered zone in the central part of the prospect. Some slightly altered diorite porphyry was seen west of the stronger alteration and on closer study, a roughly circular alteration zoning might be recognized with intensity of alteration decreasing outward from the center.

In the weak or outer alteration zones, the only intense alteration, i.e., argillation and silicification, is limited to envelopes two or three inches thick on either side of the quartz veins. Even here, biotite remains and is in places splendent. Plagioclase is subjected to varying degrees of alteration but was nowhere in this zone seen to be completely destroyed. Alteration of this degree was studied only in the diorite porphyry and its affects on the older crystalline rocks were not noted. The intervening porphyry between quartz veins is relatively unaltered although it contains appreciable amounts of oxide copper mineralization and at depth at least a little pyrite-chalcopyrite-quartz mineralization.

Much more intense and pervasive alteration characterizes the central or highly altered zone. Biotite has been completely destroyed or in a few spots replaced by chlorite and

plagioclase has been partly or wholly converted into a clay mineral or sericite. Locally within this zone are areas where the rock to the unaided eye appears to be a mass of clay and/or sericite and quartz. Both diorite porphyry and an older granite were seen to be affected by this stronger alteration. The general area of intense alteration is about 1000 ft. long and 600 ft. or so wide. Oxide copper minerals here are scarcer than in the less altered rock; however, favorable-looking iron oxide is much more abundant.

Oxidation and Enrichment.

Little information on the character of sulfide mineralization can presently be gained. In the unaltered copper-bearing zone, sulfides at depth are probably pyrite and chalcopyrite with little or no enrichment by supergene chalcocite or covellite. The only indications that no enriched sulfides will be found are (1) splendent pyrite and chalcopyrite seen in the drill core from just beneath the oxidized zone at about 380 ft. depth, (2) the almost complete lack of iron oxide indications of a leached capping, and (3) the retention of considerable oxide copper mineralization at and near the surface.

An interesting feature of the oxide mineralization in the unaltered zone is the selective replacement of plagioclase phenocrysts by chrysocolla. This phenomenon may furnish a clue as to why so much copper has been retained in the oxidized zone in the unaltered rock. Perhaps as the copper migrated from the quartz-sulfide veinlets in a supergene leaching environment, it was precipitated with silica as chrysocolla when the solutions encountered the partially altered plagioclase. Under the same leaching conditions, the plagioclase would be decomposed to yield the silica necessary for chrysocolla formation and the lime necessary to neutralize the acid solutions carrying the copper. Because much or all of the plagioclase in the highly altered central zone was destroyed during hypogene mineralization, the same conditions would not be expected to prevail in this zone during oxidation. In partial support of this view is the occurrence of abundant lime-coated boulders and lime-filled fractures in the unaltered copper-bearing zone.

Surface indications in the highly altered zone are much more promising than those outlined above. Locally in the zone, there are areas of leached capping, which possess all the indications of overlying an enriched chalcocite zone. The occurrence of jarosite indicates a significant concentration of sulfides has been leached (Locke); the presence of traces of oxide copper minerals in the capping makes it obvious that some

copper was present in the rock, and the occurrence of maroon, indigenous "relief" limonite indicates a low pyrite-chalcocite or iron-copper ratio.

In a private report dated February 26, 1920, G. M. Butler mentions that 120 ft. of "very soft material that has apparently been subjected to extensive leaching" was penetrated by a churn drill hole collared in the unaltered zone near the camp (see well on Geologic Sketch Map). From Mr. Butler's report, it seems that this 120 ft. interval is between the depths of 169 ft. and 289 ft. The hole was later deepened, according to Mr. Henshaw, to a depth of 600 ft. No reliable data is available on the deeper part of this hole.

Too little information is on hand to offer an explanation for this occurrence of a leached zone beneath a relatively unaltered, copper-bearing cap. The zone, according to Butler contains considerably less copper than the near-surface rock. Possibly it is due to a vertical expression of the same conditions which have resulted in the horizontal alteration differences or zoning.

Assays

Results of Miami Copper Company assays on samples taken by James W. Allan, company geologist, are as follows:

Sample Description	Total Cu	Oxide Cu	Mo.
1. Grab sample - Fe oxide stained, relatively unaltered diorite porphyry. Reported to be high in cuprite. Some chrysocolla visible.	0.66	0.52	0.001
2. Picked sample of vein quartz and diorite porphyry wallrock	1.15	1.01	0.002
3. Grab sample - leached capping in intensely altered zone.	0.07	tr	0.001

Pinal Grande Copper Prospect.

Assays of samples taken from the 1919 churn drill hole by Paul Henshaw listed in G. M. Butler's report of February 26, 1920, are as follows:

Depth	Henshaw's Assay	Butler's Assay
0(?) - 30	0.45% Cu	0.52% Cu
30 - 55	0.63	0.36
55 - 80	0.28	0.28
80 - 105	0.05	0.09
105 - 130	0.20	0.16
130 - 155	0.24	0.19
155 - 180	0.18	0.08
180 - 205	0.15	0.09
205 - 230	0.20	0.04
230 - 255	0.20	0.10
255 - 280	0.15	0.10
285 - 289	0.15	0.04

Reportedly, the above hole has been deepened to 600 ft. and according to Mr. Henshaw, showed "copper mineralized formations all the way."

Conclusions:

Most of the past exploratory work on the property has been done where copper mineralization is visible in outcrops. This work has not revealed any significant amount of valuable copper mineralization. Judging from data gained through observation in the field, the area already drilled shows little indication of containing a valuable orebody, whether oxide or sulfide. However, less reliable information suggests the occurrence of an altered, leached zone beneath the relatively unaltered, oxidized zone of the drilled area. A known occurrence of this phenomenon has been recognized by geologists at Chuquicamata, Chile; however, the oxidized as well as the leached zone there is strongly altered. Variation in the relative abundance of pyrite in the hypogene mineralization has been suggested as an explanation at Chuquicamata. Should any further work be done on the property, the possibility of a leached and resultant enriched zone underlying the unaltered, oxidized zone should not be overlooked.

The strongly altered "central" zone shows every indication of overlying enriched sulfide mineralization; however, the exposed area of this class of "capping" is rather small. Even if the entire strongly altered, iron-oxide stained area is assumed to overly an enriched sulfide blanket 100 ft.

Pinal Grande Copper Prospect.

thick, only about 4,000,000 tons of "ore" could be expected. Many factors would determine the grade, including grade of hypogene mineralization, depth and completeness of oxidation and leaching, and stability of the water table during enrichment. So far as is known, no exploratory work at depths of more than 10 ft. or 15 ft. has been undertaken on this favorable-appearing "central" zone.

Recommendation

Should the "central" area become available on a free option and a reasonable purchase price, the property should be revisited and a "leached outcrop" map be made as a guide to possible future drilling.

Examined: 12-12, 13, & 14, 1955 Reported: 12-27-55
Examined by: W.W.S. & J.W.A. Reported by: J.W.A.

SKETCH NO.

MIAMI COPPER COMPANY

MIAMI, ARIZONA

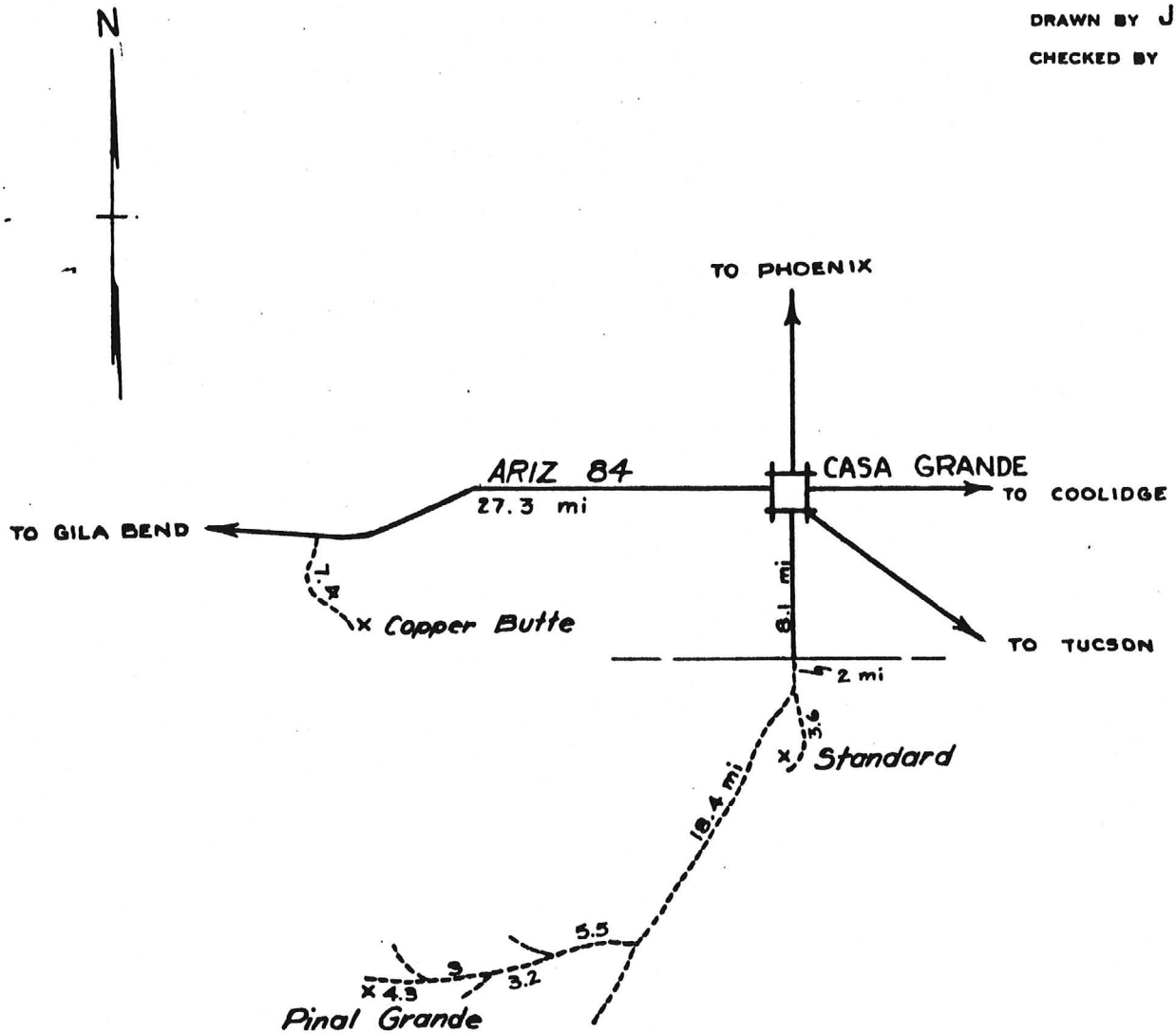
10

SCALE 1 in = 10 m

DATE 12-26-55

DRAWN BY JWA

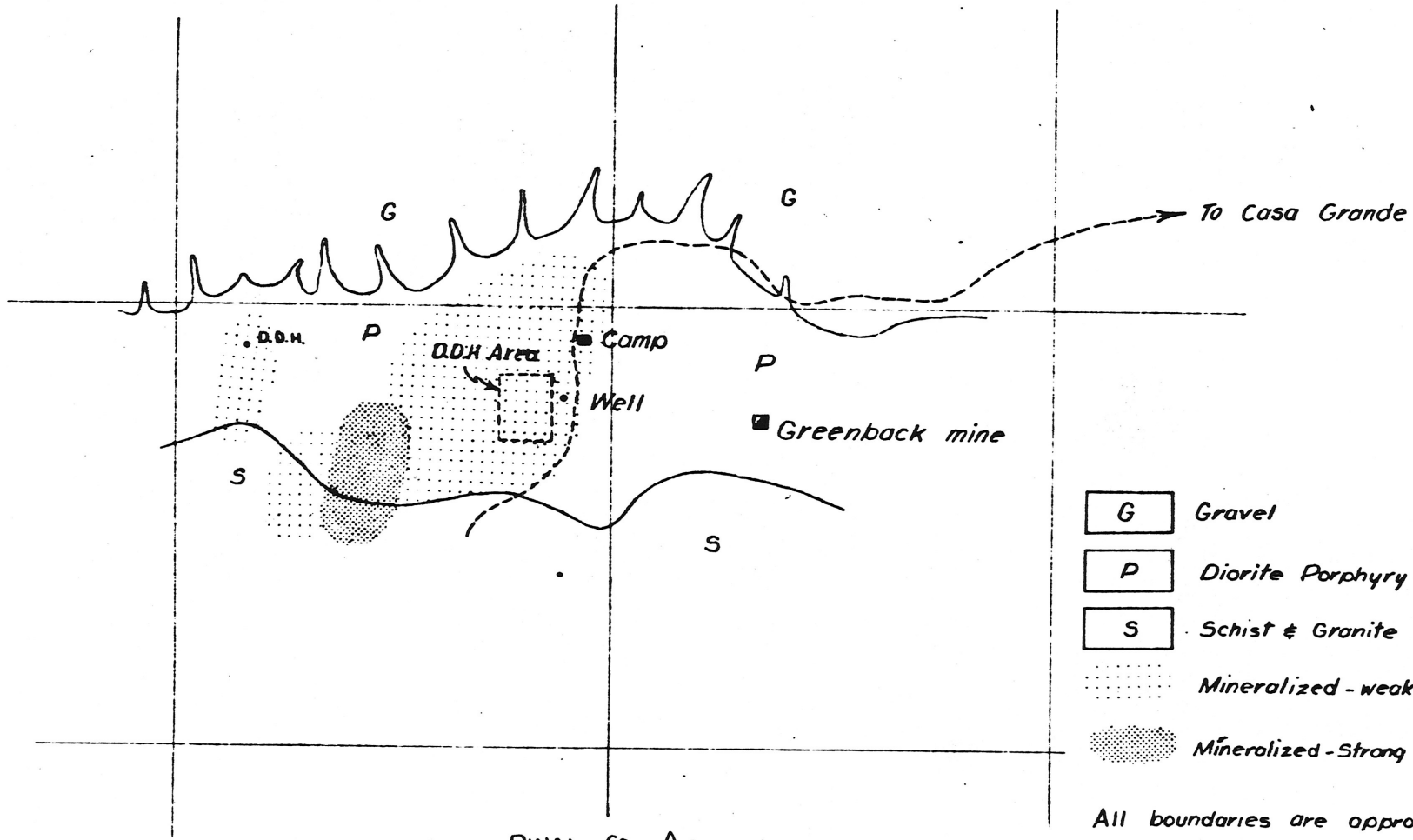
CHECKED BY



INDEX MAP TO PINAL GRANDE, STANDARD, (ESPERANZA) AND COPPER BUTTE PROSPECTS, PINAL CO., ARIZ.

——— PAVED ROAD

- - - - - - - - GRADED OR DIRT ROAD



PINAL CO., ARIZONA

PINAL GRANDE PROSPECT

GEOLOGIC SKETCH MAP

SCALE : 1" =2000'

DEC. 17, 1955 JWA

MIAMI COPPER COMPANY

MIAMI, ARIZONA

SKETCH NO.

SCALE 1"

DATE

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