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Form SL-1035

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File No. Aa-16A.3 .19B

Subject: SACATON - METALLURGY

Pinal County, Arizona

11-10-69

Secaton West zone

6" dia coring for met samples

20 holes — 365' rotary
130' coring

produce 20 tons upper cc ore with ≠ 2 ns
" 20 " middle cc " low ns

Rotary est at 5.00 per ft.
Coring 18.00 " "

JHCourtright

MR. WES
READ AND RETURN
PREPARE ANSWERS ____ HANDLE ____
FILE ✓ INITIALS

J. H. C
APR 8 1969

EL PASO ORE TESTING AND ASSAY LABORATORY

W.E.S.
APR 14 1969

El Paso, Texas
Apr. 7, 1969

Mr. G. W. Bossard
Milling Engineer
Tucson Office

The Bond grindability work indices of the three Sacaton Copper Project ore testing composites determined at 65-mesh are as follows:

Composite	Representing	Wi
A	West Zone, Mixed Oxide-Sulfide	11.28
B-D	West Zone, Sulfide	10.85
C-E	East Zone, Sulfide	11.10

T. D. Henderson, Jr.

TDH/cb
cc: TASnedden
JHCourtright
VKudryk

JHCourtright

J. H. C

APR 4 1969

EL PASO ORE TESTING AND ASSAY LABORATORY

MR. WES
READ AND RETURN
PREPARE ANSWERS ___ HANDLE ___
FILE ✓ INITIALS

El Paso, Texas
Apr. 3, 1969

Mr. G. W. Bossard
Milling Engineer
American Smelting and Refining Co.
P. O. Box 5795
Tucson, Arizona 85703

W.E.S.
APR 21 1969

Dear Sir:

Enclosed herewith are five copies of Mr. Miguel Maurtua's Report of Project No. 3128, Flotation Tests on Ore from East and West Zone Orebodies of the Sacaton Copper Project.

This report gives flotation test results for Composite A representing the west zone mixed oxide-sulfide, Composite B-D the west zone sulfides, and Composite C-E the east zone sulfide, as well as a general sample of the three composites. All composites were prepared according to drill footages supplied by Mr. Courtright in his letter of January 14, 1969.

Table I of Mr. Maurtua's report shows concentrate grades and copper recoveries obtainable from the three composites, both with and without regrinding of the rougher concentrates. Sample B-D, representing the west zone sulfide, contains primarily chalcopyrite with lesser content of chalcocite, and a large amount of pyrite. The rougher concentrate from this ore requires a regrind to make a reasonable grade of final concentrate.

? A concentrate assaying 26.19% Cu was obtained from the general ore composite by regrinding the second (oxide) rougher concentrate, combining it with the first rougher concentrate and cleaning once. The molybdenum recovery in the copper concentrate was 57.4 percent. The calculated Mo heads assay for the general composite was 0.01675% Mo.

A copper recovery of 90.1 percent in a final

Yours very truly,

ORIGINAL SIGNED BY

T. D. Henderson, Jr.

TDH/cb
cc: TASnedden/no enc.
JHCourtright/no enc.
VKudryk/2 copies of report

AMERICAN SMELTING AND REFINING COMPANY
UNITED STATES MINING DEPARTMENT
P. O. BOX 5795, TUCSON, ARIZONA 85703

J. H. C.
APR 4 1969

April 4, 1969

G. W. BOSSARD
MILLING ENGINEER

1150 NORTH 7TH AVENUE
TELEPHONE 602-792-3010

Mr. J. H. Courtright, Supervisor
Exploration Department
Tucson Office

Sacaton Project - Metallurgical Testing

Dear Sir:

I am enclosing two copies of El Paso Test Report Project No. 3128 covering the flotation test results from the three drill hole composite samples representing the east and west zones Sacaton ore bodies. The test results from the individual samples are summaried as follows:

Group	Percent Cu	Percent Ox. Cu	Concentrate Percent Cu	Concentrate Percent Recovery
A	1.48	0.48	36.1	84.6
B-D	0.76	0.07	26.3	80.8
C-E	1.52	0.15	38.6	89.7

The copper mineralization in Groups A and C-E is predominantly chalcocite while chalcopyrite predominates in Group B-D. The metallurgical test results for Groups A and C-E are comparable with good recoveries and concentrate grades. Group B-D appears to be a little more refractory than the other samples and requires a fine regrind of the rougher concentrate to obtain a suitable grade.

In order to obtain acceptable recoveries from Group A, it was necessary to first float the clean sulfides in a primary rougher stage followed by flotation of the oxide (tarnished sulfides?) minerals in a secondary rougher after conditioning with sulfidizing reagents. According to the test data information, approximately 40 percent of the copper recovered from Group A was floated in the secondary rougher concentrate. If this particular sample represents a considerable ore tonnage, then provision will have to be made in the flow sheet design to handle ores of this character.

By copy of this letter I am requesting Mr. Henderson to furnish me with Bond Work Indices at 65 mesh for the three Sacaton composites. In addition, I will need settling area requirements for the three final tailings as determined with and without the use of lime. Finally, additional work should be done on Group B-D in an attempt to improve recovery. In test B-12 (without regrinding) rougher recovery was 89 percent, while in test B-14 (with regrinding) rougher recovery was only 83 percent. The reason for such a large difference in recoveries should be established.

Yours truly,

G. W. Bossard

G. W. Bossard
Milling Engineer

GWB:dh
Enclosures (2)

cc: TASnedden - w/encl
RBMeen - w/encl
VKudryk - wo/encl
TDHenderson - wo/encl

EPOTL Binder w/copy report

AMERICAN SMELTING AND REFINING COMPANY

EL PASO ORE TESTING LABORATORY

A

REPORT

OF

PROJECT NO.3128

FLOTATION TESTS

ON ORE FROM EAST & WEST ZONE

OREBODIES OF SACATON COPPER PROJECT

- APRIL 1969 -

SACATON COPPER PROJECT - ARIZONA

INTRODUCTION

On January 10, 1969, the El Paso Ore Testing Laboratory received, via Braswell motor freight, twenty-one cans of crushed drill core rejects totaling 730 pounds. These samples represented two different zones drilled in the Sacaton Copper Project orebody.

As requested by Mr. J. H. Courtright, separate samples were cut from the 21 cans and assayed for Au, Ag, Cu, Non-Sulf. Cu and Mo. These assays were reported March 20,1969. Three composite samples were then made up, weighted according to the drill hole footages given in Mr. Courtright's letter of January 14, 1969, for assay and flotation testing. The three composites were marked as follows:

Sample #1 - West zone - Group A - Mixed Sulfide and Oxide
Sample #2 - West zone - Groups B-D - Sulfide
Sample #3 - East zone - Groups C-E - Sulfide

DESCRIPTION OF SAMPLES

The three Sacaton Copper Project composites represent ore bodies from West and East zones, and they assayed as follows:

	Ore	oz/S.Ton		Percent						
Sample No.	Sp.Gr.	Au	Ag	Cu	CuOx	Fe	Mo*	S	Ins	T.CaO
1	2.40	.005	.09	1.48	.48	3.65	.0083	1.52	84.9	0.15
2	3.45	.007	.09	.76	.07	3.80	.0115	2.33	85.0	0.20
3	2.43	.003	.10	1.52	.15	2.30	.0480	1.86	90.0	0.25
Gen.Composite	2.44	.004	.12	1.09	.17	3.80	.0200	2.02	86.9	0.21

Mo* = Average obtained from AA lamp and colorimetric determinations

Sample #1 - West zone - Group A. Mixed oxide-sulfide porphyry ore, 68% of the total copper is sulfide, and 32% is oxide. The copper sulfide is mainly present as chalcocite associated with minor amounts of chalcopyrite and covellite. In this sample pyrite was determined microscopically and small values of silver, gold and molybdenum were detected by assay.

Sample #2 - West zone - Groups B-D. Porphyry copper ore. Sulfides. - High pyrite ore with minor values of silver, gold and molybdenite. Microscopic examinations revealed more chalcopyrite than chalcocite present in this composite.

Sample #3 - East zone - Groups C-E. Porphyry copper ore. Sulfides. - Very similar to the ore body from Group A with only 10% of the total copper present as oxide.

Gangue - In all three samples tested, the principal gangue minerals are quartz and pyrite.

OBJECT OF TESTS

The main purpose of the metallurgical tests was to determine the response of ores from the three different ore-bodies to copper flotation.

CONCLUSIONS

The most difficult sample was that represented by groups B-D. The main problem in treating these ores, particularly sample #2, is the rejection of pyrite during flotation. Without regrinding of copper rougher concentrate, a mediocre concentrate grade was obtained, as shown in Table I.

TABLE I

Non-Regrinding Copper Rougher Concentrate vs Regrinding

Groups No.	% Minus 200 mesh in feed	Without Regrinding		With Regrinding	
		%Grade	%Recv.	%Grade	%Recv.
A	60.6	32.0	85.0	36.1	84.6
B-D	59.1	13.4	86.7	26.3	80.8
C-E	59.7	25.6	86.8	38.6	89.7

The metallurgical results obtained from the treatment of the individual samples are shown on pages 10-12, 14-15, 17-18, and 20.

Table II given below is the results of a flotation test on the mixture of the three composites of Sacaton Project copper ores made up according to the drill footage figures furnished by Mr. J. H. Courtright's letter.

The calculated Mo assay of this general composite was 0.01675% Mo. The recovery of Mo in the copper concentrate produced by a three-cycle flotation test on the general composite (Test S-5) was 57.4 percent.

TABLE II

Metallurgical Data on the General Composite

	Weight Percent	Assays Percent				Recoveries-Percent		
		Sulf. Cu	Oxide Cu	Total Cu	Mo	Sulf. Cu	Total Cu	Mo
Calc.Feed	100.0	0.90	0.17	1.07	.01675	100.0	100.0	100.0
Cu Conc	3.7	23.36	2.83	26.19	.26	95.7	90.1	57.4
Tailing	96.3	0.04	0.07	0.11	.0074	4.3	9.9	42.6

GENERAL REMARKS

Individually the three samples have three different behavior patterns in flotation, so that in order to have only one problem a general composite was made. The flowsheet used is shown on page 21.

The final copper concentrate in test No. S-5 was cleaned one time. Improvement might be obtained if the two copper rougher concentrates together with the copper scavenger concentrate (middlings), were reground and cleaned twice.

DESCRIPTION OF TESTS

1 - One half of the weight of each sample received was reduced to minus 10-mesh by screening, and roll crushing.

2 - 1000 gram samples of the minus 10 mesh ore were ground at 70% solids in an eight inch cylindrical laboratory ball mill.

3 - Reagents to the grinding stage:

A-Thiocarbanilide	0.1 lbs/Ton ore
Lime	2.0 lbs/Ton ore

4 - After a total of 10 minutes grinding time (4 and 6 minutes with classification between stages) a grind of 92.1 percent to 96.0 percent through 65-mesh was obtained. The screen analysis, assays and metal distributions of feed for the 10 minute grind show the concentrations of copper and iron in the finer sizes. Results of the grinding test are shown on pages 7, 8 and 9.

Usually porphyry copper ores require grinding to about 100 percent minus 65 mesh to economically liberate the copper mineral from the gangue. In the Sacaton copper ore the reason for using grinds coarser than normal was to avoid production of fine particles of pyrite which would complicate the cleaning of the copper concentrate.

5 - In order to make a first copper rougher concentrate, the following reagents were fed to a five minute conditioner (1000 gram Denver Sub-A laboratory machine):

Potassium Amyl Xanthate	0.02 lb/Ton ore
Aerofloat 15	0.06 lb/Ton ore
pH adjusted to 9.9 - 10.3	

First rougher flotation time was 5 minutes, adding 0.06 lb/Ton ore of Aerofloat 15 at 1 and 3 minutes.

6 - Tailings from the first rougher concentrate were conditioned for 5 minutes with 0.50 lb/Ton Na_2S and 0.05 lb/Ton Aerofloat 404.

The second rougher flotation time was 5 minutes, stage adding 0.10 lbs/Ton Na_2S after 1 and 3 minutes flotation time and 0.01 lb/Ton Aerofloat 404 at 1.5 and 3.5 minutes.

7 - The tails from the second rougher flotation is the final tailings.

For each succeeding cycle, clear tails water from the previous cycle was used.

8 - The concentrates from first and second copper rougher flotation periods are sent directly to the regrind circuit with 0.20 lb/Ton Na_2S and 0.02 lb/Ton Aerofloat 404. Ten minutes regrind is sufficient to obtain a 99.4 percent minus 200-mesh grind.

9 - After the copper rougher concentrate is reground, it is cleaned once for 3 minutes with additions of 10 lbs/Ton Lime to pH 11.0, and 0.01 lb/Ton cyanide for pyrite depression. In this flotation 0.04 lb/Ton of MIBC was used to improve froth conditions.

10 - A scavenger float is made on the cleaner tails or middlings for a period of 5 minutes. The copper scavenger concentrate is sent to the next regrind cycle.

SUPPORTING DATA

Page 7. Sizing test, assays and metal distribution of feed (Group A) ground for 10 minutes @ 70 percent solids.

Page 8. Sizing test, assays and metal distribution of feed (Groups B-D) ground for 10 minutes @ 70 percent solids.

Page 9. Sizing test, assays and metal distribution of feed (Groups C-E) ground for 10 minutes @ 70 percent solids.

Page 10. Batch flotation test without regrind of middlings on a composite sample of Sacaton Copper Project orebodies from West zone - group A.

Page 11. Batch flotation test with regrind of middlings on a composite sample of Sacaton Copper Project orebodies from West zone - group A.

Page 12. Three-cycle test with regrinding of middlings on a composite sample of Sacaton Copper Project orebodies from West zone - group A.

Page 13. Flowsheet used in the laboratory treatment of Sacaton copper project - group A.

Page 14. Batch flotation test without regrinding of copper rougher concentrate on a composite sample of Sacaton Copper Project orebodies from West zone - groups B-D.

Page 15. Two-cycle test with regrinding of copper rougher concentrate on a composite sample of Sacaton Copper Project orebodies from West zone - groups B-D.

Page 16. Flowsheet used in the laboratory treatment of Sacaton Copper Project - Groups B-D.

Page 17. Batch flotation test without regrinding of copper rougher concentrate on a composite sample of Sacaton Copper Project, orebodies from East zone - groups C-E.

Page 18. Three-cycle test with regrinding of copper rougher concentrate on a composite sample of Sacaton Copper Project, orebodies from East zone - groups C-E.

Page 19. Flowsheet used in the laboratory treatment of Sacaton Copper Project - groups C-E.

Page 20. Metallurgical statement of a laboratory flotation test on a composite ore sample from Sacaton Copper Project, - general composite.

Page 21. Flowsheet used in the laboratory treatment of Sacaton Copper Project - general composite.

M. MAURTUA S.

AMERICAN SMELTING AND REFINING CO.

SIZE ANALYSIS DATA SHEET

Proj. 3128 UNIT AND ORE TREATED Sacaton Copper Project - Group A

TEST NO. S-1 1000 gram sample of minus 10 mesh pulped to 70% solids

DATE 2/10/69 SAMPLE Grinding time 10 minutes - pH 8.5

	AU GRAMS	AG GRAMS	Cu %	Fe %	Ins %	CuOx %
ASSAY OF SAMPLE			1.48	3.65	84.9	0.48

NO.	SIZE MESH	MICRON	DRY WEIGHTS GRAMS	% ON	% PASSING	ASSAYS GRAMS AU	GRAMS AG	PERCENT Cu		PERCENT Fe		PERCENT CuOx		
	+ 10	1680												
	14	1190												
	20	840												
	28	590												
	35	420	-	0.0	100.0									
	48	297	5.6	.6	99.4			1.80		4.2		.43		
	65	210	34.4	3.4	96.0			1.20		3.8		.40		
	100	149	101.5	10.2	85.8			1.36		3.3		.46		
	150	105	147.6	14.8	71.0			1.54		3.1		.59		
	200	74	104.5	10.4	60.6			1.54		3.1		.67		
	-200		606.4	60.6				1.48		3.7		.62		
	" 2	40												
	" 3	28												
	" 4	20												
	" 5	14												
	" 6	10												
	" 7	- 10												
	Total													

METAL CONTENTS PRODUCT	AU	AG	Cu	Fe		CuOx	RECOVERIES AU	AG	Cu	Fe		CuOx
Calc Assay							100	100	100	100	100	100
+ 10												
14												
20												
28												
35												
48			.0108	.0252		.0026			.7	.7		.4
65			.0408	.1292		.0136			2.8	3.7		2.3
100			.1387	.3366		.0469			9.4	9.6		7.9
150			.2279	.4588		.0873			15.4	13.1		14.7
200			.1602	.3224		.0697			10.9	9.2		11.7
-200			.8969	2.2422		.3757			60.8	63.7		63.0
" 2												
" 3												
" 4												
" 5												
" 6												
" 7												
			1.4753	3.5144		.5958			100.0	100.0		100.0

Notes:

Test By:

AMERICAN SMELTING AND REFINING CO.

SIZE ANALYSIS DATA SHEET

Proj. 3128 UNIT AND ORE TREATED Sacaton Copper Project - Groups B-D

TEST NO. S-2/B-16 1000 gram sample of minus 10 mesh pulped @ 70% solids

DATE 3/14/69 SAMPLE grinding time 4/6 minutes - pH 8.5

	AU GRAMS	AG GRAMS	Cu %	Fe %	Ins %	CuOx %
ASSAY OF SAMPLE			0.76	3.80	85.0	.074

NO.	SIZE MESH	SIZE MICRON	DRY WEIGHTS GRAMS	% ON	% PASSING	ASSAYS GRAMS AU	GRAMS AG		PERCENT Cu		PERCENT Fe		
	+ 10	1680											
	14	1190											
	20	840											
	28	590											
	35	420	-	-	100.0								
489	48	297	4.1	.4	99.6				.42		4.1		
	65	210	36.3	3.6	96.0				.38		3.3		
	100	149	100.6	10.1	85.9				.47		3.0		
	150	105	151.4	15.1	70.8				.60		3.2		
	200	74	111.1	11.1	59.7				.70		3.5		
494 -200	~~Cyclone~~ 1	~~74~~ 5	596.5	59.7					.91		3.8		
	" 2	40											
	" 3	28											
	" 4	20											
	" 5	14											
	" 6	10											
	" 7	- 10											
	Total												

METAL CONTENTS PRODUCT	AU	AG		Cu		Fe	RECOVERIES AU	AG	Cu		Fe	
Calc Assay							100	100	100	100	100	100
+ 10												
14												
20												
28												
35												
48				.00168		.0164			.2		.5	
65				.01368		.1188			1.8		3.3	
100				.04747		.3030			6.1		8.5	
150				.09060		.4832			11.7		13.5	
200				.07770		.3885			10.0		10.8	
~~Cyclone~~ ~~74~~	-200			.54327		2.2686			70.2		63.4	
" 2												
" 3												
" 4												
" 5												
" 6												
" 7												
				.77440		3.5785			100.0		100.0	

Notes:

Test By:

AMERICAN SMELTING AND REFINING CO.

SIZE ANALYSIS DATA SHEET

SERIAL M128-247 UNIT AND ORE TREATED Sacaton Copper Project - Groups C-E

TEST NO. S-3/C-8 1000 gram sample of minus 10 mesh pulped @ 70% solids

DATE 3/14/69 SAMPLE Grinding time 4/6 minutes - pH 8.6

	AU GRAMS	AG GRAMS	Cu %	Fe %	Ins %	CuOx %
ASSAY OF SAMPLE			1.52	2.30	90.0	0.15

NO.	SIZE MESH	SIZE MICRON	DRY WEIGHTS GRAMS	% ON	% PASSING	ASSAYS GRAMS AU	ASSAYS GRAMS AG		PERCENT Cu		PERCENT Fe		
	+ 10	1680											
	14	1190											
	20	840											
	28	590			100.0								
495	35	420	8.0	.8	99.2				.49		1.6		
	48	297	18.5	1.9	97.3				.66		1.5		
	65	210	51.7	5.2	92.1				.87		1.7		
	100	149	100.4	10.0	82.1				1.27		1.9		
	150	105	132.1	13.2	68.9				1.61		2.3		
	200	74	97.9	9.8	59.1				1.76		2.4		
501	-200 ~~Cassel~~	~~59~~	591.4	59.1					1.60		2.2		
	" 2	40											
	" 3	28											
	" 4	20											
	" 5	14											
	" 6	10											
	" 7	- 10											
	Total		100.0	100.0	100.0								

METAL CONTENTS / RECOVERIES

PRODUCT	AU	AG	Cu		Fe		AU	AG	Cu		Fe	
Calc Assay							100	100	100	100	100	100
+ 10												
14												
20												
28												
35			.00392		.0128				.2		.6	
48			.01254		.0285				.8		1.3	
65			.04529		.0884				3.0		4.1	
100			.12700		.1900				8.4		8.8	
150			.21252		.3036				14.0		14.1	
200			.17248		.2352				11.4		10.9	
~~Cassel~~ ~~59~~ -200			.94560		1.3002				62.2		60.2	
" 2												
" 3												
" 4												
" 5												
" 6												
" 7												
			1.51935		2.1587				100.0		100.0	

Notes:

Test By:

AMERICAN SMELTING AND REFINING CO.

ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - Group A

TEST NO. A-18 PROCESS OF TREATMENT Batch flotation without regrinding

DATE 2/1/69

NO.	Au	Ag	Pb %	Cu %	Zn %	CuOx %	Fe %	Ins %	NON-SULFIDE Pb %	NON-SULFIDE Cu %	NON-SULFIDE Zn %
298											
ASSAY OF HEADS				1.48		.48	3.65	84.9			

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	DRY WEIGHTS % TOTAL	ASSAYS PERCENT		Cu	CuOx	Fe	Ins				
	Feed	1000.0											
386	Cu Conc	42.4	4.24			31.91	5.9	15.9	28.0				
387	Cu Clean T	38.8	3.88			1.18							
388	Tailings	918.8	91.88			.21							

METAL CONTENTS

PRODUCT	Cu						
CALC. HEAD							
Cu Conc	1.3530						
CuCleanT	.0458						
Tailings	.1929						
	1.5917						

RECOVERIES

Cu	Cu					
100	100	100	100	100	100	
85.0						
2.9						
12.1						
100.0						

REAGENTS

70%Solids	GRIND	Cond	Rough.	Scav	Clean.
MINUTES	4/6	5	5	5	5
pH		9.2			
CaO #/T	0.5				
Na_2S	0.3	0.2		0.2	
*F.Mixture			.036		
Z-6		0.1			
A-404		0.1			

NOTES

*F.Mixture
50% Wood Creosote
50% MIBC

Froth not good in rougher circuit

AMERICAN SMELTING AND REFINING CO.
ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - Group A

TEST NO. A-21 PROCESS OF TREATMENT Batch flotation test with regrind of middlings

DATE 2/20/69

NO.	Au	Ag	Pb %	Cu %	Zn %	CuOx %	Fe %	Ins %	NON-SULFIDE Pb %	NON-SULFIDE Cu %	NON-SULFIDE Zn %
ASSAY OF HEADS				1.48		.48	3.65	84.9			

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	DRY WEIGHTS % TOTAL	ASSAYS PERCENT Cu	CuOx	Fe
	Feed	1000.0				
404	1st Cu Conc	17.2	1.72	36.07	4.15	21.5
405	2ndCuConc(CuOx)	11.5	1.15	36.76	7.50	18.5
Total	Cu Concentrates		2.87	36.34		
406	Cu Clean T	19.0	1.90	1.68		
407	Tails	952.3	95.23	.21		
Total	Tailings		97.13	.24		

PRODUCT	METAL CONTENTS Cu	RECOVERIES	RECOVERIES Cu
CALC. HEAD		100	100
1st Cu Conc	.6204		48.7
2nd Cu Conc	.4227		33.1
Tot.Cu Conc	1.0431	Total	81.8
Cu CleanT	.0319		2.5
Tails	.2000		15.7
	1.2750		100.0

REAGENTS	GRIND	Roug	Cu Cln	Cond	Scav	Regr	CuOx Cln	NOTES
70% Solids								
MINUTES	7	5	5	5	5	10	5	
pH		8.8						
CaO #/T	.50							Froth better than
A-242	.10					.05		Test A-18
Dow-250		.008	.008		.008			
Z-6		.050	.010					
Na_2S				.60	.20	.20	.30	
A-404				.05	.02	.02	.03	

AMERICAN SMELTING AND REFINING CO.

ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - Group A

TEST NO. A-23 PROCESS OF TREATMENT Flotation with Regrinding of Middlings

DATE 2/24/69 3 cycle test

NO. 298	Au	Ag	Pb %	Cu %	Zn %	CuOx %	%	Fe %	%	Ins %	%	NON-SULFIDE Pb %	Cu %	Zn %
ASSAY OF HEADS				1.48		.48		3.65		84.9				

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	% TOTAL	ASSAYS PERCENT		Cu		CuOx		Fe			
	Feed	3000.0											
424	Cu Conc	92.8	3.1			36.12		4.60		18.1			
425	Tailings	2907.2	96.9			0.21							
		3000.0	100.0										

METAL CONTENTS

PRODUCT	Cu						
CALC. HEAD							
Cu Conc	1.1197						
Tailings	.2035						
	1.3232						

RECOVERIES

		Cu				
	100	100	100	100	100	100
Cu Conc		84.6				
Tailings		15.4				
		100.0				

REAGENTS

70%Solids	GRIND	Roug	Cln	Cond	Scav	Regr	CuOx Cln
MINUTES	3/4	5	4	5	5	10	5
pH		9.0					9.9
CaO #/T	.50						
*F.Mixture	.032						
Dow 250		.028	.016				
Z-6		.06	.010				
Na_2S				.50	.20	.20	.20
A-404				.05	.02	.02	.02

NOTES

*Frother mixture:
50% Wood Creosote
50% MIBC

Froth not good in rougher circuit

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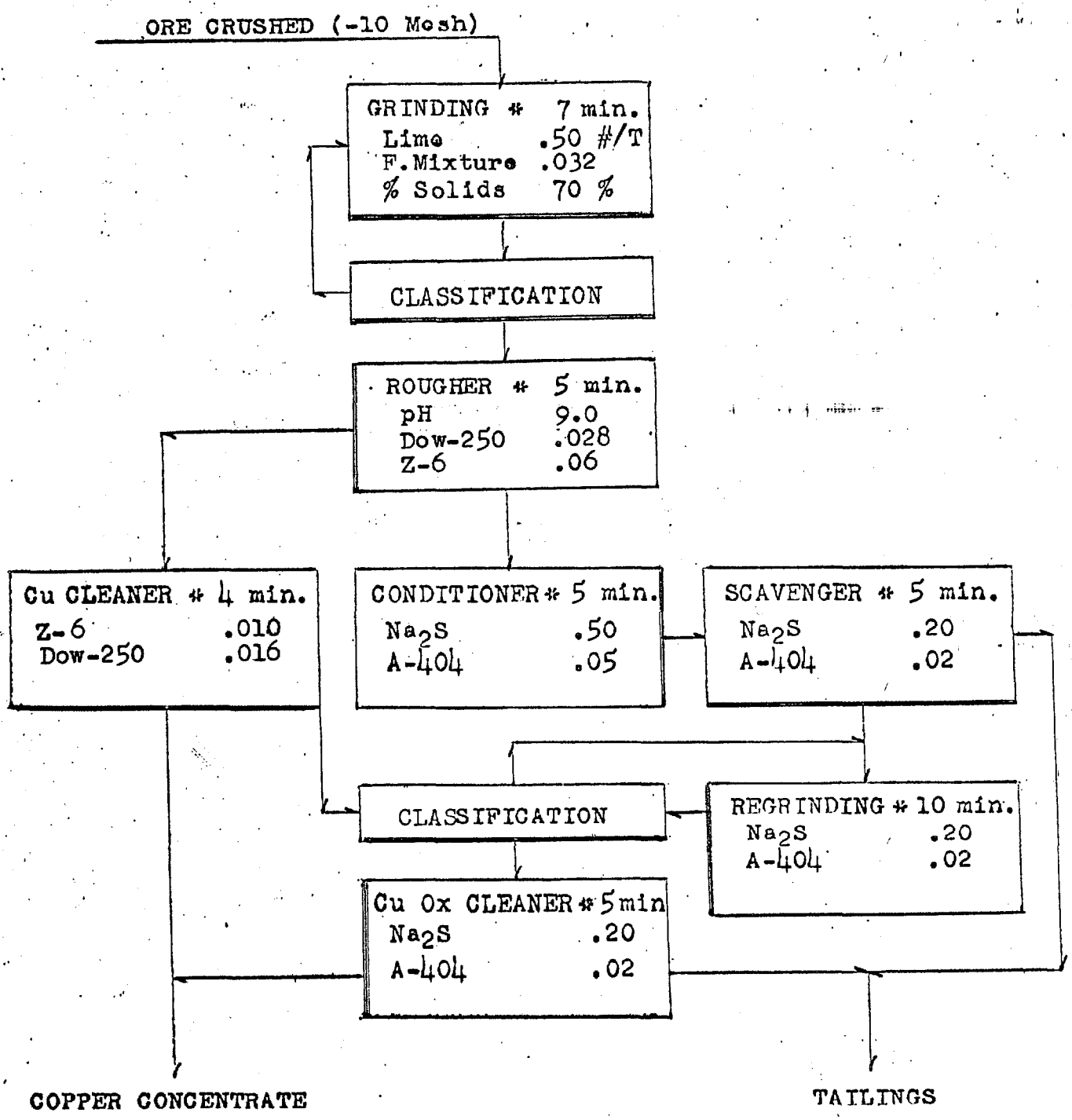
AMERICAN SMELTING AND REFINING CO.

ORE TEST FLOW SHEET

UNIT AND ORE TREATED.- Sacaton copper project # Sample A

TEST No.- A-23



AMERICAN SMELTING AND REFINING CO.

ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - Groups B-d

TEST NO. B-12 PROCESS OF TREATMENT Batch flotation without regrinding of copper rougher concentrate

DATE 3/5/69

NO. 299	Au	Ag	Pb %	Cu %	Zn %	CuOx %	Fe %	Ins %	NON-SULFIDE Pb %	NON-SULFIDE Cu %	NON-SULFIDE Zn %
ASSAY OF HEADS				.76		.074	3.80	85.0			

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	DRY WEIGHTS % TOTAL	ASSAYS PERCENT Cu	Fe	Ins
	Feed	1000.0				
446	Cu Conc	44.0	4.4	13.40	31.2	16.4
447	Cu Cln T	10.8	1.1	1.35		
448	Tailings	938.0	94.5	.09		
		992.8	100.0			

METAL CONTENTS PRODUCT	Cu	RECOVERIES Cu
CALC. HEAD		100
Cu Conc	.5896	86.7
Cu CleanT	.0149	2.2
Tailings	.0756	11.1
	.6801	100.0

REAGENTS

	GRIND	Cond	Rough	Clean	Recln
MINUTES	4/6	5	5	5	4
pH		9.6			
CaO #/T	1.0				
A-15	.056				
NaCN	0.1		.01	.01	.01
Z-6		.02	.02	.02	
Pine Oil		.05	.05	.05	.05

NOTES

Poor froth in rougher circuit

AMERICAN SMELTING AND REFINING CO.

ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - Groups B-D

TEST NO. B-14 PROCESS OF TREATMENT Two cycle test with regrinding of copper rougher concentrate

DATE 3/10/69

NO. 299	Au	Ag	Pb %	Cu %	Zn %	CuOx %	Fe %	Ins %	NON-SULFIDE Pb %	NON-SULFIDE Cu %	NON-SULFIDE Zn %
ASSAY OF HEADS				.76		.074	3.80	85.0			

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	DRY WEIGHTS % TOTAL	ASSAYS PERCENT Cu	Fe	Ins
	Feed	2000.0				
462	Cu Conc	42.6	2.1	26.34	28.7	6.6
463	Cu Clean T	53.2	2.7	.65		
464	Tailings	1904.2	95.2	.12		
		2000.0				

METAL CONTENTS / RECOVERIES

PRODUCT	Cu	Recoveries	Cu
CALC. HEAD		100	100
Cu Conc	.5531		80.8
Cu CleanT	.0176		2.6
Tailings	.1142		16.6
	.6849		

REAGENTS

70%Solids	GRIND	Cond	Rough	Regrnd	Clean
MINUTES	4/6	5	5	10	5
pH		10.5			11.0
CaO #/T	2.0				1.0
Thio.	.05				
A-15			.12		.056
NaCN				.01	
Z-6					.02

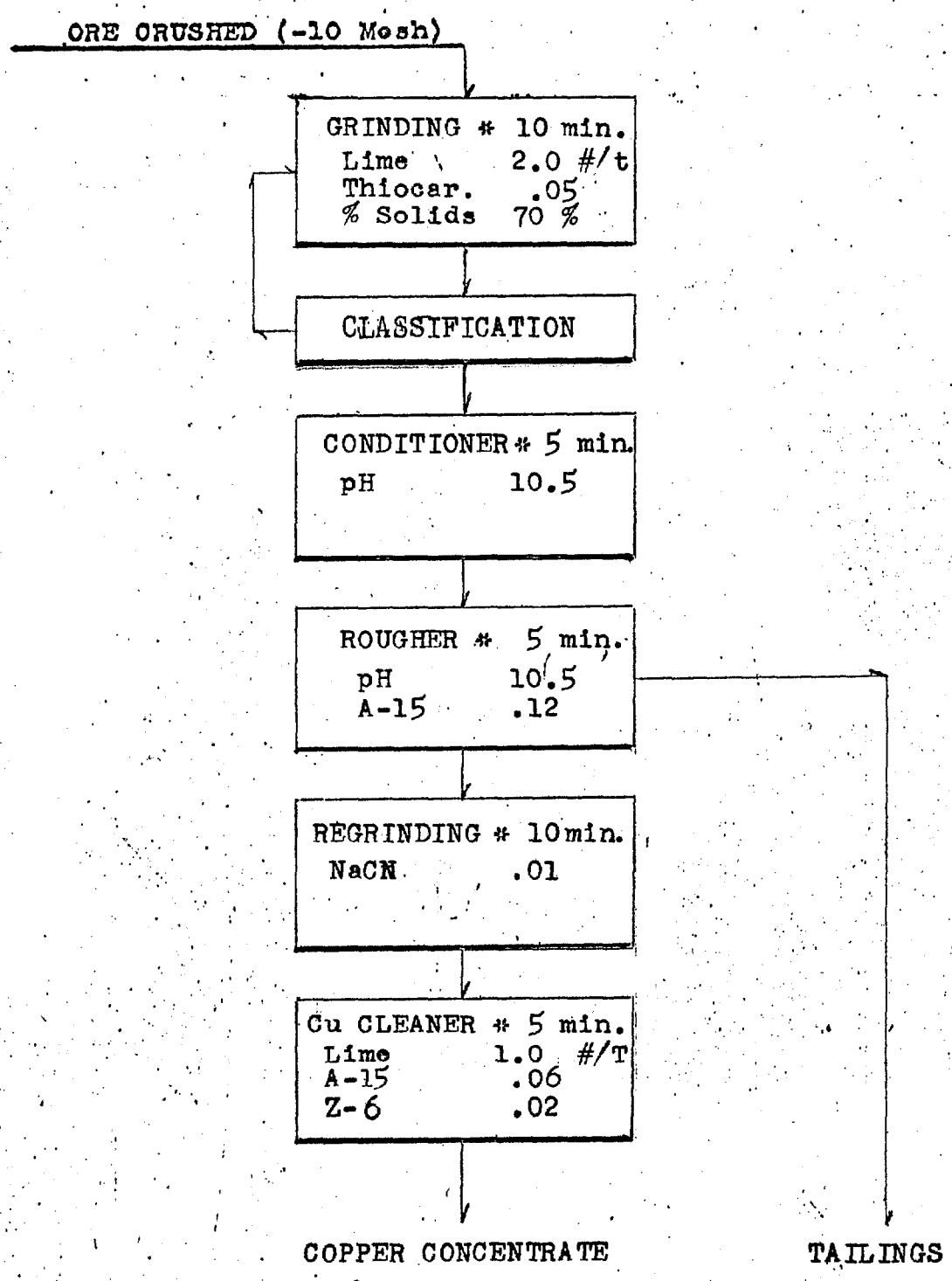
NOTES

AMERICAN SMELTING AND REFINING CO.

ORE TEST FLOW SHEET

UNIT AND ORE TREATED.- Sacaton Copper Project - Groups B-D

TEST NO.- B-14



AMERICAN SMELTING AND REFINING CO.

ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - Group C-E

TEST NO. C-6 PROCESS OF TREATMENT Batch flotation without regrinding of copper rougher concentrate

DATE 2/19/69

NO.	Au	Ag	Pb %	Cu %	Zn %	CuOx %	Fe %	Ins %	Pb % (NON-SULFIDE)	Cu % (NON-SULFIDE)	Zn % (NON-SULFIDE)
ASSAY OF HEADS				1.52		.15	2.30	90.0			

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	DRY WEIGHTS % TOTAL	ASSAYS PERCENT Cu	Fe	Ins
	Feed	1000.0				
398	Cu Conc	42.4	4.24	25.60	23.8	15.6
399	Cu Clean T	27.4	2.74	6.00		
400	Tailings	930.2	93.02	.16		
		1000.0	100.0			

METAL CONTENTS PRODUCT	Cu	RECOVERIES	Cu
CALC. HEAD		100	100
Cu Conc	1.0854		86.8
Cu Clean T	.0164		1.3
Tailings	.1488		11.9
	1.2506		

REAGENTS	GRIND	Cond	Rough	Clean
70% Solids				
MINUTES	4/6	5	5	5
pH		9.0		
CaO #/T	0.5			
Pine Oil		.024		
Z-6		.05		
A-242			.05	

NOTES

No problems in froth

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April 1969

AMERICAN SMELTING AND REFINING CO.
ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - Group C-E
TEST NO. C-7 PROCESS OF TREATMENT Three cycle test with regrind of copper rougher concentrate
DATE 3/12/69

NO.	Au	Ag	Pb %	Cu %	Zn %	CuOx %	Fe %	Ins %	NON-SULFIDE Pb %	NON-SULFIDE Cu %	NON-SULFIDE Zn %
ASSAY OF HEADS				1.52		0.15	2.30	90.0			

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	DRY WEIGHTS % TOTAL	ASSAYS PERCENT		Cu		Fe		Ins			
	Feed	3000.0											
478	Cu Conc	99.6	3.3			38.60		19.4		9.8			
479	Cu Clean T	37.2	1.2			1.08							
480	Tailings	2863.2	95.5			.14							
		3000.0	100.0										

METAL CONTENTS

PRODUCT	Cu						
CALC. HEAD							
Cu Conc	1.2738						
Cy Clean T	.0130						
Tailings	.1337						
	1.4205						

RECOVERIES

		Cu				
	100	100	100	100	100	100
Cu Conc		89.7				
Cy Clean T		.9				
Tailings		9.4				

REAGENTS

	GRIND	Cond	Rough	Regr	Clean			
MINUTES	4/6	5	5	10	5			
pH		10.5			10.9			
CaO #/T	2.0				1.0			
Thio	0.1							
Z-6			.02					
A-15			.18		.12			
NaCN				.01				

NOTES

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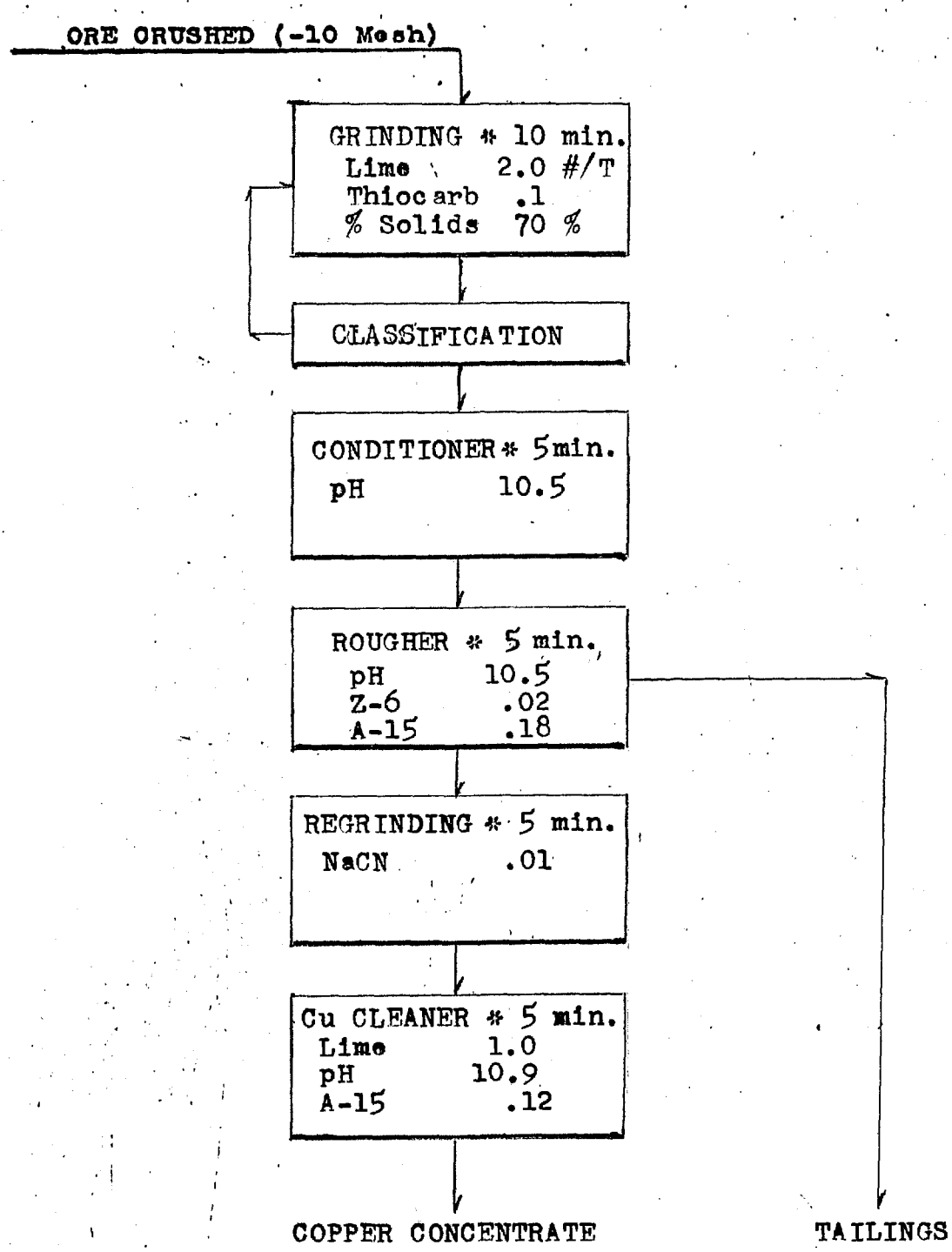
AMERICAN SMELTING AND REFINING CO.

ORE TEST FLOW SHEET

UNIT AND ORE TREATED.- Sacaton Copper Project - Groups C-E

TEST NO.- C-7



Project 3128
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April 1969

AMERICAN SMELTING AND REFINING CO.

ORE TEST DATA SHEET

TESTED BY MM UNIT AND ORE TREATED Sacaton Copper Project - General Ore Comp.

TEST NO. S-5 PROCESS OF TREATMENT Three cycle test with regrinding copper rougher conc. plus middlings

DATE 3/18/69

NO.	Au	Ag	Pb %	Cu %	Zn %	CuOx %	Fe %	Mo %	%	NON-SULFIDE Pb %	NON-SULFIDE Cu %	NON-SULFIDE Zn %
ASSAY OF HEADS				1.09		.17	3.8	.020				

NO.	DESCRIPTION	DRY WEIGHTS GRAMS	DRY WEIGHTS % TOTAL	ASSAYS PERCENT Sulf	Cu	CuOx	Total		Fe	Ins	Mo	
	Feed	2943.0										
514	Cu Conc	109.1	3.7		23.36	2.83	26.19		28.6	5.2	.26	
515	Tailings	2833.9	96.3		.04	.07	.11				.0074	

METAL CONTENTS

PRODUCT	SulfCu		CuOx	Total	Mo	
CALC. HEAD						
Cu Conc	.8643		.1047	.9690	.00962	
Tailings	.0385		.0674	.1059	.00713	
	.9028		.1721	1.0749	.01675	

RECOVERIES

	Sulf	Cu	CuOx	Tot.	Mo	
CALC. HEAD	100	100	100	100	100	100
Cu Conc		95.7	60.8	90.1	57.4	
Tailings		4.3	39.2	9.9	42.6	

REAGENTS

70%Solids	GRIND	1st Cond	1st Roug		2nd Cond	CuOx Rough		Cu Regr	Cu Cln	Cu Scav			NOTES
MINUTES	4/6	5	5		5	5		10	3	5			Good froth
pH		10.3			10.2				11.0				
CaO #/T	2.0								1.0				
Thio.	.10												
A-15		.06	.12										
Z-6		.02											
Na_2S					.50	.20		.20		.20			
A-404					.05	.02		.02		.02			
NaCN									.02				
MIBC									.04				

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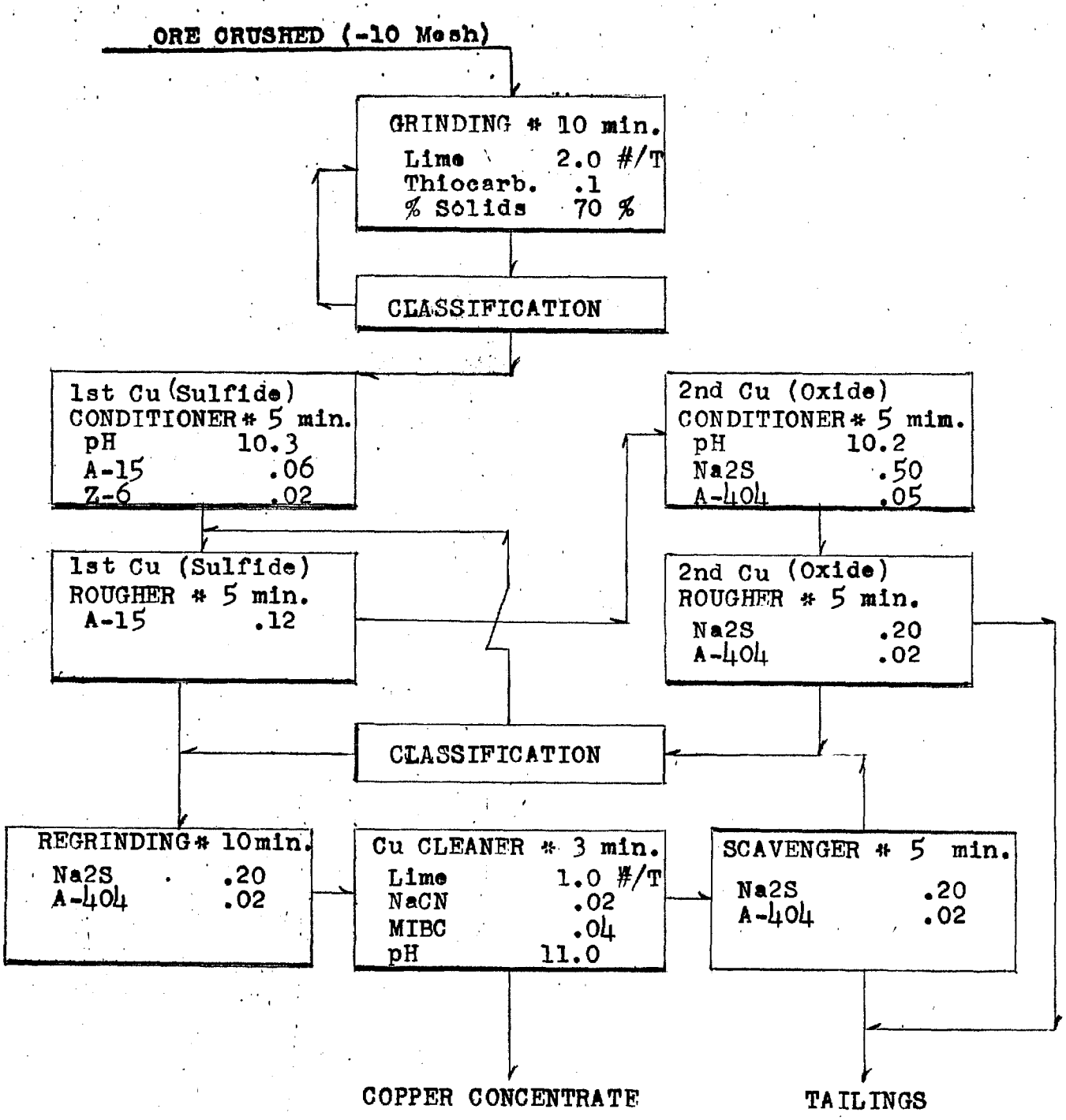
AMERICAN SMELTING AND REFINING CO.

ORE TEST FLOW SHEET

UNIT AND ORE TREATED.- Sacaton Copper Project - General Composite

TEST NO.- S-5



SACATON METALLURGICAL SAMPLES - WEST ORE BODY

J.H.C.

MAR 27 1969

HOLE NO.	FROM - TO	1 INT. (ft.)	CALC. 2 CALC. TOTAL Cu (%)	CALC. 3 CALC OXIDE Cu (%)	ASSAYS OF 3-20-69 4 EL PASO TOTAL Cu (%)	5 EL PASO OXIDE Cu (%)	6 EL PASO Mo (%)	7 EL PASO Au (OZ/TON)	8 EL PASO Ag (OZ/TON)	9	10
GROUP A - MIXED OX-SUL											
S-90	409.7 - 513.7	104.0	1.03	0.32	1.04	0.31	.014	.0025	.14	3	
S-91	283.7 - 443.8	160.1	1.66	0.20	1.34	0.41	.0076	.005	.11	5	
S-93	242.1 - 313.6	71.5	0.92	0.57	0.92	0.56	.0097	.005	.11	2	
S-94	375.0 - 448.3	73.3	1.82	0.27	1.44	0.41	.027	.005	.14	3	
S-101	566.6 - 678.0	206.4	1.92	0.16	1.80	0.54	.013	.005	.15	5	
	725.2 - 820.2										
	WT'ED TOTAL	615.3 @	1.57	0.26	1.41	.45	.013	.004	.13		
GROUP B - SULFIDES											
S-91	443.8 - 868.6	424.8	0.60	0.09	0.58	0.03	.014	.0025	.11	4	
S-93	313.6 - 458.0	144.4	0.96	0.06	0.82	0.13	.013	.0025	.11	3	
S-94	448.3 - 739.7	291.4	0.65	0.03	0.62	0.02	.019	.0025	.11	4	
S-95	385.7 - 723.2	337.5	0.92	0.04	0.84	0.08	.027	.0025	.29	5	
S-102	519.0 - 670.8	151.8	1.11	0.02	1.06	0.15	.025	.005	.10	3	
S-106	276.8 - 558.5	281.7	0.69	0.03	0.67	0.04	.013	.0025	.08	4	
	WT'ED TOTAL	1,631.6 @	0.77	0.05	0.72	0.06	.018	.0027	.14		
GROUP D - SULFIDES											
S-107	308.8 - 390.6	168.8	0.63	0.02	0.64	0.10	.022	.0025	.10		
	429.1 - 516.1										
S-111	358.3 - 573.2	214.9	0.56	0.03	0.52	0.03	.0070	.0025	.10		
S-115	312.2 - 393.1	80.9	0.61	0.13	0.56	0.18	.0097	.0025	.11		
	WT'ED TOTAL	464.6 @	0.60	0.04	0.57	0.08	.013	.0025	.10		
SUMMARY - WEST ORE BODY		2,711.5 @	0.92	0.10	0.85	0.15	.016	.003	.13		

SACATON METALLURGICAL SAMPLES – EAST ORE BODY

	Hole No.	From – To	1 INT (ft.)	CALC 2 CALC TOTAL Cu (%)	CALC 3 CALC OXIDE Cu (%)	ASSAYS OF 3-20-69 4 EL PASO TOTAL Cu (%)	5 EL PASO OXIDE Cu (%)	6 EL PASO Mo (%)	7 EL PASO Au (OZS/TON)	8 EL PASO Ag (OZS/TON)	9	10
1	GROUP	C - SULFIDES										
2	S-92	1412.0 - 1632.7	220.7	.70	0.03	.66	0.04	.0084	.0025	.09		
3	S-96	1422.4 - 1698.8	276.4	1.36	0.05	1.02	0.12	.039	.005	.04		
4	S-98	1489.7 - 1713.5	223.8	2.76	0.13	2.56	0.30	.033	.0025	.05		
5	S-104	1400.2 - 1764.7	364.5	1.64	0.04	1.80	0.29	.029	.005	.09		
6												
7		WT'ED TOTAL	1,085.4 @	1.61	0.06	1.53	0.20	.028	.004	.07		
8												
9	GROUP	E - SULFIDES										
10	S-105	1579.4 - 1761.8	182.4	1.57	0.07	1.56	0.41	.023	.0025	.10		
11	S-108	1609.8 - 1771.3	161.5	1.25	0.04	1.15	0.22	.022	.0025	.08		
12	S-118	1371.8 - 1657.2	285.4	1.20	0.04	1.20	0.22	.032	.0025	.08		
13												
14		WT'ED TOTAL	629.3 @	1.32	0.05	1.29	0.28	.027	.0025	.08		
15												
16												
17	SUMMARY – EAST ORE BODY		1,714.7 @	1.50	0.06	1.44	0.23	.028	.003	.07		
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												

NPW - Derive mo average for E + W deposits - chk Tcu assays JHC

AMERICAN SMELTING AND REFINING CO.

EL PASO ORE TESTING AND ASSAY LABORATORY

ASSAY CERTIFICATE

J.H.C

MAR 24 1969

DATE March 20 196 9

MARKED SACATON METALLURGICAL SAMPLES

LOT NO. UNIT	LOT NO. SMELTER	GOLD OZ	SILVER OZ	Cu %	Pb %	Zn %	Cd %	Fe %	Mn %	%	S %	SiO_2 %	CaO Total %	CaO Avail. %	%
Group A						%Ox.Cu		%Mo							
Hole	S-90	.0025	.14	1.04		.31		.014							
Hole	S-91	.005	.11	1.34		.41		.0076							
"	S-93	.005	.11	.92		.56		.0097							
"	S-94	.005	.14	1.44		.41		.027							
"	S-101	.005	.15	1.80		.54		.013							
Group B															
Hole	S-91	.0025	.11	.58		.03		.014							
"	S-93	.0025	.11	.82		.13		.013							
"	S-94	.0025	.11	.62		.02		.019							
"	S-95	.0025	.29	.84		.08		.027							
"	S-102	.005	.10	1.06		.15		.025							
"	S-106	.0025	.08	.67		.04		.013							
Group C															
Hole	S-92	.0025	.09	.66		.04		.0084							
"	S-96	.005	.04	1.02		.12		.039							
"	S-98	.0025	.05	2.56		.30		.033							
"	S-104	.005	.09	1.80		.29		.029							
Group D															
Hole	S-107	.0025	.10	.64		.10		.022							
"	S-111	.0025	.10	.52		.03		.0070							
"	S-115	.0025	.11	.56		.18		.0097							
Group E															
Hole	S-105	.0025	.10	1.56		.41		.023							
"	S-108	.0025	.08	1.15		.22		.022							
"	S-118	.0025	.08	1.20		.22		.032							

JHCourtright-3x
VKudryk
GWBossard
File

HILL PRINTING CO.—EL PASO

BY _____ T. D. Henderson, Jr. ~~CHIEF CHEMIST~~

AMERICAN SMELTING AND REFINING CO.

EL PASO ORE TESTING AND ASSAY LABORATORY

ASSAY CERTIFICATE

J. H. C.

MAR 24 1969

DATE March 20 1969

MARKED SACATON METALLURGICAL SAMPLES

LOT NO. UNIT	LOT NO. SMELTER	GOLD OZ	SILVER OZ	Cu %	Pb %	Zn %	Cd %	Fe %	Mn %	%	S %	SiO_2 %	CaO Total %	CaO Avail. %	%
Group A						%Ox.Cu		%Mo							
Hole	S-90	.0025	.14	1.04		.31		.014							
Hole	S-91	.005	.11	1.34		.41		.0076							
"	S-93	.005	.11	.92		.56		.0097							
"	S-94	.005	.14	1.44		.41		.027							
"	S-101	.005	.15	1.80		.54		.013							
Group B															
Hole	S-91	.0025	.11	.58		.03		.014							
"	S-93	.0025	.11	.82		.13		.013							
"	S-94	.0025	.11	.62		.02		.019							
"	S-95	.0025	.29	.84		.08		.027							
"	S-102	.005	.10	1.06		.15		.025							
"	S-106	.0025	.08	.67		.04		.013							
Group C															
Hole	S-92	.0025	.09	.66		.04		.0084							
"	S-96	.005	.04	1.02		.12		.039							
"	S-98	.0025	.05	2.56		.30		.033							
"	S-104	.005	.09	1.80		.29		.029							
Group D															
Hole	S-107	.0025	.10	.64		.10		.022							
"	S-111	.0025	.10	.52		.03		.0070							
"	S-115	.0025	.11	.56		.18		.0097							
Group E															
Hole	S-105	.0025	.10	1.56		.41		.023							
"	S-108	.0025	.08	1.15		.22		.022							
"	S-118	.0025	.08	1.20		.22		.032							

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HILL PRINTING CO.—EL PASO

BY _____

T. D. Henderson, Jr. ~~CHIEF CHEMIST~~

J.H. Courtright

J. H. C.

MAR 19 1969

W.E.S.
MAR 19 1969

EL PASO ORE TESTING AND ASSAY LABORATORY

El Paso, Texas
Mar. 18, 1969

MR. WES
READ AND RETURN ✓
PREPARE ANSWERS ____ HANDLE ____
FILE ____ INITIALS ____

Mr. J. H. Courtright, Supervisor
Southwestern U. S. Division
Exploration Department
American Smelting and Refining Co.
P. O. Box 5795
Tucson, Arizona 85703

Copper Recoveries and Concentrate Grades
Obtainable from the Three Sacaton Project
Porphyry Copper Orebodies

Dear Sir:

Mr. Maúrtua is presently completing the flotation testing of the three composites of Sacaton Project copper ores and a general composite of all three orebodies weighted according to the drill footages attached to your letter of Jan. 14, 1969.

Flotation tests have been run on all three composites representing the three orebodies. Group A is the mixed sulfide and oxide ore, 74% of the contained copper being sulfide(chalcocite with minor amounts of chalcopyrite) and the balance oxide.Group B-D contains a large amount of pyrite, and most of the sulfide copper is in the form of chalcopyrite rather than chalcocite. Group C-E is primarily a clean sulfide (chalcocite) ore, only 9% of the total copper being oxide.

The following tabulation gives the copper recoveries and concentrate grades obtainable with and without regrinding for the three ores:

		Without Regrind		With Regrind	
Group Nos.	Grind of Flotn. Feed,% -200 Mesh	Conc % Cu	Copper Recovery %	Conc % Cu	Copper Recovery %
23% A	60.6	32.0	85.0	36.1	84.6
B-D	59.1	13.4	86.7	26.3	80.8
11% C-E	59.7	25.6	86.8	38.6	89.7

Mr. Maúrtua should complete his flotation test work within a few days, and a finalized report on the flotation testing of Sacaton Project copper ore will be submitted at that time.

Yours very truly,

T. D. Henderson Jr.

T. D. Henderson, Jr.

TDH/cb
cc: GWBossard
VKudryk
TASnedden

J. H. C.

FEB 5 1969

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

February 5, 1969

Mr. T. D. Henderson
El Paso Ore Testing Laboratory
American Smelting and Refining Company
P. O. Box 895
El Paso, Texas 79999

Sacaton Project

Metallurgy

Dear Sir:

Reference is made to our telephone conversation of this date concerning the laboratory test work for the above project. The samples for this work were forwarded to El Paso by motor freight on January 8 and compositing instructions were given in Mr. Courtright's letter of January 14. It is my understanding that approximately one-half of the weight of each of the 21 samples has been crushed to minus ten mesh and in addition, head samples of each have been prepared for analysis.

Routine bench-scale test work should be undertaken on each of the three composites described in Mr. Courtright's letter to determine mesh-of-liberation, copper concentrate grade, copper and molybdenum recoveries, etc. In addition we should have Bond Work Index information for a 65 mesh grind. Data concerning thickening, filtering, etc., will not be required at this time.

Since it appears that the new San Martin sample will not arrive for some time, I would like to suggest that Mr. Maurtua begin working on this project immediately. This would also concur with Mr. Courtright's wishes, since he is concerned that the chalcocite mineralization in the Sacaton samples might begin to alter prematurely. Please, also keep in mind that you should feel free to use the services of either Mr. Crowell or Mr. Trewek at El Paso for this test work.

Yours truly,

ORIGINAL SIGNED BY
G. W. BOSSARD

G. W. BOSSARD
Milling Engineer

GWB/mg
cc: CENelson
JSSmart, Jr.
VKudryk
JHCourtright

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 14, 1969

Mr. T.D. Henderson, Jr., Supervisor
El Paso Assay & Ore Dressing Laboratory
P.O. Box 895
El Paso, Texas 79999

Sacaton Samples

Dear sir:

As explained by phone, the list of samples sent you by my letter of January 10 was incomplete.

Accordingly, I am enclosing a new list which is complete for the 21 pails (740 lbs) shipped.

Please assay each hole for Au, Ag, Mo, Cu, and Non-S and then combine into three samples for recovery work, as follows:

West zone - Group A - mixed Ox and Sulphide
West zone - Groups B and D - Sulphide
East zone - Groups C and E

Yours very truly,

J.H. Courtright

J.H. Courtright

JHC:lzb
Encl.

cc: GWBossard

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 10, 1969

Mr. T.D. Henderson, Jr., Supervisor
El Paso Assay & Ore Dressing Laboratory
P.O. Box 895
El Paso, Texas 79999

Sacaton Samples

Dear sir:

On January 8 we shipped you by Braswell Motor Freight Lines 21 cans totalling 740 lbs. These are crushed core rejects for metallurgical testing. The samples are composited by drill holes, as follows:

WEST ZONE -- GROUP D -- SULPHIDES

Hole	From	To	Footage
S-107	308.8	390.6	81.8
	429.1	516.1	87.0
S-111	358.3	573.2	214.9
S-115	312.2	393.1	80.9

EAST ZONE -- GROUP E -- SULPHIDE

Hole	From	To	Footage
S-105	1579.4	1761.8	182.4
S-108	1609.8	1771.3	161.5
S-118	1371.8	1657.2	285.4

Before combining into two groups (D and E) for recovery tests, please assay each drill hole composite for Au, Ag, Cu, Non-S Cu and Mo.

Yours very truly,

J.H. Courtright

JHC:lzb

cc: GWBossard

To: J.H. Courtright

J.H.C.
JAN 9 1969

From: N.P. Whaley

SACATON PROJECT
COMPOSITES FOR METALLURGICAL WORK
PROPOSED SHIPMENT TO EL PASO

The coarse rejects from the assay samples are now recomposited on a hole-by-hole basis from the original three metallurgical samples or groups A, B, and C and composites made up, again on a hole-by-hole basis, for two new groups identified as D and E.

The drill holes and intercepts involved are shown on the attached list under ore-body zone groupings. Each drill hole represents a separate composite which is sealed in an individual five gallon pail.

This proposed shipment consists of 21 pails aggregating approximately 740 lbs. It will be shipped today via Braswell Motor Freight Lines, Inc.

N.P. Whaley

Attachment

Sacaton Metallurgical Samples

West Zone -- Group A -- Mixed oxides and sulphides

Hole	From	To	Footage	
S-90	409.7	513.7	104.0	
S-91	283.7	443.8	160.1	
				0.2 lb/ft.
S-93	242.1	313.6	71.5	
S-94	375.0	448.3	73.3	
S-101	566.6	678.0	111.4	combined
	725.2	820.2	95.0	

West Zone -- Group B -- Sulphides

Hole	From	To	Footage	
S-91	443.8	868.6	424.8	
S-93	313.6	458.0	144.4	
				0.1 lb/ft.
S-94	448.3	739.7	291.4	
S-95	385.7	723.2	337.5	

Group B ... (Cont'd)

Hole	From	To	Footage	Composite
S-102	519.0	670.8	151.8	
S-106	276.8	558.5	281.7	

East Zone -- Group C -- Sulphides

Hole	From	To	Footage	
S-92	1412.0	1632.7	220.7	
				0.1 lb./ft.
S-96	1422.4	1698.8	276.4	
S-98	1489.7	1713.5	223.8	
S-104	1400.2	1764.7	364.5	

West Zone -- Group D -- Sulphides

Hole	From	To	Footage	
S-107	308.8	390.6	81.8	
	429.1	516.1	87.0	
				0.3 lb./ft.
S-111	358.3	573.2	214.9	

GROUP D... (con't.)

Hole	From	To	Footage	Composite factor
S-115	312.2'	393.1'	80.9	

EAST ZONE -- Group E -- Sulphide

Hole	From	To	Footage	Composite factor
S-105	1579.4'	1761.8'	182.4'	
				0.2 lb/ft.
S-108	1609.8'	1771.3'	161.5'	
S-118	1371.8'	1657.2'	285.4	

MR. W E
READ AND RETURN
PREPARE ANSWERS ___ HANDLE ___
FILE ✓ INITIALS

J H Courtright

J. H. C.

JAN 9 1969

EL PASO ORE TESTING AND ASSAY LABORATORY

El Paso, Texas
Jan. 8,1969

Mr. J. H. Courtright, Supervisor
Southwestern U. S. Division
Exploration Department
American Smelting and Refining Co.
P. O. Box 5795
Tucson, Arizona 85703

W.E.S.
JAN 13 1969

Mo Assays on Sacaton Copper Project Samples

Dear Sir:

Since we received our new AA lamp for Mo and a new spectrophotometer for running colorimetric moly determinations, we have rerun molybdenum determinations on Sacaton Copper Project samples A, B, and C by both methods. The results are given below:

Sample	Assays, % Mo AA	Colorimetric
Sacaton A	.0078	.009
Sacaton B	.011	.0105
Sacaton C	.034	.030

These results are considerably lower than those reported on our assay certificate dated October 23, 1968.

Since we get reasonably good checks by both methods run at El Paso, and these results check rather well with other assays on these three samples made at South Plainfield and Mission, it appears that our previously reported Mo assays were high.

We have also been getting much better checks on Moly determinations on other samples since using this new spectrophotometer and comparing colorimetric assays with AA Mo assays. Previously we had no AA lamp with which to check

Mr. J. H. Courtright Jan. 8, 1969

the colorimetric assays. Apparently the old spectrophotometer was giving the erroneous readings, and we now feel that we have this situation corrected.

Yours very truly,

T. D. Henderson Jr.

T. D. Henderson, Jr.

TDH/cb

cc: PALewis
DRJameson
RBMeen
VKudryk
GWBossard
WESaegart

J. H. C.

DEC 9 - 1968

JHCourtright

EL PASO ORE TESTING AND ASSAY LABORATORY

El Paso, Texas
Dec. 5, 1968

Mr. J. H. Courtright, Supervisor
Southwestern U. S. Division
Exploration Department
American Smelting and Refining Co.
P. O. Box 5795
Tucson, Arizona 85703

Sacaton

Dear Sir:

Pursuant to our conversation last Friday, at the Tucson Office, regarding the discrepanies between moly assays on Sacaton Copper Project samples A, B, and C, I am sending our duplicate pulps of these three samples to South Plainfield for further check assaying for Mo.

The attached table lists the moly assays (% Mo) made to date on these three samples at the El Paso Laboratory and the Mission Unit and Silver Bell Unit assay laboratories. The Mo assays made at El Paso were by a colorimetric method, and those made at Silver Bell were by a wet (presumably colorimetric) method checked by AA analysis. The assay method used at the Mission Unit was not specified.

Yours very truly,

T. D. Henderson Jr.

T. D. Henderson, Jr.

TDH/cb

cc: PALewis/ with attach.
DRJameson/ "
VKudryk/ "
GWBossard/ "

MOLYBDENUM ASSAYS (% Mo) OF SACATON COPPER PROJECT SAMPLES A,B,& C

	El Paso Assay Lab	Silver Bell Unit				Mission Unit
		Wet Assay		AA Assay		
Sample A	.042	Avg .0204	(.0219 (.0189	Avg .0195	(.021 (.018	.008
Sample B	.056	Avg .0471	(.0471 (.0471	Avg .046	(.046 (.046	.012
Sample C	.135	Avg .1383	(.1480 (.1287	Avg .1375	(.147 (.128	.033

JRW

11-5-65

Assay checks Sacaton composite samples.

Sample No.	% Mo Mission	% Mo El Paso
A	.008	.042
B	.012	.056
C	.033	.135

J.H.C.
OCT 1 1968

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

October 1, 1968

TO: J.H. Courtright

FROM: S.E. Zelenkov

Today, I shipped via Braswell Motor Freight, seven pails containing metallurgical samples from the Sacaton Project. The composites are divided into three groups. Group A has two cans, group B has three cans, and group C has two cans. Each can holds five gallons.

The groups are divided as follows:

Group A	West zone mixed oxides and sulfides.
Group B	West zone sulfides
Group C	East zone sulfides.

S.E. Zelenkov
S.E. Zelenkov

SEZ:lzb

cc: NPWhaley

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

October 1, 1968

Mr. T.D. Henderson, Supervisor
El Paso Assay & Ore Dressing Laboratory
P.O. Box 895
El Paso, Texas 79999

Sacaton Metallurgical
Samples

Dear Mr. Henderson:

We are shipping you today via Braswell Motor Freight seven 5-gallon cans containing crushed cores from the Sacaton Copper Project. These are more less typical porphyry copper ores and are to be used to determine recovery in a preliminary way. Since some of the samples have been in storage for several months, some oxidation of the chalcocite has no doubt taken place.

The samples have been divided into three groups, as follows:

Group A	West zone mixed oxides and sulfides.
Group B	West zone sulfides.
Group C	East zone sulfides.

Group A is contained in two cans, Group B in three cans, and Group C in two cans.

Also, please run each group for moly, gold and silver.

Yours very truly,

J.H. Courtright

JHC:lzb

cc: WGBossard

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

3226 East 46th Street
Tucson, Arizona 85713

Phone 624-0049

ASSAYERS - CHEMISTS
METALLURGICAL RESEARCH

ORE TESTING
FLOTATION - LEACHING
ELECTROLYSIS

J. H. C.

SEP 27 1968

September 26, 1968.
Tucson, Arizona.

~~Ho~~ Scanlon
metallurgy

To: Mr. James H. Courtright
American Smelting & Refining Co.
1150 North 7th Avenue
Tucson, Arizona.

From: American Analytical & Research Laboratories.

Re: ACID CONSUMPTION TESTS ON -3/8" CONGLOMERATE ROCK.

Pursuant to your instructions, the three samples, Nos. A-8312, A-8313 and A-8314, have each been treated by percolation of 1% sulfuric acid solution. 500 grams of each sample was treated at -3/8" size with 1 liter of acid solution percolating through the sample for eight hours, at a flow rate of 125 ml. per hour. The pH of the starting acid solution was 1.05.

RESULTS

No.	Acid applied	Acid consumed	Lbs. acid consumed/ton	End pH
A-8312	10.878 grams	5.243 grams	20.972 lbs./ton ore	1.30
A-8313	10.878 "	5.243 "	20.972 lbs./ton ore	1.30
A-8314	10.878 "	5.292 "	21.168 lbs./ton ore	1.30

Respectfully submitted,

P. S. Flores

cc: JHC (2)
file (2)

JH Courtright ✓

J. H. C.

OCT 25 1968

EL PASO ORE TESTING AND ASSAY LABORATORY

El Paso, Texas
Oct. 24, 1968

Mr. J. H. Courtright, Supervisor
Southwestern U. S. Division
Exploration Department
Tucson Office

Sacaton
metallurgical

Dear Sir:

I am sending by airmail duplicates of our Head samples A, B, and C of the copper porphyry ores from the Sacaton Copper Project to the Mission Unit, to the attention of Mr. Lewis. By copy of this letter I am requesting that Mr. Lewis have molybdenum assays run on these samples at the Mission laboratory in order to check the Mo assays made at El Paso.

Yours very truly,

T. D. Henderson Jr.

T. D. Henderson, Jr.

TDH/cb
cc: PALewis
GWBossard
VKudryk

Northwest Dept
SOUTHWORTH CO.
100% WATER FIBER
U.S.A.

J H C

Aa 16A.3.19B

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

September 17, 1968

MEMORANDUM TO Mr. J. E. Kinnison:

Sacaton Metallurgical Samples

Attached is a list of metallurgical samples to be made up for shipment to El Paso. There will be three separate samples, labeled A, B, and C, taken from the crushed rejects of the core.

In the right-hand column is the suggested pounds per foot to make up the sample.

In order to get these out as soon as possible, you probably will have to temporarily interrupt the sample board preparations. If you have any questions, please call me.

J. H. Courtright

J. H. Courtright

JHC:lmi

attachment

Sacaton Metallurgical Samples 9-16-68

WEST ZONE - - Sample A - - mixed oxides and sulphides

Hole	From	To	Footage	
90	409.7	515.7	104.0	
93	242.1	313.6	71.5	
94	375.0	448.3	73.3	0.2 lb/ft
91	283.7	443.8	160.1	
101	566.6	678.0	111.4	
	725.2	820.2	95.0	
			615.3	
107				

WEST ZONE - - Sample B - - Sulphide

Hole	From	To	Footage	
106	276.8	558.5	281.7	
93	313.6	458.0	144.4	
94	448.3	739.7	291.4	0.1 lb/ft
95	385.7	723.2	337.5	
91	443.8	868.6	424.8	
102	519.0	670.8	151.8	
			1601.6	
107				

EAST ZONE - - Sample C - - Sulphide

Hole	From	To	Footage	
92	1412.0	1632.7	220.7	
96	1422.4	1698.8	276.4	0.1 lb/ft
98	1489.7	1713.5	223.8	
104	1400.2	1764.7	364.5	
			1085.4	

~~WES~~ JHCourtright

AMERICAN SMELTING AND REFINING CO.

EL PASO ORE TESTING AND ASSAY LABORATORY

ASSAY CERTIFICATE

J. H. C.

OCT 24 1968

DATE Oct. 23 1968

MARKED SACATON METALLURGICAL SAMPLES

Letter JHCourtright 10/1/68

LOT NO. UNIT	LOT NO. SMELTER	GOLD Oz/T	SILVER Oz/T	Cu %	Pb %	Zn %	Cd %	Fe %	Mn %	%	S %	SiO_2 %	CaO Total %	CaO Avail. %	%
						%CuO		%Mo							
Group A		.005	.15	1.38		.25		.042							
Group B		.003	.08	.66		.04		.056							
Group C		.005	.13	1.43		.10		.135							

JHCourtright-3x
VKudryk
GWBossard
File

HILL PRINTING CO.—EL PASO

BY _____ A. Jiménez S. CHIEF CHEMIST