



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)

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AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

May 28, 1970

TO: W. E. Saegart  
FROM: A. Dalla Vista

Sacaton West Orebody  
Six-inch Core Drilling  
Final Report  
Pinal County, Arizona

Drilling on the project area began on January 17 and was completed by the 4th of May 1970.

The prime contractor was Shelton Drilling Company of Pheonix, Arizona. However, as explained later in this report, one phase of the drilling was sub-contracted to Golden State Drilling Company of Frisco, Colorado.

No breakdowns or delays hampered the drilling program.

A total of approximately 38.2 tons of bulk sample have been produced. Of these, 22 tons represented low-oxide sulphide ore ( $< .1\% \text{Ox-Cu}$ ) and 16.2 tons were classified as high oxide sulphides ( $\geq .1\% \text{Ox-Cu}$ ). In addition, about 1.3 tons of rotary cuttings, derived from what was believed to be ore grade material within the oxide zone, were collected for leaching tests.

A total of 15 holes were drilled. Ten were located about 10-15 feet from the original exploratory diamond drill holes, and five (SBI through SGM) were interspaced within the area of stronger high-oxide sulphide ore.

Two of the interspaced holes (SCM and SHM) were not cored, as originally planned.

The tabulation on the following page shows the footage rotary drilled and the footage cored in each individual hole.

Mr. Saegart,

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5/28/70

Hole No.	<u>Rotary (10") (ft)</u>	<u>Rotary to Core Point (8") (ft) in bedrock</u>	<u>Hi-Ox Suls. (ft)</u>	<u>Lo-ox Suls. (ft)</u>	<u>* Advance ft/hr</u>
S-GM	270	34.50	106.50	103.00	1.98
S-10M	260	75.00	- -	183.50	1.97
S-13M	145	289.00	87.00	148.00	1.61
S-90M	190	219.00	99.00	- -	1.38
S-91M	105	175.00	110.00	235.00	1.40
S-93M	175	108.00	32.00	143.00	1.80
S-94M	105	270.00	96.00	148.00	1.48
S-95M	200	180.00	25.00	173.70	1.61
S-103M	260	190.00	53.20	131.00	2.00
S-111M	165	143.00	52.00	199.50	1.65
S-BM	125	246.00	100.00	- -	2.12
S-CM	165	253.00	NOT CORED		
S-DM	100	340.00	130.00	- -	2.06
S-EM	215	145.00	60.00	- -	1.70
S-FM	180	220.00	55.50	- -	1.03
S-GM	145	235.00	80.00	- -	2.10
S-HM	<u>240</u>	<u>150.00</u>	<u>NOT CORED</u>		
TOTALS	3,045	3,276.50	1,086.20	1,464.70	1.75

\* Computed on the total time charged: Actual drilling, Mixing mud and moving.

Average weight of core was 30.0 lbs/ft.

Drilling was done in three different phases and a detailed description of the technical aspects of each is given below.

#### ROTARY DRILLING TO BEDROCK and CASING (10")

In the 15 holes drilled, bedrock depths ranged from 95 to 270 feet and averaged approximately 178 feet. About forty five (12 hour) shifts were required to drill the aggregate 3,045 feet through overburden.

Drilling was done with a Failing CF-15 WABCO using a 9 7/8" Tricon bit to drill a hole of sufficient diameter to set 8 5/8" OD casing.

The mud used for this phase was a mixture of quickgel, quicktrol and CC-16. Viscosity of the mixture was generally about 35-40 seconds.

Attempts to pull the casing upon completion of the holes proved unsuccessful.

Cost for this phase run \$7.00 per foot of drilling. Casing not recovered was charged at the rate of \$2.75 per foot.

#### ROTARY DRILLING TO CORE POINT IN BEDROCK (8")

When penetration using mud circulation with the Failing CF-15 proved to be far from satisfactory, this phase was subcontracted to Golden State Drilling of Frisco, Colorado. A Portadrill with a 600 cfm and a 130 spi auxiliary compressor were brought in and good penetration was achieved.

A total of 3277 feet were drilled at a cost of \$4.75 per foot.

The advance averaged around 96 feet per shift (10 hours): Quickfoam was the only additive used, to help the recovery of rotary cuttings when drilling below water table.

#### CORE DRILLING (6")

Coring was done on a 24-hour basis with a newer model CF-15 WABCO. No difficulties were encountered with neither the penetration nor recovery of the core. A total of 2,551 feet of core were drilled and recovered. Actual rate of penetration varied considerably upon the rock involved, but averaged about 2 to 4 feet per hour (not including moving or mixing mud). A Longyear 7 1/2" x 10' double tube swivel

type core barrel was used. The 6" x 7 7/8" diamond bits of approximately 115 carats were also purchased from Longyear. Each diamond bit averaged about 220' of coring. A salvage value of about 70% was credited for the eleven bits used.

#### MUD PROGRAM

A basic mixture of loloss, WOLF, CaCl<sub>2</sub>, flosal, walnut flour, and condet was found to be appropriate for the specific rock types involved. The following list shows the amount of each additive per 1000 gallons of fresh water.

Loloss	50 lbs.
WOLF	50 lbs.
Flosal	50 lbs.
Walnut flour	50 lbs.
CaCl <sub>2</sub>	250 lbs.
* Condet	2 gallons

\* One gallon of condet was added each day to control the build up of formation solids. Viscosity was checked four times daily and kept around 45-50 seconds.

By using two large mud pits, the sand content was kept below .5%, thereby increasing rate of penetration and prolonging bit life.

#### DRILLING COSTS

##### ROTARY COST

9 7/8" hole to bedrock, 3045 feet @\$7.00 per ft.	\$21,315.00
Casing 8 5/8 OD: 3045 feet @\$2.75 per ft.	8,343.00
8" hole to core point: 3276.50 ft. @\$4.75 per ft.	<u>15,349.00</u>
Total Direct Cost for Rotary Drilling	\$45,007.00

CORE DRILLING COST

Coring time 1575.75 hrs. @ \$32.00/hr	\$50,424.00
Sub-direct cost \$19.70/ft	
Bit Costs	21,843.13
Core barrel & spare parts	<u>3,538.85</u>
Total Cost	\$75,805.98
Credited to ASARCO per salvage value of bits	<u>\$14,630.00</u>
Total net cost of coring	\$61,175.98
Total Direct Cost for Rotary Drilling brought forward	<u>\$45,007.00</u>
GRAND TOTAL OF DRILLING, Rotary plus Coring	\$106,182.98

Mud cost, overhead and other contingencies was estimated to be around 15% of the total cost.

Aggregate direct cost of core drilling including time charged, diamond bits and core barrel: \$23.80 per foot.

Water was purchased from the Arizona Water Company at a rate of \$1.00 per 1000 gallons.

CORE HANDLING and PREPARATION

From the core barrel the core was placed in metallic channels 10 feet long and very carefully washed to remove any additives and mud. After being logged, the core was placed in lined 55 gallon drums. Each drum was lined with two polyethylene bags. As an average, each drum contained approximately 20 feet of core or about 600 pounds. Number and type of sample, interval represented, and type of rock were written on the outside of the drum as well as on a tag placed on the inside. Drums were shipped, via Pacific Trucking Company to ASARCO Metallurgical Research Laboratory in El Paso.

Mr. Saegart,

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5/28/70

Attached are photos showing several features of the drilling program.

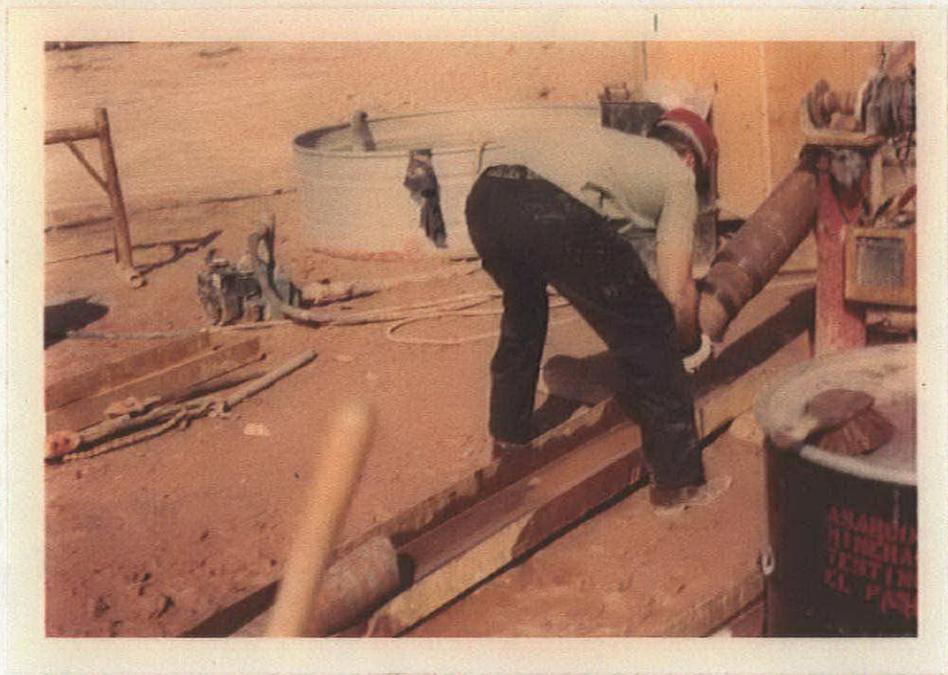
A handwritten signature in cursive script, appearing to read "A. Dalla Vista".

A. Dalla Vista

ADV:lab

cc: J.H.Courtright  
R.K.Kirkpatrick  
C.E.Williams  
N.P.Whaley

Core being removed from core barrel.



55 Gallon drums used for shipment of core.



TEN FOOT CORE

Hi-0x sulfide ore,



Lo-0x sulfide ore,





Core barrel at end of trip.

Diamond bit after approximately 250'.



Portadrill on S-DM. AT. about 350' hole produces 25 gal/min of water.



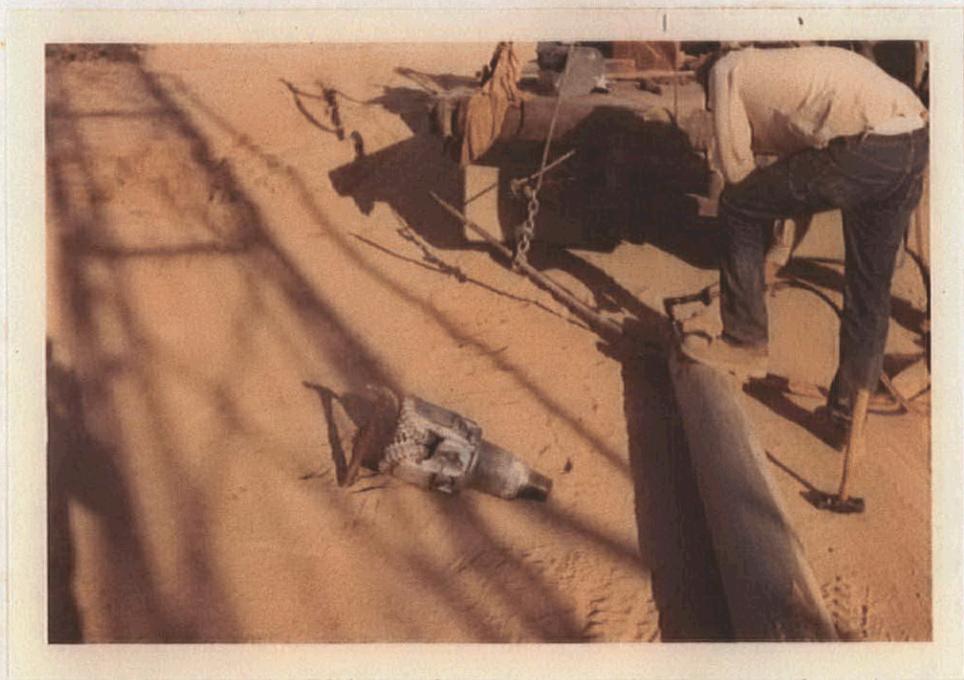
Mixing mud for core drilling.





Welding and Setting  
Casing

9 7/8" Tricon bit used to penetrate overburden.



June 15, 1970

AIR MAIL  
W. E. Saegart  
Tucson, Arizona

Dear Sir:

I am glad to acknowledge receipt of the SACATON WEST OREBODY SIX-INCH CORE DRILLING FINAL REPORT, PINAL COUNTY, ARIZONA, and wish to compliment Mr. A. Dalla Vista on his careful work. Thank you for distributing copies to all our Division Offices.

Very truly yours,

cc: ADallaVista

John J. Collins

22 June/70

Mr. W.E. Saegart, Supervisor,  
Tucson Office.

Arizona  
Sacaton West Orebody  
Six-Inch Core Drilling

Dear Bill:

I have read with interest Tony Dalla Vista's memo of May 28th concerning the drilling of six-inch core holes at Sacaton, Arizona.

It is remarkable that there was no lost time due to breakdown, and a core recovery of 100% was achieved. This was obviously a very well run project.

As requested in your accompanying letter of June 11th, I have forwarded the report to Jack Desvaux.

Yours very truly,

Original Signed by  
S. A. ANZALONE  
S.A. Anzalone.

SAA:sm

CC: JHCourtright, ADalla Vista.

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

June 11, 1970

Mr. J.J. Collins  
Assistant Vice President  
New York Office

6-in Core Drilling  
Sacaton West Orebody  
Pinal County, Arizona

Dear Sir:

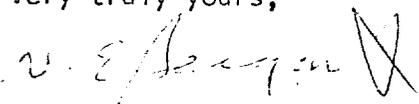
This will transmit Mr. Dalla Vista's Memorandum of May 28, summarizing the drilling performance and cost for the 6-in coring to obtain bulk metallurgical samples. A total of 38.2 tons of chalcocite ore samples were recovered from 15 holes in the course of this project.

Some of the more pertinent performance and cost figures can be summarized as follows:

1. Total direct drilling cost for 6-in coring averaged \$23.80.
2. Actual rate of coring penetration (drilling time only) averaged between 2 and 4 feet per hour.
3. Core recovery was essentially 100%.
4. A special combination of drilling fluid additives was developed as a substitute for the customary Bentonite based mud to minimize possible contamination of the core in regard to subsequent flotation tests. These additives together with the mixture ratio are shown on Page 4 of Mr. Dalla Vista's Memorandum.

One copy of this drilling summary is being circulated to each of the Exploration Division Offices for general reference.

Very truly yours,

  
W.E. Saegart

ENCLOSURE

WES:lab

cc: J.H. Courtright, w/encl.  
C.E. Williams, " "  
H.L. Crittendon, " "  
A. Dalla Vista, " "

\* Exploration Division circulation

\* Forwarded initially to S. A. Anzalone, Vancouver, B.C.

J.V. Desvaux, Knoxville, Tennessee  
D.M. Fletcher, Perth, Western Australia  
R.K. Kirkpatrick, Denver, Colorado  
R.B. Sprague, London, England  
K. Whiting, Spokane, Washington  
L.P. Entwistle, Tucson, Arizona  
Tucson Office File

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*WES.*

W.E.S.