



CONTACT INFORMATION  
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Arizona Geological Survey  
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James Doyle Sell Mining Collection

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# ASARCO

Exploration Department

Frederick T. Graybeal  
Chief Geologist

New York, April 11, 1990

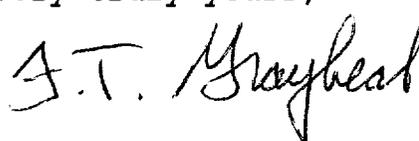
Mr. J. D. Sell  
Tucson Office

Weaver Project  
Arizona

Dear Mr. Sell:

I attach hereto a copy of Form 302-M and the request for the above-captioned project. Please note that this form has been processed by the Controllers Department and by Mr. T. C. Osborne.

Very truly yours,



F. T. Graybeal

FTG:mc  
Att.

cc: E. J. Franko (w/att.)  
W. L. Schoonmaker (w/att.)

ASARCO Incorporated

APR 16 1990

SW Exploration

New York, N.Y., March 26, 1990

To: T. C. Osborne

AEM Requests

RECEIVED  
MAR 28 1990  
T. C. OSBORNE

APR 5 1990  
T. C. O.

The attached table summarizes authorization requests for 11 separate AEM flight blocks totalling 4,451 line miles; 8 are supplemental and 3 are new project areas. The 8 supplementals cover existing claim groups and occasionally large areas of adjacent ground. Asarco holds no ground in areas of the 3 new projects, although Weaver is an extension of the Yarnell project area. Land record searches indicate the new survey areas cover mostly open Federal ground.

Four of the requests exceed \$50,000. All attach a location map, a survey flight block map and various other maps as seemed necessary. Some of the flight blocks have somewhat revised geometries from the original proposal, although I have attached some of the original proposals if they were otherwise useful. Total funds requested are \$560,000; all areas and funds are in Mr. Brown's budget, and there is an additional \$100,000 remaining in the AEM planning for initial follow-up.

Note that the request for each project is for the estimated full amount of each AEM survey even though most of the existing projects have some remaining funds. These remaining funds will be used either for AEM follow-up or assessment work (AEM is not applicable for assessment work commitments) in an additional authorization where required.

Our consultant has advised all geologists how to review data quality in the field before data are sent to Dighem in Toronto for reduction and has reviewed all flight blocks for efficient flying format. Several flight blocks include certain areas for flying 1/8 to 1/16 mile spacing over known mineralization to assist with interpretation. Nominal reconnaissance line spacing will be 1/4 mile.

Additional AEM requests will be forthcoming from the Spokane Office. The machine is already in Nevada. Clipped separately are the 11 authorization requests for your review.

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

FTG:mc  
Att.

RECEIVED  
APR 10 1990  
Department of the Interior

AEM SUMMARY

| <u>Area</u>         | <u>Line Miles</u> | <u>Contract Cost</u> <sup>1)</sup> | <u>Total Cost</u> <sup>2)</sup> |
|---------------------|-------------------|------------------------------------|---------------------------------|
| Pine Valley, Nev.   | 247               | 25,935                             | 30,000                          |
| Cooper Peak, Nev.   | 663               | 69,615                             | 80,000                          |
| Lincoln Hgwy, Nev.  | 261               | 27,405                             | 33,000                          |
| Gilbert E., Nev.    | 566               | 59,430                             | 70,000                          |
| Paradise, Nev.      | 1,165             | 122,325                            | 140,000                         |
| Ochre Spring, Utah  | 314               | 32,970                             | 38,000                          |
| Garfield, Utah      | 177               | 18,585                             | 27,000                          |
| Yellow Jacket, Utah | 176               | 18,480                             | 25,000                          |
| Weaver, Ariz.       | 356               | 37,380                             | 45,000                          |
| BVO, Ariz.          | 70                | 7,350                              | 12,000                          |
| Plomosas, Ariz.     | <u>456</u>        | <u>47,880</u>                      | <u>60,000</u>                   |
| Total               | 4,451             |                                    | \$560,000                       |

1) \$105/line mile except Paradise which is billed at \$96/line mile.

2) Includes data interpretation, mobilization, set up charges for navigation, standby for staking crews; does not include actual staking or other follow-up.

*[Handwritten signature]*  
I.C.O.

New York, N.Y., March 26, 1990

To: T. C. Osborne

Exploration Authorization  
Weaver Project  
Arizona

This is a new project covering a 15 mile long strip of shallow pediment along the southwest flank of the Weaver Mtns. which has been proposed for an AEM survey by the Tucson Office. This overlaps the Yarnell Project and covers a long zone of gold occurrences including Yarnell, The Octave mine and other structurally-controlled zones of gold mineralization, some of which extend under post-mineral cover.

Reconnaissance to date suggests all the gold occurrences in this area may be related to a single mineralizing event which extended over a large volume of rock. The AEM survey will assess the area under pediment cover and will fly detailed coverage over the Yarnell gold deposit to provide an AEM signature over gold mineralization in this environment.

Cost is estimated at \$45,000 including contract flying, data interpretation, and standby for staking crews. If you approve please initial and return the attached form.

  
F. T. Graybeal

FTG:mc  
Att.

cc: C.L. Snow (att. Form 302-M)  
(4/17/90)

FORM 302-M

APPLICATION FOR EXPLORATION APPROPRIATION

March 26, 1990

Originating Office Tucson

DESCRIPTION: Weaver Prospect

LOCATION OF PROSPECT/PROJECT:

PARTNERS:

Partner's Per Cent .....

COMPANY:  ASARCO

Subsidiary. Specify .....

WORK CONTEMPLATED:

Contract AEM flying including navigation set-up and mobilization  
Data interpretation  
Stand-by staking crews

Total estimated cost (FORM 302-MA ATTACHED)

\$ 45,000

Reviewed by .....  
Acct. Mgr. or Chief Acct.

Approved by A.T. Graybeal .....  
~~Vice President~~

Recommended by .....  
Supervisor

Approved by R.J. O'KEEFE .....  
Comptroller

**EXPLORATION EXPENSE**  
Account Chargeable to .....  
To be designated by Comptroller

Approved by Advisory Committee

Approved by Board of Directors

.....19 ...

.....19 .....

.....  
Secretary

February 20, 1991

FILE MEMO

Greater Yarnell AEM Areas  
Yavapai County, Arizona

Mr. C.O. Windels and I toured the AEM anomalies areas in the Greater Yarnell district on February 3 and 4. During that time we collected eleven samples covering areas of interest among the AEM anomalous areas.

The LW-series was cut in an adit opening where the central 4-6' "vein" zone returned 0.460 ppm (0.013 opt) gold, whereas the hanging wall section ran 2.300 ppm (0.068 opt) gold. I would have suspected the values should have been reverse, but as Carl and I took separate samples and tags, the mix-up, if any, would be a switch at the lab. Omitting any switch, then the pyritized hanging wall should be reviewed for bulk tonnage type values.

As the LW-1, -2, -3 adit structural zone probably trends (N30°W) to the northwest to the saddle and may then trend northerly along the west, upper, face of the mountain, this zone should be traced out and particular attention paid to the hanging wall areas of pyritization.

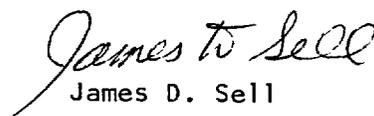
The LW-4, -5, -6 series was taken along a north-south structure which carried minor gold values. The sample LW-7 was in suboutcrop similar to sample LW-4, and returned similar low gold values.

UW-1 and UW-2 taken in upper Weaver Creek was cut in a large quartz mass and along a strong N-S shear. Neither sample was outstanding.

EW-1 and EW-2 were taken within an AEM anomaly and along a shear zone which probably intersects the anomalous area. Only EW-2, cut in the shear zone returned 0.490 ppm (0.014 opt) gold over a 25' cut.

M.A. Miller is requested to review, map, sample, the LW-1, -2, -3 adit and hanging wall, north to the Meyers Mine. Trace the structure over the hill and onto the west face of the mountain and determine if any area is worthy of securing the land based on adequate sampling and interpretation of structure.

JDS:mek  
Att.

  
James D. Sell

cc: W.L. Kurtz  
M.A. Miller  
C.O. Windels

GREATER YARNELL AEM AREAS

Yavapai County, AZ

Sample Descriptions: Yarnell 7½' Quadrangle  
(X.XXX ppm Au, X.XXX ppm Ag)

LW-1 Center, NW¼, Sec. 6, R4W, T9N. Adit zone. Center of shear zone, gouge and shears 4'-6' thick in granite, striking N30°W, dipping 40°-50°NE. MnO<sub>2</sub> dendrites and minor FeOx. (0.460 Au, 1.70 Ag)

LW-2 As above. Adit zone. Footwall portion of shear zone, medium granular granite, crushed but intact, with abundant pyrite casts and some MnO<sub>2</sub> seams, ±4' stratigraphic cut. (0.006 Au, 0.05 Ag)

LW-3 As above. Adit zone. Hanging wall portion of shear zone, large blocky granite, some pyrite casts and abundant MnO<sub>2</sub> dendrites, ±4' stratigraphic cut. (2.300 Au, 1.90 Ag)

Note: Above zone strikes toward Octave Mine to the southeast. Also probably forms saddle portion of ridge to northwest.

LW-4 NE¼NE¼, Sec. 1, R5W, T9N. Open cut zone. On west side of cut. 4' Sample of altered pyritized, sheared metavolcanics, adjacent to rhyolite dike. Zone strikes N-S, dipping vertical to 80°E. Contains pods of plus 10% yellow orange FeOx in clay gouge. (0.012 Au, 0.25 Ag)

LW-5 As above. East wall of cut. ±5' Stratigraphic cut in massive but shattered metavolcanics (which dip flatly to east) with seams and fractures of clay with orange FeOx in gouge. (0.006 Au, 0.05 Ag)

LW-6 As above. Northwest wall of cut. On east side of rhyolite dike (dike is about 4' wide, dipping near vertical). 10' Stratigraphic cut in shattered, bleached metavolcanics, with 1' vertical gouge zone on eastern edge. Abundant pyrite casts and yellow-orange FeOx coloration with black MnO<sub>2</sub> dendrites. (0.010 Au, 0.15 Ag)

Note: Above zone is below the projection of the structure in samples LW-1, -2, -3.

LW-7 NE¼NE¼, Sec. 1, R5W, T9N. In suboutcrop in small drainage cutting road to open cut (±500' from cut). Perhaps part of same zone as sampled by LW-4. Highly altered metavolcanics with yellow-orange FeOx throughout. (0.010 Au, 0.15 Ag)

EW-1 NE¼SE¼, Sec. 5, R4W, T9N. In suboutcrop on east side of Weaver Mtn. in Anomaly G. Fine to medium granular granite with heavy orange FeOx on fractures and in matrix. (0.014 Au, 0.15 Ag).

EW-2 SW¼SE¼, Sec. 32, R4W, T10N. 25' Cut in shear-gouge zone with abundant orange red FeOx. Zone trends N10°W, dipping vertical. (0.490 Au, 0.70 Ag)

GREATER YARNELL AEM AREAS

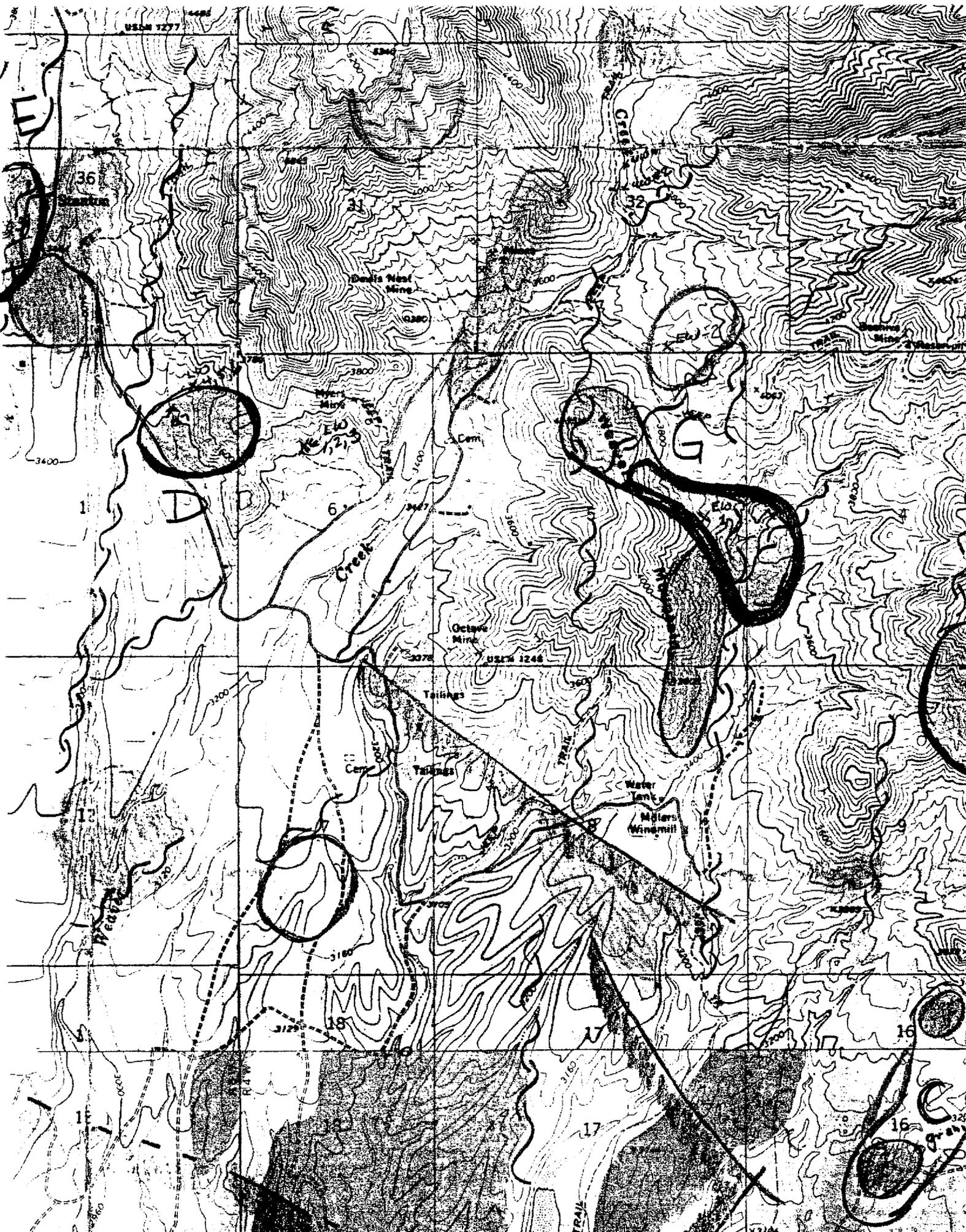
Yavapai County, AZ

Sample Descriptions: Yarnell 7½' Quadrangle (Continued)  
(X.XXX ppm Au, X.XXX ppm Ag)

Note: Zone trend may extend to sample EW-1 area, as well as to UW-1 and UW-2 zone.

UW-1 SE¼NW¼, Sec. 32, R4W, T10N. In open cut. Medium granular granite, sheared and crushed, with massive quartz and specularite seams and interstitial masses with clay and gouge zones. ±5' Cut perpendicular to fracturing trending N30°W, dipping 65°NE, with fine gouge seams dipping 10°-40° NE. (0.018 Au, <0.05 Ag)

UW-2 SE¼NW¼, Sec. 32, R4W, T10N. On east side of road cut in granite. 10' Cut along road, but ±3' cut perpendicular to strong, intense, shears and clay in zone striking N20°-30°W, dipping 65°-70°NE. Minor yellow-orange FeOx on shears. Probably continuation of zone in UW-1. Possibly the northwest striking zone continues to the southeast where EW-2 cut a similar shear and may continue on to EW-1. (0.004 Au, <0.05 Ag)



Deaths Nest Mine

Cem

Octave Mine

Tailings

Tailings

Water Tank

Mills Windmill

Creek

36

32

D

G

Myers Mine

3800

6

Cem

3160

3125

18

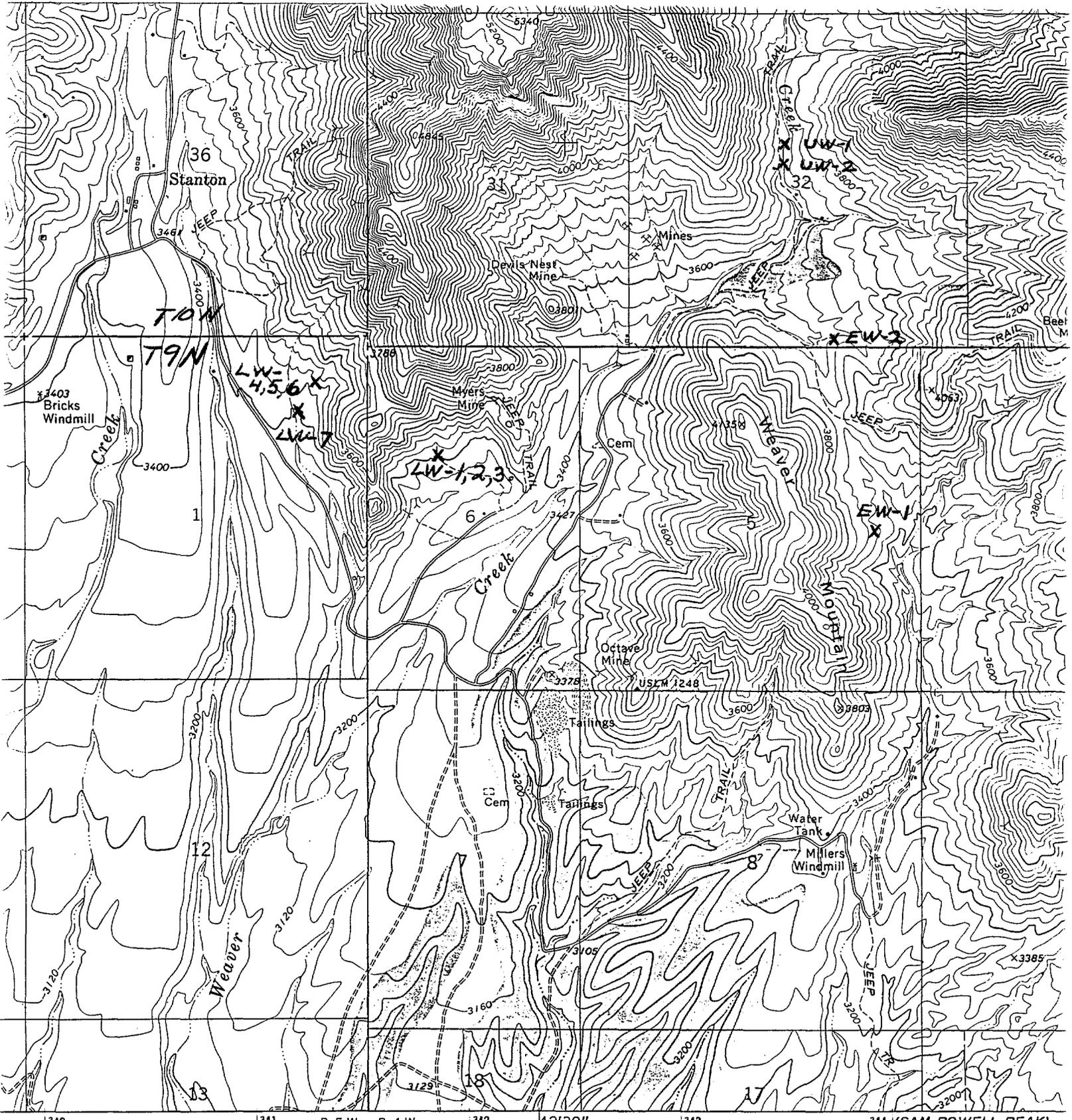
17

16

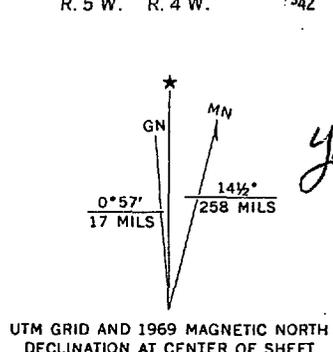
16

Gravel

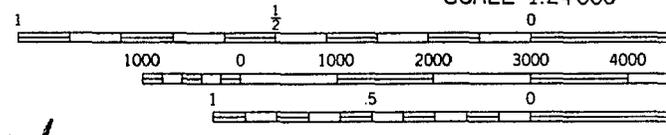
13/04



by the Geological Survey  
 Methods from aerial  
 checked 1969  
 American datum  
 coordinate system, central zone  
 arcator grid ticks,



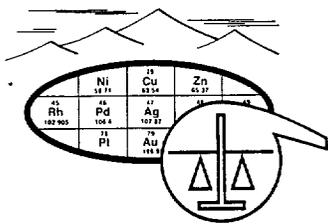
*Yarnell  
 7 1/2' quad.*



CONTOUR INTERVAL 40 FT.  
 DATUM IS MEAN SEA LEVEL

UTM GRID AND 1969 MAGNETIC NORTH  
 DECLINATION AT CENTER OF SHEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCI



**SKYLINE LABS, INC.**

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

**REPORT OF ANALYSIS**

JOB NO. TAJ 714  
 February 15, 1991  
 Project No. AEW  
 LW-1, EW-2  
 PAGE 1 OF 1

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

ASARCO Incorporated

**FEB 19 1991**

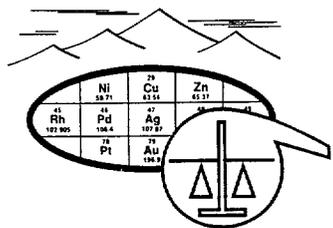
Analysis of 11 Rock Chip Samples

SW Exploration

| ITEM | SAMPLE NO. | FIRE ASSAY   |             |             |             |             |
|------|------------|--------------|-------------|-------------|-------------|-------------|
|      |            | Au*<br>(ppm) | Ag<br>(ppm) | As<br>(ppm) | Sb<br>(ppm) | Hg<br>(ppm) |
| 1    | LW-1       | .460         | 1.70        | 16.0        | 2.0         | .12         |
| 2    | LW-2       | .006         | .05         | 1.0         | .2          | .08         |
| 3    | LW-3       | 2.300        | 1.90        | 1.2         | .6          | .35         |
| 4    | LW-4       | .012         | .25         | 4.8         | .3          | .09         |
| 5    | LW-5       | .006         | .05         | 1.4         | .1          | .09         |
| 6    | LW-6       | .010         | .15         | 34.0        | 1.9         | .06         |
| 7    | LW-7       | .010         | .10         | 8.0         | .3          | .10         |
| 8    | UW-1       | .018         | <.05        | 1.0         | .2          | .07         |
| 9    | UW-2       | .004         | <.05        | .6          | .1          | .06         |
| 10   | EW-1       | .014         | .15         | 2.4         | <.1         | .07         |
| 11   | EW-2       | .490         | .70         | 1.6         | 3.1         | .13         |

\*NOTE: Method of analysis by combination fire assay and atomic absorption.

JDS



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

JOB NO. TAJ 714  
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LW-1, EW-2  
PAGE 1 OF 1

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

ASARCO Inc.  
**FEB 19 1991**  
SW Exploration

Analysis of 11 Rock Chip Samples

| ITEM | SAMPLE NO. | FIRE ASSAY   |             |             |             |             |
|------|------------|--------------|-------------|-------------|-------------|-------------|
|      |            | Au*<br>(ppm) | Ag<br>(ppm) | As<br>(ppm) | Sb<br>(ppm) | Hg<br>(ppm) |
| 1    | LW-1       | .460         | 1.70        | 16.0        | 2.0         | .12         |
| 2    | LW-2       | .006         | .05         | 1.0         | .2          | .08         |
| 3    | LW-3       | 2.300        | 1.90        | 1.2         | .6          | .35         |
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| 6    | LW-6       | .010         | .15         | 34.0        | 1.9         | .06         |
| 7    | LW-7       | .010         | .10         | 8.0         | .3          | .10         |
| 8    | UW-1       | .018         | <.05        | 1.0         | .2          | .07         |
| 9    | UW-2       | .004         | <.05        | .6          | .1          | .06         |
| 10   | EW-1       | .014         | .15         | 2.4         | <.1         | .07         |
| 11   | EW-2       | .490         | .70         | 1.6         | 3.1         | .13         |

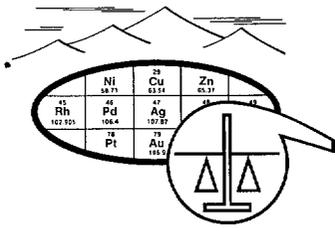
\*NOTE: Method of analysis by combination fire assay and atomic absorption.

Arizona Registered Assayer No. 9425  
WILLIAM L. LEHMBECK  
Manager  
2/15/91

Charles E. Thompson  
Arizona Registered Assayer No. 9427

William L. Lehmbek  
Arizona Registered Assayer No. 9425

James A. Martin  
Arizona Registered Assayer No. 11122



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

**INVOICE**  
**NET 30 DAYS**

**Job No. TAJ 714**  
**February 15, 1991**  
**Project No. AEW**  
**LW-1, EW-2**

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

**Analysis of 11 Rock Chip Samples**

|   |                 |
|---|-----------------|
| 11 Great Basin 3 @ \$16.00*.....                        | \$176.00        |
| 11 samples crushed, split and pulverized @ \$3.20 ..... | \$35.20         |
| <b>Totals</b>   | <b>\$211.20</b> |

\* Multi Element Discount

**COPY**

ASARCO Incorporated

**FEB 19 1991**

SW Exploration

# ORDER FOR ANALYTICAL SERVICES

TAS 714  
2-6-91  
Handl

Samples Sent to:

## SKYLINE LABS, INC.

1775 W. SAHUARO • P.O. BOX 50106  
TUCSON, ARIZONA 85703  
(602) 622-4836 FAX (602) 622-6065

(Report and invoice in duplicate will be sent to address below unless otherwise instructed)

Address Report To:

JAMES D SELL  
SKED, ASARCO  
PO BOX 5747  
TUCSON, AZ 85703  
  
TEL 792-3010 FAX \_\_\_\_\_

PROJ. NO. AEW  
PO. NO.: \_\_\_\_\_  
SHIPMENT NO.: ONE  
DATE SHIPPED: 2/6/91  
SHIPPED VIA: Handl  
NO. OF CARTONS: -  
NO. OF SAMPLES: 11  
(Information above helps us trace lost shipments)

Send Invoice To: as above

Send Copy of Report To: \_\_\_\_\_

| LIST SAMPLE NOS. | DESCRIBE MATERIAL*<br>(ROCK CHIP, SOIL, WATER, DRILL CORE, ETC.) | Au & Ag                      |        | Au & Ag                    |       | Au               |        | ✓ APPROPRIATE BOX FOR AU AND AG ANALYSIS | LIST ADDITIONAL ELEMENTS TO BE DETERMINED<br>(Give anticipated range of values, if possible) | Indicate Method of Analysis**<br>(* See Below) |
|------------------|--|------------------------------|--------|----------------------------|-------|------------------|--------|--|--|--|
|                  |  | STANDARD FIRE ASSAY (OZ/TON) |        | FIRE ASSAY AA FINISH (PPM) |       | GEOCHEM AA (PPM) |        |  |  |  |
|                  |  | Au .002                      | Ag .01 | Au .002                    | Ag .2 | Au .002          | Au .02 |  |  |  |
| LW-1 thru LW-7   | Red ch dip   |                              |        |                            |       | X                | X      |  | Great Basin Suite<br>AA/G reg. title   |  |
| UW-1<br>UW-2     | }  |                              |        |                            |       |                  |        |  |  |  |
| EW-1<br>EW-2     |  |                              |        |                            |       |                  |        |  |  |  |

PAYMENT FOR SERVICES REQUESTED MUST ACCOMPANY ORDER UNLESS CREDIT ARRANGED

Signature of person authorizing work: James D Sell  
(Use Continuation Sheet If Necessary)

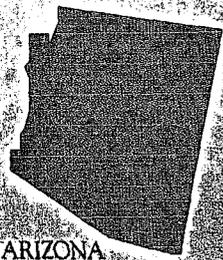
\* IF OTHER THAN STANDARD PREPARATION IS DESIRED, PLEASE ADVISE.  
\*\* METHOD OF ANALYSIS FOR ADDITIONAL ELEMENTS:  
G - Geochem, A - Routine Quantitative Assay

† SAMPLE STORAGE: Pulps stored 90 days pending instructions, bulk rejects stored 30 days pending instructions.

Enclose yellow original with samples, send white copy by mail, retain pink copy. White copy will be returned to shipper as an acknowledgement that shipment has been received.

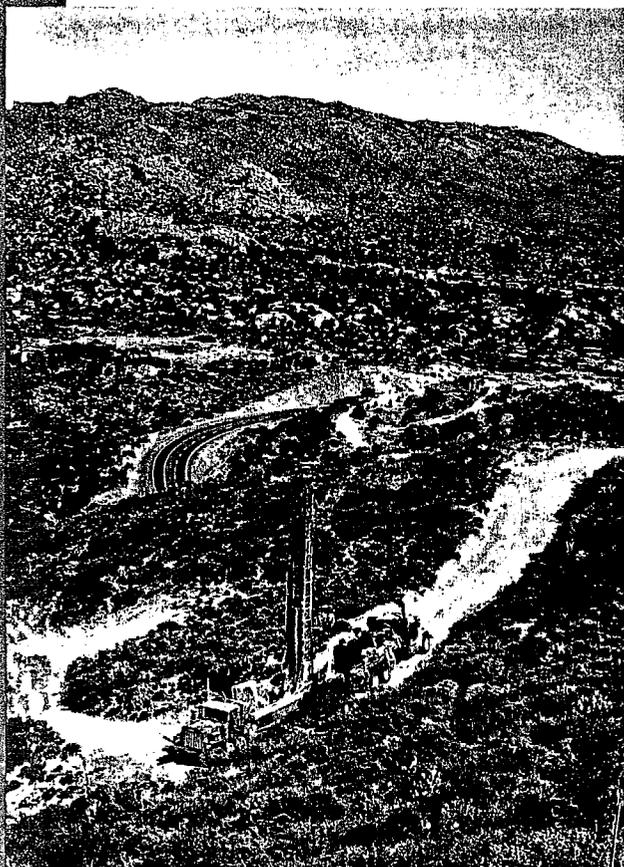
| INDICATE DESIRED DISPOSITION OF SAMPLES AFTER ANALYSIS | Bulk Rejects        | Pulp |
|--|---------------------|------|
| Return at customer's expense via:                      |                     |      |
| Store temporarily pending instructions†                | <u>will hold up</u> |      |
| Discard immediately                                    |                     |      |

## Yarnell Property, Arizona



ARIZONA

EXPLORATION  
DRILLING TO DATE  
ON THE YARNELL  
PROPERTY HAS  
OBTAINED AN  
OXIDE DEPOSIT  
CONTAINING  
773,600 OUNCES  
OF GOLD RESERVES



Bema's primary target in the successful takeover of Norgold Resources was the Yarnell Property, located in western Yavapai County, Arizona, 65 miles northwest of Phoenix. Exploration drilling to date has outlined an oxide deposit 1,800 feet in length, 500 feet in width with an average thickness of 140 feet, containing 273,600 ounces of gold reserves, with the deposit remaining open. The acquisition of this property at a cash equivalent cost of approximately U.S. \$16 per ounce of gold supports Bema's philosophy of increasing its reserves and production through the acquisition of properties with minimal acquisition costs, low debt and the potential for rapid development to full scale production.

An independent geological reserve of 7.6 million tons grading 0.036 ounces per ton gold containing 273,600 ounces of gold has been calculated at a 0.01 ounce per ton gold cut-off grade. Further drilling is planned to test the potential for additional reserves to the southwest and northeast of the deposit. Independent analysis of diamond drilling versus reverse circulation drilling results concludes that the reverse circulation drilling program may have significantly understated the grade of the deposit. Metallurgical testwork has demonstrated that the Yarnell ore is amenable to heap leaching with gold recoveries of approximately 71% at a crush size of - 2 inches. Cyanide and lime consumptions are moderate and agglomeration is not required at this crush size.

Bema Gold's operations team has carried out an initial review of the project that suggests the Yarnell Property could be put into production as a low cost, heap leach gold mine at a production rate of approximately 33,000 to 40,000 ounces of gold per year. Bema has initiated permitting and a feasibility study on the property, with production scheduled to commence in 1992. Life of Mine operating costs are estimated at approximately U.S. \$ 200 per ounce.

*Annual Report 1990*