



CONTACT INFORMATION  
Mining Records Curator  
Arizona Geological Survey  
416 W. Congress St., Suite 100  
Tucson, Arizona 85701  
520-770-3500  
<http://www.azgs.az.gov>  
[inquiries@azgs.az.gov](mailto:inquiries@azgs.az.gov)

The following file is part of the  
James Doyle Sell Mining Collection

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### **QUALITY STATEMENT**

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JAN 28 1975

file

October 25, 1972 - June 29, 1974.

TABLE 3 - - BOHME PROJECT -- COST DISTRIBUTION SUMMARY

Drill Hole Number	AH-1	\$/ft.	AH-2	\$/ft.	AH-3	\$/ft.	AH-4	\$/ft.	AH-5	\$/ft.	Total	\$/ft.
<b>FOOTAGE</b>	3863 ft.		3781 ft.		3614 ft.		2807 ft.		4513 ft.		18,578 ft.	
Rotary	1690 ft.		1995 ft.		1173 ft.		1966 ft.		894 ft.		7,718 ft.	
Core	2173 ft.		1786 ft.		2441 ft.		841 ft.		3619 ft.		10,860 ft.	
<b>DRILLING CHARGES</b>												
<b>A. Direct Drilling</b>												
Rotary	\$20,148.43	11.92	\$26,498.53	13.28	\$15,373.06	13.11	\$22,358.80	11.37	\$21,194.71	23.71	\$105,573.53	13.68
Core	44,289.18	20.38	39,619.62	22.18	45,577.21	18.66	13,589.62	16.16	80,417.20	22.22	223,452.83	20.58
<b>B. Site Preparation</b>												
Rotary	1,741.00	1.03	8,521.16	4.27	4,127.00	0.38	1,037.75	0.53	482.80	0.54	12,233.98	1.58
Core	106.14	0.05	466.13	0.26	76.13	0.03	446.40	0.53	406.40	0.11	1,501.20	0.14
<b>C. Field Administration</b>												
1. Superv. & Geology												
Rotary	666.06	0.39	499.69	0.25	278.36	0.24	263.60	0.13	581.89	0.65	2,289.60	0.30
Core	2,085.95	0.96	2,279.29	1.28	2,279.78	0.92	1,031.77	1.23	3,915.89	1.08	11,552.68	1.06
2. Assaying												
Rotary	142.82	0.09	169.06	0.08	73.62	0.06	165.78	0.09	77.21	0.09	628.49	0.08
Core	1,582.83	0.73	1,348.05	0.75	1,179.80	0.46	372.50	0.44	1,698.86	0.47	6,132.04	0.56
3. Miscellaneous												
Rotary	531.34	0.31	352.34	0.18	8.85	0.01	---	---	326.96	0.36	1,219.49	0.16
Core	723.59	0.33	1,292.33	0.73	12.11	0.02	179.73	0.21	1,684.91	0.47	3,932.67	0.36
<b>Drilling Charges Sub-Total</b>												
Rotary	\$23,229.65	13.74	\$36,040.78	18.06	\$16,115.16	13.80	\$23,825.93	12.12	\$22,663.57	25.35	\$121,945.09	15.80
Core	48,787.69	22.45	45,005.42	25.20	49,075.03	20.09	15,620.02	18.57	88,123.26	24.35	246,571.42	22.70
<b>Sub-Total</b>	\$72,017.34	18.64	\$81,046.20	21.44	\$65,270.19	18.05	\$39,445.95	14.05	\$110,786.83	24.55	\$368,516.51	19.83
<b>PROJECT CHARGES</b>												
<b>D. General Administration</b>												
Rotary	\$ 1,343.90	0.79	\$ 1,055.71	0.53	\$ 1,303.13	1.11	\$ 571.75	0.29	\$ 825.38	0.92	\$ 5,099.87	0.66
Core	1,893.93	0.87	1,352.98	0.76	2,477.90	1.00	727.47	0.86	2,673.34	0.74	9,095.62	0.84
<b>E. Option Payments, Legal</b>												
Rotary	2,075.52	1.23	1,305.11	0.65	1,310.76	1.15	333.33	0.17	\$ 2,000.00	2.24	7,064.72	0.92
Core	2,450.44	1.13	3,666.67	2.05	4,778.00	1.95	1,166.67	1.39	4,504.50	1.24	16,556.28	1.52
<b>Project Charges Sub-Total</b>												
Rotary	\$ 3,419.42	2.02	\$ 2,360.82	1.18	\$ 2,653.89	2.26	\$ 905.08	0.46	\$ 2,825.38	3.16	\$ 12,164.59	1.58
Core	4,344.37	2.00	5,019.65	2.81	7,215.90	2.95	1,894.14	2.25	7,177.84	1.98	25,651.90	2.36
<b>Sub-Total</b>	\$ 7,763.79	2.01	\$ 7,380.47	1.95	\$ 9,869.79	2.73	\$ 2,799.22	1.00	\$10,003.22	2.21	\$ 37,816.49	2.04
<b>Total Expenditures</b>	\$79,781.13	20.65	\$88,426.67	23.39	\$75,089.98	20.78	\$42,245.17	15.05	\$120,790.05	26.76	\$406,333.00	21.87

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

July 23, 1974

J. H. C.  
AUG 8 1974

Mr. T. C. Osborne  
Assistant Director of Exploration  
New York Office

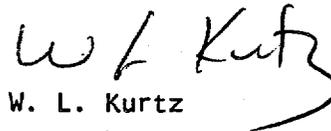
Bohme Project  
Gila County, Arizona

Dear Mr. Osborne:

The results of our joint venture exploration with Hanna Mining Company on the Bohme-Coryell property are negative and we have fulfilled all work requirements. I recommend giving notice to the Hanna Mining Co., 100 Erieview Plaza, Cleveland, Ohio 44114, that Asarco is terminating the agreement of 17 August 1972.

A summation report, substantiating above recommendation, will be prepared by Mr. Sell; however, timely notification to Hanna is necessary so that we do not have to make another land payment.

Very truly yours,

  
W. L. Kurtz

WLK:lb

cc: JHCourtright ✓  
RBCrist  
JDSell

JHC.

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

June 25, 1974

J. H. C.  
AUG 9 1974

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report - June 1974  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

Hole conditions in AH-5, mentioned last month, permitted the NX coring to progress only to 3693 feet. The hole was then cased with BX casing to a depth of 3475 feet, ending below the mudstone unit and into the more competent Naco Limestone. BX coring was resumed at that point in a deviated hole and was successfully deepened to 4295 feet when the drill string twisted off. The broken string has been recovered. The hole has been terminated and salvage of the NX and BX casing is now in progress.

Total synopsis of the depths and rock units are given on the attached map, with only those units below the Whitetail Conglomerate mudstone unit shown below.

3468-3576	Paleozoic (Naco) marlstone, limestone & quartzite
3576-3579	Tertiary lamprophyre dike
3579-3584	Paleozoic, quartzite, as above?
3584-3588	Fault zone, dipping 45°
3588-3670	Precambrian Dripping Spring Quartzite
3670-3687	Precambrian Barnes Conglomerate
3687-3892	Precambrian Pioneer Shale
3892-4205	Precambrian Diabase
4205-4226	Precambrian Diabase cut by Tertiary quartz porphyry dikelets
4226-4295	Precambrian Diabase

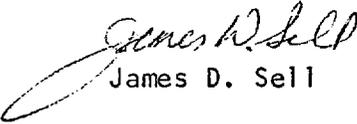
Reinterpretation of the units between 3576 and 3584 suggest they may be cataclastic deformed units which are highly sheared and mylonized. These units have been submitted for thin-sectioning. Altho of a different style of deformation than the underlying fault zone, the basic inclination is similar and compatible to strong and probably large displacement mechanism. As noted, the fault zone separates limestones high in the Paleozoic section from quartzite of Precambrian age. An unknown amount of Naco has been cut out, all the Escabros Limestone, all the Martin Limestone, and any Cambrian units, and an unknown amount of upper Dripping Spring Quartzite units.

In the adjacent AH-1 drill hole, the Escabrosa and Martin units contained replacement units highly mineralized with oxidized iron and manganese and contained appreciable residual zinc values.

No replacement units were found in the Naco Limestone of AH-5 altho some bleaching and iron addition was noted. The amount of iron limonite picked up in the porous quartzitic units below the fault and as weak stringers (oxidized) in the underlying diabase. However, only low values of Cu, Pb, and Zn have been returned on the geochemical sampling to date.

Pyrite sulfides, partially to fully oxidized, were noted in the quartz porphyry dikelet at 4205-4206 feet. This is the only sulfide noted to date. The dikelets were accompanied by more iron and alteration which affected the diabase wall rock but quartz veining and obvious hydrothermal effects were of a low magnitude. Epidote-chlorite-calcite veinlets and stringers, with some irregular replacement of groundmass accompanied by variable iron addition are common in the diabase. Again, low geochem values have been received on the samples to date.

Unexpended funds are \$14,500.



James D. Sell

JDS:lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pCpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**  
 Qtg—Gila Conglomerate  
 Td—Dacite  
 Tev—Early volcanics  
 Tw—Whitetail

**Pre-Mineral Rock Unit**  
 Tgp—Granite porphyry  
 Tsg—Schultze Granite  
 Tlqm—Lost Gulch Quartz Monzonite  
 Tgd—Gold Gulch Granodiorite  
 Pal—Paleozoic, undivided  
 pCds—Precambrian, Dripping Spg. Quartzite  
 pCdb—Precambrian Diabase  
 pCpi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of JUNE 74  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

TO ACCOMPANY MONTHLY  
REPORT  
 DATED 6-25-74  
 BY J.D. SEL

JHC

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

May 31, 1974

J. H. C.  
MAY 31 1974

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report - May 1974  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

High pressure water and increased water flow from broken quartzitic units, coupled with caving hole conditions from a muddy section of Whitetail Conglomerate, continue to cause extremely difficult drilling conditions in drill hole AH-5.

Synopsis of the rock units and depths is as follows:

0-100	Quaternary Gila Conglomerate
100-987	Tertiary Dacite
987-1710	Precambrian Diabase (bx)
1710-2996	Tertiary Whitetail Conglomerate
2996-3074	Precambrian Dripping Spring Quartzite (bx)
3074-3080	Precambrian Diabase (bx)
3080-3332	Precambrian Dripping Spring Quartzite (bx)
3332-3468	Tertiary Whitetail Conglomerate
3468-3576	Paleozoic marlstone, limestone, & quartzite; Naco?
3576-3579	Tertiary lamprophyre dike
3579-3584	Paleozoic, quartzite as above; Naco?
3584-3588	Fault zone, dipping 45°
3588-3670	Precambrian Dripping Spring Quartzite
3670-3682	Precambrian Barnes Conglomerate

The large brecciated blocks of Precambrian diabase and Precambrian quartzite resting on or within the Tertiary Whitetail Conglomerate must be gravity slide type blocks as we have found elsewhere in our drilling.

The sequence of calcareous marlstones, limestones, and calcareous quartzites found between 3468 and 3584 have not been positively identified, but most likely are part of the Pennsylvanian Naco Formation. The quartzitic units are cut by a fluidal-textured lamprophyre dike, and cut by a strong moderately dipping fault zone which contains Precambrian Dripping Spring Quartzite Conglomerate fragments.

May 31, 1974

Under the fault is a sequence of typical mottled Precambrian Dripping Spring Quartzite units in contact with Precambrian Barnes Conglomerate units.

Thus, it appears that the entire limestone sequence of Escabrosa and Martin, found in the adjacent hole AH-1, has been cut out by the fault.

The limy units have been partially bleached with minor iron addition, but no replacement textured zones were noted. Below the fault, the quartzite and Barnes Conglomerate units contain up to 2% limonite, mainly pyritic, and mainly in the sandy matrix areas.

Drilling conditions necessitated several cement jobs in an attempt to cure caving hole problems in the basal Whitetail unit, and to decrease the excessive high pressure water coming into the hole. In redrilling the cement, the bit apparently went outside the hole and, with the failure of the cement to cure the hole caving problem, it has been decided to case the hole with BX casing to below the Whitetail unit and to core below the presently known unit.

As recalled, see report for February 1973, the basal Devonian Martin units of limestone and quartzitic units found in adjacent hole AH-1 were heavily replaced with earthy limonites as well as oxidized manganese-lead-zinc values. Similar earthy limonite in the quartzitic-conglomerate units of AH-5 again point to a sulfide mineralizing source which needs to be tested for below the limonites.

Unexpended funds are \$40,600.

*James D. Sell*  
James D. Sell

JDS:lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pCpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**  
 Q<sub>1</sub>g—Gila Conglomerate  
 Td—Dacite  
 Tev—Early volcanics  
 Tw—Whitetail

**Pre-Mineral Rock Unit**  
 Tgp—Granite porphyry  
 Tsg—Schultze Granite  
 Tlqm—Lost Gulch Quartz Monzonite  
 Tgd—Gold Gulch Granodiorite  
 Pal—Paleozoic, undivided  
 pCds—Precambrian, Dripping Spg. Quartzite  
 pCdb—Precambrian Diabase  
 pCpi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of May, 1974  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

TO ACCOMPANY REPORT  
 DATED MAY 31, 1974  
 BY J. D. SELL

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

J.H.C.

May 1, 1974

MAY 2 1974

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report - April 1974  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

As shown on the accompanied map, drill hole AH-5 is now at a depth of 3047 feet. Synopsis of the rock units and depths is as follows:

0-987	Tertiary Dacite
987-1705	Precambrian Diabase
1705-2996	Tertiary Whitetail Conglomerate
2996-3047	Precambrian Dripping Spring Quartzite

The diabase, with numerous subhorizontal slickensides and mudslips, rests on younger Whitetail Conglomerate and is obviously a large block which was moved in onto the conglomerate prior to the deposition of the Dacite volcanics.

The underlying conglomerate has no native copper, nor any readily identifiable altered porphyry fragments.

At 2996 feet the conglomerate matrix fills many cracks and openings into what is probably a weathered surface of Dripping Spring Quartzite. Core recovery is less than 50% and the short intercept to date does not reveal its true character. As noted from the map, the adjacent hole AH-1 had conglomerate some 500 feet below the present point of AH-5 and encountered Mississippian limestone. It is tentatively thought that the quartzite may also be a moved block within the Whitetail environment.

High pressure (around 500 psi) water was encountered at 3027 to 3030 feet and maintains artesian flow at around 20 to 30 gallons per minute. The flow has completely disrupted the mud program and to date one cement job and one chemical grout job have only been able to cut the flow in half. We will probably go to a clear water-grease-PQ460 program and continue to core below the water zone, as the hole appears to be in good shape and not caving. Minor iron and manganese stains the quartzite.

Unexpended funds are \$61,800.

*J. D. Sell*  
J. D. Sell

JDS:1b  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pEpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**

- QTg—Gila Conglomerate
- Td—Dacite
- Tev—Early volcanics
- Tw—Whitetail

**Pre-Mineral Rock Unit**

- Tgp—Granite porphyry
- Tsg—Schultze Granite
- Tlqm—Lost Gulch Quartz Monzonite
- Tgd—Gold Gulch Granodiorite
- Pal—Paleozoic, undivided
- pEds—Precambrian, Dripping Spg. Quartzite
- pEdb—Precambrian Diabase
- pEpi—Precambrian Pinal Schist

TO ACCOMPANY Report

DATED May 1, 1974

BY L. D. Sell

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of April, 1974  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

JHC

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

March 27, 1974

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report - March 1974  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

The drill hole AH-4 was completed by coring to a depth of 2807 feet. The hole remained in Precambrian Pinal Schist breccia for the entire bedrock intercept of 556 feet. Incomplete assay returns show very low geochemical results.

Upon completion of AH-4, Boyles Brothers moved the CP-50 rig to the AH-5 drill site and commenced coring. Synopsis to date on the hole:

Tertiary Dacite	0-987
Precambrian Diabase	987-1101

The dacite had a well developed vitrophyric zone and a few feet of white tuffaceous material below. The diabase is massive, very coarse crystalline, but is cut by numerous subhorizontal to 15° inclination slickensided slips and mudslips. Variable to strong iron addition has been introduced along unaltered veinlet fractures and in the mafic sites. No pyrite casts have been noted to date. The top six inches of diabase core had fine native copper but none has been noted below. Both holes are shown on the attached map.

Unexpended funds are \$91,000.00.

*James D. Sell*  
James D. Sell

JDS:lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pCpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**

- QTg—Gila Conglomerate
- Td—Dacite
- Tev—Early volcanics
- Tw—Whitetail

**Pre-Mineral Rock Unit**

- Tgp—Granite porphyry
- Tsg—Schultze Granite
- Tlqm—Lost Gulch Quartz Monzonite
- Tgd—Gold Gulch Granodiorite
- Pal—Paleozoic, undivided
- pCds—Precambrian, Dripping Spg. Quartzite
- pCdb—Precambrian Diabase
- pCpi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of *March 1974*  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

TO ACCOMPANY *Monthly Report*  
 DATED *March 27, 1974*  
 BY *J.D. Sell*

JHC

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

March 1, 1974

J. H. C.

MAR 15 1974

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report - Feb. 1974  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

Shelton Drilling moved to AH-4 site early in the month and rotaried the hole to 1966 feet where 3-1/2" ID casing was set and cemented back to the surface.

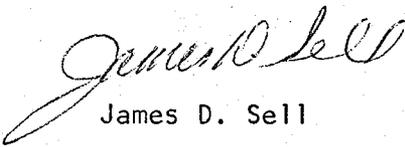
Boyles Brothers CP-50 moved onto AH-4, after moving from A-7, and commenced coring. Synopsis of the hole to date:

Quaternary Gila Conglomerate	0-1000
Tertiary Dacite	1000-2251
Precambrian Pinal Schist breccia	2251-2444

The dacite failed to develop a vitrophyre at the normal position, although a one-foot dense brown zone was developed on top of the unwelded white tuff. The tuff is very friable and may be crushed along a low-angled structure. The tuff rests on a two-foot zone of red-brown shale-mud which may also be part of the low-angled structure(?). The Pinal Schist immediately below is highly brecciated with abundant gouge throughout. The breccia appears similar to that of the Cactus breccia and is cut by numerous breccia-gouge zones generally with a low angle. No mineralization, except for a few pyrite pseudomorphs and specks of native copper, has been logged.

Inquiry into how best to deepen drill hole AH-5 has been undertaken. Boyles can either plug bit or core at the same price. Harness has a small 3-1/2" air-hammer and is scheduled to have a booster for his air-package. This combination has not been used at the depths below 900 feet.

Unexpended funds are \$250.00.

  
James D. Sell

JDS:lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pEpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**

- Qtg—Gila Conglomerate
- Td—Dacite
- Tev—Early volcanics
- Tw—Whitetail

**Pre-Mineral Rock Unit**

- Tgp—Granite porphyry
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- Pal—Paleozoic, undivided
- pEds—Precambrian, Dripping Spg. Quartzite
- pEdb—Precambrian Diabase
- pEpi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of Feb., 1974  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

TO ACCOMPANY Monthly Report  
 DATED March 1, 1974  
 BY J.D. Sell

JHC

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

February 1, 1974

J. H. C.  
MAR 15 1974

TO: W. L. Kurtz

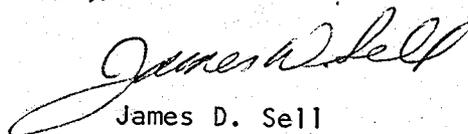
FROM: J. D. Sell

Monthly Report - Jan. 1974  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

Shelton Drilling Company commenced rotary drilling on AH-5 in early January and by the end of the month had progressed to 894 feet in dacite. The experimental rotary-mud program was not successful. Heavy mud losses occurred in the area above the water table and the penetration rate in the welded tuff was much lower than anticipated. The program was terminated by cementing in 4" ID casing at 894 feet. Boyles Brothers will commence diamond core drilling upon completion of S.E. A-7 hole.

Shelton is presently moving to site AH-4. The upper part, and probably the majority of the hole, is indurated Gila Conglomerate. It is anticipated that the rotary-mud program will give improved results in this unit.

Estimated unexpended balance is \$30,500.

  
James D. Sell

JDS:lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pEpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**

- QTg—Gila Conglomerate
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**Pre-Mineral Rock Unit**

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- Tgd—Gold Gulch Granodiorite
- Pal—Paleozoic, undivided
- pEps—Precambrian, Dripping Spg. Quartzite
- pEdb—Precambrian Diabase
- pEpi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of Jan. 1974  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

TO ACCOMPANY Monthly Report  
 DATED Feb. 1, 1974  
 BY J.D.S.

*JHC*

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

December 18, 1973

J. H. C.

DEC 21 1973

TO: W. L. Kurtz

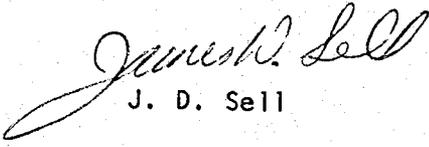
FROM: J. D. Sell

Monthly Report - Dec. 1973  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

Drill site AH-4 on the south and site AH-5 in the central part of the claim block have been constructed, as well as one temporary water entrapment basin.

Shelton Drilling Company will commence rotary drilling on AH-5 upon completion of other work. It is probable that Shelton will be moving on the project prior to the end of the month, but is unlikely that much more than surface casing will have been set by the first of the year.

Estimated unexpended balance is \$54,000.

  
J. D. Sell

JDS:1b  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pEpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**

- QTg—Gila Conglomerate
- Td—Dacite
- TeV—Early volcanics
- Tw—Whitetail

**Pre-Mineral Rock Unit**

- Tgp—Granite porphyry
- Tsg—Schultze Granite
- Tlqm—Lost Gulch Quartz Monzonite
- Tgd—Gold Gulch Grandiorite
- Pal—Paleozoic, undivided
- pEds—Precambrian, Dripping Spg. Quartzite
- pEdb—Precambrian Diabase
- pEpi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of Dec. 1973  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

TO ACCOMPANY Monthly Report  
 DATED Dec. 18, 1973  
 BY J. D. Sell

AMERICAN SMELTING AND REFINING COMPANY  
TUCSON ARIZONA

J. H. C.

DEC 5 - 1973

December 4, 1973

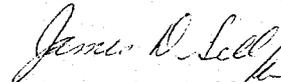
TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report - Nov. 1973  
Bohme Project  
ASARCO/Hanna Joint Venture  
Gila County, Arizona

Evaluation of data with Steve Van Nort of Hanna has confirmed the location of two additional drill sites to be drilled in the coming months. Site AH-4 on the south will be a shallow (less than 1500 feet) test for bedrock evaluation. Site of AH-5 is 1000 feet east-southeast of the original discovery mineralization of AH-1 and is programmed for 4000 feet. This will test the expected sulfide zone below the heavily mineralized and oxidized units in which AH-1 was terminated by hole conditions.

The estimated unexpended balance is \$56,900.

  
James D. Sell

JDS:lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 pCpi
- Rock type
- Bottom of hole depth
- ⊕ Proposed drill hole

**Post-Mineral Rock Unit**

- QTg—Gila Conglomerate
- Td—Dacite
- Tev—Early volcanics
- Tw—Whitetail

**Pre-Mineral Rock Unit**

- Tgp—Granite porphyry
- Tsg—Schultze Granite
- Tlqm—Last Gulch Quartz Monzonite
- Tgd—Gold Gulch Granodiorite
- Pal—Paleozoic, undivided
- pCds—Precambrian, Dripping Spg. Quartzite
- pCdb—Precambrian Diabase
- pCpi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of December  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

TO ACCOMPANY *Monthly Report*  
 DATED *Dec. 4, 1973*  
 BY *J.D. Sell*

J.H.C.

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

May 22, 1973

J. H. C.  
MAY 23 1973

Mr. T. C. Osborne  
Assistant Director of Exploration  
New York Office

Request for Supplemental  
Exploration Appropriation  
Bohme Project (Hanna)  
Gila County, Arizona

Dear Sir:

During August of 1972 we entered into an agreement with Hanna Mining Company to explore a large covered area between the Castle Dome and Copper Cities porphyry copper deposits. To date we have completed two drill holes and have earned our 50% interest in the prospect. Drill hole AH-1 penetrated 3539 feet of post-mineral cover before entering 324 feet of Paleozoic limestones containing alteration (brecciation, replacement textures, recrystallization, dolomitization) and mineralization (oxidized lead, zinc, manganese, iron, copper, and some moly values) characteristic of zones peripheral to porphyry copper intrusives. This drill hole represents a definite exploration lead for major copper mineralization and demonstrates that oxidation and leaching, necessary to the formation of chalcocite blankets, has taken place within the Bohme prospect. Drill hole AH-2, 3,400 feet to the north-northeast, penetrated very weakly altered, mineralized Paleozoic limestones and bottomed in Precambrian quartzite. This hole effectively limits exploration in this direction (see attached Index Map).

Hanna has agreed to share equally the \$221,000 cost of the second work commitment due between August 14, 1973 and May 27, 1975, at which time notification must be given whether a \$600,000 purchase option and \$100,000 per year advance royalty payment will be exercised on July 27, 1975.

Messrs. Courtright and Sell agree that the alteration and mineralization encountered in AH-1 warrant the drilling of another hole, AH-3, approximately 3,000 feet to the south. I recommend that we drill this hole immediately. Based on the results of this hole, another hole will be drilled as an offset or in the large untested zone north of the Sleeping Beauty Fault.

May 22, 1973

I estimate costs to complete the second work commitment as follows:

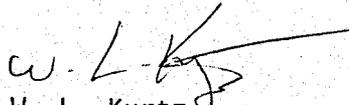
Drilling, Supervision, Assaying, and all qualifying expenses	\$200,000
Land Payments	<u>21,000</u>

Total	\$221,000
-------	-----------

ASARCO's 50%	\$110,500
--------------	-----------

If you approve, please request a \$110,500 Supplemental Exploration Appropriation. Forms 302-EA and 302-EB are enclosed.

Respectfully submitted,

  
W. L. Kurtz

WLK:lb  
Encs.

cc: JHCourtright - w/encs.   
RBCrist - w/encs.  
JDSell - w/encs.  
ADCoumides - w/forms only



PROSPECT Bohme Project (Hanna)  
 LOCATION Gila County, Arizona

COST ESTIMATE, MINERAL EXPLORATION

OFFICE SWED - Tucson  
 BY W. L. Kurtz

o.	Type of Work	Salaries/Wages		Material	Fees Rent Services	Traveling	Taxes	Other	Total Estimate Cost
		Days	Amount						
01	Outright Purchase								
02	Option Payments							35,000	35,000
03	Bonus Payments								
04	Minimum Royalties - Deductible from Future Production								
05	Minimum Royalties -Not Deductible from Future Production								
06	Rental Payments								
07	Staking Claims								
11	Surface Excavating								
12	Underground "								
21	Surface Drilling				310,000				310,000
22	Underground "								
30	Geologic								
40	Sampling, Assaying, Lab.		7,000		7,500	2,500			17,000
50	Geophysics								
60	Geochem								
70	Engineering								
80	Construction (temp.)				5,000				5,000
90	Construction (perm.)								
100	Administration, Field Offices and Camps		24,500			10,000			34,500
200	Administration, General		6,000			2,500			8,500
300	Autos and Vehicles					5,000			5,000
400	Aircraft and Boats								
			37,500		322,500	20,000		35,000	415,000
650	Partner's Share								154,500
									260,500
661	Commission or Fees								
663	Exchange								
									260,500

APPLICATION FOR SUPPLEMENTAL EXPLORATION AUTHORIZATION

..... May 22, ..... 19.73.

Originating Office ..... Tucson - SWED .....

Application is hereby made for supplemental Authorization to cover cost, in excess of original estimate, of work authorized by New York.

No... 0037-00 .....

Present total Estimated Cost (Form 302-EA attached)	\$.260,500..
Amount previously authorized (date.. June 21, 1972..)	\$.150,000..
Balance for which Authorization is now requested	\$.110,500..

ADDITIONAL WORK CONTEMPLATED:

Complete 9,000' of drilling in two holes.

EXPLANATION OF INCREASED COST:

Alteration and mineralization encountered in drill hole AH-1 is characteristic of zones peripheral to porphyry copper intrusives. The drill holes proposed will explore for the center of copper mineralization.

Reviewed by *J. P. Loumich* ..... Approved by .....  
 Acct. Mgr. or Chief Acct. Vice President

Recommended by *W. L. King* ..... Approved by .....  
 Supervisor Comptroller

Account Chargeable to .....  
To be designated by Comptroller

---

Approved by Advisory Committee ..... Approved by Board of Directors .....  
 ..... 19..... ..... 19.....

.....  
Secretary

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

J. H. C.  
FEB 5 1973

February 2, 1973

Mr. T. C. Osborne  
Asst. Director of Exploration  
New York Office

Exploration Report  
Southwestern Division  
January 1973

Dear Sir:

BOHME PROJECT (Hanna), Gila County, Arizona

AH-1 was advanced 1510 feet by diamond drilling to a depth of 3623 feet. At 3539 feet the drill hole passed from post-mineral Whitetail conglomerate into pre-mineral Mississippian limestone that contains minor manganese and sparse pyrite. Hole will be terminated and drill moved to AH-2, cased at 1988 feet in Whitetail conglomerate.

Monthly estimated expenses thru January 25th: \$47,600

Estimated unexpended balance of authorization: \$12,700

RAWHIDE PROJECT (Inspiration), Pinal County, Arizona

Work was limited to surveying and claim work. Drill site will be prepared upon final signing of the Inspiration agreement.

Monthly estimated expenses thru January 25th: \$ 6,000

Estimated unexpended balance of authorization: \$125,500

3R PROJECT (Anaconda), Santa Cruz County, Arizona

Work was limited to petrographic work and field mapping to help in selecting drill site on the adjacent Thunder Mountain Project area.

Monthly estimated expenses thru January 25th: \$ 800

Estimated unexpended balance of authorization: (\$ 7,450)

Mr. T. C. Osborne

- 2 -

February 2, 1973

RED HILLS PROJECT, Pinal County, Arizona

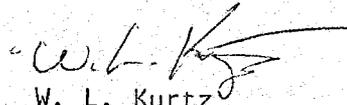
Previously staked ASARCO claims were monumented and additional claims staked to cover fractions. Location work will be performed next month.

Monthly estimated expenses thru January 25th: \$ 2,600

Estimated unexpended balance of authorization: \$17,400

SILVER STATE (balance \$126,800), SUPERIOR EAST (balance \$5,200), POSTON BUTTE (balance \$2,400), SILVER BELL EAST (balance \$8,400), BALD MOUNTAIN (balance (\$1,000)), HARDSHELL (balance -0-), and THUNDER MOUNTAIN (balance \$138,500) were inactive.

Very truly yours,

  
W. L. Kurtz

WLK:lb

Attach: Bohme Progress Map

cc: JHCourtright   
RBCrist  
JDSell

fwe

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

February 1, 1973

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report  
Bohme Project  
ASARCO/Hanna Joint Venture  
January 1973

Drill hole AH-1 passed through the Whitetail-bedrock contact at 3539 feet. Total Whitetail Conglomerate encountered in the hole was 2389 feet. This amount of conglomerate was unexpected under the original premise and, at present, can indicate several things: 1) an infilling basin between detached blocks, and 2) more influence by tilt and vertical tectonics as was found in the Superior East drilling.

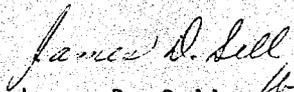
The bedrock below 3539 is indicated by only a few feet of angular slabby clasts of limestone set in the conglomeratic matrix. The bedrock is massing light to dark grey limestone cut by a few breccia (fault?) zones cemented by manganese-bearing material. Also some solution breccia zones with bleached fragments and sparse iron pseudomorphs after pyrite. Based on present knowledge, the limestone is the Mississippian Escabrosa Limestone. The thickness in the Globe-Miami district ranges from 260 feet to 365 feet.

Upon the completion of the hole, the drill rig will be moved to the AH-2 site which is cased to a depth of 1988 feet in Whitetail Conglomerate.

All drill sites and contact footages are shown on Attachment A.

Estimated unexpended balance is \$12,700.

Auditing of the expenses should be made for the participation of Hanna funds upon our meeting of the terms of the agreement.

  
James D. Sell

JDS:lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 p6pi
- Rock type
- Bottom of hole depth

**Post-Mineral Rock Unit**

- Td—Dacite
- Tev—Early volcanics
- Tw—Whitetail

**Pre-Mineral Rock Unit**

- Tap—Granite porphyry
- Tag—Schultz Granite
- Tiqm—Lost Gulch Quartz Monzonite
- Twsg—Willow Springs Granodiorite
- Pal—Paleozoic, undivided
- p6—Precambrian, undivided
- p6db—Precambrian Diabase
- p6pi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of *January 1973*  
**ASARCO-HANNA JOINT VENTURE**

GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

JNC

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

February 1, 1973

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report  
Rawhide Project  
ASARCO/ICC Joint Venture  
January 1973

All location drilling and claim monumenting of LD No. 1 through No. 17 was completed during the month.

Mr. Travis Gant has conducted field work in establishing several corners of the patented land, but will not be surveying in any claim corners at this time.

The Lindburg surveying was completed, along with a few extra Buck claims, and a court order of no trespassing was initiated by the Lindburg group participants.

Some location(?) drilling has been conducted in the area of the Dees & Stew claims of W. Dees. No papers have yet been found in the field except Xerox copies of the location notices. No filings in the court house have been noted.

Estimated unexpended balance is \$125,500.

*James D. Sell*  
James D. Sell

JDS:1b

JHC

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

February 1, 1973

TO: W. L. Kurtz

FROM: J. D. Sell

Monthly Report  
Superior East Project  
January 1973

Road building east from drill site A-2 has progressed some 300 feet during the month. W. L. Kurtz late last week found new location notices by W. Dees on the Margaret claims.

Discussion on future drilling on the project area has been made and tentative plans have been formulated with a test to the east of A-2 (actually on the Rawhide area when the joint venture proposal is signed) and another south of A-4 on the project proper.

The hole on the State Lease land of Coryell, hole KC-1, was terminated at a depth of 3304 feet (driller's shift report). Cuttings and core chips at the site suggest a brown fine-grained limestone (dolomitic) unit was the last encountered. This is presently interpreted as being the Devonian Martin Limestone. Verbal report by the foreman suggested some three hundred feet of limestone had been cut. NX casing was set at 2966 feet and Whitetail Conglomerate was reported at 3039 feet. Thus the formation change is estimated at 3040(?) feet. If the reported unit and footage are correct, then a fault of considerable magnitude exists between KC-1 and A-4. An alternate possibility (probability?) is that the unit is a slide block. The driller reported going into "shaley" zones between limestone units, and these may be fine-grained mudstone units of the Whitetail Conglomerate.

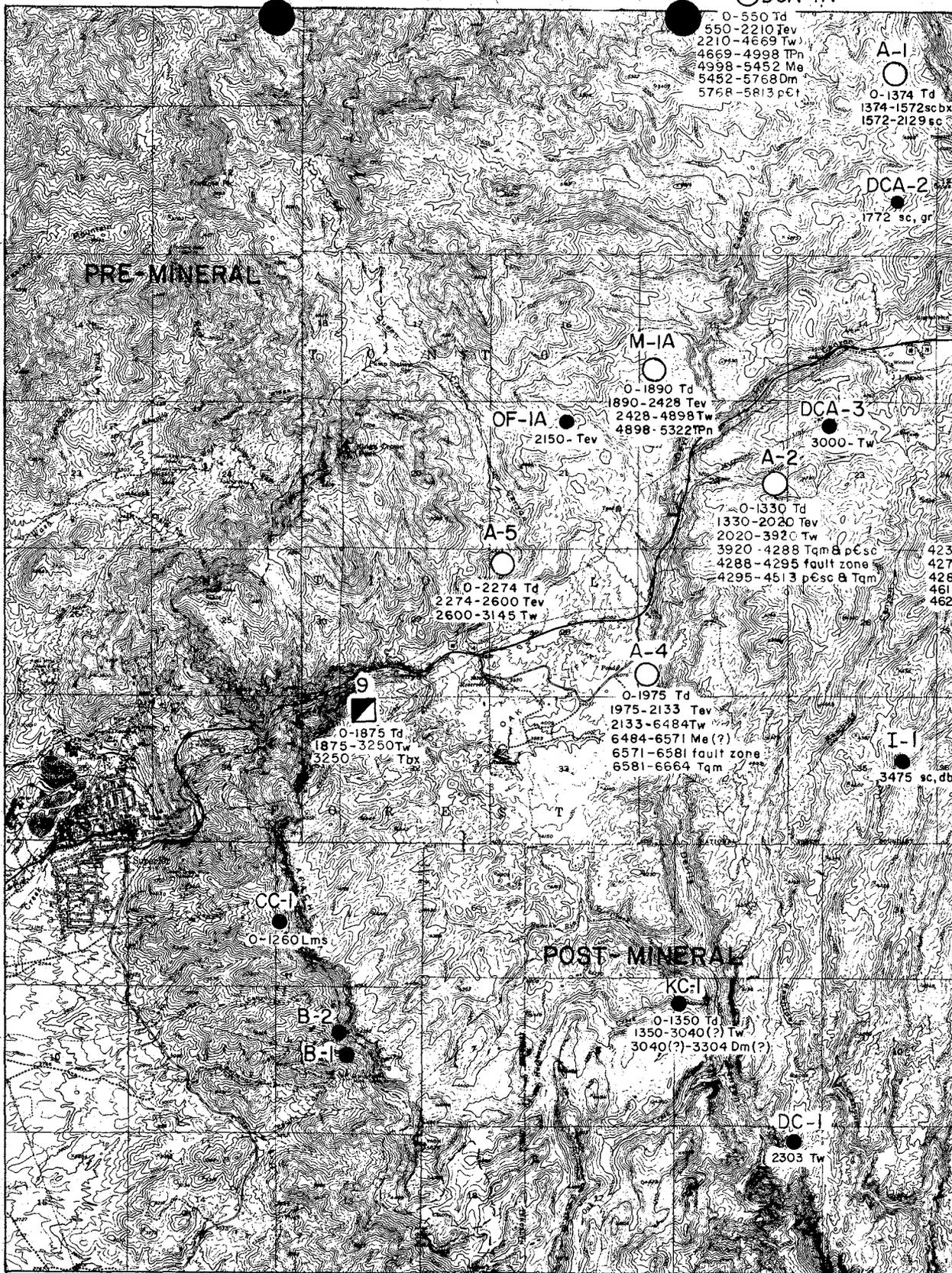
The Magma drill hole CC-1 is a skid rig drilling a 60° angle hole and is reported at 1260 feet in limestone. Apparently drilling problems (lost circulation?) is plaguing the drilling. The hole was collared near the Whitetail-Pennsylvanian Limestone contact.

The Conoco Oil drill rig on Norandex claims was moved off this week. The vertical hole is in the SW quarter of section 21, T2S, R13E, approximately three-quarters of a mile south of the south boundary of Attachment A (the section south of Section 16). The hole was collared near the Whitetail-Pennsylvanian Limestone contact. No information is known on the findings.

The estimated unexpended balance is \$5,200.

*James D. Sell*  
James D. Sell

JDS/lb  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- Magma's # 9 shaft
- DCA-1 (hole designation)
- 4011 Tw
- Rock type
- Bottom hole depth
- Proposed drill site

POST-MINERAL ROCK UNIT

- Td - Dacite
- Tev - Early volcanics
- Tw - Whitetail

PRE-MINERAL ROCK UNIT

- Tbx - Breccia
- Tqm - Quartz Monzonite
- Tgr - Granite
- TPn - Naco limestone
- Mg - Escobedo limestone
- Dm - Martin lms
- pCt - Troy qtz
- pCdb - Diabase
- pCsc - Schist

**DRILLING PROGRESS MAP**  
 for the month of January 1973  
**SUPERIOR EAST**  
 GILA & PINAL COUNTY, ARIZONA  
 SCALE: 1" = 1 mile  
 J.D.S.  
 2463

JHC

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

February 1, 1973

Memorandum to: W. L. Kurtz

From: F. T. Graybeal

3R Project (MA 0040)  
Monthly Report  
January 1973

Petrographic work, assaying, and relogging of TR-10 was completed and a summary report submitted. Splitting of all the remaining core for geochemical analyses has been started.

Summary reports on the Anaconda TR and ASARCO SU drill projects were submitted. Field mapping was continued in the BX area.

Expenditures during the month were \$800, leaving an estimated deficit of \$7,450.

*F. T. Graybeal*  
F. T. Graybeal

FTG:lb

*JHC*

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

February 1, 1973

Memorandum to: W. L. Kurtz

From: F. T. Graybeal

Thunder Mtn. Project  
(MA 0042)  
Monthly Report  
January 1973

Kerr-McGee has staked a total of 7 claims in two areas of open ground west of the Humboldt mine. Validation work must be completed before March 13, 1973.

Additional logging of Kerr-McGee drill holes was performed.

Expenditures during the month were \$250, leaving a balance of \$138,500.

*Fred T. Graybeal*  
Fred T. Graybeal *ll*

FTG:1b

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

I. H. C.  
DEC 1 - 1972

November 28, 1972

TO: W. L. Kurtz

FROM: J. D. Sell

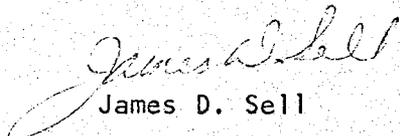
Monthly Report  
Bohme Project  
ASARCO/Hanna Joint Venture  
November 1972

Whatley Drilling Company has cased drill hole AH-1 with 4-inch casing to a depth of 1690 feet. Boyles Brothers has moved a CP-50 diamond core rig onto the hole and is expected to drill out the plug and commence coring within the next few days.

Whatley has moved onto site AH-2 and as of the 25th was at 651 feet in the early volcanic unit after penetrating through the dacite. It is estimated that only a minor amount of volcanics remain prior to going into Whitetail Conglomerate. As before, the hole will be cased for coring and the rotary rig will move to drill site AH-3.

All drill sites and contact footages are shown on Attachment A.

Estimated unexpended balance is \$103,000.00.

  
James D. Sell

JDS:lab  
Attach.



**EXPLANATION**

- Previous drill hole
- ASARCO drill hole
- BC-2 (hole designation)
- 872 p6pi
- Rock type
- Bottom of hole depth

**Post-Mineral Rock Unit**

- Td—Dacite
- Tev—Early volcanics
- Tw—Whitetail

**Pre-Mineral Rock Unit**

- Tgp—Granite porphyry
- Tsg—Schultze Granite
- Tlqm—Lost Gulch Quartz Monzonite
- Twsg—Willow Springs Granodiorite
- Pal—Paleozoic, undivided
- pE—Precambrian, undivided
- p6db—Precambrian Diabase
- p6pi—Precambrian Pinal Schist

**BOHME PROJECT**  
**DRILLING PROGRESS MAP**  
 for the month of NOV. 1972  
**ASARCO-HANNA JOINT VENTURE**  
 GILA COUNTY, ARIZ.  
 Scale 1:24,000 J.D.S.

J. H. C.

AUG 3 - 1972

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

August 1, 1972

Mr. J. J. Collins  
Director of Exploration  
New York Office

Proposed Drill Hole Locations  
ASARCO-Hanna Joint Venture  
Gila County, Arizona

Dear John:

Enclosed is the north-south cross section through the ASARCO-Hanna joint venture property which you requested and a short statement by Mr. Sell on the units we expect to encounter in our drilling program.

Very truly yours,

*W. L. Kurtz*  
W. L. Kurtz *W.L.*

WLK:lad  
Enc.

cc: JHCourtright - w/enc. 

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

July 24, 1972

TO: W. L. Kurtz

FROM: J. D. Sell

Proposed Drill Hole Locations  
ASARCO-Hanna Joint Venture  
Bohme-Coryell Property  
Miami District  
Gila County, Arizona

Attached are a plan map (Attachment A) and cross-section A-A<sup>1</sup> (Attachment B) showing the proposed locations for the drill holes in the ASARCO-Hanna joint venture proposal.

Drill holes AH-1 and AH-2 will test the Black Segment area of the Copper Cities deposit above the Webster Gulch basement fault, while AH-3 will test the root zone of the Live Oak deposit below the Webster Gulch fault.

Anticipated depths and units are as follows:

Drill Hole AH-1:

0-900	Postmineral Dacite	0-1150	
900-1900	Postmineral Whitetail Conglomerate	1150-3539	
1900-3700	(Target) Lost Gulch Quartz Monzonite and Granite Porphyry		
	Fault		
3700-	Precambrian Pinal Schist and Diabase		3539-3678 Me 3678-3863 Dm } mineralized

Drill Hole AH-2:

0-900	Postmineral Dacite	0-728	
900-2200	Postmineral Whitetail Conglomerate	728-3400	
2200-4100	(Target) Lost Gulch Quartz Monzonite and Granite Porphyry		
	Fault		3400-3590 Me
4100-	Precambrian Pinal Schist and Diabase		3590-3770 Dm 3770-3781 Peds

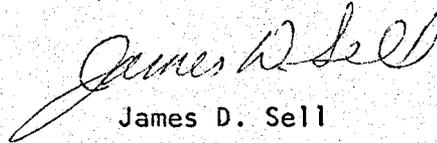
Drill Hole AH-3:

0-600	Postmineral Gila Conglomerate	0-770	
600-900	Postmineral Dacite	770-1730	
900-2100	Preminal Lost Gulch Quartz Monzonite and Schultze Granite		
	Fault		1730-1743 Tw
2100-3500	(Target) Schultze Granite		1743-1796 Pcd 1796-1954 Pci 1956-2072 Pcd 2072-3619 Pci

July 24, 1972

The locations may be moved somewhat due to final accessibility for the large size drill areas which are necessary.

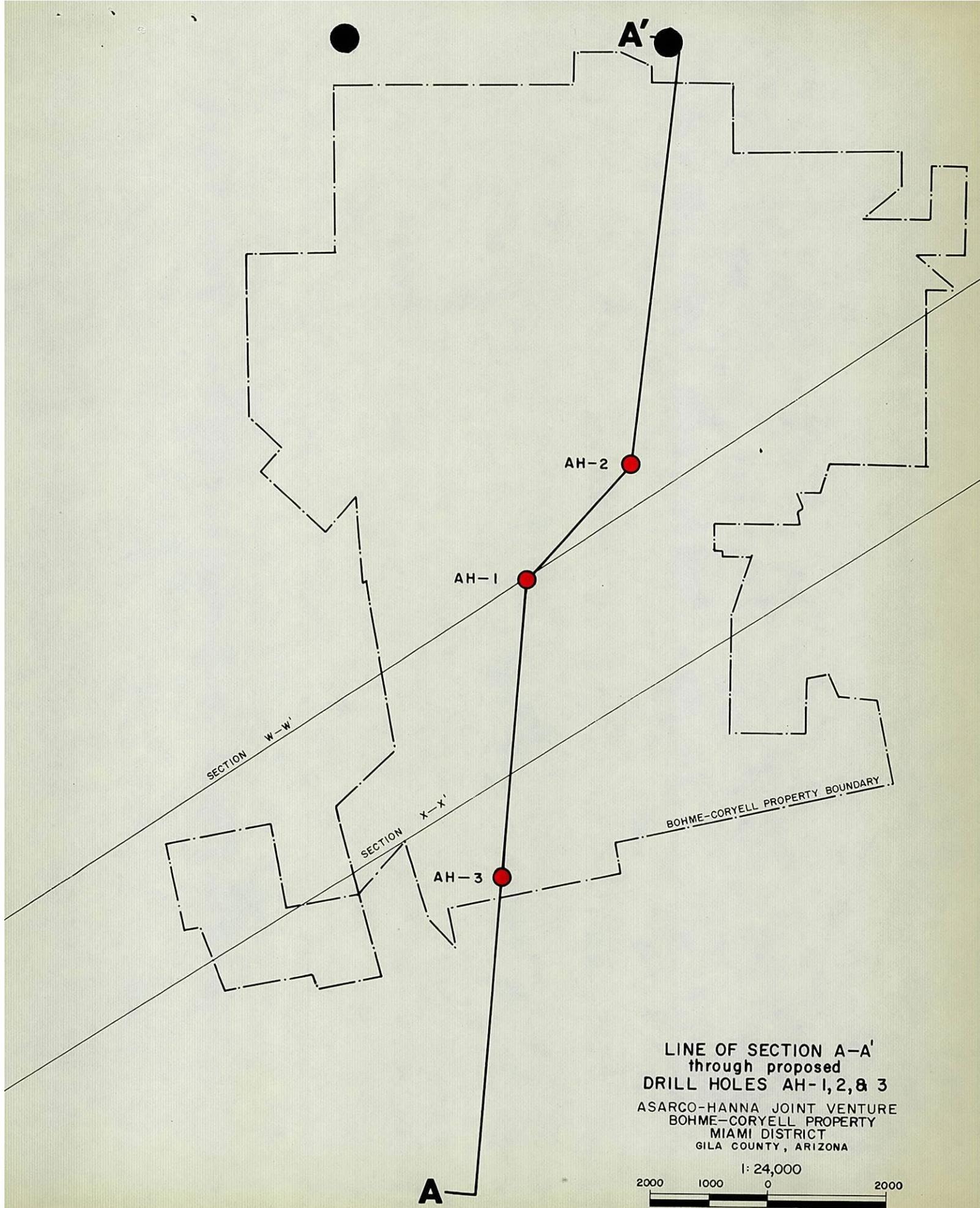
The plan map also shows the Bohme-Coryell claim outline as well as the location of the cross-sections W-W<sup>1</sup> and X-X<sup>1</sup> which accompanied my Hanna Joint Venture Exploration Proposal report dated June 12, 1972.

A handwritten signature in cursive script, appearing to read "James D. Sell".

James D. Sell

JDS:lad

Attachs: A & B



LINE OF SECTION A-A'  
through proposed  
DRILL HOLES AH-1, 2, & 3

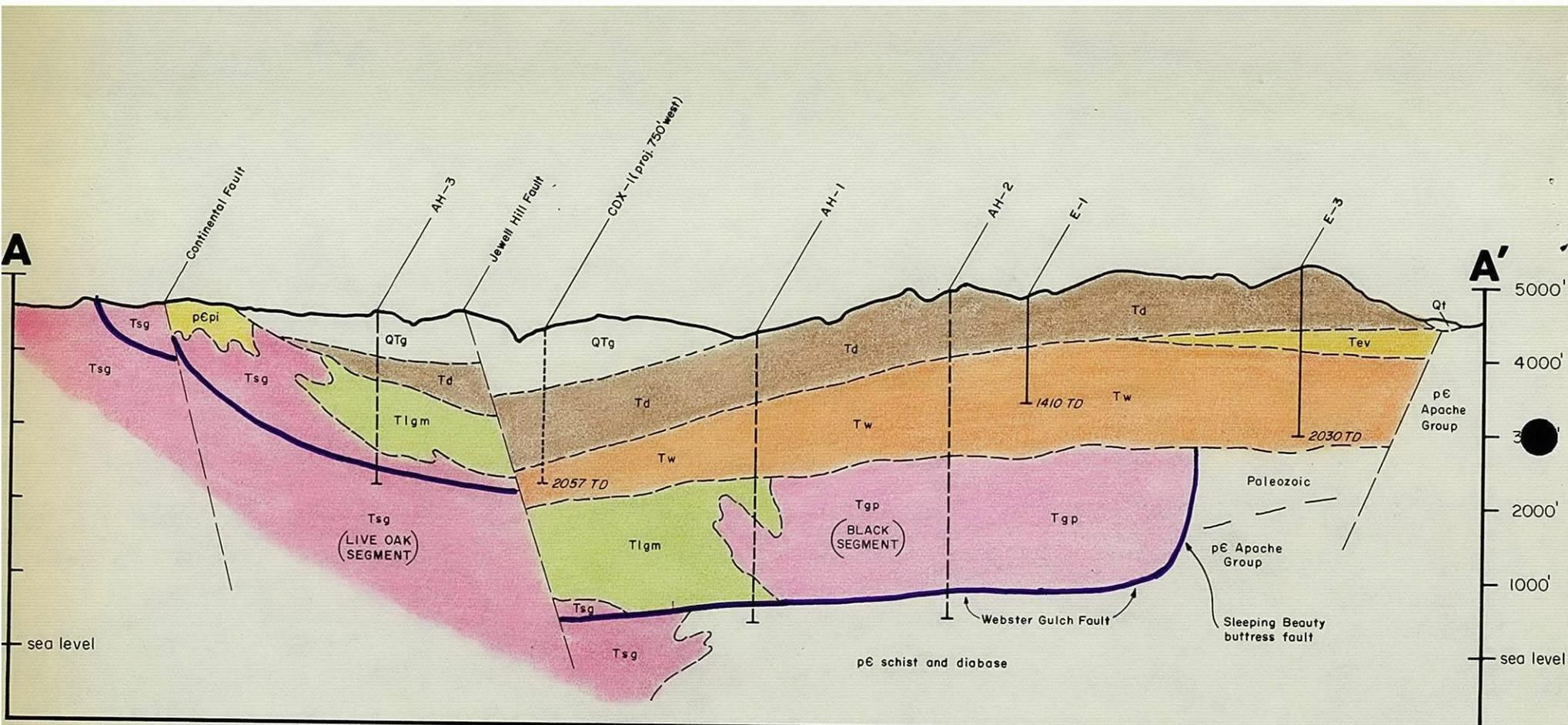
ASARCO-HANNA JOINT VENTURE  
BOHME-CORYELL PROPERTY  
MIAMI DISTRICT  
GILA COUNTY, ARIZONA

1: 24,000



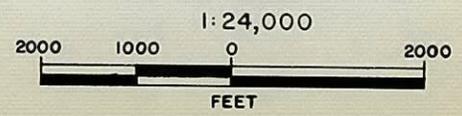
JDS

JULY 25, 1972



LOOKING WEST

NORTH-SOUTH SECTION A-A'  
 through proposed  
 AH series DRILL HOLES  
 ASARCO-HANNA JOINT VENTURE  
 BOHME-CORYELL PROPERTY  
 MIAMI DISTRICT  
 GILA COUNTY, ARIZONA



JDS

JULY 25, 1972

JHC

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

July 25, 1972

TO: W. L. Kurtz

FROM: J. D. Sell

ADDENDA

Hanna Joint Venture  
Exploration Proposal  
Bohme-Coryell Property  
Miami District  
Gila County, Arizona

In my report on the above subject dated June 12, 1972 I included a cross-section W-W<sup>1</sup> showing the present position of rock outcrops and mineral deposits along a line southwest of Copper Cities toward Castle Dome. The section included the interpretation of fault movement along several flat faults and the suspected location of several hidden deposits.

Although the section X-X<sup>1</sup> indicated the various amounts of movement along the various proposed flat faults, through the matching of specific rock unit contacts, it was not as clear on section W-W<sup>1</sup> where the ore bodies were involved.

Attachment A of this memo is intended to clarify the evolution of fault movement extension along the various flat faults and a modification of the present interpretation as given in the modified section W-W<sup>1</sup>.

Stage I. The apparent configuration after the intrusion of the Tertiary Lost Gulch Quartz Monzonite and a younger core of Tertiary quartz porphyry with the attendant mineralization-alteration outline. The location of the flat fault planes of movement which extend the porphyry-mineral system are also shown.

Stage II. The configuration after the initial movement along the Webster Gulch fault and the Black fault zones.

Stage III. The configuration upon full extension by flat faulting through continued movement along the Empress and Williams fault zones.

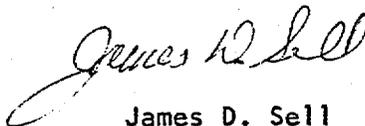
Stage IV. The present day configuration after block faulting, deposition of the Whitetail Conglomerate, Earlier volcanics, and Dacite cover rocks and late Quaternary gravel deposits. Some additional movement has taken place along the block fault structures as well as along the West Williams fault. Erosion then sculptured the surface to its present outline.

July 25, 1972

To be noted here is the modification of the original section W-W<sup>1</sup>, whereby a thin part of the Diamond H segment is found under the Williams Faults. The presently exposed portion of Diamond H is to the north and undoubtedly represents a side-buttress remnant which was sliced off in passage of the roof zone as presently exposed at Copper Cities.

Also to be noted is that the roof zone of the Copper Cities deposit has been totally covered by premineral rocks and not subjected to any supergene effects, whereas the Black Segment area was subjected to erosional effects and probably exposed for a supergene enrichment cycle prior to being covered by the postmineral units. Similarly, the Diamond H segment was buried under premineral rocks as shown in the section (but was exposed in the side-buttress remnant to the north) while the Copper Cities roof was exposed.

The approximate ASARCO-Hanna joint venture area is shown with Miami Copper Company division of Cities Service Company claims on both sides as shown in the final section W-W<sup>1</sup>.



James D. Sell

JDS:lad  
Attach.

## OFFICE OF THE SECRETARY

New York, N.Y., June 23, 1972

J. H. C.

JUN 26 1972

Mr. J. J. Collins

The following is an extract from the minutes of the Advisory Committee meeting held on June 21, 1972:

Mining Authorization #0037-00  
 Hanna Joint Venture  
 (Bohme-Coryell Property)  
 Gila County, Arizona

It was reported that Company Geologists have, for several years, been interested in a covered block of ground in the Miami Mining District, known as the Bohme-Coryell property, as a prime exploration area for the discovery of one or more porphyry copper deposits. It was reported further that two target areas are available for exploration by the Company through a joint venture with the Hanna Mining Company (Hanna), which controls the Bohme-Coryell property. It was reported further that a 50/50 joint venture agreement has been negotiated with Hanna. Asarco's initial work commitment, under the terms of this agreement, would be to spend \$150,000 by August 14, 1973 and if Asarco continues to participate it must expend an additional \$100,000 by May 27, 1975. In order to test the two porphyry copper target areas, approximately 8,000 feet of drilling in three drill holes would be required. Asarco's share of these costs to accomplish this minimum test would be \$150,000.

Company Geologists request approval to conclude the 50/50 joint venture agreement with Hanna and to expend \$150,000 for drilling on the Bohme-Coryell property.

There was approved the concluding of the aforesaid agreement with Hanna and there was also approved a mining authorization in the amount of \$150,000 for 8,000 feet of drilling at the Bohme-Coryell property, Gila County, Arizona, a possible copper prospect.

J. F. Hornbostel, Jr.

JFH:pg

Encl.

RLHennebach w/encl.

FGHamrick w/encl.

HQStringham w/encl.

JHCourtright

WLKurtz

RBCrist

KAVdSteinen

AUTHORIZATION FOR MINERAL EXPLORATION

June 16, 1972.

Originating Office ...TUCSON - SWED.....

DESCRIPTION:

Hanna Joint Venture,

LOCATION OF PROSPECT/PROJECT: 4 miles west of Miami, Gila Co., Arizona

PARTNERS: Hanna Mining Company

Partner's Per Cent ..50%. (subject to dilution)

COMPANY:  ASARCO

Subsidiary. Specify .....

WORK CONTEMPLATED:

Complete 8,000 feet of drilling in three drill holes to test two porphyry copper target areas on ground controlled by Hanna Mining Company.

Total estimated cost (FORM 302-MA ATTACHED)

\$..150,000.....

Reviewed by *[Signature]*  
Acct. Mgr. or Chief Acct.

Approved by *[Signature]*  
Director Vice President of Exploration

Recommended by *[Signature]*  
Supervisor

Approved by *[Signature]*  
Comptroller

Account Chargeable to *Exploration Expense*  
To be designated by Comptroller

Approved by Advisory Committee  
*June 21* 19 *72*

Approved by Board of Directors  
.....19 .....

.....  
Secretary



MAR 15 1971



AMERICAN SMELTING AND REFINING COMPANY  
SOUTHWESTERN EXPLORATION DIVISION

P. O. BOX 5747, TUCSON, ARIZONA 85703

W. E. SAEGART  
SUPERVISOR

W. L. KURTZ  
ASSISTANT SUPERVISOR

1150 NORTH 7TH AVENUE  
TELEPHONE 602-792-3010

March 9, 1971

Mr. Victor E. Kral, Resident Manager  
Coastal Mining Company  
2020 East 13th Street  
Tucson, Arizona 85719

*Miami District  
Gila Co., Ariz*

Dear Sir:

*file*

This letter will serve to clarify the views which I have expressed during our recent conversations in connection with Hanna's Bohme-Coryell Property located in Gila County, Arizona. We consider that this Property is favorably located along the Miami-Superior porphyry copper lineament and as such, constitutes an attractive exploration target. From the information we have gathered on this post-mineral covered graben block, we assume that drill hole depths averaging 3,000 to 3,500 feet would be required to penetrate the post-mineral sequence and explore the underlying rocks. Because of the depths involved, the costs of drilling sufficient holes to explore the Property would be very substantial. Accordingly, we would like to propose a joint-venture between Hanna and Asarco to explore the Bohme-Coryell Property. By sharing the costs of drilling it should be possible to effect a fairly comprehensive test and still limit individual expenditures to a reasonable order of magnitude.

*file*

I would like to suggest a 50-50 joint-venture arrangement wherein Asarco would be the operating partner. It is assumed that your total expenditures to date are on the order of \$40,000.00. We propose to spend a greater amount - - - say \$60,000.00 to earn our 50% interest. After Asarco spends this initial amount, expenses and profits would be shared equally between the two companies.

It is my understanding that no further property payments are due during the remainder of your five year option, and that you have an unfulfilled work commitment of approximately \$120,000.00 which must be spent before May 27th, 1973. I think we are generally in agreement concerning the type and scope of drilling program which would constitute a minimum test of the Bohme-Coryell Property. We propose then, that the drilling program for this minimum test would be mutually developed and agreed to by both companies. At this time we are thinking that five additional holes costing some \$300,000.00 would constitute the minimum test to be conducted during the next two years.

Mr. Victor E. Kral

- 2 -

March 9, 1971

With the proposal which I have suggested, Asarco would spend \$180,000.00 of this amount. Subsequent work program proposals would be submitted to Hanna for consideration and review. I would think, however, that the final decision concerning subsequent exploration or development would have to be made by Asarco as the operating partner.

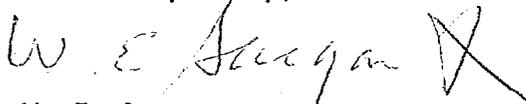
If we should be successful in proving an ore deposit, we would then make plans for putting the property into production. These plans would, of course, be made only after consultation with Hanna. Any profits or losses from production would be shared equally. At any time before the property is put into production, either party may decide not to make further contributions and if the other party wishes to continue, the party ceasing to make contributions will have its interest proportionately reduced. If Asarco should be the one to decide not to contribute further, Hanna would then become the manager of the project.

I believe this is sufficient to give you a general idea of our proposal. If we can come to an agreement on general terms, we would be happy to draft a formal document for your consideration.

We have had four of our Geologists studying the Miami-Superior porphyry copper belt continuously for the past five months. Our studies have developed a great deal of information concerning the general nature of ore deposits along this trend. We feel that we now have a good understanding of the local enrichment history as well as the post-mineral structural complexities. Hopefully this accumulated information could be effectively utilized in connection with a joint-venture of the Bohme-Coryell Property. We also can contribute the results of both high and low level aeromagnetic surveying covering the area.

I would be happy to explore this subject in greater detail if your Management would consider a joint-venture with Asarco on this Property. We would also be willing to explore other avenues for participation.

Yours very truly,



W. E. Saegart

WES:van

cc: J. J. Collins  
J. H. Courtright ✓  
W. L. Kurtz  
J. D. Sell  
S. I. Bowditch/R. B. Crist

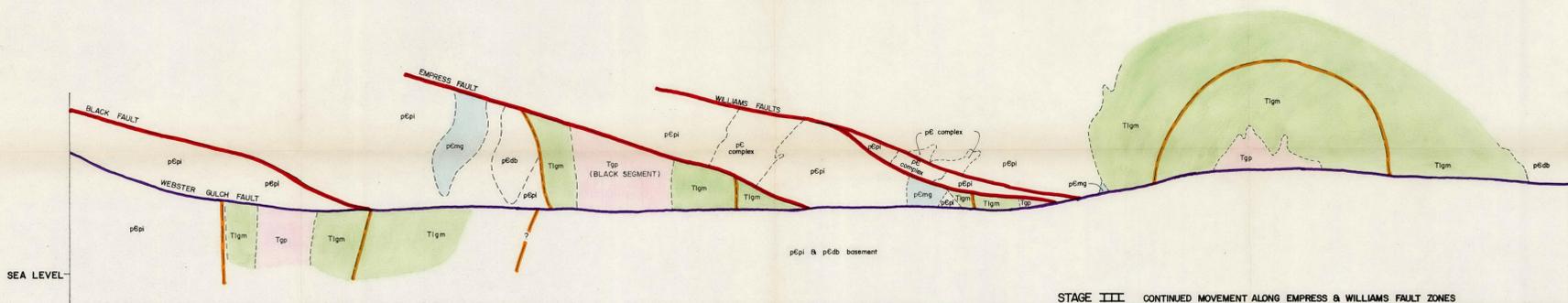
TO ACCOMPANY REPORT  
 DATED 7/25/72  
 BY J. D. SELL



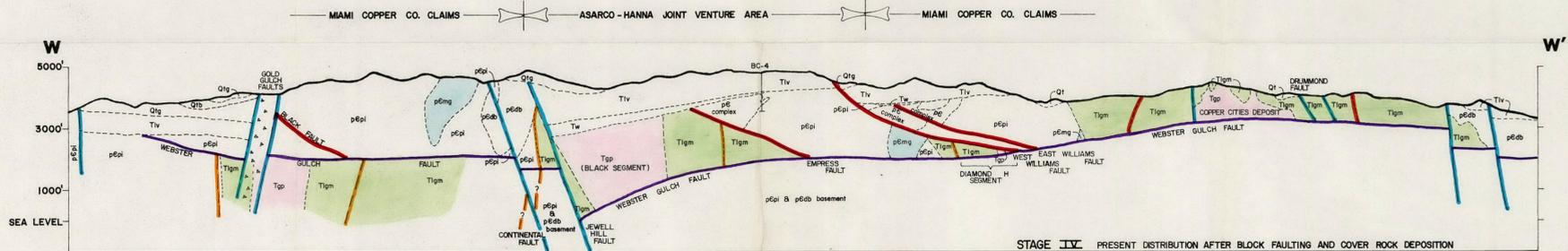
STAGE I PORPHYRY - MINERALIZATION EMPLACEMENT



STAGE II MOVEMENT ALONG WEBSTER GULCH & BLACK FAULT ZONES



STAGE III CONTINUED MOVEMENT ALONG EMPRESS & WILLIAMS FAULT ZONES



STAGE IV PRESENT DISTRIBUTION AFTER BLOCK FAULTING AND COVER ROCK DEPOSITION

**EXPLANATION**

(NOTE: see attachment A for rock unit designation)

- CASTLE DOME - COPPER CITIES BASEMENT FAULT
- INTERNAL CASTLE DOME - COPPER CITIES IMBRICATE FAULTS
- INSPIRATION - MIAMI BASEMENT FAULT
- INTERNAL INSPIRATION - MIAMI IMBRICATE FAULTS
- NORMAL (POST IMBRICATION) FAULTS
- EXPOSED OR KNOWN ROOT & SEGMENT MINERAL DEPOSITS
- POSTULATED ROOT & SEGMENT MINERAL DEPOSITS
- COX-1 KNOWN DRILL HOLE

**EVOLUTION OF FAULT MOVEMENT EXTENSION ALONG SECTION W-W' (MODIFIED) ASARCO - HANNA JOINT VENTURE BOHME - CORYELL PROPERTY MIAMI DISTRICT GILA COUNTY, ARIZONA**

0 1000 2000 3000 4000 5000 6000 7000 FEET

J. D. SELL SCALE 1:24000 JULY 31, 1972