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TOMBSTONE MINING DISTRICT

Cochise County, Arizona

Block 4

Geology & Drilling

(In area of Mutual Interest)

Austral Oil Exploration

Geology, Geophysics, Geochem & Mill Tests

Metallurgical Consulting to the Chemical Industry

METCON LABORATORY

Box 5912
Tucson, Ariz.
85703
Phone 623-5045
Area code 602

649

September 26, 1968

Mr. William Lundby
8840 Wrightstown Road
Tucson, Arizona 85715

Dear Mr. Lundby,

Here is the final report on the Tombstone test work.

We are also enclosing a final billing. Inasmuch as we have delayed this final dispatch unreasonably long we are canceling our laboratory charge but would appreciate receiving the small amount we are out of pocket for assays.

Thank you very much for having this opportunity to work with you and we would certainly appreciate any consideration you might be able to give us in the future.

Very cordially,

Phil Allen, Director
METCON Laboratory

PA/vi

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METCON LABORATORY

PROJECT CT-15

FOR

AUSTRAL OIL COMPANY

TOMBSTONE, ARIZONA

July 22, 1968

SUMMARY

Preliminary work only has been done. Due to misunderstanding no further work was carried on until Mr. Carouso came in during the first week in July and indicated the urgency. Since then additional work has been done, the results of which are not all available. Cyanide assays of pregnant liquor, obtained at a custom assay office failed to check expected results within credibility figures.

PROCEDURE

A large sample of ore (over a thousand pounds) from the Tombstone, Arizona area was delivered to METCON LABORATORY by the Austral Oil Company. This was thoroughly mixed by coning several times after which coning and quartering continued until a small enough sample was achieved for screen analysis and an aliquot portion for head assay.

SCREEN ANALYSIS AND ASSAY OF SCREEN FRACTIONS

No.	SCREEN	WGT. %	ASSAY OZ/TON Au	ASSAY OZ/TON Ag	UNITS Au	UNITS Ag	% DISTRIBUTION Au	% DISTRIBUTION Ag
525	1.050	29.73	0.008	3.18	0.0024	0.945	35	29.8
526	0.742	10.10	0.010	3.21	0.0010	0.324	15	10.3
527	0.525	9.52	0.006	2.31	0.0006	0.220	9	6.9
528	0.371	8.08	0.008	2.35	0.0006	0.190	8	6.0
529	3 MESH	6.20	0.005	1.94	0.0003	0.120	4	3.8
530	4 "	5.11	0.004	2.18	0.0002	0.111	3	3.5
531	6 "	4.30	0.004	3.62	0.0002	0.156	3	4.9
532	10 "	4.87	0.004	3.84	0.0002	0.187	3	5.9
533	20 "	5.26	0.003	2.18	0.0002	0.115	3	3.6
534	35 "	4.35	0.008	4.53	0.0003	0.197	4	6.2
535.	48 "	1.71	0.005	6.28	0.0001	0.107	1	3.4
536	65 "	2.49	0.005	6.02	0.0001	0.150	1	4.7
537	100 "	1.36	0.004	6.27	0.0001	0.085	1	2.7
538	200 "	3.69	0.010	4.83	0.0004	0.178	6	5.6
539	-200 "	3.23	0.010	2.59	0.0003	0.084	4	2.7
	Calculated Screen Head				0.007	3.169		
	Actual Assay of Screen Feed				0.010	2.82		

Looking at the silver distribution in the screen analysis, it appears there is little to be gained by screening or classifying since the silver distribution follows the fraction weights very closely.

Three alkalinity checks were made to determine if acid generating minerals were in evidence.

TEST No. 1

200 grams of ore - minus 9 mesh

200 ml of water

Rolled for 1 hour Final pH 6.0

TEST No. 2

Same as above but with the addition of

2 grams CaO. Final pH 11.2

TEST No. 3

Same as above but with the addition

of 1 gram of CaO and rolled for

20 hours. Final pH 11.0

It appears that once sufficient lime has been added to raise the pH substantially on the alkaline side there is little degradation. Apparently there are not many sulfides available for creating acid.

653

Additional tests, Nos. 4 through 9 were completed to determine the protective alkalinity as follows:

400 grams of ore - each charge

0.645 grams of 77.5% available CaO (equal to 0.5 grams on a 100% basis)

1000 ml of water

	TIME ON ROLLS (HRS.)	MESH OF ORE	LIME TITRATION OF FINAL LIQUOR
4	1	-10	0.0050% CaO
5	2	-10	0.0060% "
6	3	-10	0.0055% "
7	4	-10	0.0050% "
8	1	-100	0.0030% "
9	4	-100	0.0030% "

The final liquor was titrated with 0.1 N HNO_3.

Four preliminary tests were run to compare mesh size with leach capabilities.

Make-up of each charge as follows (differing only in screen size):

500 grams of ore assaying Au 0.010 Ag 2.82

500 ml of water

5 grams CaO

1.885 grams NaCN (KCN equivalent to 0.5%)

All were rolled for 20 hours and tailing assayed.

SAMPLE No.	100 % MINUS SCREEN MESH	Au	Ag	% RECOVERY
603	9	Nil	0.73	74.12
604	20	"	0.64	77.31
605	35	"	0.60	78.73
606	48	"	0.52	81.57

No further gold assays will be obtained since obviously 100 % recovery of the gold is evidenced.

It could well be that finer grinds might be even more easily leached however in reducing to all minus 48 mesh in a mill a lot of very fine material would be created. In this test the samples were screened before each additional pass through the pulverizer (loose plates) so not too much in fines above the next smaller mesh screen could be created.

Cyanide consumption is not known at this point since the assay results were not credible. These will be rerun.

We will fabricate some laboratory size tanks for counter-current

leaching (probably of the pachuca type) and proceed with tank type leaching as soon as possible.

We are nearly set up to do our own assaying of Cyanide and available lime. Since this appears to be something the assay offices are not readily able to slot into their line-up, quite probably we can do a better job.

Phil Allen, Director
METCON Laboratory

PA/vi

656

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Metcon Laboratory
P. O. Box 5912
Tucson, Arizona

JOB # 002883
RECEIVED 7-30-68
REPORTED 7-31-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
15-622		1.14					
623		.82					
624		.76					
625		.74					
626		.40					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE 10.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002740
RECEIVED 7-2-68
REPORTED 7-7-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
95L:							
190 NO.		.06					
30 S.	Nil	3.00					
50 W.		.34					
433 L:							
105 NW	Nil	2.34					
60 S	Nil	5.24					
175N50W	Nil	.62					
195L:							
76 S.	Nil	7.26					
105 NO.	Nil	8.66					
356L 136NO.	Nil	9.28					
356L100 NO.	Nil	1.52					
300L							
77NO. 41W	Nil	8.12					
141L-30S	.003	21.06					
161L 35 NO.	Nil	6.32					
480L							
164S 117W	Nil	Trace					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WIL WRIGHT
Tucson Arizona U. S. A.

CHARGE 52.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

cc: W. Lumdby

JOB # 002423
RECEIVED 4-22-63
REPORTED 4-24-63

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
SA-1	Nil	3.04					
SA-2	.016	1.63					
SA-3	Nil	2.40					
SA-4	.010	20.39					
SA-5	Trace	.64					
SA-6	Trace	.54					

CHARGE 22.50

(please hold payment until statement is received)

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

659

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Inc.
2700 Humble Building
Houston, Texas 77002

CC; Lundby

JOB # 002574
RECEIVED 5-29-68
REPORTED 6-4-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
Dump: 3	Nil	2.46					
4	Nil	2.60					
5	.003	1.24					

Chance - So. Bonanza

REGISTERED ASSAYER CERTIFICATE NO. 5675 WILLARD D. WRIGHT Date Signed 6/4 Arizona U. S. A.

CHARGE $ 11.25

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

660

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

JOB # 002618
RECEIVED 6-11-68
REPORTED 6-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
Dump #6	Nil	1.60					

Linde Sir

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILBUR D. WRIGHT
Date Signed
Arizona U. S. A.

CHARGE 3.75

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

661

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002739
RECEIVED 7-2-68
REPORTED 7-8-68

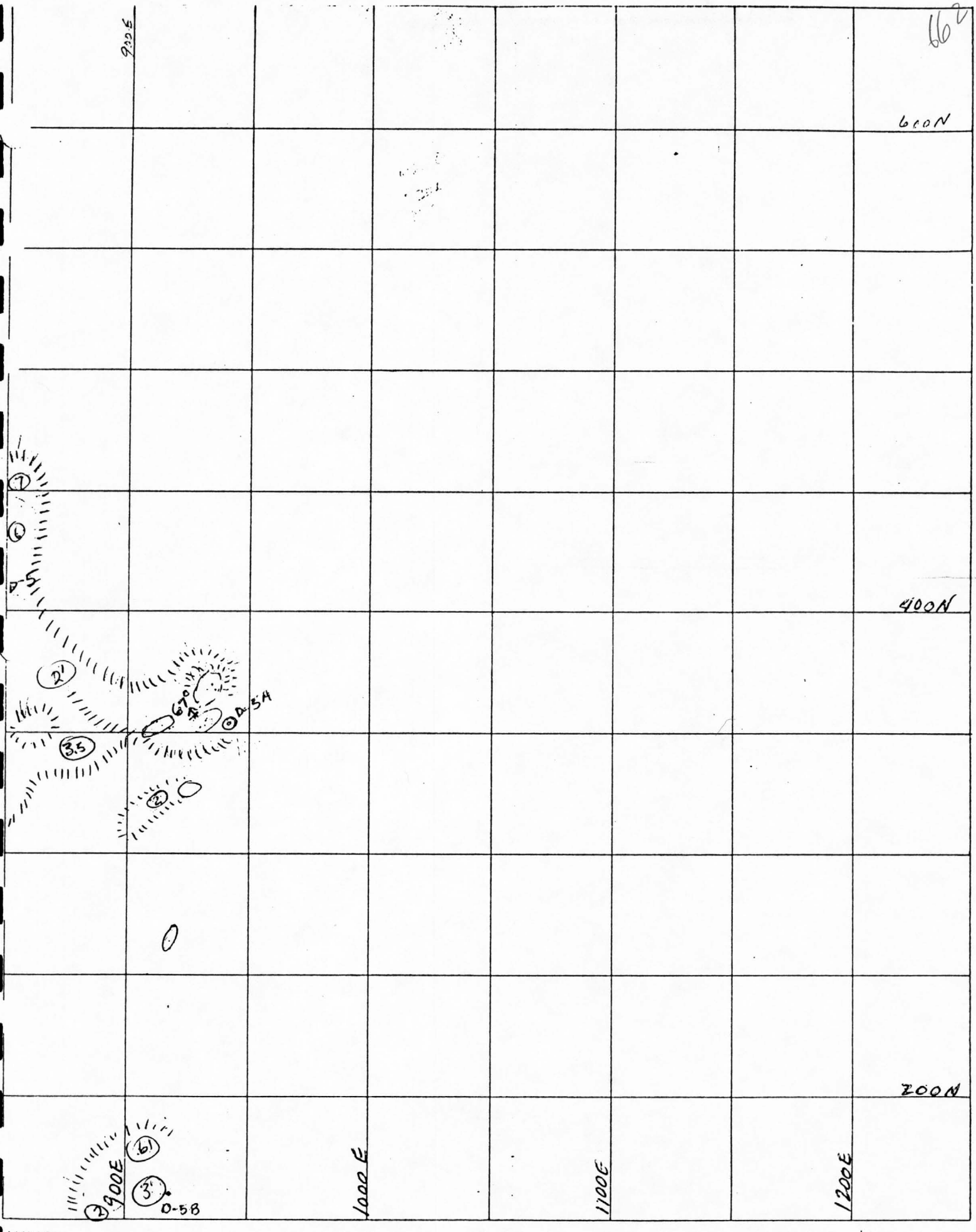
SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
Dump Samples:							
# 9	.003	1.84	North Bonanza				
10	.004	2.80	Solstice				
11	Trace	1.02	Joseph				
12	Nil	1.94	Brother Jonathan				

REGISTERED ASSAYER
CERTIFICATE
WRIGHT
Arizona U. S. A.

CHARGE 16.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

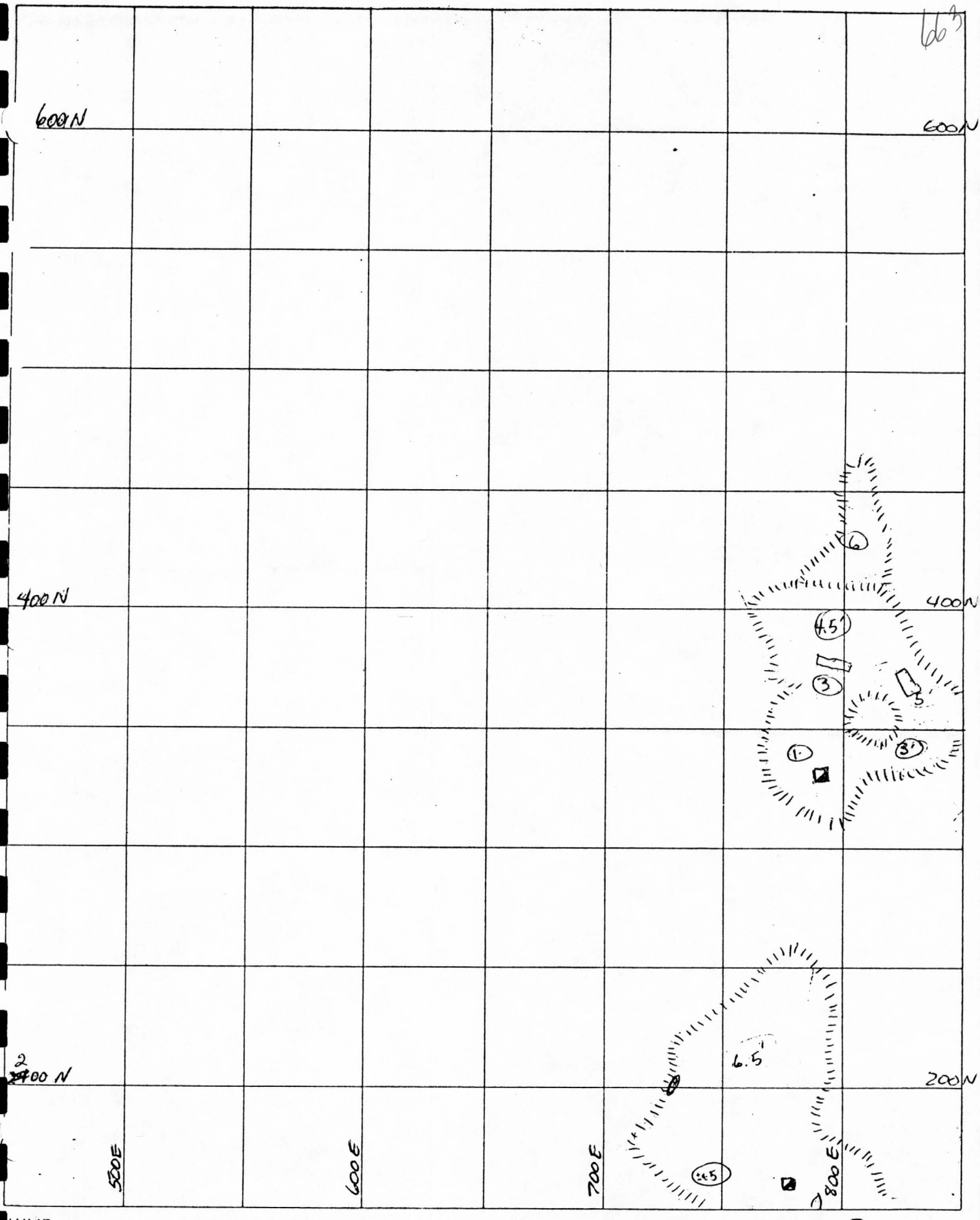
INVOICE



MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

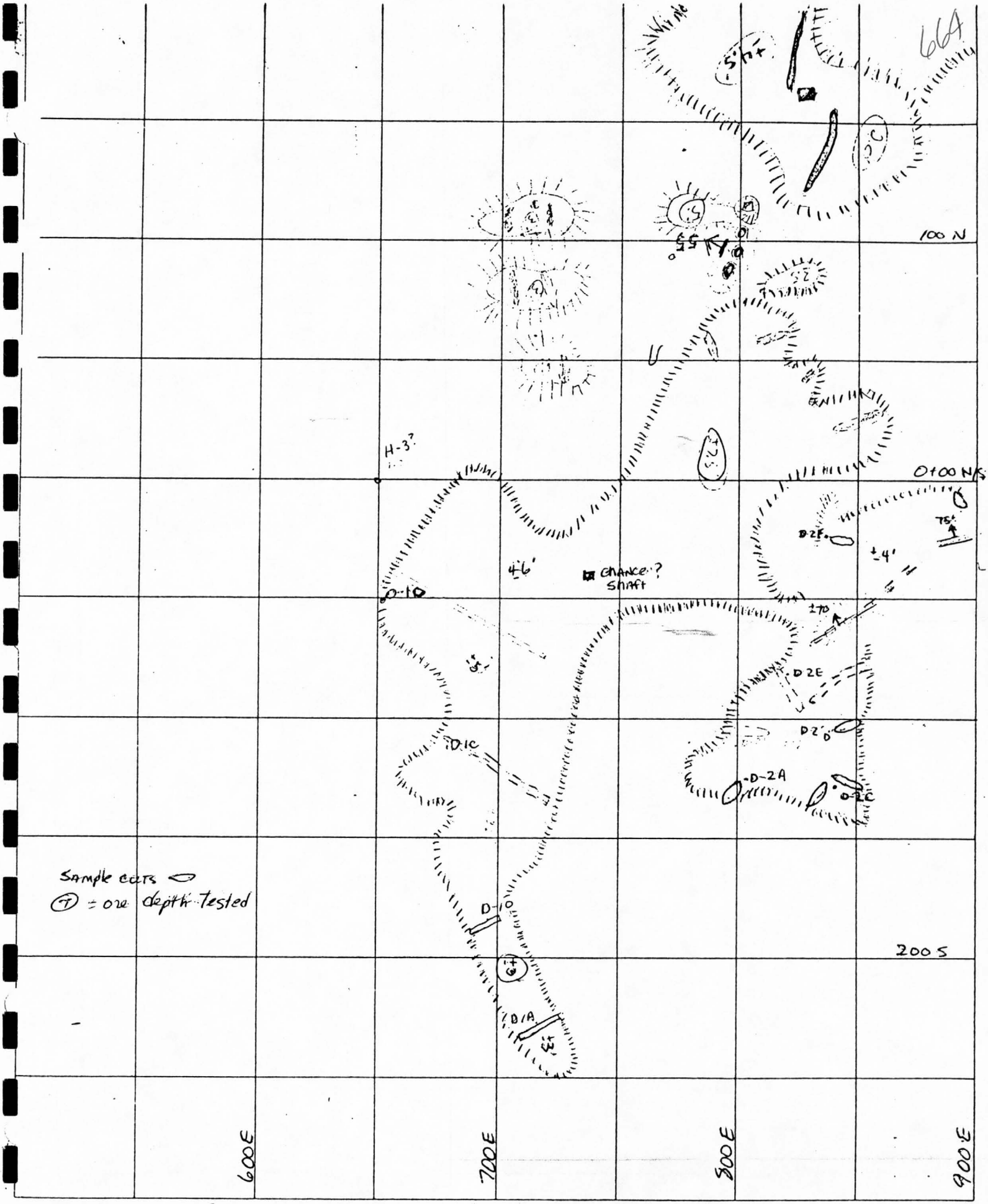
N _____ E _____ EL. _____



MINE _____ LOCATION _____ LEVEL Pumps

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE 1" = 50'

N _____ E _____ EL _____



MINE Chance - Bonanza LOCATION Tombstone, ARIZONA. LEVEL

GEOLOGY BY W.L. SURVEY DATE SCALE 1"=50'

N E EL.

665

+400 N

0-00 E/W

100 E

200 E

300 E

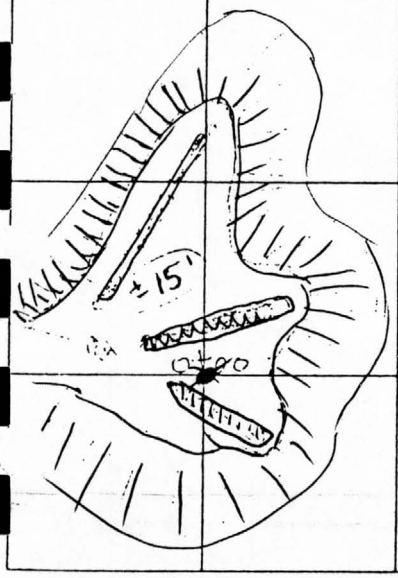
400 N

300 N

200 N

100 N

0+00 N/S

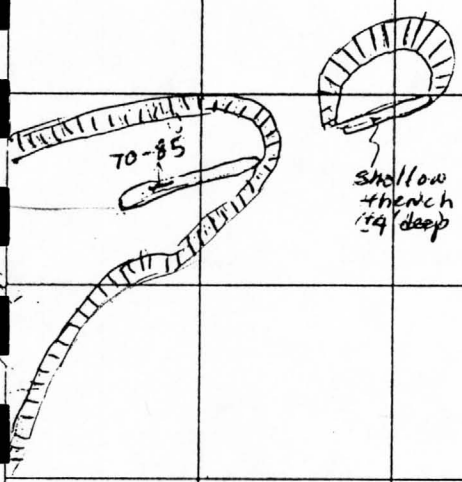


MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

N _____ E _____ EL. _____

666



0-00 N/S

200 S

MINE Chance - Banner LOCATION [illegible] LEVEL

GEOLOGY BY [illegible] SURVEY DATE SCALE

N E EL.

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

667

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5575

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002703
RECEIVED 6-27-68
REPORTED 6-27-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
# 7 Stateof Maine	Nil	4.54					
# 8 Stateof Maine (course:	Nil	4.94					

REGISTERED ASSAYER CERTIFICATE 5575 WIL WRIGHT ARIZONA U. S. A.

CHARGE 8.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

668

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
H ouston, Texas

JOB # 002751
RECEIVED 7-5-68
REPORTED 7-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
Dump # 13	Nil	2.34	— Manual				

4.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

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March 11, 1968

Austral Oil Company, Inc.
Houston, Texas

Tombstone Area, Cochise County, Arizona, Mining Dump surveyed for cubic yardage from February 22 to March 3, 1968 for Austral Oil Company, Inc., of Houston, Texas, with the following results:

1	North Bananza		2,546.3 cu. yds.
2	Southern		2,493.5 " "
3	Santa Ana		
	A.	42.5	
	B.	10.3	
	C.	70.2	
	D.	157.7	
			280.7 " "
4	Red Top		
	A	70.7	
		34.5	
			105.2 " "
5	South Bonanza		
	A.		
	B.	36.8	
	C.	35.4	
	D.	80.2	
	E.	61.4	
	F.	40.2	
	G.	190.1	
	H.	195.6	
	I.	204.0	
	J.	182.4	
	K.	192.9	
	L.	336.2	
	M.	230.0	
	N.	276.7	
	O	435.5	
			2,497.4 " "
6	Chance		
	A.	306.0	
	B.	15.0	
	C.	20.0	
	D.	33.0	
	E.	4.0	
	F.	18.0	

6	Chance (Continued)		
	G.	28.0	
	H.	12.0	
	I.	24.00	
	J.	6.0	
	K.	266.0	
	L.	110.0	
	M.	125.0	
	N.	138.2	
	O.	49.0	
	P.	92.0	
	Q.	83.0	
			1,239.2 cu. yds.
6	Chance (Cyanide Tailings)		
	A.	178.0	178. " "
7	Brother John		
	A.	2,466.0	
	B.	11.0	
	C.	4.0	
	D.	30.0	
	E.	5.9	
	F.	3.1	
	G.	4.2	
	H.	5.5	
	I.	466.0	
	J.	5.7	
	K.	4.4	
	L.	4.2	
	M.	20.0	
	N.	20.0	
		6.0	
		5.8	
		3.0	
		4.3	
		6.0	
		6.3	
			3,061.9 " "
8	Triple X		392.3 " "
9	Earnist		254.5 " "
10	May		85.3 " "

11	Maine		
	A.	1,288.2	
	B.	13,703.0	
	C.	7,100.4	
			22,091.6 cu. yds.
12	Uncle Sam		
	A.	102.0	
	B.	232.0	
	C.	7.6	
			341.6 " "
13	South Fox		
	A.	104.0	
	B.	56.0	
	C.	72.0	
	D.	84.0	
			316.0 " "
14	North Fox		
	A.	52.0	
	B.	107.0	
	C.	526.0	
			685.0 " "

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March 7, 1968

Austral Oil Company, Inc.
Houston, Texas

Tombstone Area, Cochise County, Arizona, Mining Dump surveyed for cubic yardage from February 22 to March 3, 1968 for Austral Oil Company, Inc., of Houston, Texas, with the following results:

1	North Bananza 1 dump	2,547.3	cu. yds
2	Southern 1 dump	2,493.5	" "
3	Santa Ana Numerous combined small dumps	280.7	" "
4	Red Top 2 dumps	105.2	" "
5	South Bananza Numerous combined dumps	2,497.4	" "
6	Chance Numerous combined dumps	1,329.2	" "
6a	Chance (Cyanide Talings)	178	" "
7	Brother John Numerous combined dumps	3,081.9	" "
8	Triple X 1 dump	392.3	" "
9	Earnest ? 1 dump	254.5	" "
10	May 1 dump	85.3	" "
11	Maine 3 dumps (large)	22,091.6	" "
12	Uncle Sam 3 dumps (small)	341.6	" "
13	South Fox Group 4 dumps (small)	316	" "
14	North Fox Group 3 dumps (small)	685	" "

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Dump # 2	Nil	5.78

"Clearance area"

CHARGE $ 7.50

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

674

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil
2700 Humble Building
Houston, Texas 77002

cc: Lundby

JOB # 002489
RECEIVED 5-9-68
REPORTED 5-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %	Manganese %	MOLYBDENUM %
D-1	.020	6.10				.20	

"Chance area"

CHARGE $ 6.75

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

675

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002771
RECEIVED 7-10-68
REPORTED 7-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
	CaO %	MgO %	Fe %	S %	SiO_2 %	Insol %	Al_2O_3 %
Dump #: 1	.56	.22	3.95	.49	73.3	9.9	3.9
2	1.25	.30	4.37	.10	70.3	8.3	4.1
3	.91	.29	3.25	.33	71.9	8.1	4.7
4	.70	.27	4.85	.41	66.6	13.3	4.5
5	.56	.23	4.25	.38	79.8	1.8	3.7
6	.52	.30	2.79	.34	72.5	2.8	4.5
7	.56	.27	3.06	.22	75.0	11.1	3.9
8	.65	.22	2.30	.16	73.5	12.7	3.5
9	.93	.23	3.50	.14	76.5	.80	3.4
10	3.95	.39	3.45	.07	70.0	11.7	3.0
11	16.6	.98	3.40	.05	47.50	7.7	4.1
12	1.99	.65	2.97	.04	67.7	13.1	3.9
13	2.07	.44	3.01	.09	70.7	8.8	5.1

WILSON E. WRIGHT
Date Signed
Arizona U. S. A.

481.00 less 10% quantity discount of 48.10

CHARGE 432.90

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

676

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas 77002

JOB # 002542
RECEIVED 5-21-68
REPORTED 5-24-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
SA# 7	.200	838.80					
8	.080	210.92					
9	.040	32.96					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WIL WRIGHT
As Signed
Arizona U. S. A.

CHARGE $ 11.25

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

WILLARD C. LACY
4034 East Burns Street
Tucson, Arizona 85711

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AUSTRAL OIL COMPANY

Explaration of the Escapule Claim Area

Tombstone, Cochise County, Arizona

Willard C. Lacy William Lundby

WILLARD C. LACY
4034 East Burns Street
Tucson, Arizona 85711

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TOMBSTONE, ARIZONA

EXPLORATION OF THE ESCAPULE CLAIM GROUP

LIST OF PLATES

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August 27, 1968.

TOMBSTONE, ARIZONA

EXPLORATION OF ESCAPULE CLAIM GROUP.

I. INTRODUCTION:

Summary Statement

A thorough exploration program, beginning in February 1968 and terminating in July 1968, under the auspices of the Austral Oil Company and directed by Richard Dobson, William Lundby and Willard Lacy, was directed toward establishing a large tonnage of low-grade silver ore amenable to bulk mining methods in the Tombstone area, Arizona. The various possibilities were tested with disappointing results, and the option was dropped.

Location, and Ownership

The Escapule claim group, totalling about three square miles, are located about two and a half miles southwest of Tombstone, Arizona in sections 9, 10, 15, 16, 17 and 21; Township 20 South; Range 22 East. The ground is held by the Escapules (Ernest B., Ernest H., Dustin, Charles, and Louis), H.E. Davis, W.W. Grace and A.J. Colvin. See Plate II.

Objectives

The Escapule claim group has had a reputation and history for the production of a considerable tonnage of high-grade silver ore from vein structures within the Uncle Sam Porphyry unit. This rock unit in the vicinity of the Escapule holdings showed widespread shattering and alteration, and there appeared to be numerous, closely spaced structures that had not been explored that had possibilities bulk mining. In addition, a breccia zone at the base of the Uncle Sam Porphyry sill was virtually un explored. It was felt that this breccia zone and the Bisbee formation below the sill offerred excellent chances for the spreading out of silver values to yield a large tonnage deposit. Also, the cpntact zone between the Schieffelin Granodiorite and the Bisbee formation was untested.

The high price of silver made the investigation of these possibilities most attractive.

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Exploration Methods

Aerial photography was flown to furnish a good base map of the western Tombstone area (Plate I) and served as the base for detailed geological mapping and evaluation.

To delineate specific target areas six initial steps were employed:

1) Field reconnaissance was made and the zone of alteration, brecciation, and mineralization as reflected in previous workings and mineralized structureswas delimited.

2) A geochemical survey was made over the favorable area and anomalous concentrations of silver and copper were outlined (Plate III).

3) A limited geophysical (I.P.) survey was run over selected areas to test possibilities of subsurface sulphide concentrations.

4) A program for extensive sampling of mine dumps and underground openings to determine the minimum grade of material previously mined, and to check the possibility of extensions of known veins was carried out. This was supplemented by metallurgical testing of the dumps to test their amenability to silver extraction.

5) Photogeologic mapping, supplemented field reconnaissance mapping, was directed toward the determination of possible additional mineralized structures or zones. Plate III.

6) Detailed underground mapping of the State of Maine and Uncle Sam underground workings was done to establish those controls respnsible for the localization of the previously mine oreshoots. Plates XIII to XVII.

II. GEOLOGICAL ENVIRONMENT:

General Geology

The geology of the Tombstone area has been discussed in considerable detail and with insight by James Gilluly in the USGS Professional Paper #281 (1956). This was supplemented in the area of the Escapule claims by the work of L. Courtland Lee in an MS thesis prepared for the University of Arizona in 1967.

To obtain greater structural detail a photogeologic map was prepared by Gilbert Noice at the University of Arizona. This was field checked and modified by both Lundby and Lacy. (Plate III) Particular attention was given in this study to linear structures subtley reflected in vegetation, topography and tone that wpuld indicate possible underlying fracture zones or vein structures.

The greater portion of the Escapule claim area is underlain by a flat-lying, warped and faulted sill of Uncle Sam (quartz latite) Porphyry which was intruded along a thrust fault that cuts across the Bisbee formation of clastic sediments and thin limestone units. Where the base of the sill is exposed, at the surface and in mine workings, a complex of brecciated Bisbee sediments and Porphyry with evidence of alteration and mineralization was noted. A geochemically anomalous area follows the zone on the surface (see Plate III). Drilling and underground workings have shown the sill to be flat, about 200 to 300 feet thick but irregular and always underlain by the breccia zone.

The sill has in turn been cut by a swarm of steep andesite dikes trending N35°E. These are generally less than 10 feet wide and are most abundant in the mineralized areas.

A series of vein structures follow the dike swarm in strike, ranging from N 10°E to N60°E, butgenerally tending to a dual system with concentrations of orientations at N10°E and N60°E. The veins dip generally to the north at 80° to 25°, with the flatter dips more characteristic of the veins to the north. A close correllation was noted, both on the surface and in the underground workings, of the distribution of ore shoots with intersections of these two fracture systems.

In the northeastern portion of the claim area the Schieffelin Granodiorite with the Bisbee formation. This intrusive appears to be later than the Uncle Sam Porphyry, but earlier than at least some of the andesite dikes and is weakly cut by the vein structures. It appears that the granodiorite is pre-ore, but its massive character

made it resistant to the forces that developed or reopened fractures that were mineralized. The contact of the granodirite and the Bisbee formation was notable for its lack of contact metamorphic or alteration effects.

Vein Systems

The vein structures were mapped in some detail in the State of Maine and the Uncle Sam mine workings (Plates XIII to XVII), and were examined but not mapped in the Santa Ana-Chance-Bonanza vein system.

The veins were generally less than a foot in width except at junctions where they would widen to four to ten feet. In these junctions they generally made ore, as evidenced by the distribution and attitude of the mined stopes. These junctions are generally marked by variations of strike or dip of the major vein structure and the mine workings.

Oxidation is deep along fracture zones, extending to below 500 feet, though pyrite was noted as shallow as 200 feet where the rock was less fractured. Silver values are carried by the silver halide, Bromyrite, and is generally associated with manganese oxides, chalcedony, quartz, calcite and iron oxides. Some wire silver has been reported.

Ore shoots range from 1,000 to 5,000 tons and are about three times as long down dip as the width along the strike, and are two to three feet thick.

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III. EXPLORATION PROGRAM:

Targets

Primary targets selected for drilling on the basis of the reconnaissance geological and geochemical work were:

1) Shattered and mineralized zones in the walls adjacent to the Santa Ana-Chace-Bonanza and the State of Maine-Uncle Sam vein systems. These two vein systems had attracted the greatest amount of mining, they gave excellent geochemical anomalies, and their mine dumps contained the best values.

2) Brecciated Bisbee formation at the base of the Uncle Sam Porphyry sill adjacent to the vein structures.

3) Replacement deposits in favored horizons within the Bisbee formation adjacent to the vein structures.

4) Mineralization in the contact zone between the Schieffelin Granodiorite intrusive stock and the Bisbee formation.

5) An extension of the high-grade Santa Ana vein structure to the east.

Secondary targets included:

1) Unmined ore shoots in the Mamie, Red Top and State of Maine veins.

2) Location of ore shoots alon new vein structures.

Geochemical Sampling

Soil geochemical samples were collected over most of section 16 to locate zone anomalous in silver or copper. These samples were taken on a 300-foot grid, screened to -80 mesh and tested geochemically by Rocky Mountain Geochemical Laboratories at Prescott, Arizona for silver and copper. The survey outlined the position of known vein structures, but indicated no new hidden structures with values. A broad weakly anomalous area followed the breccia zone at the base of the sill.

Mine Dump Sampling

Major mine dumps, generally in excess of 1000 tons, were sampled. A backhoe was used to trench the dumps. These large trench samples were coned and quartered at the dump, reducing the volume to about one truck load (1 ton). This selected sample was crushed to minus 3/4 inch diameter, then coned and quartered to reduce the sample to about 200 pounds. This sample was crushed to minus 1/4 inch diameter, split to 15 pounds and assayed.

Only two areas yielded significant results:

1) The Chance-Bonanza dumps averaged about six ounces of silver per ton, and

2) The State of Maine mine dumps averaged slightly over 4.5 ounces of silver per ton.

Results from the assays of the other dumps were:

	Ounces/ton	
	Au	Ag
UnclesSam	Nil	1.60
Soltice	.004	2.80
North Bonanza	.003	1.84
Joseph	Tr	1.02
Brother Jonathan	Nil	1.94

Geophysics

An induced polarization (IP) survey was run to outlineany possible subsurface sulphide bodies. Although some slightly anomalous zones were indicated, no concentrations of importance were encountered. See Appendix A for the report.

Drilling

Diamond Drilling:

Six diamond drill holes, totalling 2,256 feet, were drilled to penetrate the Santa Ana-Chance-Bonanza vein system in depth. Diamond drilling was used to give structural information and to more accurately delineate any ore zones. The deepest hole (DD-2) was terminated at 876 feet.

The drilling established that the silver values were closely confined to the vein structures -- there are no disseminated values extending into the hanging or footwall.

Hammer Drilling:

A total of thirty hammer drill holes, totalling 8,398 feet, were drilled for claim validation and for the testing for dispersed values. The holes were concentrated in the following areas:

1) adjacent to the Chance-Bonanza veins;

2) in the hanging wall of the State of Maine vein and near the Uncle Sam shaft;

3) on the northern and southern extensions of the Santa Ana vein;

4) through the Red Top vein, an extension of the Chance-Bonanza vein in virgin ground.

In the productive veins of the area the assays were low, one to four ounces of silver per ton, except for 30 feet in H-19 which averaged 0.235 ounces gold and 5.39 ounces silver per ton. Assays ranged from a trace of silver to about 0.2 ounces of silver per ton in all other instances.

Samples were collected from the air drilling using a duclone collector.

The location of drill holes are shown on Plates VIII and IV, and cross-sections showing the attitude of the drill holes, the geology and the assay results are shown on Plates V, VI, VII, IX, X and XI.

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IV. RESULTS AND CONCLUSIONS:

Drilling of the most promising target areas in the Escapule claim area showed:

1)values in the shattered and weakly mineralized zones adjacent to the veins were extremely low;

2) brecciated Bisbee formation at the base of the Uncle Sam Porphyry sill was pyritized but contained no appreciable silver values;

3) no massive sulphide bodies were indicated by geophysics;

4) the Schieffelin Granodiorite - Bisbee formation contact was extremely "dry", with no alteration or metamorphism nor yielding any anomalous geochemical values, thereby eliminating the possibility of contact metasomatic deposits;

5 5) extension of known, previously productive veins showed little promise for other than small ore pockets.

It is very possible that small ore "shoots", ranging in size from 1,000 tons to 5,000 tons might be developed in the areas previously mined at intersections of the two principal fracture directions. However, there appears to be little possibility of developing moderate to large tonnages of ore amenable to bulk mining methods.

The mine dumps could probably be shipped at a slight profit, but the tonnage would be small (about 50,000 tons total), and the profit would be insufficient to support the option payments.

August 27, 1968.

W. C. Lacy

Willard C. Lacy

William Lundby

June 18, 1973

Note 1 - n1

State of Maine Vein cropping out in addit, vein dips 36 degrees west strikes degrees magnetic slickensided fault was point of measurement below which is gougee zone 3 feet thick. Magneese crops out in fault but is pinched to none existence at breast height, tunnel more correctly addit penetrates approximately 75 feet beyond this point showing too moderate argillic alteration and patchy stronger alteration with MNOX along sheer fractures at the end of the tunnel Alteration seems to fade lightly but workings intersect slickenside zone approximately parellel to addis lenghth. In portal and road a distance of approximately 40 feet rock is highly sheared and bleached directly below in the footwall of the gougee zone is maganeferous zone caused by maganeese stringers approximately six to eight feet in thickness these stringers are spaced several to the foot and dip approxximately 72 degrees west parelleling strike directions approximately of the more shallowly dipping veinlet or vein other stringers between the magganeese zone and the road show approximately the dame dip suggesting that the shallow dipping stringer may be post mineral movemnet and continues to the road where it is covered by NQAL T237 cut around both sides of portal 243 the footwall of the slickenside over approximately ten foot thickness end n-1

n - 2

At this location a short incline goes down approximately 30 to 40 feet hwere it flattens and disappears from sight in darkness I didn't go to the bottom although it may extend another 20 to 50 feet following the vein which strike about north 50 to 60 degrees east magnetic and dips at approximately 20 degrees and appears to flatten with depth. Vein is actually a breecha zone between one and six feet wide with altered wall rocks it pinches and swells in a manner that suggests ever thrusting. It isn't clear whether this is part of the Maine Vein system or possibly a fracture zone enchlon with the triple XXX vein system at any rate because of the low dip the strike will probably vary greatly Sample 241 across 2 feet at the collar T240 30 feet down the incline n - 1 At the shaft a linenite stained vein approximately 2 to 3 feet in thickness is exposed in the footwall the hanging wall is very poorly altered being essentially fresh with a few little stains of limenite, hematite and maganeese on it. The main vein strikes 178 degrees magnetic dipping approximately 35 this is very close to the strike of the vein at the State of Maine shaft andc in all likelihood this is the vein with the other features between here and the State of Maine Shaft being subsidiary fractures striking more north= easternly and probably being tear fractures associated with the over thrusting on the Main State of Maine fracture system end of n -2

N - 4

At the Uncle Sam incline shaft with wood faced and metal rails going down the incline the vein here appears to be striking about north 5 east magnetic and dipping about 35 degrees and ranging from about a foot too about 4 feet in width Although the walls are very dirty and it is very difficult to see the vein exactly which is almost due north and the inclination makes it appear that this is also the State of Maine Vein but north 4 the oldd back hoe cuts in the top of the Uncle Sam Dump put in by Austral Oil indicate that this dump is well sampled probably the best I have seen so far the back hoe cuts go approximately 3 feet deep and 2 feet wide and are on every branch of the various dumps. Branch 5 at this shaft which is vertical to about 20 feet and then dips down probably along the State of Maine Vein we see parallel shear zones striking approximately parallel to the maine vein that is 5 degrees magnetic north dipping 43 degrees to the west. Not well altered but somewhat bleached containing maganeese and limenit the projection of the Maine Vein from the Uncle Sam incline would suggest that the shafts to the and the prospects pits to the south east of

N - 5

shaft would intersect the vein however the shafts and prospects only intersected fresh rock this suggest that wither these are faults which off set the vein or it changes drastically in strike and then straightens out again giving it a braided or weaving nature since all the ground is covered in between these two veins. We can only speculate on which case it might be. The dump with be sampled by number 294 end n -5

N- 6

At this point we have a shallow shaft approximately 20 feet deep the shaft intersects moderate to strong alteration including rather strong maganeese oxide the bottom of the shaft veers to the north and west or to the west to form a drift following this maganeese and a small pile of the highgrade MNOX material is piled on the west side of the shaft. Sample 299 represents this material while sample 298 represents mine run dump material. At this point and in this area between north 5 and north 6 we are still on the State of Maine Vein at a point 297 the vein appears to flay out and broaden due to] topographic affect this being a very flat spot it looks as though it may be up to 100 feet wide and float indicates this. This is merely and affect of the flow angel of the vein and the flat topography end N - 6

Summary

Geologic work for June 18, 1973

From approximately 11:30 to 6:30 geologic traverses were made along the State of Maine Vein from the State of Maine Shaft in a northerly direction tol the Fox Creek road between the main shaft and note point north* n -3 several low

angle veins and faults breachia zones are exposed however none of these appear to be the State fo Maine instead the State of Maine appears to lie under alluvial cover and the exposed veins are more easterly trending shear fractures associated with the Maine Vein and indicative of right latteral over thrusting movement the Maine vein is again exposed at point n -3 and also to the north in some of the workings in the Uncle Sam Mine and it is apparently trasable north of the Uncle Sam Mine by leached float in tailis alluvium on the hills at point n -6 the vein flays out and to the north this cretaceous Bisbee group sediments are exposed. The vein can not be traced into theses sediments although it projects into them or into this area although the whole northern slope of this hillside shows reasonable alteration with quite a few alluvial fragments of black shale material. There are therr possibilities as to what has become of the vein 1- It may continue and be hard to trace because of the varried nature of the cretaceous sediments. 2 - It may be diverted such that it follows the contact between the Uncle Sam Porphyry and the cretaceous sediments thus becoming very very low angle in nature adn becoming essentially a horizonaal plain or 3 - It could become so defuse in the cretaceous Bisbee group that it looses its identity as a vein and only regains that where it encounters the more competnet Uncle Sam Porphyry. This hillside should receive some deep bulldozer scraper cuts to explore for continuing of the vein below the aluvium. To the north of this and across the Fox Creek road are exposed quartsite which is probably the equivalent of the navaculite of the Tombstone basin and strongly breechiated sediments along a northeast trending zone showing strong maganeese oxide as seen in some shaft areas the veins are very hard to discern in the sediments and are very hard to trace on the surface. End comments for June 18, 1973

(80)

Field notes June 22, 1973

N - 7

At a rhyolite outcrop this point the rhyolite shows swirlley circular flow texture something that has not been noted in the same rhyolite dike in other areas this suggest this spot may be a circular vent area. This outcrop argillic alteration with limenite staining after about two percent finely crystalline pyrite.

N - 8 June 28, 1973

At the clipper shaft just south of the half section line section 10 at this location one two compartment vertical shaft one incline shaft one caved incline shaft along the same structure the rock seems more composed of breachia than other dumps I have examined there is a rather high magneese ocide content or more correctly samomoline (Psislomene which for the total dumps would fall in the range of between ten and twenty per cent content in addition there is some pitachiao green unidentified mineral which occurs with the Psislomene the limenite content is probably five to fift percent with alot of jarosite being in evidence. In addition to the magneese occurance the rock here seems to be much more silicifed than it was in the State of Maine Vein in the incline shaft there is a low angle structure striking magnetic north dipping approximately 32 degrees west which appears to cut off a northwesterly vein dipping 70 degrees the northwest trending vein is rather moderately silicified showing strong argillization and hematite after limenite whereas the magnetic narth striking fracture zone is strongley brechiated and looks as though it may be a later feature even a late or post mineral structure although maganeese and strong iron stain seems to ne= gate this possibility.

N - 9 June 29, 1973

In this area creataceous Bisbee group sediments are exposed they are for the most part shales of various types intriculated with one or possibly two thin limestone horizons the shale material has been largely altered to hornfels with containign quite a bit of chorletic materail and other hornfelsic alteration where the limestone has been altered to marble and in a few places appears to have possible semi-silicate mineralization although this is weak these sediments are apparently located in the footwall of the State of Maine Vein and below in the vein projection and its post outcrop on the top of the hill showing a rather strong limonite staining and maganese and silicification of the sediments a bulldozer cut will be required in this area to expose what the float suggest may be relatively good mineralization just south of the Fox Creek road the sediments are less altered but there is an intrusive feature just south of the road which appears to be very much like one of the rolls of the Tombstone district the limestone marker horizon is folded quite nicely and with o careful examination the relations appear rather complex the hole pitching to the east and at the nose of the anticline there appears to be some rather good manganese veining a few inches wide this would probably be a good spot for a test hole that is on the axial plane of the anticline

N - 10

At this point there are some large cobbles or boulders of limestone occuring as xenoliths in the Uncle Sam porphry these limestone fragments are up to several in length above this there are apparently some large quartzite fragments this suggest forceful intrusion of the Uncle Sam with tearing off of chunks of the underlying Bisbee group sediments.

N - 11

At this point there is outcropping a blue limestone breccia with a very small exposure of quartzite on its eastern edge the breccia appears to be sedimentary feature how ever it could be a tectonic intrusive origin there is a outcrop approximately two feet square in the bottom of the wash of what looks to be Oracle type granite this is the only exposure of this rock I have seen in the Tombstone District it may be classed with the limestone quartzite breccia its contacks are inconclusive this area only sparatically altered with a small amount of limenite stains for the msot part the limestone is unmarbledlized.

N - 12

At this point is a small pod of heavy green garnet skarn associated with a blue limestone the other surrounding Bisbee group sediments are dark grey hornfels and where they carry sulfides or where they carry sulfides they are colored medium red from limenite products the Uncle Sam Porphry contack is about fifty feet to the south but does nat appear to be related to heavy garnet skarn neither is the skarn apparently relatedto an exposed structural feature it is significant in that this is the first occasion that I have seen intense development of garnet.

Thoughts on the State of Maine area:

The State of Maine area itself consists of the State of Maine shaft Brother Johnathan and Uncle Sam shafts which are essentially located on the State of Maine Vein there are othere systems which parrellel this and total number of major veins exposed to date are four in number they include the State of Maine Vein the Wood Collare Shaft Vein the FRee Coinage Clipper VEin and Chance Vein all of thhsee systems and we might also include the San Pedro Vein although this seems to dip more steeply all these systems strike north northeasterly and dip from thirty to fifty degrees to the west the dip generally being forth thirty eight to forty two degrees with considerable amount of consistency apparent between the vein systems. vein systems occur in both Uncle Sam porphyry and crotashish Bisbee group sediments. There appears to be a subsidiary related vein system which strikes northeasterly and dips steeply in the range of 50 to seventy degrees. The growth aspect of these verins systems suggest thrust volting activity with movembnt from the southwest to the northeast and a right lateral throw along the fault structures it is apparent the vautl movement was premineral and occured allong several plains. These plains being previous mentioned veins. Veins were on the surface appreared to be one to five feet in thickness the main thickness being in the range to two to three feet are of course intermediate subsideary and related eshilon vains however by enlarge the rock in betwwen the major vein systems is relatively fressh and altered. The preceeding observation suggest that there is little potential for larger diseminated orbodies minable by balk methods either underground or surface. This conclusion might be negated if the veins tend to flatten and cotess depth however this is a mear speculation and that possibility would have to be tested by further exploration drilling and subsurface geologic work. Thus encumbant of the preceeding observations that the potental in this area is for Bonanza type vein minerallization along rather shallowy dippy structures. These structures may be imminable mining by some sort of trackless mining system involved in the shrinagke stopping or other semi-bulk methods. However, their explotation will be expensive both from an exploration and a mining veiw point. And a critical factor in the economic explotation of the mineralization will be close attention to cost cutting. There are a couple of subilities for this one being variations of trackless miningand shrinkage stoping of one type or another Another solution might be to sink a shaft to the present water table drive raises along the veins and either drill and blast them in place or start shrinkage stop operations leaving the muck in place. After sufficeint quantity of muck has been broken and loosened sionide solution could be perculated through the ore the broken ore and collected in a sub at the bottom of the shaft or on various sub levels. This type of

This type of insitu leech operation the ore might never have to be mined if the metallic values could be recovedred in place. Below the water table leeching would be impossible because of the action of the intermingling solvent solution and the ground water unless the ground water is lowered by pumpong . On the other hand the nature of the ore may change to lead-zinc solfides which are not minable to sionide leeching and thus it may be possible or it may be necessary to mine the ore in and hoist it for processing through a normal flotation plant. Nation of these mining may be may make the deposit economicly feasible. A considerable tonage of ore should be present in the various veins systems. Ation should consist of continued detailed surface mapping and sampling done prior and contemperainiously on a continuing basis with vertical drilling by rotary drills followed by vertical or incline drilling by diamond drill rigs.

Monday July 30 N-13

At this point exposed in a shallow prospect pit is a very intensly altered lay tight or andisight porfree dike of the silver lily type . The feld spars and ground masks have gone to cerisight with very finly diseminated hymitight points diseminatede throughout. This occurs with a north , northeast trending sheer zone with abundant liminight staining. This is one of the few places so far seen that this type of dike is strongly altered in other areas similar apprearing rock is fresh ajjacent to strong alterations suggest that it might be postmineral. Either this dike is not postmineral or this is a different age feature but similar in composition.

N-14

Ex posed at this point in a shallow inclined propsect shaft added is a vault stucture along a quartz vien in which quotatish arcos is dropped down on the hanging wall and quotashish shales are up thrown on the handging wall showing a thrust fault or reverse fault. And that is on the order of 6 to 10 feet although corelity bedscould not be matched up exactly. Erzone is from 3 to 6 inches wide and lined with Yuggy quartz a couple of plaines it is not strongly prchiated . This is another line of evidence towards my idea proposed Idea of north thrusting-from the soutwest to the northeast.

N - 15

At this point exposed in the bottom of the wash is pinkish Uncle Same Porfree the ground mass of this exposure appears quite pink in relation to that exposed at Uncle Sam hill where it is dark gray to almost black where ~~it is~~ fresh. This pinkis color may be due to hemitite staining in the feltspars however the feltspars appear quite pink as though there is more poggiclay than is present in the Uncle Sam Hill area. Slightly to the northwest down thecreek is the contack between the Uncle Sam and the Cotashish shales at approximately on the contact is a silver lily type indisight. dike fresh completely unalteredexcept for exotic liminite stainning. After a dilligent search around the surrounding area no more exposures of this Uncle Sam porfree ore found and thus it is concluded that iseither a dike or anapothosy of the larger Uncl Sam porfree cell. This may account for its differeence in color and texture and possibly composition.

13, 1973 N- 13
Near the Fox Ranch

At this point we have a contact exposed between the Uncle Sam Laytipe porfree and what are probably crotashish Bisbee group sediments. The contact is somewhat grayashinal with horńfélsed limestone grating into dirty xenolithic Uncle Sam profree which then grades into dark Uncle Same profree which then grades into the normal fresh Uncle Sam porfree cell. The contact appears to be very low the exposure is not good enough to be accurate but it appears to dip in the range of 20 degrees or less to the west. This is the first good clean or the cleanest contact I have seen and it looks like an ignious feture suggesting that the Uncle Sam is a rather shallow cell and it is certainly not faulted at this point.

N - 21

At this point we have another contact between Uncle Sam porfree and Bisbee group sedimentsz . Here the appearcance of the porfree is the same in that it is very xenolithic and dirty looking . The rock has be cloritized apparently the xenolith tended to become cloretic from deuteric alteration while the limey rocks at the contact are brieccited and have been somewhat horfelded however the alteration in either rock is not intense . This is further evidence that thés is outcrop of sediment is actually a window in the csill and not an upfaulted or fault fragment.

Saturday July 14, 1973

n - 22

At this point there is exposed a shadder zone which appears to be either late or postmineral even though it has some liminite stain on the fractures it strikes almost due north slightly west of north and looking towards the dome it appears as though this may be ohethe projection of the mile long fault zone visable on areal photographs. This is not here been before noted in the feild but thése exposure may be part of it.

N - 23

At this point is exposed a composit dike consisting of an older andisight dike paralell and broken by a younger riolite dike. Thé riolite occurs on both the hanging and foot wall of the andisight profree dike . It is composed of five to seven féet on either side and has toren off and cimilated around spherical fragments of the andisite profree. The andisite porfree is the silver lily or silver thread type porfree and it isfdefinitly younger than the riolite they both have apparently the same strike in dip and they cut unaltered Uncle Sam porfree little or no alterarion being evident caused by the dikes.

Wednesday July 18, 1973
Subject: Tmr Drilling Equipment

The equipment visited at Steve Henderson's 40 acre ranch sight on the middle March pass road. Equpment consists of 1 porter drill 500 which is approximately equivilent to a Faline 1500, mounted on a 1962 Ford truck with dual rear wheels dual rear tires. the mass has been lengthened and strengthened with three Sheel

wheels so that it can pull a 30 foot lenth of drill pipe . The capability of the ri g is approximately 1800feet using 23/8"drill pipe . Steve Henderson suggest for air drilling we should purchase 27/8 drill pipe . We have essentially no drill pipe tha is unworen on hand approximately 300 feet which may have about 500 feet of air drili drilling or less in it before it is completely unusable. There is no air compresser which would be required for air drilling approxmiatly a 600 CFM unit there is a air hammer 61/2 inch size. Ther is no core barrell but the rig is capable of doing some light core drilling. In addition ther is a Ford (62 age) flat bed truck with a water bed mounted on it and side and over head racks for drill steel . A 1948 (probable) vintage Ford winch truck with an a-frame mounted on the back with an exten sion so that it is 15 to 20 crane . An old studebaker panel truck with a willy's Jeep 4-wheel drive frame and axle under it and an old (probable 1955) vintage Chevy 6-cylinder 5ton flat bed truck with dual rear wheels on a single axle side boards on this truck would make it capable of it hauling a good diverse (hayload. Ther is also a 1962 3/4 ton For truck which is in ok running condition but needs rubber under it. Value of the four micellaneous trucks and including a pick-up truck for a total of five would probably be about $2,000 to $2,500 . The drill rig seems to be in reasonable condition Steve figures a new string of 1.000 foot drill pipe to 27/8 inch diamiter and miscellaneous equipment reparis needed on the rig would run about $10,000 at least $7,000 of that being cost for pipe.. He would like about $5 per hour and is interested in running the rig and operation.

Wednesday JUly 18, 1973

N - 24
Located South of the San Padreo Shaft.

At this point the San Padreo vein is trenched the vein itself is probabely at least 20 feet wide although dumps and aloovium cover its true extent and it is poorly exposed. However this trench is cut on a 3 foot wide manginiferous breccha zone which is omewhat better mineralized than the more silisous parts of the vien, In the foot wall of this smaller zone, which dips appproximately 80 to the west, is exposed oxide copper with the magenese.

N - 25

Exposed on the dump of the San Padreo shaft are fragments of sulfide bearing Uncle Sam porfree . It is obvious that the San Padreo shaft has intersected the sulfide zone which is obviously in the Uncle Sam Porfree . The Uncle Sam is altered to rather strong serisite, farly typical pyritic mezothermal zone-the pirite is very ~~yellow or~~ brassy to white in color-very little indication of contained copper. No tarnishing or introduction of calcocite or argentiite.

Notes July 26 1973

695

N - 26

At this point exposed in a bulldozer cut is a north 70 degree magnetic east vein dipping 42 to the northwest. Previous examination of this suggest that it might be the continuation of the State of Maine vein. The dip is approximately the same however the strike is much more easterly than the State of Maine at the State of Maine shaft. Red hemitite along the vein and rather strong clay cerisite along a width of 10 feet suggests resonable alteration antethitic faulting or jointing dipping into the viein at 48 degrees but dipping at an opposite direction suggest that this structure has suffered left lateral strain. xxxxxxxxxxxxxxxxx Alteration exposed in this dozer cut varies from weak to moderate to strong along the vein structure.

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

Town D -196

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

cc: Lundby

JOB # 002460
RECEIVED 5-1-68
REPORTED 5-4-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
BC-1	Nil	.42					
2	Nil	.28					
3	.010	.75					
4	.005	.88					
B-5	Nil	1.24					
6	NIl	.66					
7	Nil	.54					
8	.008	1.13					
9	.007	2.55					
10	.012	7.25					
11	Trace	.56					
12	Trace	1.60					
13	Trace	2.04					
14	.004	1.08					
15	.003	1.14					
16	.003	2.12					
17	Nil	.48					
18	Trace	.40					
19	.010	1.35					
20	Nil	.52					
21	.003	.34					
22	.003	2.86					
23	.012	1.43					
24	.020	52.38					
25	.014	12.13					
26	No sample						
27	.020	23.08					
28	.008	7.64					

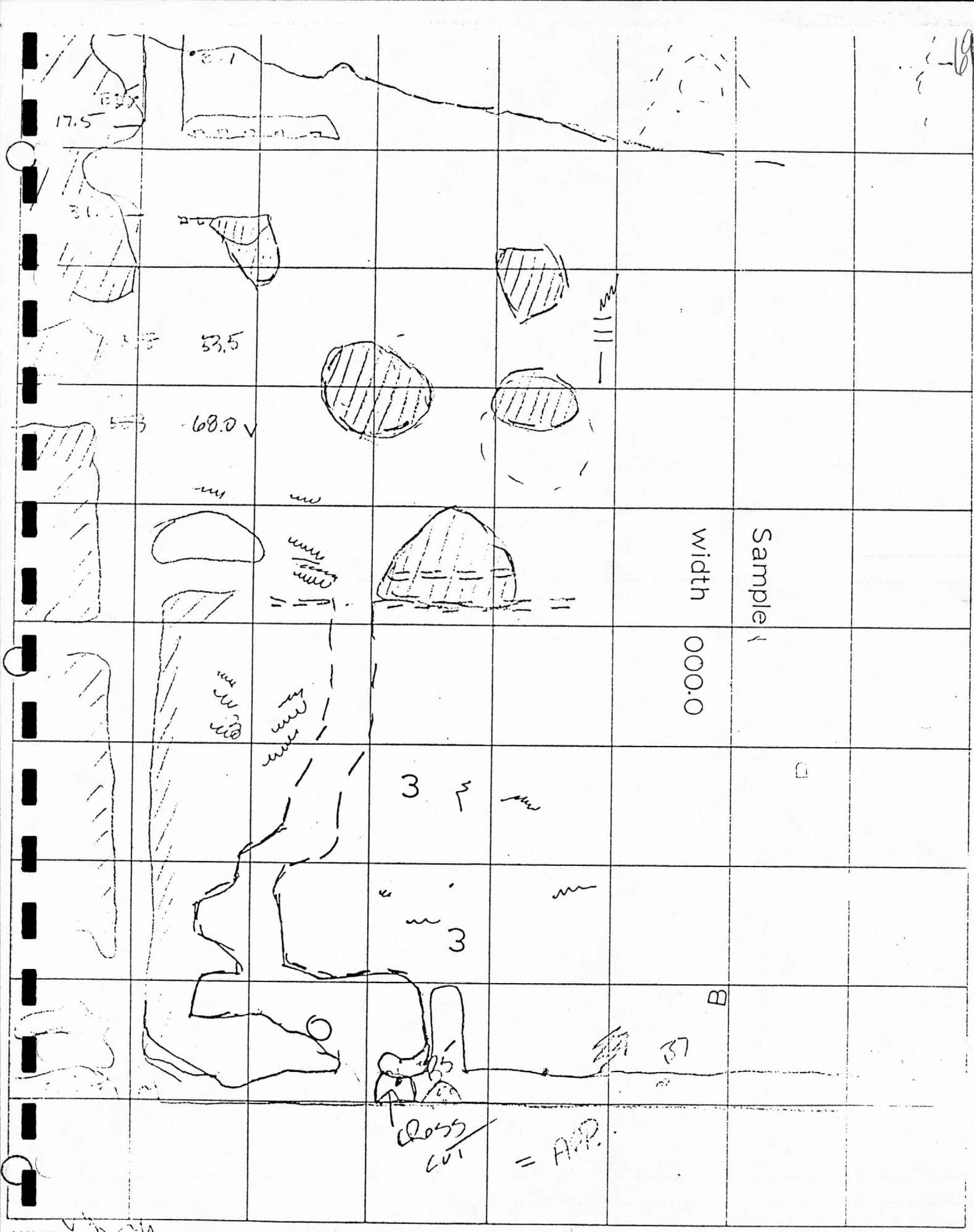
So. Bonanza

RECEIVED
APR 2 1969
JAMES STEWART COMPANY
PHOENIX, ARIZONA

CHARGE $ 101.25

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

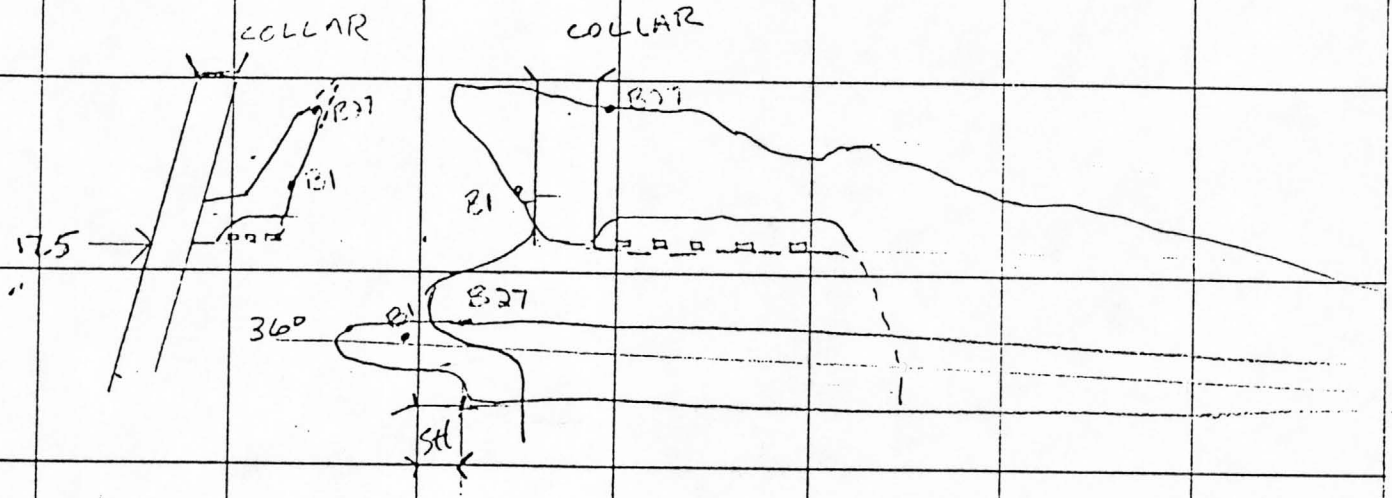
INVOICE



MINE _____ LOCATION _____ LEVEL _____

OLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

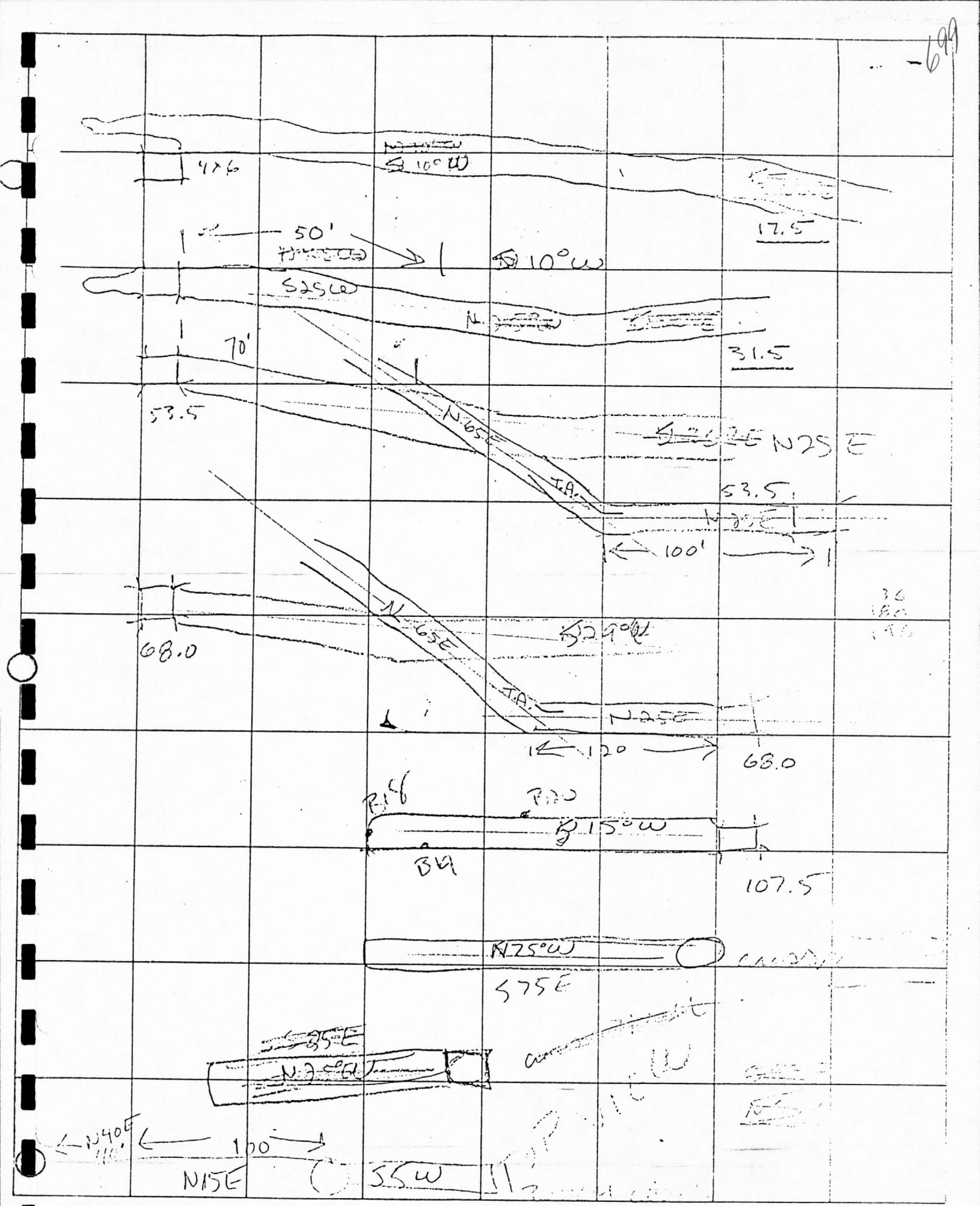
_____ E _____ EL. _____



MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

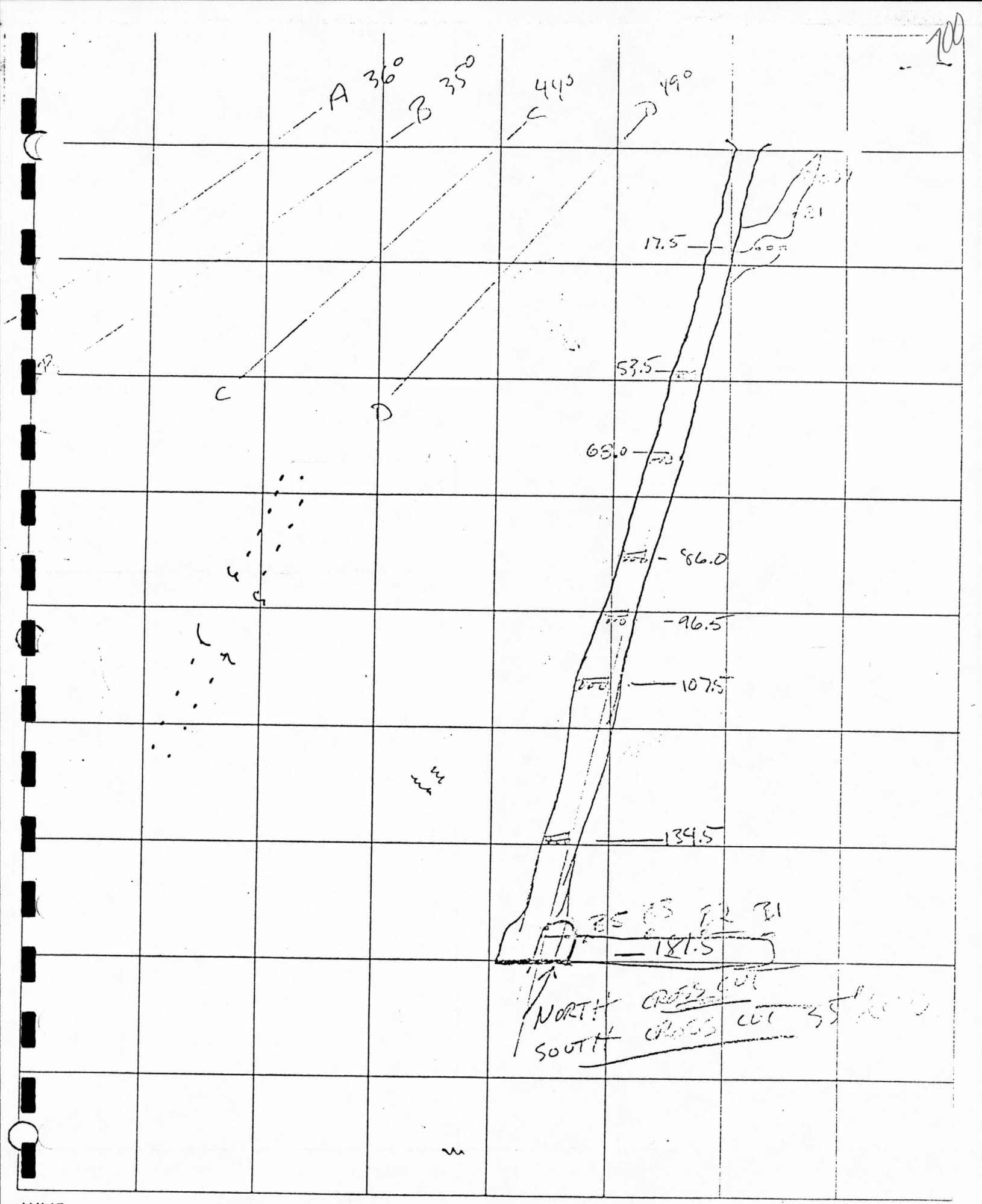
_____ E _____ EL. _____



MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

N _____ E _____ EL _____



MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

N _____ E _____ EL. _____

MINE _____ LOCATION _____ LEVEL _____

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

N _____ E _____ EL. _____

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002740
RECEIVED 7-2-68
REPORTED 7-7-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
95L:							
190 NO.		.06					
30 S.	Nil	3.00					
50 W.		.34					
433 L:							
105 NW	Nil	2.34					
60 S	Nil	5.24					
175N80W	Nil	.62					
195L:							
76 S.	Nil	7.26					
105 NO.	Nil	8.66					
356L 136NO.	Nil	9.28					
356L100 NO.	Nil	1.52					
300L							
77NO. 41W	Nil	8.12					
141L-30S	.003	21.06					
161L 35 NO.	Nil	6.32					
480L							
164S 117W	Nil	Trace					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILL WRIGHT
Duly Signed
Arizona U. S. A.

CHARGE $ 52.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

B 18 North
4' across face
start of vein
60 ft to face

B 25
130' approx
12 in vein
near surface

B 23
16 ft from start
8 ft deep in crosscut
to ~~South~~ West
14 in vein

B 19
across vein
in hanging wall
2 ft. across
to 19

B 27
2 ft vein
South of shaft
near surface

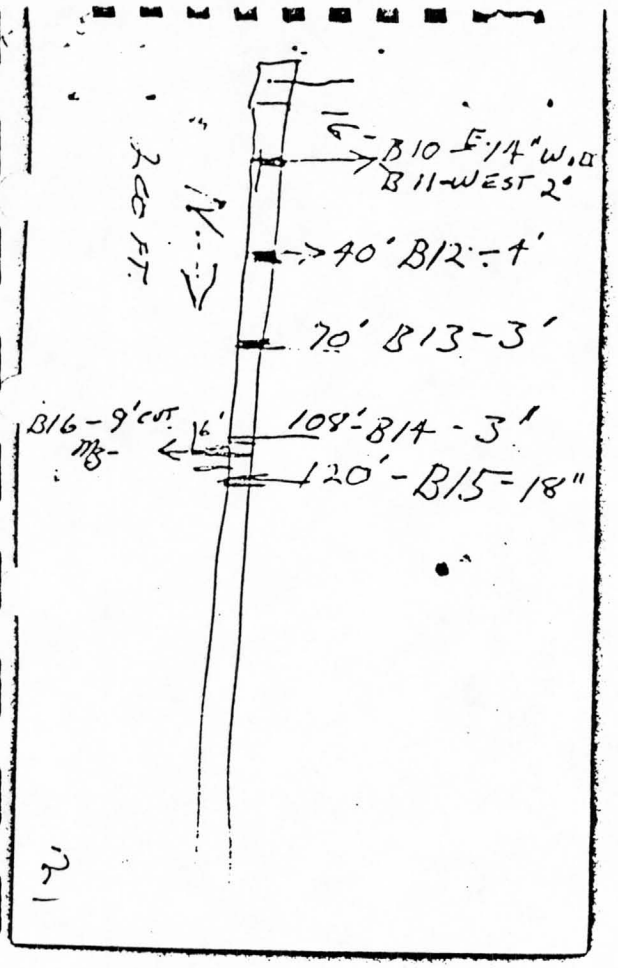
B 24
23 ft from shaft
12 in vein overhead
30 ft.

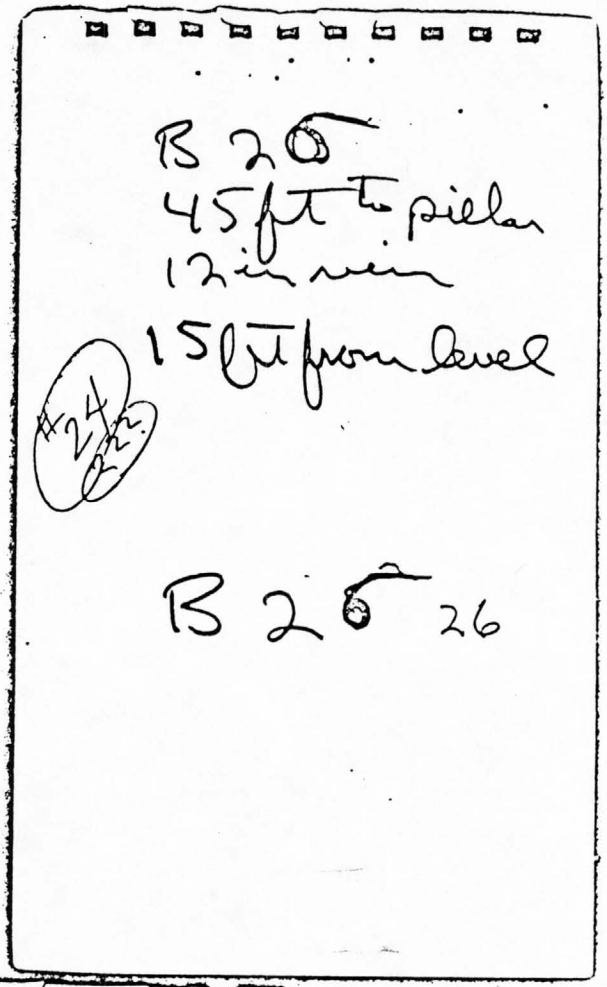
B 20
across vein
overhead
5 ft. across
34 ft from shaft

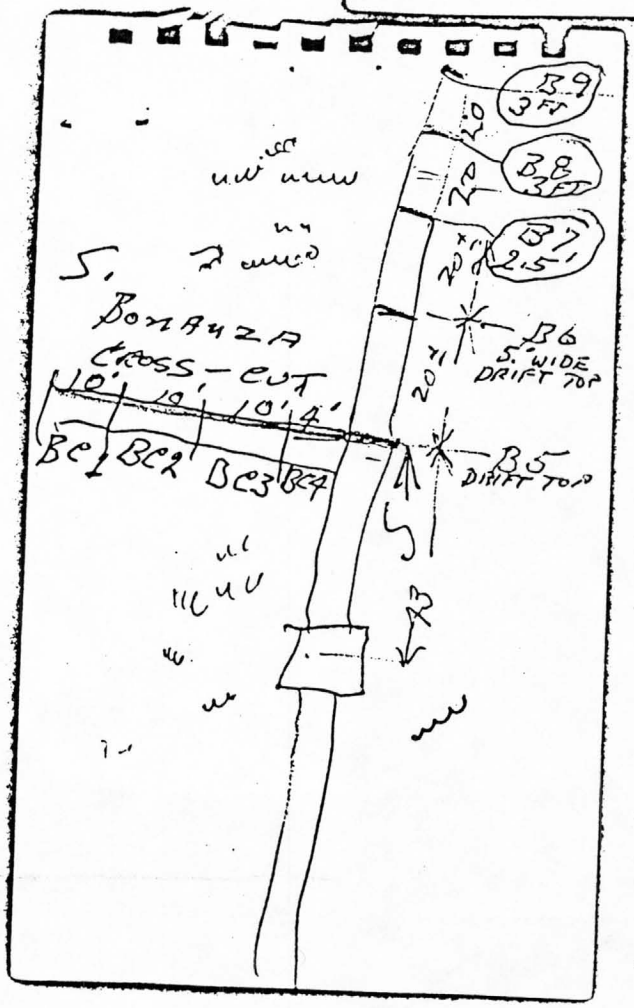
B 28
10 ft South of
shaft
30 ft. from surface
3 ft vein

B 21
3 ft. across vein
down shaft

B 22
8 ft from start
2 ft vein start
of ~~South~~ West crosscut


B10 E 14" W, 10
B11 WEST 2'
40' B12 - 4'
70' B13 - 3'
B16 - 9' CUT
108' B14 - 3'
120' B15 - 18"


B20
45 ft to pilar
12 in min
15 ft from level
#24
B26
26


B9
3 FT
B8
B7
2.5'
B6
5' WIDE
DRIFT TOP
B5
DRIFT TOP
S. BONANZA
CROSS-CUT
10' 10' 10' 4'
BC1 BC2 BC3 BC4

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 6875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002771
RECEIVED 7-10-68
REPORTED 7-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
	CaO % B	MgO %	Fe %	S %	SiO_2 %	Insol %	Al_2O_3 %
Dump #: 1	.56	.22	3.95	.49	73.3	9.9	3.9
2	1.25	.30	4.37	.10	70.3	8.3	4.1
3	.91	.29	3.25	.33	71.9	8.1	4.7
4	.79	.27	4.85	.41	66.6	13.3	4.5
5	.56	.23	4.25	.38	79.8	1.8	3.7
6	.52	.30	2.79	.34	72.5	2.8	4.5
7	.56	.27	3.06	.22	75.0	11.1	3.9
8	.65	.22	2.30	.16	73.5	12.7	3.5
9	.93	.23	3.50	.14	76.5	.80	3.4
10	3.95	.39	3.45	.07	70.0	11.7	3.0
11	16.6	.93	3.40	.05	47.50	7.7	4.1
12	1.99	.65	2.97	.04	67.7	13.1	3.9
13	2.07	.44	3.01	.09	70.7	8.8	5.1

$ 481.00 less 10% quantity discount of 48.10

RECEIVED
APR 2 1969
JAMES STEWART COMPANY
PHOENIX, ARIZONA

CHARGE $ 432.90

INVOICE

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 8875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

706

Auctral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002771
RECEIVED 7-10-68
REPORTED 7-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
	CaO %	MgO %	Fe %	S %	SiO_2 %	Insol %	Al_2O_3 %
Dump #: 1	.56	.22	3.95	.49	73.3	9.9	3.9
2	1.25	.30	4.37	.10	70.3	8.3	4.1
3	.91	.29	3.25	.33	71.9	8.1	4.7
4	.70	.27	4.85	.41	66.6	13.3	4.5
5	.56	.23	4.25	.38	79.8	1.8	3.7

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 8675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil
2700 Humble Building.
Houston, Texas 77002

cc: Lundby

JOB # 002489
RECEIVED 5-9-68
REPORTED 5-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %	Manganese %	MOLYBDENUM %
D-1	.020	6.10				.20	

"Chemex"

CHARGE $ 6.75

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

Dump # 2 N11 5.78

"Chance area"

708

CHARGE $ 7.50

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

709

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 6675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Inc.
2700 Humble Building
Houston, Texas 77002

CC; Lundby

JOB # 002574
RECEIVED 5-29-63
REPORTED 6-4-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
Dump: 3	Nil	2.46					
4	Nil	2.60					
5	.003	1.24					

Chance - So. Bonanza

REGISTERED U.S. ASSAYER
CERTIFICATE NO. 584
WILBURD. WRIGHT
Date Signed 6/4
Arizona U. S. A.

CHARGE $ 11.25

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

710

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

JOB # 002618
RECEIVED 6-11-68
REPORTED 6-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
Dump #6	Nil	1.60					

Uncle Sam

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Title Signed
Arizona U. S. A.

CHARGE $ 3.75

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

711

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002703
RECEIVED 6-27-68
REPORTED 6-27-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
# 7 State Maine	Nil	4.54					
# 8 State of Maine (course:	Nil	4.94					

REGISTERED ASSAYER CERTIFICATE No. 5875 WILLIAM D. WRIGHT Date Signed 6-27-68 Arizona U. S. A.

CHARGE $ 8.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

712

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002739
RECEIVED 7-2-68
REPORTED 7-3-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
Dump Samples:							
# 9	.003	1.84	North Bonanza				
10	.004	2.80	Solstice				
11	Trace	1.02	Joseph				
12	Nil	1.94	Brother Jonathan				

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 16.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

713

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

cc: W. Lundby

JOB # 002437
RECEIVED 4-25-68
REPORTED 4-26-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-1:							
0-10		Nil					
20		Nil					
30		Nil					
40		Nil					
50		Nil					
60		Nil					
70		Nil					
80		Nil					
90		Nil					
100		Nil					
110		Nil					
120		Nil					
130		Nil					
140		Nil					
150		Nil					
160		Ni.					
170		Nil					
180		Nil					
190		Nil					
200		Nil					
210		Nil		.010			
220		Nil		.005			
230		Nil		.007			
240		Nil		.005			
250		Nil		.010			
260		Nil		.055			
270		Nil		.020			
280		Nil		.010			
290		Nil		.015			
300		Nil		.015			

RECEIVED
APR 2 1969
JAMES STEWART COMPANY
PHOENIX, ARIZONA

CHARGE $ 75.50

30 Ag @ $2.00: 10 Cu @ $1.50

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

71A

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

cc: W. Lundby

JOB # 002438
RECEIVED 4-25-68
REPORTED 4-26-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-2:							
0-10		Nil					
20		Nil					
30		Nil					
40		Nil					
50		Nil					
60		Nil					
70		Nil					
80		Nil					
90		Nil					
100		Nil					
110		Nil					
120		Nil					
130		Nil					
140		Nil					
150		Nil					
160		Nil					
170		Nil					
180		Nil					
190		Nil					
200		Nil					
210		Nil					
215		Nil					
22 Ag. @ $2.00			Limits of detectability are 0.01 oz/Ton or approximately 3ppm.				

CHARGE $ 44.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

TS 715

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 8675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

The Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

JOB # 002593
RECEIVED 6-4-68
REPORTED 6-7-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD# 2:							
260-270		Trace					
270-280		Trace					
280-290		Trace					
H-3:							
0 -10		Trace					
-20		Trace					
-30		Trace					
-40		Trace					
-50		Trace					
-60		.04					
-70		Trace					
-80		.08					
-90		Trace					
-100		.14					
-110		.14					
-120		.26					
-130		.12					
-140		.10					
-150		.06					
-160		.06					
-170		.04					
-180		.12					
-190		.04					
-200		.14					

CHARGE $ 46.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

716

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas 77002

CC: Dobson

JOB # 002613
RECEIVED 6-10-68
REPORTED 6-12-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-3:							
200-210		.24	0.29				
210-220		.34					
220-230	Nil	.80					
230-240	Nil	.62	0.48				
240-250	Tr	(0.45) .38					
250-260		.44	0-Au 0.45 oz Ag				
260-270	Nil	.80					
270-280		.28					
280-290		.32					
290-300		.36					
300-310		.40					
310-320	Nil	(1.30) 1.20	1.22				
320-330	Nil	1.24	~~0-Au~~ ~~0.87 oz Ag~~				
330-340		.42	0.31				
340-350		.20					
350-360	Nil	2.56					
360-370		.42					
370-380	Nil	.74	0.56				
380-390	Nil	.54					
390-400	Nil	(0.55) .54					
400-410		.08		.015			
410-420		.22		.010			
420-430		Trace	0-1n	.009			
430-440		Trace	0.13 oz Ag	.012	0.12% Cu		
440-450		.23		.015			
450-460		.18		.011			
460-470		.20		.019			
470-480		.20		.010			
480-490		.06		.009			
490-500		.08		.011			
				.121			

Signed
Arizona U. S. A.

2 of 4

CHARGE $ 98.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas

JOB # 002625
RECEIVED 6-11-68
REPORTED 6-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-4:							
1-10		Trace					
30-40		Trace					
60-70		Trace					
90-100		Trace					
120-130		Trace					
150-160		Trace					

CHARGE $ 12.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 8675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

716

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas cc: Lundby

JOB # 002647
RECEIVED 6-14-68
REPORTED 6-19-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-4:							
180-190		Trace					
210-220		Trace					
240-250		Trace					
270-280		Trace					
290-300		Trace					

CHARGE $ 10.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

719

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS E_
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

cox Lundby

JOB # 002644
RECEIVED 6-14-68
REPORTED 6-19-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-5:							
40-50		Trace					
90-100		.06	0.15				
140-150	Tr	.04					
190-200		Trace					
240-250		Trace					

CHARGE $ 10.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

720

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Tucson, Arizona

JOB # 002672
RECEIVED 6-19-68
REPORTED 6-21-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-# 6:							
0-10		.07					
40-50		Trace					
90-100		Trace					
140-150		Trace					
190-200		Trace					
240-250		Trace					

REGISTERED ASSAYER
CERTIFICATE NO. 5
WILBUR D. WRIGHT
Date Signed 6-21-68
Arizona U. S. A.

CHARGE $ 12.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 8875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

cc: Lundoy

JOB # 002675
RECEIVED 6-19-68
REPORTED 6-25-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
HH-7:							
0-10		Trace					
40-50		.04					
90-100		Trace					
140-150		Trace					
190-200		Trace					
240-250		Trace					
HH:8:							
0-10		Trace					
40-50		Trace					
90-100		Trace					

REGISTERED ASSAYER
CERTIFICATE NO. 5975
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 18.00

* Gold and Silver reported in troy oz. per 2,000 lb.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

122

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 8675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Tucson, Arizona

JOB # 002696
RECEIVED 6-26-68
REPORTED 6-27-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
HD-9:							
90-100		Trace					
130-140		Trace					

REGISTERED ASSAYER CERTIFICATE NO. 2675 WILBUR D. WRIGHT Date Signed 6-27-68 Arizona U. S. A.

CHARGE $ 4.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

123

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002723
RECEIVED 7-1-68
REPORTED 7-5-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-10:							
0-10		.20					
10-20		.16					
20-30		.04					
30-40		.22					
40-50		Trace					
50-60		.04					
60-70		.08					
70-80		.04					
80-90		.26					
90-100		Trace					
100-110		Trace					
110-120		Trace					
120-130		.06					
130-140		.10					
140-150		.06					
150-160		.22					
160-170	Tr	.32 → 0.50					
170-180		.06					
180-190		.04					
190-200		.04					
200-210		Trace					
210-220		Trace					
220-230		.04					
230-240		Trace					
240-250		Trace					
250-260		Trace					
260-270		Trace					
270-280		Trace					
280-290		Trace					
290-300		Trace					

CHARGE _____

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company

JOB # 002723 Continued
RECEIVED
REPORTED

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-10:							
300-310		.48					
310-320		.04					
320-330		Trace					
330-340		Trace					
340-350		Trace					
350-360		.20					
360-370		.04					
370-380		.38					

REGISTERED ASSAYER
CERTIFICATE NO. 375
WILBUR D. WRIGHT
Date Signed 6/5
Arizona U. S. A.

CHARGE $ 76.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

725

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002735
RECEIVED 7-2-68
REPORTED 7-5-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-10:							
380-390	Nil	.54					
390-400	Nil (T2)	.90	0.40				
400-410		.48					
410-420		.46					
420-426	Nil	.64					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
STATE OF
ARIZONA
Arizona U. S. A.

CHARGE $ 16.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

726

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002736
RECEIVED 7-2-68
REPORTED 7-5-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-11:							
0-10		Trace					
10-20		.04					
20-30	Nil	.52					
30-40	Nil	.86					
40-50	Nil	.66					
50-60	Nil	.74	0.55				
60-70	Nil	.84					
70-80	Nil	.82					
80-90		.48					
90-100		.34					
100-110		.46					
110-120		.22					
120-130		.18					
130-140		.18					
140-150		.26					
150-160		.30					
160-170	Nil	.54					
170-180		.34					
180-190		.24					
190-200		.16					
200-210		.18					
210-220		Trace					
220-230		.16					
230-240		.20					
240-250		.08					

REGISTERED ASSAYER CERTIFICATE NO 5875 WILBUR D. WRIGHT Title Signed Arizona U. S. A.

CHARGE $ 64.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

727

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002772
RECEIVED 7-10-68
REPORTED 7-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-11 240-250		Trace					

REGISTERED ASSAYER CERTIFICATE NO. 5875 Signed Arizona U.S.A.

CHARGE $ 2.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

728

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002737
RECEIVED 7-2-68
REPORTED 7-5-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-12:							
0-10		.02					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		Trace					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		.08					
120-130		Trace					
130-140		Trace					
140-150		Trace					
150-160		Trace					
160-170		Trace					
170-180		Trace					
180-190		Trace					
190-200		.48 (0.15)					
200-210		.32					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Signed
Arizona U. S. A.

CHARGE $ 42.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

729

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002749
RECEIVED 7-5-68
REPORTED 7-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
HH-12:							
240-250		.04					
250-260		Trace					
260-270		Trace					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILLIAM S.
WRIGHT
Arizona U. S. A.

CHARGE $ 6.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

730

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002738
RECEIVED 6-2-68
REPORTED 7-8-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-13:							
0-10		.08	0.20				
10-20		.22					
20-30		.20					
30-40		.16					
40-50		.36					
50-60	Nil	.84	0.75				
60-70	.012	.71					
70-80	.165	4.86					
80-90	.520	10.06					
90-100	.140	1.26					
100-110	.020 .005	.84	0.95				
110-120	0.010	.46	0.63				
120-130	.010	.60					
130-140		.32	0.28				
140-150		.24					
150-160		.12	0.11				
160-170		.10					
170-180	.0005	.48	0.59				
180-190	.010	.69					
190-200		.06	0.08				
200-210		.08					
210-220		.10					
220-230		No sample					
230-240		.06					
240-250		.08					

Jacobs
T2 - 0.80
0.18 - 5.20
0.54 - 10.75
0.03 - 1.30
43.27

REGISTERED ASSAYER
CERTIFICATE NO.
5875
STATE OF
WILL D.
WRIGHT
Signed
Arizona U. S. A.

CHARGE $ 64.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002750
RECEIVED 7-5-68
REPORTED 7-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
HH-14:							
0-10		.18					
10-20		Trace					
20-30		.06					
30-40		Trace					
40-50		Trace					
50-60		.44					
60-70		.42					
70-80		.26					
80-90		.06					
90-100	Tr	.18 (0.30)					
100-110		.16					
110-120		.08					
120-130		.03					
130-140		.06					
140-150		.04					
150-160		Trace					
160-170		.08					
170-180		Trace					
180-190		Trace					
190-200		Trace					
200-210		Trace					
210-220		Trace					
220-230		Trace					
230-240		Trace					
240-250		Trace					

REGISTERED ASSAYER CERTIFICATE NO. 5875 WILBUR D. WRIGHT Tucson Arizona U. S. A.

CHARGE $50.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

732

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 0027600
RECEIVED 7-8-68
REPORTED 7-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
HH-15:							
0-10		Trace					
10-20		.04					
20-30		.04					
30-40		.06					
40-50		.04					
50-60		.06					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		.04					
120-130		Trace					
130-140		.06					
140-150		Trace					
150-160		.06					
160-170		.04					
170-180		.08					
180-190		.10					
190-200		Trace					
200-210		.22					
210-220		.12					

Arizona U. S. A.

CHARGE $ 44.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

733

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002773
RECEIVED 7-10-68
REPORTED 7-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-15:							
220-230		.22					
230-240		.18					
240-250		.18					

REGISTERED ASSAYER CERTIFICATE 537 ARIZONA Signed Arizona U. S. A.

CHARGE $ 6.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002757
RECEIVED 7-8-68
REPORTED 7-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
HH-16:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		.08					
60-70		Trace					
70-80		Trace					

CHARGE $ 16.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

735

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002774
RECEIVED 7-10-68
REPORTED 7-14-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-16:80-90		.06					
90-100		.20					
100-110		Trace					
110-120		.04					
120-130		.06					
130-140		Trace					
140-150	Tr	.10 (0.10)					
150-160		.14					
160-170	.012	7.69					

CHARGE $ 20.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

736

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002758
RECEIVED 7-8-68
REPORTED 7-9-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
HH-17:							
0-10		.04					
10-20		.10					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		Trace					
60-70		Trace					
70-80		Trace					
80-90		.08					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WIL WRIGHT
Tucson
Arizona U. S. A.

CHARGE $ 18.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

737

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002775
RECEIVED 7-10-68
REPORTED 7-14-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-17:							
80-90		Trace					
90-100		.16					
100-110		.24					
110-120		.06					
120+130		.22					
130-140		.30					
140-150	Tr	.14	0.30				
150-160		.08					
160-170		.06					
170-180		.10					
180-190		.18					
190-200		.14					
206-210		.06	(This was a small bag of wet material inside of 200-210				
200-210		.08					
210-220		.12					
220-230		.04					
230-240		Trace					
240-250		Trace					
250-260		Trace					
280-285		.04					

REGISTERED ASSAYER
CERTIFICATE NO. 587
Signed
Arizona U. S. A.

CHARGE $ 40.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

138

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002776
RECEIVED 7-10-68
REPORTED 7-14-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-18:							
0-10		.08					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		Trace					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		Trace					
120-130		Trace					
130-140		.16					
140-150		.24					
150-160	Tr.	.35					
160-170		.22					
170-180		Trace					
180-190		Trace					
190-200		.04					
200-210		Trace					
210-220		Trace					
220-230		Trace					
230-240		Trace					
240-250		.14					
250-260		Trace					
260-270		Trace					
270-280		Trace					
280-290		Trace					
290-300		Trace					

97

0.24

0.155

CHARGE _____

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

139

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company

JOB # 002776 Continued

RECEIVED _____

REPORTED _____

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-18:							
300-310		Trace					
310-~~320~~ 313		Trace					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WIL-FUR D. WRIGHT
Arizona U. S. A.

CHARGE $ 64.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

140

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002781
RECEIVED 7-11-68
REPORTED 7-16-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-19:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		Trace					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		Trace					
120-130		Trace					
130-140		Trace					
140-150		Trace					
150-160	Nil	.80					
160-170		Trace					
170-180		Trace					
180-190		Trace					
190-200		Trace					
200-210		Trace					
210-220		Trace					
220-230		Trace					
230-240		Trace					
240-250		Trace					
250-260		Trace					
260-270		Trace					
270-280		Trace					
280-290		Trace					
290-300		Trace					

CHARGE _____

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

74

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company

JOB # 002781 Continued
RECEIVED
REPORTED

Page # 2

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER ppm	ZINC %		MOLYBDENUM %
H-19:							
300-310		Trace					
310-320		Trace					
320-330		.14					
330-340		Trace					
340-350		.12 } 0.17					
350-360		.22 }					
360-370		.04 } 0.05					
370-380		.08 }					
380-390		.04 } 0.45					
390-400	Tr	.32		60			
400-410		.22 } 0.30		40			
410-420		.34		32			
420-430		.30		20			
430-440	No Sample						
440-450		.08		20			
450-460		.06		24			
460-470		.06		16			
470-480		.20		16			
480-490		.08		12			

REGISTERED ASSAYER CERTIFICATE NO. 5875 WILBUR D. WRIGHT Date Signed Arizona U. S. A.

CHARGE $ 116.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

142.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
H ouston, Texas

JOB # 002777
RECEIVED 7-10-68
REPORTED 7-14-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-20:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		.06					
40-50		Trace					
50-60		Trace					
60-70		Trace					
70-80		.08					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		.06					
120-130		Trace					
130-140		Trace					
140-150		.16					
150-160		.06					
160-170		.14					
170-180		.06					
180-190		.08					
190-200		.10					
200-210		Trace					
210-220		Trace					
220-230		.06					
230-240		Trace					
240-250		Trace					
250-260		.08					
260-270		Trace					
270-280		Trace					
280-290		Trace					
290-300		Trace					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILBUR D. WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 60.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

743

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002782
RECEIVED 7-11-68
REPORTED 7-16-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-21:							
0-10		.16					
10-20		.18					
20-30		.12					
30-40		Trace					
40-50		.10					
50-60		.04					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		.06					
100-110		.04					
110-120		.04					
120-130		Trace					
130-140		Trace					
140-150		Trace					
150-160		Trace					
160-170		.08					
170-180		.06					
180-190		Trace					
190-200		Trace					
200-210		Trace					
210-220		Trace					
220-230		Trace					
230-240		Trace					
240-250		Trace					
250-260		Trace					
260-270		Trace					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILBUR D. WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 54.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002783
RECEIVED 7-15-68
REPORTED 8-16-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-22:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		Trace					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		.04					
100-110		.02					
110-120		.08					
120-130		Trace					
130-140		Trace					
140-150		Trace					
150-160		.06					
160-170		.04					
170-180		.16					
180-190		Trace					
190-200		Trace					
200-210		k04					
210-220		Trace					
220-230		Trace					
230-240		Trace					
240-250		Trace					
250-260		Trace					
260-270		Trace					
270-280		.06					
280-290		.04					

REGISTERED ASSAYER CERTIFICATE NO. 5875 WILBUR D. WRIGHT Date Signed 7/16 Arizona U. S. A.

CHARGE $ 58.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

145

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002790
RECEIVED 7-12-68
REPORTED 7-16-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-23:							
0-10		.46					
10-20		.34					
20-30		.42					
30-40		.38					
40-50		.48					
50-60		.30					
60-70	Nil Tr	1.16 — 1.30					
70-80	Nil	1.00					
80-90	Nil	.58					
90-100		.32					
100-110		.36					
110-120		.34					
120-130		.24					
130-140		.22					
140-150		.24					
150-160		.28					
160-170		.20					
170-180		.10					
180-190		.08					
190-200		.34					
200-207	Tr.	.40 < 0.65					

REGISTERED ASSAYER CERTIFICATE NO. 5875 WILBUR D. WRIGHT Date Signed 7/16 Arizona U. S. A.

CHARGE $ 42.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

746

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EV. IS BLVD.
PHONE 602 94-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002791
RECEIVED 7-12-68
REPORTED 7-17-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-24:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		Trace					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		Trace					
120-130		Trace					
130-140		Trace					
140-150		.20					
150-160		.18					
160-170		Trace					
170-180		Trace					
180-190		Trace					
190-200		.10					
200-210		.12					
210-220		.08					
220-230		.08					
230-240		.16					
240-250		.10					
250-260		.08					
260-270		.12					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 54.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002810
RECEIVED 7-15-68
REPORTED 7-17-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
11-25 ~~11-26~~:							
0-10		TRace					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		Trace					
60-70		.06					
70-80		Trace					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		Trace					
120-130		Trace					
130-140		Trace					
140-150		Trace					
150-160		Trace					
160-170		Trace					
170-180		Trace					
180-190		Trace					
190-200		.08					
200-210		Trace					
210-220		Trace					
220-230		Trace					
230-240		.06					
240-250		.06					
250-260		Trace					
260-270		.04					
270-280		Trace					
280-290		Trace					

REGISTERED ASSAYER CERTIFICATE NO. 5875 WILBUR C. WRIGHT Date Signed Arizona U. S. A.

CHARGE $ 58.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

748

Austral Oil Company
2700 Humole Building
Houston, Texas

JOB # 002792
RECEIVED 7-12-68
REPORTED 7-17-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
4-26 H-25:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		Trace					
50-60		TRace					
60-70		Trace					
70-80		Trace					
80-90		Trace					
90-100		Trace					
100-110		Trace					
110-120		Trace					
120-130		Trace					
130-140		Trace					
140-150		.04					
150-160		.04					
160-170		Trace					
170-180		Trace					
180-190		Trace					
190-200		Trace					
200-210		Trace					
210-220		Trace					
220-230		Trace					
230-240		Trace					
240-250		Trace					
250-260		Trace					
260-270		Trace					
270-280		Trace					
280-290		Trace					
290-300		Trace					

CHARGE _____

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

149

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company

JOB # 002792 Continued
RECEIVED
REPORTED

Page # 2

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER ppm	ZINC %		MOLYBDENUM %
H-26:							
300-310		.04					
310-320		Trace					
320-330		Trace	Tr				
330-340		Trace					
340-350		Trace					
350-360		Trace					
360-370		Trace					
370-380		.36					
380-390		.12	0.19				
390-400		.10		28			
400-410	Nil	2.10		36			
410-420	Nil	3.02	2.90 2.56	104			
420-430	Nil	.90	0.90	140			
430-440		.30	0.30	32			
440-450		.08		24			
450-460		.06		20			
460-470		.10	0.07	22			
470-480		.08		.20			
480-490		.04		16			
490-500		.08		16			

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR S.
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 128.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002811
RECEIVED 7-15-68
REPORTED 7-17-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-27:							
0-10		Trace					
10-20		Trace					
20-30		.04					
30-40		.06					
40-50		.32					
50-60		.24					
60-70	Nil	.68					
70-80		.30					
80-90		.24					
90-100		.18					
100-110		.16					
110-120		.08					
120-130		.20					
130-140	Nil Tr	.72	0.40				
140-150		.36					
150-160		.30					
160-170		.04					
170-180		Trace					
180-190		Trace					
190-200		.04					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 40.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

751

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002812
RECEIVED 7-15-68
REPORTED 7-17-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-28:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		.06					
40-50		.04					
50-60		.32					
60-70		.16					
70-80		.08					
80-90		.10					
90-100		.06					
100-110		.08					
110-120		.04					
120-130		.18					

REGISTERED ASSAYER
CERTIFICATE NO.
5375
WILBUR O. WRIGHT
Date Signed 7/17/68
Arizona U. S. A.

CHARGE $ 26.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

752

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002834
RECEIVED 7-19-68
REPORTED 7-23-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-28:							
130-140		.08					
140-150		.12					
150-160		.28					
160-170		.22					
170-180		Trace					
180-190		.10					
190-200		.20					
200-210		.08					
210-220		.36					
220-230		.34					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILBUR D. WRIGHT
Date Signed 7-23-68
Arizona U. S. A.

CHARGE $ 20.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

753

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002820
RECEIVED 7-17-68
REPORTED 7-20-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-29:							
0-10		Trace					
10-20		Trace					
20-30		Trace					
30-40		Trace					
40-50		.06					
50-60		.10					
60-70		.16					
70-80		.08					
80-90		.04					
90-100		.18					
100-110		.16					
110-120		.10					
120-130		.06					
130-140		.04					
140-150		.30	0.30				
150-160		.18					
160-170		.20					
170+180		.12					
180-190		.10					
190-200		.08					
200-210		.20					
210-220		.36					
220-227		.12	(Hit Water)				
227-235		.06					

REGISTERED ASSAYER CERTIFICATE NO. 5875 WILFOUR D. WRIGHT Date Signed 7-20-68 Arizona U. S. A.

CHARGE $ 46.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

754

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5311

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002821
RECEIVED 7-17-68
REPORTED 7-20-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
H-30:							
0-10		.08					
10-20		.10					
20-30		.22					
30-40		.30					
40-50		.22					
50-60		.20					
60-70		.08					
70-80		.10					
80-90		.10					
90-100		.26					
100-110	Tr	.28	0.35				
110-120		.08					
120-130		.08					
130-140		.28					
140-150		.06					
150-160		.08					
160-170		.06					
170-180		.04					
180-190		.08					
190-200		.06					
200-210		.10					
210-220		Trace					
220-230		.06					
230-240		.04					
240-250		.08					
250-260		Trace					
260-270		Trace					
280-280		.04					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILLIAM D. WRIGHT
Date Signed: 7-22
Arizona, U. S. A.

CHARGE $ 56.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

cc: Lundby

JOB # 002512
RECEIVED 5-14-68
REPORTED 5-14-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD-1: 80-90	Nil	Trace					

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas

ccx B. Lundby

JOB # 002535
RECEIVED 5-20-68
REPORTED 5-21-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD-1:							
40-50	Nil	.44					
90-100	Nil	.12					
100-110	Nil	Trace					
110-119	Nil	Trace					
119-122	Nil	Trace					
122-126	Nil	Trace					
126-132	Nil	Trace					
132-136	Nil	.08					
136-144	Nil	.06					
144-147	Nil	Trace					
147-150	Nil	.10					
150-157	Nil	Trace					
157-160	Nil	.22					
160-170	Nil	.18					
170-180	Nil	Trace					

0.04

0.20

REGISTERED ASSAYER
CERTIFICATE NO. 5975
WILBUR D. WRIGHT
Date Issued 7/21
Arizona U. S. A.

CHARGE $ 56.25

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5211

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

JOB # 002541
RECEIVED 5-21-68
REPORTED 5-24-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD-1:							
180-190	Nil	Trace					
190-200	Nil	Trace					
200-210	Nil	Trace					
210-220	Nil	Trace					
220-230	Nil (.001)	.14	(0.10)				
230-240	Nil	.12					
240-252	.003	.10					

WIL WRIGHT
Arizona U. S. A.

CHARGE $ 26.25

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002559
RECEIVED 5-27-68
REPORTED 5-28-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD # 2:							
20-30	Nil	Trace					
30-40	Nil	.06					

REGISTERED ASSAYER
CERTIFICATE NO. 1370
STATE OF ARIZONA
Signed
Arizona U. S. A.

CHARGE $ 7.50

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

TS 159

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

cc: Lundby

JOB # 002573
RECEIVED 5-29-68
REPORTED 6-4-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*
DD-2:		
90-100	Nil	Trace
140-150	Nil	Trace
150-160	Nil	Trace
190-200	Nil	Trace
220-230	Nil	Trace
230-240	Nil	Trace
240-250	Nil	Trace
250-260	Nil	Trace
260-270		Trace
270-280		Trace
280-290		Trace
DDH# 2:		
310-320		Trace
32320-330		Trace
330-340		Trace
340-350		Trace
350-360		Trace
360-370		Trace
370-380		Trace
380-390		Trace
390-400		.06
400-410		.28
410-420		.12
420-430		.06
430-440		.06
440-450		.34
450-460.5	.010	3.67
460.5-461.5	Nil	.96
461.5-470	Nil	1.12

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	Copper %
DDH:2:					
480-490	Nil	.62		.025	.008
490-500		.04		.019	.007
500-510		.06		.011	.008
510-520		.28		.009	.020
520-530	Nil	1.52		.021	.019
530-540		.32		.012	.020
540-550		.18		.010	.185
550-560		.04		<.01	.030
560-570		Trace		<.01	
570-580		Trace		<.01	
580-590		Trace		<.01	

REGISTERED ASSAYER
CERTIFICATE NO.
5875
Arizona U. S. A.

CHARGE $ 30.00

* Gold and Silver reported in troy oz. per 2

* Gold and Silver reported in troy oz. per 2,(

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

760

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

cc: Lundby

JOB # 002573
RECEIVED 5-29-68
REPORTED 6-4-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD-2:							
90-100	Nil	Trace					
140-150	Nil	Trace					
150-160	Nil	Trace					
190-200	Nil	Trace					
220-230	Nil	Trace					
230-240	Nil	Trace					
240-250	Nil	Trace					
250-260	Nil	Trace					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILBUR D. WRIGHT
Tucson Arizona U. S. A.

CHARGE $ 30.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

The Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

JOB # 002593
RECEIVED 6-4-68
REPORTED 6-7-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD# 2:							
260-270		Trace					
270-280		Trace					
280-290		Trace					

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

762

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas

JOB # 002614
RECEIVED 6-10-68
REPORTED 6-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH# 2:							
310-320		Trace					
320-330		Trace					
330-340		Trace					
340-350		Trace					
350-360		Trace					
360-370		Trace					
370-380		Trace					
380-390		Trace					
390-400		.06		.008			
400-410		.28		.007			
410-420		.12		.008			
420-430	N.A.	.08		.020			
430-440		.06		.019			
440-450		.34		.020			
450-460.5	.010	3.67		.185			
460.5-461.5	.003 Nil	.96		.030			
461.5-470	Nil	1.12					

0'-370' = 0, Au Trace, Au Trace, Cu 0.014%

Au 3.4, Au 0.1

390'-450' = 2.45, .012% Cu, .033% Cu

REGISTERED ASSAYER CERTIFICATE ... Signed ... Arizona U. S. A.

CHARGE $ 56.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

763

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas

ccc Lundby

JOB # 002645
RECEIVED 6-14-60
REPORTED 6-19-60

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH:2:							
480-490	Nil	.62	0.25	.025	.016% Cu		
490-500		.04		.019			
500-510		.06		.011			
510-520		.28		.009			
520-530	Nil	1.52		.021			
530-540		.32	0.25	.012	.011% Cu		
540-550		.18		.010			

CHARGE $ 32.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

764

Austral Oil Company

JOB # 002670
RECEIVED 6-19-68
REPORTED 6-21-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH-2:							
550-560		.04		<.01			
560-570		Trace		<.01			
570-580		Trace		<.01			
580-590		Trace		<.01			

REGISTERED ASSAYER
CERTIFICATE NO. 5875
W. D. WRIGHT
ARIZONA U. S. A.

CHARGE $ 16.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

765

Austral Oil Company
2700s Humble Building
Houston, Texas

cc: Lundby

JOB # 002673
RECEIVED 6-19-68
REPORTED 6-25-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH:2:							
610-620		Trace		<100ppm			
620-630		.04		<100			
670-680		.04		<100			

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WIL K. D.
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 12.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

766

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Housston, Texas

cc: Lundby

JOB # 002694
RECEIVED 6-26-68
REPORTED 6-27-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER ppm	ZINC %		MOLYBDENUM %
DDH-2:							
590-600		Trace		40			
600-610		Trace		32			
630-640		Trace		48			
640-650		Trace		40			
650-660		Trace		44			
660-670		Trace		40			
720-730		Trace		36			
750-760		.22		44			
760-770		.18	0.17	24			
770-780		.10		32			
780-790	Nil	2.02	1.53	24			
790-800	Nil	1.04		36			
800-810		.32		20			

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILBUR D. WRIGHT
Date Signed 6-27-68
Arizona U. S. A.

CHARGE $ 52.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002748
RECEIVED 7-5-68
REPORTED 7-8-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER ppm	ZINC %		MOLYBDENUM %
DD-2:							
810-820		Trace		52			
820-830		.08		40			
830-840		.04		44			
840-845		.18		40			
845-850	Nil	.84		152			
850-860		.08		52			
860-870		Trace		40			
870-876		.12		44			

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Date Signed 7-8-68
Arizona U. S. A.

CHARGE $ 34.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

168

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas

JOB # 002624
RECEIVED 6-11-68
REPORTED 6-13-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH# 3:							
40-50		Trace					
100-110		Trace					
110-120		Trace					
120-130		Trace					
130-140		.06					
140-150		.10					
150-160		.12	0.22 oz Ag				
160-170		.34					
170-180		.28					
180-190		.42					
190-200	Nil	2.32					
200-210	Nil	.60	1.28				

2.92
2.32
1.28

REGISTERED ASSAYER CERTIFICATE NO. 5875 WILBUR D. WRIGHT File Signed Arizona U. S. A.

CHARGE $ 28.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

769

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas

JOB # 002646
RECEIVED 6-14-68
REPORTED 6-19-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH: 3			1.28				
210-220	Nil	.70					
220-230	Nil	1.52					
230-240		.38					

CHARGE $ 10.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002671
RECEIVED 6-19-68
REPORTED 6-21-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH-3:							
240-250		.38 .16	0.2				
250-260		Trace					
260-270		Trace	Tr.				
270-280		Trace					
280-290		Trace					
330-340		.12					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Arizona U. S. A.

CHARGE $12.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas

cc: Lundby

JOB # 002674
RECEIVED 6-19-68
REPORTED 6-15-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DD: 3:							
290-300		.06					
300-310		Trace					
310-320		Trace					
320-330	Nil	.56					
330-340		.12					
340-350		.04					
350-360		.04					
360-370		Trace					
		Tr					
		530					

REGISTERED ASSAYER
CERTIFICATE NO. 5875
WILBUR WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 16.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

772

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002695
RECEIVED 6-26-68
REPORTED 6-27-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER ppm	ZINC %		MOLYBDENUM %
DDH:3:							
390-400		.12		48			
420-430		Trace		24			

CHARGE $ 8,00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

773

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002724
RECEIVED 7-1-68
REPORTED 7-5-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER ppm	ZINC %		MOLYBDENUM %
DD# 3:							
440-450		.10		80			
450-460		Trace		40			
460-470		Trace		28			
500-510		.06		28			
510-520		.08		32			
520-530		.04		26			
530-540		40 .39		20			
540-550		.38		24			

REGISTERED ASSAYER
CERTIFICATE NO. 5675
WIL WRIGHT
Arizona U. S. A.

CHARGE $ 32.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

7-14

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Tucson, Arizona

JOB # 002780
RECEIVED 7-11-68
REPORTED 7-16-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DH-4							
40-50		Trace					
90-98		Trace					

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILFRED D.
WRIGHT
Date Signed
Arizona U. S. A.

CHARGE $ 4.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002791
RECEIVED 7-12-63
REPORTED 7-16-63

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DH-5:							
10-20		.06					
20-30		.48					
30-40		.44					
40-50		.48					
50-60		.26					
60-70	Nil	.90					
70-80		.38					
80-90		.22					
90-100	Nil	1.28					
100-110	Nil	1.44					
110-120		.22					
120-130		.34					
130-140		.36					
140-150		.20					
150-160		.16					

CHARGE $ 36.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

TS 7-16

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002807
RECEIVED 7-15-68
REPORTED 7-17-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH-5:							
160-170		.10					
170-180		.14					
180-190		.32					
190-200		.42					
200-205		.08					
205-216		.10					

CHARGE $ 12.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5675

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

777

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002808
RECEIVED 7-15-68
REPORTED 7-17-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM
DDH-6:							
170-180		.06					
180-190		.06					
190-200		.08					

CHARGE $ 6.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

778

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company
2700 Humble Building
Houston, Texas

JOB # 002813
RECEIVED 7-16-58
REPORTED 7-17-58

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
DDH-6:							
200-210		Trace					
210-220		Trace					
220-230		.06					
230-240		.08					
240-250		.06					
250-260		.06					

CHARGE $ 12.00

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

779

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5879

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Austral Oil Company Inc.
2700 Humble Building
Houston, Texas 77002

cc: W. Lumdby

JOB # 002423
RECEIVED 4-22-58
REPORTED 4-24-58

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
SA-1	Nil	3.04					
SA-2	.016	1.63					
SA-3	Nil	2.40					
SA-4	.010	20.39					
SA-5	Trace	.64					
SA-6	Trace	.54					

CHARGE $ 22.50

(please hold payment until statement is received)

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

780

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. Ev[illegible]NS BLVD.
PHONE 60[illegible]94-5811

Austral Oil Company
2700 Humble Building
Houston, Texas 77002

JOB # 002542
RECEIVED 5-21-68
REPORTED 5-24-68

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %		MOLYBDENUM %
SA# 7	.200	838.80					
8	.080	210.92					
9	.040	32.96					

Santa Ana

REGISTERED ASSAYER
CERTIFICATE NO.
5875
WILBUR D.
WRIGHT
Date Signed 5/24/68
Arizona U. S. A.

CHARGE $ 11.25

* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

MILL TEST
AUSTRAL

Tim Briscoe 608

Counter Current Decantation Cyanide Process for Tombstone, Arizona, Silver Ores

Introduction

The cyanide process was a very important metallurgical process, developed for the extraction of gold and silver from their ores.

The early development of the cyanide process is mainly attributed to John Stewart MacArthur and the Forrest brothers. It was first introduced into South Africa in 1890, and then it was widely used in Australia, Mexico and the United States.

From a historical standpoint, it is interesting to note that the first patent registered by MacArthur and the Forrests was on October 19, 1887. It covered the effectiveness of a weak solution of potassium cyanide as a solvent for gold and silver. The following year they patented the use of alkalies and zinc for precipitation of the precious metals from solution. The fact is that this old process revolutionized the gold and silver processing industry and is still basically the same process used today.

The flowsheet of a typical cyanide circuit will be discussed to familiarize the reader with the process. The crushed ore is ground in a ball mill in closed circuit with a classifier to a preselected fine size in the presence of an alkaline cyanide solution. The classifier overflow is thickened to remove the pregnant solution and produce an underflow which is subjected to agitation for final dissolution of gold and silver values. The agitator discharge is washed in a countercurrent decantation system consisting of several washing thickeners. Pulp is fed into one end and water into the other end, thus the flow of pulp and water is in opposite directions. The pulp becomes progressively

lower in soluble content as it passes to the discharge end and the water at the discharge end increases in lime, cyanide, gold and silver strength to constitute the mill solution. The mill solution is then used in the grinding circuit and is further enriched in gold and silver content to form the pregnant solution from the primary thickener. The pregnant solution is precipitated using zinc dust and the barren solution after precipitation is recycled to the washing thickeners. The precipitate is refined to bullion by adding fluxes and smelting.

Flowsheet for Tombstone Mill

Cyanidation flowsheets consist mainly of two types, all-slime and sand leaching. The all-slime cyanidation flowsheet includes fine grinding and agitation in alkaline cyanide solution for dissolution of gold and silver values, whereas, sand leaching is usually a batch process treated in vats by percolation. Another type could be called sand-slime leaching and a modified version of this type will be discussed in another report and will cover my concepts of an agitated vat leaching process for crushed ore.

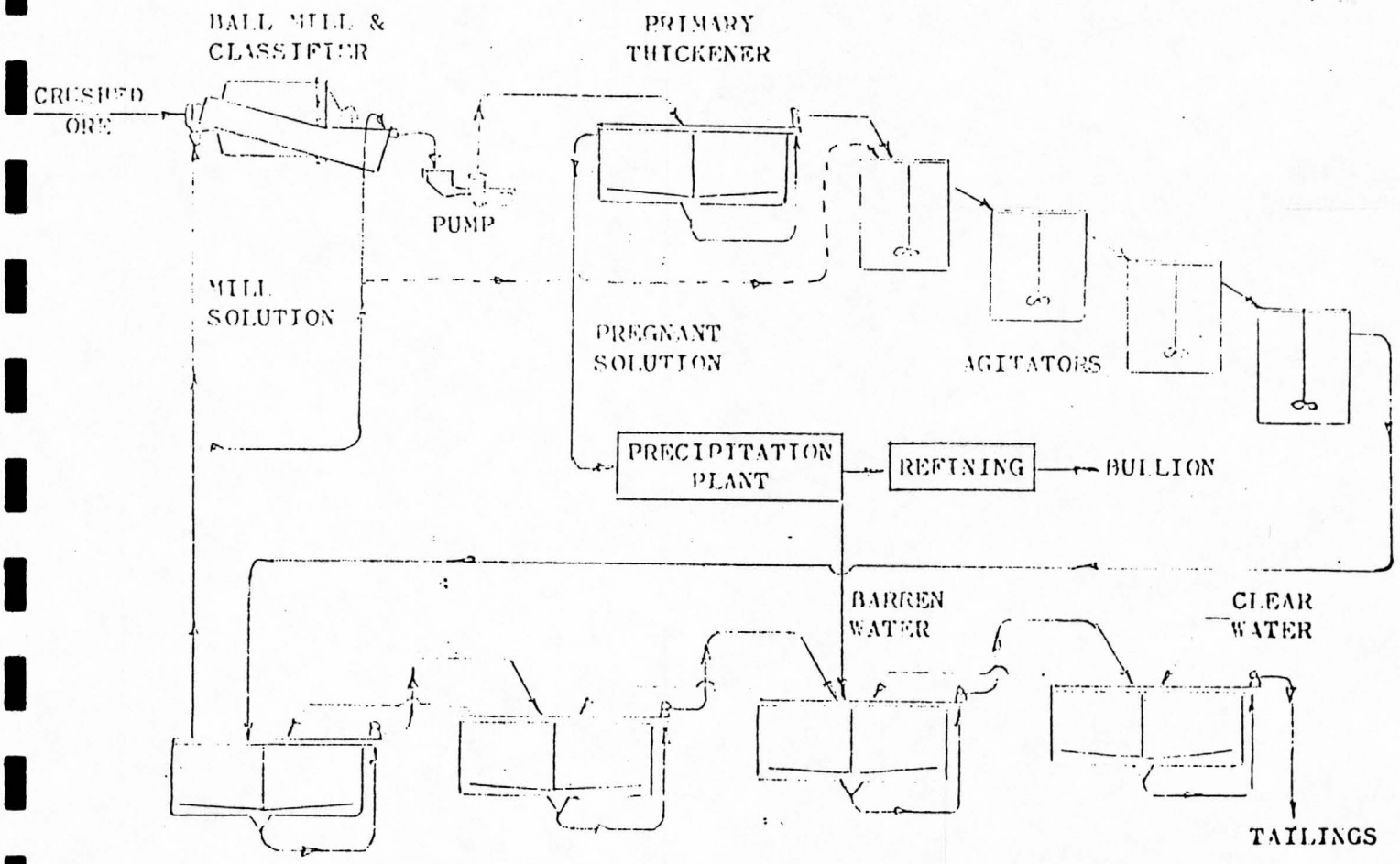
A typical flowsheet is included in this report. This type of flowsheet is industry approved and tested. Although this flowsheet appears similar to an all-slime type process, it will differ because a relatively coarse grind will be sought. Preliminary laboratory testing indicates that a coarse grind should give satisfactory recoveries of gold and silver values.

Settling rates favor a coarser grind and recoveries are not adversely influenced. Laboratory testing currently being conducted at the Arizona Bureau of Mines Laboratory in Tucson, will furnish the necessary data to finalize the mill design and plant operating

BY NHC DATE 9-18-73 SUBJECT SHEET NO. 610 OF

CHKD. BY DATE TOMBSTONE, ARIZONA JOB NO. 71 MINERALS LTD.

CCD CYANIDE PLANT FLOWSHEET



COUNTER CURRENT DECANTATION THICKENERS

conditions.

A discussion of the various steps in the flowsheet will be presented and related to the equipment available from the Whitehall, Montana, mill.

Grinding

Single stage grinding utilizing the No. 66 Marcy Ball Mill in close circuit with the No. 1658-D Dorr Rake Classifier, should give the tentative optimum mesh size of grind at a thru-put of about 150 tons per day of ore, assuming that ball mill feed will be -½" screen fraction from the crushing plant.

To slightly increase the thru-put of the grinding circuit, one can consider several options; one, feed the mill with a smaller size screen fraction, two, increase the coarseness of grind, three, optimize by mill testing, the size and number of ball charge and type of liners, however, to substantially increase the daily tonnage, a second ball mill and classifier circuit should be installed.

Agitation

The propeller type agitators available from the Whitehall Mill are ideal for agitating a coarse grind product. Installation of an air agitation system to the agitators should be considered, especially to the rake Dorr type agitator.

Aeration is essential for successful cyanidation, to supply free oxygen. For efficient dissolving, it is necessary that oxygen come in physical contact with the gold and silver particles. Therefore, air bubbles should be well dispersed in the pulp. The agitators can be modified to accomplish this.

As in the grinding circuit, the calculated tonnage that can

be treated by the available agitators is about 150 tons per day. This is assuming that 24 hour retention time in the agitators will be sufficient, however, 48 hours or a longer retention time may be required. Current laboratory tests, when completed, should give us this information.

To increase the retention time and also the tonnage, additional agitators will be required.

The agitator tanks and drive mechanism are in fairly good condition, however, the impellers must be reworked and possibly rubber covered.

Thickening

Thickening is an important part of a cyanide plant and is essentially a continuous mechanical process involving settling where excess solution is removed from the pulp.

The primary thickener removes pregnant solution which is sent to the precipitation plant for removal of gold and silver values from the solution. The counter current decantation thickeners wash the cyanide pulp to recover the solution and reject the solids to waste.

Free settling rate studies conducted at the Arizona Bureau of Mines Laboratory, Tucson, Arizona, indicate that the State of Maine dump ore tested had acceptable settling characteristics at a pH of 11.0, adjusted with lime at 2#/ton ore. The settling rate determined was 0.5 feet per hour and was dependent on a high pH. Lower pH degraded the settling rate. Based on this free settling rate, the available thickeners are capable of handling at least 70 tons per day of ore per thickener.

The thickeners can be installed in parallel. I recommend that

the thickeners be installed in pairs, each higher in elevation than the preceeding thickener pair to allow the solution to flow by gravity, thus eliminating at least four pumps, if standby pumps are included.

The pulp will have to be pumped from the underflow of each thickener to the next thickener. This can be accomplished by either an adjustable stroke diaphragm pump or a slurry pump with pinch valve flow control. Either pumping systems are effective, however, the slurry pump-pinch valve system will lend itself favorably to future automatic control systems.

The five 30 foot diameter thickeners at the Whitehall Mill were all set at the same elevation. This arrangement requires many pumps, and in my opinion and experience as Chief Metallurgical Engineer for a 30,000 ton per day concentrator, will result in high maintenance costs and poor running time availability. Industry practice, and the two recently constructed cyanide plants in Nevada, use gravity flow for thickener solution.

The available thickeners are in need of repair. Pulp was left in the thickener tanks when the Whitehall Mill was shut down in the middle 1950's, and along the air-pulp interface, the tank walls are badly rusted. Badly rusted sections should be replaced or portions cut out and new plates welded in place. All tank sections should be sand blasted and when the tanks are assembled, they should be treated inside with a corrosion resistant coating. A 2-part catalytic nylon base epoxy primer and enamel will be tested as soon as received from the supplier. A butyl rubber coating, "Elastron", has been received and will be tested immediately.

The thickener drive mechanisms are in only fair mechanical condition and will have to be reworked.

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Clarification and Precipitation

The equipment, although antiquated, appears to be useable. The leaf type clarifier filter and the sock type precipitation tank, typical of small cyanide plants in the past, can be reworked and used for initial production.

At a later date, pressure type clarifier filters and precipitate presses can be installed to update the precipitation plant.

Refinery

At present, refinery equipment is not available. It is believed that the Amex-Placer people plan to keep this equipment with their laboratory facilities at Whitehall, Montana; however, it would seem prudent for management to investigate.

Summary and Conclusions

It appears that about 150 tons of ore per day is the maximum tonnage that can be processed, utilizing the equipment acquired from the Whitehall mill. Upon completion of laboratory test work, plant design and operating conditions can be finalized.

Thickeners should be installed to benefit from gravity flow of solutions. Agitators should also be installed to benefit from gravity.

The thickener tanks must be repaired as well as the drive mechanisms. Agitator impellers should be rebuilt and possibly rubber covered.

The Oliver Vacuum Drum Filter, acquired from the Whitehall mill, should be reworked and available for use in the counter current decantation washing circuit as well as the two 22 foot diameter thickeners. It is quite evident that we will be crowded for pulp

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washing capacity.

Additional equipment will have to be acquired to expand the mill capacity. The writer has been active in investigating sources for equipment procurement.

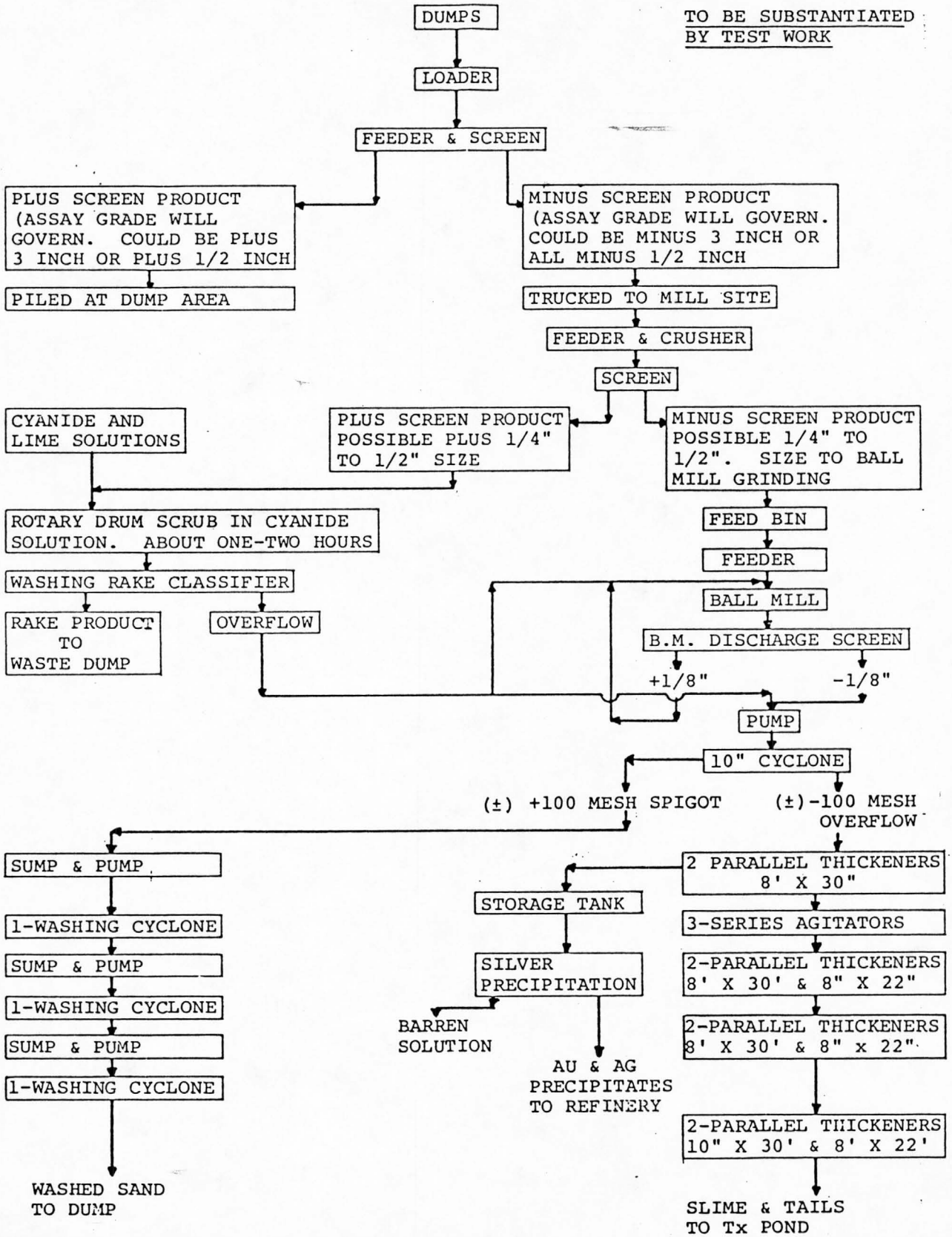
This cyanide plant, with realistic engineering and careful construction practices, should be successful.

Nicholas H. Carouso

Nicholas H. Carouso
Consultant

September 18, 1973

POSSIBLE ORE OPERATIONS FLOWSHEET - TOMBSTONE



CYCLONE CCD CIRCUIT

THICKENER CCD CIRCUIT

File. Tombstone

September 11, 1973

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Mr. R. F. Hewlett, President
Sierra Mineral Management
4741 East Sunrise Drive
Skyline Bell Aire Plaza
Tucson, Arizona 85718

Dear Dick:

On Saturday, September 8, an examination was made of the Tombstone area operations. Messrs. Charles and Ernest Escapule were guides for this tour. Of course, a one day inspection visit cannot fully acquaint anyone with all the facets of the proposed operations. The tour, however, did alert me to your general proposed plan. I see nothing wrong with the overall picture, but would like to offer the following suggestions which are based on examination of present test work and field inspection.

1. Dump Sampling:

   Attached to this letter is a sampling procedure which will allow for a quick analysis for the silver contained in a dump. The system allows for a dump to be segregated into areas which can then be sampled and tonnages calculated.

   Dumps already known to carry some values should be the first tested. This would allow for a known ore feed to the plant prior to the start of milling operations.

   It is suggested that at least 100,000 tons should be proven prior to the start of milling. The program should not take over three months to accomplish.

2. Screening Plant:

   An adequate screening plant should be immediately constructed and operated. At least 10,000 tons of mill feed should be stockpiled for subsequent treatment.

   The operation of this plant, prior to actual milling, would work out the most adequate production methods.

   All screened materials should be stockpiled either at dump or mill site. This would allow for subsequent weighing and blending (if necessary) prior to milling.

September 11, 1973

3. Assaying of Products:

The assay office should immediately be completed. Analysis of ores at the job site would save considerable dollars plus giving more adequate control of sampling operations.

4. Milling Plant:

The cyanide plant with added ore feed bins should be installed as it was at Whitehall, Montana. Space should be left for added wet screening, cyclone CCD circuit and an additional grinding mill. The flowsheet with minor changes and location of equipment is correct for testing the Tombstone area silver ores.

5. Open Pit Prospecting:

Areas around old stopes might contain sufficient values to allow for treatment. As old prospectors say, "Look for elephants where elephants have been before." It is suggested that prospecting around the old stopes of the main mines could be quite productive.

With the Tombstone Exploration holdings tied up, your company can develop long-range plans.

The main thing right now is to do the work for getting the dumps properly sampled and prepare the mill for operation. Once money is being generated, everyone feels better.

I strongly recommend that other mine work or geologic exploration be held to a minimum until the work outlined in the preceding paragraph is done.

Sincerely yours,

John B. White
Post Office Box 8
Inspiration, Arizona 85537

JBW:ma

PROGRESS REPORT

To: R. F. Hewlett, President

From: N. H. Carouso, Consultant

Subject: Progress Report

71 Minerals Project:

The 71 Minerals project area, southwest of Tombstone, Arizona, was visited with Mr. R. F. Hewlett, President, Sierra Mineral Management, on June 28, 1973, to inspect the project site, and discuss project goals. It was decided to resample the State of Maine Mine area dumps at a deeper level in the dumps to determine if the grade of silver changes with depth and also to collect representative samples for cyanidation tests to be run by the Reno Metallurgy Research Center, U.S.B.M., Reno, Nevada. A forty to fifty pound sample from each dump was collected and sent to the Reno Metallurgy Research Center. Mine dumps sampled were as follows:

	Ag. oz./ton	Au. oz./ton
State of Maine dump #2	3.8	trace
" #3	2.0	trace
" #4	2.8	trace
" #5	2.6	trace
" #6	1.4	trace
" #7	4.8	trace
" #8	3.2	trace
Triple X dump	3.7	trace
Triple X extension dump	4.5	trace
Bonanza dump	4.4	trace
North Bonanza dump	2.0	trace
Uncle Sam dump	1.1	trace
Brother Jonathan	3.0	trace
Solstice	3.4	trace
Merrimac	2.4	trace

The above assays were run by the Reno Metallurgy Research Center, and the results received by the writer while visiting the Center on August 17, 1973. Discussion of the visit will be reported in a subsequent part of the progress report.

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On July 9, 1973, at a meeting at Miami, Arizona, Messrs. R.F. Hewlett, E. Escapule, John White and the writer discussed the Golden Sunlight Mill at Whitehall, Montana, which was to be dismantled and reconstructed at the 71 Minerals project area near Tombstone, Arizona. Immediately after the meeting, Mr. E. Escapule and his crew departed for Whitehall, Montana. Early the next morning the writer and his son, Mark, also departed for Whitehall, Montana, to inspect the equipment, take measurements of equipment and building, and assist Mr. E. Escapule in scheduling the priority of equipment to be dismantled and shipped to Tombstone, Arizona.

Upon inspection of the thickners at the Whitehall Mill, it was found that pulp had been left in the steel tanks when the mill was shut down about 1956, and along the air/solids line the walls of the tanks were pitted and in places rusted through. Two possible coatings to restore the tanks will be discussed later in this report. The agitator tanks are sound and will only require minor modification to conform to our flowsheet design. The balance of the major equipment all appears usable. The building will be erected at the Tombstone site and will be expanded using material from the Whitehall site and other sources.

It was decided to return via Denver, Colorado, and to contact MSI Industries, Inc., makers of the Marcy ball mill acquired from the Whitehall Mill, and order Instruction and Operations Manuals, to include Parts Lists and Foundation Drawings. This was done, however, as of August 22, 1973. The Manuals have not arrived. The ball mill foundation drawings are needed to complete our building foundation plans. While in Denver, Colorado, Mr. Charles Cito of Machinery Reserve of Denver, and Mr. Harold Grimes of Morse Bros. Machinery Co., were visited and I inspected some equipment which we may need for the Tombstone Mill. Mr. Charles Cito has followed up with additional quotations.

Before the return trip via Denver, Colorado, a gold property evaluation trip was made to the Ruby and Joe placer claims, situated on the St. Joe River, of eastern Idaho. The evaluation of this property will be covered by a separate report. Also a trip was made to Salt Lake City, Utah, for a meeting with Messrs. R.F. Hewlett and J. Bruce Stevenson pertaining to the Gibson Mine copper leaching operation and on the following day a meeting with Messrs. R. F. Hewlett, J.B. Stevenson, and Seth Horne, et al., regarding the acquisition of mining claims to

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expand the 71 Minerals project area.

Upon returning to Arizona during the week of July 24th, effort was directed toward calling and visiting local suppliers of used milling equipment, corrosion resistant coatings, gasket material for the thickner and agitator tanks, prefabricated forms for construction of tanks and sumps from concrete, Gunite contractors, electric motor rebuilders and suppliers. During this time much consideration was given to Tombstone plant site location for the cyanide counter current decantations plant and also the tailings disposal area. A site was selected near the State of Maine main shaft and the site was stripped to bedrock and then drilled by pneumatic drill to obtain samples for assay. Assay results and geological examination will determine if the site selected can be used. We will then set forms for the mill building foundation. However, we are waiting for the ball mill foundations drawings from USI Industries, Inc. Called Mr. Al Evans, Applications Engineer, for MSI Industries, Inc., Denver, Colorado, on August 22, 1973, and he assured me he will expedite our getting the foundation drawings. It is expected that we will set forms for the mill foundations next week.

Two types of tank coatings are being considered and will be evaluated by coating test material. One coating is called Elastron butyl base coating by United Paint Mfg., and the other is a catalytic 2-part nylon epoxy primer and a catalytic nylon modified epoxy enamel manufactured by Garlock Products. The test results should determine the product to be used; however, at this time I am partial to the nylon epoxy coating because, firstly, the cost is approximately one fourth the cost of the butyl base, evaluating from their respective specifications sheets, and secondly, I believe the Garlock product has been more widely tested by industry, expecially the mining industry.

Quotations on gasket material required for tanks, approximately 4600 feet, vary widely. Of the two quotations we have, one is for $114.00/100 feet and the other is for $24.80/100 feet. The $24.80/100 feet quote is my preference, both from cost and quality, as this gasket will be fabricated from Garlock neoprene by Helm Industrial Supply, Inc., Phoenix, Arizona, with one week delivery.

A meeting with Mr. Henry H. Rubin, Trelleborg, pertaining to rubber linings and wear point products was very informative and could lead to some applications at the Tombstone Mill.

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A meeting with Mr. Thomas L. Muir, President, Phoenix Gunite, Inc. Costs and application of Gunite for our needs was discussed and Mr. Muir will send us drawings per my specifications and price quotations for construction of 500 TPD leaching vat and a leach dump pad. The vat could be considered for both Tombstone and the Gibson Mine expansion.

Through Mr. C. Richardson, Denver Equipment Co., Tucson Office, I learned about a CCD cyanide plant that could possibly be acquired at Atlanta, Nevada. We were unable to locate the last owner of the mill, so I decided that I would inspect the mill at the Atlanta Mine, Nevada, and at the same time attempt to determine the ownership. The trip to Nevada would also include visiting the Carlin Gold Mine and Cortez Gold Mine along with visiting and discussing test work results with Bureau of Mine personnel at the Reno Metallurgy Center, Reno, Nevada.

The Atlanta CCD cyanide plant is about a 500 TPD plant less the crushing plant and conveyors. The equipment is in good condition. The present owner is Mr. Rutherford Day, 1118 S.W. 8th Terrace, Ft. Lauderdale, Fla. 33345, phone (305) 527-0368, who purchased the equipment and buildings at a sheriff's sale on May 25, 1973 for $17,325. The appraised valuation is approximately $98,000 and assessed value at $32,500. I attempted to contact Mr. Day and was informed that he would be back in Florida on August 24, 1973, at which time I will ask him if he wishes to sell the mill and for how much.

The Carlin Gold Mine, Carlin, Nevada, was interesting. I visited with Mr. Jim McFarlane, Chief Engineer, and discussed the mill design and performance and also their dump leaching design and techniques. They plan to use stripped lake bed pads for dump leaching of their satellite deposits. Asphalt pads, 4 inches thick, sheared, at their millsite test area. This is similar to some of my experiences with asphalt pads. I found at the Gibson Mine that compacted local clay worked far superior to asphalt. The Carlin Mill was designed for 2000 TPD capacity and cost about $6,000,000 and about a year to build. They are now milling about 2400 TPD gold ore.

Heap leaching at Carlin Gold Mine is presently conducted on the abovementioned asphalt pads. They are 100 feet wide and 90 feet long, with four such pads in line with approximately a 2.5% pad slope grade. They load to about a 10 foot lift and irrigate with rubber tubing outlets at 120 gpm per 90 X 100 feet pad. Leaching time is about 5½ days for a 60%

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recovery. Carbon precipitation is used with a caustic strip.

The Cortez Gold Mine, Cortez, Nevada, was next visited and a detailed inspection of the mill was arranged by Mr. Don Duncan, Mine Manager. Messrs. Jim Smolik, Mill Superintendent; Reeve Fagg, Mill Foreman; Ed Walker, Refinery Operator; and Bob Baker, Metallurgist, all were very informative. The Cortez Mill was patterned after the Carlin Mill and it has a design capacity of 1600 TPD and cost about $7,000,000. They are milling about 2400 TPD, due to their efficient grinding section. Metallurgy is about the same as Carlin.

Mr. Don Duncan refused to discuss their heap leaching operation with the statement that it was company policy; however, I was able to piece together enough information to at least satisfy some of my curiosity. They are building heaps on stripped lake beds and then compacting mill tailings in the pad area. They eventually plan to build a 50 foot lift. The slope grade of their pads is about 5%. It appears that the gold content of the heap dumps was underestimated, because from a reliable source I learned that as of a week or so ago, they have already extracted 150% of the gold they estimated to be in the dumps. It looks like they may have used mill grade ore for their dump heaps.

The visit with U.S. Bureau of Mines personnel at the Reno Metallurgy Center, Reno, Nevada, was loke old home week. Most of the fellows that I worked with at the Center during the middle 1950's are still there. We discussed Bureau projects, past, present and potential future. Mr. R. Lindstrom, Supervisor Chemical Engineer, assured me that our State of Maine mine area dump samples will be processed in the near future. We need this data for our mill design at Tombstone; therefore, I am initiating test work to be conducted at the Arizona Bureau of Mines laboratory at the University of Arizona, Tucson, Arizona. Mr. Dave Rabb, of the Arizona Bureau of Mines, will expedite grinding and settling rate tests on our ore next week.

I believe that Mr. E. Morrice, Research Metallurgist, Reno Metallurgy Center, Reno, Nevada, is conducting a research project to study methods to benificiate argentiferous manganese ore that is common in certain areas of the Tombstone district and other localities of Arizona. I plan to send Ed Morrice samples of this type ore and information I have and also possibly assist funding of the research project by talking to Dr. T. Henrie, Assistant Director, U.S. Bureau of Mines, Washington, D.C.

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I strongly urge that we implement the laboratory at Tombstone to enable us to do most or all of our test work. This is necessary for mill control and to test characteristics of custom ores or for whatever property is being evaluated by the company. If this suggestion meets with management approval, I will prepare a proposal of what equipment will be required and supervise the implementation of management and train the laboratory technicians

August 22 1973

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TWX: 910-931-2600

June 14, 1973

Sierra Mineral Management
4741 East Sunrise Street
Tucson Arizona 85700

Attention: Mr. Richard Hewlett

Gentlemen:

Proposal
Feasibility Study of Containment System
Proposed Heap Leaching Operation
Near Tombstone, Arizona
For Sierra Mineral Management

INTRODUCTION

In response to a request from Mr. Richard Hewlett of Sierra Mineral Management, we are pleased to submit this proposal for performing a feasibility study of alternative containment systems for a heap leaching operation near the abandoned Maine Mine to the south and east of Tombstone, Arizona. Mr. Larry K. Davidson of Dames & Moore was escorted on a tour of the site area by Mr. James A. Briscoe, exploration geologist for the project, on Friday, June 8, 1973. A topographic map of the site area was provided by Mr. Briscoe for use in preparing this proposal.

PROJECT DESCRIPTION

Sierra Mineral Management plans to extract silver from mine waste dump material near the abandoned Maine Mine by using a combination of heap leaching with a cyanide solution and cyanide milling. The pH of the leaching solution will be controlled at an alkaline level to prevent the formation of cyanide gas. Waste dump materials passing a No. 20 mesh screen will be milled, and the large sized material will be leached. Materials contained in the dumps are estimated to be approximately 20 to 30 percent finer than the No. 20 mesh. The same facilities will be used to precipitate silver from pregnant cyanide solution obtained from the leaching and milling operations.

Estimates of the volume of mine waste material available on the surface of the site range from 30 to 40-thousand tons. Work is currently underway on a head-frame for re-entry into the Maine Mine, and additional silver is expected to be contained within the "gob" located in many of the mine stopes. With additional prospecting, total reserves of leachable ore are expected to reach 100 to 130-thousand tons.

Present plans are to construct a leach pad of sufficient size to stack all of the leachable ore in the dumps over the surface of the site. Areal extent of this pad is expected to be on the order of 150 feet by 250 feet in plan dimensions. Ore will be stacked on the leach pads with scrapers, rather than by stackers and conveyor belts. Depending upon the economics of leach pad construction and transport costs, additional pads or pad area may be constructed as additional ore becomes available or the initial pad may be cleared of leached ore and restacked with the new ore.

The heap leach pad or pads will consist of graded areas of reasonably uniform slope, with a relatively impervious blanket or membrane at the ground surface to permit collection of pregnant leach solution percolating down through the overlying ore pile, without significant seepage loss into underlying soil or rock. Leach solution is normally collected in one or more sumps at the downslope edge of the pad. Dikes of a sprinkler system are commonly used on top of the leach piles to control the distribution of leaching solution.

PROPOSED STUDY

PURPOSE

The purpose of our study would be to evaluate the near-surface materials and topograph at two prospective leach pad locations on the site, one near the Maine Mine shaft and the other near the Fox Ranch; and to provide recommendations for leach pad construction procedures and materials at each site. Suitable lining materials would be of critical importance at both sites.

Primary consideration would be given to the use of compacted native materials for construction of the pads. The fine-grained soils in the low ground to the northeast of the Maine Mine are potential lining materials, possibly in combination with the soils at the pad site near the Fox Ranch. Various commercially-available additives which can be used in combination with natural soils would also be considered. Artificial linings or membranes

will be considered, if necessary, for a workable solution; although these materials are normally more expensive than alternatives using native materials, and performance of these materials on a slope and under a stack of solid materials is sometimes unsatisfactory.

SCOPE

In order to accomplish the purpose of our study, we propose to perform the following scope of work:

1) Representative bulk sampling of native soil at the Fox Ranch pad site and any fine-grained soils in the area which may be available in sufficient quantities for use in lining construction (we understand that Mr. Briscoe may be able to perform this task);

2) Laboratory testing of the sampled materials to determine the compaction and permeability characteristics of these soils alone and possibly in combination with other soils or additives;

3) An office engineering program which will include,

   a) An evaluation of the engineering properties of alternative lining materials,

   b) An evaluation of required site preparation and grading and construction method for the lining material,

   c) Estimating seepage loss of leach solution for the lining alternatives;

4) A brief site visit to inspect test pits used for sampling and to verify available material quantity estimates;

5) Preparation of a final report which will summarize our findings and recommendations.

SCHEDULE

We are prepared to begin our work on the project within 2 to 3 days following your notification to proceed and receipt of the necessary soil samples from the site. We estimate that 3 to 4 weeks would be required to complete our work and submit a final report.

FEE

We propose to perform our study on a time-and-expense basis, in accordance with the attached schedule of charges. We estimate that our fee, including expenses, will be on the order of $2500 to $3000. For this estimate, we have assumed that field sampling could be performed by Mr. Briscoe, and that no equipment charges would be included. We would not exceed our estimated maximum fee without your prior authorization.

In the case of all new clients, it is the policy of Dames & Moore to request that an amount of money equal to our fee estimate be placed in an escrow account for payment of our billings upon receipt. Verification of this account is required before the work can be started. We hope that you will understand the firm's position on this matter.

INSURANCE

During the course of our work, we will provide workmens' compensation insurance as required by law, and public liability and property damage insurance in an amount in excess of $1,000,000.

* * *

It has been our pleasure to prepare this proposal for your consideration. We look forward to assisting you on this project. If you are in agreement with the contents of this proposal, please sign one copy in the space provided below and return it for our files. Receipt of a signed copy will be considered as your notification to proceed.

Very truly yours,

DAMES & MOORE

Larry K. Davidson
Associate

LKD/dls

Attachment

SIERRA MINERAL MANAGEMENT

Richard Hewlett

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SCHEDULE OF CHARGES AND GENERAL CONDITIONS

DAMES & MOORE

UNITED STATES & CANADA

The compensation to Dames & Moore for our professional services is based upon and measured by the following elements, which are computed as set forth below.

PERSONNEL CHARGES

Charges for employees are computed by multiplying the total direct salary cost of our personnel by two and one-half. The total direct salary cost shall be a sum equal to the direct payroll cost (computed on a typical annual basis and expressed as an average hourly rate) plus 25 percent of same to cover payroll taxes, insurance incident to employment, holidays, sick leave vacations, etc. The time of a partner or retained consultant devoted to the project is charged at an assigned billing rate.

The 25 percent employee benefit factor is used for work performed by personnel assigned to offices in the United States and Canada. For work performed by personnel in our offices in other countries, it will vary depending on the employee benefits paid in the particular location.

When outside the United States, employees' and partners' total direct salary cost will be increased by the premium customarily paid by other organizations for work at that location.

Time spent in either local or inter-city travel, when travel is in the interest of the work, will be charged for in accordance with the foregoing schedule; when traveling by public carrier, a maximum charge of eight hours per day will be made.

EQUIPMENT CHARGES

Computer control of project costs will be billed at a rate of $1.25 per each $50 of job charges. Other Dames & Moore equipment, if used, will be billed at the rates noted in the Appendix.

OTHER SERVICES AND SUPPLIES

Charges for services, equipment and facilities not furnished directly by Dames & Moore, and any unusual items of expense not customarily incurred in our normal operations, are computed on the basis of cost plus ten percent. Such items include:

Rental and operation of drilling equipment
Erecting facilities for the performance of field tests
Surveying services
Shipping charges for equipment or samples
Subsistence
Fares of public carriers
Rental vehicles
Printing and photographic reproductions
Long distance communications
Special fees, insurance, permits and licenses
Services of testing laboratories
Services of explosives technicians

BILLING

Statements will be issued every four weeks, payable upon receipt, unless otherwise agreed.

Interest of 1½% per month (but not exceeding the maximum rate allowable by law) will be payable on any amounts not paid within 30 days, payment thereafter to be applied first to accrued interest and then to the principal unpaid amount. Any attorney's fees or other costs incurred in collecting any delinquent amount shall be paid by the Client.

In the event that the Client requests termination of the work prior to completion of a report, we reserve the right to complete such analyses and records as are necessary to place our files in order and, where considered by us necessary to protect our professional reputation, to complete a report on the work performed to date. A termination charge to cover the cost thereof in an amount not to exceed 30 percent of all charges incurred up to the date of the stoppage of the work may, at the discretion of Dames & Moore, be made.

Rates are subject to change upon notification.

WARRANTY AND LIABILITY

Dames & Moore warrants that our services are performed, within the limits prescribed by our Clients, with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended in our proposals, contracts or reports.

Our liability to the Client for injury or damage to persons or property arising out of work performed for the Client and for which legal liability may be found to rest upon us, other than for professional errors and omissions, will be limited to our general liability insurance coverage, which we maintain in limits in excess of $3,000,000. For any damage on account of any error, omission or other professional negligence, our liability will be limited to a sum not to exceed $50,000 or our fee, whichever is greater. In the event that the Client does not wish to limit our professional liability to this sum, we will waive this limitation upon the Client's written request provided that the Client agrees to pay for this waiver an additional consideration of 4% of our total fee or $200, whichever is greater.

In the event the Client makes a claim against Dames & Moore, at law or otherwise, for any alleged error, omission or other act arising out of the performance of our professional services, and the Client fails to prove such claim, then the Client shall pay all costs incurred by Dames & Moore in defending itself against the claim.

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UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

May 30, 1973

Mr. J. A. Briscoe
1971 Minerals Ltd.
Sierra Mineral Management
4741 E. Sunrise Dr.
Tucson, Arizona 85716

Dear Mr. Briscoe:

Ore Test No. 2182

A sample of minus 20-mesh product which Mr. Smith had screened from the State of Maine dump was separated into minus 20 plus 100-mesh, which assayed 8.3 ounces silver per ton, and minus 100-mesh products.

The minus 100-mesh product was cyanided in a rotating bottle at 40 percent solids for 72 hours and after settling the solution was syphoned off. There is clay present in the material and a flocculent was needed to make the solids settle. More water was added and the pulp agitated for a few minutes and again allowed to settle and the clear solution syphoned off. This procedure was repeated.

The results are given in the following table:

Product	Percent weight based on -100-mesh product	Ounces silver per ton	Distribution percent silver
Head	100.0	6.05*	100.0
Solution #1	85.0	2.55	40.7
" #2	68.0	2.08	23.3
" #3	92.0	0.87	13.3
Tailing	98.0	1.40	22.7

*Calculated

The cyanide consumption was 3.0 pounds per ton and lime, 2.5 pounds. The silver recovered amounted to 77.3 percent of the silver in the minus 100-mesh.

Another test was made on the minus 20-mesh desliming the material at about 200-mesh and cyaniding the plus 200-mesh sands. There was too much fine material left in the sands for the solution to percolate down through the sand in a 20-inch column. I would not recommend leaving any material less than 20-mesh in the sands to be leached.

Juvenile in fines ?

KEEP Slimes out of dump

NO Pan

Assayed finest slimes, hi $SO_4^{\uparrow}$

633

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

#2, 5/30/73

Mr. J. A. Briscoe

State of Maine

Ore Test No. 2183

The sample you delivered to the Arizona Bureau of Mines, May 25, was screened and the products assayed. The results are given in the following table:

Screen size	Weight Percent	Assay ounces silver	Distribution percent silver
Head	100.0	4.25*	100.0
on 1"	31.8	2.00	15.0
Minus 1 on 3/4"	9.1	2.75	6.0
3/4 on 1/2"	6.9	2.30	3.7
1/2 on 1/4"	16.2	3.85	14.8
1/4 on 10-mesh	17.6	6.90	28.6
10 on 20-mesh	6.9	6.40	10.4
20-mesh	11.3	8.10	21.5

*Calculated from products

The silver values in the minus 1/2 plus 20-mesh amounted to 40.7 percent of the weight and contained 53.8 percent of the silver in the mine run sample. It assayed 5.8 ounces silver.

We are holding the samples in reserve in case you may wish to have cyanide test made on any of these products.

634

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

#3, 5/30/73

Mr. J. A. Briscoe

Bisbee Group
(Solstice Mine)

Ore Test No. 2184

The sample you delivered from the Bisbee group, May 25, was screened and each size assayed. The results are given in the following table:

Product	Weight percent	Assay Ounces Silver
Head	100.0	2.00*
plus 1"	32.5	1.30
Minus 1 plus 3/4"	12.4	4.20*
3/4 " 1/2"	10.4	2.20
1/2 " 1/4"	21.4	1.80
1/4 " 10-mesh	11.4	2.20
10 on 20-mesh	3.5	1.85
20-mesh	8.4	3.80

*Calculated

This sample is too low to be considered ore.

Yours very truly,

Geo. Roseveare,
Metallurgist

GR:B

* a little out of norm.: Why?

METALLURGICAL RESULTS OBTAINED ABOVE SHOULD BE CONSIDERED AS ONLY APPLICABLE TO MATERIAL CONFORMING TO THE CHARACTER OF THE SAMPLE UPON WHICH THE TESTS WERE MADE.

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PRELIMINARY CYANIDATION TEST ON DUMP MATERIAL FROM THE "STATE OF MAINE AND BROTHER JONATHAN MINE, TOMBSTONE, ARIZONA

Lot I

submitted

by

Mr. James A. Briscoe
Sierra Mineral Management
4741 E. Sunrise Dr.
602-299-9736
Tucson, Arizona 85718

by

Sigmund L. Smith
Registered Metallurgical Engineer
P.O. Box 4063, University Station
Tucson, Arizona, 85717
602-884-1578 or 1361

May 16, 1973

RESULTS:

Lot I; about 500 pounds

Calculated head assay = 3.06 oz/T silver and a trace of gold

PERCOLATION TEST

The plus 20 mesh (0.03") minus 6 mesh (0.13") material assaying 3.40 oz/T silver (40% of the total silver) and 37.3% of the total weight percolated in a 5 foot column for 3 days will extract about 70% of the silver and have a tail assaying about 1.06 oz/T silver.

Using the first order reaction equation, the percent extract vs. time at the end of a 4 day leach will be about 80% recovery of the silver.

Cyanidation and lime consumption tests shows a normal consumption of about 1.5 pounds soldium cyanide (NaCN) and about 5 pounds of lime (CaO) per ton of ore leached.

SCREEN ANALYSIS AND ASSAYS

No.	Size	Ind. % Wt.	Accum. % Wt.	ASSAYS		SILVER DIST.	
				oz/T Silver	oz/T Gold	Ind. % Total	Accum. %
1	+1.05"	18.9	18.9	0.36	Tr(A)	2.2	2.2
2	-1.05 +0.74	5.9	24.8	0.56	Tr	1.1	3.3
3	-0.74 +0.63	5.7	30.5	0.72	Tr	1.3	4.6
4	-0.63 +0.38	5.9	36.4	1.14	Tr	2.2	6.8
5	-0.38 +0.26	5.9	42.3	1.60	Tr	3.1	9.9
6	-0.26 +0.13	12.4	54.7	2.40	Tr	9.7	19.6
7	-0.13 + .065	13.5	68.2	3.60	Tr	15.8	35.4
8	-0.065+0.031	11.4	79.6	4.02	Tr	14.9	50.3
9	-0.33(20M)	20.4	100.0	7.52	Tr	49.6	99.9

(A) Trace less than 0.02 oz/T gold.

Calculated head assay = 3.06 oz/T silver and a trace of gold.

CYANIDATION AND LIME CONSUMPTION: TEST I

Forty grams of pulverized head sample was agitation leached with 120 cc tap water plus 120 mg lime (2#/T solution or 6#/T ore) and 300 mg solium cyanide (5#/T solution or 15#/T ore) for 4 hours.

After leaching the free sodium cyanide was 4.5 # NaCN/ton solution or consumed 0.5 # cyanide/T solution or 1.5 #/T ore.

The free lime was 0.35 # CaO/T solution or consumed 1.65 # CaO/T solution or 4.95 #/T ore.

SOAK AND DISPLACEMENT LEACH OF VARIOUS SIZE: TEST 2

Five hundred cc of ore was placed in a 600 cc beaker and tap water was added to make a volume of 500 cc. Three hundred and fifty grams of lime and 350 mg sodium cyanide were added to each size fraction. Every 24 hours the contents were changed to a new beaker.

Test 2	Size	Gms Ore	CC Soln.	Reagents Added		Pulp Ratio	After 96 Hours Leaching #/T Soln				
				NaCN #/T Soln.	CaO #/T Soln.		Free CN	Free CaO	Heads oz/T mg	Tails oz/T mg	% Rec Trend
A	-1.05 +0.742	514	270	2.6	2.6	1 to 1.90	1.04	Trace	0.56	0.48	14.0
B	-0.74 +0.63	543	270	2.6	2.6	1 to 1.97	0.96	Trace	0.72	0.60	17.0
C	-0.63 +0.38	560	270	2.6	2.6	1 to 2.08	0.76	Trace	1.14	0.56	51.0
D	-0.38 +0.26	590	270	2.6	2.6	1 to 2.19	0.68	Trace	1.60	Lost	--
E	-0.26 +0.13	621	270	2.6	2.6	1 to 2.30	0.60	Trace	2.40	1.20	50.0
F	-0.13 +0.065	623	270	2.6	2.6	1 to 2.32	0.54	Trace	3.60	0.98	73.0
G	-0.065+0.031	611	270	2.6	2.6	1 to 2.26	0.98	Trace	4.02	2.42	(B) 40.0
H	-0.033(20M)	669	270	2.6	2.6	1 to 2.48	NO RESULT		7.52	2.68	(B) 65.0

(B) Poor results caused by insufficient washing.

PERCOLATION TEST: TEST 3

A 4" diameter 5.5 feet high plastic tube was used as a downward type of percolator.

Feed: Mixed (41 pounds)

6,410 grams #6 -0.26 +0.13" (33% by wt.)

6,960 grams #7 -0.13 +0.065 (36% by wt.)

5,940 grams #8 -.065 +0.03 (31% by wt.)

19,310 grams

Having an assay of 3.4 oz/T silver.

Solution: 8.5 liters (pulp ratio 1 to 0.44) contained 10.69 NaCN (1.25 #/T soln) and 11.39 CaO (1.33 #/T soln).

Leaching cycle was 72 hours and the percolation rate was about 6 inches per hour, a satisfactory rate.

At the end of 24 hours the free cyanide was 1.50 #/T solution and a trace of lime. End 48 hours the free cyanide was 1.30 #/T solution and a trace of lime and at the end of 72 hours of leaching the free cyanide was 1.16 #/T solution.

The tails assayed 1.06 oz/T silver giving a recovery of about 70% for 3 days of leaching or a calculated 80% for 4 days of leaching.

After leaching the system was allowed to drain over night and 2 separate washings were applied.

First wash of 1,250 cc contained 165 mg silver.

Second wash of 1,000 cc contained 64.0 mg silver.

Total silver IN = $\frac{19,300}{30}$ x 3.4 = 2180 mg Ag.

% Recovery total silver first wash = $\frac{165}{2180}$ x 100 = 7.6

% Recovery total silver second wash = $\frac{64}{2180}$ x 100 = 3.0

Wash recovery = 10.6%

Which can be considered satisfactory.

CONCLUSION:

It appears the dump material is amenable for cyanidation leaching and the cyanide and lime consumption is satisfactory.

More work should be done with various fractions between -20 mesh and perhaps 65 mesh to increase the assay of silver and at the same time increase the percent of the total weight going to percolation. The -0.375 + 0.265 material assaying 1.60 oz/T silver might be included as percolation material.

The -20 mesh material had a poor filtering rate and further testing should be required on agitation before any conclusion can be reached as to its amenability to agitation leaching.

Sigmund L. Smith

Sigmund L. Smith
Registered Metallurgical
Engineer

APPENDIX B

643

METCON LABORATORY

PROJECT CT-15

FOR

AUSTRAL OIL COMPANY

TOMBSTONE, ARIZONA

July 22, 1968

SUMMARY

Preliminary work only has been done. Due to misunderstanding no further work was carried on until Mr. Carouso came in during the first week in July and indicated the urgency. Since then additional work has been done, the results of which are not all available. Cyanide assays of pregnant liquor, obtained at a custom assay office failed to check expected results within credibility figures.

PROCEDURE

A large sample of ore (over a thousand pounds) from the Tombstone, Arizona area was delivered to METCON LABORATORY by the Austral Oil Company. This was thoroughly mixed by coning several times after which coning and quartering continued until a small enough sample was achieved for screen analysis and an aliquot portion for head assay.

SCREEN ANALYSIS AND ASSAY OF SCREEN FRACTIONS

No.	SCREEN	WGT. %	ASSAY OZ/TON Au	ASSAY OZ/TON Ag	UNITS Au	UNITS Ag	% DISTRIBUTION Au	% DISTRIBUTION Ag
525	1.050	29.73	0.008	3.18	0.0024	0.945	35	29.8
526	0.742	10.10	0.010	3.21	0.0010	0.324	15	10.3
527	0.525	9.52	0.006	2.31	0.0006	0.220	9	6.9
528	0.371	8.08	0.008	2.35	0.0006	0.190	8	6.0
529	3 MESH	6.20	0.005	1.94	0.0003	0.120	4	3.8
530	4 "	5.11	0.004	2.18	0.0002	0.111	3	3.5
531	6 "	4.30	0.004	3.62	0.0002	0.156	3	4.9
532	10 "	4.87	0.004	3.84	0.0002	0.187	3	5.9
533	20 "	5.26	0.003	2.18	0.0002	0.115	3	3.6
534	35 "	4.35	0.008	4.53	0.0003	0.197	4	6.2
535.	48 "	1.71	0.005	6.28	0.0001	0.107	1	3.4
536	65 "	2.49	0.005	6.02	0.0001	0.150	1	4.7
537	100 "	1.36	0.004	6.27	0.0001	0.085	1	2.7
538	200 "	3.69	0.010	4.83	0.0004	0.178	6	5.6
539	-200 "	3.23	0.010	2.59	0.0003	0.084	4	2.7
	Calculated Screen Head				0.007	3.169		
	Actual Assay of Screen Feed				0.010	2.82		

Looking at the silver distribution in the screen analysis, it appears there is little to be gained by screening or classifying since the silver distribution follows the fraction weights very closely.

Three alkalinity checks were made to determine if acid generating minerals were in evidence.

TEST No. 1

200 grams of ore - minus 9 mesh
200 ml of water
Rolled for 1 hour Final pH 6.0

TEST No. 2

Same as above but with the addition of
2 grams CaO. Final pH 11.2

TEST No. 3

Same as above but with the addition
of 1 gram of CaO and rolled for
20 hours. Final pH 11.0

It appears that once sufficient lime has been added to raise the pH substantially on the alkaline side there is little degradation. Apparently there are not many sulfides available for creating acid.

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Additional tests, Nos. 4 through 9 were completed to determine the protective alkalinity as follows:

400 grams of ore - each charge

0.645 grams of 77.5% available CaO (equal to 0.5 grams on a 100% basis)

1000 ml of water

	TIME ON ROLLS (HRS.)	MESH OF ORE	LIME TITRATION OF FINAL LIQUOR
4	1	-10	0.0050% CaO
5	2	-10	0.0060% "
6	3	-10	0.0055% "
7	4	-10	0.0050% "
8	1	-100	0.0030% "
9	4	-100	0.0030% "

The final liquor was titrated with 0.1 N HNO_3.

Four preliminary tests were run to compare mesh size with leach capabilities.

Make-up of each charge as follows (differing only in screen size):

500 grams of ore assaying Au 0.010 Ag 2.82

500 ml of water

5 grams CaO

1.885 grams NaCN (KCN equivalent to 0.5%)

All were rolled for 20 hours and tailing assayed.

SAMPLE No.	100 % MINUS SCREEN MESH	Au	Ag	% RECOVERY
603	9	Nil	0.73	74.12
604	20	"	0.64	77.31
605	35	"	0.60	78.73
606	48	"	0.52	81.57

No further gold assays will be obtained since obviously 100 % recovery of the gold is evidenced.

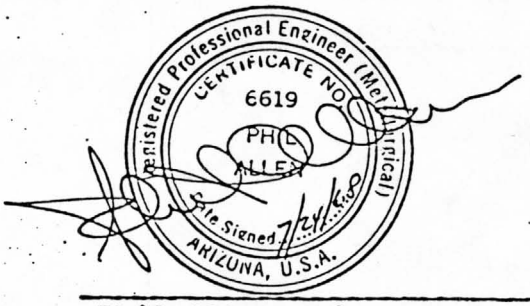
It could well be that finer grinds might be even more easily leached however in reducing to all minus 48 mesh in a mill a lot of very fine material would be created. In this test the samples were screened before each additional pass through the pulverizer (loose plates) so not too much in fines above the next smaller mesh screen could be created.

Cyanide consumption is not known at this point since the assay results were not credible. These will be rerun.

We will fabricate some laboratory size tanks for counter-current

leaching (probably of the pachuca type) and proceed with tank type leaching as soon as possible.

We are nearly set up to do our own assaying of Cyanide and available lime. Since this appears to be something the assay offices are not readily able to slot into their line-up, quite probably we can do a better job.



Phil Allen, Director
METCON Laboratory

PA/vi

I. P. AUSTRAL

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APPENDIX A

REPORT ON THE

INDUCED POLARIZATION SURVEY

ON THE

AUSTRAL OIL CO. HOLDINGS, TOMBSTONE AREA

COCHISE COUNTY, ARIZONA

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REPORT ON THE INDUCED POLARIZATION SURVEY ON THE AUSTRAL OIL CO. HOLDINGS, TOMBSTONE AREA COCHISE COUNTY, ARIZONA

I
INTRODUCTION

At the request of Mr. Bill Lundby, representing Austral Oil Co., a reconnaissance induced polarization survey was conducted on the Austral Oil Co. holdings near Tombstone, Arizona. The property is situated several miles Southwest of Tombstone.

The induced polarization survey was attempted to assist in locating any zones of mineralization that might be present at depth.

II
PRESENTATION OF RESULTS

The induced polarization and resistivity results are shown on the following enclosed data plots.

Seven lines with a bearing of N 45° W were run using dipole spacings of five hundred (500) feet.

LINE NO. 1	500' electrode spacing
LINE NO. 2	500' electrode spacing
LINE NO. 3	500' electrode spacing
LINE NO. 4	500' electrode spacing
LINE NO. 5	500' electrode spacing
LINE NO. 6	500' electrode spacing
LINE NO. 7	500' electrode spacing

A plan map of the surveyed area is included to exhibit the orientation and spacing of the lines run.

III

DISCUSION OF RESULTS

The apparent resistivities measured during the reconnaissance survey are in most cases moderately low. All lines run exhibit that the area surveyed is structurally quite complex.

The percent frequency effect (PFE) values range from usually excepted background to marginally anomalous. The metallic conducting factor (MCF) values exhibit a range which one would expect to find unmineralized to disseminated sulfides in the subsurface structures.

LINE NO. 1, has three possible weakly anomalous zones which are near the areas of 0.5 N to 1.5 N, 1.5 S to 2.5 S and 4.5 S to 5.0 S.

LINE NO. 2, has possible near surface and deeper marginally anomalous zones between 0.5 S and 2.5 S.

LINE NO. 3 is in a higher resistivity area, however, lower resistivity zones in the region of 2.0 N to 2.5 N and 0.5 S to 1.0 S, offer the slim possibility of bedded mineralization.

LINE NO. 4, has a weakly anomalous area between 0.5 N and 1.5 N.

LINE NO. 5, has several possible weakly anomalous zones, from 4.0 N to 5.0 N, 1.5 N to 2.5 N and 0.5 S to 1.0 S.

LINE NO. 6, has two weakly anomalous areas, 4.5 N to 5.0 N and 0.0 NS to 0.5 S.

LINE NO. 7, is not too interesting except for a possible anomalous zone from 0.5 N to 1.0 N.

Since the induced polarization measurement is essentially an averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the spread length; i.e. when using 500' spreads, the position of a narrow sulfide body can only be determined to lie between two stations 500' apart. In order to locate sources at greater depth, larger spreads must be used, with a corresponding increase in the

uncertainties of location. Therefore, while the center of the indicated anomaly probably corresponds fairly well with the source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

It should be mentioned that a mineralized body having dimensions of less than 0.1 the dipole spacing of 500 feet could go undetected.

IV

CONCLUSIONS AND RECOMMENDATIONS

The reconnaissance induced polarization survey of this area indicates that zones of weak mineralization exist. A detailing of the weakly anomalous zones, using shorter dipole spacings, might prove advantageous if future drilling is being considered.

Respectfully submitted,

Nicholas H. Carouso

Nicholas H. Carouso 7-24-68

THE INDUCED POLARIZATION METHOD

Induced Polarization as a geophysical measurement refers to the blocking action or polarization of metallic or electronic conductors in a medium of ionic solution conductors.

This electro-chemical phenomenon occurs wherever electrical current is passed through an area which contains electronic conductors such as base metal sulfides. Normally, when current is passed through the ground, as in resistivity measurements, all of the conduction takes place through ions present in the water content of the rock or soil; i. e. by ionic conduction. This is because almost all minerals have a much higher specific resistivity than ground water. The minerals commonly described as "metallic", however, have specific resistivities much lower than ground waters. The induced polarization effect takes place at those interfaces where the mode of conduction changes from ionic in the solutions filling the interstices of the rock to electronic in the metallic minerals present in the rock.

The blocking action or induced polarization described above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a D. C. current is allowed to flow through the rock; i. e. as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the interfaces to effectively stop all current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

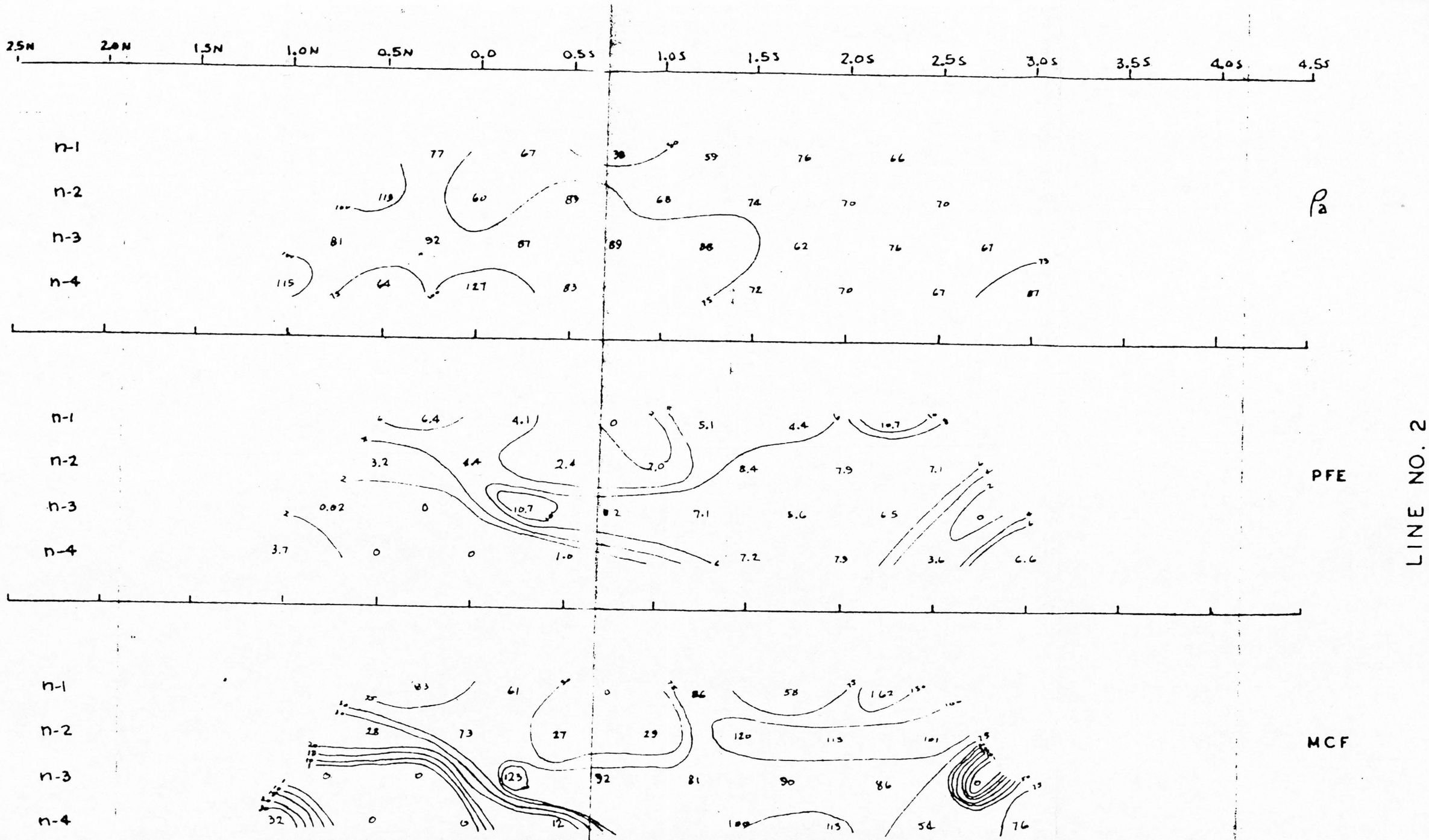
When the D. C. voltage used to create this D. C. current flow is cut off, the Coulomb forces between the charged ions forming the polarization cause them to return to their steady state. This movement of charge creates a small current flow which can be measured on the surface of the ground as a decaying potential difference.

Now if the direction of the current through the system is reversed repeatedly before the polarization occurs, the effective resistivity of the system as a whole will change as the frequency of the switching is changed.

In this induced polarization reconnaissance survey, five equally spaced co-linear current electrodes were placed in the ground by

burying aluminum foil in pits wetted with brine. Observations were made in accordance with a symmetrical dipole-dipole configuration where the distance between the receiver or potential electrodes was kept equal to the distance between adjacent electrode pairs. Generally the receiving dipole is separated by one to six dipole units ("n" separation) from the sending dipole. A precisely controlled square wave current was sent through a sending dipole at 0.05 and 3.0 cycles per second from which, at the receiving dipole, a D. C. and an A. C. voltage was measured, respectively. By knowing the geometry involved (the dipole length or spacing and the separation distance between the two receiving-sending dipole pairs), along with the two voltages, an apparent D. C. and an A. C. resistivity was calculated. From these apparent resistivities, their percentage difference was determined, thus giving the Percent Frequency Effect (PFE). A third quantity proportional to PFE and inversely proportional to D. C. resistivity, called Metallic Conduction Factor (MCF) was computed in order to somewhat normalize PFE for variations in ground conductivity purely as a technical interpretational aid.

The IP technique was developed primarily for porphyry type deposits and is perhaps the only reliable means of detecting hidden disseminated sulfides. However, the IP method works just as well or perhaps better on semi-massive to massive sulfides, contrary to some of the earlier thinking, for it gives increased response with increased volume percentage of sulfides.



I.P. SURVEY

AUSTRAL OIL CO.

TOMBSTONE AREA, COCHISE CTY.- ARIZ.

LOOKING - NE

SCALE - ONE INCH = 500'

JULY 1968

VI 134 607

2.5N 2.0N 1.5N 1.0N 0.5N 0.0 0.5S 1.0S 1.5S 2.0S 2.5S 3.0S 3.5S 4.0S 4.5S

n-1
n-2
n-3
n-4

77 67 59 76 66
118 60 89 68 74 70 70
81 92 87 89 86 62 76 67
115 64 127 83 72 70 67 87

Pa

n-1
n-2
n-3
n-4

6.4 4.1 5.1 4.4 10.7
3.2 4.4 2.4 2.0 8.4 7.9 7.1
0.02 0 10.7 7.1 5.6 6.5
3.7 0 0 1.0 7.2 7.9 3.6 6.6

PFE

n-1
n-2
n-3
n-4

83 61 86 58 162
28 73 27 29 120 113 101
123 92 81 90 86
32 0 0 12 100 113 54 76

MCF

LINE NO. 2

I.P. SURVEY

AUSTRAL OIL CO.

TOMBSTONE AREA, COCHISE CTY.- ARIZ.

LOOKING - NE

SCALE - ONE INCH = 500'

JULY 1968

VBA 607

4.0N 3.5N 3.0N 2.5N 2.0N 1.5N 1.0N 0.5N 0.0 0.5S 1.0S 1.5S 2.0S 2.5S 3.0S

n-1
n-2
n-3
n-4

81 235 233 265 178 151 150 100
68 72 148 268 169 141 66 100
184 71 68 171 148 132 60 138
194 72 85 122 70 60 108

ρ_a

n-1
n-2
n-3
n-4

5.8 5.4 5.4 2.0 4.5 2.1
3.5 2.9 2.9 4.6 3.0 0 2.9
0 0 1.4 4.4 0 0 0.6 1.6
0 0 3.0 0 3.7 0.4 2.5

PFE

n-1
n-2
n-3
n-4

11 23 23 7 26 14
51 40 20 17 18 0 59
0 0 21 26 0 0 19 12
0 0 35 0 58 23

MCF

LINE NO. 3

I.P. SURVEY

AUSTRAL OIL CO.

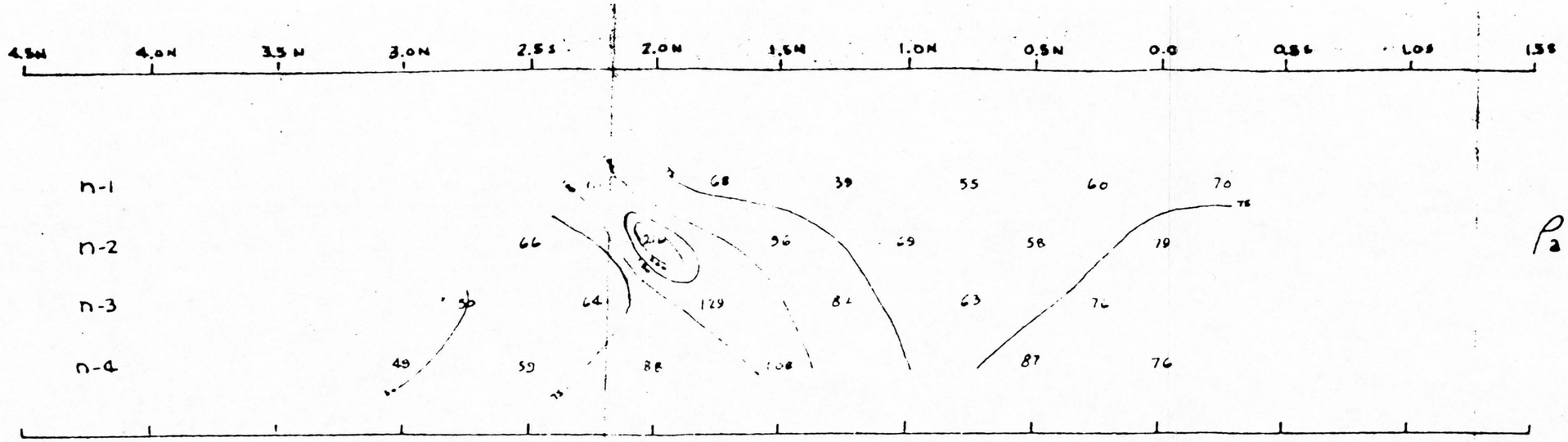
TOMBSTONE AREA. COCHISE CTY.- ARIZ.

LOOKING - NE

SCALE- ONE INCH = 500'

JULY 1968

VI DA 607



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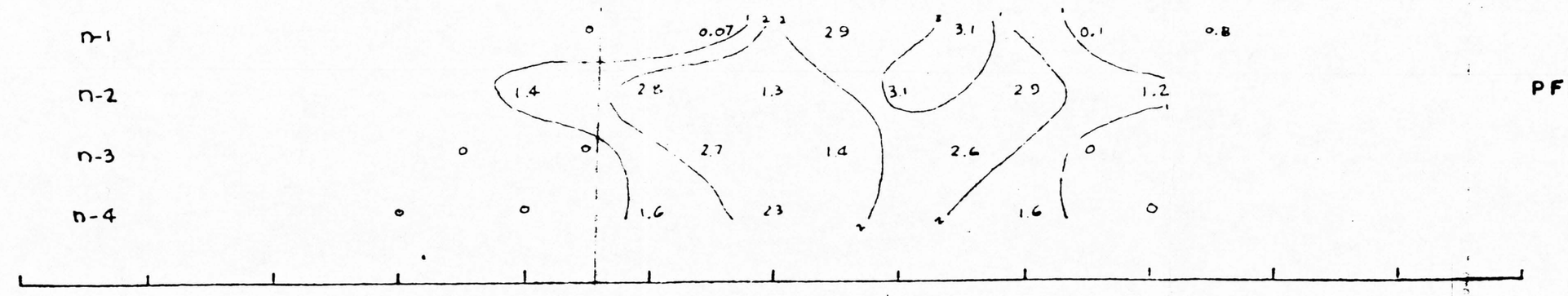
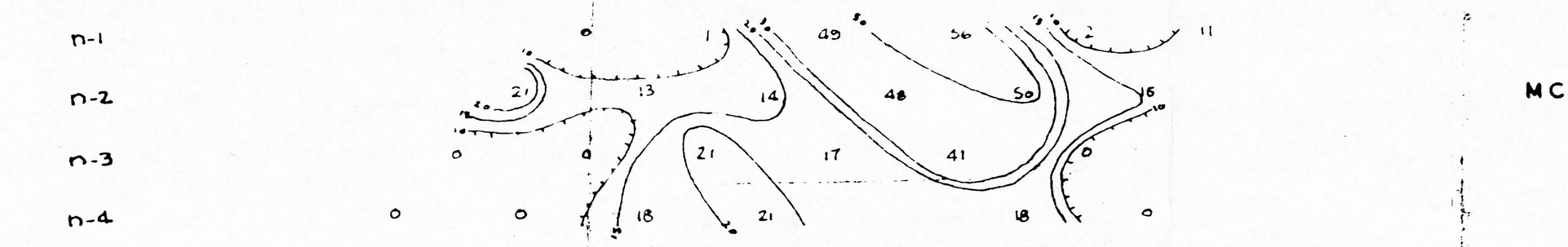


PFE



MCF

I.P. SURVEY

AUSTRAL OIL CO.

TOMBSTONE AREA, COCHISE CTY.- ARIZ.

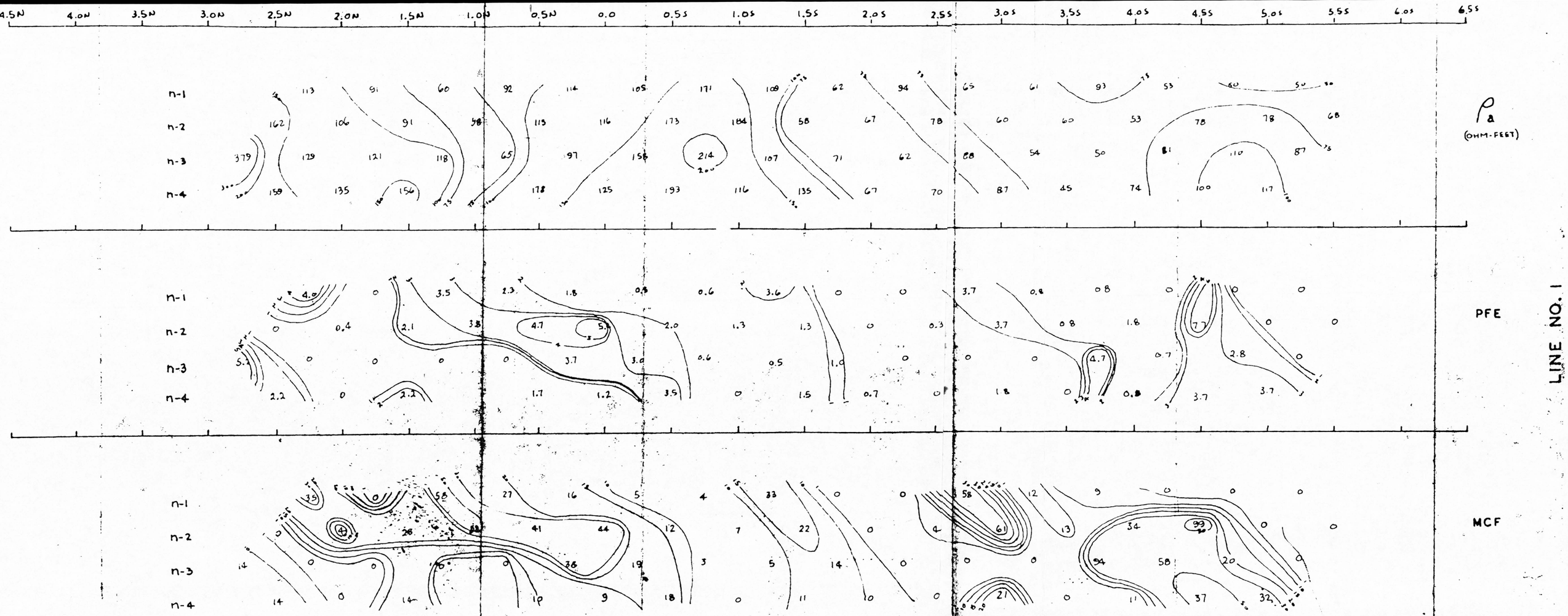
LOOKING - N E

SCALE - ONE INCH = 500'

JULY 1968

LINE NO. 4

VI 69 607



I.P. SURVEY

AUSTRAL OIL CO.

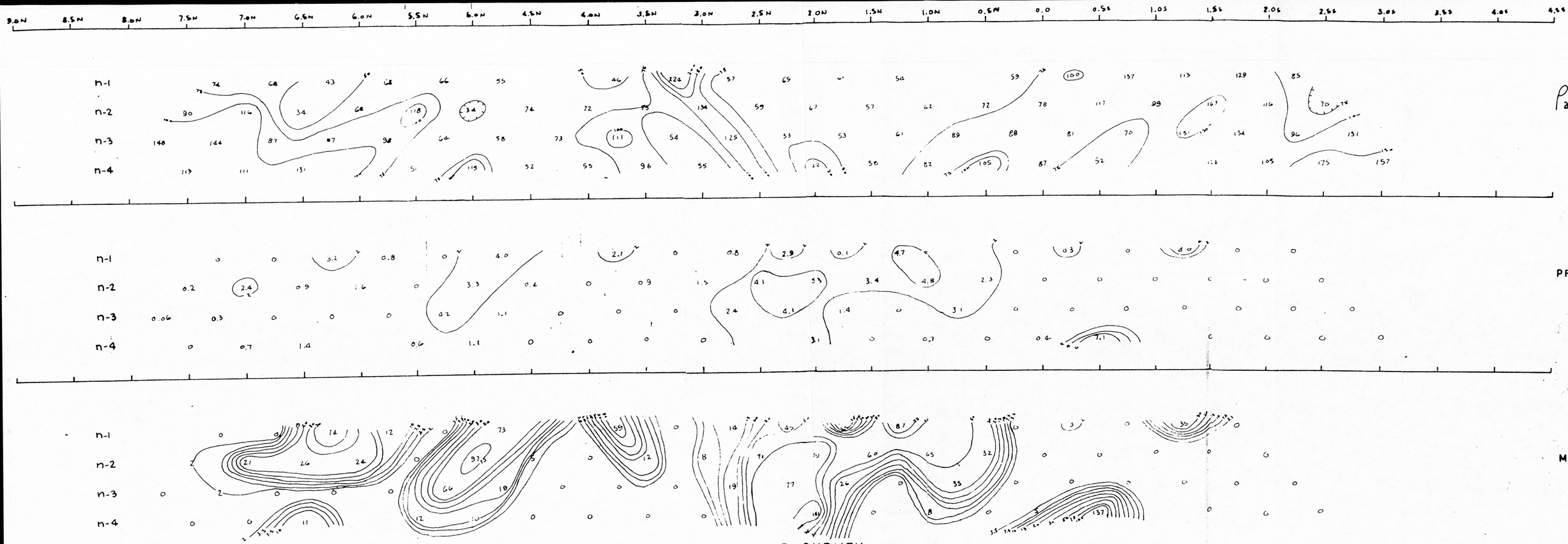
TOMBSTONE AREA, COCHISE CTY.-ARIZ.

LOOKING - NE

SCALE - ONE INCH = 500'

JULY 1968

1-4-607



I.P. SURVEY

AUSTRAL OIL CO.

TOMBSTONE AREA, COCHISE CTY.-ARIZ.

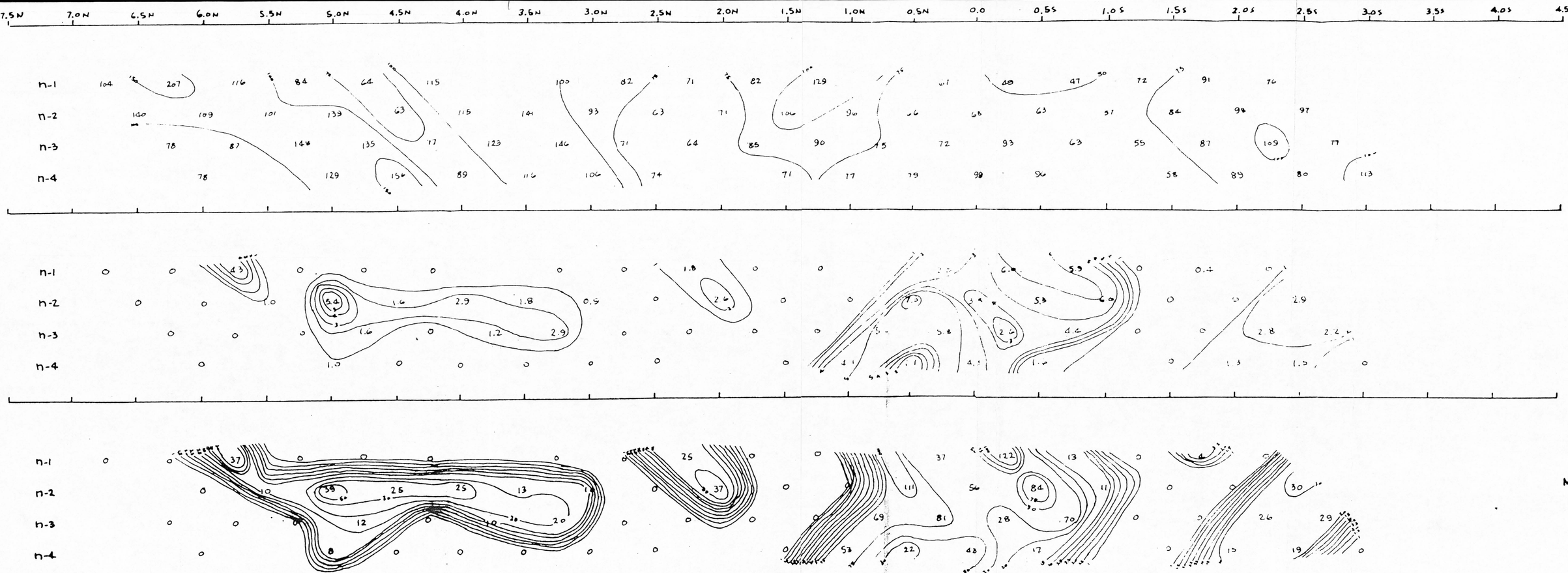
LOOKING - NE

SCALE—ONE IN CH = 500'

JULY 1968

LINE NO. 5

1-4-607



LINE NO. 6

I.P. SURVEY

AUSTRAL OIL CO.

TOMBSTONE AREA, COCHISE CTY., - ARIZ.

LOOKING - NE

SCALE - ONE INCH = 500'

JULY 1968

1-4-607

4.0N 3.5N 3.0N 2.5N 2.0N 1.5N 1.0N 0.5N 0.0 0.5S 1.0S 1.5S

n-1 119 132 172 64 70 70
n-2 179 126 182 72 80 87 106
n-3 98 187 163 39 84 87 136
n-4 95 43 86 125

P_A

n-1 0 2 5 3 0 1
n-2 3 0 0 0 0 0
n-3 0 0 0 0 0 0 0
n-4 0 0 0 0 0

PFE

n-1 30 29 16 14
n-2 17 28
n-3
n-4

CF

LINE NO. 7

I.P. SURVEY

AUSTRAL OIL CO.

TOMBSTONE AREA, COCHISE CTY.- ARIZ.

LOOKING- NE

SCALE- ONE INCH=500'

JULY 1968 1-9-607

R22E

7 8 9 10

18 17 16 15

19 20 21 22 T20S

30 29 28 27

31 32 33 34

A-L7 A-L4 A-L3 A-L2 A-L1 A-L5 A-L6 C-L1 C-L3 C-L2

STEWART CO.

STEWART CO.

+5% FeS

8-2

INDUCED POLARIZATION AND RESISTIVITY SURVEY
COMPOSITE OF CAB AND AUSTRAL SURVEYS
TOMBSTONE AREA, COCHISE COUNTY, ARIZONA
SCALE 1:24000

SUFACE PROJECTION OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE

I.P. LINES
A = AUSTRAL
C = CAB

STATE LEASE

1-4-6074

NOV. 1968

2000 W

1500 N

Uncle Sam (Incline Shaft)

H-27 (200)

H-24 270

H-25 (500)

H-19 (490)

H-18 (313)

H-16 (170)

State of Maine (Incline Shaft)

H-26 (500)

H-12 (210)

D

D'

E

E'

F

F'

00N

00N

N.

AUSTRAL OIL COMPANY INC.

TOMBSTONE AREA

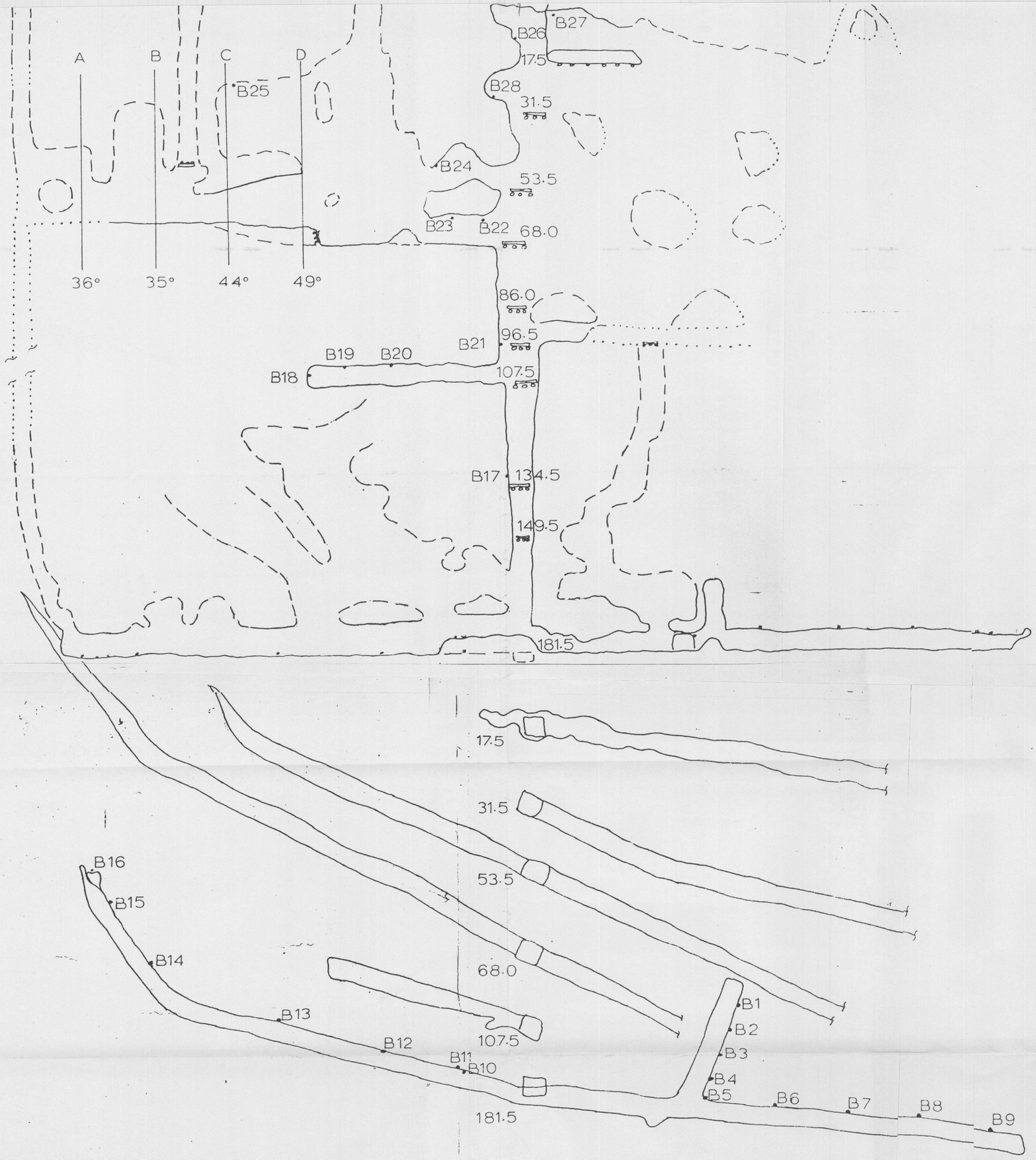
COCHISE COUNTY, ARIZONA

PLATE VIII

0 50 100 200 Feet

W.L. July, 1968

1-4-781



Sample	Width	Assay Au.	Assay Ag.
B1		NIL	.42
2		NIL	.28
3		.010	.75
4		.005	.88
5	3.	NIL	1.24
6	5.	NIL	.66
7	2.5	NIL	.54
8	3.	.008	1.13
9	3.	.007	2.55
10	1.2	.012	7.25
11	2.	Tr.	.56
12	4.	Tr.	1.60
13	3.	Tr.	2.04
14	3.	.004	1.08
15	1.5	.003	1.14
16	9.	.003	2.12
17	3.	NIL	.48
18	4.	Tr.	.40
19	2.	.010	1.35
20	5.	NIL	.52
21	3.	.003	.34
22	2.	.003	2.86
23	1.5	.012	1.43
24	1.	.020	52.38
25	1.	.014	12.13
26		no sample	
27	2.	.020	23.08
28	3.	.008	7.64
Avg. (5-28)		.004	3.20

1-4-787


400 N
400 N
300 E
500E
700E
700E
900E
900E
900E
200N
200N
5A
SHAFT
D-5B
N
DDH-1
DH-4
DH-3
SHAFT
0 100 N
5½
3½
3
3
CHANCE-BONANZE
DUMPS 1"=50'
SAMPLE CUTS
VEINS & OPEN CUTS
1-4-781

500E

1000E

4500

4400

4300

4200

4100

4000

3900

3800

DD-3 (-45°)
DD-4 (-60°)

H-10

Kb - Bisbee
Tup - Uncle Sam Porphyry
Tap - Andesite Porphyry

Chicago - Bonanza Vein

0.15 g. Ag.
0.04 g. Ag.
0.26 g. Ag.
Tr. Ag.
0.07 g. Ag.
0.27 g. Ag.
0.25 g. Ag.
Tr. Ag.
0.48 g. Ag.
Tr. Ag.
0.20 g. Ag.
0.39 g. Ag.
0.57 g. Ag.

100'
200'
300'
400'
500'
426'

0.22 g. Ag. 60' Av.
1.28 g. Ag. 20' Av.
0.27 g. Ag.
0.56 g. Ag.
0.12 g. Ag.

AUSTRAL OIL COMPANY INC.

TOMBSTONE AREA

COCHISE COUNTY, ARIZONA

CROSS-SECTION B-B'
EAST-WEST SECTION
(Looking North)

0 10 50 100 Feet

W.L. July, 1968

P-A 18

500E

1000E

1500E

H-22
(290)

H-20
(300)

H-21
(270)

C

H-17
(205)

Section line C-C

H-15
(250)

H-14
(270)

DD-5

H-30
(280)

H-11
(250)

H-13
(250)

C'

Santa Ana
Shaft

H-23
(207)

H-29
(236)

N

H-28
(230)

S. Bonanza
Shaft

200N

B

DD-3
-45°

DD-4
-60°

B'

H-10
(426)

200N

00N

A

DD-2
-45°

DD-1
-45°

H-3
(500)

A'

00N

Chance
Shaft

500E

AUSTRAL OIL COMPANY INC.

TOMBSTONE AREA

COCHISE COUNTY, ARIZONA

PLATE IV

1-4-781

50 100 200 Feet

W L July, 1968

AUSTRAL OIL COMPANY INC.

TOMBSTONE AREA

COCHISE COUNTY, ARIZONA

CROSS-SECTION A-A'

EAST-WEST SECTION

(Looking North)

0 10 50 100 Feet

W.L. July, 1968

R22E

8

9

10

17

16

15

T.20

20

21

22

LINE NO. 1

LINE NO. 2

LINE NO. 3

LINE NO. 4

LINE NO. 5

LINE NO. 6

LINE NO. 7

N

I.P. SURVEY

AUSTRAL OIL CO.

TOMBSTONE AREA-COCHISE CTY.-ARIZ.

SCALE-ONE INCH = 1000'

JULY 1