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James Doyle Sell Mining Collection

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JDS

ASARCO

Southwestern Exploration Division

August 28, 1985

To: J. D. Sell

From: F. R. Koutz

Alvarado Mine
Scarth Oil & Gas - Pope Mining
Octave (Weaver) District
Yavapai County, AZ

In June I answered an ad in the Northern Miner offering 116 patented acres (+158 acres unpat. + state) containing 250,000T @ .18-.25 opt Au shallow ore blocked out with 200,000T tails and dumps, worked to 1300', with electricity, phone and good water, near Congress for the low price of $350,000--only $3,012.57 an acre! I phoned and talked to Stan and his father Robert Scarth (petroleum engineer), V.P. & Pres. of Scarth Oil and Gas, a small family oil company out of Amarillo that decided to diversify into gold and silver mining in the 1979-81 oil (+Au-Ag) price boom. They formed Pope Mining, Inc. and picking up several promising properties--the last of which remains--the Alvarado Mine which they bought outright.

The Scarth's commissioned several geologic and engineering feasibility reports with surface surveying and sampling of tails, dumps and outcrop. Old reports (1907) had indicated 176,000T @ 0.26 Au reserves with grade increasing with depth down the 26° dipping quartz vein down to the 1000' incline level. However, records indicated that the 1935-1943 production of 139,000T @ 0.178 opt Au (recovered) had mostly come from below the 1000' level to at least the 1300' and possibly the 1500' level which might mean that the thinner-lower grade ore in the upper levels was intact. The mine was closed by WPB order L-208 in late 1942, allowed to flood with the surface plant stripped. The operators lost their lease and the mine was never reopened with most of the operational/engineering records lost.

In 1980 the Scarth's moved in a trailer camp and over a three week period pumped down the water to below the 700 level with a 200 gpm submersible pump. They found the reserves in the upper levels essentially intact with little stoping, but their sampling through the 600' level was slightly lower (.17 opt) than previous grades. They decided not to dewater deeper because the drawdown was too slow with this particular pump (35 gpm new inflow) and disagreements with the mine inspector and over the "rusty" water disposed. After the 1981-82 gold price decrease the property was farmed out to Norquest (Canadians) for a year starting April 1982 for 100 Krugerrands. Norquest did lots of surface and dump sampling but failed to make the next 100 Krugerrand payment for 6 months. The Scarth's have since decided to dispose of the property--in large part for its real estate value.

FTG copy sent without comment.

Our files are fairly complete on the Alvarado Mine before the 1940's dating back to 1907, and confirm the reserve information. It was felt in the 1930's that with the low grade, narrowness of the vein and high mining costs associated with the flat dip of the vein that mining would not be much better than a break-even proposition, even after the Au price rise to $35/oz. Our last new information, an October 1943 memo by F.M. Stephens states that the Alvarado had a net profit of $49,654 before depletion and royalties on gross income of $112,042 in 1942, and that during the last part of the operation little money was made, but that Liberty Hill Gold Mines (R.P.M. Davis) did well on the operation as a whole. B.N. Rickard's October 1941 field notes indicated that the vein had been opened to the 1800' level where it was beginning to fade out and the outlook for new ore didn't seem good. It was assumed that the situation was similar to the Octave Unit--the ore shoot bottomed and the mine about worked out. (1942 Production: 19,000T.)

The Scarth's reserves down to the 1000' level were 143,000T @ 0.26 opt Au with a 3.57' average width. Diluted to a 5 foot width with .05 opt waste gives some 201,000T @ .20 opt Au. Judging from the assay long-section (Fig. 4 of Scarth's report) I would guess that 1/4 of the reserve between the 800-1000' levels has been mined out and the grade probably was at least 0.25 opt. This would leave some 150,000T @ 0.17 opt Au. J.R. Stringham indicated that Asarco might be able to operate in such a thin, shallow-dipping vein near to the surface if above 200,000T of +.25 opt Au were present and everything else were favorable. The reserve left even including 50,000T of dumps @ .06-.07 opt and 140,000T of sand tails at .03 opt is therefore submarginal. To fully evaluate the zone the mine would have to be pumped out to the lowest (1800') levels, mapped and sampled--a major undertaking. To test for extensions laterally or at depth would require drill holes in the 800-1000' depth range because of the topography. The Alvarado would seem to be an unattractive mining and exploration proposition for 25,500 oz. Au or $7,650,000 gross value ($300 Au) left.

The Alvarado is the third largest producer in the district after the Congress-Niagara-Queen (700,000T @ .62 opt recovered) and the Octave (800,000T @ .26 opt). A number of other mines with similar occurrence in the district produced a maximum of a few 10,000T each: Yarnell, Rincon, Leviathon, Beehive, Commodore (Rich Hill), Monica, Jerome, and others. These mines generally involve shallow (15°-50°) NNW to NW-dipping thin quartz veins in thrusts shears in and along diorite to rhyolite dikes within Precambrian granite to granodiorite--locally gneissic toward the vein. The vein zones may be slightly offset along orthogonal to WNW faults--sometimes containing Tertiary dikes. The veins oxidized near the surface contain minor pyrite with lesser amounts of galena, chalcopyrite and sphalerite. Minor silver is present, often not much more than the gold. The district is the secondary largest Au-Ag vein producer (not with major base metals) in Arizona after Oatman-Gold Road. Apparently we have done no work in the district, some 200 sq. miles, since the early 1940's except for sampling (J.F. Lord) the Weaver Creek Placers in 1961.

I believe the district deserves a thorough reconnaissance to determine if untested vein targets bigger than the Alvarado exist or whether lower grade zones in the right topographic situation would be amenable to open-pit mining. The AGS spring field trip visited the area in April 1985 concentrating on Echo Bay Mining's dump and tailings leach operations and new potential in-place underground (+.5 opt Au) and open pit ore zones at the Congress Mine. On my last trip to California I spent 5 hours at the Alvarado outcrops and dumps to examine the style of this mineralization. I collected 11 vein, dump and tailings samples (Skyline TAJ-439) for character (Au, Ag, Hg with 7 E-Specs) which are described on the attached field and sample notes and ERS and summarized below

The host rocks in the Alvarado area are Precambrian (1400 m.y.) medium to coarse-grained biotite granites to granodiorites, locally with K-feldspar phenocrysts to several inches and minor muscovite, partially assimilated dioritic xenoliths to several tens of feet; pegmatic and aplitic zones and dikes and low angle N to NW dipping gneissic to schistose zones. Toward the Alvarado vein both in the footwall and hanging wall the foliation becomes more pronounced. Only a maximum of 25% of the vein shear zone outcrops--the rest covered by dumps, tails and talus. Overall outcrop is 60-70% in this area just above the pediment alluvium at the foot of Yarnell Grade. Only along 10-20% of the zone can quartz be found in outcrop, but quartz and dioritic to felsitic float serve to mark the zone. Overall the vein zone is marked by a slight topographic "bench," the gneissic texture of the granites and fracturing--compared to the rounded monolithic outcrops away from the structure.

Sheared-shaley argillized and chloritized diorite and argillized felsite sills occur along the vein zone, usually in the hanging wall but also in the footwall of the vein-structure. The sills-dikes appear to be pre- or syn-mineral. The vein is made up of ore on more white to glassy quartz veins 1-6 feet in thickness which pinch and swell along strike and dip (boudinage) often with horses of shaley altered diorite with a ramellao of quartz veinlets between thicker vein splits. Veinlet stringer zones extend a few feet into the wallrocks especially where the vein tends to bend or die out. On the SW end of the vein the outcrop shows multiple quartz veins, all less than 1 foot over a 30-40 foot width.

The vein-zone reportedly strikes an average of N50°E dipping 27° NW, but I found more NNE strikes along the SW portion of the vein and dips from 20-35° in outcrop. A quartz vein in a central portion of the zone apparently offset somewhat along high-angle NW to NW faults and appears to dip 45° NW. The better-looking outcrop and workings extend for some 1500-1800' on strike although the best looking areas are only some 200' (A-B shafts) and 400' (C-D shafts) of strike. Overall the Alvarado vein does not look very impressive compared to the size of the dumps and tails which were mined--the outcrop is essentially the vein apex. This suggests that other poor-looking vein outcrops in the district might get better in depth.

The quartz veins themselves are locally quite vuggy and contain several percent goethite and hematite after pyrite and local traces of malachite. Pyrite and jarosite were noted in several dump samples. The veins also show several percent late siderite, calcite and trace barite. The carbonates often contain several percent manganese contributing to Mn oxide dendrites on weathering.

The character samples cut showed two quartz vein samples of ore grade 5' @ .98 & .34 opt Au and 3-5' quartz vein samples running 0.14 opt each. Argillized, stockwork quartz-veined felsite (Hw, Fw and dump material) ran .007-.02 opt Au. The chloritized diorite zones between veins with ramellao quartz veinlets or in the hanging walls were not sampled but were included in the vein samples. The 3 dump samples show that the better half of the dumps (±50,000T) may indeed average .06 opt Au, but the two tailings samples (.023 and .014 opt) are less than the advertised average of .03-.035 opt. Silver values are often greater than Au, except in the highest grade samples, suggesting a separate silver mineral besides electrum. Hg values in the .06 -.72 ppm range show a good correlation with Au-Ag.

The 7 E-Spec. samples show 2-10% Fe, more than was noted in hand specimen and with several vein samples considerable Ca, Mg, Sr and Mn, probably in carbonate. Pb (100-7000 ppm) and Cu (70-1000 ppm) were anomalous, but only 2 samples showed 200 or more ppm Zn. Mo was relatively high: 5-50 ppm while As, Sb, Bi and W were below detection limits. In 5 samples Ba ranged from 0.1 to +1% suggesting local barite which was noted in several places on the dumps. 50-200 ppm B in 3 samples suggests minor tourmaline. From their results it is not clear that any other elements besides possibly Ag, Hg and Ba would be particularly useful in the search for this type of Au-quartz veins. Cr (20-500 ppm) & V (20-150 ppm) are locally high.

The age and origin of these Alvarado veins are problematic. The NW faults which offset the vein often contain mid-Tertiary dated diorite to rhyolite dikes (as at Octave). These dikes may or may not be the same or about the same age as those sills in and along the low-angle quartz vein zones, but the low-angle shearing-thrusting including the quartz and sills took place in the mid-Tertiary. These are <u>not</u> detachment faults, but may be part of the same stress event. The mineralization could be Precambrian, Laramide, or mid-Tertiary. A detailed examination of extensive Octave Unit maps and reports from the 1940's (basement) might shed more light on this problem and these files should be carefully reviewed as part of any reconnaissance in the district. I plan to do this one week reconnaissance this fall.

You have asked that I "calculate the parameters of a million tons with 5' widths using known lengths" for Alvarado. At 1500' strike length (better vein outcrop) @ 12.5 cu.ft/T a 5' width would give 1667' of dip length for a million tons. If B.N. Rickards "1800" level is to be believed, Alvarado

has (had) a million tons of "potential" ore zone. Of course, the vein to the 1000' level averages only 3.6', but is thicker below. The 1907 long sections to the 1000' level show only about 40% of the structure closely explored by workings and only 1/3 of this would average >0.2 opt Au. The Octave mine extended to the 2000' inclined level and the Congress vein down to the 3900 foot level so it is not unreasonable that these type of veins could produce a million tons.

F. R. Koutz

FRK:mek
Att: ERS
Field and Sample Notes
Assay & E-Spec (TAJ-439)
Sample Map (6290)

ASARCO EXPLORATION RECORD

[X] FIELD EXAMINATION [ ] LITERATURE SEARCH [X] ASARCO FILE [X] Advertisement in N. Miner 806-373-6932

116 acres Pat., 158 acres Unpat.: Fed & State Lease

Section I General Indexing

① Name(s) of Property or Area: Alvarado Mine (Planet Saturn) (Scarth Oil&Gas=Pope Mining) Octave(Weaver) Dist.						② Country: USA - Yavapai Co.	③ State or Province: Arizona
						④ USGS Quad.: Congress 7½'	⑤ File or Core No.
⑥ Latitude: 34°12'N	⑦ Longitude: 11°47°W	⑧ AMS Sheet: Prescott	Township: 10N	Range: 5W	Section: 21	⑨ Examined by: F.R.Koutz	⑩ Date: 8/5/85
						⑪ Office: Tucson	⑫ Field Days: 1/2

Section II Sources of Information

Date Typed 9/10/85

⑬ References

Author	Date	Title	Publications	Vol. No.
Chronic,J.	1981,	Alvarado Gold Mine (Report to Scarth Oil)	12p. + maps	
Coggin, H.M.,	1982,	Econ.Pot.-Alvarado Gold Mine, 12p. + maps & attach.		
Asarco files - (Alvarado-Yarnell Mines) Octave District (also Octave Unit Files)				

Section III Appraisal

USBM Circ. 6991 (1938) p43-45

⑭ Recommendations
- [ ] Action Now
- [?] Too Low Grade
- [X] Too Small
- [ ] Ownership Problem
- [ ] Access Problem
- [X] Dist.Exam.

⑮ Closed 1942: L208
- [X] Post Producer
- [ ] Producer
- [X] Mineral Deposit
- [ ] Prospect
- [X] Real Estate for $350,000

Grade & width
- [X] incr.w/depth
- [X] Geologic Concept
- [ ] Geochem Anomaly
- [ ] Geophy Anomaly
- [ ]

⑯ Production

Commodity	Tons	Rec. Grade opt
Au/Ag(1935-42)	139,312	0.178/.224
pre 1935	20,000??	.30 opt Au

⑰ Reserves

[?] Measured Commodity	[X] Estimated Tons	Grade
Tails	140,000	.03-.035 opt Au
"3.57'undil.	143,438 (?)	@0.260 opt Au"
old dumps	50,000	.06-.07 opt

⑱ Num. Drill Holes 0

Approx Total Footage -

⑲ Excavations 13+(100')levels 7000'drifts,unwat.to 8 lev. (1980)

⑳ [7] Spectro. Analysis Attached

㉑ [X] Assays Attached TAJ 439

㉒ [11] Geochem Results Attached

Section IV Geologic Data

㉓ Commodity or Contained Metals: Au (Ag) ± minor Pb-Cu (could ? make a concentrate)

㉔ Ore Minerals-Major: Au, py gn, cpy Trace sl Minor: Vn: Qtz,barite,chl-wallrock

㉕ Host Rocks-Major: Granite (gneiss)-granodiorite Minor: diorite-felsite-arkose-qtzite

㉖ Age of Host Rocks: PЄ - 1400 m.y. PЄ &/or m-Tertiary

㉗ Nature of Exposures: Good. 10-20% Qtz vn is outcrop but good float. Vein zone on "bench" in granite gneiss. 600' of relief in mine area but on bottom of S.slope of 2000' (att.)

㉘ Alteration: Qtz vein,weakly sheared, chloritzed biot in diorite dikes and granite, weak-clay-sers, local silicific,(att.) ㉙ Total Extent: 1400'+on strike,1500'+ down dip

㉚ Structure: N30-55E, 20-35(27°av)NW vein dip,local 45°NW vein dip. Shear increases in granite Fw toward vein. Main shears in chloritized diorite in & encasing vein. (att.)

㉛ Ore Occurrence: low angle quartz fissure vein in/along low angle dior-felsite (PЄ or mT) dikes in foliation of granite gneissic zones. Minor Thrusts but not detachment. One of a number of Congress- (att.) ㉜ Age of Mineralization: PЄ vs mid-Tertiary?

㉝ Conclusions & Recommendations: Vein looks thin, discontinuous and breaks up into stringers along strike but gets better/thicker, more continuous, higher grade) @ depth. Most of 1935-42 production from deeper levels of mine. Limited laterally by - faults and pinch-outs. May be 150,000T @ 0.2 opt Au (5') left in upper part of mine, but mine would have to be pumped out to 13-18 levels to explore. I suspect potential is limited to 200-400,000T. The district deserves about 5 days recon. with Octave file review as there are multiple horizons of (att.)

(For additional space use extra sheets)

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

Alvarado Mine

27. Nature of Exposures (Continued)

Yarnell Grade. 60-70% outcrop in mine area.

28. Alteration (Continued)

Minor brown calcite and barite.

30. Structure (Continued)

Sev. N70°W 80°N cross faults with 1-10' vn offset.

31. Ore Occurrence (Continued)

Octave type veins (2nd largest Au-Ag vein district in Arizona).

33. Conclusions & Recommendations (Continued)

flat quartz veins in district-most. untested @ depth. The low angle, thin veins, often with ratty back and cross faults would have high mining costs. Open pit potential would be rare.

JDJ: INFO + MK Assay File
26 AUG

SEC 21
T10N
R5W
CONGRESS 7½ QUAD

F.R. KOUTZ
5 AUG 85

(TAJ-439)

FIELD & SAMPLE NOTES

ALVARADO MINE – YAVAPAI COUNTY – Below Yarnell Grade

- Locked GATE S of trailers. Phil E. Holt 12 black dogs "Watchmen" Knows little about mining – Scarths let him live on property – Phone line in – not connected. Have been 8-10 geologists by in last 5 months to examine (PD, AMAX, SANTA FE RR, several Canadians etc) – optioned for a year by Norquest (1983) but they didn't do anything besides sample. Holt has been @ mine site since 1981 and was there during UG unwatering + sampling but didn't participate. PD spent lots of time sampling

@ "D" (?) inclined shaft 20-30° NW dipping shear zone in gneissic FW with feldspar augen to 1cm. Several feet of rotten FW (sheared + argillized). 2-2½ ft wh. QTZ VN above, 3-5% local drusy vugs with 2% Goeth STAIN. T MnOx T $CuCO_3$. HW is shaley-sheared diorite with a few ½-4" QTZ veins – pods in foliation. Bleached (sericite?) stringers around HW QTZ vn lts. QTZ VN crushed somewhat @ margins. Back appears to stand well @ portal + the 50' down incline to H_2O. QTZ VN is up to 4' thick – comes + goes + splits into 2 or 3 veins locally with sheared diorite between. About 50% Fs to 1cm in gneiss. Gneissic character + chlorite dies out ⊥ to QTZ VN zone into both HW + FW.

- Tails (sand + silt) 700' long 100' av wide 25-40' (max) Thick tails have been surveyed (LS10847P @ NE END of tails). Stacked by slusher-scraper. Tails heavily rilled ≈ 20% loss

- Dumps: Maybe 150,000-100,000 T looks like way to much to come out of lousy surface showing of VEIN – must get better @ depth. Quartzite (?) on dump w/ sideritic-goethite staining + Fe filling. Weak calcite veining. Could be a phase of the diorite. Gneiss is 60-80% Fs – rest is biotite, weakly chloritized (or green biotite – may be some Hbd with trace of granular epidote). Dull pyrite also on dumps – veinlet controlled. Looks like some py could be pyrrhotite (dull luster). RARE chunks of py-hem. on dump w/ $CuCO_3$ stain – prob. from cpy. QTZ outcrops get very spotty to SW. Vein appears to break up + be in several "stratigraphic" (foliation) horizons. Some diorite xenoliths in gneiss. Along SW end of vein are multiple 1-5' felsite sills above 4' QTZ VN – some below QTZ veins. General only shallow prospect pits where felsite present.
- In SW end of vein the structure may be somewhat en echelon offset by NW cross faults + Dip is up to 45° NW (N40E strike) rather than 27° NW. Looks like some NW cross faults are scissors-type
- Note: Topographic bench-step above + below vein – a break in steep slope – maybe a guide for finding others. Only 10-20% of vein zone is outcrop of QTZ vein rest is slump-cover but fairly good indication of vein location by QTZ float (where not dump covered)
- Maybe some old (pre 1937) horiz. Tunnels into vein at lower foliation levels – Behind mill – @ magazine. Looks like 1960's-1970's attempt at heap leach behind old mill.

SEC21
T10N
R5W
Congress 7½ Quad

F.R. Koutz
5 Aug 85

(TAJ-439)

Field & Sample Notes

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ALVARADO

FRK
5 AUG 85

SAMPLES (FRK85-ALV-) - TAJ 439 Skyline ⟶ ppm (AA) Au/Ag/Hg

ALV-1: 5' Horiz. cut from Trench ⊥ vein, 30' SW of "C" shaft 1-2' QTZ VN dip ~ 25° NW
1/3 of sample is wh. QTZ, G=5, Hem.=1, MnOx=T+. Sheared chloritic-diorite schist
REST of sample (2/3) "C" shaft was one pumped out in 1980 by Scarths
0.98 opt Au (Fire) 1.6 ppm Ag 0.72 ppm Hg

ALV-2A: 50' NE of "C" SHAFT: felsic dike upper 4' of 5-6' dike sampled, sheared,
(E) Goeth=3, Hem=1/2, T+ MnOx. In vein zone on FW. .24/.4/.12

2B: 3' QTZ VN above felsite. G=1/2, Hem=T, MnOx=T+; clay gouge on margins
(E) + shears, N50E, 27° NW VEIN 4.8/6.2/.62 (.14 opt Au)

ALV-3A Dump GRAB: Sideritic (?) quartzite dump material including fines. Pyritized,
Goeth=7-8%, pyrite stringers in some chunks, 5% wh. QTZ vnlts.
3.1/10/.39 (.090 opt Au)

-3B Quartz vein material from Dump. Pyrite 5-6%, Jarosite = 1/2 (from weathering)
Goeth=T. Mostly white quartz, 5-10% wallrock (gneiss) 4.3/7.2/.46
.125 opt Au

-note 200' SW of #3 on road up hill to SW is offset on twisted N40E 45° NW QTZ VN
There are piles of specularite + red hematite + $CuCO_3$ in small piles + boulders locally
here - they maybe salt + were not sampled. (Swansea-like)

ALV-4: on dump (SW) White to Lt pink (K-fs?) cream - bleached felsite > gneiss
with 3% dk brown (sideritic?) soaking. Felsite has fabric (foliation) +
looks like welded tuff, 5-8% 1-3mm holes after pheno. Some of pink
gneiss has K-fs augen. Sample from 10 piles from 100' N60W trench dozed
in dump. Sample mostly felsite + felsite Bx; Trench is 6-8' deep 10-15' wide.
Hand sample (4) w/ pink fs augen gneiss. .70/1.0/.08

ALV-5A N33E 27 NW VN zone at 2nd from last (SW) inclined shaft. Sample ⊥
(E) to vein @ portal. Gneiss FW not sampled. Going up: 1.7' 85% white QTZ VN w/
5-8% Goeth on Fx + 2' bleached + goethite stained shaley "sandstone" (diorite-
gneiss??) with 1-4" QTZ stringers @ top (Goeth=10%, MnOx=1/4%) +
1.5' white vitreous, sharp, quartz vein with fractures parallel to zone dip.
1-2% Goeth. in Fx + sheared at margins. + 3-4' of sheared SS or diorite ??
schist on top (not sampled) + 5' of white bleached semi rotten felsite
1.7'+2'+1.5' = 5.2' sample ⊥ to dip. .34 opt Au (Fire) / 4.6 ppm Ag / .40 ppm Hg

(E) - 5B: 3' ⊥ sample of rotten felsite schist, clayey; Goethite = 2%, weakly silicified
at bottom, 5-8% QTZ vnlts. .37/.2/.06 ppm

NOTE 5A+5B contain 1-2% green fluorescent
mineral (strained QTZ?)

FRK
SAUG 85

SAMPLES (FRK85-ALV-) - TAJ 439 Skyline ⟶ ppm (AA) Au/Ag/Hg

ALV-1: 5' Horiz. cut from Trench ⊥ vein, 30' SW of "C" shaft 1-2' QTZ VN dip ~ 25° NW
1/3 of sample is wh. QTZ, G=5, Hem.=1, MnOx=T+. Sheared Chloritic-diorite schist
Rest of sample (2/3) "C" shaft was one pumped out in 1980 by Scanths
0.88 opt Au (Fire) 1.6 ppm Ag 0.72 ppm Hg

ALV-2A: 50' NE of "C" SHAFT: Felsic dike upper 4' of 5-6' dike sampled, sheared,
(E) Goeth=3, Hem=1/2, T+ MnOx. In vein zone on FW. .24/.4/.12
2B: 3' QTZ VN above felsite. G=1/2, Hem=T, MnOx=T+; clay gouge on margins
(E) + shears, N50E, 27° NW VEIN 4.8/6.2/.62 (.14 opt Au)

ALV-3A Dump GRAB: Sideritic (?) quartzite dump material including fines. Pyritized,
Goeth=7-8%, pyrite stringers in some chunks, 5% wh. QTZ vnlts.
3.1/10/.39 (.080 opt Au)
-3B Quartz vein material from Dump. Pyrite 5-6%, Jarosite = 1/2 (from weathering)
Goeth=T. Mostly white quartz. 5-10% wallrock (gneiss) 4.3/7.2/.46
.125 opt Au

-note 200' SW of #3 on road up hill to SW is offset or twisted N40E 45° NW QTZ VN
There are piles of specularite + red hematite + $CuCO_3$ in small piles + boulders locally
here - they maybe salt + were not sampled. (Swansea-like)

ALV-4: On dump (SW) White to Lt pink (K-fs?) cream - bleached felsite > gneiss
with 3% dk brown (sederite?) soaking. Felsite has fabric (foliation) +
looks like welded tuff, 5-8% 1-3mm holes after pheno. Some of pink
gneiss has K-fs Augen. Sample from 10 piles from 100' N60W trench dozed
in dump. Sample mostly felsite + felsite Bx; Trench is 6-8' deep 10-15' wide.
Hand sample (4) w/ pink fs augen gneiss. .70/1.0/.08
1000 Ba

ALV-5A N33E 27 NW VN zone at 2nd from last (SW) inclined shaft. Sample ⊥
(E) to vein @ portal. Gneiss FW not sampled. Going up: 1.7' 85% white QTZ VN w/
5-8% Goeth on Fx + 2' bleached + goethite stained shaley "sandstone" (diorite -
gneiss??) with 1-4" QTZ stringers @ top (Goeth=10%, MnOx=1/4%) +
1.5' white vitreous, sharp, quartz vein with fractures parallel to zone dip.
1-2% Goeth. in Fx + sheared at margins. + 3-4' of sheared SS or diorite ??
schist on top (not sampled) + 5' of white bleached semi rotten felsite
1.7'+2'+1.5' = 5.2' sample ⊥ to dip. .34 opt Au (Fire)/4.6 ppm Ag/.40 ppm Hg
(E) - 5B: 3' ⊥ sample of rotten felsite schist, clayey; Goethite = 2%, weakly silicified
at bottom, 5-8% QTZ vnlts. .37/.2/.06 ppm

500 Cu
1000 Cu
20 Mo
7000 Pb
500 Zn
>1% Ba
1000 Ba
200 Cu
500 Pb
150 V
200 Zn

NOTE 5A+5B contain 1-2% green fluorescent
mineral (stained QTZ?)

ALVARADO

ppm
Au/Ag/Hg

FRK
5 AUG 85

ALV-6 (50' NE of "D" shaft) @ S-5 stake. 5' cut horiz. across (along) trench across vein zone. Sample ⊥ to vein. 1' QTZ (FW) + 2' 10% QTZ veined goethite (12%) schist + 2' HW QTZ vein (well Fx) with ½% MNOX, 2% Goeth. Zone ~ 20% NW dip but slump. 4.7/4.8/.76 (.137 opt Au)
D incline (not sampled) N53E 22-38° (28° Au) NW. Bad GNATS! Holt says they are horrible after rain. Well on property supplies 50 gpm but somewhat less than that now. Holt has trouble filling 1000 gal H_2O tank. Pump kicks off after 10 min. Well 80' deep - 12-15' DIAM? - Hand dug? Says 120 gpm. Mine makes 35-70 gpm. 60 KW general

ALV-7 TAILS: 5x8' cut N. side of tailings, tan silt > sand cut 1' below surface - fairly moist! Biotite ± muscovite flakes in tails. .79/3.4/.23 (.023 opt Au)

ALV-8 TAILS: 5x6' vertical cuts, Sand = silt, Banded & layered with 10-20% dip.
(E) Below hoist - slusher cable in middle of tails: should be among latest tails. .47/2.4/.21 (.014 opt Au)

Note: CF Moores samples CF-03-xx + TL-xx-xx (TAILS?) coarse-grained in grocery sacks in trailer. Zinc dust, sulphur other 5-10 yr. old chemicals around. Scarth predecessors tried to heap leach.

(E): Character E-spec. to be run. 2A+B, 5A+B, 8.

IN ALVARADO AREA
Local pegmatite zones in granite, locally granodiorite xenoliths - partially assimilated. Looks like SEV. other leaching operations to E of ALVARADO. Blue Bucket Leviaton - Stanton AREA

NOTE: Scarth's say: tails run .03 - .035 opt 140,000 T (old .05 opt Au numbers are too high) ← 2 samples (.014 + .023)
Dump IF screen < 2" runs .06 - .07; 25-50,000 tons
(.09 + .125 + .02) = Dump samples. ½ volume - double grade
- Note! Are samples show BKGD readings on scintillometer

SEE 1985 AGS Spring Field trip Guide on AREA. Many think diorite - rhyolite dikes in area are pЄ others think mid-Tertiary. The dikes in ⊥ faults are mid-Tertiary (dated by Damon U of Az). Thrusting (gneiss zone) along one horizon is in part post one but not detachment but is (or last was) mid Tertiary. Mineralization may be pЄ as host rocks or mid-Tertiary (or Laramide??) as dikes(?). Stan Keith thinks one dikes mid-Tertiary + thinks he has chemistry of rocks to "prove" it. Echo Bay people (congress mine) don't agree with him + have chemistry of rocks to "prove" it.

ERS to follow

ALVARADO

FRK
SAUG 85

ppm
Au/Ag/Hg

ALV-6 (50' NE of "D" SHAFT) @ S-5 stake. 5' cut horiz. across (along) trench across VEIN ZONE. Sample ⊥ to VEIN. 1' QTZ (FW) + 2' 10% QTZ veined goethite (12%) schist + 2' 1% QTZ vein (well Fx) with ½% MnOx, 2% Goeth. Zone ~ 20% NW dip but slump. 4.7/4.8/.76 (.137 opt Au)
D incline (not sampled) N53E 22-38° (28° Au) NW. Real GNATS! Holt says they are horrible after rain. Well on property supplies 50 gpm but somewhat less than that now. Holt has trouble filling 1000 gal H2O tank, pump kicks off after 10 min. Well 80' deep - 12-15' diam? - Hand dug? says 120 gpm. Mine makes 35-70 gpm. 60 KW generator

ALV-7 TAILS: 5x8' cut N. side of tailings, tan silt > sand cut 1' below surface - fairly moist! Biotite ± muscovite flakes in tails. .79/3.4/.23 (.023 opt Au)

ALV-8 TAILS: 5x6' vertical cuts, Sand > silt, Banded & layered with 10-20% dip.
(E) Below hoist - slusher cable in middle of tails: should be among latest tails. .47/2.4/.21 (.014 opt Au)
50 Mo, 300 Pb 3000 Ba, 200 Cu, 1000 Mn

Note: CF Mines samples CF-03-xx + TL-xx-xx (TAILS?) in grocery sacks in trailer. Zinc dust, sulphur other 5-10 yr. old chemicals around. Scanth predecessors tried to heap leach.

(E): characterize E-spec. to be run. 2A+B, 5A+B, 8. (3 at b)

IN ALVARADO AREA
Local pegmatite zones in granite, locally granodiorite xenoliths partially assimilated. looks like sev. other leaching operations to E of ALVARADO. Blue Bucket Leviston - Stanton. AREA.

NOTE: Scanth's say: tails run .03 - .035 opt 140,000 T (old .05 opt Au numbers are too high) (2 samples (.014 + .023))
Dump IF screen < 2" runs .06-.07; .25-50,000 tons
(.09 + .125 + .02) = Dump samples. ½ volume - double grade
- Note: Are samples show BKGD readings on scintillometer

SEE 1985 AGS Spring Field trip Guide on AREA. Many think diorite - aplite dikes in AREA are pre other think mid-Tertiary. The dikes in ⊥ faults are mid-Tertiary (dated by DAMON UofAz). Thrusting along one horizon (gneiss zone) is in part post one but NOT detachment but is (on last was) mid Tertiary. Mineralization may be pre as last ducks on mid-Tertiary (on Lamarite??) as dikes(?). Stan Keith thinks one dikes mid-Tertiary + thinks he has chemistry of rocks to "prove it". Echo Bay people (congress mine) don't agree with him + have chemistry of rocks to "prove" it.

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

REPORT OF ANALYSIS

JOB NO. TAJ 439
August 23, 1985
SHIPMENT NO. FRK-85-ALV
JAMES D. SELL
ALV-1/ALV-8
PAGE 1 OF 1

ASARCO INCORPORATED
Attn: Mr. Fleetwood R. Koutz
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

ASARCO Incorporated
AUG 26 1985
SW Exploration

Analysis of 9 Rock Chips and 2 Tail Samples

ITEM	SAMPLE NO.	Au (ppm)	Ag (ppm)	Hg (ppm)	FIRE ASSAY Au (oz/t)	FIRE ASSAY Ag (oz/t)
1	ALV-1	>10.00	1.6	.72	.980	<.01
2	ALV-2A	.24	.4	.12		
3	ALV-2B	4.80	6.2	.62		
4	ALV-3A	3.10	10.0	.39		
5	ALV-3B	4.30	7.2	.46		
6	ALV-4	.70	1.0	.08		
7	ALV-5A	>10.00	4.6	.40	.340	<.01
8	ALV-5B	.37	.2	.06		
9	ALV-6	4.70	4.8	.76		
10	ALV-7	.79	3.4	.23		
11	ALV-8	.47	2.4	.21		

NOTE: Spectrographic analysis to follow as TAJ 439-A.

cc: Asarco Incorporated
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703
Attn.: Mr. James D. Sell
Ms. Mary Kavanagh

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK DULY SIGNED Arizona U.S.A.

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

REPORT OF ANALYSIS

JOB NO. TAJ 439
August 23, 1985
SHIPMENT NO. FRK-85-ALV
JAMES D. SELL
ALV-1/ALV-8

ASARCO INCORPORATED
Attn: Mr. Fleetwood R. Koutz
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 9 Rock Chips and 2 Tail Samples

ITEM	SAMPLE NO.	Au (ppm)	Ag (ppm)	Hg (ppm)	FIRE ASSAY Au (oz/t)	FIRE ASSAY Ag (oz/t)
1 5'	ALV-1 QTZ VEIN	>10.00	.98 opt Fire 1.6	.72	.980	<.01
FW 2 4'	ALV-2A Felsite dike	.24	.007 .4	.12		
3 3'	ALV-2B QTZ VN (Hw)	4.80	.140 6.2	.62		
4 Dump	ALV-3A Siliceous QTZ	3.10	.090 10.0	.39		
5 Dump	ALV-3B QTZ VN w/Py	4.30	.125 7.2	.46		
6 Dump	ALV-4 bleached Felsite	.70	.02 1.0	.08		
7 5.2'	ALV-5A VEIN	>10.00	.34 Fire 4.6	.40	.340	<.01
8 3'	ALV-5B Felsite HW	.37	.011 .2	.06		
9 6'	ALV-6 VEIN ZONE	4.70	.137 4.8	.76		
10 5'&8'	ALV-7 / grab	.79	.023 3.4	.23		
11 5'&6'	ALV-8 /	.47	.014 2.4	.21		

NOTE: Spectrographic analysis to follow as TAJ 439-A.

cc: Asarco Incorporated
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703
Attn.: Mr. James D. Sell
Ms. Mary Kavanagh

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK WHEN SIGNED Arizona

William L. Lehmbeck
Manager

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

REPORT OF SPECTROGRAPHIC ANALYSIS

JOB NO. TAJ 439B
September 3, 1985
SHIPMENT NO. FRK-85-ALV
JAMES D. SELL
ALV-1/ALV-8

ASARCO INCORPORATED
Attn: Mr. Fleetwood R. Koutz
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 7 Pulp Samples

The attached pages comprise this report of analysis. Values are reported in parts per million (ppm), except where otherwise noted, to the nearest number in the series 1, 1.5, 2, 3, 5, 7, 10, etc. within each order of magnitude. These numbers represent the approximate boundaries and midpoints of arbitrary ranges of concentration differing by the reciprocal of the cube root of ten. The 'accepted' value is considered to be within + or - 1 step of the range reported at the 68 % confidence level and within + or - 2 steps at the 95 % confidence level.

William L. Lehmbeck
Manager

cc: Asarco Incorporated
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703
Attn.: Mr. James Sell
Ms. Mary Kavanagh

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

JOB NO. TAJ 439B
PAGE 2

2 mica granites

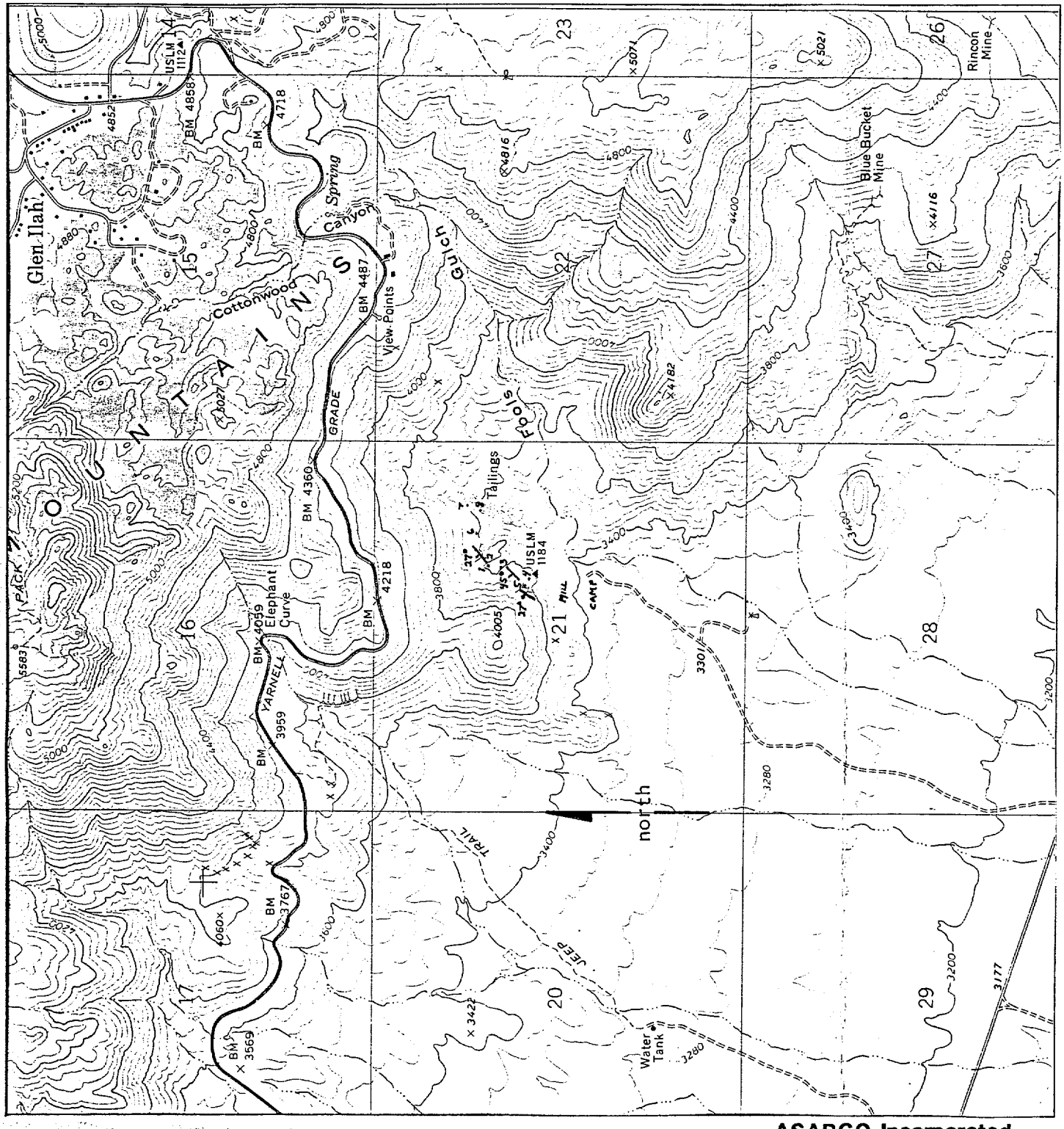
ITEM NO.	SAMPLE NO.	
2 =	ALV-2A	Felsite dike (Fw) 4'
3 =	ALV-2B	3' QTZ VN
4 =	ALV-3A	GRAB SIDERITE "QTZite"
5 =	ALV-3B	GRAB QTZ VN.
7 =	ALV-5A	VEIN ZONE
8 =	ALV-5B	Felsite (Hw) schist
11 =	ALV-8	TAILS

ITEM	2 (Felsite)	3	4	5	7	8 (Felsite)	11	
ELEMENT	ppm						TAILS	
Fe	15%	2%	20% SIDERITE ankerite	3%	10%	15%	10%	← Hem+Goeth > pyrite
Ca	1%	.05%	5% $CO_3^{=}$	.5%	1.5%	5%	5%	Dolomites on high Mg in mafics
Mg	1%	.2%	5%	.2%	.5%	3%	3%	
Au	.24	4.8	3.1	4.3	.34 opt	.37	.47	
Ag	<1	5	20	7	10	<1	2	
As	<500	<500	<500	<500	<500	<500	<500	Low
B	200	Tourm. <10	<10	<10	<10	50	50	
Ba	300	100	1000	>10000	>10000	1000	3000	Barite
Be	<2	<2	<2	<2	<2	<2	<2	
Bi	<10	<10	<10	<10	<10	<10	<10	Low
Cd	<50	<50	<50	<50	<50	<50	<50	
Co	20	<5	50	<5	10	70	30	
Cr	20	150	50	150	500	50	50	← Common in GR-GRD in Hi Au meas
Cu	100	70	70	150	1000	200	200	← W/V
Ga	10	<10	20	<10	15	20	20	
Ge	<20	<20	<20	<20	<20	<20	<20	
La	<20	<20	<20	<20	<20	<20	<20	
Mn	700	500	1500	200	700	1000	1000	
Mo	10	20	20	30	20	5	50	← High
Nb	20	<20	20	<20	<20	<20	<20	
Ni	15	<5	50	10	15	30	20	
Pb	700	500	100	300	7000	500	300	← Sulfides may make concentrate
Sb	<100	<100	<100	<100	<100	<100	<100	
Sc	<10	<10	20	<10	10	20	10	
Sn	<10	<10	<10	<10	<10	<10	<10	
Sr	<100	<100	2000 $CO_3^{=}$	500	200	200	1000	
Ti	3000	500	7000	1000	2000	5000	3000	
V	100	20	50	20	30	150	100	←
W	<50	<50	<50	<50	<50	<50	<50	— Low
Y	30	<10	20	<10	<10	15	10	
Zn	<200	<200	<200	<200	500	200	<200	
Zr	100	<20	50	<20	50	100	50	

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122



Skyline Samples TAJ-439

ASARCO Incorporated

1985 GOLD PROGRAM

AMS Sheet: Prescott, Az

USGS Quad.: Congress, Az. 7 1/2

Twsp.: 10N **Rng.:** 5W **Sec.:** 21

Prospect Name: Alvarado Mine

Owner: Scarth Oil and Gas

Examined by: F.R.Koutz 8/5/85

Follow-up Recommended: Yes☒ No☐

State: Arizona

County: Yavapai

SCALE: 1"=2000' District

District: Octave (Weaver)

MILS and/or Terradata # _____ / _____

map no. 6290 **date** 9/85

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EXPLORATION DEPARTMENT

WLK-JDS

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