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James Doyle Sell Mining Collection

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Things to Do. 7/18/85 →

Bob Pitts

No info — Musto (Jasper), Washington Co, UT — St. George Metric
N of St George — Sec. 6, T43S, R17W. — Washington Co, UT.

No info. — Escalante, Iron Co, UT — Cedar City, Metric
W of Cedar City — Sec. 2, T36S, R17W.

HGK Report-map. — Bufan Head, Iron Co, UT — Panguitch Metric
~~Sec~~ E of Cedar City, Sec. 26, T34S, R8W.

UT GEOL V3-1. — Gold Springs, Iron County, UT. — Cabenta Metric ~~Cabenta AMS~~ folded
W of Cedar, E of Cabenta — Sec. 25, 24, 36, T33S, R20E (UT).
N of Modena

UT GEOL V2-1 ~~(do not have)~~ ~~get near~~ done — Stateline, Iron County, UT — Cabenta-Lund Metric
W of Cedar, E of Cabenta — Sec. 19, 30, T32S, R19W & Sec. 13, 24, 25 T32S R20W (UT).
N of Modena, N of Gold Springs.

Bound Report. — Beaver Carbonate, Beaver Co., UT — Wah Wah Mtns South Metric
NW of Milford — Sec. 7, T27S, R12W.

UGA Pub-3 ~~UGRS~~ Cove Letter — USMX Dotty, Beaver Co., UT — Wah Wah Mtns South Metric
S W of Milford

UT Sp St #46 plate 2 — A. North Star, best assays in bottom center of Sec. 20, T28S, R11W. Wahwah light Fox, "Sameness", result entrs in lower slopes.

Hayward-B4U 28-3 — B. Lordlick Mtn, Sec. 7, T29S, R12W & Sec. 12, T29S, R13W. Very large silica-jasperoid-chert repl. Little Bx, no gp in, three color.

Weaver B4U 27-3 — C. Blue Mtn. NE Sec. 5, NW¼ Sec 17, T30S, R14W.

Lucin District – NV-UT.

OFR-82-834 & OFR-83-725 — A. Copper Mountain. Sewell et al. Wells Metric
Sec. 10, T 6 N, R 19 W (UT)

OFR-83-725 — B. Lion Mountain Duval et al. Brigham City AMS
Sec 4, T 6 N, R 18 W (UT)

Paper 25 of NW Mining Convention Dec. 1984. — C. Noranda's Tecoma (NW Mining Report) Wells Metric
± Sec. 9, T 8 N, R 19 W (UT

Vande Ley Report — Seendopin, NV.
T 24 N, R
T 25 N, R 52 E. Eureka Co, NV. Winnemucca AMS
Millett AMS

WLK note — Gold Bar, NV. Eureka Co, NV. Millett AMS
"atlas" T 22-23 N, R 49 E NW of Eureka, NV.

FRK Report — Brown's Ranch Fault San Bernardino Co, CA. Cuddleback BLM
Sec. 16, 17, 20, 30 of T 29 S, R 42 E. or Trona AMS
E of Randsburg CA.

Mock Windy Rpt. — Windy San Bernardino Co, CA. San Bernardino AMS
Sec. 10 et al. T 6 N, R 2 E S of Barstow
✓ Cadiz Mtn 15'

as above — Gold Reef San Bernardino Co. CA San B AMS
Sec. 7, 18 et T 6 N, R 3 E E of Windy
✓ Radnor Mtn 15'

Gilmer Paper. — Cady San Bernardino Co, CA San B. AMS
T 8 N, R 7 E N of Ludlow.

Folded Map — Marble — San Bernardino Co, CA
Castle Mine Sec. 34, T7N, R13E
NE of Amboy
SB AMS
✓ Providence Mtns CDCA Quad 12.

MAM's report — Chuckwalla Mining — Whay Oil Co
✓ Chuckwalla Spring 15' Quad.
also MM 6223 map.
W of Blythe.
T8S. R17E
SB AMS
~~Chuckwalla CDCA Guide 18~~
CDCA Guide 19
Salton Sea Metric BLM Surf. Mgm Map & Eagle Mtns

George Cross — Midway Hills — Imperial Co.
?? 10 miles N of Picacho Heap Leach!
?? Gold Basin to Peter Kane Waterhole
T12S R 20E
E of Blythe-Yuma Rd
S of Milpitas Cutoff.
Tinajas Mtns BLM Surf.

Map Tube — Ali — Imperial Co.
Sec 20, 21, 28, 29 T14S, R21E.
N of Yuma
Yuma BLM Surf Map

2 Reports — Buckskin — La Paz Co, AZ
Sec 1, 2, 11, 12, T10N, R17W.
NE of Parker, AZ

Quad Sheet — Shadow Mtns — San Bernardino Co, CA
Clark Mtns between Baker & Mitu Pass
Sec 15, 14, 21, T17N R11E.
15' Kingston Peak Quad

Quad Newsheet — Soda Spring — End of Zzyzx Road! W of Baker 6 miles
Irwin CDCA 8
Soda Mtns BLM SM

Staff - Take Care!

JDS-WJK -

✓ Send copy to Doug Smith

IN REPLY REFER TO:
8550 (036)
x3200

JDS

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE
1800 Marquess Street
Las Cruces, New Mexico 88005

ASARCO Incorporated

JUN 7 1985

SW Exploration

CERTIFIED--RETURN RECEIPT REQUESTED LC801224

JUN 5 1985

ASARCO, Inc.
P.O. Box 5747
Tucson, AZ 85703

Dear Sir:

The Bureau of Land Management (BLM) has recently been receiving notice of an increasing number of unauthorized actions within areas of public land which are being studied to determine their suitability for wilderness designation. These lands are designated as wilderness study area (WSAs). Some of these unauthorized actions may impair the suitability of these areas for consideration as wilderness areas.

As a result of these unauthorized activities, the BLM State Office has recently issued instructions which clarify the policy on dealing with authorized and unauthorized activities on public lands under wilderness review.

These instructions strengthen the public awareness program to inform general and user publics of the Interim Management Policy and Guidelines for Lands Under Wilderness Review (IMP) and intensifies monitoring and surveillance responsibilities to aid in the early detection of unauthorized activities and in the continued monitoring and surveillance of authorized activities.

These instructions stress that under no circumstances are unauthorized actions in WSA's to be approved. In addition, all aboveground structures installed in trespass must be removed and rehabilitation work completed as directed by BLM. Trespass damages and administrative costs incurred by BLM in processing the trespass and reclamation work will be borne by the violator.

The IMP does not prohibit authorized uses in WSAs but emphasizes the importance of reducing unauthorized activities and rehabilitation of areas where authorized as well as unauthorized activities have occurred.

Any future proposed uses on public lands, especially those within or near a WSA, should be brought to the attention of the Las Cruces District Office well in advance of the date an authorization is needed. This will allow the appropriate resource specialists time to review your proposal and identify any potential problems associated with your proposed activities.

If you have any questions regarding the IMP or this new policy clarification, please contact me at (505) 525-8228.

Sincerely,

William J. Harkenrider Jr

William J. Harkenrider, Jr.
Area Manager
Las Cruces/Lordsburg Resource Area

sent 8/29/85 mek ✓copy for FIG — A 21 day trip that reveals what you experienced factor sees on a quick pass!

ASARCO

Southwestern Exploration Division

August 16, 1985

To: W. L. Kurtz

From: J. D. Sell

Review Trip
AZ-UT-NV-CA
July 22- August 11, 1985

During the above period I made a sweep through the areas to review their exploration possibilities, interest, and to gain a better insight into the problems where the staff will be mapping-evaluating.

Musto (Apex), Washington Co., UT Sec. 6, T43S, R17W

Musto has dedicated their new Ga-Ge Mill and office complex located in Sec. 5, T42S, R17W. I arrived late in the day and they requested that visitors not proceed the six miles south to the mine area as they would not allow access. They intend to be in production late in the 3rd quarter.

T. Dalla Vista, when he works in the area, should review the total region.

Escalante, Iron Co., UT Sec. 2, T36S, R17W

I did not stop at the operation but noted that the roads over the hills on the strike trend (and over the ore body) do show a weak color anomaly. Mr. T. Dalla Vista should visit the mine when he is in the area.

Brian Head, Iron Co., UT Sec. 16, T36S, R8W

Weakly anomalous gold values were reported by H.G. Kreis in his Exploration Record Sheet typed 1/6/84. Values came from the northwesterly-trending Castle Creek drainage and the southeasterly trending Mammoth Creek drainage; both heading out in Section 26. Scattered other anomalous samples were also detected.

Although the underlying Wasatch Formation is very thick, and being made up of muds, silts, and sands, it is probable that mineralized feeder faults would not break through except for the very intense zones.

If we use the Gold Strike model of gravels accumulating and being mineralized by feeder faults and fluid movement along the channel, then, of course, gravels could accumulate on the soft Wasatch, but probably not as well as on the hard bottom limestone as at Gold Strike.

JDS

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As the bulk of the anomalous samples came out of the two drainages mentioned, and such may be reflected in a major northwest-trending feeder fault, I believe a more detailed examination should be conducted along this zone. I believe it would be beneficial for T. Dalla Vista to field review the situation at Gold Strike prior to going to Brian Head.

Silver Peak District, Iron Co., UT Sec. 8, T36S, R14W

A report from the past indicated the SLC group had visited the area and said that it had been drilled. I did not see any drill sites but likely looking drill pads were along the roads. Several ½-1 mile long, not traceable continuously, 8-10 foot wide quartz-barite, multi-stage veins trending northwesterly cut the andesite host rock. Manganese is on the surface and copper stain is on the dump of the "Brian claim" from a 150-200 foot shaft.

The veins are not easily traceable in the andesite rubble, but with the multi-stage and known mineralization, they are of interest.

These strike northwest while the similar Escalante vein strikes southwest. A surface tour over the Escalante would be helpful in making an assessment of the Silver Peak zone.

Gold Springs, Iron Co., UT Sec. 25, etc., T33S, R20W

A Canadian company, Energex, Arne O. Beikeland, President, controls most of the unpatented ground in some eight square miles of the district. His card shows two companies:

Energex Minerals Ltd.

Suite 700, 850 W. Hastings St.
Vancouver, B.C. V6C 1E1
Office (604) 684-1258
Residence (604) 929-1046

Energex Resources, Inc.

1210 Kleepe Lane
Sparks, Nevada 89431
Office (702) 359-3020
Mail: P.O. Box 20610
Reno, NV 89515

Out at Gold Springs was Eric Beikeland, a younger brother to Arne, and a jack-of-all-trades, who lives in Reno, NV, and apparently takes care of the office when he is in.

The project geologist-engineer for Energex is Mr. David R. Deering, Mining Engineer Consultant, 1208 Franklin Street, Port Townsend, Washington 98368.

David has been working on the project since 1981 when Energex started acquiring and staking a land position. David had his large recreation vehicle, electric generators, rock saw, tents, et al, wife and three children all set up in a nice camp.

Also in camp was a tall young Canadian geologist, David ?, who was doing much of the leg work on the project. He apparently was also the on-site representative for one of the investing groups into Energex.

Energex has a core drill from SLC and they are coring a half dozen or so shallow 100' holes testing some of the veins. Their first three holes were not too encouraging according to the words said.

The geology and mines are discussed in Utah Geology, vol. 3, no. 1, p. 23-49, 1976, by Lee Perry.

Although Mr. Beikeland was open to allowing Asarco to wander over their claims (after I talked with him on the phone), I was not privy to any written reports or assays. Mr. Deering did provide me with their 1:12,000 topo map of the district, which has been placed with Utah Geology. Verbally, it seems that Energex has a very high opinion of the place and hence a high entry fee for anyone wishing to participate. They want their last 5 years' expenditures back plus a healthy work commitment. Of course, that is all open, and if their following holes offer little encouragement then Energex might be more receptive to an agreement.

Three targets appear to be promising in the district:

1. The Jumbo Vein, Sec. 25. Apparently drilled by Ranchers Exploration several years ago with holes 100 feet below the outcrop. The vein strikes north and from stringer veins to massive in character and 10-60 feet in width of quartz, calcite, and ankerite. The gold likes to favor the hanging wall in ankerite rock.

   Ranchers apparently cut only low gold values with 2-5 opt silver. Energex has blasted several trenches across the outcrop--a system they have found is better than rock chips off the hard eroded knobs --and cuts in the trenches show spotty +0.05 opt gold values. Samples by Lee in his reports ranged from 0.01 to 0.12 opt gold, and 0.4-26.5 opt silver.

   As the sampling in the 100 foot Jumbo Shaft and minor lateral workings, and the shallow Ranchers drill holes, have only barely tested the depth potential of the structure, it would appear to be a good target at this time. Perhaps some fluid inclusion studies would be appropriate to suggest if we are above a potential productive horizon.

2. Pope Mine, Lincoln Co., NV, Sec. 29, T1N, R71E., is two miles northwest of the Jumbo. It is a 2"-6" wide quartz vein with half ounce gold. The Pope vein is the only vein in the entire district that runs westerly. It is also the only vein in rhyolite tuff. The underlying andesite flow units are the host for the northerly trending veins throughout the district, which terminate at or near the rhyolite contact. Thus it would appear that at the Pope Mine, the system was of sufficient strength to break into the rhyolite and with twice the district average grade it is of interest. The large northwesterly Snowflake vein system is productive over some 7000 feet of strike length before it goes under alluvial cover. A thousand feet on strike across the alluvial is andesite with a number of shallow workings. But, the Pope and the Snowflake extensions should intersect under the alluvial surface and this should make a very interesting target in the favorable andesite (see Plate 1 of Perry).

3. Three quarters of a mile west of the Pope (in Sec. 30) is the Horseshoe Mine group. This group of patented claims is held by S.S. Arentz of Salt Lake City. Their mining engineer, James D. Alto, and the ex-exploration geologist of the Escalante Mine, were sampling the quartz vein to see if any values remained. As Alto said, there are three or more parallel veins in the block which vary from several feet up to 30 feet wide and collectively a modest operation may be possible. I asked Alto to keep Asarco in mind when their report is ready for discussion.

   Horseshoe production 1900-1902 is reported at 39,342 tons of ore valued at $269,000.

Stateline District, Iron County, UT Sec. 25, etc., T32S, R20W

In the township north of Gold Spring is the Stateline District. Historic grades of gold are in the 0.02-0.03 opt gold range with 10-20 opt silver in narrow 2-4 foot wide quartz breccia veins. The Gold Dome mill was rebuilt after 1974. The mill was further refurbished in 1983-84 as the Ofer mill and production from a quasi-open cut in kaolinized hanging wall tuff was apparently mined to help feed the now defunct mill.

I saw little encouragement for further work in the district. The Stateline is written up in Utah Geology, vol. 2, no. 1, p. 27-47 (1975).

New Arrowhead Mine, Iron Co., UT Sec. 12, T31S, R18W

Skarn ore is on the dumps and along one of the roads was a boulder of a black felted-quartz-minor tourmaline-mafic matrix supported quartzite breccia. I did not find the source. Notices were posted that drill hole No. 3 had taken care of the assessment work to Sept. 1, 1985.

As the Indian Peak Range has a number of prospects and old mines, it should be carefully looked at by T. Dalla Vista during his SW Utah reconnaissance.

USMX Areas, Beaver Co., UT

Longlick Mountain, Sec. 7, T29S, R12W. The largest zone is a good jasperoid chert replacing the thin-bedded Mississippian age Desert Limestone. However, the jasperoid shows no change in color and is mostly grey and light yellow, few breaks, few breccia zones, no quartz veins, and no pyrite. Apparently, not drilled by USMX. Probably not of interest in spite of its large size.

To the east a mile or so are some workings in black shale and limestone which would be a better ore host. USMX sampling apparently failed to get any encouraging values.

To the west, USMX has several anomalous jasperoid samples in Humbug formation which are up to 0.5 ppm gold. As the Humbug is a variable limestone, dolomite, sandstone sequence, it could be of more interest. I did not get into this area.

Cooper Mountain, Box Elder Co., UT Sec. 10, T6N, R19W

I could not make contact with the Sewells in two passes by their place in Montello, NV. Chuck had previously mentioned that they were detailing several areas of anomalous samples from the previous year, plus going underground and doing mapping and resampling where high grade (+1 ounce gold) had been found.

Lion Mountain, Box Elder Co., UT Sec. 4, T6N, R18W and adjacent section 7 to the north.

Duval had picked up this area before Sewell could and has held it for several years. It is some low-lying hills of Ordovician and Devonian sliced up by thrust faults (see OFR-83-725). A large jasperoid replacement is above one of the thrusts in Guilmette Formation, a well-known gold-host in Nevada. It is mapped as breccia but these are large broken rubble units, such as a volcanic flow produces, and few finer hydrothermal breccia occur. The coloration is a very, very, uniform light orange-brown. No FeOx seams, no yellows, greens, deep reds, no quartz veining. Not impressive.

Duval drilled two rotary holes, one on each side of the main jasperoid (NE, NE¼ of Sec. 4, and SE, SE¼ of Sec. 7) and both cut blah looking Guilmette limestone, although the eastern (Sec. 7) down-dip hole did cut a minor amount of weak-colored jasperoid. Overall a dull-looking area.

Tecoma, Box Elder Co., UT Sec. 9, 16, T8N, R19W

The Noranda find was turned over to Western States which apparently drilled a number of WT-series holes this past fall or spring. In many cases the 40-50 pound sample reject sacks were left by the drill hole. The drilling appeared to be only infilling of the previous grid.

A new brass cap section corner has been placed in the area covering the corner of 9, 10, 15, and 16.

As noted previously, the jasperoids are impressive with various brecciation textures, barite, and greens, yellows, reds of arsenic-iron oxides in variable amounts throughout.

Tecoma North and Northeast, Box Elder Co., UT Sec. 9, T8N, R19W

Phelps Dodge has a very large block of claims to the north and north-east, up to 2 miles from the Tecoma property of Noranda-Western States. It appears that between 15 and 20 holes have been drilled, some as a 5-spot test, others as single scattered here and there. The cuttings I saw were not impressive though black shale was cut in many of the holes. No jasperoids or colors were noted.

Jackson Mine area, Elko Co., NV Sec. 7 (?), T41N, R70E

The old area was replacement deposits with gold in the oxidized gossans, in Guilmette-Chainman-Diamond Peak units. Impressive shear zones with vein material of drusy quartz, variably colored jasperoid, some with brecciated textures, and abundant yellow-green-red-black FeOx suggest a very active system. These replacement-shear structures are on the west side of the north-south trending ridgeline.

On the east side a large brecciated, variable colored massive to sheared jasperoid outcrops several hundred feet wide and a thousand or so feet long. Drill roads were cut in the limestones above and below the jasperoid. Two holes were drilled on each of the roads with moderately interesting appearing cuttings although none of the holes appeared to cut the massive jasperoid for any appreciable distance. The third access road at the foot of the slope also has several drill holes along it.

As this area was the starting point for the Noranda team that found Tecoma, three miles to the southeast, I would suspect that the area was well sampled, but I am surprised that drill holes were not placed in the jasperoid breccia.

The feeder faults attributed to the precious metal strike NE; porphyry values at Tecoma strike NW; porphyry dikes are in proximity and are thought to be part of the mineralization process; and the overall trend of the quartz monzonite porphyry dike swarm is to the NW. Anyone doing further work in the area might consider these thoughts.

Sundown Mining, Eureka Co., NV Sec. 5, T24N, R52E

Several years back when I was fussing with the replacement textures in limestone in the sections north of Sec. 5, Mr. Van der Ley mentioned some gold in shale on their Vigilante claim group to the south.

I stopped in late in the evening and went south to find the area. Black altered shale with red-black-orange jasperoid masses were found in the area east of the last limestone outcrops going west. Six NAS-series samples (NAS-50 thru NAS-55) were collected. See separate report for results.

The next day I tracked down a "yellow rig" which I had seen the previous evening. It turned out to be a large Cat which had just finished bulldozing a road along the canyon bottom eastward to near the Silver Belle area, east of the Old Whalen Mine.

I also met Mr. Bill (?) Tubbs, consultant with Nevada license plate, who had been hired to oversee the road building and some air-trac work. I later met Mr. Rex Rogers, owner/geologist of "Rough Country Drilling," Riverton, Wyoming. Mr. Rogers later stated that he had drilled 580 feet prior to his compressor going out, apparently around the Copper Hill replacement area where I saw his good-looking rig.

East of Mt. Hope, Eureka Co., NV middle of T22N, R52E

Just south and east of the entrance road to Mt. Hope were two Boyle Brothers core rigs. They were along side Garden Pass Creek. The adjacent hills have a nice color zone on them. Only one rig had its mast up. Earlier research showed that the eastern land is part of the Exxon Mt. Hope property holdings.

Gold Bar, Eureka Co., NV Sec. 26, T22N, R49E

The Atlas discovery was quiet, with several trailers, a weather station setup, and a tractor with an attached auger. I didn't see anyone, but I felt the tractor operator would be back at any time. Their main trench is an elongated "T" and I took two GB-series samples, one of a more undeformed siltstone and another of the brecciated siltstone, both with weak yellow FeOx stain and cut by washed out red breccia zones of siltstone. Various types of silica and grey jasperoid seams and nodules are throughout. See report for the assay results.

The drill pattern seems to be "bunchy," that is, it was probably drilled on 50'-100' centers with, here and there, groups of holes on 5'-10' spacing. The tractor auger appeared to be drilling a 10' spacing in a 40-50' block and having completed 6-8 holes.

Most of the drilling is on the bench just west of the last limestone ridges and some holes further west of the main northerly drainage. Only several roads were made to act as gatherers in the area. The main road being the one on the topo map.

Drilling was conducted by driving along lines through the sage and putting down the hole. Most have some sort of pipe or post in them now. The total area is quite rutted as they must have drilled last fall or this spring in the deep mud. No large piles of cuttings were noted and I suspect they either took large samples or they scattered them with a tractor.

Monte Cristo-Cedar Mts.-Royston Hills, Esmeralda Co., NV

While driving west from Tonopah, I was impressed by the way the Royston Hills appeared as listric-tilted fault blocks similar to those in the detachment terrains of western Arizona and California.

Although Asarco's interest in those areas in 1965 was for porphyry copper-moly targets, it is true that the first mining was for precious metals, primarily silver.

The Royston-Crow Springs-Gilbert-South Cedar district reports by Saegart, Kurtz, Beck, and Sell, mention low-angled structures, basal breccias under volcanics, etc., suggestive that the area should be re-examined in light of basal detachment zones and thrust faults with possible related precious metal systems. The abundant copper oxide and turquoise known throughout the area may be the counterpart of the copper oxides found related to the basal fault gold occurrences in Arizona and California.

Montgomery Pass South, Mineral Co., NV T1N, R32-33E

All along the western slope and along the ridge line of the White Mountains between Montgomery Pass (NV) and Denton (CA), as viewed from highway 6, are numerous patches and centers of sulfotaric-type alteration in the volcanics. The northern centers often have drill road patterns whereas many of patches do not have any roads.

Further south the intrusives have some 200'-300' of yellow-orange-reddish FeOx contact zones with their wallrock.

Mr. H.G. Kreis in his work further south around Lone Pine and Bishop verbally reports that such zones are of no interest. In the Buena Vista District of Nevada the mineralization occurs as Au-Ag in quartz veins in post-Esmeralda volcanics as well as cinnabar, and some tactite deposits (NV Bur. Min. Bull. 58). Is a closer look justified in this high, rough country?

Browns Ranch Fault, San Bernardino Co., CA Sec. 19-20, T29S, R42E

The area certainly needs mapping to understand it better. Some offset faulting is present and may account for the increased width of reported alteration. The drill hole in the SW corner of BRF-13 should have been near the fault projection but the cuttings were only of unaltered purple volcanics. The opaline silica apron is exposed on an erosional escarpment

north of the common corners of BRF-23, 24, 36, 37. Two drill holes LM-3 and LM-4 are located on the south down-dip projection of the apron. LM-3 hit the siliceous tuff, but LM-4 appears to have stayed in cover gravels. As the BR Fault should cut just north of the escarpment, it should provide a look at the underlying tuffs in the canyon.

Windy Group, San Bernardino Co., CA Sec. 10, T6N, R2E

Review of the area revealed why no samples were collected west of the anomalous zone. The subvolcanic textured rock is very dense, hard, and fresh, and thus deserved no samples. Further west where a number of samples (all non-anomalous) were cut along the ridge line slope, is a color zone which appears to dip eastward, but has no apparent faults to guide the linear color zone. However, close examination might suggest a listric-type fault along the zone, as well as one being in the anomalous zone trend. I do not believe the best zone is wide enough and I have suggested to H.G. Kreis, who will map the area, to look outside the area to find a flattish feature which will increase the shattered nature of the host unit at depth.

Gold Reef, San Bernardino Co., CA Sec. 12-13, T6N, R2E

The small hills west of the color zone with a few anomalous values certainly have the appearance of a stacked detachment zone. The shearing increases eastward as does the chlorite content but the actual detachment fault was not seen. Mapping should reveal some target concept for testing these zones. H.G. Kreis is assigned to the mapping-evaluation here as well as at Windy.

Marble Claims, San Bernardino Co., CA Sec. 34, T7N, R13E

The extensive amount of rock cairns, some with 4" x 4"'s and some without, are scattered throughout the Asarco Marble claim block. I agree that they are very old and have not been reposted and are probably nonvalid. However, I do believe that the mapper-evaluator should plot all these monuments for future control.

I found only one weakly altered--FeOx smeared andesite out in the flats. Fracture patterns should be mapped as well as FeOx content and rock type.

Projecting from northwest to southeast along that trend, one sees workings on the far southeast. Inspection of these show mineralized structure which are perpendicular to the trend. An overall evaluation will be undertaken soon.

Ali Claims, Imperial Co., CA Sec. 20, T14S, R21E

A review by several passes with F.R. Koutz over the gulch zones to check the structures, suggested that high angled strike-slip faults are probably the features responsible rather than flat-lying detachment structures. Mr. Koutz was requested to map the zones in detail to provide a complete interpretation.

Buckskin, La Paz Co., AZ Sec. 2 et al, T10N, R17W

The Buckskin Project is a submittal by AMAX Exploration in an area with a number of holes into the Buckskin detachment zone. Extensive sampling by AMAX, and their only anomalous drill hole, indicates most of the gold is in the high-angled listric faults. N. Lehman mapped and interpreted the rock units and suggested that a quartzite breccia would provide a suitable host at the intersection of a listric and a detachment fault. AMAX failed to intercept the optimum junction as most of their holes were too shallow.

My review suggests the quartzites are too dense except for the breccia openings to be a real reactive host. The adjacent carbonate matrix volcanic units also have copper stain, low gold values and spotty tactite development. Many small diggings are in both the quartzite breccia and the carbonate volcanic. Several AMAX drill holes in the carbonate failed to show increased gold values, although again, the holes were too short to penetrate to the detachment zone.

Asarco Tucson did not wish to participate further with AMAX on the project.

Mockingbird Prospect, Mohave Co., AZ Sec. 22, T26N, R21W

This Anaconda property is in a typical detachment zone situation including numerous veins and shears in the footwall units (Mockingbird is in the footwall). Several vertical FeOx-Qtz structures and basalt filled dikes also cut the footwall. An interesting feature is the large amount of epidote-chlorite and shearing in the footwall for as much as 500 feet (estimated). Shearing and the chlorite content do increase upward, but where I crossed the footwall - volcanic contact it was suggestive of being a depositional weathered contact. The volcanics are tuffs and ignimbrites and may be younger than the normal andesitic-basalts found in this relationship.

A Mr. Williamson of Chloride, AZ, was out doing some air-trac drilling on his claims to the west. He and his brother (deceased) are old-timers in the district and have a large block of lode claims in the footwall as well as several miles of associated placers.

The trace of the contact in the flat leaves from 0.2-0.6 miles of rolling ground eastward prior to the steep rise of the volcanic units. Thus the space is available for considerable tonnage and the widespread workings, alteration, and shearing in the footwall makes for an attractive situation.

James D. Sell

JDS:mek

James D. Sell

ASARCO

Southwestern Exploration Division

JDS

June 6, 1985

J. D. Sell
Tucson Office

Review Trip

I have read your memo on the above subject and conclude that you, in a ten-day period, can generate more work and targets than that of the total Mohave Winter blitz program.

Your uncanny knack for seeing targets and the need for additional detailed exploration work suggests to me that the best policy for the SWED is for you to have your men do the detail work and you select the areas.

W. L. Kurtz

WLK:mek

cc: R. L. Brown (w/att.)

ASARCO

Southwestern Exploration Division

June 4, 1985

To: W. L. Kurtz

From: J. D. Sell

Review Trip
Detachment Zones
May 20-29, 1985

During this time period I visited a number of areas with suspected detachment zones capable of having clues to an ore deposit. Some zones were initially seen by viewing from the highway, others were submittals, and some were from the Winter Program.

1. Mohawk Pass, Yuma County, AZ

On Interstate 8 (Tucson-Yuma) approximately 12 miles west of Dateland interchange, the east side of the Mohawk Mountains shows a core complex main mass with light colored granite slabs attached as spurs extending easterly.

A good exposure of the detachment surface can be seen by taking the Mohawk Valley off-ramp west (Ave. 52E) onto old US 80 and approximately ½ mile to Milepost 57.2. At this roadcut area the hanging wall brecciated granite can be viewed as well as the footwall sequence. Back to the southeast toward the railroad tracks, a line of pits and trenches probe the detachment zone itself. One pit, near a saddle is 4' x 6' x 5' deep and exposes the best red-black iron oxide. A competitor aluminum tag #SY-19-62 is nailed in the wall. I collected three samples from top to bottom on the north wall.

SY-19-62-1	1½ feet of sheared iron-stained granitoid.
SY-19-62-2	1 foot of fractured rhyolite sill subparallel to zone.
SY-19-62-3	3 foot sheared, heavy (+10%) FeOx red-black limonite and quartz seams with minor chloritic material.

The zone trends northwesterly and dips 20°-30° northeasterly. The footwall is various sheared subparallel to the detachment zone with epidote and some iron-staining, mapped as Mesozoic schist. The detachment zone itself is variable in thickness, but may be up to 50 feet in thickness in some areas. The hanging wall is brecciated, Mesozoic granite, and forms a ¼-½ mile topographic valley to the northeast prior to rising up into the hills.

As several miles of space are available northwesterly and southeasterly from the pass before the farm lands or Gunnery Range is reached, the zone should be further reconnaissanced, sampled, and mapped as an environment to host a detachment type deposit.

2. Telegraph Pass, Yuma County, AZ

On Interstate 8 (Tucson-Yuma) approximately 10 miles west of the Wellton Interchange, between Mileposts 19 and 21, the east side of the Gila Mountains shows numerous low-angled fault, shear, and dike filled zones in a metamorphic complex. The lineation dipping eastward is characteristic of being near a detachment surface, but no positive evidence was noted. Four to five miles north, the north end of the Gila Mountains is a mass of darker units with aplite-pegmatite throughout. Thick conglomerates and gravels are on the north side and recent placer miners are scuffing around.

Again, as several miles of ground are available before the Gunnery Range to the south, and between the mountains and the Wellton-Mohawk Canal easterly, the east face of the Gila Mountains should be reconnaissanced for clues to a detachment type terrain.

3. Tumco Mine Area, Imperial County, CA

Mr. H.G. Kreis is putting together a report on the area, including his new detailed sampling and integration of available data. A few observation comments:

a. On the west side of the Cargo Muchacho Mountains, the hills south of the entrance to the Tumco Mine are laced with pegmatite and granitoid dikes. Steep dipping clay altered fault zones have been mined which trend north-south. A few chlorite zones also cut the schist complex in the low hills. Though the weak alteration effects die out rapidly to the east, the fault structures could be related to a basin-range fault system, or the footwall structures to a detachment surface. Two and one-half miles to the the south, the strong Padre-Madre flat structure trends northwesterly, and when projected, would also intercept near the outcropping pegmatites, and clay-altered zones. A drill hole on the north side of the hills next to the paved highway apparently intercepted the altered schist but no iron-oxides or chlorite material was noted in the cuttings.

b. At the Queen Mine area, the workings set within a darker green-gray hill in contrast to the grays to the east and north. Also from the Queen, you can look southward past the Cross Mine (the largest of the Tumco Mines) and see a wide (500-1000 feet) zone of light orange-reddish iron oxide coloration extending far south, but cutting off to the east and west. Traversing the color zone shows it to be quite fresh granitoid-schist with a light oxide paint on the fractures. However, the paint is sufficient to express a color zone which is along and above the 1300 foot inclined shaft of the Cross Mine.

c. The two adjacent Soverign Mines, east and west of the Cross Mine, were of lesser production and extent and are on the outside edge of the color zone.

d. The Crown Mine, the last one west on the south side of Tumco Wash, has some workings but no apparent color zone over it.

e. The diggings outside the main Queen-Soverign-Cross-Crown area are generally on discrete "veins" or structures and rarely extend to any distance along strike.

f. The King Mine, on the north side of the wash opposite the Crown, is within a southerly dipping foliation, as are the named mines previously mentioned. Going northwesterly toward the "Coffee-Pot" workings, the mineralization becomes more and more confined to steeper fracture controlled shears.

g. The 800-1300 foot declined length of the shafts in the main area, continuing without any change in dip (equivalent to 400 to 700 feet vertically below the level of Tumco Wash) suggest strongly that if they flatten into any detachment surface, then such a surface is far below our present exploration thoughts.

4. Ali Claims, Imperial Co., CA (Ogilby, CA 15' Quad.)

Outline Oil Corporation sent Mr. M. Miller a packet of material on samples collected by them and Santa Fe Mining Company on the property. The property encompasses the unsurveyed sections 20-21-28-29, T14S, R21E, on the north side of the Cargo Muchacho Mountains. The Ali claims are apparently surrounded by Gold Field claims. A few anomalous gold values (highest at 0.205 ppm Au) with detectable silver has been found and a detailed 200' grid sampling was collected in the area of four of the highest chip samples. Anomalous gold and mercury areas were indicated by the grid sampling, though generally they did not overlap. The area can be reached by taking the Ogilby off-ramp from Interstate 8 west of Yuma (14 miles), then on the paved road go past the dirt road to Padre-Madre (Am. Girl), Tumco, and at approximately 12 miles north, a good dirt road turns eastward and has a "Hyduke Road" sign. Take the Hyduke Road 3 miles east (essentially "Bench Mark 716"), where a good road travels south back toward the main Cargo Muchacho Mountains. The Ali claims extend ½ to 2 miles south of the Hyduke Road and for 1½ miles east of the large wash.

A few shallow drill holes are evident but the main work was apparently the random and grid sampling (see M.A. Miller's memo). The low hills are composed of intensely brecciated granite with thin quartz veins with sericite halos and minor epidote patches as well as thin calcite veins. The northwesterly trending higher hills on the south are held up by massive calcite veins (up to 3 feet thick), and epidote-hard

FeOx jasperoid masses--all with a steep dip. It is apparent that most of the anomalous gold values were from such mineralized zones. From the main hill 994, it appears that the drainage follows a major detachment zone, though I did not go into it or the hills further south to confirm the thought. The strong vertical hanging wall type veins, the mineralizations, and the brecciated weakly altered granite probable hanging wall granite make this a very interesting target area. I will call Outline Oil to learn more of their position, but the four square miles need to be carefully mapped to confirm the detachment environment and possible drill target (high priority).

5. Cone Mountain Gold Area, Imperial Co., CA (Palo Verde Mountains 15' Quad., T9S, R20E)

M. Miller looked at some placer ground of Hyduke's in the SE corner of the township and colored on his map the Chuckwaller complex (core type) with Tertiary volcanics to the north separated by a fault. Miller did not get to Hyduke's Cone Mountain area which suggested by the map to be on the fault. A classic detachment situation. A field review in the vicinity failed to identify the fault as late boulder basalts mantle the hills and pediment surface.

The workings found were all in volcanics of several sorts and had no obvious mineralization or alteration. The volcanics include dacite, andesite, volcaniclastics, and the late basalts and suggest a volcanic center, but no indication of hot-spring type units were noted.

A detailed examination of the fault projections on the east side of the Chuckwalla complex is warranted.

6. Black Butte Mine, Riverside Co., CA (Chuckwalla Mountains 15' Quad, CA, approx. Sec. 33, T7S, R16E)

M. Miller spent some time in this area and met Barney (President) and George (Vice President) of Golden Glade, Inc. in the field some miles from the outcrops as shown in photographs in Barney Spielman's submittal packet. The photos suggest a low-angled structure with blue coloration (copper oxides?) and having a strongly brecciated hanging wall. Miller apparently did not get to the property. A large number of shallow drill holes with interesting gold-silver assays are reported.

I travelled around the Chuckwalla Mountains from Interstate 10, taking the Red Cloud off-ramp, 9 miles west of Desert Center. Going south on the dirt road to the Navy Boundary (11 miles), then turning east on the Bradshaw Road. A very treacherous, sandy, 4-wheel drive, unmaintained road along the north boundary of the Gunnery Range. The road to the claims was not readily evident though several trails were noted in the mileage interval stated to be "24 miles to claims from highway junction." The lateness of the day and unknown exit eastward, prompted me not to explore further, but to press on eastward. The

Bradshaw Road does not get any better until just before Wiley Well as it stays in many of the washes for long stretches. From Wiley Well the BLM maintained dirt road goes north to the Wiley Well intersection on Interstate 10, seventeen miles west of Blythe.

The area should be tracked down, but not alone in the hot-weather.

7. California Aqueduct, Coxcomb Mts., Riverside Co., CA

Approximately 15 miles north of Desert Center on State Route 177 to Rice, is a road to one of the Aqueduct portion which passes through the range. From the State Route 177, the range is seen as a well laminated "MM' metamorphic sediment sequence of quartzites and shales, all with a moderate dip to the northeast. A contact is noted with light colored granites on the hanging wall side--a site for a possible detachment surface.

Close inspection shows the biotite granite to be intrusive at this point with minor quartz seams and trace of epidote. A walk around the large dump shows some weak iron-oxide and some chlorite-epidote associated with both granite and metamorphic zones.

The maps suggest a fault along the metamorphic-granite contact. The contact may be a potential detachment type terrain elsewhere. Are the geology reports on the California River Aqueduct work available for study?

8. Groover Mine Area, Riverside County, CA (Valley Mt. 15' Quad., Sec. 4, T2S, R11E)

This is one of T. Dalla Vista's areas where he verbally reported a flat fault situation. My brief visit suggests at least three and probably 4 or more 30°-40° valleyward dipping faults which contain various amounts of gouge, quartz, epidote-tactite, chlorite and copper stain.

I did not go far enough southwesterly to get into the mapped metamorphic complex, but I would suspect a detachment fault (#1) at the contact with the overlying packet. This included a quartzite unit with epidote skarn (detachment #2) in contact with quartzite. Then epidote skarn with chlorite (detachment #3) with marble on the hanging wall. The main mine workings are in a fault zone (detachment #4) having the marble on the footwall, containing gouge, epidote, chlorite, copper, crushed granitoid, gold (?), and with crushed biotite rich feldspar granite on the hanging wall which apparently continues eastward to the alluvial covering the adjacent valley.

The skarns, up to 40-50 feet thick, may also have zones of pegmatite or feldspar granite in them, and in the second quartzite block a mass of granite intrudes the block.

The entire structural zone trends northwesterly and may turn northerly and be part of the stacked skarns at Dalla Vista's Maria Mine some two miles north of the Groover.

Hi-angled quartz veins and epidote veins (up to 30' thick) cut the brecciated granite.

Total area needs to be mapped as it appears to be a stacked detachment zone and the epidote may be the distal part of a system centered out in the valley to the east.

9. North Landers, San Bernardino Co., CA (T2&3N, R5E)

About ten miles north of the town of Yucca Valley on State Highway 247 is the cutoff to the town of Landers. As viewed from Highway 247 and as shown on the geologic maps, the next 8-10 miles northward on both sides of the highway are of Precambrian metamorphics with adjacent Cretaceous intrusives. Alongside the road the granite is highly fractured and brecciated with low angled fractures and lineations showing an east side dip. Out in the valley, the granites have the metamorphics mapped lying on top of the granite.

Along the foothills of the San Bernardino Mountains on the north side, and west of Highway 247, the geology map has a thrust fault striking easterly which may curl south along the base of the range and be a part of a large detachment surface in this area, perhaps as a stacked sequence.

Future reconnaissance should include this area.

10. Gold Reef Prospect, San Bernardino Co., CA (Sec. 7 & 8, T6N, R3E)

This is within H.G. Kreis cluster area, but was not looked at by him during his last swing through the area. It is also a submittal by F. Mack and sampled by Gold Fields, Newmont, as well as by Mack (and others).

The area is a quartzite "roof pendant" set in a sea of Jurassic granodiorite, intruded by granite and diabasic lamprophyres. Anomalous gold values (mostly 0.01-0.02 opt., with one 0.13 ounces per ton gold) are found in the metasediment and generally in the vicinity of the diabasic dikes along with quartz and epidote in shears, all rather high angled features. All the main hill has a "broken" texture.

To the west some 2500-3000 feet, in the low foothills, are a number of dark dikes striking northwest. (These are at the edge of Mack's map and only two samples taken out there in and near a prospect pit.

The one sample returned +10 ppm Au and 3.9 ppm Ag with 0.18% Cu, while the other (wallrock ?) returned 10 ppb Au, 0.2 ppm Ag, and 38 ppm Cu.

The series of dikes are composed of fine grained hornblende diorite, some porphyritic, to silicic, to the diabasic lamprophyre, and often with masses and pods of silica, with variable epidote. The western dikes have a nominal dip of 45 degrees or less overall. As the dikes occur over a width of 500 feet, it would appear that they represent a wide detachment type zone.

An isolated quartzite knob, a half mile or so along projection from the main hill, is highly fractured and has the highest reddish iron oxide (ex-pyrite) content of any of the exposures. Alluvial cover is all around the knob. F. Mack 6/5 verbal. Au <5 ppb; Ag <0.2 ppm; Cu 14 ppm; Pb 8 ppm; Zn 5 ppm.

As the projection of the dike-detachment zone would pass west of the isolated hill, this hill as well as the entire suspect zone should be reevaluated in the detachment zone concept.

11. Cady Hot Springs, San Bernardino Co., CA (Sec. 27 et al, T8N, R7E)

This was also a submittal from F. Mack, though he was touting the low values in the andesite volcanics and associated flow rubble breccias.

T. Dalla Vista found two zones of "front range" hot spring deposits with the interior zone having excellent multicolored jasperoid (silica) replacement of the hot-spring limestone mound and apron material. Anomalous associated metals are found and will be in the report in preparation.

A factor which bothered me during the initial visit was the abundance of hard silicious auto-brecciated volcanic--an unlikely candidate for metal deposition. Closer inspection by Dalla Vista found additional exposures of silica replaced travertine, and I noted gray and green altered tuff in several exposures in the interior valley and thus believe that favorable replacement horizons can be found in the vicinity of the hot spring system.

Along the southern front of the mountain range is another fossil hot spring with lesser silica replacement for the most part. Further west along the front, several large cuts and an inclined shaft was put in on the dip of a fault which is apparently the feeder for the hot-spring deposit to the east. These are in tuff beds. As T. Dalla Vista has not sampled this area, we have no knowledge of this unnamed mine on the map.

Duval Industrial Mineral group, Pam Wilkenson of Tucson, drilled a number of holes in the valley between the mountain front and the

freeway and say they found the largest celestite (strontium sulfate) deposit in the U.S.A. Dalla Vista and Koutz will review the data as Duval is dropping the project.

I am bullish on the area as several hot-spring zones have been found and mineralization traces are known, and the extent of replacement silica is sufficient for a moderate to large tonnage with expansion possibilities.

F. Mack has both the Gold Reef and Cady areas under claims. In talking with him 6/3/85, he states that he is willing to allow drilling on his properties for several months at no rental cost, but, if continued or held longer, then payments would be required.

12. Shadow Mountain, San Bernardino Co., CA (Sec. 8, et al, T17N, R11E)

Report by L. Applegate in press. Larry had called to say that he had found an interesting zone in some low foothills with strong kaolinite-sericite alteration in the hanging wall of a low-angle fault.

When I arrived, no one else was in the area; however, the road appeared to be much used with very recent tire tracks. Also, new claim posts and locations had been placed the previous day and week. The year old FMC claims were also in the area. I parked on the side of the road a half mile or so from the Knob Hill and had barely reached the zone when two trucks appeared on the ridge to the south. My quick circle of the hill and adjacent area confirmed Applegate's thoughts. The alteration is similar to a near fringe porphyry copper. Brecciation is throughout. A churn drill hole on the south side was apparently several hundred feet deep and stayed in the variable to weakly altered rock throughout the spoil pile. No chlorite was noted to suggest the hole reached the basal fault.

By the time I was back to my vehicle, one of the trucks had arrived and Mr. Richard (Dick) D. Inberg of Apex Surveying, Inc., Riverton, Wyoming was waiting for me. The claims were in his name but he later admitted that he was staking for a client. Later he mentioned that he works mostly for Exxon (Mt. Hope, NV) and Atlas (Gold Bar, NV). Dick is a geologist but owns the surveying company, and has worked at that for the past dozen years.

At least four unpatented claim groups are in the vicinity of the hill: Shadow Valley Lodes of Resources Exploration Co., Inc, Las Vegas, NV (early June 1984); FMC, late June 1984; a two-person group, one 83 years old, May 1985; and Mr. Inberg, May 1985. Patented ground is also in the area of the Shadow Mountain Mine, a mile and one-half to the south-east.

Mr. Inberg says he has not had any luck talking to the patented ground people, though Inberg is staking up to their line. I am having Stringham/Gay check out the land status, as the system seems very strong and with the high angled fault--veins mined or prospected in the main range--these may be high angled structures to the basal system and worthy of a test at depth.

13. Roadside Area, Mohave Co., AZ (T21-22N, R21W)

I quickly reviewed the Anaconda drill data and their map of the district. The bulk of their drilling was in Sec. 34 (T22N, R21W) in the triangle of the Gold Chain Mine, Adams Mine, and the unnamed hill in the SW corner. No expansion of ore was found outside that already indicated by Fisher-Watts.

I then went over the area of the Black Dyke Mine where massive calcite is in the flat structure zone. At the Roadside Mine are three or four "retirees" working a small leach dump of material from the walls of the large surface stope. Ernie is the head man, but was recuperating from a hospital stay and not at the property on the day of my visit.

P. Durning had circled his "best" target areas out from the Black Dyke and Roadside Mine area. Both are to the southwest, and it is interesting that in both cases a color zone trend can be seen to extend to the southwest for a mile or so from the outcrop. Fresh granites are mixed with altered granites in the units SW of the Roadside. In a conversation with Perry, he mentioned: a) the granite may represent tilt blocks of basement brought up to the level of exposure, or b) part of the hanging wall sequence with tilted volcanics overlying the granites. As some drill holes extend in that SW direction, the question of a basal fault being rotated up to expose the basement should be answerable.

As a side note: Fisher-Watt drilled a dozen holes out from the Roadside Mine using water-injection rotary and though they felt they had a representative sample of the slurry, the end assays showed no gold even near earlier gold-bearing holes. They now conclude that this method is not the type to use in sampling for low-value micron gold. They recommend reverse air rotary as the only way for a preliminary test of this type deposit.

14. Arabian Mine, Mohave Co., AZ (Sec. 20, T21N, R20W)

John Balla had sent the results of Meridian Land and Mineral Company who had drilled a number of holes in the high-angled quartz-calcite breccia structure.

Although the Arabian fault is typical of the Oatman District green quartz-gold-calcite epithermal veins structures, P. Durning indicates

that the flat fault of Roadside-Black Dyke (3-4 miles to northwest) extends west of the Arabian structure where it crosses State Highway 68.

Thus the Arabian would be in the footwall of the Roadside detachment Structure and possibly intercept it some miles to the southwest. I have not been in this part, but it would appear that it should be investigated as a possible locus for mineralization along the detachment surface.

James D. Sell

James D. Sell

JDS:mek

ASARCO

Southwestern Exploration Division

JDS

June 4, 1985

FILE NOTE

Cone Mountain Area
T9S, R20E
Palo Verde Mountains
Imperial County, CA

The Ned Hyduke Mine area and vicinity may have a detachment surface interface on either side of the Chuckwalla Complex in the southern part of the township and the township to the south.

The Cone Mountain gold mine itself has shallow workings in various volcanic units and appears not to have any mineralization features. The fault mapped was not found, although it could be covered by basalt rubble at this area.

M. Miller looked at the placer ground circled and a report should be forthcoming.

James D. Sell

JDS:mek
Att.

JDS

ASARCO

Southwestern Exploration Division

June 4, 1985

FILE NOTE

Black Butte Prospect
Golden Glade, Inc.
Sec. 33, T7S, R16E
Chuckwalla Mountains
San Bernardino Co., CA

I did not reach this area on a swing around the mountains. The Bradshaw Road is many times in the sandy washes and very difficult driving. I DO NOT recommend unprepared four-wheel drive vehicles in the summer time.

The pictures suggest a mineralized flattish structure and the scattering of old drill holes suggest values of interest.

Access is either via the Wiley Well road offramp (of I-10), 17 miles west of Blythe, California, then south 8 miles to the Bradshaw Road intersection at Wiley Well, then west 35-36 miles, then north to the area; or 10 miles west of Desert Center on I-10, taking the Red Cloud offramp and going 4 miles southeasterly to the road intersection which turns south (Red Cloud road continues southeasterly), continues another 7½ miles to the boundary of the Gunnery Range, turn east on the Bradshaw Road about 10-11 miles to a road leading north to the area.

James D. Sell

James D. Sell

JDS:mek
Atts.

JDS

ASARCO

Southwestern Exploration Division

June 4, 1985

FILE NOTE

Gold Reef Prospect
Sec. 7-18, T6N, R3E
Ord Mining District
San Bernardino Co., CA

The Gold Reef area is of some interest based on the few anomalous gold-silver values in high-angled structures which are in the brecciated hanging wall of a east-dipping detachment structure located on the west side foothills.

A well altered brecciated knob-hill is located a half mile out in the valley to the northwest of the main outcrops on the attached maps.
Mack: 6/5/85 verbal Au <5 ppb; Ag <0.2 ppm; Cu 14 ppm; Pb 8 ppm; Zn 5 ppm.
This suggests a larger hanging wall potential as well as near the detachment surface under the alluvial cover to the north.

Mack has completed the Mag survey with mixed results, part of which he attributes to the power line on the south. He apparently does pick up the diabasic lamprophyre dikes which are always around the anomalous samples.

Mack verbally stated that he would let a "drilling" company have several months free time to drill and evaluate the property, then some monthly rental-royalty, and a 6% NSR. (All negotiable.) (Mack also controls the Cady Mountains Area.)

James D. Sell

James D. Sell

JDS:mek
Atts.

JDS

ASARCO

Southwestern Exploration Division

June 4, 1985

FILE NOTE

Silver Bullion Claims
Horizon Gold Shares Inc.
Sec. 17, T6N, R8E
Stedman Mining District
San Bernardino Co., CA

The attached submittal has not been field reviewed by me, nor was the Confidentiality Agreement signed.

James D. Sell

James D. Sell

JDS:mek
Atts.

ASARCO

Southwestern Exploration Division

JD-

June 4, 1985

FILE NOTE

Shadow Mountain
T17N, R11E
San Bernardino Co., CA

Attached are L. Applegate's preliminary map and sample notes.

Bill Gay is getting up a land status map for the township.

The high-angled mine workings of the Shadow Mine and others in the main range, may be expressions in the hanging wall block above the eastward dipping detachment surface.

Thus they may offer a depth target under the patented claims.

The unpatented claims are covered in part by four groups including FMC.

James D. Sell

JDS:mek
Atts.

James D. Sell

ASARCO

Southwestern Exploration Division

June 5, 1985

FILE NOTE

Roadside Mine Area
T21-22N, R21W
Mohave Co., AZ

The Roadside Mine area still has potential ground untested by drill holes or not adequately tested.

The large Anaconda map of the district is available through Perry Durning for those who wish to reevaluate the various exposures.

Anaconda drilled mainly in Section 34 in the triangle of the Gold Chain Mine - Adams Mine - unnamed hill in the SW¼ corner. No ore extensions were found in the ten-hole program.

Durning noted that Amoco stated that they had a "geophysical trend" which extends from the Katherine area northeasterly past the north side of the SW¼ hill and toward the prospect in the center of the Section 34 and toward the Gold Chain. Amoco would not give him any data. Anaconda drilled on the south side of the SW¼ hill but found no ore. Durning correctly states that the north side of the SW¼ hill is better altered than the south.

Southwest trending color zones extend from both the Black Dyke and Roadside Mine areas.

Perhaps only relatively narrow ore zones extend outward from the outcrop alteration and better drilling control is needed in the district.

Perry stated that Fisher Watt has applied for a prospecting-mineral lease on Sections 28, 33, 4 and 9 of the Lake Mead National Recreation Area lands adjacent and west of the Pecos/Fisher Watt JV lands.

James D. Sell

James D. Sell

JDS:mek
Atts.

JDS

ASARCO

Southwestern Exploration Division

June 4, 1985

FILE NOTE

Arabian Mine
Sec. 20, T21N, R20W
Mohave County, AZ

The Arabian Mine zone adjacent to State Highway 68 on the west side of Union Pass, appears to be a typical epithermal vein of quartz-calcite breccia.

The suggested reserves are borderline based on the mining parameters in the vicinity of Highway 68.

If the structure is a vein within the footwall block of the Roadside detachment fault, located some one-half mile to the west along the Highway, then an interesting target would be the intersection zone to the southwest.

James D. Sell

James D. Sell

JDS:mek
Att.

ASARCO

Southwestern Exploration Division

JDS

June 4, 1985

FILE NOTE

Gold City Prospect
Horizon Gold Shares, Inc.
Secs. 23,24,25,26,35,36
T4N, R21W
La Paz County, AZ

The Gold City Prospect is on the west side of the pass, west of Quartzite, Arizona, and north of Interstate 10.

I have not field checked the area.

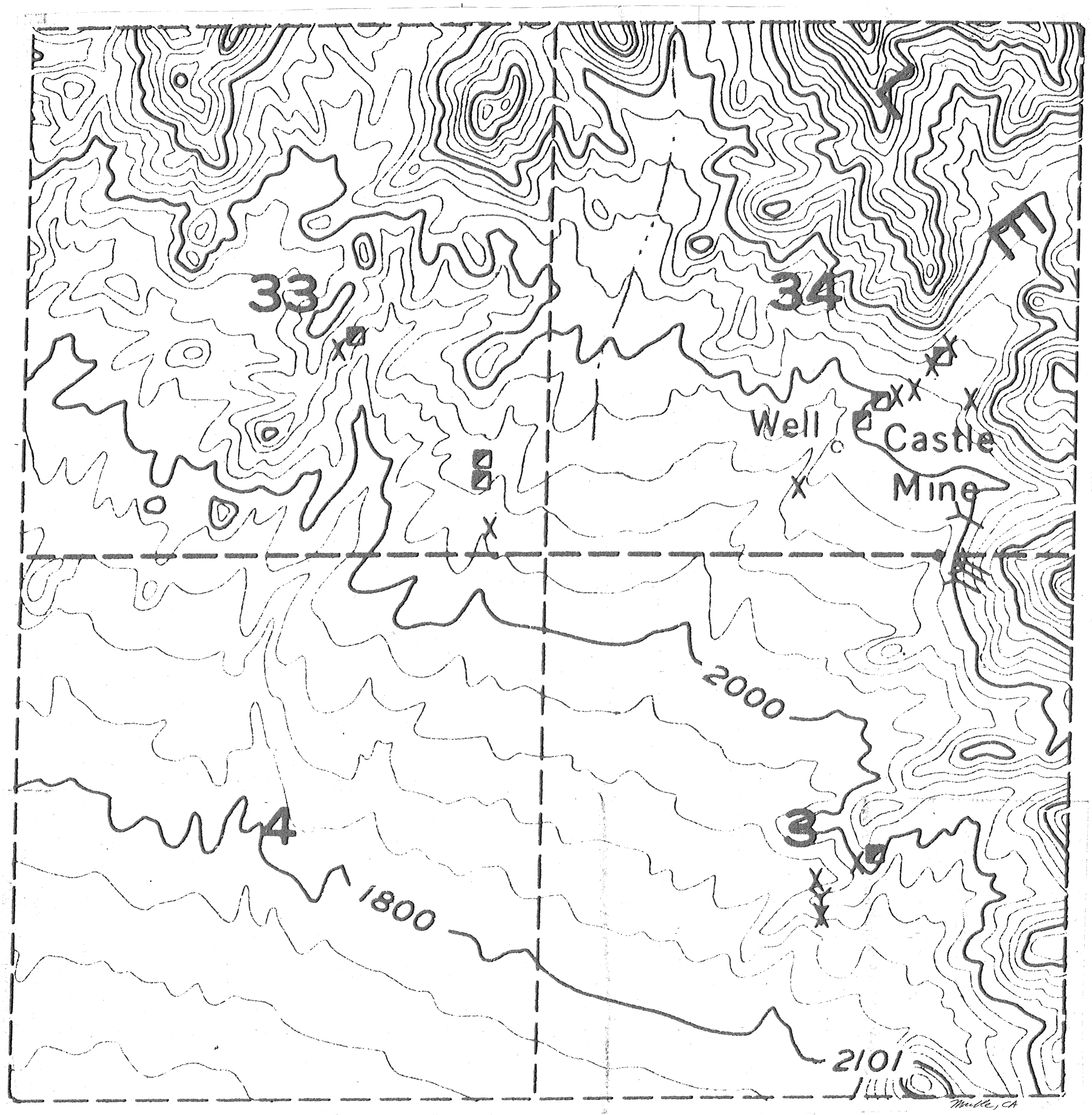
This may be the source area for the La Paz Placers.

The Confidentiality Agreement has not been signed.

James D. Sell

James D. Sell

JDS:mek
Attachments


33
34
Well
Castle
Mine
2000
4
1800
3
2101
Mulle, CA

ASARCO

Southwestern Exploration Division

JDS

June 14, 1985

Chuckwalla Springs
15' Quad

F. T. Graybeal
New York Office

M. A. Miller's Report
Wray Oil Company Property
Augustine Pass Area
Chuckwalla Mountains
W. Central portion, T8S, R17E
Riverside Co., CA

Attached is the memo, a location map and four sample results showing gold-silver and tellurium.

Also attached is the Wray Oil Company's submitted map showing the sample points by Gold Field Mining group. I have added the two "trends" as stated by Miller along with the GFMC assays. The four Asarco rock samples (CM-14 thru CM-17) are on the east side of the area.

The map is north of the Chuckawalla Mining Company ground covered in Miller's ERS Of April 21-24, 1985 (my cover sheet of June 13, 1985).

In the Tucson Office files are the data, assay and reports, submitted by Wray of the GFMC assay data along with several generated maps showing the two trends and gold-silver-moly-arsenic values. The trend outlines are 400-800 feet wide by 3000 feet long and nearly a mile apart.

Miocene (?) volcanic rocks overlay the gneiss on the south. Although Miller and I did not note a detachment surface fault at the contact during our traverse, the area should again be reconnaissanced to determine further interest in the trends.

A very large fault structure is located in the drainage where Asarco sample CM-17 was taken. A number of different rock slices are within the structure (which appears to be more high-angled than most detachment types) and the sample was collected in the best color-altered block of granitic material. As noted, neither sample CM-17 or the others had detectable gold-silver or tellurium. Of course, it is possible that this fault flattens rapidly at depth and becomes a detachment-type structure which underlies the entire region, including the property held by Chuckawalla Mining Company on the south.

James D. Sell

James D. Sell

JDS:mek
Attachments

cc: W. L. Kurtz
M. A. Miller

JDS

ASARCO

Southwestern Exploration Division

May 7, 1985

To: J. D. Sell

From: M. A. Miller

Wray Oil Company Property
Chuckwalla Mountains
Riverside County, CA

Summary & Conclusions

Sporadic gold mineralization appears to be associated with tectonized gneisses of probable Precambrian age. The gneisses exhibit alteration features such as hematization and chloritization, but the best appearing alteration does not contain any gold values. Goldfields has extensively sampled the area and there is a weak suggestion of two north east mineral trends. If any further work is done in the area, these "trends" would seem to be likely starting points. Other than the two "trends" the property does not appear to hold much potential.

Location

The Wray Oil Company (Canyon Minerals) property is located on the northeast end of the Chuckwalla Mountains in Riverside County, California. The size of the area is roughly 4000' wide x 12,000' long. (I was told that they had staked four sections.) There is a small placer mill set up on the property and there is evidence of recent operations (within the last year).

Geology and Mineralization

The area is characterized by gneisses?? which appear to have been strongly tectonized and resemble in appearance the type of upper plate rocks seen at Copper Basin and Padre Madre. There is abundant hematite and moderate to abundant carbonate on the fractures and as fracture fill; local chloritization, high angle boudinage structures, and mafic dike intrusions which themselves have been sheared and fractured. Locally, large quartz veins (→1' wide) have been introduced along the dikes and these also are sheared and fractured. The structural setting could be one of a range front fault zone as the majority of structures are high angle +95→60°. The movement appears to be that of a normal fault or a series of faults. Sampling by Asarco (me) was done specifically in areas where there was abundant hematite, carbonate and shearing on the assumption that this was the best ground preparation. Results were negative. Goldfields extensively sampled the properties one year ago and got some scattered anomalies, but no major areas of mineralization. Canyon Minerals has sampled the properties both for placer and lode potential. The majority

of samples taken for placer show values ranging from Tr→.03 opt. Rock samples as described in the report range from .02→.1 opt. Based upon the redundancy of Goldfields sampling, I would question some of Canyon Minerals' results. There appear to be two areas where follow-up work could be done: (see enclosed map)

1. The Augustine Pass Road Area sample (113, 99, 177, 108) where the sampling indicates anomalous values.

2. The area of (105, C-10, 104, C-2, 28, C-5, C-6, C-4, A-11) where anomalous values have been found.

See large Sample map 6623 1" = 459'

Based upon the "anomalous" values, there is a suggestion of a northeast mineral trend which might intersect the main northwest trending structure.

Recommendations

There is a slight suggestion of 2 anomalous zones as discussed above. The areas sampled by Asarco while having all the appearances for mineralization, did not show any anomalous values. Therefore, if any more is to be done on the property, it should be with the idea of verifying and enlarging the "anomalous trends."

Mark A. Miller

MAM:mek
Atts.

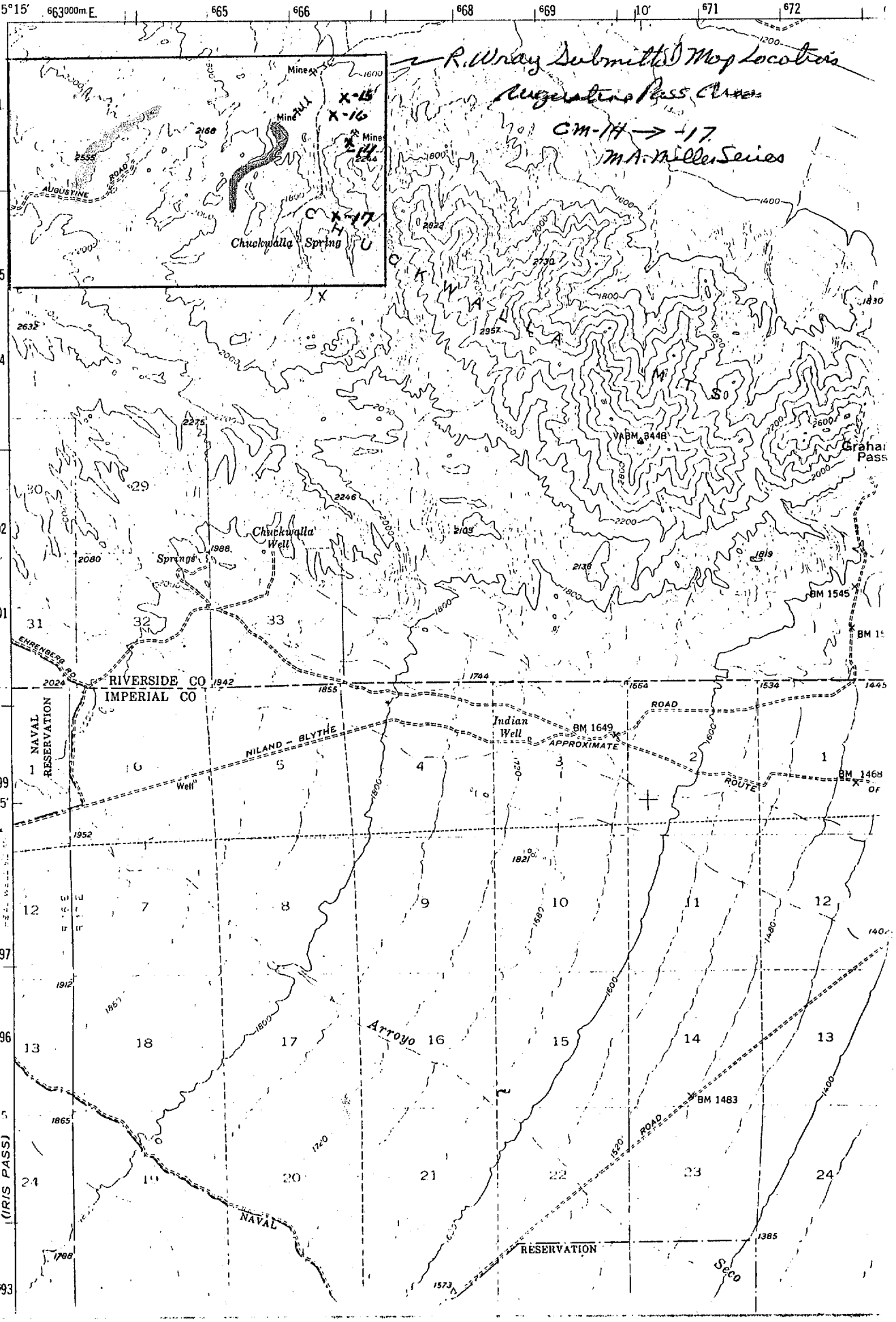
Chuckwalla Spring CA.
15' quad.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

R. 17E

T. 8 S.

R. Wray Submitted Map Locations
Augustine Pass Area
CM-14 → -17
M.A. Miller Series



REPORT OF ANALYSIS

JOB NO. TAJ 412
May 7, 1985
MOHAVE GOLD
CHR-41/HD-40

ASARCO INCORPORATED
Attn: Mr. James D. Sell
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 45 Rock Samples

ITEM	SAMPLE NO.	Au* (ppm)	Ag (ppm)
1	CHR-41	.002	<.2
2	CHR-42	.007	<.2
3	CHR-43	.060	.2
4	CHR-44	.017	<.2
5	CHR-45	<.002	<.2
6	CHR-46	.004	<.2
7	CHR-47	.003	<.2
8	CHR-48	<.002	<.2
9	CHR-49	.002	<.2
10	CHR-50	<.002	<.2
11	CHR-51	<.002	<.2
12	CM-1	<.002	<.2
13	CM-2	<.002	<.2
14	CM-3	<.002	<.2
15	CM-4	<.002	<.2
16	CM-5	<.002	<.2
17	CM-6	.005	<.2
18	CM-7	<.002	<.2
19	CM-8	.002	<.2
20	CM-9	<.002	<.2
21	CM-10	.007	<.2
22	CM-11	.009	<.2
23	CM-12	<.002	<.2
24	CM-13	<.002	<.2
25	CM-14	<.002	<.2
26	CM-15	<.002	<.2
27	CM-16	<.002	<.2
22	CM-17	<.002	<.2

ASARCO Incorporated
MAY 9 1985
SW Exploration

MAMillers
Wray Oil Property
Chackwalla Mtns
May 7, 1985

*NOTE: Method of analysis by combination fire assay and atomic absorption based on a one assay-ton sample

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TAJ 412A
May 22, 1985
MOHAVE GOLD
CHR-41/HD-40
PAGE 1 OF 1

ASARCO INCORPORATED
Attn: Mr. James D. Sell
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 4 Pulp Samples

ITEM	SAMPLE NO.	Te (ppm)
12	CM-1	.005
23	CM-12	.010
24	CM-13	.005
25	CM-14	.005

MAM - Chuckwalla Mining Co. AER sheet April 21-24, 1985

MAM: Wray Oil Co. Property May 7, 1985 Report.

cc: Mr. Mark Miller
P.O. Box 306
Salem, Missouri 65580

cc: Asarco Incorporated
Attn: Ms. Mary Kavangh
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK ARIZONA

William L. Lehmbeck
Manager

JDS

ASARCO

Southwestern Exploration Division

June 13, 1985

Chuckwalla Spring 15' Quad.

F. T. Graybeal
New York Office

Chuckwalla Mining Company
Brian D. Wilmot, President
Sec. 16,17,20,21, T8S,R17E
Riverside County, CA

M. A. Miller's Exploration Sheet, location map and sample sites, and the CM-1 thru -16 assay results are attached.

As noted, the property is "a man's dream of a gold deposit" (MAM), and I would agree in the pit area of volcanics where they intended to start production last month (May). I intend to visit the area at intervals.

The Tucson File copy has a number of maps and assay data of various sorts. The data shows very interesting "troy ounces per ton" figures, but unfortunately some strange (and wonderful ?) assay procedures and calculation manipulations came from various labs to give those numbers.

The CM-1 thru -16 assay samples, which I helped collect, show barely detectable gold.

However, the district does have some potential and part may lie on the CMC claims. See the "Wray Oil Company Property" report of MAM, May 7, 1985.

James D. Sell

James D. Sell

JDS:mek
Atts.

cc: W. L. Kurtz
M. A. Miller

JDS

ASARCO

Exploration Department
Southwestern United States Division

James D. Sell
Manager

June 13, 1985

Mr. Brian D. Wilmot, President
Chuckawalla Mining Company, Inc.
P.O. Box 999
1219 Main Street
Angels Camp, California 95222

Dear Mr. Wilmot:

Your letter of May 2, 1985, to Mr. Mark Miller along with some recent assay data and location map, has been retransmitted to this office.

Apparent scattered gold is encouraging from your sample-test results and we wish you continued success in your work.

The few samples by M. Miller did not return notable gold-silver values in the portions he sampled.

I hope to meet up with you again in one of my trips through California and see your mill in operation.

Sincerely,

James D. Sell

JDS:mek

cc: M.A.Miller

ASARCO Incorporated P. O. Box 5747 Tucson, Az 85703
1150 North 7th Avenue (602) 792-3010

ASARCO EXPLORATION RECORD

☒ FIELD EXAMINATION ☐ LITERATURE SEARCH ☐ ASARCO FILE ☐ _____

Section I General Indexing

① Name(s) of Property or Area: CHUCKWALLA MINING COMPANY					② Country: USA	③ State or Province: CALIFORNIA	
					④ USGS Quad.: CHUCKWALLA SPRINGS 15'	⑤ File or Gore No.	
⑥ Latitude: 33°27.5'	⑦ Longitude: 115°12.5'	⑧ AMS Sheet: SALTON SEA	Township: T8S	Range: 17E	Section: 16,17,20 21	⑨ Examined by: MA MILLER	⑩ Date: APRIL-21-24
						⑪ Office: TUSCON	⑫ Field Days: 3

Section II Sources of Information

Date Typed _____

⑬ References

Author	Date	Title	Publications	Vol. No.
ATTACHED		CHUCKWALLA MINING COMPANY REPORTS		

Section III Appraisal

⑭ Recommendations
- ☐ Action Now
- ☒ Too Low Grade
- ☐ Too Small
- ☐ Ownership Problem
- ☐ Access Problem
- ☒ 15

⑮
- ☐ Post Producer
- ☐ Producer
- ☐ Mineral Deposit
- ☐ Prospect
- ☒ DREAM BUILDER
- ☐ Geologic Concept
- ☐ Geochem Anomaly
- ☐ Geophy Anomaly
- ☒ COLORANOMALY

⑯ Production

Commodity	Tons	Grade

⑰ Reserves ☐ Measured ☐ Estimated

Commodity	Tons	Grade

⑱ Num. Drill Holes: 0

Approx Total Footage _____

⑲ Excavations: PIT AREA ~ 3 ACRES IN SIZE

⑳ ☐ Spectro. Analysis Attached ㉑ ☒ Assays Attached ㉒ ☒ Geochem Results Attached

Section IV Geologic Data

㉓ Commodity or Contained Metals: GOLD

㉔ Ore Minerals-Major: GOLD, SILVER, PGE PLATINIUM/ Minor: _____

㉕ Host Rocks-Major: VOLCANIC ANDESITES & LATITES Minor: _____

㉖ Age of Host Rocks: TERTIARY

㉗ Nature of Exposures

㉘ Alteration: CELADONITE ASSOCIATED w/ THE VOLCANICS, CALCITE, ZEOLITES & OPAL

㉙ Total Extent: VOLCANICS COVER THE S END OF THE CHUCKWALLA MTS range.

㉚ Structure: NONE SEEN

㉛ Ore Occurrence: REPORTED TO BE ASSOCIATED w/ VOLCANICS AS "MICRON GOLD"

㉜ Age of Mineralization: TERTIARY?

㉝ Conclusions & Recommendations: A MANS DREAM OF A GOLD DEPOSIT. PAN ~~AMALGATION~~ AMALGAMATION TECHNIQUES SHOW .4 opt GOLD. FIRE ASSAYS SHOW NOTHING. RECOMMEND THAT WE VISIT ONCE HE IS IN PRODUCTION TO SEE THE GOLD.

(For additional space use extra sheets)

Form Revised-June 1980-J.H.C. MVK-5193

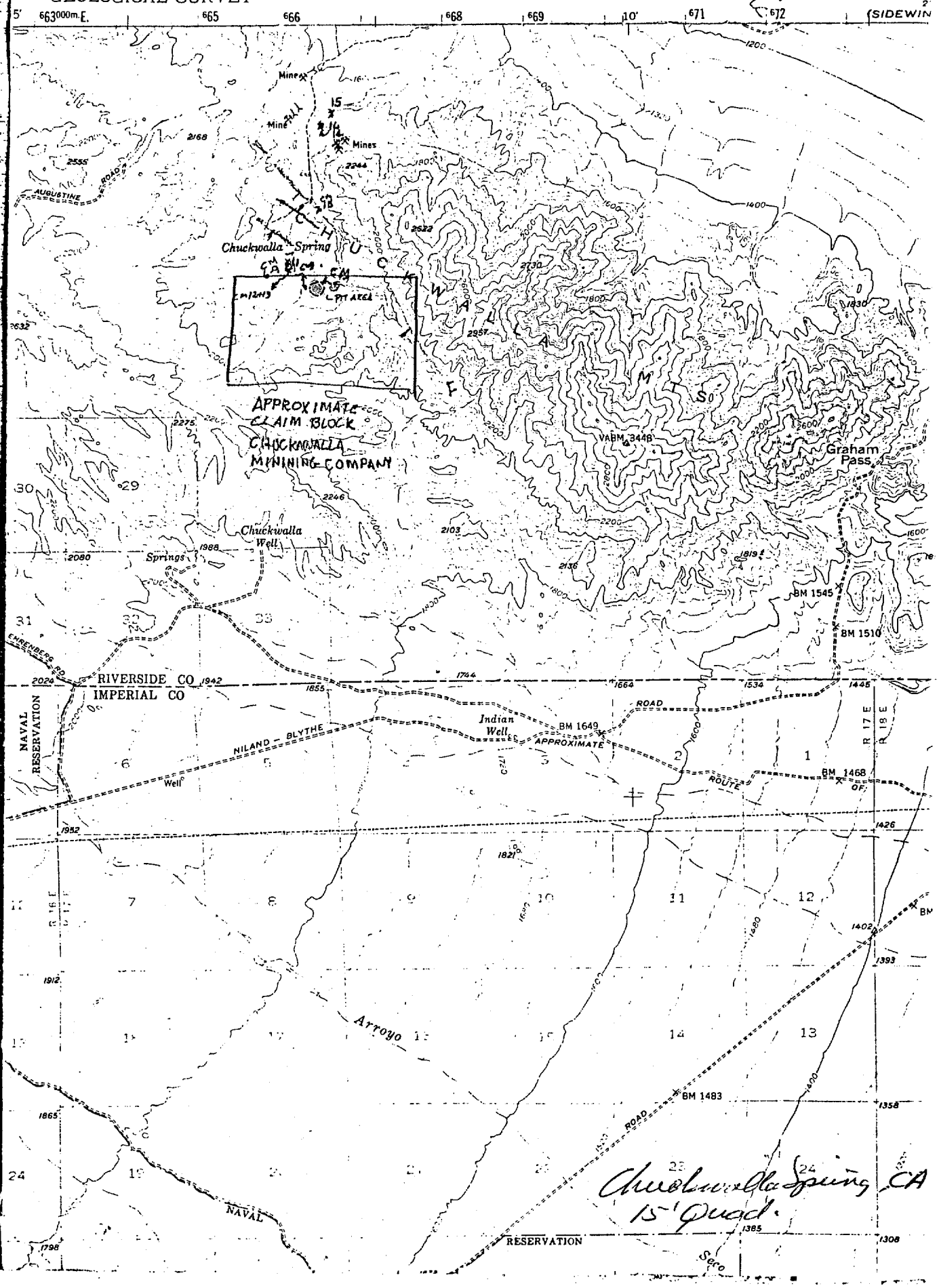
Tom Tuttle
Ray Oil Company

Chuckwalla Mining Co

Bill Martindale
Chuckwalla

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF
REPRESEN
DIRECTOR OF



SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TAJ 412
May 7, 1985
MOHAVE GOLD
CHR-41/HD-40

ASARCO INCORPORATED
Attn: Mr. James D. Sell
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 45 Rock Samples

ITEM	SAMPLE NO.	Au* (ppm)	Ag (ppm)
1	CHR-41	.002	<.2
2	CHR-42	.007	<.2
3	CHR-43	.060	.2
4	CHR-44	.017	<.2
5	CHR-45	<.002	<.2
6	CHR-46	.004	<.2
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17	CM-6	.005	<.2
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20	CM-9	<.002	<.2
21	CM-10	.007	<.2
22	CM-11	.009	<.2
23	CM-12	<.002	<.2
24	CM-13	<.002	<.2
25	CM-14	<.002	<.2
26	CM-15	<.002	<.2
27	CM-16	<.002	<.2
28	BM-1	<.002	.2

M.A. Miller
Asarco Exploration Record
Sheet
Chrichenville Mining Co
April 21-24, 1985

ASARCO Incorporated
MAY 9 1985
SW Exploration

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TAJ 412A
May 22, 1985
MOHAVE GOLD
CHR-41/HD-40
PAGE 1 OF 1

ASARCO INCORPORATED
Attn: Mr. James D. Sell
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 4 Pulp Samples

ITEM	SAMPLE NO.	Te (ppm)
12	CM-1	.005
23	CM-12	.010
24	CM-13	.005
25	CM-14	.005

MAM: Cherokee Oil Mining Co. AER sheet April 21-24, 1985

MAM: Wray Oil Co. Properties May 7, 1985 Report.

cc: Mr. Mark Miller
P.O. Box 306
Salem, Missouri 65580

cc: Asarco Incorporated
Attn: Ms. Mary Kavangh
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK ARIZONA

William L. Lehmbeck
Manager

JDS

ASARCO

Southwestern Exploration Division

May 7, 1985

File Note

Chuckawalla Mining Company
Chuckwalla Mountains
Sec. 16,17,20,21, T8S, R17E
Riverside County, CA

On April 21, 1985, I accompanied M. Miller of the Mohave 7 into the area where the Chuckawalla (spelled with a middle "a") Mining Company, Inc., Mr. Brian D. Wilmot, President, P.O. Box 999, Angels Camp, California 95222, phone 209/736-4854 or 736-2100, is erecting a mill and getting ready to open-pit some "0.4 oz. gold." Sample results by Mr. Miller failed to confirm these gold values in volcanic rock with abundant green iron-sulfate(?) nodules so common to volcanic rocks of the Southwest.

I attach three photos of the plant, which include a "vacuum" crusher-classifier. A small riffle is in the gold recovery building.

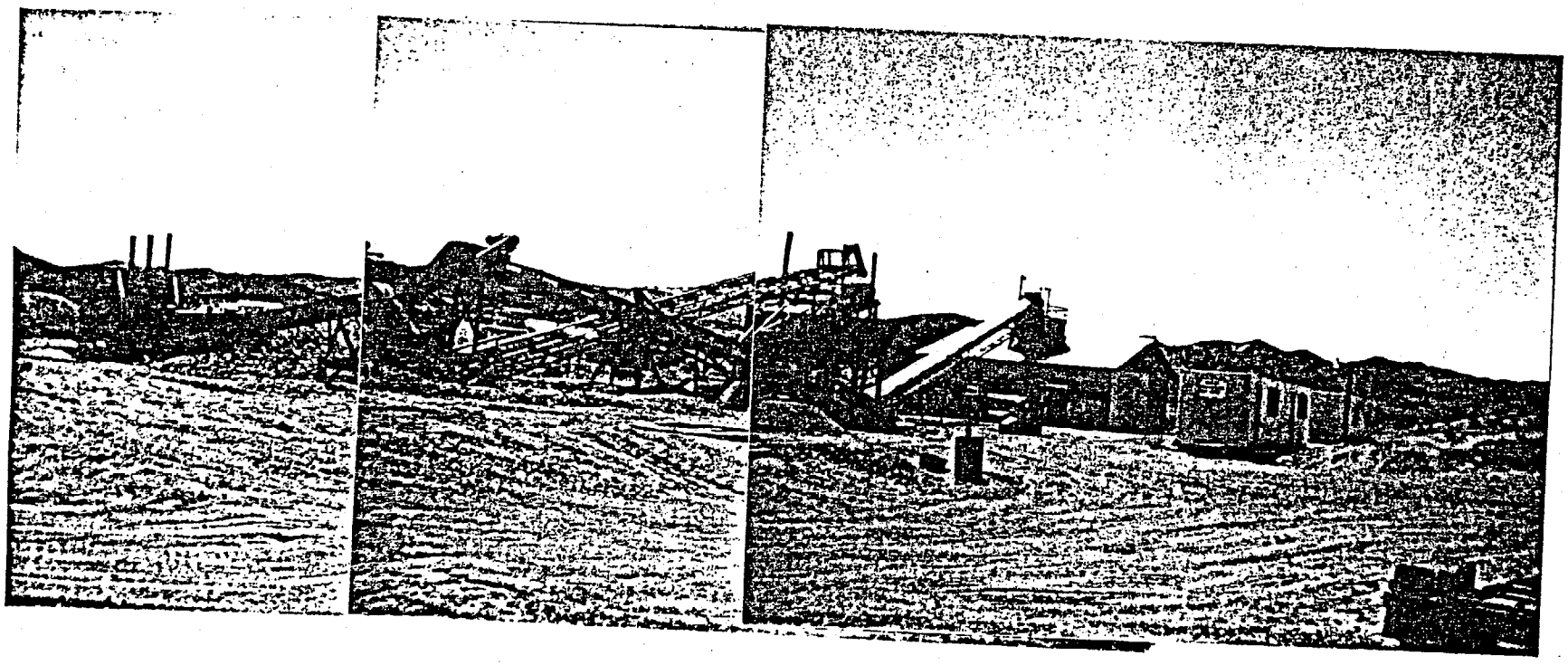
Mr. Wilmot has raised considerable monies via limited partnership sales and hopes to be in production by the end of May.

See M. Miller's report on the area along with Goldfields' sample results.

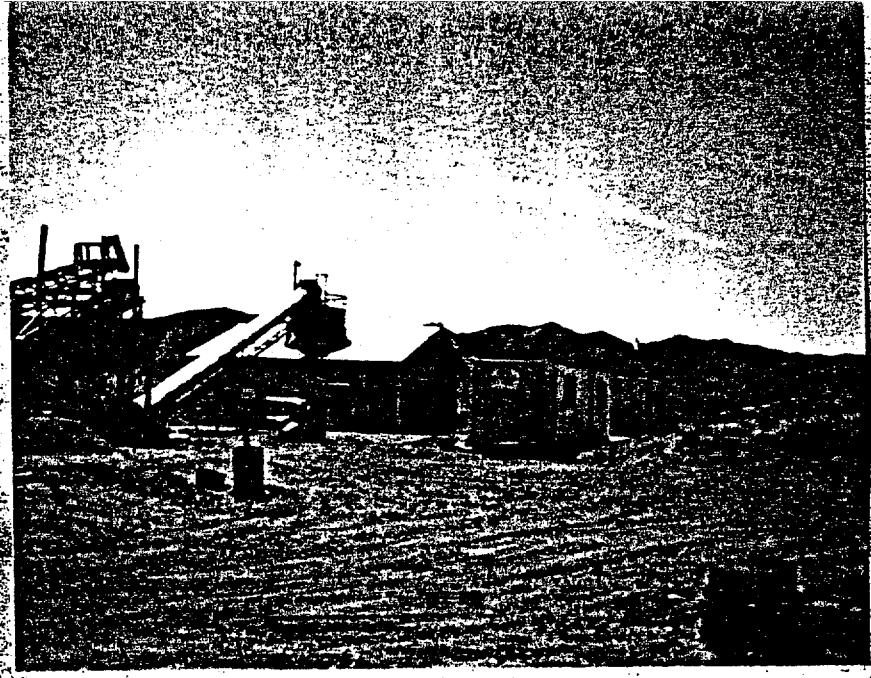
James D. Sell

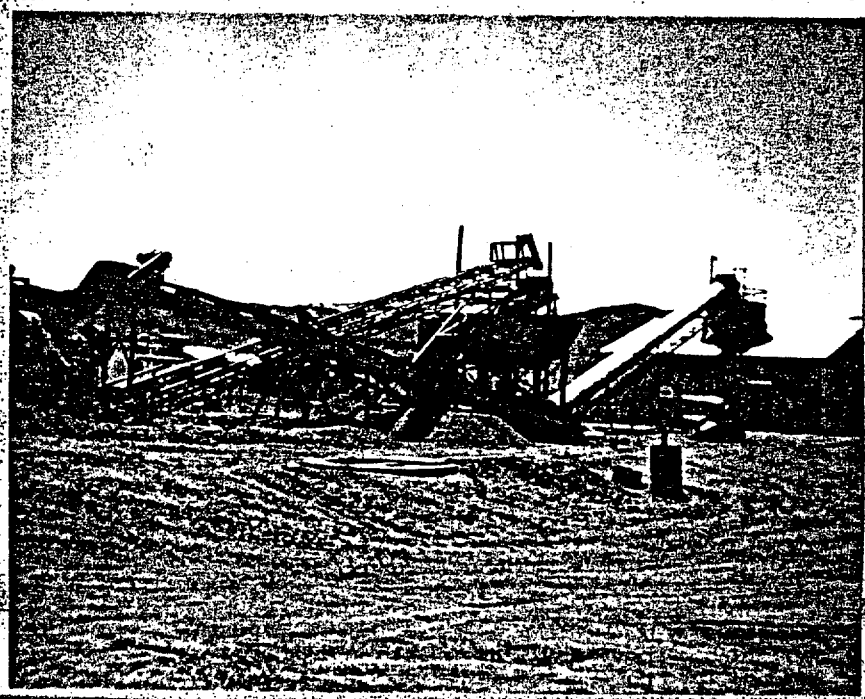
JDS:mek
Att.

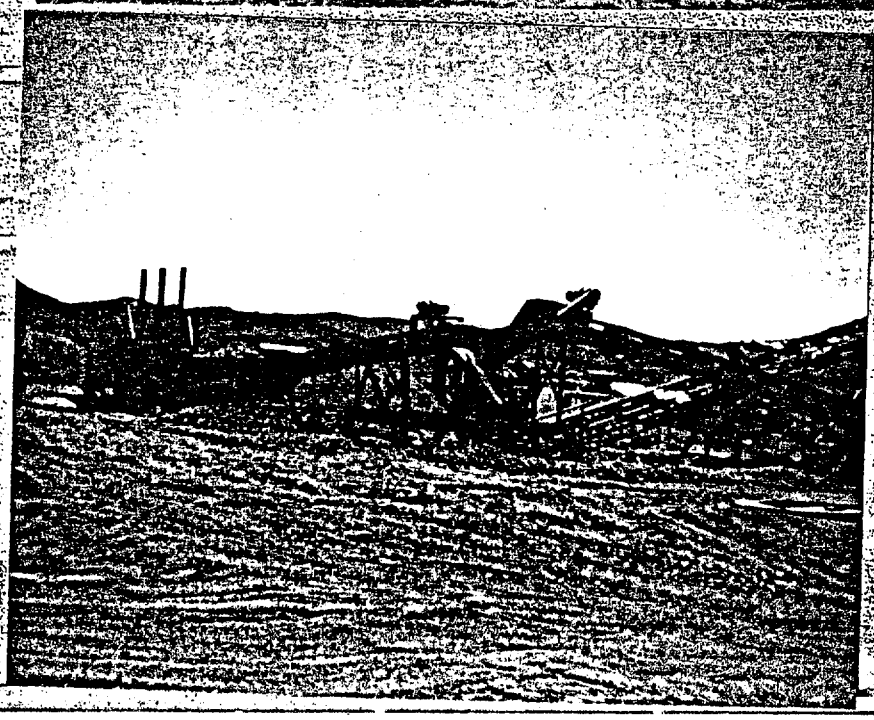
cc: M. Miller



Plant of Chuckawalla Mining Company
Chuckawalla Mountains
Sec. 16, 17, 20, 21 of T8S, R17E
Riverside County, CA.



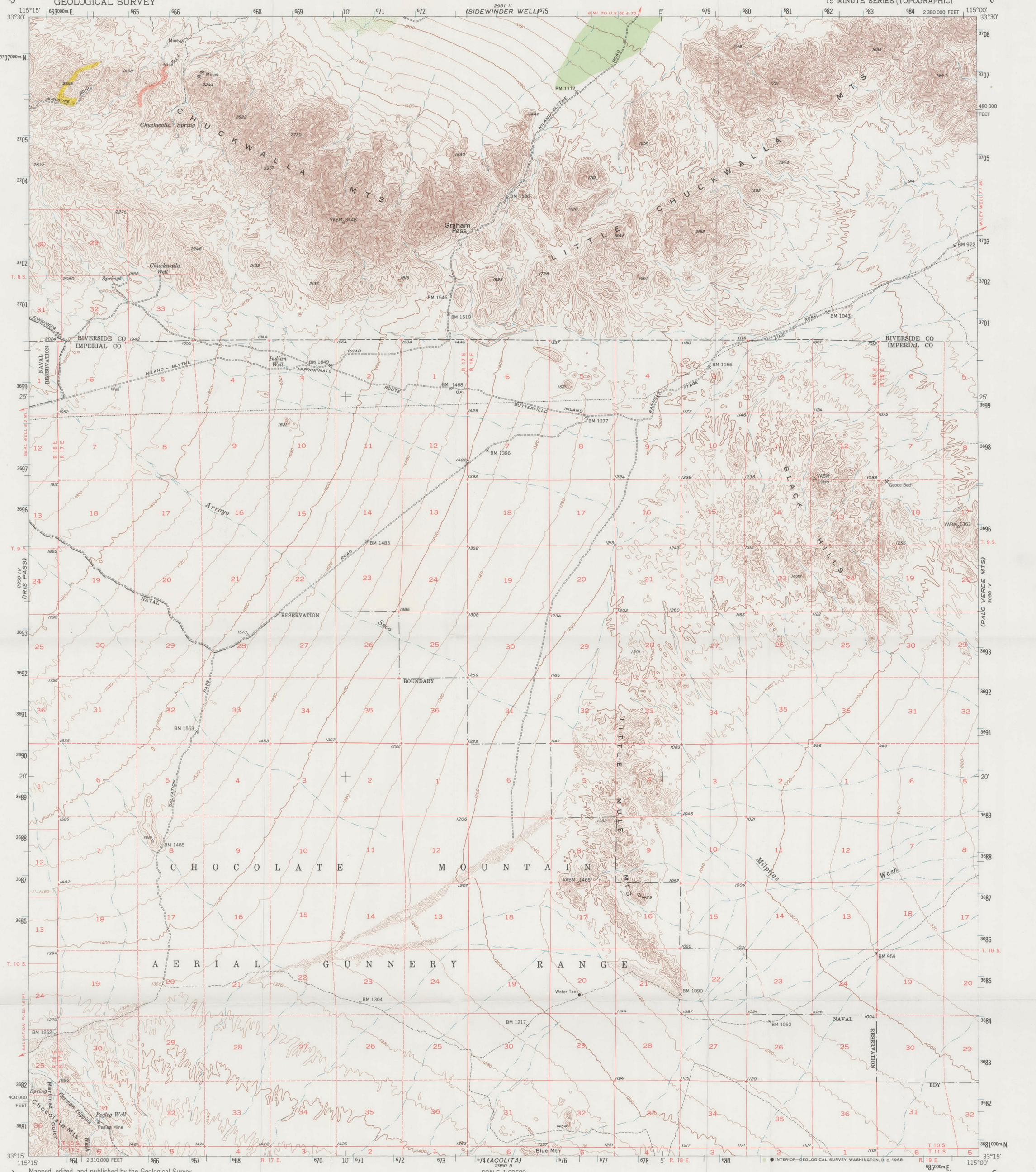




UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF CALIFORNIA
REPRESENTED BY THE
DIRECTOR OF PUBLIC WORKS

CHUCKWALLA SPRING QUADRANGLE
CALIFORNIA
15 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Topography from aerial photographs by photogrammetric methods
Aerial photographs taken 1948. Field check 1953

Polyconic projection. 1927 North American datum
10,000-foot grid based on California coordinate system, zone 6

Dashed land lines indicate approximate locations

1000-meter Universal Transverse Mercator grid ticks, zone 11, shown in blue

UTM GRID AND 1953 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:62 500

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION
Unimproved dirt

QUADRANGLE LOCATION

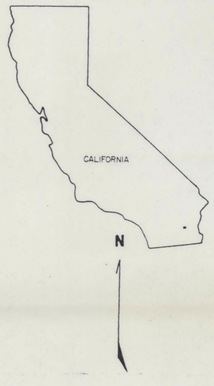
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225 OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.-1968

CHUCKWALLA SPRING, CALIF.
N3315—W11500/15
1953
AMS 2950 I—SERIES V795

14

CANYON MINERAL CO.



1" = 459.1'

CONTOUR INTERVAL: 40'

AUGUSTINE PASS AREA

TOWNSHIP 8 SOUTH

RIVERSIDE CO., CALIFORNIA

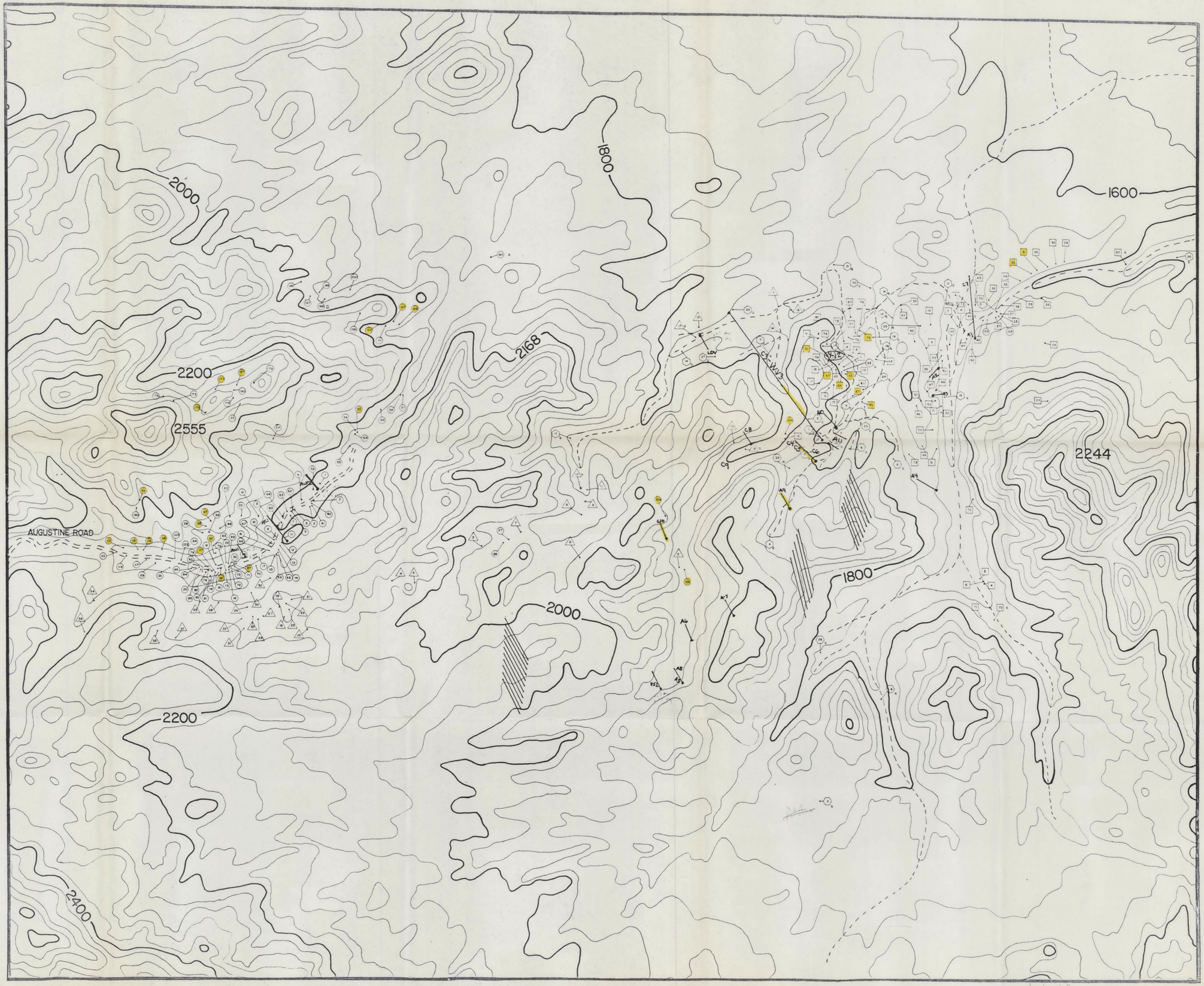
MAP # 6223
FILED FOR JDS

LEGEND

- SRS-93 — SERIES ROCK CHIP SAMPLES (G. DENOTES GRAVEL SAMPLES)
- SRS-92 — SERIES ROCK CHIP SAMPLES (G. DENOTES GRAVEL SAMPLES)
- SRS-91 — SERIES ROCK CHIP SAMPLES (G. DENOTES GRAVEL SAMPLES)
- — CANYON MINERAL SAMPLES (G. DENOTES GRAVEL SAMPLES)
- = = = or - - - DIRT ROAD OR JEEP TRAIL
- Sample Numbers And Zone ⟶
- AFFINITY INSTRUMENTATION

Anomalous in Ton mex:
Au ≥ 0.005 opt
Ag ≥ 0.48 opt
Mo > 6 ppm
Cu > 10 ppm

Gold Trail Mining



R. Wray 7/1/84

Augustine Pass
Wray Int

MN 6223

1716-609 GRANVILLE ST.
P.O. Box 10363 STOCK EXCHANGE TOWER
VANCOUVER, B.C.
V7Y 1G8
683-7865
(AREA CODE 604)

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George Cross News Letter
"Wealth Reporting"

NO.130(1985)
JULY 8,1985

NO.130(1985)
JULY 8,1985

WESTERN CANADIAN INVESTMENTS

PACKARD RESOURCES LTD.(PAD-V)

SILVER EXPLORATION PROGRAM UNDERWAY - UPON ACQUISITION OF ADJOINING CLAIMS

Formal signing of lease contracts have been completed in the acquisition of 7 miles of an intermittently silver mineralized regional fault system in a major belt in Imperial county, California, 30 miles north of Yuma, Arizona and 10 miles north of the Picacho heap leach gold mine of Glamis Gold Ltd.

Packard Resources Ltd. president Julian Baldry has announced the final documentation has been completed for acquisition of 1,600 acres peripheral to the company's main 5,200 acre Midway Hills project.(See map overleaf) The holdings now cover 6,400 acres, some 10 square miles. The recent 1,600 acres were acquired from Santa Fe Mining Inc. subject to 5% net smelter royalty plus the right of Santa Fe to back in to a 50% joint venture working interest in the 1,600 acres at the point of a production decision. Packard has committed to a $50,000 work program by 28Jun85 with option work programs of $50,000 in each of 1986 and 1987. The 5,200-acre main block is held 100% by Packard, subject to 5% net smelter return royalty to a $6,000,000 end price.

Packard has started a program of road building, drill site preparation and trenching; drilling will start as soon as possible. All required government permits have been issued for drill testing the firm targets.

Exploration in 1984 discovered epithermal vein outcrops along a 3-mile central segment of the regional fault. The outcrops range up to 10 feet wide. Surface samples all yielded silver mineralization with values up to 7.68 oz. silver/ton. The outcrops have been heavily leached, eroded and are without a hanging wall contact suggesting they represent remnants of a vein system which may become wider and richer beneath the zone of leaching. The Midway Hills project is based on a geological model based on the Escalante mine in SW Utah. The profitable Escalante orebody has a number of geological features similar on surface to those at Midway Hills. At Escalante, the surface expression is 4 to 6 feet wide with low to 6 oz.silver per ton, however, 150 feet below surface the vein widens, averaging 19 feet, with values ranging from 8 to 12 oz. silver/t. Mr.Baldry states the property has the potential for discovery of several large tonnage, low cost underground mines.

~~Packard's second active project is in the Regional Resources area, 60 miles west of Watson Lake, Yukon. The 6~~ sqare mile property is held 75% by Packard, 25% by Megaline with Reg Resources holding an option to earn 51% working interest by spending $250,000 on exploration over 3 years, including $50,000 in 1985. Previous work located 4 soil sample targets one of which has been confirmed by geophysics. More geophysical surveys are planned by early August.

On the 10 claims held 100% by Packard on the north end of Texada Island, B.C., trenching is planned as a follow-up on gold soil sample anomalies and coincident magnetometer targets located earlier this year. The gold values range from 7 to 22 times background and are considered a good target.

A favorable geological structure has been located together with high gold soil sample values as well as grab samples up to 0.5 oz.gold/t, on the 147 claims, 800 acres, 100% owned Neal project 25 miles SE of Boise, Idaho. Geochemical, geophysical surveys and trenching have been recommended.

SILVER HART MINES LTD. (SVM.A-V,Alberta)

HOLE	LOCATION	INTERVAL, FEET	FOOTAGE	OZ.SILVER/T.	CORE LOSS*
85-1	± 0 North	no core recovered			
85-2	± 0 N	no core recovered			7.5 Feet
85-3	± 0 N	122.5 - 123.6	1.1	43.76	11.2
85-4	50 feet S	67.6 - 68.9	1.3	31.12	1.4
85-5	50 feet S	109.0 - 110.0	1.0	4.86	1.2
		131.0 - 132.7	1.7	8.40	
85-6	300 feet S	79.1 - 79.8	0.7	21.14	0.3
		93.4 - 94.7	1.3	79.36	
85-7	450 feet S	78.0 - 87.0	9.0	5.65	
		99.0 - 101.4	2.4	66.20	
		143.0 - 144.1	1.1	9.00	8.0
85-8	450 feet S	126.1 - 126.6	0.5	17.76	2.2
		139.4 - 140.8	1.4	167.88	
		140.0 - 150.0	10.0	74.07	(sludge)
85-9	300 feet S	160.4 - 161.0	0.6	31.04	3.3
85-11	600 feet S	118.0 - 119.3	1.3	105.14	2.5
		132.5 - 133.3	0.8	16.52	

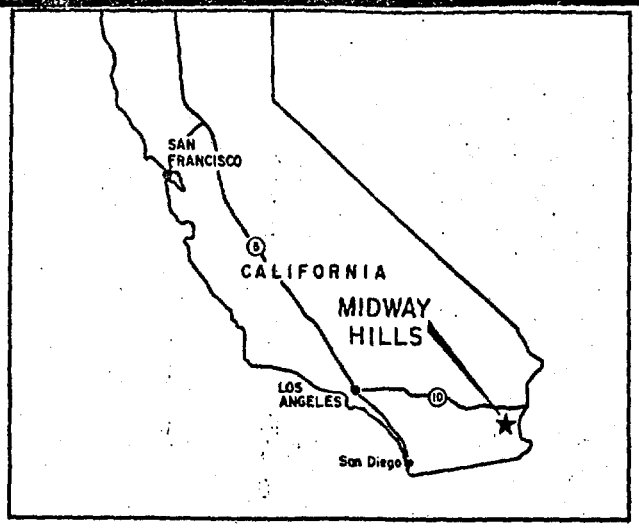
* Core loss in mineralization

GOLD SILVER GRADES CONFIRMED IN YUKON

Alvin Harter, president of Silver Hart Mines Ltd. reports progress made in exploration of their Hart silver property in southern Yukon since his 5Jun85 announcement of extremely high silver assays from trench sampling over a strike length of 345 feet, being an overall average grade of 113.1 oz.silver/t over a width of 4.6 feet. Mr. Harter says, "We have now confirmed good grades and depth continuity down to 250 feet vertically and to an additional 300 feet on strike. The total strike length known to date on the SW end of the epithermal structure (referred to as the TM zone) is 750 feet." To the northeast, the structure previously known as the FM Zone has been trenched and appears to be a continuation of the TM Zone. This adds 1,000 feet so the TM-FM strike length is 1,750 feet and still open at both ends. Samples from trenches along the FM Zone range up to 102 oz. silver/t. and up to 38.0 oz. silver/t over 4.6 feet width. Diamond drill intersections in the 19 holes drilled to 4July85 range from 50 to 250 feet vertically. All but 2 holes cut the mineralized zone which contains seams of galena freibergite and gouge material that tends to crumble so that much of it is lost. Some lost material appears to be high in grade - sludge samples from Hole 85-8 assayed up to 74.07 oz.silver/t. over 10 feet. It appears the drill core recover less than half the silver mineralization. Given the weak rock characteristics in the mineralized zone, diamond drilling serves largely to determine structure. Thus, a decision has been made to drive a 1500 foot adit.

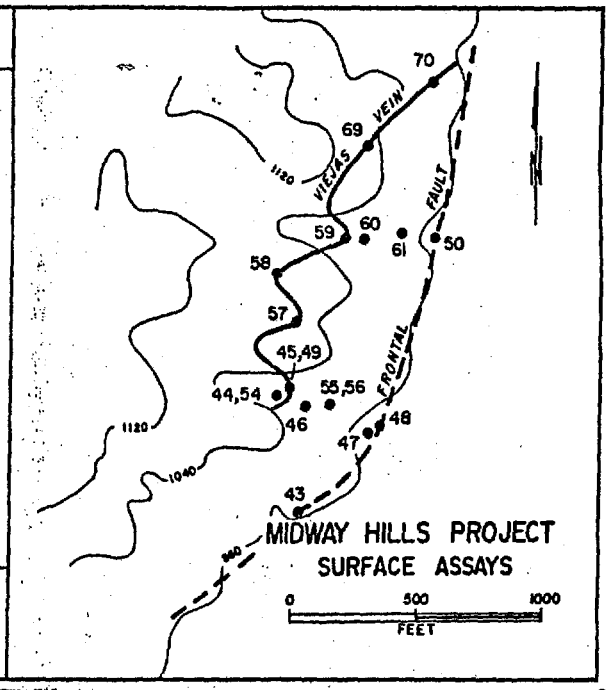
cc PGV

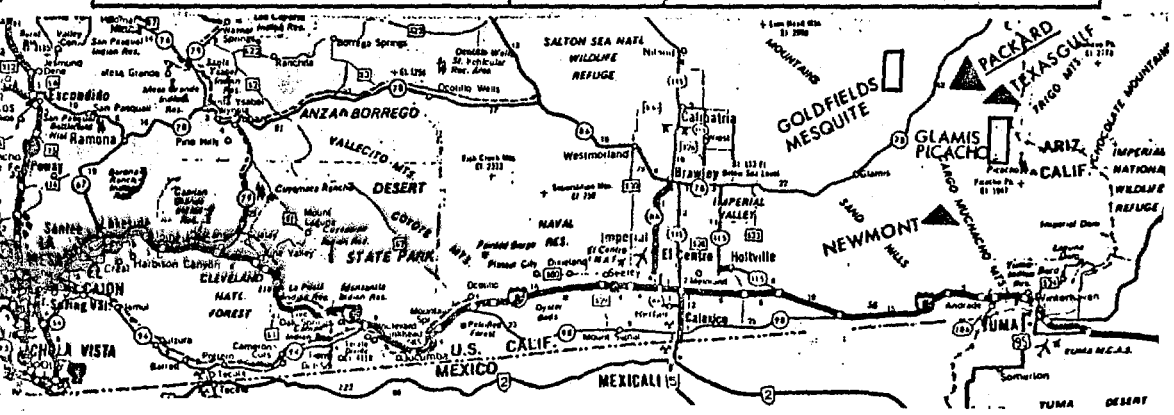
PACKARD RESOURCES LTD



SAMPLE No.	TYPE	TRUE WIDTH	FIRE ASSAY Ag(oz/ton)
70	C		0.60
69	C		1.35
50	C		1.30
61	CC	0.6'	0.82
60	CC	3.0'	1.99
59	CC	7.0'	0.53
58	CC	2.0'	2.81
57	CC	3.5'	1.67
45	C		2.73
49	CC	3.0'	4.01
44	C		4.18
54	CC	2.5'	5.28
46	C		1.19
55 & 56	CC	4.3'	1.44
47	C		0.03
43	C		0.05(AA)
48	C		0.93(AA)

C = Chip Sample
CC = Channel Sample





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Newsbeat

APRIL 1985

ASARCO Incorporated
MAY 13 1985
SW Exploration

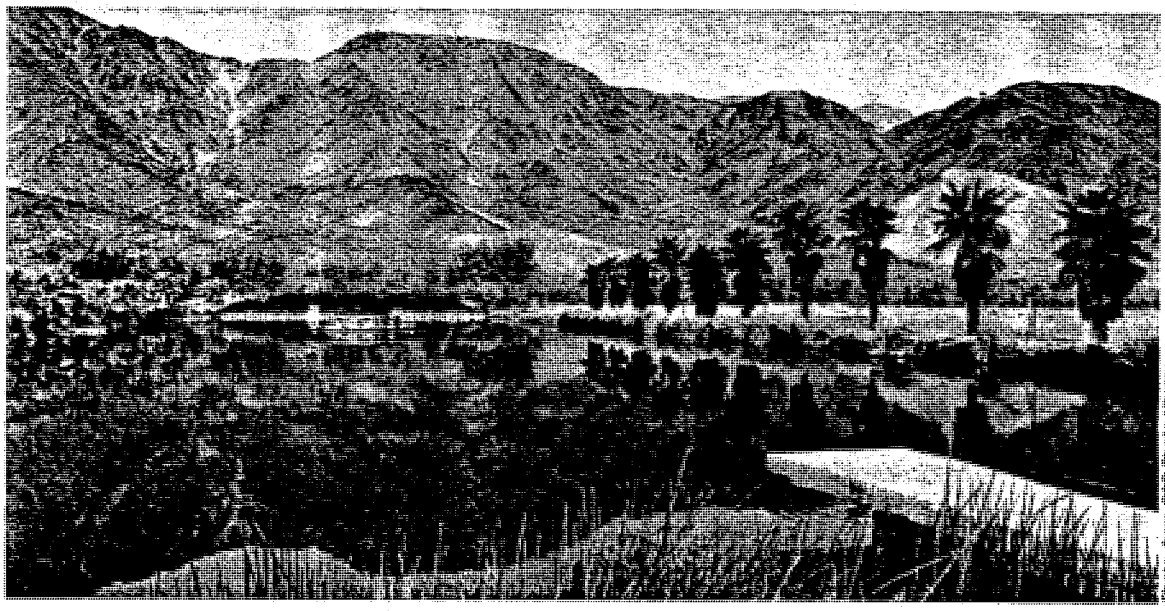

Photo from CSC Photo Library

Soda Springs

by Don Applegate
Barstow Resource Area

Soda Springs, once a water source for early California Desert travelers, has served throughout history as an Indian camp, U.S. Army outpost, stagecoach way station, railroad stop, mining center, and a spiritual and health retreat.

The area is located in the Mojave Desert, 50 miles northeast of Barstow at the end of Zzyzx Road, along the western edge of Soda Dry Lake.

The Bureau of Land Management and the California State University system now manage Soda Springs under a cooperative agreement entered into in 1976. Each agency fulfills defined responsibilities for the protection of the area's resources.

Under the agreement, the Desert Studies Center was established at Soda Springs to develop the area's resources into a living desert laboratory. Existing buildings and utilities were renovated, laboratory facilities were developed, and an active program of teaching and research was begun.

Classes from "art to zoology" use the studies center to observe and study desert plants, animals, archaeology, geology, history, and sources of energy, especially wind and sun.

In addition to serving students already enrolled in colleges or universities, the Desert Studies Center offers a variety of courses for adults interested in topics such as prehistoric rock art, archaeology of the Soda Springs area, desert plants and animals, and geology of the California Desert. These courses are open to all on a first-come, first-served basis.

More recently, the center has begun working with high desert school districts to meet special needs of both teachers and students.

The Desert Studies Center is also available for use by interest groups that are planning desert-related activities. This includes overnight use of the dormitory facilities. Information and reservations for this type of use or for class schedules are obtainable through the Desert Studies Consortium, Department of Biological Science, California State University, Fullerton, CA 92534, (714) 773-2428.

The BLM offers public tours of historic Soda Springs. In past years, tours were offered only one weekend of each month. This year, tours are offered at 10 a.m., 12 Noon, and 2 p.m. every Saturday until the arrival of hot summer weather. A fee of $1.00 per person is charged.

The tour exposes visitors to the natural resources that make Soda Springs so important to researchers and educators. It explains how natural resources have contributed to the historic uses of the site, and shows the physical evidence that has remained through various periods of history.

BLM is now seeking volunteer hosts to give the Soda Springs tours and expand the current tour season. One or two hosts will be allowed to set up living quarters at the site and stay for the high-use season.

Questions concerning the public tour or the volunteer host program may be directed to the Bureau of Land Management, 831 Barstow Road, Barstow, CA 92311, or call (619) 256-3911 Mondays, Tuesdays, and Fridays.

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Wildfire	**page 6**
Volunteers	**page 6**

ASARCO

Southwestern Exploration Division

March 7, 1985

To: L. Applegate
T. Dalla Vista
A. E. Giesecke
N. L. Joseph
F. R. Koutz
H. G. Kreis
M. A. Miller

From: J. D. Sell

Field Trip Guidebook
Detachment Zones
California-Arizona

I bring to your attention the recent Field Trip Guidebook now in the SWED Library by Applied Geologic Studies, Inc.:

Arizona-California Metamorphic Core Complexes and Mineralized Detachment Zones.

Attached is a two-page schedule which sets the tone for what is in the guidebook -- much of it from previously published articles. Also attached is a copy of H.G. Kreis' memo on the trip.

James D. Sell

JDS:mek
Atts.

cc: F. T. Graybeal
W. L. Kurtz

ASARCO

Southwestern Exploration Division

February 20, 1985

To: J. D. Sell

From: H. G. Kreis

Field Trip
Detachment Zones
California-Arizona

During the week of February 3rd Tony Dalla Vista and I attended the metamorphic core complex and detachment zone field trip led by Bill Rehrig. The itinerary of the field trip is summarized on the first two pages of the accompanying field trip book.

The geology of nearly all the stops is well described in the accompanying book, but there are a few stops in need of additional description. In addition, some information of interest was obtained from field trip participants. All of this follows.

Madre-Padre Mine: Newmont's discovery, the Madre-Padre Mine is hardly described in the accompanying book, and it was the best field trip example of gold mineralization associated with low angle faulting.

The Madre-Padre is said to contain 300,000 ounces of gold in rock with an average grade of 0.05 to 0.07 oz./ton. This indicates a size of 5 million tons. Judging from the large area of drilling and what was said on the field trip, the gold mineralization is thin, possibly less than 100', excluding lenses of internal waste.

The gold is disseminated in narrow lenses of very strong shear foliation and chloritization that are separated by less intensely sheared and chloritized waste rock. The lenses of gold mineralization and shear foliation dip gently to the west at less than 20°.

The host rock is a fine to medium-grained, gneissic biotite diorite. To the east and apparently beneath the gold bearing diorite is a coarse-grained granite with moderately chloritized mafic minerals. In the area examined, the contact between the two rock types was covered. Shearing and strong brecciation in the outcrops closest to the contact indicate it is a fault contact. Judging from the outcrops that I saw, the gold bearing, brecciated diorite was faulted over the granite by a low angle fault.

Most of the mafic minerals in the diorite are chloritized, and locally epidote is found in the rock. In general, less than 5% quartz veining and less than 1% pyrite is present in the diorite. Sericitization and 6" thick quartz veining occurs in the old stopes of the Madre-Padre Mine.

American Girl Mine: Newmont's American Girl Mine lies about one mile north of the Madre-Padre Mine. Although not visited, this deposit is said to be geologically similar to the Madre-Padre deposit, and it is at least 300,000 ounces of gold in size.

Mesquite Deposit (not visited): The only information given about Goldfield's Mesquite deposit is that the deposit is sandwiched between two low angle fault structures.

Copperstone Deposit (not visited): AMOCO's Copperstone Deposit, near Parker, Arizona, consists of 10 million tons at 0.07 oz. gold per ton. Apparently, it has a silica zone and a hematite zone near some chlorite alteration. Its relationship to detachment faulting is not known, but it is above a detachment fault. However, it has a 50 million year old date which is much older than detachment faulting.

I was shown some samples of mineralization that were taken on strike, one mile from Copperstone. These samples consisted of quartz breccia fragments in a hematite-specularite matrix with barite crystals.

Clara Peak Prospect: The field trip visited the Clara Peak Prospect which is located just east of the Swansea Mine. Phelps Dodge staked on or about the prospect in October 1984. The prospect has gold mineralization in a 5' to 20' thick, shallow dipping fault zone. The gold values are very spotty and range up to 20 ppm.

The footwall rock is chloritized, augen gneiss, possibly after Precambrian granite or a Jurassic intrusive. The hanging wall rocks are southwesterly dipping andesitic volcanics and intervolcanic sediments (mostly brown sandstone).

The mineralization and alteration in the fault zone is strongly hematite stained, bleached, clay-sericite altered breccia. The mineralization, prior to oxidation, consisted of up to 2% total sulfides. Copper oxide staining suggests most of the former sulfides were chalcopyrite. Micro quartz veinlets are less than 2% of the mineralized breccia, and local barite is present. Weak specularite occurs in the chloritized footwall gneiss.

Bill Rehrig suggested the altered breccia of the fault zone is actually a rhyolite dike that intruded the shallow dipping fault zone, but the evidence for a rhyolite dike was not convincing.

Nickle Plate Prospect: The Nickle Plate prospect is in a Whipple Mountain wilderness study area, and its geology is almost identical to that of the Clara Peak prospect. A 5' to 10' thick, moderately dipping, fault zone contains up to 0.1 oz. gold per ton. The mineralized fault is in chloritzed quartz monzonite just below andesitic volcanics. The mineralization is $\leq$10% quartz veining and silicification in quartz monzonite that is clay-sericite altered. The rock is strongly hematite and copper oxide stained.

Copper Basin Deposit: The Copper Basin copper deposit, described in the accompanying book, was presented as an example of a detachment type, bulk tonnage mineral deposit (40 million tons of copper "ore"). Although no gold is associated with the copper mineralization, the large size of the deposit was used to justify the possibility of such tonnages of gold ore elsewhere in detachment structures.

The few outcrops that I examined gave strong evidence of a typical porphyry copper sulfide system dissected by post mineral, low angle faulting. So, someday it would be worthwhile examining the core from this deposit to resolve such differing interpretations.

Riverside Mountains: The west end of the Riverside Mountains hosts widespread siderite veining. Most of the siderite is oxidized to goethite. Locally, there are one foot thick quartz-siderite veins. We were told the siderite mineralization carries no precious metal values, and the significance of the siderite veining is not known. Texas Gulf Sulfur recently staked the entire area.

McCoy Gold Deposit: I learned from a Tenneco geologist that their McCoy deposit contains 3 million tons at 0.09 oz. gold per ton. The McCoy deposit is located 20 miles from Duval's Copper Canyon deposit.

The quoted reserve occurs in the oxidized equivalent of magnetite-pyrite-pyrrhotite mineralization. The oxide zone is enriched in gold, and the sulfide zone only contains 0.03 oz. gold per ton. The mineralization occurs in limestone at the contact of a quartzite bed where the contact is cut by a porphyry dike. The ore is 100' thick, and the 3 million tons is open pit mineable.

Vulture Mine: The Vulture Mine at Kingman is said to be open. For various reasons, no serious exploration work has been performed on the property in recent years. This property is worth an Asarco evaluation for open pit mineable ore.

American Mine: The American Mine in San Bernardino County, just east of the Chase Bagdad, is rumored to be an 80' thick zone and part of it has been downfaulted to a depth of about 200'. The reserves are rumored to be a few hundred thousand tons at 0.1 oz. gold per ton. This property should be evaluated by Asarco for open pit mineable ore.

Crescent Peak Mine: The Crescent Peak Mine area, near Crescent Peak, was drilled by Tenneco. At Crescent Peak Mine area, gold mineralization is hosted by a low angle fault zone in granitic rocks. The gold mineralization is up to 100' in thickness and averages a rather uniform 0.01 oz. gold per ton. The best intercept was 100' at 0.04 oz. gold.

Sterling Mine: The Sterling Mine at Burro Mountain in Beatty, Nevada is said to have 700,000 tons at 0.2 to 0.25 oz. gold per ton. The gold values are very erratic, and are hosted in a flat, thrust type fault where it is intersected by basin-range faults.

H. G. Kreis/mek

H. G. Kreis

HGK:mek
Accompaniment

FIELD TRIP

ARIZONA – CALIFORNIA METAMORPHIC CORE COMPLEXES AND MINERALIZED DETACHMENT ZONES.

APPLIED GEOLOGIC STUDIES INC.

TENTATIVE SCHEDULE

Sunday, February 3

Evening seminar introducing and overviewing the metamorphic core complex detachment fault, precious metals story - Distribution of handout material and general RAP session.

Monday, February 4

Drive from Tuscon north on I-10 to the Red Rock exit. Proceed north on frontage road to dirt road leading into the southeast end of the Picacho Mountains where we will carefully examine excellent exposures of a lower-middle- and upper plate detachment zone package.

Return to Interstate and proceed to the South Mountain core complex just south of Phoenix where we'll briefly look at lower plate mylonitic rocks derived from a composite mid-Tertiary batholith.

Drive west from South Mountains to I-10, then north on gravel road to Vulture Mountains where multiple listric faults have rotated and repeated mid-Tertiary volcanic-volcaniclastic rocks perhaps in upper plate configurations with respect to some subsurface detachment discontinuity.

Intersect U.S. Highway 60 and drive east to Wickenburg - Rancho Grande Motel.

Tuesday, February 5

Drive west to small town of Salome and into the Harquahala Mountains to check out the Hercules thrust fault, a major Laramide low-angle structure which will be compared with Tertiary detachment faults.

Continue west through the Harcuvar metamorphic core complex to State Highway 72, northwest toward Bouse and then into the Granite Wash Mountains to the Yuma mine area to examine copper-gold mineralization localized by Mesozoic-Laramide stratigraphic and structural (thrust fault) factors. Return to route 72, then to Bouse and proceed northeast to visit the Swansea and Clara mineral districts in the Buckskin Mountains. The Swansea hematite-copper deposit will be compared with the Clara copper-gold occurrence, both of which are localized in the Buckskin detachment zone.

Drive out of Buckskins ending up at Parker - El Rancho Motel.

Wednesday, February 6

4-wheel drive traverse up Bowman Wash into the Whipple metamorphic core complex in California to examine detachment setting of the Copper Basin copper (minor gold) bulk tonnage deposit.

Drive south on U. S. 95 to the Riverside Mountains to inspect detachment fault (?) not related to lower plate mylonitic rocks.

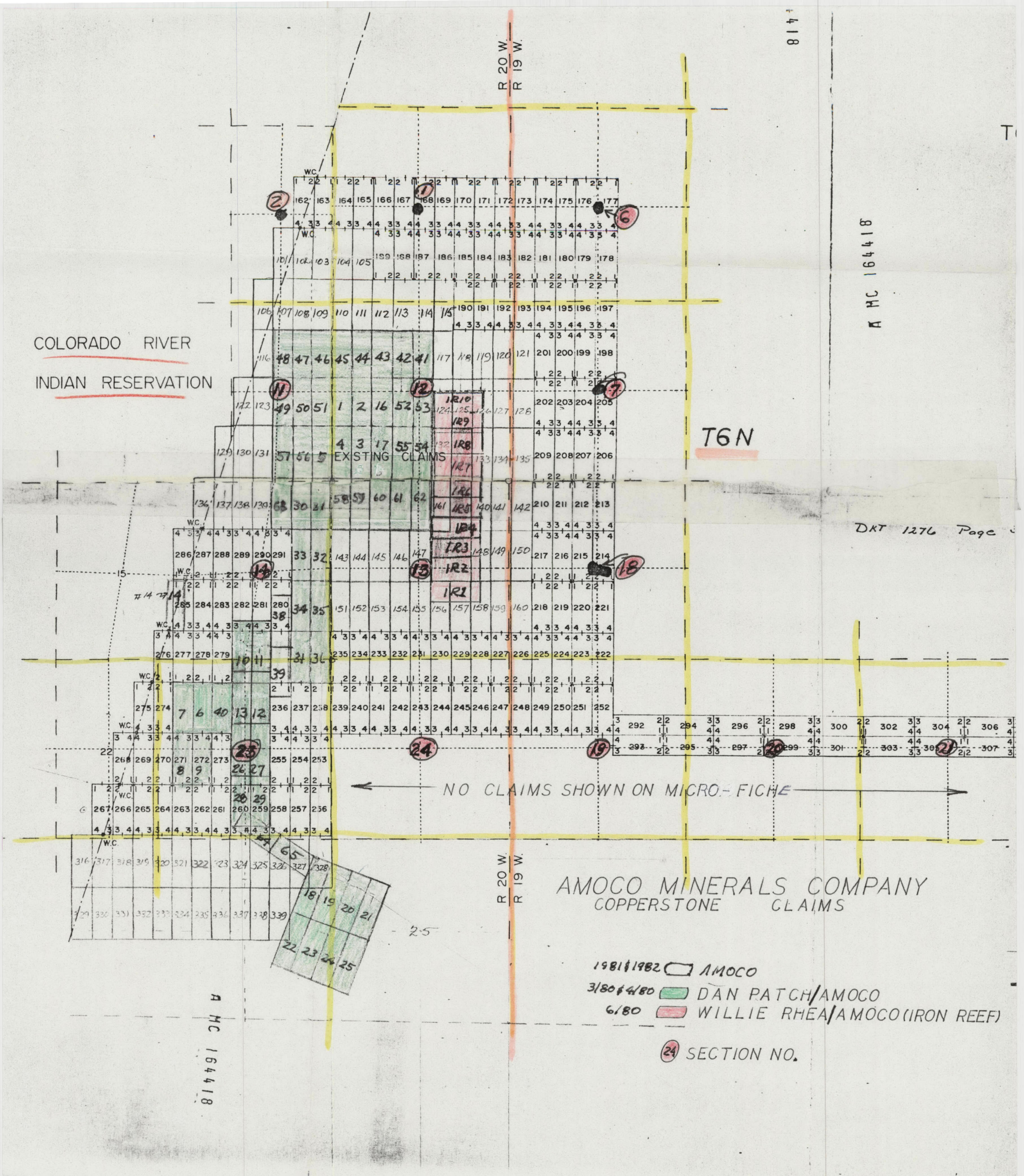
Proceed south on 95 to Blyth - Comfort Motel.

Thursday, February 7

Drive south from Blyth on State Route 78 past the Mule and Palo Verde Mountains and then on dirt road into the Midway Mountains to check out the manganese mineralization localized in the so called Midway detachment fault.

Proceed south on 78 to the Ogleby cut off and then into the Cargo Muchaco Mountains to consider the structural-stratigraphic setting of gold mineralization in that area.

Drive to Yuma, Arizona, pass by the airport, and then onto Phoenix via Interstate 8.


COLORADO RIVER
INDIAN RESERVATION
R 20 W.
R 19 W.
T6N
EXISTING CLAIMS
NO CLAIMS SHOWN ON MICRO-FICHE
AMOCO MINERALS COMPANY
COPPERSTONE CLAIMS
1981 & 1982 AMOCO
3/80 & 4/80 DAN PATCH/AMOCO
6/80 WILLIE RHEA/AMOCO (IRON REEF)
SECTION NO.
A MC 164418
DKT 1276 Page

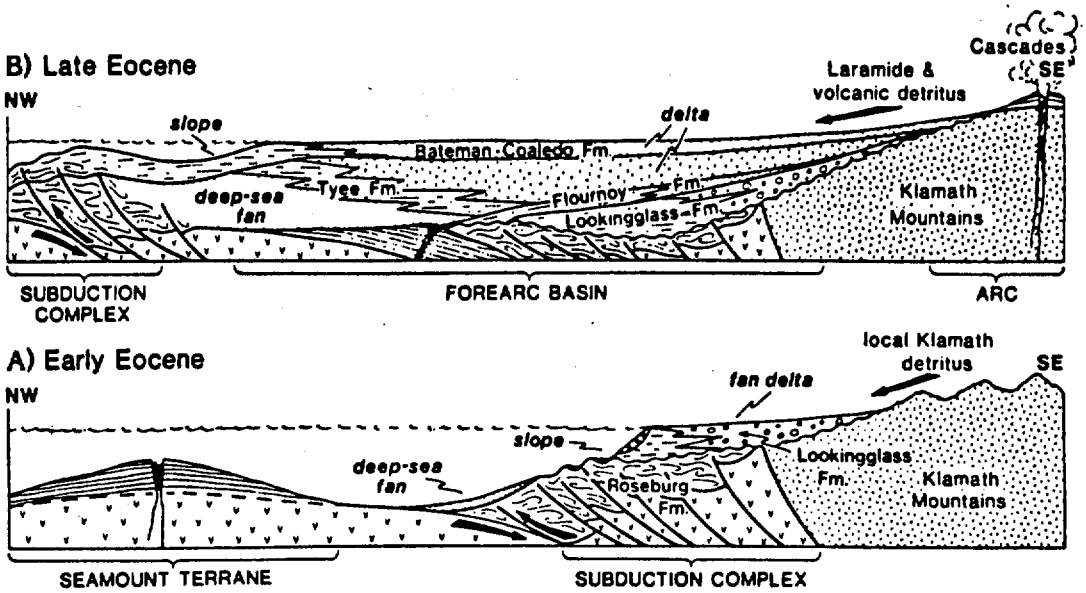
James D. Sell

12TH ANNUAL

DEPARTMENT OF GEOSCIENCES:
UNIVERSITY OF ARIZONA

PRESENTS

GEOSCIENCE DAZE



March 28-30, 1984

Senior Ballroom

ECONOMIC GEOLOGY OF THE DELAMAR DISTRICT, LINCOLN COUNTY, NEVADA

Mark Bradley

The Delamar district, located 46 km southwest of Caliente in Lincoln County, was one of the premier gold-producing districts in Nevada. From 1892 to 1902, some 9.5 million dollars worth of gold @ $16-20/oz. was shipped from Delamar, an amount comparable to that produced by the Tonopah and Goldfield districts; 10,300 lbs. of lead, 5400 lbs. of copper and 400,000 ozs. of silver were also produced between 1902 and 1950. The deposits occur in Cambrian quartzite, limestones, and shales intruded by Tertiary rhyolite, quartz monzonite, and basalt dikes and sills. Principal Au mineralization is in the Prospect Mountain Quartzite adjacent to rhyolite dikes, as quartzite and rhyolite breccias cemented by cherty and comb quartz containing free Au and sulfides. The Highland Peak Limestone hosts a series of small base-metal replacement bodies between 4 and 7 km north of the Delamar townsite, with grades of 15-30% Zn and 6% Pb in some pockets. Structural controls on the deposits are well-defined, particularly for the limestone replacement bodies which are localized along high-angle normal fault trends. Minerals identified in the breccia and replacement ores include pyrite, tetrahedrite, chalcopyrite, bornite, sphalerite, galena, cerussite, pyromorphite, and Mn- and Fe-oxides. Drill-hole data collected in the mid-1970's by Newmont Exploration and others suggest that the Prospect Mountain Quartzite forms the upper plate of a large thrust fault overlying younger pyritic black shales This raises the possibility that the quartzite mineralization is the surficial expression of buried shale-hosted ore bodies beneath the thrust sheet.

This research was conducted in affiliation with Bilidon.

BOILING AS A MECHANISM OF PRECIOUS METAL DEPOSITION

Howard Grahn

Many epithermal precious metal deposits are thought to have formed within near-surface convective cells of low temperature meteoric waters which are low in sulfur, halides and total dissolved solids. Precious metals are carried as thio- or arsenothio-complexes in reduced solutions and as chloride complexes in oxidized solutions. Although simple cooling can account for precipitation of precious metals through normal prograde solubility, boiling, as a result of pressure effects, might be a more significant mechanism for accumulation of ore-grade deposits. Boiling results in fracturing of the country rock, cooling of the fluids, and the loss of volatiles. pH will rise, f_{O_2} will increase, f_{S_2} and f_{CO_2} will decrease, and chloride and metals will become more concentrated. The resulting breakdown of the metal-bearing complexes results in the rapid precipitation of Au and Ag.

Evidence for boiling, though critical in the interpretation of systems, may be difficult to obtain. Hydrothermal explosion breccias with "floating" untransported clasts, and multiple generations of silicification and stockwork veining are the best field evidence. Coexisting vapor and liquid phase fluid inclusions are thought to be evidence of a boiling system. Intense, localized argillic and phyllic alteration is commonly an indicator of a lower boiling zone. In drill holes, trace element partitioning has been used to delineate zones of vapor-phase separation.

The understanding and recognition of boiling effects could be an essential guide in the evaluation of a mineralized hydrothermal system.

STRUCTURAL GEOLOGY OF THE RANDSBURG MINING DISTRICT, MOJAVE DESERT, CALIFORNIA

Jeffrey Morehouse

Rock relations in the Randsburg District are dominated by a whaleback of subduction-related Rand Schist which surfaces between Mesozoic Sierra Nevada-type Atolia Quartz Monzonite to the south and Johannesburg Gneiss (Paleozoic carbonates?) to the northeast. Intruded axially along the whaleback are an early Tertiary quartz monzonite stock and a succession of finer-grained intrusives culminating in a Mio-Pliocene rhyolitic pyroclastic complex. Interbedded with the pyroclastics and extending eastward is a basinal accumulation of Bedrock Springs Formation sediments which have been intruded by and largely buried by Pliocene andesites.

Structurally, the regionally extensive Laramide Rand Thrust Fault with its lubricating layer of exotic limestone and its potential reactivation in a normal sense may have exploration importance. A suite of NW-striking, NE-dipping low to medium angle normal faults with 18 m.y. old gold mineralization are considered to be the youngest and most northeasterly episode of "mid-Tertiary detachment faulting" yet documented in the Mojave region. The Garlock Fault dominates the recent structual evolution with a suite of ENE-trending *en echelon* synthetic normal left-lateral faults which focus alteration district-wide. Some examples are silicification in the Triplet Fault, the elaborate silver-rich 11 m.y. old Kelly Fault Zone, and geothermal plumbing in active and fossil hot springs along the Red Head-Steam Well Fault Zone. Radiometric ages are forthcoming for all the estimated ages used here.

A HYPOTHETICAL MODEL FOR GOLD MINERALIZATION ASSOCIATED WITH DETACHMENT FAULTS

Stephen Naruk

Detachment faults and metamorphic core complexes, long thought to be devoid of any economic mineralization, have recently become precious metal exploration targets. Known detachment-fault deposits are low-tonnage, high-grade, hypogene deposits of specularite, manganese oxides and calcite with subordinate quartz, pyrite, chalcopyrite, argentiferous galena, sphalerite and native gold. The ore mineralization occurs as open-space fillings in faults, fault breccias, and shears associated with the detachment faults. Cataclastic ore textures and the absence of mineralization in post-kinematic rocks indicate that mineralization occurred contemporaneously with detachment faulting. Syn-kinematic intrusives are not known to be associated with any of the deposits.

The structural association of detachment faults with metamorphic core complex mylonites suggests the possibility of deriving the mineralizing solutions from the mylonites. The petrography and geochemistry of the mylonites suggest that Ca, Mg, Fe, Ti and possibly other elements are transferred from the mylonite zones to the zones of detachment faulting. The unstable mineral phases from which these components are derived are also the major Au-bearing phases in the mylonites' protoliths. Mass balance calculations show that more than sufficient Au and water can be derived from the mylonites to produce the observed deposits. Derivation of the Au from the mylonites suggests particular transport and deposition mechanisms which are surprisingly consistent with the mineralogy of the known deposits.

MAGMATIC OCCURRENCES AND LODE GOLD DEPOSITS IN ARIZONA

David Pietenpol

Lode gold occurrences in Arizona are restricted to the southern and western portion of the state; gold is generally not found in the Colorado Plateau. Within the metallized area, gold has long been associated with volcanic and igneous rocks. Volcanic rocks often either host, or are adjacent to hosts of mineralization.

Four major periods of post-Precambrian igneous activity have been recognized in southern Arizona (Coney, 1978, Reynolds, 1980). Coney (1978) describes these as 1) late Triassic to late Jurassic magmatic arc activity; 2) late Cretaceous to early Tertiary (Laramide) compression and magmatic arc activity; 3) mid-Tertiary magmatic arc activity; and 4) late Tertiary rifting and associated volcanism.

In order to determine sources for gold in Arizona, 27 lithotectonic units have been plotted on a tectonic map of the state. Due to their association with lode gold deposits; plutonic, volcanic, and metamorphic rocks have been described in more detail. In addition, 422 gold occurrences have been plotted.

These data reveal that gold is not dominantly associated with any one magmatic event. Rather, 80% of the occurrences are located in or adjacent to Precambrian basement, suggesting that the Precambrian is the dominant source for the metal.

NOTE: This talk will continue as a Poster Session.

STRUCTURAL ANALYSIS OF MESOZOIC THRUSTING IN THE NORTHERN PLOMOSA MOUNTAINS, SOUTHWESTERN ARIZONA

Deborah Stoneman

A major north-vergent thrust zone of Mesozoic age is exposed in the Plomosa Pass area of the Northern Plomosa Mountains, La Paz County, Arizona. The thrust zone contains imbricated Paleozoic and Mesozoic metasedimentary rocks, sandwiched between structurally higher and lower blocks of Precambrian granite and gneiss. The whole sequence has been metamorphosed to greenschist facies. The fault zone is crosscut by an 85m.y. old granodiorite pluton and associated microdiorite dike swarms. The east-west trending thrust zone is truncated by an east-dipping Tertiary detachment fault which parallels the eastern flank of the Plomosa Range. The granite-metasediment-gneiss tectonic stacking order is repeated in several places within the upper plate of the detachment fault.

The thrust fault zone consists of two approximately parallel south-dipping faults bounding the medial imbricated wedge. The upper Deadman Fault appears to show ductile northeast-directed thrusting. The Lower Plomosa Pass Fault is much more ambiguous in character, appearing to show both ductile and brittle behavior.

The imbricated metasediment wedge varies along strike in width, composition, and structural complexity. Large quartzite, phyllite, marble, and conglomerate lenses are structurally interleaved. These blocks are internally deformed, as well as externally shear-bounded and rotated. Most rock types contain well-developed foliation and lineation, and many exhibit intrafolia folds, stretched clasts, and many other features indicative of ductile shearing.

In summary, deformation in this area is characterized by Mesozoic large-scale, ductile thrusting, involving basement rocks and chaotic metasediment assemblages, overprinted by Tertiary detachment faulting.

THE NATURE OF A MAJOR TECTONIC BOUNDARY WHICH JUXTAPOSES CRATONIC NORTH AMERICA AND MESOZOIC SEDIMENTARY TERRANE, NORTHERN DOME ROCK MOUNTAINS, WESTERN ARIZONA

Kenneth J. Yeats

A major tectonic boundary, separating rocks of fundamentally distinct lithologic terranes, runs through western Arizona and southeastern California, marking the southwestern limit of unequivocal North American craton. This boundary is a zone of intense deformation which places crystalline basement and cover rocks of North American cratonic affinity over Mesozoic rocks of a northwest-trending structurally complex basin, the McCoy Terrane. This terrane largely consists of a thick pile of Jurassic volcanics, whose base is not exposed, and an overlying anomalously thick clastic sequence, the McCoy Mountains Formation, which is quite different from the classic cratonic Mesozoic sequence exposed to the north. The age and tectonic setting of McCoy sedimentation, and the timing and style of metamorphic, plutonic, and deformational events, remain controversial.

This tectonic boundary is best exposed as a north-dipping thrust fault in the northern Dome Rock Mountains of western Arizona, 25 km northeast of Blythe, California. This area is the subject of on-going geologic mapping and structural analysis. The mylonitic fault zone places metamorphosed and intensely folded cratonic Precambrian basement and Paleozoic (Grand Canyon correlative) rocks over greatly disrupted Mesozoic metasedimentary (McCoy Mountains Formation?), plutonic, and metamorphic rocks. Rock units appear to have been isoclinally folded at all scales; fold geometries are sympathetic with the major south-vergent thrust fault. Amphibolite-grade metamorphic rocks are exposed beneath the thrust. Post-kinematic late Mesozoic granites intrude both terranes.

Preliminary observations suggest that North American cratonic rocks were thrust southward over McCoy terrane rocks at deep crustal levels during a progressive deformational event in middle to late Mesozoic time. Precise time constrants await radiometric dating of key plutonic rocks.

STRATIGRAPHY, STRUCTURE, AND HYDROTHERMAL ALTERATION WITHIN A TERTIARY IGNEOUS COMPLEX, TONOPAH, NEVADA

Walter Barker

Volcanic and intrusive rocks exposed at the surface and within underground workings at this west-central Nevada igneous complex range in age from approximately 35 to 15 million years. Older units are composed of predominantly intermediate volcanics erupted from stratovolcanoes, and include the Mizpah Formation andesite within which were developed the 'bonanza' silver sulfosalt and sulfide ore shoots discovered at the turn of the century. This subduction-related activity was succeeded by the large silicic caldera complex from which voluminous, compositionally graded, ash-flow sheets were erupted. Late-stage rhyolites intruded caldera ring-fractures and other faults, as extensional tectonism was initiated, to be followed by Basin and Range style bimodal volcanism which continued into the late Miocene in the vicinity of Tonopah.

The silver ore was deposited in a network of fault-controlled fractures during the caldera formation stage of the growth of the igneous complex, apparently at the intersection of two major caldera ring-fracture systems. The poster cartoons attempt to show the illustrator's interpretive bias of the lithologic, structural, and alteration development of the region.

Review and criticism from those familiar with the district is unabashedly encouraged.