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James Doyle Sell Mining Collection

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ANNUAL PROJECT PLANNING SHEET

		EXPENDITURES (ASARCO HALF)	TYPE	OF PROJECT	COST ESTIMATE & APPRO	PRIATION R	EQUEST	
DISTRICT: <u>Southwest</u>	1.	Month of \$		Recon			Appro	vals
PROJECT NAME:Santa Cruz-Peripheral Land	s 2.	Current Year Expenses to Date	X	Drilling	,	ļ		West.
PROJECT NUMBER: 0087		thru \$	<u> </u>	Pre-			Geol.	U. S.
PROJECT SUPERVISOR: _H.G.Kreis	3.	Budget for Current Year 1981 \$149,000		Development	Current Yr. Orig. Budget Current Yr. Add. Request @ 7/8]	\$149,000	2000	am
PROJECT GEOLOGIST: H.G.Kreis	4.	Thru previous year, since		Other	Current Yr. Add. Request @	\$ <u>42,000*</u> \$	S	
PREPARED BY/DATE:HGK/6-2-81		project began \$1,879,328			New Total	\$ <u>191,000</u>		

OBJECTIVE: No geologic work; maintain land position with a budget of \$149,000.

Progress for the Month of

*Correction of land expenditures

•

PLANNED TASKS .	RESPONSIBILITY/TIME TO COMPLETE	TARGET DATE	% COMPLETE	PROGRESS TO DATE
 Maintain land by making land payments as needed. 	R.B.C.	As needed		
 If drilling were to occur in 1981, funds and manpower would be transferred from The Lands allocation. 	H.G.K., Geologist, T.C.B., Contractors, Core splitters	12-15-81		
3) Meeting with Freeport to agree on 1982 drilling program.	H.G.K., W.D.P., W.L.K./ l day	11-1-81		
			•	
		-		



May 27, 1982

To: J. D. Sell

From: H. G. Kreis

Monthly Report, May 1982 Santa Cruz Project EA-0075 and EA-0087 Pinal County, Arizona

Preliminary interpretations of resistivity surveys on the Parks-Salyor area and the adjoining Asarco Sacaton Mine land indicate bedrock depths of 350' to 500' in the favorable target, north-northeast of drill hole SC-26. A final report on the resistivity and I.P. surveys is expected within a week or two.

The report on the geology of The Lands area is nearing completion. It is expected to be completed in June.

Estimated expenditures for the month of May are \$2,043 and \$3,738 respectively. This leaves estimated overruns of \$7,583 (0075) and \$61,904 (0087).

H.G. Kein

H. G. Kreis

HGK/cg

December 17,1984 Memorandian is Mr. H. Kreis Re: Mining Case studies - Sonta Cruz Parks-Soljer Arm

. . .

Hank: The following are rough estimates of costs to mine, will and smelt the three (3) cases. which one as tollows: Thirkner Length Xwidth

	Tons(10+)	Grade	% C4	Depth'	Thicknes ore	- Ore
Case I	20	1.5		200'	350'	850 ×850'
Case II	50	1.5		350'	350'	1300 X1300
Case III	50	1.5		500'	700	950 ×950'
(Ae	sume o'-	100' 15	loose	e gravel	100'- top	ore waster rack,

Case I is best suited for mining by open pit methods, Case II is best suited for open pit, but a comparison was made using an underground black raving mine and Case III is too deep for open pit mining so a black caving mine was selected. Costs are approximate due to the idealized are bodies.

SUMMARY	$\mathcal{Q}_{\mathcal{A}}$	

CASE No.	MINING METHOD CREN	1	MILLING	SMELTING COSTS(2)		FORAL IOS FEROVERAD CU	605T PFK 16 CU
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П	CATE	426,000,000	208,500,000	72,909,900	706, 900,000	810,000,000	87=
III	CAVE	442,500,000	208,500,000	72,900,000	723,900 000	810,00,000	87 ¢
		1		•			
		: :					

O Summary cost do not take into account taxes, depreciation, interest expense etc.

2 Lorger open pit would indicate a cheaper cost/16 of Cu, but this project is tied to the existing Sacaton Mill; which does not lend itself to more production - hence lower unit milling costs.

WD. Kay

CC: J.R. Stringhom

... , ≥s

12-7-1984

From the desk of:

H. G. KREIS

J.D.S. forwarded a copy of the Parks-dalger memo of 11-29-84 to

SAA.

H.G.K.



Exploration Department Southwestern United States Division

January 28, 1985

Mr. J. Jennings Procurement Manager American West Pipeline Constructors 7575 San Felipe, Suite 350 Houston, Texas 77063

Sacaton Arizona Property

Dear Mr. Jennings:

We might lease 17 acres of land in either the NE¹/₄ or SE¹/₄ of Section 4, T6S, R4E, east of Casa Grande, AZ, if you meet certain conditions.

First, you would have to supply a bond to assure that the land will be revegetated to its present condition. Our agronomist would estimate how much that bond would have to be.

Second, the road you'd have to cross is in bad shape. We have to ask you to make arrangements with the Pinal County authorities to repair any damage you cause to it. Then, of course, the price you offer will have to be satisfactory to us.

I hope that we can be of service to you in your endeavors.

vours, Sincerely/ ingham

Assistant to the Manager, SWED

JDS:mek

cc: W. L. Kurtz J. D. Sell

TES

TEG- UXK



AMERICAN WEST PIPELINE CONSTRUCTORS A Joint Venture



I have been used then anone RS

Lawyers Title of Arizona Trust 1451

January 15, 1985

Letter No: AG-36-85 File No: A-18 & C-5

> ain djulious të leasmin for a yun?

Gentlemen:

P. O. Box 7338 Phoenix, AZ 85011

American West Pipeline Constructors has been awarded a contract to construct an oil pipeline from McCamey, Texas, to Las Flores, California.

Southern Pacific Railroad is transporting the pipe for us.

There is a siding owned by Asarco, Inc. at Sacaton, Casa Grande, Arizona. We would like to unload pipe there and then haul and string it on our right-of-way.

Information was obtained by us from the Tax Assessor's Office at Casa Grande that you are the owner of a parcel of land in Township 6 South, Range 5 East, NE 1/4 and SE 1/4 of Section 4.

If this property contains 17 acres of land and is adjacent to the Asarco railroad spur, American West Pipeline Constructors would like to lease your land for approximately one year beginning March 1, 1985.

A prompt response, even if negative, would be greatly appreciated.

Sincerely Jim Jennings

Procurement Mgr.

JRJ/jes

FORM 129-REV. 6-78 Champagne Printing-Houston

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Southwestern Exploration Division

October 21, 1987

FILE MEMORANDUM

Santa Cruz Project Pinal County, AZ

On October 20, 1987 at the request of Mr. W.L. Kurtz, Mr. Sell and I searched drill sites in the Santa Cruz Project area. Sites S-5 and S-13 were not looked for.

Attached are notes and a map of our findings.

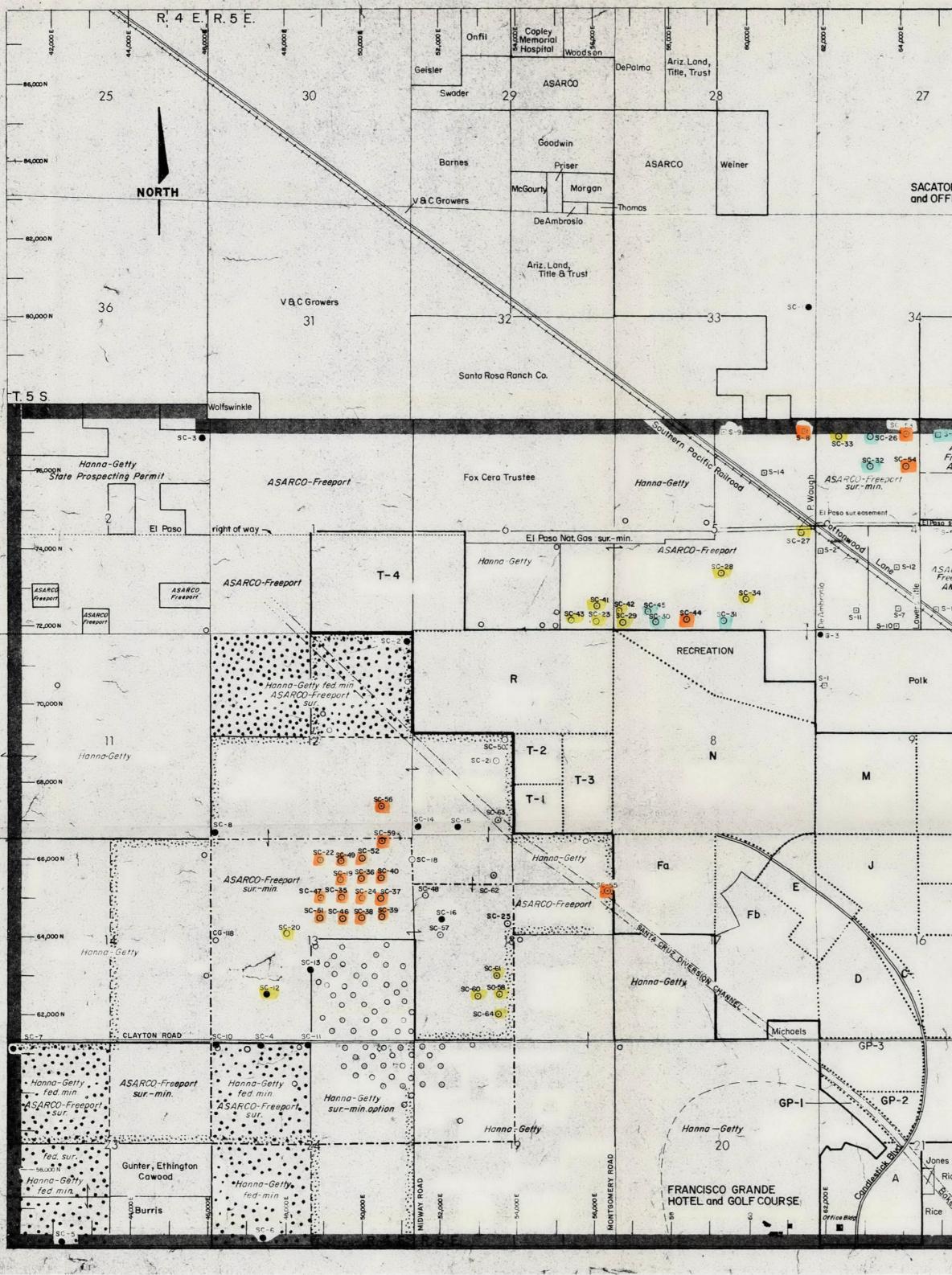
WDG:mek

cc: W.L. Kurtz J.D. Sell

W. U. Jay W. D. Gay

5-6 did not find 5-8 4" Black plastic	5C-27 no sile lound 5C-27 no sile lound 5C-41 "	10/20187_ Found
Cop is secured Above grd 19" SE-26 Signs of distarbance no hole SC-33 - found site - no hole	SC-28 - " " " SC-43 " " SC-31 Found site no hole	557 20W
SC-32 - 2×2 wood post-no pipe SC-33 - 4" steel pipe - 16" obove ground-copped (Screw on)	or dint 32 pipe trush with surface dropped rock - deep did not bear water 3 5C-38 312 steel	(kely site for clumping)
SC-54 - Steel pipe with black PVG screw in plug about 2" ciboue ground	5C-20 Top of pipe & cop corrod-d. 5C-20 Found site, but not 5C-45 Found site, but not bole	
SEC 34 S-157 - Location about Tight but could be some ather hole - 8/2 stel pipe, 12" 960 ve graved.	SC-29 no site found SC-29 no site found Extensive wildert dumping	
Dropped rock in hole Joundat S-151 found site, no pipe	along road-especially west end near Nontgonery Rol.	

0-20-87 SC-56 star pipe w/scrue pay 56-55 +" alore que? ____(Occupied by drill 5C-40 312 pipe Open-Giled to top w/ der 56-46 31/3 pipe cappel 56-35 9" above git 5C-37 - Uncapped 3's pipe found hole - rould be - hole open - noter at 56-24 bolom Pipe Has plugger - appeared to hove had a welded cap 50+19 - 3/2 steel pipe - open driller appear 10 SC-39 Itas 3 priser E. added welder 1 cop. be selling ready to. set up on in Old pipe stowed had to welded Onange Beck chat 56-29 closed 31/2 sterl Screw CGp of grot level -SC-97 - Grof level 1/2" steel -plate welles cap (SC-22 found when hole. loso tion top buried EC-20 no sit- found morted is 1" PVC white del 50-12 is it 11 Found w/ riser (20) 56-52 pent - old pipe was sealed off of gra level ocange peel ٧ steel pipe w/ scen plug 56-59 grd level



T I TASK

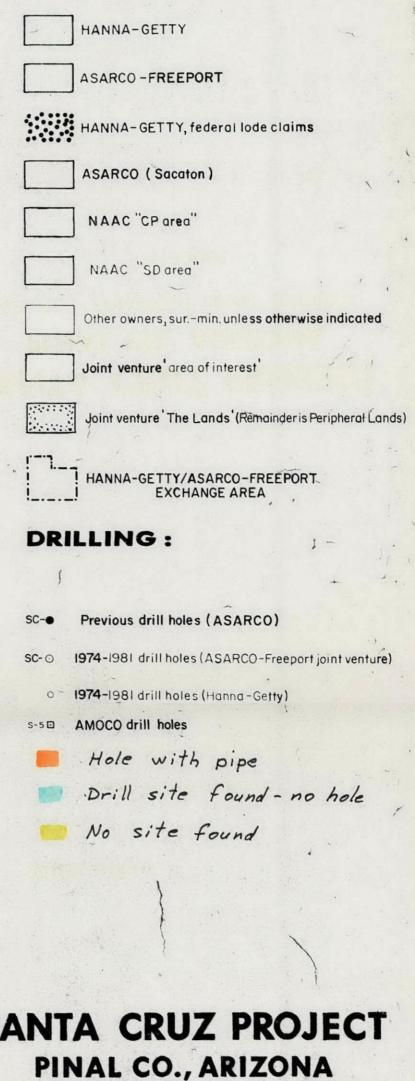
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EXPLANATION PROPERTY:



ASARCO-FREEPORT JOINT VENTURE

I" = 2000'

5.7.

18



October 22, 1987

Mr. W.L. Kurtz

Santa Cruz Project Pinal County, AZ

At your request, Mr. Sell and I on October 20, 1987, searched for all drill sites except S-5 and S-13 on land which we plan to trade with Mr. Simmons.

The following is what was found:

- 1. Hole Nos. SC-53, SC-54, SC-44 and SC-55 were found with caps.
- 2. Hole No. S-4 indicates a hole covered with black plastic sheeting and soil. No attempt was made to uncover the hole.
- 3. All other sites did not disclose a visible hole or pipe above ground.

WDG:mek

W. U. Jay W. D. Gay

10/21/87

Steve Montoya

commubers ony Chen 834- 5082 a name change but that 2013 change believe Og Cheric Galen Dad was owne'd Ory Chem.

æ 1 tiliz. Stear Dailogy Waley 834-4813

Man - Jun Hicks, was also in That



October 23, 1987

FILE NOTE

Oxi Chemical Company Santa Cruz Project Pinal County, AZ

At the request of W.L. Kurtz, I attempted to secure some information on the Oxi Chemical Company which operated a sales-distribution unit in Casa Grande, Arizona, in the 1970's-1980's.

I first called Mr. Roddie (R.G.) Goff, phone: 836-1311 (home), a Stanfield area farmer who has now leased his ground out and is the Farm Administration Officer for the Casa Grande area. Roddie remembered Oxi Chemical, but had always done business with Norris Chemical, and could not remember when Oxi Chemical changed names. He suggested | call Steve Montoya.

Steve Montoya remembered Oxi Chemical and thought they had two or three name changes prior to now being the Casa Grande Chemicals at the same location. But he couldn't remember when the name changes occurred. Steve's phone number in Casa Grande is 836-8082.

Steve thought that a Mr. Jim Hicks had been a manager at one time (he lives in Casa Grande).

Steve also suggested that a Mr. Tom (?) Daley was once one of the franchise owners of Oxi Chemical Company when it was operating in Casa Grande. Montoya said that a son named Steve Daley (phone: 836-4813) still lives in Casa Grande and probably could add some light on the operations of Oxi Chemical Company during the 1980's.

Casa Grande Chemicals Casa Grande phone is 836-8286. Oxi Chemicals phone in California is 1-800-344-3400 (according to T.E. Scartaccini).

I did not attempt to call Steve Daley.

Junes D. Sell

JDS:mek

cc: W.L. Kurtz W.D. Gav



Southwestern Exploration Division

November 12, 1987

W.L. Kurtz

j.

Sampling of Drill Holes Santa Cruz Project

On November 11, 1987 Don Melhado and I sampled drill holes Nos. SC-53 and SC-54. Hole number S-4 was to be sampled, but it was caved at the collar.

Time	Event
5:45 AM	Left Tucson for Casa Grande.
7:30 AM	Arrived at Sacaton Mine to obtain a 36" pipe wrench.
8:15 AM	Arrived in general area of drill holes to be sampled.
8:45 AM	Located all holes SC-53, SC-54 and S-4.
9:00 AM	Walked to S-4 with hand shovels to hopefully find hole by digging. Dug about 4 feet deep, but no visible sign of hole. Appears top casing was pulled and hole caved in.
9:51 AM	Arrived at SC-53. Before attempting any activity around the hole, a 10' x 10' plastic sheet was placed on the ground with the casing protruding at the center. Another several layers of plastic about 2' x 2' with a hole cut slightly smaller than the 0.D. of the casing were put over the casing to form a tight seal around the casing. Set up over drill hole No. SC-53. Unscrewed cap with 36" pipe wrench without any difficulty. Cautiously smelled the open pipe. The odor was similar to old used motor oil. The inside of cap showed condensation and rust. Organized all cleaning material, labeled sample bottles and set up water depth probe. The depth probe was a single strand IP wire on a reel with a screen door spring attached to the end of the IP wire. A 6 volt dry cell battery was connected in series with the reel wire through a voltmeter, then grounded to the drill hole casing. When the IP wire and spring were lowered into the hole, the instant the spring touched the top of the water, the voltmeter would move. A plastic pipe was used over the spring to prevent false readings against casing. The wire was marked at the collar when top of water was located, then the wire was measured with a 100 foot cloth tape. Prior to lowering probe into the hole washing was done by rinsing in tap water. Depth to water surface in SC-53 was 142'-8". When probe was pulled out of the hole it smelled like insect spray. The probe was again washed with tap water, acetone and de-ionized water. Washing will be the term used throughout the remainder of this memoran- dum to mean first rinsing with tap water, rinsing with acetone and finally rinsing with de-ionized water.

10:58 AM Started first trip with bailer. Took all samples at about 150 ft. below collar elevation. The liquid recovered in the bailer was a translucent grey with an oily film on the surface. The liquid again smelled like insect spray. The liquid contained a silty looking material like copper concentrate. First filled 3-40 ml. bottles for Solvent Scan, then filled 3-1 liter amber bottles for BNA 625 analysis. To fill the 1 liter bottles a stainless steel funnel was used to prevent spillage. All bottles were filled as per instructions from Mr. Dalton of Errol L. Montgomery & Assoc., Inc. The samples were immediately put on ice in an ice chest. The caps of all bottles were taped with electrical tape and then the 3-40 ml. bottles were taped together and the 3-1 liter amber bottles were taped together.

> Before sampling at the bottom of the hole, the bailer was thoroughly washed. It was noticed during the washing that the places on the bailer where the solution dried would not wash off with acetone soaked rags, but water soaked rags did clean the spots. The washing cycle now included scrubbing with a tap water soaked rag before the tap water rinse.

The bailer was slowly lowered into the hole and when the bailer hit bottom the IP wire was marked at collar and measured with the cloth tape after sampling was completed. Depth from collar to bottom was 406'. Sample bottles were filled the same as was done at the top. Liquid from bottom similar to top including smell, except it seemed more silty material was seen in the bottles. Sampling was done at about 401' and the bailer was "pumped' six (6) times in order to get a more representative solution at the bottom.

- 12:15 PM Finished sampling hole No. SC-53 and started cleaning up to move to SC-54. Cap was replaced on casing as tight as possible using 36" pipe wrench.
- 1:05 PM Finished cleaning and ate lunch. It was not previously noted, but a 55 gallon drum lined with large garbage bags was used to catch solutions as the bailer was washed. Also, the drum was used as a waste container for all debris.
- 1:25 PM Arrived at hole No. SC-54. The PVC plug was not a threaded fit into the casing, but just a plug that could be easily lifted out of the casing. The odor from this hole was musty compared to the oily smell of SC-53. Area around hole was prepared exactly like SC-53.
- 1:40 PM Washed depth measuring probe and determined top of water at 138'-5".

W.L. Kurtz

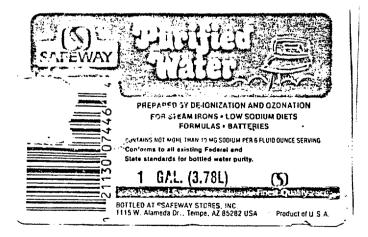
2:07 PM	Started sampling with bailer. Top samples were taken about 146'
	down from collar. Solution from top sampling had same physical
	characteristics as solution in SC-53, except smell was only
	slightly musty. Bottom of hole was found at 216'7" and sampling
	was done about 4 feet off bottom. The first solution from the
	bottom smelled like insect spray again, but did not seem as strong
	as SC-53.

- 3:15 PM Finished sampling hole No. SC-54. For the record, sampling of this hole was done exactly as hole No. SC-53.
- 3:32 PM Finished cleaning up all equipment.
- 3:37 PM Left drill hole area to return pipe wrench to Sacaton Mine and store the 55 gallon drum at mine site.
- 4:15 PM Left mine for Tempe to turn over samples to Analytical Technologies, Inc.
- 5:50 PM Arrived at lab in Tempe. Turned over samples to lab personnel and filled out necessary paper work. Copy of Chain of Custody attached.
- 6:10 PM Left Tempe for Tucson.

General Comments

The following materials were used:

- 1. Tap water brought from Tucson in a clean plastic container.
- 2. De-ionized water purchased at Safeway store. Label:



- Acetone purchased through Turner Laboratories, Tucson, AZ. Manufactured by Ashland Chemical Company under name "Clean Room." Filtered through 2 micron filters, ID No. 080337D.
- 4. Plastic sheeting was Film-Gard 10' x 25' 4 mil.
- 5. Used Teflon bailer approx. 1 quart capacity.
- 6. Filled the 1-liter bottles with a stainless steel funnel.
- 7. All sample bottles and two (2) ice chests were furnished by Analytical Technologies, Inc.
- 8. Used Edmont chemical resistant gloves. These were thrown away after sampling was completed.
- 9. Washing and wiping was done with cotton "shop rags." These were discarded after use.

Sample Numbers

SC-53

Top of Hole Nos. 1A, 2A & 3A were 40 ml samples Nos. 4A, 5A & 6A were 1-liter samples Bottom of Hole Nos. 7A, 8A & 9A were 40 ml samples Nos. 10A, 11A & 12A were 1-liter samples

SC-54

Top of Hole

Nos. 1B, 2B & 3B were 40 ml samples Nos. 4B, 5B & 6B were 1-liter samples

Bottom of Hole

Nos. 7B, 8B & 9B were 40 ml samples Nos. 10B, 11B & 12B were 1-liter samples.

Comments

1. It is interesting to note the following:

	<u>SC-53</u>	<u>SC-54</u>
Found bottom @	406 ft.	226 ft.
Casing depth as shown in drill logs	406 ft.(1667' TD)	217 ft. (1155' TD)

2. Solution from either hole did not seem to effect the surface of styrofoam.

William D. Bay William D. Gay

WDG:mek Attachments:

> Chain of Custody report Analysis results Photographs during sampling

cc: J.D. Sell



Chain of Custody

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DATE 11-11-87 PAGE ____ OF ____

PROJ. MGR. W.D. GAY								ANALYSIS REQUEST													RS		
ADDRESS <u>P.O. C</u> These	COMPANY ASARCO, Incorporated ADDRESS <u>P.O. Box 5747</u> THESON, AL 85703 (PHONE NO.) (PHONE NO.)				BASE/NEU/ACID CMPDS. GC/MS/ 625/8270	APDS. 3240	CB	∆R 610/8310	PHENOLS, SUB PHENOLS 604/8040	ED 601/8010	AROMATIC VOLATILES 602/8020	ANIC 19060	NIC	ONS 418	IT SCAN	PRIORITY POLLUTANT METALS (13)	\$ (18)		SWDA-INORGANICS PRIMARY/SECONDARY	WASTE			NUMBER OF CONTAINER
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TRIBUTION: WHITE, CANARY - ANALYTICAL TECHNOLOGIES, INC. • PI ORIGINATOR



Chain of Custody

DATE 11-11-87 PAGE 2 OF 23

PROJ. MGR. W.C. COMPANY ASA). GAY	1											ANA	LYSIS	REQL	JEST									RS
COMPANY <u>HSA</u> ADDRESS	820, /	ncorf	or eta	<i></i>	CMPDS. 270	IPDS. 240	CB	.R 510/8310	PHENOLS, SUB PHENOLS 604/8040	ED 501/8010	AROMATIC VOLATILES 602/8020	NIC 9060	NIC	ONS 418	T SCAN		PRIORITY POLLUTANT METALS (13)	(18)		SWDA-INORGANICS PRIMARY/SECONDARY	WASTE				F CONTAINERS
SAMPLERS (SIGNATUR	Ξ Ε)	.	(PH)	DNE NO.)	BASE/NEU/ACID (GC/MS/ 625/8270	VOLATILE CMPDS. GC/MS/ 624/8240	PESTICIDES/PCB 608/8080	POLYNUCLEAR AROMATIC 610/8310	NOLS, SUI 8040	HALOGENATED VOLATILES 601/8010	MATIC VO	TOTAL ORGANIC CARBON 415/9060	TOTAL ORGANIC HALIDES 9020	PETROLEUM HYDROCARBONS 418	ZVENZ		ORITY PC FALS (13)	CAM METALS (18) TTLC/STLC	EP TOX METALS (8)	DA-INORG	HAZARDOUS WASTE PROFILE				NUMBER OF
SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	BAS GC/	SC V	PES 608,	POL	PHE 604	4AL Voi	AR(602	TOT	TOT	PET	0 V		P.B.M.	CAN	Ъй	PRI	PRC				Ž
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5 B		2:27		3	×														- 0) N 2	561	,	-		
6 B		2:32	V	3	X															<u> </u>			L		
PROJECT INFOR	MATION			ERECEIP					SHED I					RELIN	QUISHE	ED BY			2.	RELIN	IQU ISI	HED BY			3.
PQ NO.			L NO. OF C	<u> </u>			(Siona	ture)	Лa	/		<u>6.03</u> (Til	me) (Signatu	re)			(Ti	me) (Signat	ure)			(T	ime)
SHIPPING ID, NO.	<u></u>		GOOD CO		COLD		W. (Print	<u>D, d</u> ed Nan	GAI	• 		atel ^{Di}	97 ate) (Printed	Name)			(Di	ate)	(Printe	d Nam	e)		(0)ate)
VIA:					I		H.S (Com	pany)	<u>co./</u>	720	rpor	वरिष		Compa	ny)			<u></u>		(Comp	any)				
	NS/COMME		°. 35	61	<u></u>		RECE	IVED	BY				1.	RECEN	ED BY	(2.	RECE	YEDE	IY (LAB	511		
SPECIAL INSTRUCTIO	6B 150	ne A	ampé				(Signa	ature)		-,		(Tir	me) (Signatu	re)			(Ti	me	IS OF	ure)		661	me (T	z Fine) 180
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ATI,LABORATC 3: SAN DIEGO (619) 458-9141 PHOENIX (602) 438-1530

"RIBUTION: WHITE, CANARY - ANALYTICAL TECHNOLOGIES, INC.
PI ORIGINATOR



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December 1, 1987

ASARCO Incorporateu

4 1937 DEC

SW Exploration

Asarco, Inc. P.O. Box 5747 Tucson, Arizona 85703

Accession: 3561

Date Received: 11/11/87

Attention: W.D. Gay

Note: Verbals were given to W. Gay by Mike Barry on November 23, 1987.

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Mike Barry **Project Manager**

Robert V. Woods Laboratory Manager

RVW/lmo

Note:

Samples will be disposed of within 30 days unless otherwise notified.



EPA METHOD 601/602 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER ANALYST: MGB	• -	SAMPLE ID: 3A LOCATION: LAB SAMPLE #: 3561-1 UNITS: ug/I DILUTION FACTOR: 10
	DETECTION LIMIT	RESULT
CHLOROMETHANE BROMOMETHANE DICHLORODIFLUOROMETHANE VINYL CHLORIDE CHLOROETHANE METHYLENE CHLORIDE TRICHLOROFLUOROMETHANE 1,1-DICHLOROETHENE 1,1-DICHLOROETHENE TRANS-1,2-DICHLOROETHENE CHLOROFORM 1,2-DICHLOROETHANE 1,1,1-TRICHLOROETHANE 1,2-DICHLOROMETHANE 1,2-DICHLOROPROPANE TRANS-1,3-DICHLOROPROPENE TRICHLOROETHENE DIBROMOCHLOROMETHANE 1,1,2-TRICHLOROPTOPENE 2-CHLOROETHYLVINYL ETHER	0.2 0.6 0.4 0.5 1 0.2 0.7 0.7 0.7 0.5 0.9 0.5 0.7 0.3 0.8 0.4 0.3 1.1 0.6 0.7 0.3 0.7	ND ND ND ND ND ND ND ND ND ND ND ND ND N
BROMOFORM 1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE BENZENE TOLUENE CHLOROBENZENE 1,3-DICHLOROBENZENE 1,2-DICHLOROBENZENE 1,4-DICHLOROBENZENE M-XYLENE 0,P-XYLENE	0.9	ND ND ND ND ND ND ND ND ND ND ND 16 16

106 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

PROJECT MANAGER: M. GAULA

DATE: 12/1/87



EPA METHOD 601/602 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER ANALYST: MGB		SAMPLE 1D: 7A LOCATION: LAB SAMPLE #: 3561-2 UNITS: ug/1 Dilution Factor: 10
	DETECTION LIMIT	
CHLOROMETHANE BROMOMETHANE	0.2	ND
BROMOMETHANE	0.6	ND
DICHLORODIFLUOROMETHANE	0.4	ND
VINYL CHLORIDE	0.4 0.5	ND
CHLOROETHANE	1	ND
METHYLENE CHLORIDE TRICHLOROFLUOROMETHANE 1,1-DICHLOROETHENE 1,1-DICHLOROETHANE TRANS-1,2-DICHLOROETHENE	0.2	ND
TRICHLOROFLUOROMETHANE	0.7	ND
1,1-DICHLOROETHENE	0.7	ND
1,1-DICHLOROETHANE	0.5	ND
TRANS-1,2-DICHLOROETHENE	0.9	ND
CHLOROFORM		IND
CHLOROFORM 1,2-DICHLOROETHANE	0.7	ND
1, 1, 1-TRICHLOROETHANE	0.3	ND
CARBON TETRACHLORIDE	0.8	ND
BROMODICHLOROMETHANE	0.4	ND
1.2-DICHLOROPROPANE	0.3	ND
TRANS-1, 3-DICHLOROPROPENE	1.1	ND
TRICHLOROETHENE	0.6	ND
DIBROMOCHLOROMETHANE	0.7	ND
1,1,2-TRICHLOROETHANE	0.3	ND
1,1,2-TRICHLOROETHANE CIS-1,3-DICHLOROPROPENE	0.7	ND
2-CHLOROETHYLVINYL ETHER	0.3	ND
RROWOFORM	0.0	ND
1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE	0.3	ND
TETRACHLOROETHENE	0.3	ND
BENZENE	2	ND
TOLUENE	4	13
TOLUENE CHLOROBENZENE ETHYLBENZENE 1,3-DICHLOROBENZENE	-1.6	ND
ETHYLBENZENE		ND
1.3-DICHLOROBENZENE	1 4	ND
1,2-DICHLOROBENZENE	4	ND
1,4-DICHLOROBENZENE	6	ND
		• 5

1.8

1.5

94.4 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

1, 2

PROJECT MANAGER: M. Ralin

M-XYLENE

O, P-XYLENE

DATE: 12/1/87

15

16



EPA METHOD 601/602 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER ANALYST: MGB		SAMPLE ID: 1B Location: Lab Sample #: 3561-3 Units: ug/) Dilution Factor: 10
CONSTITUENT NAME		
CHLOROMETHANE BROMOMETHANE DICHLORODIFLUOROMETHANE VINYL CHLORIDE CHLOROETHANE METHYLENE CHLORIDE TRICHLOROFLUOROMETHANE 1,1-DICHLOROETHENE 1,1-DICHLOROETHANE TRANS-1,2-DICHLOROETHENE CHLOROFORM 1,2-DICHLOROETHANE 1,1,1-TRICHLOROETHANE CARBON TETRACHLORIDE BROMODICHLOROMETHANE 1,2-DICHLOROPROPANE TRANS-1,3-DICHLOROPROPENE TRICHLOROETHENE DIBROMOCHLOROMETHANE 1,1,2-TRICHLOROETHANE CIS-1,3-DICHLOROPROPENE 2-CHLOROETHYLVINYL ETHER BROMOFORM 1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE BENZENE TOLUENE CHLOROBENZENE	$\begin{array}{c} 0.2 \\ 0.6 \\ 0.4 \\ 0.5 \\ 1 \\ 0.2 \\ 0.7 \\ 0.7 \\ 0.5 \\ 0.9 \\ 0.5 \\ 0.7 \\ 0.3 \\ 0.8 \\ 0.4 \\ 0.3 \\ 1.1 \\ 0.6 \\ 0.7 \\ 0.3 \\ 0.7 \\ 0.3 \\ 0.7 \\ 0.3 \\ 0.9 \end{array}$	ND ND ND ND ND ND ND ND ND ND ND ND ND N
ETHYLBENZENE 1,3-DICHLOROBENZENE 1,2-DICHLOROBENZENE 1,4-DICHLOROBENZENE M-XYLENE 0,P-XYLENE	1 4 6 1.8 1.5	ND ND ND 6 9

88.8 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

project manager: M. Galing

DATE: 12/1/87



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EFA METHOD 601/602 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER ANALYST: MGB		SAMPLE ID: 8B LOCATION: LAB SAMPLE #: 3561-4 UNITS: ug/1 Dilution Factor: 10
CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE BROMOMETHANE DICHLORODIFLUOROMETHANE	0.2 0.6 0.4 0.5	
CHLOROETHANE METHYLENE CHLORIDE TRICHLOROELUOROMETHANE	1 0.2 0.7	ND ND ND
1,1-DICHLOROETHENE 1,1-DICHLOROETHANE TRANS-1,2-DICHLOROETHENE	0.7 0.5 0.9	ND ND ND ND
CHLOROFORM 1,2-DICHLOROETHANE 1,1,1-TRICHLOROETHANE CARBON TETRACHLORIDE	0.5 0.7 0.3 0.8	ND ND ND
BROMODICHLOROMETHANE 1,2-DICHLOROPROPANE TRANS-1,3-DICHLOROPROPENE	1.1	ND ND ND ND
TRICHLOROETHENE DIBROMOCHLOROMETHANE 1,1,2-TRICHLOROETHANE CIS-1,3-DICHLOROPROPENE	0.6 0.7 0.3 0.7	ND
2-CHLOROETHYLVINYL ETHER BROMOFORM	0.3 0.9	ND ND ND
1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE Benzene Toluene Chlorobenzene	0.3 2 4	ND ND 5
CHLOROBENZENE ETHYLBENZENE	1.6	

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

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4

6

1.8

1.5

project manager: M.

1,3-DICHLOROBENZENE

1,2-DICHLOROBENZENE

1,4-DICHLOROBENZENE

M-XYLENE

O, P-XYLENE

DATE: 12/1/87

ND ND

ND

103 % SURROGATE RECOVERY

12

12



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EPA METHOD 625

PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		UNITS: ug/l DILUTION: 2 ANALYST: MGB
CONSTITUENT	DETECTION	
CONSTITUENT <u>NAME</u>	LIMIT	RESULT
N-NITROSODIMETHYLAMINE BIS(2-CHLOROETHYL)ETHER	20	ND
BIS(2-CHLOROETHYL)ETHER	20	ND
1,3-DICHLOROBENZENE	20	ND
1,3-DICHLOROBENZENE 1,4-DICHLOROBENZENE 1,2-DICHLOROBENZENE	20 20 20	ND
1,2-DICHLOROBENZENE	20	ND
BIS(2-CHLOROISOPROPYL)ETHER		ND
HEXACHLOROETHANE	20	ND
N-NITROSO-DI-N-PROPYLAMINE		ND
NITROBENZENE	20	ND
ISOPHORONE	20	ND
BENZYL ALCOHOL	20	ND
BIS(2-CHLOROETHOXY)METHANE	20	ND
BENZOIC ACID	20	ND
BENZOIC ACID 1,2,4-TRICHLOROBENZENE	20	ND
	20	63
4-CHLOROANILINE	20	ND
APHTHALENE 4-CHLOROANILINE HEXACHLOROBUTADIENE	20	ND
2-METHYLNAPHTHALENE	20	72
HEXACHLOROCYCLOPENTADIENE	20	ND
2-CHLORONAPHTHALENE	20	ND
2-NITROANILINE	20	ND
ACENAPHTHYLENE	20	ND
DIMETHYLPHTHALATE	20	ND
ACENAPHTHENE	20	ND
2-NITROANILINE ACENAPHTHYLENE DIMETHYLPHTHALATE ACENAPHTHENE 3-NITROANILINE 2,4-DINITROTOLUENE DIBENZOFURAN	20	ND
2,4-DINITROTOLUENE	20	ND
	20	ND
2,6-DINITROTOLUENE	20	ND
FLUORENE	20	ND
4-NITROANILINE	20	ND
4-CHLOROPHENYL PHENYL ETHER	20	ND
DIETHYLPHTHALATE	20	ND
N-NITROSODIPHENYLAMINE	20	ND
4-BROMOPHENYL PHENYL ETHER	20	ND
HEXACHLOROBENZENE	20	ND
ALPHA-BHC	20	ND
BETA-BHC	20 .	ND
DELTA-BHC	20	ND
GAMMA-BHC	20	ND
PHENANTHRENE	20	ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED MDL HIGHER DUE TO SA	-	к
project manager: M. DOUL	4	DATE: 12/1/87

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EPA METHOD 825

PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4A LAB SAMPLE #: 3561-1 UNITS: ug/1 DILUTION: 2 ANALYST: MGB
CONSTITUENT NAME	DETECTION LIMIT	RESULT
ANTHRACENE	20	ND
HEPTACHLOR	20	ND
BENZIDINE	20	ND
DI-N-BUTYL PHTHALATE	20	ND
ALDRIN	20	ND
HEPTACHLOR EPOXIDE	20	ND
FLUORANTHENE	20	ND
PYRENE	20	ND
ENDOSULFAN I	20	ND
4,4-DDE	20	ND
DIELDRIN	20	ND
ENDRIN	20	ND
ENDOSULFAN II	20	ND
4,4-DDD	20	ND
BUTYLBENZYLPHTHALATE	20	ND
3,3-DICHLOROBENZIDINE	20	ND
ENDOSULFAN SULFATE	20	ND
CHRYSENE	20	ND
4,4-DDT BENZO(a)ANTHRACENE BIS(2-ETHYLHEXYL)PHTHALATE	20	ND
BENZO(a)ANTHRACENE	20	ND
	20	ND
DI-N-OCTYL PHTHALATE	20	ND
BENZO(b)FLUORANTHENE	20	ND
BENZO(k)FLUORANTHENE	20 20	ND ND
BENZO(a)PYRENE	20	ND
INDENO(1,2,3-cd)PYRENE	20	ND
DIBENZO(a, h) ANTHRACENE	20	ND
BENZO(g,h,i)PERYLENE Endrin Aldehyde		ND
	20 200	ND
CHLORDANE	200	ND
TOXAPHENE PCB-1016	200	ND
PCB-1016 PCB-1221		ND
PCB-1221 PCB-1232	60	ND
PCB-1232 PCB-1242		ND
PCB-1254		ND
PCB-1260	72 .	ND
PHENOL	20	ND
2-CHLOROPHENOL	20	ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED		
PROJECT MANAGER: M. Fally		DATE: 12/1/87
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EPA METHOD 625 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4A LAB SAMPLE #: 3561-1 UNITS: ug/l DILUTION: 2 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	LIMIT	RESULT
2-METHYLPHENOL 4-METHYL PHENOL 2-NITROPHENOL 2,4-DIMETHYLPHENOL 2,4-DICHLOROPHENOL 4-CHLORO-3-METHYLPHENOL 2,4,6-TRICHLOROPHENOL 2,4,5-TRICHLOROPHENOL 2,4-DINITROPHENOL 4-NITROPHENOL	20 20 20 20 20 20 20 20 100 100	ND ND ND 1200 ND 125 ND ND ND ND
2-METHYL-4,6-DINITROPHENOL PENTACHLOROPHENOL	100 100	ND ND

SURROGATES-PERCENT RECOVERY

86.0%	NITROBENZENE-D5
130 %	2-FLUOROBIPHENYL
89.8%	TERPHENYL-D14
46.2%	PHENOL-D5

- 47.6% 2-FLUOROPHENOL 79.8% 2,4,6-TRIBROMOPHENOL

NOTE: J = ESTIMATED VALUE B = ANALYTE WAS FOUND IN THE BLANK AS WELL AS THE SAMPLE.

COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED

PROJECT MANAGER:

DATE: 12/1/87

- PAGE 3 OF 3 -

 β m. ballin



PROJECT: 3561 SAMPLE DATE: 11/11/87 SAMPLE ID: 12A LAB RECEIPT DATE: 11/11/87 LAB SAMPLE #: 3561-2 DATE EXTRACTED: 11/11/87 UNITS: ug/l ANALYSIS DATE: 11/23/87 DILUTION: 10 MATRIX: WATER ANALYST: MGB CONSTITUENT DETECTION NAME LIMIT RESULT N-NITROSODIMETHYLAMINE 100 ND BIS(2-CHLOROETHYL)ETHER 100 ND 1,3-DICHLOROBENZENE 100 ND 1,4-DICHLOROBENZENE 100 ND 1.2-DICHLOROBENZENE 100 ND BIS(2-CHLOROISOPROPYL)ETHER 100 ND HEXACHLOROETHANE 100 ND N-NITROSO-DI-N-PROPYLAMINE 100 ND NITROBENZENE 100 ND ISOPHORONE 100 ND BENZYL ALCOHOL 100 ND BIS(2-CHLOROETHOXY)METHANE 100 ND BENZOIC ACID 100 ND 1,2,4-TRICHLOROBENZENE 100 ND NAPHTHALENE 100 51 J 4-CHLOROANILINE 100 ND HEXACHLOROBUTADIENE 100 ND 2-METHYLNAPHTHALENE 100 47 J HEXACHLOROCYCLOPENTADIENE 100 ND 2-CHLORONAPHTHALENE 100 ND 2-NITROANILINE 100 ND ACENAPHTHYLENE 100 ND DIMETHYLPHTHALATE 100 ND ACENAPHTHENE 100 ND 3-NITROANILINE 100 ND 2,4-DINITROTOLUENE 100 ND DIBENZOFURAN 100 ND 2,6-DINITROTOLUENE 100 ND FLUORENE 100 ND 4-NITROANILINE 100 ND 4-CHLOROPHENYL PHENYL ETHER 100 ND DIETHYLPHTHALATE 100 ND N-NITROSODIPHENYLAMINE 100 ND **4-BROMOPHENYL PHENYL ETHER** 100 ND HEXACHLOROBENZENE 100 ND ALPHA-BHC 100 ND BETA-BHC 100 ND DELTA-BHC 100 ND GAMMA-BHC 100 ND PHENANTHRENE 100 ND COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED MDL HIGHER DUE TO SAMPLE MATRIX PROJECT MANAGER: 711. Palin DATE: 12/1/87

EPA METHOD 625

Analytical Technologies, Inc.

EPA METHOD 625 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER		SAMPLE ID: 12A LAB SAMPLE #: 3561-2 UNITS: ug/l DILUTION: 10 ANALYST: MGB
CONSTITUENT <u>NAME</u>	DETECTION	
ANTHRACENE	100	ND
HEPTACHLOR	100	ND
BENZIDINE	100	ND
DI-N-BUTYL PHTHALATE	100	ND
ALDRIN	100	ND
HEPTACHLOR EPOXIDE	100	ND
FLUORANTHENE	100	ND
PYRENE	100	ND
ENDOSULFAN I	100	ND
4,4-DDE	100	ND
DIELDRIN	100	ND
ENDRIN	100	ND
ENDOSULFAN II	100	ND
4,4-DDD	100	ND
BUTYLBENZYLPHTHALATE	100	ND
3, 3-DICHLOROBENZIDINE	100	ND
ENDOSULFAN SULFATE	100	ND
CHRYSENE	100	ND
4,4-DDT	100	ND
BENZO(a)ANTHRACENE	100	ND
BIS(2-ETHYLHEXYL)PHTHALATE	100	ND
DI-N-OCTYL PHTHALATE	100	ND
BENZO(b)FLUORANTHENE	100	ND
BENZO(k)FLUORANTHENE	100	ND
BENZO(a)PYRENE	100	ND
INDENO(1,2,3-cd)PYRENE	100	ND
DIBENZO(a,h)ANTHRACENE	100	ND
BENZO(g,h,i)PERYLENE	100	ND
ENDRIN ALDEHYDE	100	ND
CHLORDANE	1000	ND
TOXAPHENE	1000	ND
PCB-1016		ND
PCB-1221		ND
PCB-1232	300	ND
PCB-1242		ND
PCB-1254		ND
PCB-1260	360	ND
PHENOL	100	ND
2-CHLOROPHENOL	100	ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED		
PROJECT MANAGER: M. Kalle		DATE: 12/1/87
- PAGE &	0F 3 -	· · · · - -

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EPA METHOD 625 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER		SAMPLE ID: 12A LAB SAMPLE #: 3561-2 UNITS: ug/l DILUTION: 10 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	. <u>LIMIT</u>	RESULT
2-METHYLPHENOL 4-METHYL PHENOL 2-NITROPHENOL 2,4-DIMETHYLPHENOL 2,4-DICHLOROPHENOL	100 100 100 100 100	ND ND ND 3600
4-CHLORO-3-METHYLPHENOL	100	ND
2,4,6-TRICHLOROPHENOL 2,4,5-TRICHLOROPHENOL 2,4-DINITROPHENOL 4-NITROPHENOL 2-METHYL-4,6-DINITROPHENOL PENTACHLOROPHENOL	100 100 500 500 500 500	129 ND ND ND ND ND

SURROGATES-PERCENT RECOVERY

77.7% NITROBENZENE-D5

63.5% 2-FLUOROBIPHENYL

- 80.5% TERPHENYL-D14
- 68.2% PHENOL-D5
- 76.0% 2-FLUOROPHENOL
- 41.5% 2,4,6-TRIBROMOPHENOL

NOTE: J = ESTIMATED VALUE

B = ANALYTE WAS FOUND IN THE BLANK AS WELL AS THE SAMPLE.

COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED

PROJECT MANAGER: 71. BUILY DATE: 12/1/87

- PAGE 3 OF 3 -

EPA METHOD 625 Project: 3561			
SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4B LAB SAMPLE #: 3561-3 UNITS: ug/l DILUTION: 10 ANALYST: MGB	
CONSTITUENT NAME	DETECTION		
NAME	LIMIT	RESULT	
N-NITROSODIMETHYLAMINE	100	ND	
BIS(2-CHLOROETHYL)ETHER	100	ND	
1,3-DICHLOROBENZENE	100	ND	
•	100	ND	
1,4-DICHLOROBENZENE			
1,2-DICHLOROBENZENE	100	ND	
BIS(2-CHLOROISOPROPYL)ETHER	100	ND	
HEXACHLOROETHANE	100	ND	
N-NITROSO-DI-N-PROPYLAMINE	100	ND	
N I TROBENZENE	100	ND	
I SOPHORONE	100	ND	
BENZYL ALCOHOL	100	ND	
BIS(2-CHLOROETHOXY)METHANE	100	ND	
BENZOIC ACID	100	ND	
1,2,4-TRICHLOROBENZENE	100	ND	
NAPHTHALENE	100	25 J	
4-CHLOROANILINE	100	ND	
HEXACHLOROBUTADIENE	100	ND	
2-METHYLNAPHTHALENE	100	24 J	
HEXACHLOROCYCLOPENTADIENE	100	ND	
	100	ND	
2-CHLORONAPHTHALENE 2-NITROANILINE			
	100	ND	
ACENAPHTHYLENE	100	ND	
DIMETHYLPHTHALATE	100	ND	
ACENAPHTHENE	100	ND	
3-NITROANILINE	100	ND	
2,4-DINITROTOLUENE	100	ND	
DIBENZOFURAN	100	ND	
2,6-DINITROTOLUENE	100	ND	
FLUORENE	100	ND	
4-NITROANILINE	100	ND	
4-CHLOROPHENYL PHENYL ETHER	100	ND	
DIETHYLPHTHALATE	100	ND	
N-NITROSODIPHENYLAMINE	100	ND	
4-BROMOPHENYL PHENYL ETHER	100	ND	
HEXACHLOROBENZENE	100	ND	
ALPHA-BHC	100	ND	
BETA-BHC	100	ND	
DELTA-BHC	100	ND	
GAMMA-BHC	100	ND	
PHENANTHRENE	100	ND	
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED MDL HIGHER DUE TO SAMPLE MATRIX			
PROJECT MANAGER: M. P.M.M. DATE: 12/1/87			
- PAGE 1 OF 3 -			

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EPA METHOD 825

PROJECT: 3561

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SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4B LAB SAMPLE #: 3561-3 UNITS: ug/l DILUTION: 10 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	<u>LIMIT</u>	RESULT
ANTHRACENE	100	ND
HEPTACHLOR	100	ND
BENZIDINE	100	ND
DI-N-BUTYL PHTHALATE	100	ND
ALDRIN	100	ND
HEPTACHLOR EPOXIDE	100	ND
FLUORANTHENE	100	ND
PYRENE	100	ND
ENDOSULFAN I	100	ND
4.4-DDE	100	ND
DIELDRIN	100	ND
ENDRIN	100	ND
ENDOSULFAN II	100	ND
	100	ND
4,4-DDD		ND
BUTYLBENZYLPHTHALATE	100	
3,3-DICHLOROBENZIDINE	100	ND
ENDOSULFAN SULFATE	100	ND
CHRYSENE	100	ND
4,4-DDT	100	ND
BENZO(a)ANTHRACENE	100	ND
BIS(2-ETHYLHEXYL)PHTHALATE	100	ND
DI-N-OCTYL PHTHALATE	100	ND
BENZO(b)FLUORANTHENE	100	ND -
BENZO(k)FLUORANTHENE	100	. ND
BENZO(a)PYRENE	100	ND
INDENO(1,2,3-cd)PYRENE	100	ND
DIBENZO(a, h)ANTHRACENE	100	ND
BENZO(g,h,i)PERYLENE	100	ND
ENDRIN ALDEHYDE	100	ND
CHLORDANE	1000	ND
TOXAPHENE	1000	ND
PCB-1016		ND
PCB-1221		ND
PCB-1221 PCB-1232	300	ND
PCB-1232 PCB-1242		ND
PCB-1242 PCB-1254		ND
	360	ND
PCB-1260 Phenol	100	ND
	100	ND
2-CHLOROPHENOL	100	1112/
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED		
project manager: 7.7. Bai	1 1	DATE: 12/1/87
- PAGE 2	OF 3 -	

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PROJECT: 3	3561	
SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4B LAB SAMPLE #: 3561-3 UNITS: ug/l DILUTION: 10 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	··· LIMIT	<u>RESULT</u>
2-METHYLPHENOL 4-METHYL PHENOL 2-NITROPHENOL 2,4-DIMETHYLPHENOL 4-CHLORO-3-METHYLPHENOL 2,4,6-TRICHLOROPHENOL 2,4,5-TRICHLOROPHENOL 2,4-DINITROPHENOL 4-NITROPHENOL 2-METHYL-4,6-DINITROPHENOL PENTACHLOROPHENOL	100 100 100 100 100 100 100 500 500 500	ND ND ND 540 ND 32 J ND ND ND ND ND

EPA METHOD 625

SURROGATES-PERCENT RECOVERY 79.4% NITROBENZENE-D5 144 % 2-FLUOROBIPHENYL 108 % TERPHENYL-D14 79.7% PHENOL-D5 22.5% 2-FLUOROPHENOL 126 % 2,4,6-TRIBROMOPHENOL

NOTE: J = ESTIMATED VALUE B = ANALYTE WAS FOUND IN THE BLANK AS WELL AS THE SAMPLE.

COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED PROJECT MANAGER: 711 PULL

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DATE: 12/1/87

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- PAGE 3 OF 3 -

EPA METHOD 625 PROJECT: 3561

SAMPLE ID: 10B SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 LAB SAMPLE #: 3561-4 UNITS: ug/l DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 DILUTION: 10 ANALYST: MGB MATRIX: WATER CONSTITUENT DETECTION LIMIT RESULT NAME 100 ND N-NITROSODIMETHYLAMINE 100 ND BIS(2-CHLOROETHYL)ETHER 100 ND 1.3-DICHLOROBENZENE ND 1,4-DICHLOROBENZENE 100 ND 100 1.2-DICHLOROBENZENE ND BIS(2-CHLOROISOPROPYL)ETHER 100 ND HEXACHLOROETHANE 100 ND N-NITROSO-DI-N-PROPYLAMINE 100 100 ND NITROBENZENE 100 ND ISOPHORONE BENZYL ALCOHOL ND 100 ND BIS(2-CHLOROETHOXY)METHANE 100 ND BENZOIC ACID 100 1,2,4-TRICHLOROBENZENE ND 100 100 ND NAPHTHALENE ND 100 4-CHLOROANILINE 100 ND HEXACHLOROBUTADIENE 2-METHYLNAPHTHALENE 100 ND ND **HEXACHLOROCYCLOPENTADIENE** 100 ND 2-CHLORONAPHTHALENE 100 2-NITROANILINE 100 ND 100 ND ACENAPHTHYLENE DIMETHYLPHTHALATE 100 ND ND 100 ACENAPHTHENE 100 ND 3-NITROANILINE ND 2.4-DINITROTOLUENE 100 100 ND DIBENZOFURAN 100 ND 2.6-DINITROTOLUENE ND 100 FLUORENE ND 100 4-NITROANILINE ND **4-CHLOROPHENYL PHENYL ETHER** 100 DIETHYLPHTHALATE 100 ND 100 ND N-NITROSODIPHENYLAMINE 4-BROMOPHENYL PHENYL ETHER 100 ND 100 ND HEXACHLOROBENZENE ALPHA-BHC 100 ND 100 ND BETA-BHC 100 ND DELTA-BHC 100 ND GAMMA-BHC 100 ND PHENANTHRENE COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED MDL HIGHER DUE TO SAMPLE MATRIX

DATE: 12/1/87

PROJECT MANAGER:

PROJECT:	3561	
SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER		SAMPLE ID: 10B LAB SAMPLE #: 3561-4 UNITS: ug/l DILUTION: 10 ANALYST: MGB
NAME	DETECTION LIMIT	RESULT
ANTHRACENE HEPTACHLOR BENZIDINE DI-N-BUTYL PHTHALATE ALDRIN HEPTACHLOR EPOXIDE FLUORANTHENE PYRENE ENDOSULFAN I 4,4-DDE DIELDRIN ENDOSULFAN II 4,4-DDD BUTYLBENZYLPHTHALATE 3,3-DICHLOROBENZIDINE ENDOSULFAN SULFATE CHRYSENE 4,4-DDT BENZO(a)ANTHRACENE BIS(2-ETHYLHEXYL)PHTHALATE DI-N-OCTYL PHTHALATE BENZO(b)FLUORANTHENE BENZO(ca)PYRENE INDENO(1,2,3-cd)PYRENE DIBENZO(a,h)ANTHRACENE BENZO(g,h,i)PERYLENE ENDRIN ALDEHYDE	100 100	ND ND ND ND ND ND ND ND ND ND ND ND ND N
CHLORDANE TOXAPHENE PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1254 PCB-1260 PHENOL 2-CHLOROPHENOL	1000 1000 300 360 100 100	ND ND ND ND ND ND ND ND ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED PROJECT MANAGER: M. DOUN - PAGE 2	, 053 -	DATE: 12/1/87
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EPA METHOD 625 PROJECT: 3561

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EPA METHOD 625 Project: 3561

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SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER		SAMPLE ID: 10B LAB SAMPLE #: 3561-4 UNITS: ug/1 DILUTION: 10 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	- LIMIT	RESULT
2-METHYLPHENOL 4-METHYL PHENOL 2-NITROPHENOL 2,4-DIMETHYLPHENOL 2,4-DICHLOROPHENOL 4-CHLORO-3-METHYLPHENOL 2,4,6-TRICHLOROPHENOL 2,4,5-TRICHLOROPHENOL 2,4-DINITROPHENOL 4-NITROPHENOL 2-METHYL-4,6-DINITROPHENOL	100 100 100 100 100 100 100 500 500 500	ND ND ND 180 ND ND ND ND ND ND ND
PENTACHLOROPHENOL	500	ND

SURROGATES-PERCENT RECOVERY

24.8% NITROBENZENE-D5

69.4% 2-FLUOROBIPHENYL

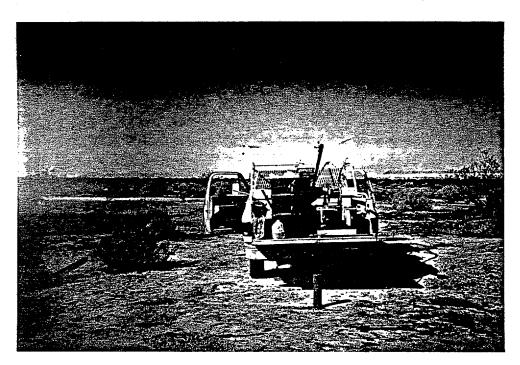
- 85.4% TERPHENYL-D14
- 18.6% PHENOL-D5
- 23.6% 2-FLUOROPHENOL
- 49.8% 2,4,6-TRIBROMOPHENOL

NOTE: J = ESTIMATED VALUE B = ANALYTE WAS FOUND IN THE BLANK AS WELL AS THE SAMPLE.

COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED

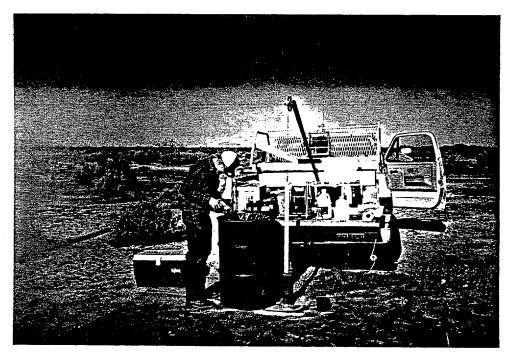
DATE: 12/1/87

PROJECT MANAGER: M. Bally - PAGE 3 OF 3 -

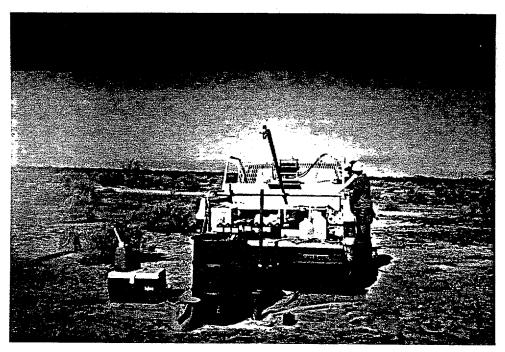


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1. SC-53 Prior to sampling.



2. Depth probe at SC-53.



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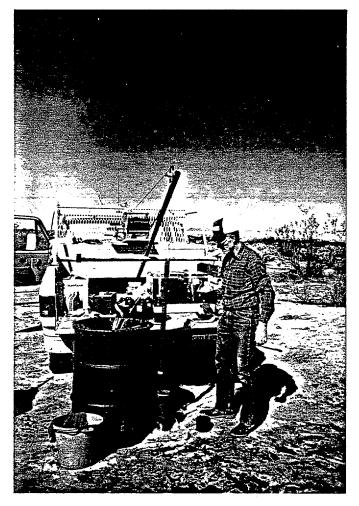
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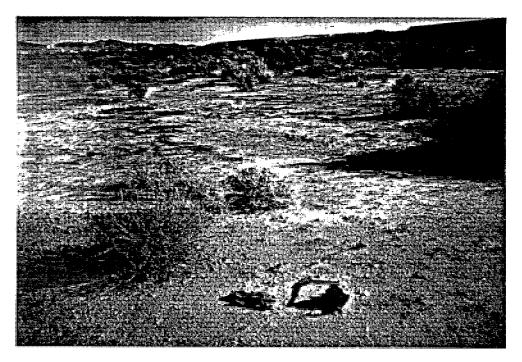
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3. Bailer with solution from hole at SC-53. Color was actually translucent grey.



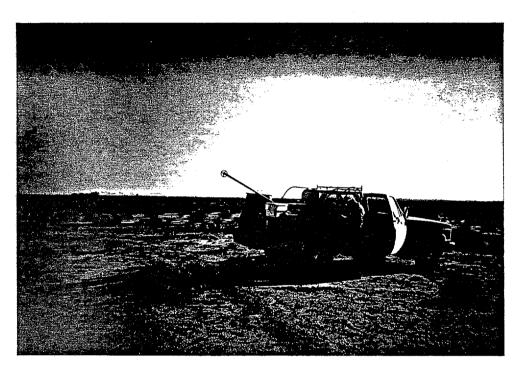
4. Preparing to fill sample bottle at SC-53.



5. SC-54 Site.



6. Set up at SC-54.



7. SC-54 Site cleaned up.



December 1, 1987

ASARCO Incorporated

DEC 4 1987

SW Exploration

Asarco, Inc. P.O. Box 5747 Tucson, Arizona 85703

Accession: 3561

Date Received: 11/11/87

Attention: W.D. Gay

Note: Verbals were given to W. Gay by Mike Barry on November 23, 1987.

Mike Barry Project Manager

Robert V. Woods Laboratory Manager

RVW/1mo

Note:

Samples will be disposed of within 30 days unless otherwise notified.

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SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER ANALYST: MGB		SAMPLE ID: 3A LOCATION: LAB SAMPLE #: 3561-1 UNITS: ug/l DILUTION FACTOR: 10
CONST I TUENT NAME	DETECTION LIMIT	RESULT
		6175

CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.6	ND
DICHLORODIFLUOROMETHANE	0.4	ND
VINYL CHLORIDE	0.5	ND
CHLOROETHANE	1	ND
CHLORDETHANE METHYLENE CHLORIDE	1 0.2	ND
	Δ 7	ND
1.1-DICHLOROETHENE	0.7	ND
1,1-DICHLOROETHENE 1,1-DICHLOROETHENE TRANS-1,2-DICHLOROETHENE	0.5	ND
TRANS-1.2-DICHLOROETHENE	0.9	ND
		ND
1,2-DICHLORDETHANE	0.7	ND
CHLOROFORM 1,2-DICHLOROETHANE 1,1,1-TRICHLOROETHANE	0.3	ND
CARBON TETRACHLORIDE	0.8	ND
	0.4	ND
1,2-DICHLOROPROPANE	0.3	ND
TRANS-1, 3-DICHLOROPROPENE	1.1	ND
TRICHLOROETHENE DIBROMOCHLOROMETHANE	0.6	ND
DIBROMOCHLOROMETHANE	0.7	ND
1.1.2-TRICHLOROETHANE	0.3	ND
CIS-1, 3-DICHLOROPROPENE	0.7	ND
2-CHLOROETHYLVINYL ETHER	0.3	ND
BROMOFORM	0.9	ND
1,1,2,2-TETRACHLOROETHANE	0.3	ND
TETRACHLOROETHENE	0.3	ND
BENZENE	2	ND
TOLUENE	4	10
CHLOROBENZENE	1.6	ND
ETHYLBENZENE	1	ND
1,3-DICHLOROBENZENE	4	ND
1,2-DICHLOROBENZENE	4	ND
BROMOFORM 1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE BENZENE TOLUENE CHLOROBENZENE ETHYLBENZENE 1,3-DICHLOROBENZENE 1,2-DICHLOROBENZENE 1,4-DICHLOROBENZENE M-XYLENE	6	ND
		16
0,P-XYLENE	1.5	16

106 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

DATE: 12/1/87

PROJECT MANAGER: M. GAULA



SAMPLE DATE: 11/11/87	SAMPLE ID: 7A
LAB RECEIPT DATE: 11/11/87	LOCATION:
ANALYSIS DATE: 11/20/87	LAB SAMPLE #: 3561-2
MATRIX: WATER	UNITS: ug/l
ANALYST: MGB	DILUTION FACTOR: 10

DETECTION CONSTITUENT RESULT LIMIT NAME CHLOROMETHANE 0.2 ND ND BROMOMETHANE 0.6 ND DICHLORODIFLUOROMETHANE 0.4 ND 0.5 VINYL CHLORIDE ND 1 CHLOROETHANE ND 0.2 METHYLENE CHLORIDE ND 0.7 TRICHLOROFLUOROMETHANE ND 0.7 1,1-DICHLOROETHENE 0.5 ND 1.1-DICHLOROETHANE 0.9 ND TRANS-1, 2-DICHLOROETHENE ND 0.5 CHLOROFORM ND 0.7 1.2-DICHLOROETHANE ND 1,1,1-TRICHLOROETHANE 0.3 0.8 ND CARBON TETRACHLORIDE ND 0.4 BROMODICHLOROMETHANE ND 1,2-DICHLOROPROPANE 0.3 ND 1.1 TRANS-1, 3-DICHLOROPROPENE ND TRICHLOROETHENE 0.6 0.7 ND DIBROMOCHLOROMETHANE 0.3 ND 1,1,2-TRICHLOROETHANE ND 0.7 CIS-1.3-DICHLOROPROPENE ND 0.3 2-CHLOROETHYLVINYL ETHER ND 0.9 BROMOFORM 1,1,2,2-TETRACHLOROETHANE ND 0.3 ND 0.3 TETRACHLOROETHENE 2 ND BENZENE 13 4 TOLUENE ND 1.6 CHLOROBENZENE 1 ND ETHYLBENZENE ND 4 1, 3-DICHLOROBENZENE 4 ND 1,2-DICHLOROBENZENE ND 1,4-DICHLOROBENZENE 6 15 1.8 M-XYLENE 1.5 16 O.P-XYLENE

94.4 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

project manager: 711. Baliu

DATE: 12/1/87



SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER ANALYST: MGB CONSTITUENT	DETECTION	SAMPLE ID: 1B LOCATION: LAB SAMPLE #: 3561-3 UNITS: ug/1 DILUTION FACTOR: 10
CONSTITUENT NAME	LIMIT	RESULT
CHLOROMETHANE BROMOMETHANE DICHLORODIFLUOROMETHANE VINYL CHLORIDE CHLOROETHANE METHYLENE CHLORIDE TRICHLOROFLUOROMETHANE 1,1-DICHLOROETHENE	$\begin{array}{c} 0.2 \\ 0.6 \\ 0.4 \\ 0.5 \\ 1 \\ 0.2 \\ 0.7 \\ 0.7 \\ 0.5 \\ 0.9 \\ 0.5 \\ 0.7 \\ 0.3 \\ 0.8 \\ 0.4 \\ 0.3 \\ 1.1 \\ 0.6 \\ 0.7 \\ 0.3 \\ 0.7 \\ 0.3 \\ 0.7 \\ 0.3 \\ 0.9 \end{array}$	ND ND ND ND ND ND ND ND ND ND
O, P-XYLENE	1.5	9

88.8 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

project manager: Mi. Baling

.

DATE: 12/1/87



SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER ANALYST: MGB		SAMPLE ID: 8B LOCATION: LAB SAMPLE #: 3561-4 UNITS: ug/) DILUTION FACTOR: 10
CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE BROMOMETHANE DICHLORODIFLUOROMETHANE VINYL CHLORIDE CHLOROETHANE METHYLENE CHLORIDE TRICHLOROFLUOROMETHANE 1,1-DICHLOROETHENE 1,1-DICHLOROETHANE TRANS-1,2-DICHLOROETHENE CHLOROFORM 1,2-DICHLOROETHANE	0.2 0.6 0.4 0.5 1 0.2 0.7 0.7 0.5 0.9	ND ND ND
1,1,1-TRICHLOROETHANE CARBON TETRACHLORIDE BROMODICHLOROMETHANE	0.3 0.8 0.4	ND ND
1,2-DICHLOROPROPANE TRANS-1,3-DICHLOROPROPENE TRICHLOROETHENE DIBROMOCHLOROMETHANE 1,1,2-TRICHLOROETHANE CIS-1,3-DICHLOROPROPENE 2-CHLOROETHYLVINYL ETHER BROMOFORM 1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE BENZENE TOLUENE CHLOROBENZENE ETHYLBENZENE 1,3-DICHLOROBENZENE 1,2-DICHLOROBENZENE 1,4-DICHLOROBENZENE M-XYLENE 0,P-XYLENE	0.3 0.9 0.3 0.3 2 4 1.6 1 4 4 6 1.8 1.5	ND ND ND ND ND S ND ND ND ND ND ND ND ND ND 12 12

103 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED MDL HIGHER DUE TO SAMPLE MATRIX

PROJECT MANAGER: M. Bally

DATE: 12/1/87



EPA METHOD 625

PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		ANALYST: MGB
CONSTITUENT NAME		RESULT
N-NITROSODIMETHYLAMINE	20	ND
BIS(2-CHLOROETHYL)ETHER	20	ND
1,3-DICHLOROBENZENE	20	ND
1,4-DICHLOROBENZENE 1,2-DICHLOROBENZENE	20	ND
1,2-DICHLOROBENZENE	20	ND
BIS(2-CHLOROISOPROPYL)ETHER	20	ND
HEXACHLOROETHANE	20	ND
N-NITROSO-DI-N-PROPYLAMINE	20	ND
NITROBENZENE	20	ND
ISOPHORONE	20	ND
	20	ND
	20	ND
BENZOIC ACID	20	ND
1,2,4-TRICHLOROBENZENE	20	ND
NAPHTHALENE	20	63
4-CHLOROANILINE	20	ND
HEXACHLOROBUTADIENE	20	ND
2-METHYLNAPHTHALENE	20	72
HEXACHLOROCYCLOPENTAD I ENE	20	ND
2-CHLORONAPHTHALENE	20	ND
2-NITROANILINE	20	ND
ACENAPHTHYLENE	20	ND
DIMETHYLPHTHALATE	20	ND
ACENAPHTHENE	20	ND
3-NITROANILINE	20	ND
2,4-DINITROTOLUENE	20	ND
DIBENZOFURAN	20	ND
2,6-DINITROTOLUENE	20	ND
FLUORENE	20	ND
4-NITROANILINE	20	ND
4-CHLOROPHENYL PHENYL ETHER	20	ND
DIETHYLPHTHALATE	20	ND
N-NITROSODIPHENYLAMINE	20	ND
4-BROMOPHENYL PHENYL ETHER	20	ND
HEXACHLOROBENZENE	20	ND
ALPHA-BHC	20	ND
BETA-BHC	20	ND
DELTA-BHC	20	ND
GAMMA-BHC	20	ND
PHENANTHRENE	20	ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED MDL HIGHER DUE TO S	AMPLE MATRIX	:

PROJECT MANAGER: Mi. Paidy

DATE: 12/1/87



EPA METHOD 825

PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4A LAB SAMPLE #: 3561-1 UNITS: ug/1 DILUTION: 2 ANALYST: MGB
CONSTITUENT <u>NAME</u>	DETECTION LIMIT	
ANTHRACENE	20	ND
HEPTACHLOR	20	ND
BENZIDINE	20	ND
DI-N-BUTYL PHTHALATE	20	ND
ALDRIN	20	ND
HEPTACHLOR EPOXIDE	20	ND
FLUORANTHENE	20	ND
PYRENE	20	ND
ENDOSULFAN I	20	ND
4,4-DDE	20	ND
DIELDRIN	20	ND
ENDRIN	20	ND
ENDOSULFAN II	20	ND
4,4-DDD	20	ND
BUTYLBENZYLPHTHALATE	20 20	ND ND
3, 3-DICHLOROBENZIDINE	20	ND
ENDOSULFAN SULFATE	20	ND
CHRYSENE	20	ND
4,4-DDT		ND
BENZO(a)ANTHRACENE	20	ND
BIS(2-ETHYLHEXYL)PHTHALATE	20	
DI-N-OCTYL PHTHALATE	20	ND ND
BENZO(b)FLUORANTHENE	20 20	ND
BENZO(k)FLUORANTHENE BENZO(a)PYRENE	20	ND
INDENO(1,2,3-cd)PYRENE	20	ND
DIBENZO(a, h)ANTHRACENE	20	ND
BENZO(g, h, i)PERYLENE	20	ND
ENDRIN ALDEHYDE	20	ND
CHLORDANE	200	ND
TOXAPHENE	200	ND
PCB-1016		ND
PCB-1221		ND
PCB-1232	60	ND
PCB-1242		ND
PCB-1254		ND
PCB-1260	72	ND
PHENOL	20	ND
2-CHLOROPHENOL	20	ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED		
PROJECT MANAGER: M. Hail		DATE: 12/1/87
- PAGE 2	0F 3 -	



EPA METHOD 625 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4A LAB SAMPLE #: 3561-1 UNITS: ug/l DILUTION: 2 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	LIMIT	RESULT
	<u></u>	
2-METHYLPHENOL	20	ND
4-METHYL PHENOL	20	ND
2-NITROPHENOL	20	ND
2,4-DIMETHYLPHENOL	20	ND
2,4-DICHLOROPHENOL	20	1200
4-CHLORO-3-METHYLPHENOL	20	ND
2,4,6-TRICHLOROPHENOL	20	125
2,4,5-TRICHLOROPHENOL	20	ND
2,4-DINITROPHENOL	100	ND
4-NITROPHENOL	100	ND
2-METHYL-4,6-DINITROPHENOL	100	ND
PENTACHLOROPHENOL	100	ND

SURROGATES-PERCENT RECOVERY 86.0% NITROBENZENE-D5 130 % 2-FLUOROBIPHENYL 89.8% TERPHENYL-D14 46.2% PHENOL-D5 47.6% 2-FLUOROPHENOL 79.8% 2,4,6-TRIBROMOPHENOL

NOTE: J = ESTIMATED VALUE B = ANALYTE WAS FOUND IN THE BLANK AS WELL AS THE SAMPLE.

COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED

PROJECT MANAGER:

DATE: 12/1/87

- PAGE 3 OF 3 -

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PROJECT: 3561 SAMPLE DATE: 11/11/87 SAMPLE ID: 12A LAB RECEIPT DATE: 11/11/87 LAB SAMPLE #: 3561-2 DATE EXTRACTED: 11/11/87 UNITS: ug/l ANALYSIS DATE: 11/23/87 DILUTION: 10 MATRIX: WATER ANALYST: MGB CONSTITUENT DETECTION NAME LIMIT RESULT N-NITROSODIMETHYLAMINE 100 ND BIS(2-CHLOROETHYL)ETHER 100 ND 1,3-DICHLOROBENZENE 100 ND 1,4-DICHLOROBENZENE 100 ND 1.2-DICHLOROBENZENE 100 ND BIS(2-CHLOROISOPROPYL)ETHER 100 ND HEXACHLOROETHANE 100 ND N-NITROSO-DI-N-PROPYLAMINE 100 ND NITROBENZENE 100 ND **I SOPHORONE** 100 ND BENZYL ALCOHOL 100 ND BIS(2-CHLOROETHOXY)METHANE 100 ND BENZOIC ACID 100 ND 1,2,4-TRICHLOROBENZENE 100 ND NAPHTHALENE 51 J 100 4-CHLOROANILINE 100 ND HEXACHLOROBUTADIENE 100 ND 2-METHYLNAPHTHALENE 47 J 100 **HEXACHLOROCYCLOPENTADIENE** 100 ND 2-CHLORONAPHTHALENE 100 ND 2-NITROANILINE ND 100 ACENAPHTHYLENE 100 ND DIMETHYLPHTHALATE 100 ND ACENAPHTHENE 100 ND 3-NITROANILINE 100 ND 2,4-DINITROTOLUENE 100 ND DIBENZOFURAN 100 ND 2,6-DINITROTOLUENE 100 ND FLUORENE 100 ND 4-NITROANILINE 100 ND 4-CHLOROPHENYL PHENYL ETHER 100 ND DIETHYLPHTHALATE 100 ND N-NITROSODIPHENYLAMINE 100 ND 4-BROMOPHENYL PHENYL ETHER 100 ND HEXACHLOROBENZENE 100 ND ALPHA-BHC 100 ND BETA-BHC 100 ND DELTA-BHC 100 ND GAMMA-BHC 100 ND PHENANTHRENE 100 ND COMMENTS: ND = NOT DETECTEDNA = NOT ANALYZED MDL HIGHER DUE TO SAMPLE MATRIX PROJECT MANAGER: 711. 190114 DATE: 12/1/87 - PAGE 1 OF 3 -

EPA METHOD 625



EPA METHOD 625 PROJECT: 3561

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER		SAMPLE ID: 12A LAB SAMPLE #: 3561-2 JNITS: ug/l DILUTION: 10 ANALYST: MGB
CONSTITUENT <u>NAME</u>	DETECTION LIMIT	RESULT
ANTHRACENE HEPTACHLOR BENZIDINE DI-N-BUTYL PHTHALATE ALDRIN HEPTACHLOR EPOXIDE FLUORANTHENE PYRENE ENDOSULFAN I 4,4-DDE DIELDRIN ENDOSULFAN II 4,4-DDD BUTYLBENZYLPHTHALATE 3,3-DICHLOROBENZIDINE ENDOSULFAN SULFATE CHRYSENE 4,4-DDT BENZO(a)ANTHRACENE BIS(2-ETHYLHEXYL)PHTHALATE DI-N-OCTYL PHTHALATE BENZO(b)FLUORANTHENE BENZO(c)FLUORANTHENE BENZO(c)PYRENE INDENO(1,2,3-cd)PYRENE DIBENZO(c,b)ANTHRACENE	100 100 100 100 100 100 100 100 100 100	ND ND ND ND ND ND ND ND ND ND ND ND ND N
DIBENZO(a, h) ANTHRACENE BENZO(g, h, i) PERYLENE ENDRIN ALDEHYDE CHLORDANE TOXAPHENE PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1254 PCB-1260 PHENOL 2-CHLOROPHENOL COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED PROJECT MANAGER: M. M. J. - PAGE 2	100 1000 1000 300 360 100 100	ND ND ND ND ND ND ND ND ND ND ND ND ND N

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Analytical Technologies, Inc.

SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER		SAMPLE ID: 12A LAB SAMPLE #: 3561-2 UNITS: ug/1 DILUTION: 10 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME_	LIMIT	RESULT
2-METHYLPHENOL	100	ND
4-METHYL PHENOL	100	ND
2-NITROPHENOL	100	ND
2,4-DIMETHYLPHENOL	100	ND
2,4-DICHLOROPHENOL	100	3600
4-CHLORO-3-METHYLPHENOL	100	ND
2,4,6-TRICHLOROPHENOL	100	129
2,4,5-TRICHLOROPHENOL	100	ND
2,4-DINITROPHENOL	500	ND
4-NITROPHENOL	500	ND
2-METHYL-4,6-DINITROPHENOL	500	ND
PENTACHLOROPHENOL	500	ND

SURROGATES-PERCENT RECOVERY

77.7% NITROBENZENE-D5

- 63.5% 2-FLUOROBIPHENYL
- 80.5% TERPHENYL-D14
- 68.2% PHENOL-D5
- 76.0% 2-FLUOROPHENOL
- 41.5% 2,4,6-TRIBROMOPHENOL

- PAGE 3 OF 3 -

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PROJECT: 3	3561	
SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER	UNIT DILU ANAL	PLE ID: 4B SAMPLE #: 3561-3 'S: ug/l VTION: 10 YST: MGB
CONSTITUENT NAME	DETECTION LIMIT	RESULT
N-NITROSODIMETHYLAMINE BIS(2-CHLOROBENZENE 1,3-DICHLOROBENZENE 1,4-DICHLOROBENZENE BIS(2-CHLOROISOPROPYL)ETHER HEXACHLOROETHANE N-NITROSO-DI-N-PROPYLAMINE NITROBENZENE ISOPHORONE BENZYL ALCOHOL BIS(2-CHLOROETHOXY)METHANE BENZOIC ACID 1,2,4-TRICHLOROBENZENE NAPHTHALENE 4-CHLOROANILINE HEXACHLOROBUTADIENE 2-METHYLNAPHTHALENE HEXACHLOROCYCLOPENTADIENE 2-CHLORONAPHTHALENE HEXACHLOROCYCLOPENTADIENE 2-CHLORONAPHTHALENE METHYLPHTHALATE ACENAPHTHYLENE DIMETHYLPHTHALATE ACENAPHTHENE 3-NITROANILINE 2,4-DINITROTOLUENE FLUORENE 4-CHLOROPHENYL PHENYL ETHER DIBENZOFURAN 2,6-DINITROTOLUENE FLUORENE 4-NITROANILINE 4-CHLOROPHENYL PHENYL ETHER DIETHYLPHTHALATE N-NITROSODIPHENYLAMINE 4-BROMOPHENYL PHENYL ETHER HEXACHLOROBENZENE ALPHA-BHC BETA-BHC DELTA-BHC GAMMA-BHC PHENANTHRENE	$ \begin{array}{c} 100 \\ $	ND ND ND ND ND ND ND ND ND ND ND ND ND N
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED MDL HIGHER DUE TO S	AMPLE MATRIX	
PROJECT MANAGER: M. P.M.M.		DATE: 12/1/87
	OF 3 -	

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EPA METHOD 625 PROJECT: 3561

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EPA METHOD 625

PROJECT: 3561

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SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4B LAB SAMPLE #: 3561-3 UNITS: ug/l DILUTION: 10 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	LIMIT	RESULT
ANTHRACENE	100	ND
HEPTACHLOR	100	ND
BENZIDINE	100	ND
DI-N-BUTYL PHTHALATE	100	ND
ALDRIN	100	ND
HEPTACHLOR EPOXIDE	100	ND
FLUORANTHENE	100	ND
PYRENE	100	ND
ENDOSULFAN I	100	ND
4,4-DDE	100	ND
DIELDRIN	100	ND
ENDRIN	100	ND
ENDOSULFAN II	100	ND
4,4-DDD	100	ND
BUTYLBENZYLPHTHALATE	100	ND
3, 3-DICHLOROBENZIDINE	100	ND
ENDOSULFAN SULFATE	100	ND
CHRYSENE	100	ND
4, 4-DDT	100	ND
BENZO(a)ANTHRACENE	100	ND
BIS(2-ETHYLHEXYL)PHTHALATE	100	ND
DI-N-OCTYL PHTHALATE	100	ND
BENZO(b)FLUORANTHENE	100	ND
BENZO(C) FLUORANTHENE	100	ND
BENZO(a)PYRENE	100	ND
INDENO(1,2,3-cd)PYRENE	100	ND
DIBENZO(a, h) ANTHRACENE	100	ND
BENZO(g, h, i) PERYLENE	100	ND
ENDRIN ALDEHYDE	100	ND
CHLORDANE	1000	ND
TOXAPHENE	1000	ND
PCB-1016		ND
PCB-1221		ND
PCB-1232	300	ND
PCB-1242		ND
PCB-1254		ND
PCB-1260	360	ND
PHENOL	100	ND
2-CHLOROPHENOL	100	ND
2 ONLORUT NERUL		IND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED		
PROJECT MANAGER: 711. BUUI	1	DATE: 12/1/87
- PAGE 2	OF 3 -	

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EPA METHOD 625 PROJECT: 3561

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SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/20/87 MATRIX: WATER		SAMPLE ID: 4B LAB SAMPLE #: 3561-3 UNITS: ug/l DILUTION: 10 ANALYST: MGB
CONSTITUENT	DETECTION	
NAME	LIMIT	RESULT
2-METHYLPHENOL	100	ND
4-METHYL PHENOL	100	ND
2-NITROPHENOL	100	ND
2,4-DIMETHYLPHENOL	100	ND
2,4-DICHLOROPHENOL	100	540
4-CHLORO-3-METHYLPHENOL	100	ND
2,4,6-TRICHLOROPHENOL	100	32 J
2,4,5-TRICHLOROPHENOL	100	ND
2,4-DINITROPHENOL	500	ND
4-NITROPHENOL	500	ND
2-METHYL-4,6-DINITROPHENOL	500	ND
PENTACHLOROPHENOL	500	ND

SURROGATES-PERCENT RECOVERY

79.4% NITROBENZENE-D5

144 % 2-FLUOROBIPHENYL

- 108 % TERPHENYL-D14
- 79.7% PHENOL-D5
- 22.5% 2-FLUOROPHENOL
- 126 % 2,4,6-TRIBROMOPHENOL

NOTE: J = ESTIMATED VALUE B = ANALYTE WAS FOUND IN THE BLANK AS WELL AS THE SAMPLE.

COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED PROJECT MANAGER: 7:10 (UUUU)

DATE: 12/1/87

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EPA METHOD 025

PROJECT: 3561

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SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER	D D	NITS: Ug/I ILUTION: 10 NALYST: MGB
CONSTITUENT NAME	DETECTION	
NAME	LIMIT	RESULT
		UD.
N-NITROSODIMETHYLAMINE	100	ND
BIS(2-CHLOROETHYL)ETHER	100	ND
1,3-DICHLOROBENZENE	100	ND
BIS(2-CHLOROETHYL)ETHER 1,3-DICHLOROBENZENE 1,4-DICHLOROBENZENE 1,2-DICHLOROBENZENE	100	ND
1,2-DICHLOROBENZENE	100	ND
BIS(2-CHLOROISOPROPYL)ETHER	100	, ND
HEXACHLOROETHANE	100	ND
N-NITROSO-DI-N-PROPYLAMINE	100	ND
NITROBENZENE	100	ND
I SOPHORONE	100	ND
BENZYL ALCOHOL	100	ND
BIS(2-CHLOROETHOXY)METHANE	100	ND
BENZOIC ACID	100	ND
1,2,4-TRICHLOROBENZENE	100	ND
NAPHTHALENE	100	ND
NAPHTHALENE 4-CHLOROANILINE HEXACHLOROBUTADIENE	100	ND
	100	ND
	100	ND
2-METHYLNAPHTHALENE	100	ND
HEXACHLOROCYCLOPENTADIENE		
2-CHLORONAPHTHALENE	100	ND
2-NITROANILINE	100	ND ND
ACENAPHTHYLENE	100	ND
DIMETHYLPHTHALATE	100	ND
ACENAPHTHENE	100	
3-NITROANILINE	100	ND ND
2,4-DINITROTOLUENE	100	ND
DIBENZOFURAN	100	
2,6-DINITROTOLUENE	100	ND
FLUORENE	100	ND
4-NITROANILINE	100	ND
4-CHLOROPHENYL PHENYL ETHER	100	ND
DIETHYLPHTHALATE	100	ND
N-NITROSODIPHENYLAMINE	100	ND
4-BROMOPHENYL PHENYL ETHER	100	ND
HEXACHLOROBENZENE	100	ND
ALPHA-BHC	100	ND
BETA-BHC	100	ND
DELTA-BHC	100	ND
GAMMA-BHC	100	ND
PHENANTHRENE	100	ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED MDL HIGHER DUE TO S		
PROJECT MANAGER: M. GUM		DATE: 12/1/87
	OF 3 -	

- PAGE 1 OF 3 -

PROJECT:	3561	
SAMPLE DATE: 11/11/87 LAB RECEIPT DATE: 11/11/87 DATE EXTRACTED: 11/11/87 ANALYSIS DATE: 11/23/87 MATRIX: WATER		SAMPLE ID: 10B LAB SAMPLE #: 3561-4 UNITS: ug/l DILUTION: 10 ANALYST: MGB
NAME	LIMIT	RESULT
		<u> </u>
ANTHRACENE	100	ND
HEPTACHLOR	100	ND
BENZIDINE	100	ND
DI-N-BUTYL PHTHALATE	100	ND
ALDRIN Heptachlor epoxide	100	ND
FLUORANTHENE	100 100	ND ND
PYRENE		
ENDOSULFAN I	100	ND
4,4-DDE	100 100	ND
DIELDRIN	100	ND
ENDRIN	100	ND
ENDRIN ENDOSULFAN II	100	ND ND
4,4-DDD	100	ND
BUTYLBENZYLPHTHALATE	100	ND
3.3-DICHLOROBENZIDINE	100	ND
3,3-DICHLOROBENZIDINE Endosulfan sulfate	100	ND
CHRYSENE	100	ND
4,4-DDT	100	ND
BENZO(a)ANTHRACENE	100	ND
BIS(2-ETHYLHEXYL)PHTHALATE	100	ND
DI-N-OCTYL PHTHALATE	100	ND
BENZO(b)FLUORANTHENE	100	ND
BENZO(k)FLUORANTHENE	100	ND
BENZO(a)PYRENE	100	ND
INDENO(1,2,3-cd)PYRENE	100	ND
DIBENZO(a, h) ANTHRACENE	100	ND
BENZO(g,h,i)PERYLENE	100	ND
ENDRIN ALDEHYDE Chlordane	100	ND
TOXAPHENE	1000 1000	ND
PCB-1016		ND ND
PCB-1221		ND
PCB-1232	300	ND
PCB-1242		ND
PCB-1254		ND
PCB-1260	360	ND
PHENOL	100	ND
2-CHLOROPHENOL	100	ND
COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED	·	
PROJECT MANAGER: M. Balia		DATE: 12/1/87
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EPA METHOD 625 PROJECT: 3561

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EPA METHOD 625

PROJECT: 3561

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1	SAMPLE ID: 10B LAB SAMPLE #: 3561-4 UNITS: ug/l DILUTION: 10 ANALYST: MGB
DETECTION	
LIMIT	RESULT
100 100 100 100	ND ND ND ND
100	180 ND
100 100 500 500 500 500	ND ND ND ND ND ND
	DETECTION LIMIT 100 100 100 100 100 100 100 100 100 500 5

SURROGATES-PERCENT RECOVERY

24.8% NITROBENZENE-D5

69.4% 2-FLUOROBIPHENYL

- 85.4% TERPHENYL-D14
- 18.6% PHENOL-D5
- 23.6% 2-FLUOROPHENOL 49.8% 2,4,6-TRIBROMOPHENOL

NOTE: J = ESTIMATED VALUE B = ANALYTE WAS FOUND IN THEBLANK AS WELL AS THE SAMPLE.

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COMMENTS: ND = NOT DETECTED NA = NOT ANALYZED

PROJECT MANAGER:

DATE: 12/1/87 -----

- PAGE 3 OF 3 -

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Chain of Custody

DATE 11-11-87 PAGE _ OF 23

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	30× 5 0N, AZ	747	703		BASE /NEU/ACID CMPDS. GC/MS/ 625/8270	MPDS. 8240	РСВ	POLYNUCLEAR AROMATIC 610/8310	PHENOLS, SUB PHENOLS 604/8040	HALOGENATED VOLATILES 601/8010	AROMATIC VOLATILES 602/8020	ANIC /9060	ANIC	PETROLEUM HYDROCARBONS 418	UT SCAN	PRIORITY POLLUTANT METALS (13)	S (18)		SWDA-INORGANICS PRIMARY/SECONDARY	S WASTE				OF CONTAINERS
SAMPLERS IS GNATUR	E) /		(PH) 792-	ONE NO.) - 30/0	E /NEU/A MS/ 625/	VOLATILE CMPDS. GC/MS/ 624/8240	PESTICIDES/PCB 608/8080	YNUCLE MATIC	NOLS, SI 8040	OGENAT	MATIC V 8020	TOTAL ORGANIC CARBON 415/9060	TOTAL ORGANIC HALIDES 9020	ROLEUM	OLVENT	ORITY P FALS (13)	CAM METALS (18) TTLC/STLC	EP TOX METALS (8)	A-INOR	HAZARDOUS WASTE PROFILE				NUMBER (
SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	a di kacamatan di k	IJ Ś Ś	PES' 608/	POL	PHE 604/	HAL	ARC 602/	TOT	TOT	H H H H	S	PRI	A A A A	ME 1	SWC	PRC				2
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8 A		11:55		2										1	X				C	1	њ 	1		
9 A	V	12:00	V	2											X									
PROJECT INFORM	MATION		SAMPI	E RECEIP	т			INQUI		BY			1, 1	RELIN	QUISHEDI	3Y		2.	RELIN		HED BY	,		3.
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SPECIAL INSTRUCTION							5.										K	inn	26	m	$\infty 1$	∂		
SPECIAL INSTRUCTIONS/COMMENTS: 1-6A is one Sample 7-12A is another sample 5 day Turn around					(Sign.	ature)		··		(Tir	ne) (Signatu	ire)		(T	inte)	TSignature) (Time)							
5 day Turn around					(Printed Name) (Date)					te) (I	(Printed Name) (Date)				ate)					<u> </u>				
5						:	(Com	pany)					(Compa	ηγ)				ANAL	YTICA	L TECH	INOLC	GIES, I	INC.

ATI LABORAT(5: SAN DIEGO (619) 458-9141 PHOENIX (602) 438-1530

TRIBUTION: WHITE, CANARY - ANALYTICAL TECHNOLOGIES, INC. • PI ORIGINATOR



Chain of Custody

DATE 11-11-87 PAGE 2 OF 23

PROJECT INFORMATION SAMPLE RECEIPT Herindonicolist Internacionado Internacinternaciona Internacinado Internacionado Internacionado Internaci	PROJ. MGR. W. D. GAY	,											ANA	LYSIS	REQL	JEST									RS
SAMPLE ID. DATE TIME MATRIX LABID. SUBS 25 ES 2		ncorpor	reta		LID CMPDS. 270	PDS. 240	CB	R 10/8310	3 PHENOLS	ED 501/8010	DLATILES	NIC 9060	NIC	ONS 418	1 1		DLLUTANT	(18)		ANICS CONDARY	WASTE				F CONTAINE
SAMPLE ID. DATE TIME MATRIX LAB ID. SQ SQ MS QS MS MS QS MS MS QS MS MS MS QS MS QS MS MS MS QS MS MS QS MS MS QS MS	SAMPLERS (SIGNATURE)		(PHO	ONE NO.)	E/NEU/AC MS/ 625/8:	ATILE CM MS/ 624/8:	TICIDES/P	VNUCLEA	NOLS, SUE /8040	LATILES 6	DMATIC VC /8020	TAL ORGA 3BON 415/9	AL ORGA	ROLEUM	2		ORITY PO TALS (13)	M METALS -C/STLC	TOX TALS (8)	DA-INORG	ZARDOUS DFILE				UMBER OI
11 A 12:10 X A 12:15 X A 12 A 12:15 X A 12:15 X A 1 B 2:07 X X A A A 1 B 2:07 X X A A A 2 B 2:12 X X A A A 3 B 2:17 Z X A A A 4 B 2:22 X X A A A 4 B 2:27 X A A A A 6 B 2:32 X A A A A A PROJECT INFORMATION SAMPLE RECEIPT RELINQUISHED BY 1. RELINQUISHED BY 2. RELINQUISHED BY 1. RELINQUISHED BY 1. RELINQUISHED BY 2. RELINQUISHED BY 1. A A A A A A A A A A A A A	SAMPLE ID. DATE	тіме м	MATRIX		BAS GC/	ο ν ν	PES 608,	POL	PHE 604	HAI	AR(602	TO.	LO H	PET HY1	N N		PRI	IT CA	Ξž	SWI	HA. PR(~
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Z B 2:1Z B 2:1Z C </td <td>17 A V</td> <td></td> <td>$\left \right\rangle$</td> <td>-</td> <td>X</td> <td></td> <td>ļ</td> <td></td> <td>•</td> <td></td> <td></td> <td></td> <td></td>	17 A V		$\left \right\rangle$	-	X		ļ														•				
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Analytical **Technologies,**Inc.

San Diego 🕢 Phoenix 🌒 Seattle

	ANALYSIS REQUEST
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ATI LABORATORIES: SAN DIEGO (619) 458-9141 PHOENIX (602) 438-1530

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DISTRIBUTION: WHITE, CANARY - ANALYTICAL TECHNOLOGIES, INC. • PINK - ORIGINATOR

Chain of Custody

.... ·

Lunch at 11:30 12/9/87. Errd Montgemens Suits B 1075 EFt Lowell Off-ceff discussion As he knows, wis Don Green, some pectre Les mine are in several dill holes. Question on how they got there. 1) a diemp site some '14 mile andy has been abondance & The evoporation - containment pord is in desariay - plastic tous + gone, pipes proche etc. 2) if such things can more thus soul ~ allovin I get with dull holes set in bedreck? 3). I drewged in hole, they? on liquids wowi, with bedrock? 4) How best to remove & clean higerich - die Mala? Basic belief that hydrologic flow can so bety direction, but peoblely somewhat slower in bedroch procheres. The their "note tabl" in that area is doen inside The bedrock . Orly 100' of allevial the egl, the The low membres prohably suggest that it was not "hot" stuff being deenged into dull hole. Denity segregation load sequence & the hotter" stuff now doen hol. Stepwise pering payeling moveld help to resolve. State ZPA now rays they are "on " This sate/problem seed to know overship of state land - Hered dury sto.

lo there cell sile Stat hard? or do we own it? . -

JDS

HYDRO GEO CHEM, INC.

Groundwater Consultants

1430 N. Sixth Avenue Tucson, Arizona 85705 (602) 623-6981

19 October 1987

Mr. Bill Kurz Asarco Inc. 1150 N. 7th Avenue Tucson, Arizona 85705

Dear Bill,

Please note that both SC-53 and SC-54 had very high concentrations of polar organics, sufficient to attach to latex gloves and the PVC caps on the sample bottles. Because these were not reported in the priority pollutant analyses, the compounds are probably common industrial solvents such as ketones.

Sincerely yours,

Harold W. Bentley

Enclosures

22 April 1981

Mr. Dale Altshul Arizona State Land Department Casa Grande Office 300 E. 4th Street City Hall Casa Grande, Arizona 85222

Dear Dale,

Enclosed are the analysis results of the Casa Grande hazardous waste site to date. Samples 1-8 are surface samples. Those submitted to the University Analytical Center were 12 gm soil samples extracted with 100 ml 0.02 N "Ultrex" nitric acid. Number 6 was taken approximately 50 feet from the dump site; the others were taken at the site or in a yellow-colored deposit just south of the site (#7). To convert these numbers to mg/kg soil (ppm) multiply by 8.3. For instance #8 has 3700 x 8.3 mg/kg of chromium, or 30.7 gms/kg Cr, or 3% Cr. Similar soil samples were submitted for proton induced X-ray analysis to the N.S.F., Arizona Regional Accelerator Facility. A general report is enclosed.

The water samples are 42809, 42810, and 42811.

I must emphasize the preliminary nature of these results. The organic analyses should be finished by next week, and my report on the pollution assessment of this site will be submitted after analysis of those data.

Sincerely,

Harold W. Bentley

Enclosure

cc. Norm Gumenik ADHS Bureau of Waste Control 1740 West Adams Phoenix, Arizona 85007



MEMORANDUM

TO: Harold Bentley

FROM: Michele Corcoran

RE: Waste Water analysis #810560

DATE: April 15, 1981

Your samples have been analyzed as requested. Results are presented below and expressed as $\mu g/ml$. If you have any questions, please call.

Sample	Ca	Mg	Na	<u>_K</u>	Li	Fe	Ba	Pb		Ni	Zn
1 2 3	890 770 640	270 330 37	1,800 9,500 36,300	94 39 210	0.74 0.88 0.15	160 270 56	<0.5		38 24 8	0.35 0.49 <0.05	0.96 1.1 0.35
4 5 6 7	550 1600 260 490	200 240 220 270	35,700 2,200 1,300 2,800	190 63 110 120	0.78 0.16 0.58 0.71	56 42 190 210	1.5 4.1	0. 0.	35 28 36 30	0.66 <0.05 0.44 0.40	1.8 0.39 1.0 1.2
8 42809 42810 42811	640 32 25 98	810 0.11 4.0 24	40,200 4,400 8,200 10,000	34 28 53 75	1.9 0.15 0.51 0.06	420 < 0 170 170	.1 <0.5 <0.5	0. <0. <0. <0.	1	1.1 <0.05 <0.05 <0.05	2.3 0.11 0.43 0.89
<u>Sample</u> 1 2 3 4 5	<u>Co</u> <0.05 <0.05 <0.05 <0.05 <0.05	<u>Cu</u> 0.44 0.56 1.3 82 8.5	<u>Sr</u> 5.9 0.73 4.4 6.7 13	<u>Cr</u> 430 1700 490 760 41	•	Cd <0.02 <0.02 <0.02 <0.02 0.12 <0.02	<u>Mn</u> 8.9 19 1.5 4.9 1.1	<u>TOC</u> - - -	<u>c1</u> - - -	<u>S0</u> - - -	<u>C03 *</u> - - -
5 6 7	0.36 0.18	0.42 0.51	1.5 4.6	. 0. 230		<0.02 <0.02	21 14	-	-	-	-
8 42809 42810 42811 * "Apparen	0.24 <0.05 <0.05 <0.05 nt"	1.0 < 0.05 < 0.10 < 0.17	0.23 0.25 0.54 1.9	< 0.	.05 .05	<0.02 <0.02 <0.02 <0.02	35 < 0.05 0.87 2.1	50 150 300	- 13 (44 (36 (50	3000 7600 6400

8 May 1981

Mr. Dale Altshul Arizona State Land Department Casa Grande Office 300 E. 4th Street City Hall Casa Grande, Arizona 85222

Dear Dale,

SC 54

Enclosed is a copy of the analytical report on sample #12872 that was taken from the Casa Grande hazardous waste site and a copy of the letter from Dr. Wong of the California Analytical Laboratories.

Sincerely,

Sherrif K. Bontle

Sherril K. Bentley

Enclosure

cc. Norm Gumenik ADHS Bureau of Waste Control 1740 West Adams Phoenix, Arizona 85007

California Analytical Laboratories, Inc.

•	SACRAMENTO CA (916) 444 EFA		444-9602	
	PRIORITY POLLUTANT	DATA S	HEET ^O	56- 34
CLIENT Hydro Geo Chem	n Inc.		CAL LAB NO.	12872
			CLIENT I.D.	42811 (0
ACID COMPOUNDS	μg/L	BA	SE/NEUTRAL COMPOUN	IDS
\times 21A 2,4,6-trichlorophenol	20	<u>418</u>	4-bromophenyl phe	enyl ether
22A p-chloro-m-cresol	ND	<u>42</u> B	bis(2-chloroisopr	
24A 2-chlorophenol	ND	43B	bis(2-chloroetho	
31A 2,4-dichlorophenol	460	52B	bexachlorobutadie	
34A 2,4-dimethylphenol	ND	53B	hexachlorocyclope	entadiene
57A 2-nitrophenol	NB	54B	isophorone	
58A 4-nitrophenol	ND	4 ×5 5B	naphthalene	
59A 2,4-dinitrophenol	ND	56B	nitrobenzene	
60A 4,6-dinitro-o-cresol	ND	<u>61</u> B	N-nitrosodimethyl	amine

ND

⋇

BASE/NEUTRAL COMPOUNDS

64A pentachlorophenol

phenol

65A

1B	acenaphthene	ND
<u>5</u> B	benzidine	ND
<u>8B</u>	1,2,4-trichlorobenzene .	AN
9B	hexachlorobenzene	ND
12B	hexachloroethane	ND
<u>18B</u>	bis(2-chloroethyl)ether	ND
20B	2-chloronaphthalene	ND
25B	1,2-dichlorobenzene	AN
26B	1,3-dichlorobenzene	ND
27B	1,4-dichlorobenzene	ath
<u>28</u> B	3,3'-dichlorobenzidine	ND
<u>358</u>	2,4-dinitrotoluene	NB
<u>368</u>	2,6-dinitrotoluene	ND
37B	1,2-diphenylhydrazine	
	(as azobenzene)	NB
398	fluoranthene	ND
. <u>408</u>	4-chlorophenyl phenyl ether	ND

	CAL LAB NO. 12872	
	CLIENT I.D. 42811 (1	Casa
BA	SE/NEUTRAL COMPOUNDS	grande)
<u>418</u>	4-bromophenyl phenyl ether	ND
<u>428</u>	bis(2-chloroisopropyl)ether	ND
<u>43</u> B	bis(2-chloroethoxy)methane	ND
<u>528</u>	bexachlorobutadiene	ND
53B hexachlorocyclopentadiene		ND
<u>548</u>	isophorone	ND
X- <u>55</u> B	naphthalene	55
56B	nitrobenzene	ND
<u>61</u> B	N-nitrosodimethylamine	ND
<u>62B</u>	N-nitrosodiphenylamine	110
<u>638</u>	.N-nitrosodi-n-propylamine	ND
<u>66</u> B	bis(2-ethylhexyl)phthalate	*
<u>678</u>	butyl benzyl phthalate	ND
<u>68</u> B	di-n-butyl phthalate	*
<u>69</u> B	di-n-octyl phthalate	ND
<u>708</u>	diethyl phthalate	*
<u>718</u>	dimethyl phthalate	ND
<u>72B</u>	benzo(a)anthracene	NB
<u>73</u> B	benzo(a)pyrene	ND
74B	3,4-benzofluoranthene	ND
<u>75B</u>	benzo(k)fluoranthene	ND
<u>768</u>	chrysene	ND
77B	acenaphthylene	NS
<u>78B</u>	anthracene	ND
<u>798</u>	benzo(ghi)perylene	NB
<u>80B</u>	fluorene	*
<u>818</u>	phenanthrene	12
<u>828</u>	dibenzo(a,h)anthracene	ND
<u>83B</u>	indeno(1,2,3-cd)pyrene	ND
<u>84</u> B	pyrene	ND

401 NORTH 16th STREET

PAUL A. TAYLOR, Ph.D. PRESIDENT

CHARLES J. SODERQUIST, Ph.D VICE PRESIDENT

£

RUBY A. ULRICH SECRETARY/TREASURER

California Analytical Laboratories, Inc.

401 NORTH 16th STREET SACRAMENTO, CALIFORNIA 95814 (916) 444-9602

April 30, 1981

Harold Bentley Hydro Geo Chem, Inc. 6850 N. Moonglow Tucson, AZ 85718

Dear Dr. Bentley:

, o.Th SC-54

Enclosed are the results for the following two samples which we received on 3/31/81:

CAL I.D.	SAMPLE I.D.
12872-1	42811 (Casa Grande)
12872-2	42811 (purgeables)

Sample 12872-1 was extracted and analyzed by method 625 for acids and base/neutrals. The results are given on the enclosed data summary sheet. The detection limit for all compounds is 10ppb. ($10\mu g/L$).

It sould be pointed out that one of the compounds identified, N-nitrosodiphenylamine, is analyzed as the diphenylamine by this method, and is not necessarily the nitroso compound. The sample was also analyzed for dioxins and pesticides. The dioxin analysis was negative, with a detection limit of 100ppt. $(0.10\mu g/L)$.

Sample 12872-2 was analyzed by method 624 for volatile organics. Again the results are given on the data summary sheet.

If you have any questions or require any additional data or documentation, please let me know.

MChory

Anthony S. Weng, PhD Vice President Research and Analytical Services

Michael J. Mille, PhD Director of GC/MS Services

ASW, MM/nc

California Analytical Laboratories, Inc.

401 NORTH 16th STREET SACRAMENTO, CALIFORNIA 95814 (916) 444-9602

£.

PRIORITY POLLUTANT DATA SHEET--page 2

CL. J.	THIT Hydro Geo Chem,	Anc.	CAL LAB NO. 12872
	VOLATILES	µg/L	CLIENT I.D. <u>42811 (Casa</u> <u>PESTICIDES</u> Grande & Aygeable.
27	acrolein	ND	900 - J uluin
37	acrylonitrile	ND	90P dieldrin ND
47	benzene	ND	91P chlordane ND
<u>6</u> V	carbon tetrachloride	ND	92P 4,4'-DDT ND
7 <u>V</u>	chlorobenzene	ND	93P 4,4'-DDE ND
101	1,2-dichloroethane	ND	94P 4,4'-DDD ND
117	1,1,1-trichloroethane	ND	95P -endosulfan ND
<u>13V</u>	1,1-dichloroethane	ND	96P -endosulfan NA
14V	1,1,2-trichloroethane	ND	97P endosulfan sulfate ND
<u>15</u> V	1,1,2,2-tetrachloroethane	ND	98P endrin ND
16V	chloroethane	ND	99P endrin aldehyde ND
191	2-chloroethylvinyl ether	ND	100P heptachlor ND
231	chloroform	ND	
29V	1,1-dichloroethylene	ND	101P neptach for epoxide ND 102P -BHC ND
30 V	1,2-trans-dichloroethylene	ND	103P -BHC ND
<u>32</u> V	ì,2-dichloropropane	ND	104Р - BHC ND
<u>33</u> V	1,3-dichloropropylene	ND	105P - BHC ИД
<u>38</u> V	ethylbenzene	ND	106P PCB-1242 ND
<u>44</u>	methylene chloride	ND	107P PCB-1254
45V	methyl chloride	ND	108P PCB-1221
<u>46</u> 7	methyl bromide	ND	109P PCB-1232
<u>47</u> V	bromoform	ND	110P PCB-1248 ND
<u>43</u> V	dichlorobromomethane	ND	111P PCB-1260
497	trichlorofluoromethane	AU	112P PCB-1016 ND
50V	dichlorodifluoromethane	ND	113P toxaphene ND
519	chlorodibromomethane	ND	
85V	tetrachloroethylene	ND	DIOXINS
X 36V	toluene	20	129B 2,3,7,8-tetrachlorodibenzo- p-dioxin AD
<u>87 y</u>	trichloroethylene	ND	
88V	vinyl chloride	ND	<pre>* Less than 10 µg/L (pesticides less than 5 µg/L)</pre>

ND = not detected



Southwestern Exploration Division

December 28, 1987

R. L. Brown New York Office

HEXCEL SITE

Enclosed are two (2) Xerox maps and four (4) photographs (photos are numbered on back).

The large scale map shows the Hexcel site in relation to drill holes SC-53 and SC-54 and the general direction of the surface water flow.

The Hexcel Site map shows the direction the enclosed photos were taken:

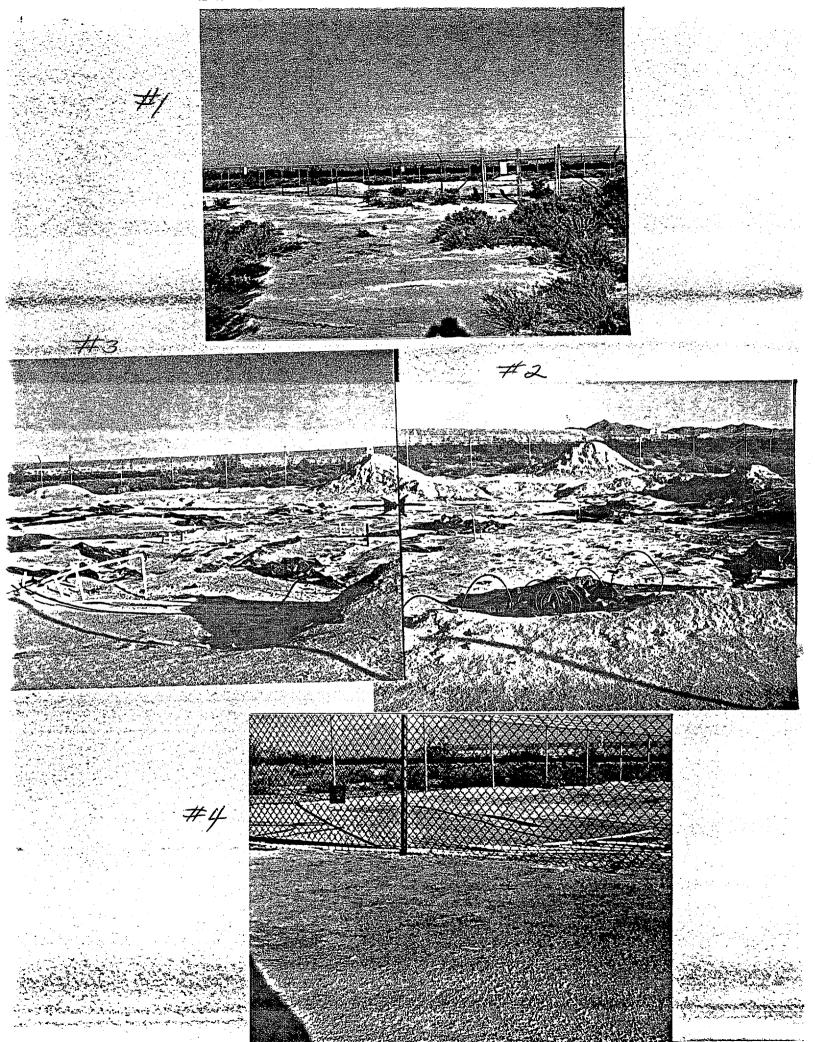
Photo No.

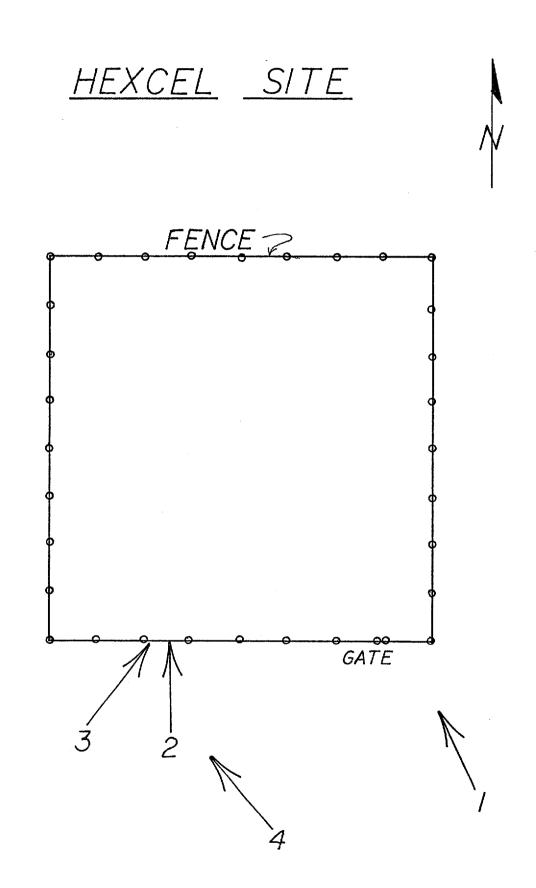
- 1. Overall view of site. Enclosure is locked.
- 2. & 3. Overlap right side of photo 3 over left side of photo 2 and line up arrows. This shows the interior. Note yellow stain on left side of 3. Pipe is PVC.
- 4. Area showing southwest corner of fenced area with the yellow stain both inside and outside fenced area.

William D. Gay

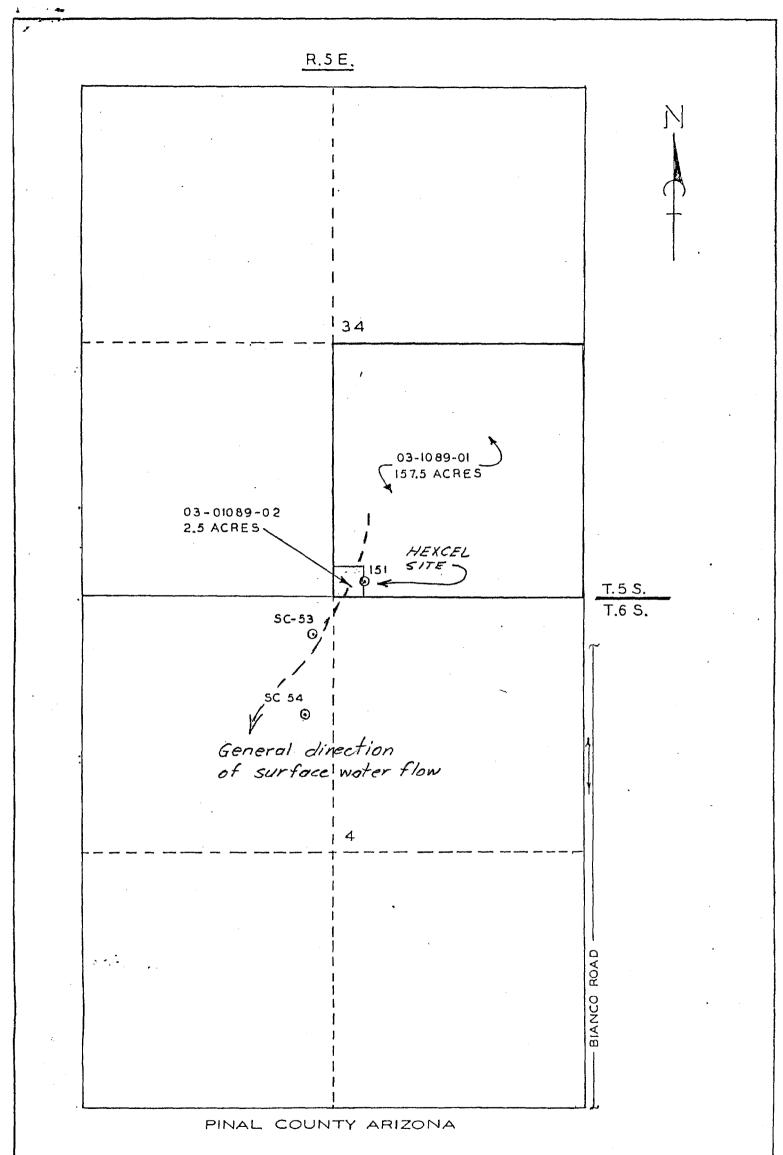
WDG:mek

cc: W.L. Kurtz J.D. Sell





NO SCALE



ASARCO Incorporated SCALE: I=1000' NOV. 87



December 30, 1987

W. L. Kurtz

Measuring depth of Santa Cruz Holes SC-53 and SC-54

On December 4, 1987 Don Melhado and I went to Santa Cruz area to determine the actual depth of SC-53 and SC-54*.

 SC-53 - Found depth from collar to obstruction at 406' (casing depth 406').

 SC-54 - Found depth from collar to obstruction at 217' (casing depth 226').

*Used a 1" x 28" round steel rod with a sharpened point. All efforts failed to penetrate obstruction. The rod was both pumped like a "churn drill" and let free fall about 20 feet.

William D. Gay

WDG:mek

cc: J.D. Sell



December 30, 1987

W.L. Kurtz

Sampling (Metals) Santa Cruz Drill Hole SC-53 on 12-10-87

Time	Event
7:20 AM	(12-10-877) Arrived at drill hole SC-53. Cleaned boiler (tap water - acetone - distilled water. Same washing procedure as done on November 11, 1987).
7:42 AM	Finished sampling top of hole. Cleaned bailer as described above.
7:48 AM	Started to retrieve samples from bottom of hole*.
8:14 AM	Last boiler emptied into sample bottles.
9:06 AM	Cleaned all equipment and left site.
10:54 AM	Arrived Analytical Technologies, Inc. and turned samples over to them.
Samples were ma	rked "T" (top) and "B" (bottom) of hole. Four plastic

bottles were filled both at top and bottom (see photo).

*Bottom of hole sampling about 212 feet ± from collar.

William D. Gay

WDG:mek

Att: 1. Chain of Custody
2. Two (2) photographs of sampling.

cc: J. D. Sell

Analytical **Technologies**, Inc. San Diego • Phoenix • Seattle

作うないで、うちます。

Chain of Custody

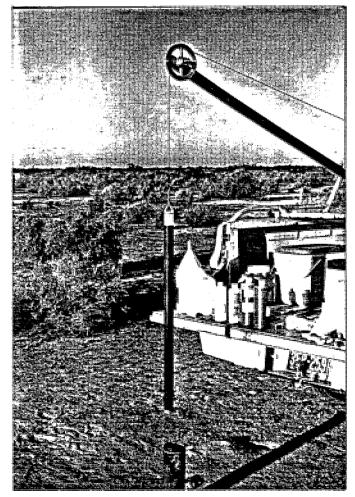
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PROJ. MGR. WT	5-24	. <u>*</u> *		264335 	i de pr	19.5% 19.5% 19.5%	- 		ĝr €5.	į v	in F ∕	× 4	ANA	LYSIS	REQ	UEST	t. and t		an ing kan	349 ^a	1. A.	1971 - P	i i an		st. چ
		<u>1</u>	Augo Augo Lec Es	9762	ID CMPDS.	PDS. 1	8	4 10/8310	PHENOLS	D 01/8010		41C 060	IC Contraction	NS 418		/5.44	POLLUTANT 3)	18)	*九十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二	NICS	ASTE				CONTAINERS
SAMPLERS SIGNATURE	5)		(PH 772	ONE NO.)	BASE /NEU/ACID (GC/MS/ 625/8270	VOLATILE CMPDS. GC/MS/ 624/8240	PESTICIDES/PCB 608/8080	POLYNUCLEAR AROMATIC 610/8310	PHENOLS, SUB PHENOL 604/8040	HALOGENATED VOLATILES 601/8010	AROMATIC VOLATILES 602/8020	TOTAL ORGANIC CARBON 415/9060	TOTAL ORGANIC HALIDES 9020	PETROLEUM HYDROCARBONS	R	Metals	PRIORITY POL METALS (13)	CAM METALS (18)	EP TOX METALS (8)	SWDA-INORGANICS PRIMARY/SECOND	HAZARDOUS WASTE PROFILE	ordan.			NUMBER OF
SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	BAS GC/I	C C C	PES1 608/	POL	PHE 604/	HAL	ARO 602/	TOT CAR	TOT. HAL	PET I HYD	V	X	PRIC	CAM	EP T	SWD. PRIN	HAZ PRO	1			N.
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ATI LABORATORIES: SAN DIEGO (619) 458-9141 PHOENIX (602) 438-1530

DISTRIBUTION: WHITE CANARY ANALYTICAL TECHNOLOGIES, INC. . PINK ORIGINATOR



SC-53 PRIOR TO SAMPLING



BAILER WITH SOLUTION

WHK/JDS

Exploration Department Southwestern United States Division

January 20, 1988

Mr. Burton M. Apker Apker, Apker & Kurtz, P.C. 2111 E. Highland Ave., Suite 230 Phoenix, AZ 85016

> Re: Santa Cruz Project Casa Grande, AZ

Dear Mr. Apker:

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Tabulated below is the Asarco-Freeport and Amoco drilling information that you requested.

ASARCO-FREEPORT DRILL HOLES

	Rotary Hole	Core Hole					
SC-26	3-17 to 3-20-1976 Shelton Drilling	6-30 to 8-3-1976 Longyear Drilling					
-32	9-13 to 9-14-1976	9-18 to 9-30-1976 '' ''					
-33	9-14 to 9-20-1976	9-30 to 10-12-1976					
-53	10-16 to 10-17-1979	10-22 to 11-17-1979 Joy "					
	10-17 to 10-17-1979	11-19 to 12-6-1979					

AMOCO DRILL HOLES

Rotary and Core

S-4	2-26 to 3-12-1977	Longyear	Drilling
-5	3-12 to 3-18-1977	11	11
-6	4-4 to 4-28-1977	11	11

Tony Benavidez can be reached by contacting his daughter at 444 W. Alturas, Tucson, AZ 85705.

If I can be of any further help, please let me know.

Sincerely yours,

Hanh Kin

Henry G. Kreis Geologist

HGK:mek

cc: W.L. Kurtz/J.D. Sell

ASARCO Incorporated P. O. Box 5747 Tucson, Az 85703-0747 (602) 792-3010 1150 North 7th Avenue



Exploration Department Southwestern United States Division

CERTIFIED MAIL RETURN RECEIPT

July 8, 1991

Ms. Kathleen C. Felix Pinal County Recorder P.O. Box 848 Florence, AZ 85232

> Affidavit of Labor Santa Cruz Project Pinal County, Arizona

Dear Ms. Felix:

Enclosed is Asarco's check of \$14.00 as the recording fee for the attached Affidavit of Labor for the following unpatented lode claims:

 Claim Names
 No. of Pages
 Fee

 NIK #1 thru #41

 2
 \$14.00

 NIK #50 thru #54
 2
 \$14.00
 \$14.00

 CHAVO #42 thru #49
 2
 \$14.00

Also enclosed is a return, stamped envelope.

Very truly yours,

William U. Main

William D. Gay Land Manager, SWED/

WDG:mek encs.

cc: J.D. Sell C.L. Snow H.G. Kreis

AFFIDAVIT OF LABOR PERFORMED AND IMPROVEMENTS MADE

STATE OF ARIZONA)) ss County of Pima)

William D. Gay, being first duly sworn, deposes and says that he is a citizen of the United States and more than twenty-one (21) years of age, and resides in Tucson, County of Pima, State of Arizona, and is personally acquainted with the mining claims situated in Pinal County, Arizona, the names and books and pages of record in the office of the County Recorder of Pinal County, Arizona, and the Bureau of Land Management serial number of the Notices of Location whereof are as follows:

<u>Recording_Data</u>									
Name of claim	Book	<u>Page</u>	<u>Serial No.</u>						
NIK #1 thru #41	761	127 thru 167	AMC 47329 thru 47369						
NIK #50 thru #54	761	176 thru 180	AMC 47370 thru 47374						
CHAVO #42 thru #49	785	415 thru 422	AMC 47320 thru 47327						
CHAVO #55	785	414	AMC 47328						

All claims are located in sections 12, 23 and 24 of Township 6 South, Range 4 East, GSRM.

That all of said mining claims are owned by Santa Cruz Joint Venture, the mailing address for which is P.O. Box 5747, Tucson, Arizona 85703; that between June 15, 1991 and June 19, 1991, in excess of \$5,500 worth of work and improvements were done and performed for the benefit of the aforementioned claims. Work and improvements consisted of drilling performed by Cissell Drilling Co., P.O. Box 1048, Casa Grande, Arizona 85222.

1

Said labor was performed and improvements made at the expense of Santa Cruz Joint Venture for the benefit of each and all of said mining claims comprising said contiguous groups as part of a general plan of exploration, improvements and development, and they tend to explore. improve and develop each and all of said mining claims. The amount expended for and the value of said labor and improvements is more that One Hundred Dollars (\$100.00) for each of the mining claims and at least said amount was allocated to each of the mining claims. Said expenditure was made in good faith for the purpose of exploring, improving and developing said contiguous groups of mining claims, and was intended as annual labor and improvements for each and all of the above-described unpatented lode(placer) mining claims for the assessment year ending at 12:00 o'clock Meridian. September 1, 1991.

ASARCO Incorporated

By William W May Agent

STATE OF ARIZONA) ss County of Pima)

On the 3 day of On the <u>3</u> day of <u>fuly</u>, 1991, personally appeared before me William D. Gay, Land Englineer, SWED, ASARCO Incorporated, the signer of the above instrument who duly acknowledged to me that he executed the same.

Wildred C Koeppen Notary Public

My Commission Expires:

Wy Commission Expires Nov. 28, 1992



Southwestern Exploration Division

November 19, 1991

A.R. Raihl

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Exotic Copper Cimarron Farm Santa Cruz Project

For the record, let it be known there is an occurrence of exotic copper oxide mineralization in an irrigation ditch on the farm property belonging to Cimarron Farms (Jerry Simmons). This occurrence is known by Clark Arnold, a local consulting geologist. Mr. Arnold passed this information on to Jim Sell who told me about it on July 21, 1989. This occurrence was visually confirmed by me, and I showed it to you in the field several months ago.

Copper oxide mineralization locally coats and somewhat cements the unconsolidated gravel and sand in the bottom of an irrigation ditch. The copper oxide mineralization occurs in the irrigation ditch at the site of an irrigation well just a couple hundred feet north of the south quarter corner, Section 14, T6S, R4E. The copper oxide mineralization is bluish green in color, and some of it appears to be copper stained calcite. The copper oxide mineralization occurs in a layer below gravel and sand free of copper mineralization suggesting it was deposited long before my visual inspection.

The source of this copper oxide mineralization is not known, but I suspect it originated from agricultural chemicals or water well equipment. There was no evidence of leached capping or anything else in the sand and gravel suggesting a porphyry copper source. Samples of basin fill deposits and conglomerate in a nearby exploration drill hole show no evidence of anomalous copper values or other geologic features normally associated with copper mineralization, exotic or otherwise.

This copper oxide occurrence will be verified by an independent consulting geologist before any copper leaching occurs at the test site. It would be worthwhile having the consultant examine other irrigation ditches in the area to see if similar copper oxides exist elsewhere in the area.

H.G. Thin

H.G. Kreis

HGK:mek

cc: F.T. Graybeal W.L. Kurtz J.D. Sell S.A. Swan W.E. McCulloch C.F. Barter



Exploration Department Southwestern United States Division

FEDERAL EXPRESS

December 23, 1991

Mr. David L. Clayton D&M Farms 24978 W. Boone Drive Casa Grande, Arizona 85222

Dear Mr. Clayton:

Enclosed are two (2) copies of the agricultural lease for 1992. Please read it over and if you find it satisfactory, please sign and return both copies. We will return a fully signed copy to you.

Sincerely yours,

William D. Gay Land Engineer, SWED

WDG:mek enc.

cc: W.L. Kurtz J.D. Sell



Exploration Department Southwestern United States Division

November 2, 1992

Mr. David L. Clayton D&M Farms 24978 W. Boone Drive Casa Grande, Arizona 85222

Dear Mr. Clayton:

Enclosed are two (2) copies of the agricultural lease for 1993. Please read it over and if you find it satisfactory, please sign and return both copies. We will return a fully signed copy to you.

Sincerely yours,

William D. Gay Land Engineer, SWED

WDG:mek enc.

cc: W.L. Kurtz J.D. Sell

AGRICULTURAL CASH LEASE

THIS LEASE is effective as of January 1, 1993, between ASARCO Santa Cruz, Inc., a Delaware corporation, and Freeport Copper Company, a Delaware corporation, Joint Venturers doing business as SANTA CRUZ JOINT VENTURE (hereinafter "Lessor"), and D & M FARMS, an Arizona general partnership (hereinafter "Lessee").

Lessor leases to Lessee and Lessee leases from Lessor on the terms and conditions set forth in this Lease, for agricultural purposes only, the Premises, with the appurtenances, particularly described in Exhibit "1" attached hereto and incorporated herein (hereinafter referred to as the "Premises" or "Leased Premises").

This lease is subject to all existing easements, servitudes, licenses, and rights-of-way, canals, ditches, levees, roads, highways, and telegraph, telephone, and electric power lines, railroads, pipelines, and other appurtenances, whether recorded or not.

1. <u>Term</u>. The term of this Lease shall commence on January 1, 1993, and shall continue until December 31, 1993. If Lessee, at the termination of this Lease has a crop on the Leased Premises which has not been fully harvested, Lessee shall have sixty (60) days after any such termination in which to complete the harvesting of such crop.

2. <u>Rental</u>.

(a) Lessee shall pay to Lessor as rental for said Leased Premises the sum of \$32,500.00 payable within five
(5) days of execution of this Lease.

(b) Lessee shall employ its skill and services in supervising the planting and growing of crops, and furnish at its own cost and expense all farm machinery, tools, and equipment necessary to prepare for, plant, cultivate, irrigate, fertilize, mature, and harvest such crops. Lessee further agrees to maintain at its own cost and expense such farm machinery, tools and equipment in good serviceable condition.

3. <u>Well Maintenance</u>. Expenses for pump repairs, well repairs, and other items normally considered as capital expenditures shall be solely the responsibility of the Lessor, provided however, that repairs to pumping equipment located above ground shall be solely the responsibility of the Lessee.

4. Use of Leased Premises.

(a) Lessee shall use the Leased Premises for agricultural purposes only. Lessee agrees during the term of this Lease that it will in a good and farmerlike manner prepare, plant, irrigate, cultivate and harvest cotton and/or such other crops as may be agreed upon by Lessee and Lessor.

(b) Lessor and Lessee agree that in their mutual interest the total acres planted to cotton and/or other crops shall approximate the maximum number of acres for which there is sufficient water to afford reasonable yields. The acreage planted to each crop shall be determined by mutual agreement, provided however, that in the event Lessee plants an excess of 250 acres, the rental as provided in Paragraph 2(a) above shall increase by \$130.00 per acre for each acre planted in excess of 330 acres; said increased rental shall be due and payable within five (5) days of the verification by the Department of Agriculture of the actual acres planted.

(c) If Lessee desires to increase the total acreage planted beyond 330 acres, prior written consent and approval of the Lessor must first be obtained before planting.

- 2 -

(d) Lessee covenants with Lessor that Lessee will give special attention and put forth special and extra effort at all times to control, prevent the spread of, and eradicate all noxious weeds and grasses on the portion of the Premises under cultivation, and adjacent thereto.

5. <u>Entry by Owner</u>. Lessee shall permit Lessor and Lessor's agents and assigns at all reasonable times to enter the Leased Premises and to use the roads established on the Premises now or in the future for the purposes of conducting surveys and land use studies, inspecting compliance with the terms of this Lease, exercise of all rights under this Lease, posting notices, and all other lawful purposes of Lessor as owner.

6. <u>Condition of Premises</u>. Lessee acknowledges that it is familiar with the condition of the Premises. By entry and performance under this Lease, Lessee accepts the Premises in their present condition and Lessee agrees on the last day of term, or on sooner termination of this Lease, to surrender the Premises in the condition as when received, reasonable use, wear, and damage by fire, acts of God, or the elements excepted, and to remove all of Lessee's property from the Premises.

7. <u>Waste</u>. Lessee shall not commit or permit any others to commit on the Premises waste, or any nuisance or any other act that disturbs the quiet enjoyment of Lessor or any other tenant or agent of Lessor on reserved or adjacent property.

8. <u>Oil, Gas and Mineral Rights</u>. All rights in all minerals, oil, gas and other hydrocarbons located on or under the Leased Premises are particularly reserved to Lessor and are

- 3 -

particularly excepted from the property covered by the terms of this Lease. Lessee expressly grants to Lessor and to any Lessee of the oil, gas and mineral rights, and to Lessor's agents and licensees, a right of entry and right-of-way for ingress and egress, in and to, over and on, the Leased Premises, during the term of this Lease, for the exploration, drilling and mining of minerals, oil, gas and other hydrocarbons on the Leased Premises; provided that Lessor shall reimburse Lessee for any reasonable damage that Lessee sustains as a result of any interference with the agricultural operations conducted on the Leased Premises under the terms of this Lease arising from such exploration, drilling or mining operations.

Taxes. Lessee shall comply with all lawful 9. demands of the County Assessor in reporting property owned by Lessee and located on the Leased Premises and shall pay before the same become delinquent all taxes, assessments, and other governmental charges upon or attributable to said crops, structures, improvements, machinery, equipment or other property placed by or for Lessee on the Premises (excluding irrigation facilities, buildings, houses and equipment placed thereon by Lessor and Lessee). Should any such taxes, assessments or charges be assessed to Lessor or remain unpaid ten (10) days before delinquency thereof, Lessor may, at its option, pay the same and Lessee shall upon demand promptly reimburse Lessor therefor. Lessor shall pay all other property taxes or assessments levied upon the said Premises including pump tax.

10. <u>Maintenance</u>. Lessee shall care for both the Leased Premises and the approaches to the appurtenances of the Leased Premises, including, but not limited to, all fences, corrals, wells, ditches, roadways, and usable housing, if any, and the areas surrounding and adjacent to them, and maintain

- 4 -

them in a state of good condition and repair at all times during the term of this lease and so long as Lessee occupies the demised Premises hereunder.

11. <u>Water Supply</u>. Lessee agrees that the Lessor has made no covenants or warranties, express or implied, concerning the amount or quality of water legally or physically available for said Premises and that Lessor shall not be responsible for any shortage or quality of water for the Leased Premises. Lessee further agrees and acknowledges that any repairs or improvements made by Lessee to wells shall not give rise to any rights on behalf of Lessee in said wells, including wells in Section 13 T6SR5E to be used by Lessee, nor shall said repairs or improvements give rise to any claim for extension or renewal of this Lease.

Assignment or Subletting. Lessee shall not 12. assign this Lease, or any rights under it and shall not sublet the entire or any part of the Premises, or any right or privilege appurtenant to the Premises, or permit any other person (the agents and servants of Lessee excepted) to occupy or use the entire or any portion of the Premises, without first obtaining Lessor's written consent. A consent to one assignment, subletting, occupation or use by another person is not a consent to a further assignment, subletting, occupation or use by another person or firm. An assignment or a subletting without Lessor's consent shall be void, and shall, at Lessor's option, terminate this Lease. No interest of Lessee in this Lease shall be assignable by operation of law without Lessor's written consent. Any permitted assignment or sublease shall be made subject to the terms and conditions of this Lease and shall not have the effect of reducing any rental provided hereunder. Notwithstanding Lessor's consent to any

- 5 -

assignment or sublease, Lessee shall not be released of any obligations imposed hereunder.

13. <u>Compliance With Law</u>. Lessee shall comply with all requirements of all governmental authorities, in force either now or in the future, affecting the Premises, and shall faithfully observe in Lessee's use of the Premises all laws, rules and regulations of these authorities, in force either now or in the future. The judgment of a court of competent jurisdiction, or Lessee's admission in an action or a proceeding against Lessee, whether Lessor by a party to it or not, that Lessee has violated any law, rule or regulation in Lessee's use of the Premises, shall be considered conclusive evidence of the fact as between Lessor and Lessee.

14. Conservation and Other Farm Programs.

(a) It is understood and agreed that the Leased Premises herein described may be, by reason of participating in any applicable agricultural conservation, soil conservation, or other Federal or other governmental farm conservation programs, entitled to receive cash or other kinds of benefit payments or compensation, and it is agreed that all such benefit payments or compensation when received shall belong to and be delivered to Lessor, except that in the event the governmental agency which distributes said payments directs under its rules that a portion of said payments belongs to Lessee, then such portion of said payments shall be paid to Lessee; or, in the event that, prior to entering into soil conservation practices or other governmental programs, Lessor and Lessee have mutually agreed in writing to a division of benefit payments between them, then the provisions of such agreement shall apply.

(b) Notwithstanding the provisions of Section
 14(a) above, Lessor agrees that it shall not participate in the
 U.S. Department of Agriculture's 1993 Commodity Programs. It

- 6 -

is expressly agreed that Lessee may participate in said program for 1993, provided Lessee agrees not to commit, or allow others to commit, any act with regard to the Leased Premises which would cause the Lessor to be out of compliance of any other lands owned by Lessor and jeopardize payments to which Lessor would otherwise be entitled.

(c) Leased Premises cannot be put into combination with other lands without prior written consent of Lessor.

15. <u>Indemnification</u>. Lessee agrees to protect, defend, and hold Lessor, its directors, officers, employees, agents, successors, and assigns free and harmless from any and all claims, damages, judgments, fines, costs, liabilities, or loss arising from any injury to any person, including Lessee and its employees or agents, or to the Leased Premises or to property of any kind belonging to anyone, including Lessee and its employees or agents, while in, upon, or in any way connected with the Leased Premises, including without limiting the generality of the foregoing, environmental contamination caused by or under Lessee, its employees, agents or permitted assigns or sublessees.

The foregoing indemnity shall survive the expiration or termination of this Lease and/or any transfer of all or any portion of the Leased Premises, or of any interest in this Lease.

16. <u>Insurance</u>. Lessee agrees to take out, procure, and keep in force during the term of this Lease, at Lessee's own expense, public liability insurance in reputable companies for protection against liability to the public arising as an incident to the use of or resulting from any accident occurring in or about the Premises.

- 7 -

The minimum limits of liability under said insurance are to be for amounts not less than \$200,000.00 for any one person injured, \$500,000.00 for any one accident, and \$200,000.00 for property damage.

These policies shall insure the contingent liability of Lessor and said policies or certificates or photocopies thereof evidencing said insurance are to be placed with and delivered immediately to Lessor. Lessee has the duty and agrees to obtain a written obligation imposed on the insurance carriers and agents to notify Lessor in writing at least thirty (30) days before any cancellation of the insurance. Lessee agrees that if Lessee does not keep the insurance in force, Lessor may, at its option, but need not take out and procure necessary insurance and pay the premium. The repayment of the premium shall be part of the rental and payment shall be made immediately by Lessee upon demand made by Lessor. Lessee further agrees to take out, procure and keep in force during the term of this Lease, at Lessee's own expense, proper and adequate Workmen's Compensation Insurance.

It is specifically understood and agreed that the relationship of the parties is that of landlord and tenant, and not as partners or joint venturers, and that Lessor shall receive and accept as rental for the use of the Premises herein leased the benefits and sums hereinabove provided, and that Lessor shall have no control over the operations of the Lessee, except its right to insist that Lessee carry out the terms and conditions of this Lease.

17. <u>Attorneys' Fees</u>. In any action or proceeding by Lessor or Lessee to enforce this Lease or any provision thereof, the prevailing party shall be entitled to all costs incurred and to reasonable attorneys' fees.

- 8 -

18. <u>Crop Mortgages</u>. All crop mortgages, security agreements, encumbrances, or liens given or suffered by Lessee shall be for terms or periods not extending beyond the term of this Lease. All liens created or suffered by Lessee must be satisfied of record by Lessee before the end of the term of this Lease and any extension thereof. If a mortgage, deed of trust, security agreement or lien creates a cloud on Lessor's title, Lessee must pay all reasonable costs and expenses, including attorneys' fees, required for the removal of the cloud, either before or after termination of this Lease. Lessee shall not impose or incur any voluntary liens or encumbrances upon the real or personal property on the Leased Premises, without first securing the express written consent of Lessor.

19. <u>Alterations and Liens</u>. The Lessee shall not make or permit any other person to make alterations to the Leased Premises or to any improvement thereon or facility appurtenant thereto without the written consent of the Lessor first had and obtained. The Lessee shall keep the Leased Premises free and clear from any and all liens, claims, and demand, for work performed, materials furnished, or operations conducted thereon at the instance or request of Lessee.

20. <u>Default by Lessee</u>. All covenants and agreements contained in this Lease are declared to be conditions to this Lease and to the term hereby demised to the Lessee. Should the Lessee default in the performance of any covenant, condition, or agreement contained in this Lease, the Lessor may terminate this Lease and re-enter and regain possession of the Leased Premises in the manner then provided by the law of the State of Arizona then in effect.

- 9 -

21. <u>Waiver</u>. The failure of Lessor to avail itself of any remedy available to it for a breach of any term, covenant, or condition contained in this Lease shall not be treated as a wavier of such term, covenant, or condition, or as a waiver of a future breach of the same or any other term, covenant, or condition contained in this Lease. The acceptance of rent by Lessor shall not be treated as a waiver of a previous breach by Lessee of any term, covenant, or condition of this Lease, other than the failure of Lessee to pay the particular rental so accepted, regardless of Lessor's knowledge of a previous breach at the time of acceptance of rent.

22. <u>Notices</u>. Any notices to be given to either party or by the other shall be in writing and shall be served either personally or by Registered or Certified Mail, addressed as follows:

- LESSOR: SANTA CRUZ JOINT VENTURE c/o ASARCO Incorporated 1150 North 7th Avenue P. O. Box 5747 Tucson, Arizona 85703-0747
 - with copy to: Burton M. Apker, Esq. Apker, Apker, Haggard & Kurtz, P.C. P. O. Box 10280 2111 East Highland Ave., Suite 230 Phoenix, Arizona 85064
- LESSEE: D & M FARMS 24978 W. Boone Drive Casa Grande, Arizona 85222

23. <u>Miscellaneous</u>. <u>Legal Effect</u>. All covenants of Lessee contained in this Lease are expressly made conditions precedent.

The provisions of this Lease shall, subject to the provisions on assignment, apply to and bind the heirs,

successors, executors, administrators and permitted assigns of all parties to this Lease.

The titles or headings to the paragraphs of this Lease are not a part of this Lease and shall have no effect on the construction or interpretation of any part of this Lease.

24. Integration and Disclaimer of Representations.

This Lease contains the complete understanding and agreement of the parties hereto with respect to the subject matter hereof, and any and all prior representations, negotiations and understandings, written or oral, are superseded hereby and merged into this Lease. Not in limitation of the generality of the foregoing, Lessee acknowledges that Lessor has made no representation or promise, express or implied, that Lessor will extend the lease term beyond December 31, 1993.

25. <u>Time</u>. Time is of the essence of this Lease and each and every provision hereof.

LESSEE:

D & M FARMS An Arizona General Partnership

By

Its Managing Partner

LESSOR:

ASARCO Santa Cruz, Inc., a Delaware corporation

AND

Freeport Copper Company, a Delaware corporation

Joint Venturers Doing Business as SANTA CRUZ JOINT VENTURE

By

Its President MANAGING JOINT VENTURER

- 11 -

STATE OF ARIZONA) : SS. County of _____)

The foregoing instrument was acknowledged before me this ______ day of ______, Managing Partner of D & M FARMS, an Arizona General Partnership.

My Commission Expires:

Notary Public

STATE OF ARIZONA) : ss. County of Pima)

The foregoing instrument was acknowledged before me this ______ day of _____, 1992, by William L. Kurtz, President of ASARCO Santa Cruz, Inc., a Delaware corporation, on behalf of the corporation as Managing Joint Venturer of SANTA CRUZ JOINT VENTURE.

My Commission Expires:

Notary Public

- 12 -

EXHIBIT "1"

Leased Premises situated in Pinal County, Arizona more fully described as follows:

- Section 25: N/2 except E/2 NE/4 NE/4 and 210' strip along north section line, Township 6 South, Range 4 East
- Section 26: N/2 except W/2 NW/4 NW/4 and N/2 NW/4 SW/4 NW/4, Township 6 South, Range 4 East
- Section 23: SE/4, Township 6 South, Range 4 East

June 30, 1986

Exploration Department

R. L. Brown Vice President

Mr. R. L. Hoyle Accounting Manager Tucson Office

Dear Mr. Hoyle:

Please find the enclosed copies of the 302 Forms concerning Santa Cruz (The Lands) and Santa Cruz (Peripheral Lands).

Please note that these forms have been processed by the Controller and that the approval of the Advisory Committee on June 11, 1986 is indicated.

Yours very truly,

human

R. L. Brown

RLB:mr Att.

cc: J. D. Sell (w/att.)
 R. J. O'Keefe/E. J. Franko (w/att.)

ASARCO Incorporated

JUL 7 1986

SW Exploration

FORM 302-MB (9/79)

APPLICATION FOR SUPPLEMENTAL EXPLORATION APPROPRIATION

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

No. 0087 Santa Cruz (Peripheral Lands), Arizona

Present total Estimated Cost (Form 302-MA attached)	\$1,092,600
Amount previously authorized (date)	\$1,030,600
Balance for which Authorization is now requested	\$62,000

ADDITIONAL WORK CONTEMPLATED:

Land payments, cancel \$7,190 overrun

EXPLANATION OF INCREASED COST:

Copper reserve justifies holding the ground

Reviewed by R.J. O'KEE Fatcon MGR. OR CHIEF ACCNIT.	Recommended byJ. D. Sell
Reviewed by R.J. O'KEE Fatcit MGR OR CHIEF ACCNIT Approved by Account Chargeable to EXPLORATION EXPENSE TO BE FILLED IN BY CONTROLLER	Approved by
Approved by Advisory Committee	Approved by Board of Directors
JUN 11 1986 19	
PRINTED IN U.S.A.	SECRETARY

FORM 302-MB (9/79)

New York No. 00 87-11

JDS

. . 19....

SECRETARY

APPLICATION FOR SUPPLEMENTAL EXPLORATION APPROPRIATION

Originating Office ... Tucson

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

No. 0087 Santa Cruz (Peripheral Lands), Arizona	·
Present total Estimated Cost (Form 302-MA attached)	\$1,0 <u>92</u> ,600
Amount previously authorized (date)	\$1,030,600
Balance for which Authorization is now requested	\$62,000

ADDITIONAL WORK CONTEMPLATED:

Land payments, cancel \$7,190 overrun

EXPLANATION OF INCREASED COST:

Copper reserve justifies holding	ASARCO Incorporated AUG 1 1 1986 SW Exploration
	J. D. Sell
Approved by R.J. O'KEEFE Account EXPLORATION EXPENSE Chargeable to TOBEFILLED IN BY CONTROLLER	Approved by
Approved by Advisory Committee	Approved by Board of Directors

.

JUN 11 1986



April 12, 1988

W.L. Kurtz

Bailing Water from SC-53 and SC-54 Santa Cruz Project

SC-54

On March 16, 1988, hole SC-54 was bailed using a PVC 2 inch inside diameter bailer 10 feet long, capacity of 1.64 gallons. The water that was bailed went into metal 55 gallon barrels. The "used" barrels came from the Sacaton Mine.

Started bailing at 1:20 PM and finished after 2 hours and 35 minutes.

Events

1. At the beginning the water level dropped fast, about 3' per bailer, but gradually it slowed until after 30 bailers (48 gallons), the water level stabilized at 21 feet below the original water level.

2. Went to the bottom of the hole a few times and found black slime, sand and darker colored water.

3. After bailing 52 bailers (83.2 gallons or 1 (one) hole volume), we cleaned up and prepared to move to SC-53. This took about 28 minutes. The hole was measured for water depth after this time and it recharged 21 feet or almost a foot per minute.

4. This hole was measured for water depth the following day at 12:07 PM and it had recharged to its original level.

SC-53

On March 17, 1988, hole No. SC-54 was bailed, but a problem with the electric motor stopped the bailing before 1 (one) hole volume could be removed.

Events

1. After 10 bailers, which took 30 minutes, the water level dropped 18.1 feet.

2. After 10 more bailers, which took 27 minutes (total bailers 20 and total time 57 minutes), the water level dropped 21.9 feet.

JDS

W. L. Kurtz

April 12, 1988 Page 2

3. After 10 more bailers, which took 27 minutes (total bailers 30 and total time 1 hour 24 minutes), the water remained at 21.9 feet.

4. At 10:45 AM stopped to adjust motor pulley. This took about 15 minutes and when the water level was measured, the water came up 14.9 feet. This again as in SC-54 was a rise of about 1 foot per minute.

5. At 11:18 AM the electric motor lost power and bailing had to be stopped.

6. Total bailers was 37 which amounts to 59.2 gallons. For 1 (one) volume an additional 204 gallons will have to be removed.

General

A larger motor has been obtained and plans now are to, time permitting, go up for two days each week until SC-53 has one (1) hole volume removed and SC-54 has five (5) volumes removed. Samples will be taken on existing barrels and from SC-54 after five (5) volumes are removed.

WDG:mek

William W. May William D. Gay

cc: J.D. Sell

MIND5

ASARCO INCORPORATED TUCSON - 7845 PAGE: 1

MINE EXAMINATION AND DEVELOPMENT EXPENSE

DATE: ____AUGUST_09: 1988___

MONTH: JULY . 1988

.

87-11 SANTA CRUZ PROJECT (PERIPHERAL LANDS)

87.11	SANTA CRUZ PROJECT (PERIPHERAL LANDS)	MONTH_	YEAR	TO-DATE_
530	GEOLOGY			an a
220	100 SALARIES	0.0	0.0	582.00
	220 SOCIAL SECURITY TAXES	0.0	0.0	17.20
	230 INSUR GROUP LIFE	0.0	0.0	7.51
	240 RETIREMENT ANNUITY	0.0	0.0	59.30
	350 RENTAL EQUIPMENT	0.0	55.00	55.00
	400 MATERIALS AND SUPPLIES	42.66	360.23	360-23
	790 RENT	0.0	40.70	40.70
	301 TAXES - STATE & CITY SALES	2.98	31.41	31.41
540	SAMPLING, ASSAYING, LAB.			· · · · · · · · · · · · · · · · · · ·
	754 DUTSIDE PROFESSIONAL SERVICES	0.0	875.50	875.50
571	ENGINEERING - SURVEYING			·
	754 OUTSIDE PROFESSIONAL SERVICES	0.0	12267.00	12267.00
610	ADMIN., FIELD OFFICES AND CAMP			·····
	100 SALARIES	0.0	0.0	40.72
	220 SOCIAL SECURITY TAXES	0.0	0.0	2.73
	230 INSUR - GROUP LIFE	0.0	0.0	0.53
	240 RETIREMENT ANNUITY	0.0	0.0	6.06
	600 TRAVELING EXPENSE	0.0	0.0	2.35
	790 RENT	0•0	0.0	1200.00
620	ADMIN., GENERAL		in a sin and and three and a single	anna (1994) a chain a gu agus a chuir a chuir ann an ann ann ann ann ann ann ann ann
			1752.38	An analysis of the second s
		128.00	508.50	508.50
	220 SOCIAL SECURITY FAXES	0.0	0.0	127.33
	230 INSUR - GROUP LIFE	0.0	0.0	29.58
	240 RETIREMENT ANNUITY	0.0 0.0	0.0	250.48
	350 RENTAL EQUIPMENT		-24.00	-24.00
	400 MATERIALS AND SUPPLIES	0.0	139.86	181-14
	500 COMMUNICATIONS	0.0	2.19	2.19
	600 TRAVELING EXPENSE	0.0	92.46	92.46
	501 TRAVELING EXP-30% LIMIT	21.00	67.72	79.09
	753 LEGAL EXPENSE	245.76	17727.09	17727.09
	754 OUTSIDE PROFESSIONAL SERVICES	0.0	-6167.06	-62.37
	801 TAXES - STATE & CITY SALES	0.0	5.60	7.44

SARCO Incorporated

AUG 1 2 1988

SW Exploration

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		MINE_EXA	MINATION	LAND_DEVELO	PMENT_EXP	ENSE		e station and the	
DATE:	<u>A</u> l	JGUST 09.	<u>1988</u>		Ч	IONTH:	JULY. 1988		
87.11	SAI	NTA CRUZ	PROJECT	(PERIPHERAL	LANDS)	MONTH_	YEAR	<u></u> TO-	DATE
620	303 950	IN., GENE TAXES OTHER INTERES	- STATE	PROPERTY		25.00	0.0 175.00 4601.71	11	.00.00
641	400 801		LS AND S - STATE	SUPPLIES & CITY SALFS		0.0	0.0		60•98 0•24
		40 AMA 440 AMA 440 AMA 440 AMA 440 AMA		TOTALS:					345.98
		GMA GHTUA		MONTH		AR DATE	TOTAL TO-DATE		
87	•11	620	00+00	905.87	32511	•29	74845.98	-12849	• 98
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September 1, 1988

F.T. Graybeal Chief Geologist, NYC

> Santa Cruz Appropriations Pinal County, AZ

As you have instructed, I hereby submit a Supplemental Exploration Authorization for each of the three areas which as of July 31, 1988 have overrun expenditures. These are:

- Santa Cruz Joint Venture, AZ (EA-0075) 1.
- 2. Santa Cruz Project (Peripheral Lands) (EA-0087)
- 3. Santa Cruz Project Mooney Tract (EA-0134).

The other parcels not overextended and with little activity include:

- 4. Santa Cruz Project, Ollerton Tract (EA-0135)
- 5. Santa Cruz, NAAC Acquisition (EA-0136)
- 6. AMOCO Land (EA-0196).

For your general interest I also attach a copy of the July 31, 1988 accounting sheets showing the above Santa Cruz Project areas. Note that the status is exclusive of Freeport Copper Co. participation, and all figures are for the Asarco account.

The above requests are separate from A.R. Raihl's appropriations request of August 12, 1988.

Dames R. Leer James D. Sell

JDS:mek Atts.

cc: W.L. Kurtz C.L. Snow

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	• • •		SANTA CRUZ JO E OF FREEPORT CU US OF EXPLORATIO	PPER CO. PARTICI		+ 1983 L
			AS OF JULY	31, 1988		•
	AUTHORIZATI	ON ANOUNT		AMOUNT EXPENDED		PALANCE
	NUMBER	AUTHORIZED	*********** Month **********	••••••••••••••••• YEAP •••••	*************** TO DATE **********	UNSXPENDED
	SANTA CRUZ	JOINT VENTURE, A	RIZONA			
-	0075-00/02	382,000.00	• 00	.00	392,000.00	.00
	0075-03	39,000.00	• 07	.00	37.000.00	•00
1	0075-04	48,000.00	•00	• 00	48+000+00	•00
		372+000+00	•00	.00	372,000.00	•00
	0075-06	200,000.00	•00	•00	200,000.00	•00
	0075-07	137,500.00	•00 •00	-00 -00	137+500+00 60+336+93	•00 50•336•830
ļ.	0075-09	170,000.00	•00	•00	L70+000+00	•00
	0075-10	265,000.00	•00	• 00	265,000.00	•00
· .	0075-11	15+700+00	256.34	1,565.91	11,505.36	4,094.54
		***********	*****	************	**********	***********
·	TOTAL	1+639+200+00	256.34	1,565,91	1,685,442.19	46,242,190
		***********	******	******	********	*************
	SANTA CRUZ	PROJECT TPERIPHE	RAL LANDSI			
	0087-00/03	289,000,00	• 00			
•	0087-04	7.000.00	•00	00 00	239,000.00	•00
	0087-05	239,000.00			7,000.00	• 00
!	0087-06	114,000.00	•00	• 00	239,000.00	•00
	0087-08	333,300.00	•00	•00	114.000.00	•00
	0087-09	18,300.00	•00	•01 •00	333,300,00 102,003,72	•00 83,703,920
	0087-10	30,000.00	•00	•20	30+000+00	•00
	0087-11	62,000.00	905.87	32,511.29	74 845 98	12,945,980
• •	\$	******	******			
	TOTAL	1,092,600.00	905 • 87 ******	32,511,29	1,189,149.70	96,547.900
		PROJECT. MOONEY		•••••		****
	0134-00	99+503+00				
:	0134-01	4+300+00	• 00 • 00	• 00 • 00	77,500+00 5,148+36	•00 948•36CF

	TOTAL	103,800.00	•00	•00	104,648.36	845.360
. 1 . 1	•	*****	******	****	*****	*****
_	SANTA CRUZ	PROJECT, OLLERIO	N TRACT			
i di	0135-00	347,000.00	•00	• 07	70+607+71	275,390.09
	0135-01	13,000.00	•00	• 00	13,048.48	49.480
	And a second		******			
	\$	360,000.00	• 00	•00	83+558-39	276,341.61
	+ TOTAL		******			
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Sw Exploration

SANTA CRUZ JOINT VENTURE (EXCLUSIVE OF FREEPORT COPPER CO. PARTICIPATION) JULY ... STATUS OF EXPLORATION AUTHORIZATIONS PAGE

31, 1988

AS OF JULY

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JULY 1988 PAGE 2

AUTHORIZATION AMOUNT AMOUNT EXPENDED BALANCE ***** ******* NUMBER AUTHORIZED MONTH YEAR TO DATE UNEXPENDED ****** ****** ******** ********* *********** *********** SANTA CRUZ, NAAC ACQUISITION 0136-00 850,000.00 • 00 20.00 275,078.25 574,921.75 TOTAL 850,000.00 .00 20.00 275,078.25 574,921.75 *** ************ *********** *********** AHOCO LAND 0196-00 200,000.00 .00 26.50 163,104.23 35,895.17 ***** ****** ******* TOTAL 200,000.00 .00 26.50 163,104.23 36.895.17

APPROVED:

· / for

ASARCO Incurpolates

AUG 1 2 1988

SW Exploration

FORM 302-MB (9/79)

New York No.

APPLICATION FOR SUPPLEMENTAL EXPLORATION APPROPRIATION

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

No. 0087 Santa Cruz (Peripheral Lands), AZ

Present total Estimated Cost	\$.1,209,200
Amount previously authorized (date .țhru. 6/5/86) (EA 0087-11)	<u>\$ 1,092,600</u>
Balance for which Authorization is now requested	\$116,600

ADDITIONAL WORK CONTEMPLATED:

Land payments, legal, contamination resolvement	\$ 20,000
Cancel overrun from 1986 (mainly professional	
expenses, legal fees, etc. associated with	* _
contamination problem)	96,600
Total	\$116,600

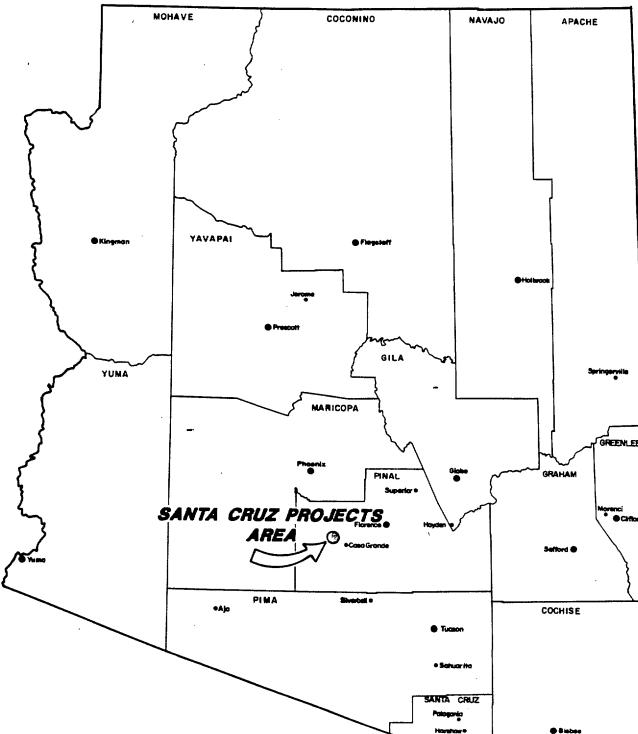
EXPLANATION OF INCREASED COST:

Copper reserve justifies holding the ground.

Reviewed by	Recommended by Junes D. Sell Supervisor
Account Chargeable to	Approved by
Approved by Advisory Committee	Approved by Board of Directors
PRINTED IN U.S.A.	SECRETARY

G GILA YUMA MARICOPA GREENLEE GRAHAM PINAL SANTA CRUZ PROJECTS nci ● Ciifte AREA PIMA •Ajo COCHISE Tuc ANTA CRUZ 🖶 Bisbes Douglas

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INDEX MAP



T-4.19 ASC-4.19

Santa Cuery Peripheral Lands

Southwestern Mining Department

November 9, 1988

MEMORANDUM

TUCSON OFFICE Santa Cruz Project Reports

Heretofore, cost reports for Santa Cruz Joint Venture's Exploration Authorizations have been exclusive of Freeport Copper Company's participation.

Effective October, 1988, these cost reports will include the total expenditures under each cost center and expense number. Freeport Copper Company's share of the total costs will be indicated under cost center 650 partners' Share. The grand total of each report will still reflect Asarco Santa Cruz Incorporated's net share of total cost.

G. H. Myers

Accounting Manager

GHM/CLS/kh

NOV 1 1 1988

SW Exploration

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MIND5 ASARCO INCURPORATED TUCSUN - 7845

PAGE: 1

MINE_EXAMINATION_AND_DEVELOPMENI_EXPENSE_

DATE: NOVEMBER 09. 1988

MONTH: OCTOBER: 1988

87-11 SANTA CRUZ PROJECT (PERIPHERAL LANDS)

		МОМІН	YEAR	IO-DAIE_
530	GEOLOGY			
	100 SALARIES	0.0	0.0	1164.00
	220 SOCIAL SECURITY TAXES	0.0	0.0	34.40
	230 INSUR - GROUP LIFE	0.0	0.0	15.02
	240 RETIREMENT ANNULTY	0.0	0.0	118.60
	350 RENTAL EQUIPMENT	9.0	110.00	110.00
	400 MATERIALS AND SUPPLIES	0.0	720.46	720.46
	790 RENT	0.0	81.40	81-40
	801 TAXES - STATE & CITY SALES	0•0	62.82	62.82
540	SAMPLING, ASSAYING, LAB.			
a ya manangang akala da dar sang sang pina pina gan sang sang sa	754 OUTSIDE PROFESSIONAL SERVICES	686.00	7174.00	7174-00
571	ENGINEERING - SURVEYING			
	754 OUTSIDE PROFESSIONAL SERVICES	0.0	24534.00	24534.00
610	ADMIN., FIELD OFFICES AND CAMP			
	100 SALARIES	0.0	0.0	81.44
	220 SOCIAL SECURITY TAXES	0.0	0.0	5.46
	230 INSUR GROUP LIFE	0.0	0.0	1.06
	240 RETIREMENT ANNUITY	0.0	0.0	12.12
	600 TRAVELING EXPENSE	0.0	0.0	4.70
	790 RENT	0•0	0.0	2400.00
620	ADMIN., GENERAL			
n mar an an Marina Angele an Angel agus an Angel	100 SALARIES	0.0	3804.16	8499•92
	210 OVERHEAD FROM GENERAL	0.0	1104.00	1104.00
	220 SOCIAL SECURITY TAXES	0.0	0.0	254.66
	230 INSUR - GROUP LIFE	0.0	0.0	59-16
	240 RETIREMENT ANNUITY	0+0	0.0	500.96
	350 RENTAL EQUIPMENT	0.0	-43.00	-48.00
· · · · · · · · · · · · · · · · · · ·	400 MATERIALS AND SUPPLIES	0.0	559.06	541.62
	500 COMMUNICATIONS	0.0	4.38	4.38
 More Ref. Processing and an annual section of the sec	600 TRAVELING EXPENSE	0.0	184.92	184+92
	601 TRAVELING EXP-80% LIMIT	0.0	135.44	158.18
· ••• ••••••••••••••••••••••••••••••••	753. LEGAL EXPENSE	6108.11	27542.35	29542.35
	754 OUTSIDE PROFESSIONAL SERVICES	0.0	8006-66	20216.04
	801 TAXES - STATE & CITY SALES	0.0	30.76	34•44

+SARCO Incorporated

NOV 1 1 1988

SW Exploration

MIND5	ASARCO INCO	RPORATED	TUCSON - 7845	!	PAGE: 2
- a maganang agang Pantananan gana ay ng sa gana ang ggaga.	MINE EXAMINATION	AND DEVELOPH	MENT_EXPENSE_		
DATE:_	NDVEMBER 09. 1988		MONTH:	DCTOBER - 198	8_
87.11	SANTA CRUZ PROJECT	(PERIPHERAL L			
•			<u> </u>	YEAK	IO-DAIE_
620	ADMIN., GENERAL 803 TAXES - STATE		0017 70	0017 70	45700-30
	950 OTHER	roferii	-950.00		1350.00
	951 INTEREST		0.0		
641	DISTRIB. ACCOUNTS -	AUTUS			
** « Millioning Paper (Providence Andread and Providence Andread and	400 MATERIALS AND S		0.0	0.0	
-	801 TAXES - STATE	& CITY SALES	0.0	0.0	0•48
650	PARTNER'S SHARE 950 OTHER		-7380-94	-46913.80	-89148-49
				به بیرون ادانه میده بیرون بیرون میدو دهم محمد محمد بارو د	
 Provide complete and provide a basis. A second complete comple		TOTALS:	7390.95	46813.81	89148.50
	HOR• AMOUNT BER AUTHORIZED	MONTH	YEAR To-date	TOTAL TO-DATE	
87	•11 62000.00	7380.95	46813.81	89148.50	-27148.50
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				NOV 1 1	1988



Southwestern Exploration Division

March 9, 1989

F.T. Graybeal Chief Geologist, NYC

> Santa Cruz Appropriations Pinal County, Arizona

As you have instructed (3/8/89), I hereby submit a Supplemental Exploration Authorization for each of the three areas which have overrun expenditures. The SEA will include the 1988 overrun plus the 1989 budget items.

The three areas are:

- 1. Santa Cruz Joint Venture, AZ (EA-0075)
- 2. Santa Cruz Project Peripheral Lands (EA-0087)
- 3. Santa Cruz Project Mooney Tract (EA-0134)

The other parcels are not overextended and with little activity on them, I will not submit any SEA/budget request on:

- 4. Santa Cruz Project Ollerton Tract (EA-0135)
- 5. Santa Cruz NAAC Acquisition (EA-0136)
- 6. AMOCO Land (EA-0196).

The above requests are separate from A.R. Raihl's appropriation request of August 12, 1988 for in situ.

JDS:mek Attachments

James to Sell James D. Sell

cc: W.L. Kurtz C.L. Snow

FORM 302-MB (9/79)

New York No.

APPLICATION FOR SUPPLEMENTAL EXPLORATION APPROPRIATION

March 9, 19.89 Originating Office Tucson, SWED

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

No0087.Santa Cruz (Peripheral Lands), AZ	
Present total Estimated Cost XRXXXX \$02 XXX XXXXXXXXXXXXXXXXXXXXXXXXXXX	\$1,242,600
Amount previously authorized (date 6/5/86	\$ 1,092,600
EA-0087-11 Balance for which Authorization is now requested	\$150,000

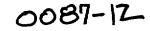
ADDITIONAL WORK CONTEMPLATED:

Land payments, legal, contamination resolvement	(1989)	\$ 33,000
Cancel overruns from 1986 (mainly professional		
expenses, legal fees, etc., associated with		
contamination problem)		117,000
Total		\$150,000

EXPLANATION OF INCREASED COST:

Copper reserves justifies holding the ground.

Reviewed byC	Recommended by Memes To Selo
Approved by	
Account Chargeable to	Approved by
Approved by Advisory Committee	Approved by Board of Directors
PRINTED IN U.S.A.	SECRETARY



FORM 302-MB (9/79)

New York No.

APPLICATION FOR SUPPLEMENTAL EXPLORATION APPROPRIATION

March 9, 19 89. Originating Office Tucson, SWED

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

No. 0087 Santa Cruz (Peripheral Lands), AZ

	- 1 - 2 <i>h</i> 2 - 600
Present total Estimated Cost XROUXX 802 WAXACCHEOX	\$ 1,242,600
Amount previously authorized (date 6/5/86)	\$ 1,092,600
EA-0087-11 Balance for which Authorization is now requested	\$150,000

ADDITIONAL WORK CONTEMPLATED:

Land payments, legal, contamination resolvement (1989) \$ 33,000 Cancel overruns from 1986 (mainly professional expenses, legal fees, etc., associated with contamination problem) <u>117,000</u> Total \$150,000

EXPLANATION OF INCREASED COST:

Copper reserves justifies holding the ground.

Reviewed by	C. L. ACCT. MGR. OR CHIEFACCNT	Recommended by Junes To Sell
Approved by Account Chargeable to	EXPLORATION EXPENSE	Approved by F.T. Groupheal
Approved by Advis	sory Committee	Approved by Board of Directors
·····		
PRINTED IN U.S.A.	τ. c. 0.	SECRETARY





Exploration Department

R. L. Brown Vice President April 11, 1989

Mr. J. D. Sell Tucson Office

> The Lands Peripheral Lands Mooney Property <u>Santa Cruz Project, Arizona</u>

Dear Mr. Sell:

I attach herewith copies of Forms 302-MB for the abovecaptioned project. Please note that these forms have been processed by the Controllers Department and that the approvals by Messrs. R. deJ. Osborne and T. C. Osborne are indicated.

Yours very truly,

R. L. Brown

RLB:mc Att.

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

cc: C.L. Snow (4/17/89)

ASARCO Incorporated

APR 1 7 1989;

SW Exploration

ASARCO Incorporated 180 Maiden Lane New York, N.Y. 10038 (212) 510-2000

T. C. Osborne From: To: R de J.O. \$ 150000 as Asarco

50%. thave (Freeport 507) of "Santa Cruz land holding costs. Includes accumulated "oversuns" since 1986/87/98. Budgeter

TCO

-~ CIV CD APR -5-1989 I.C. OSBORNE

New York, N.Y., April 3, 1989

TO: T. C. Osborne

Peripheral Lands Supplemental Exploration Authorization Santa Cruz Project, Arizona

Attached is a Supplemental Exploration Authorization Form for a \$150,000 expenditure on Peripheral Lands to cover Asarco's 50% of 1988 and 1989 costs related to land payments on the Parks-Salyer block, property taxes, and containment and clean-up of organic-based drilling fluids in an old diamond drill hole.

If you approve, please obtain approval and initial and return the attached form.

J. T. Maybeal F. T. Graybeal

FTG:mc Att.

l

C/1/FROM: W. L. KURTZ Sell [1] Guy Schanget togethe w/maky o close this Kiers M. То: Not Stevenson's "cutinished lusiness." Please trade -1 and 2 for lawyers and RLRidum 3 I agree

R-JOS-WDG - FREIS

ASARCO Incorporated

JUN 1 1 1990

SHE EXPLICITION

-----ASARCO INTEROFFICE MEMORANDUM------T. E. Scartaccini - SW Mining TO: P. J. Maley - SW Mining R. L. Brown, Jr. - Asarco NYO W. D. Gay - SW Exploration - Asarco NYO J. L. Woods J. C. Zimmerman - Meyer, Hendricks Burton Apker - Apker, Apker & Kurtz D. A. Robbins - TSC Jim Sieverson - TSC 975 FROM: June 7, 1990 DATE: Final Response to ADEQ on Ground Water RE: Monitoring at Santa Cruz

On April 6, I forwarded to each of you a complete copy of a certified letter sent to me by the Arizona DEQ requesting more ground water sampling at the Santa Cruz property. ADEQ originally required a response on or before April 19, but I obtained an extension to April 30.

I have attached a copy of our formal response to ADEQ's certified letter. I apologize for not sending you the final version of our response before now. The delay was the result of some sick leave and the crush of other activities.

I have had no acknowledgement or rebuttal from ADEQ since sending them our April 30 response.

I offer the following comments on unfinished business:

- 1. Should we send copies of our response to Hexcel and to State Lands? Others? If yes, who should send out the copies?
- 2. Should we send a letter to Hexcel complaining about the discharge of purge water from their monitoring well onto our land last January? The discharge line has been removed, but Pat Maley has photographs. Hexcel's water sample did show high levels of arsenic and selenium so it is reasonable to assume that the discharge (particularly if repeated) could result in contamination of Asarco property. Also, it is my opinion that the discharge was unprofessional practice.

I recommend that the Exploration Department and the Southwestern Mining Department should proceed to close (plug with cement or whatever may be required by State regulations) all remaining boreholes in the Santa Cruz/Sacaton area so ADEQ can't keep dreaming up ways to use the boreholes for data generation. This would be consistent with our position that boreholes are an unreliable indicator of ground water quality and are not suitable for ground water monitoring.

3.

Jim Sinan

2



April 30, 1990

Technical Services Center M.O. Varner Director D.E. Holt Engineering Manager D.A. Robbins Environmental Sciences Manager M.G. King

Research Manager

Lowell M. Carty, Jr. Project Manager Remedial Project Unit Arizona Department of Environmental Quality Central Palm Plaza Building 2005 North Central Avenue Phoenix, Arizona 85004

RE: Santa Cruz Property - Response to Your Certified Letter

Dear Mr. Carty,

I am responding to your certified letter dated March 14 requesting information on the disposal of purge water from our boreholes SC53 and SC54 and requesting additional ground water sampling.

Your letter requested a written response within 21 days of receipt. Your letter was received on March 21. Thus, a response would have been expected on or before April 19 (assuming 21 working days). Since my schedule would not allow me to complete a response within the required time, I contacted you on April 6 and obtained your verbal approval to extend the response time to April 30. I appreciate your patience.

I believe that your March letter can be summarized as follows:

- Item 1. Submit a written explanation of the final disposition of the 15 barrels used to evaporate borehole purge water.
- Item 2. ASARCO should coordinate a ground water "sampling event" with Hexcel. ASARCO would sample 3 boreholes while Hexcel would sample their newly installed ground water monitoring well.
- Item 3. Notify ADEQ of any activities, such as in situ leaching, that might have contributed to elevated levels of arsenic and selenium found in the new ground water monitoring well installed by Hexcel.

My responses will follow the same order shown in your letter and will reference the item numbering shown above.

Item 1. Submit a written explanation of the final disposition of the 15 barrels used to evaporate borehole purge water.

I intended my letter of May 25, 1989 to be the follow-up letter requested by ADEQ in your May 18 correspondence, but I certainly don't object to furnishing ADEQ with additional follow-up information, to wit:

The 15 barrels of purge water had the tops removed in May 1989 to allow the contents to evaporate naturally. The barrels were periodically checked by Asarco personnel to see if the barrels were dry. The 15 barrels had not been disposed of before receipt of the ADEQ letter (dated March 14) because our last check of the barrels showed some residual water. After receiving the ADEQ letter dated March 14, the barrels were immediately checked by Asarco personnel from our Tucson office. The barrels were found to be dry so the barrels were crushed and sent to the Stanfield landfill on March 22, 1990. No residues were left at the storage site.

Item 2. ASARCO should coordinate a ground water "sampling event" with Hexcel. ASARCO would sample 3 boreholes while Hexcel would sample their newly installed ground water monitoring well.

Asarco is agreeable to collecting additional ground water samples in conjunction with Hexcel representatives and representatives of other interested parties. However, we have some concerns that need to be resolved before undertaking any coordinated sampling event.

First, ADEQ requests sampling of an additional borehole, identified by ADEQ as SC-151. I understand that you found this borehole about 150 feet north of the Hexcel lagoon site while observing installation of the Hexcel monitoring well. Asarco has two boreholes in this general area, one of which is designated S151 (please note the alphanumeric change in your records). Our records indicate S151 is caved-in and is not suitable for sampling. Therefore, we need to know which borehole you actually found and make sure that our respective records reflect the correct designation and location. We suggest an on-site meeting between you and Mr. Pat Maley of our Tucson office. Please phone Mr. Maley at (602) 792-3010 to coordinate a site meeting.

I understand that the reason for adding this additional borehole was its proximity to the Hexcel Lagoon Site. However, I don't understand how a borehole cased several hundred feet to bedrock can yield any useful information relevant to understanding the ground water regime around the Hexcel Lagoon Site. To help me understand ADEQ's reasoning, I request a copy of the Hexcel well installation report and the well log to determine the depth to ground water, drilling method, screened interval, and other parameters as well as any other pertinent information or correspondence.

Second, your letter does not address a sampling and analytical protocol that would detail analytes, sampling procedures, purge water volumes or disposal, and quality assurance. I believe that a sampling and analytical protocol must be developed prior to a coordinated sampling event to prevent misunderstandings. For example, after reading your letter, I presumed that ADEQ was now primarily concerned about arsenic and selenium in ground water leading me to the expectation that the borehole samples would be analyzed for arsenic and selenium (despite the fact that arsenic and selenium were not even detected in two water samples collected in December 1987 from borehole SC-53). Upon calling you, I learned that you really wanted borehole samples checked for 2,4 DCP and 2,4,6 TCP, but I question what analytes ADEQ has in mind for the additional borehole or for the Hexcel If a coordinated sampling event is really monitoring well. needed, then a common list of analytes should be prescribed for all samples. Also, if the phenols are of concern, we need to know if ADEQ wants the top or bottom of the water column sampled.

I am particularly concerned with field and laboratory quality assurance. I was amazed that ADEQ allowed Hexcel to submit only one sample for analysis in January. In my professional opinion, a field blank should have been submitted to insure that the elevated arsenic and selenium levels found in the January sample were not the result of field sampling contamination. The sampling and analysis protocol should provide for field blanks and field duplicates to insure accurate results.

If ADEQ has some sort of standardized protocol, I would be willing to review it. If not, I volunteer to draft a protocol for review and approval by the affected parties before any field sampling is conducted.

Finally, Asarco presumes that, if the borehole samples have maintained the low levels of phenols previously found in August 1988, then there will be no need for further inquiry involving sampling of the boreholes. Asarco has acted responsibly and cooperated with all ADEQ requests and feels that the phenol issue was resolved in 1988. We would appreciate confirmation that the inquiry into phenol contamination will be concluded if the currently planned sampling confirms the low phenol levels previously found.

ADEQ's statement that the boreholes "are the only current sampleable avenue" (presumably in reference to the Hexcel investigation) is not a reason for requiring Asarco to perform sampling intended to further investigate the Hexcel Site. If ADEO has continuing concerns about the ground water impacts of the Hexcel Site, then it should require Hexcel to install a sufficient number of upgradient and downgradient wells to adequately characterize ground water quality around the Hexcel As you know, exploration boreholes are not Lagoon Site. designed or intended for ground water monitoring. As already demonstrated at SC53 and SC54, the drilling methods and additives may give misleading information. It is Asarco's position that boreholes are an unreliable indicator of ground water quality and are not suitable for ground water monitoring.

Item 3. Notify ADEQ of any activities, such as in situ leaching, that might have contributed to elevated levels of arsenic and selenium found in the new ground water monitoring well installed by Hexcel.

Asarco personnel are not aware of any activities that might have contributed to the water quality discovered. Asarco strongly questions the validity of the January sample from the Hexcel monitoring well. As discussed previously, a field blank should have been submitted to insure that the elevated arsenic (0.76 mg/l - 15 times more than the EPA MCL of 0.05 mg/l) and the elevated selenium (0.03 mg/l - 3 times the EPA MCL of 0.01 mg/l) results were not the result of field sampling contamination. Also, the lab repeatability and spike for selenium were both poor, suggesting that the lab had problems with the selenium analysis.

The only in situ leaching project, to Asarco's knowledge, near the Hexcel Site is the Santa Cruz In Situ Copper Mining Research Project - a cooperative research project with the U.S. Bureau of Mines. I have enclosed a brochure describing the Santa Cruz In Situ Copper Mining Research Project and a land status map showing the location of the Santa Cruz Project to the Hexcel Site. The land map shows that the Santa Cruz Project is over 3 miles southwest of the Hexcel Site. I have also attached a large map showing water level contours and directions of ground water movement for the Casa Grande area, which shows that the Research Project is <u>not</u> upgradient of the Hexcel Site. The map was originally Figure 2 from a report entitled "Hydrogeologic Conditions, ASARCO Sacaton Open-Pit Mine, Pinal County, Arizona" prepared in 1986 by Erroll L Montgomery and Associates, Inc. (previously submitted by Asarco to ADEQ in December 1988).

The Santa Cruz Project has 4 monitoring wells, which are sampled quarterly. Two quarterly sampling rounds have been conducted to date. The results have been reported to ADEQ and show low arsenic levels and non-detectable levels of selenium. I understand that these reports are available from David Woodruff (ADEQ Water Pollution Unit). Also, I recommend that you talk with Bruce Thatcher (ADEQ hydrogeologist) who is familiar with the Santa Cruz Project.

The work to date on the Santa Cruz Project has been the drilling of injection, recovery, and monitoring wells. <u>No</u> leaching has started - only ground water has been injected down the Project wells.

Operations at the Sacaton Mine were suspended in 1984 so there have been no activities on that property that could have contributed to the water quality discovered at the Hexcel monitoring well.

Please let me know how you wish to proceed with preparations for the proposed sampling.

Sincerely,

James P. Sieverson Senior Corporate Environmental Scientist

RECEIVED 175 LAW OFFICES E. MEYER, HENDRICKS, VICTOR, OSBORN & MALEDON AUG 2 11970 A PROFESSIONAL ASSOCIATION J. L. Woods 2700 NORTH THIRD STREET Legal SUITE 4000 24112 PHOENIX, ARIZONA 85004 1 . August 1, 1990 ASARCO Company, Inc. c/o James Woods, Esq. Assistant General Counsel 180 Maiden Lane New York, NY 10038 TAXPAYER I.D. #86-0254663 or professional services rendered through and including July 31, 1990 as follows: Groundwater Contamination: Review Sieverson memo regarding possible 07/02/90 J. Zimmerman .4 closure of bore holes. Letter to Jim Sieverson regarding his proposal to close old bore holes; research bore hole 2.2 J. Zimmerman 07/03/90 closure requirements. Call from Jim Sieverson regarding possible .4 J. Zimmerman closure of bore holes. 07/05/90 APPROVED 3.0 Total Hours: \$510.00 SEP 2 6 1990 Current Fees: COMENDAL S COSTS AND CHARGES: .60 07/01/90 Long distance telephone charges. 21.00 07/03/90 Photocopying charges AUTHORIZEL \$ 21.60 2911-111-751-510.00 Total Costs and Charges: EA 87-12 \$531.60 2911-111-752-21,60 Current Fees, Costs and Charges: 2911-111-755- 4510,007 NF-2911-111-756-6221,607 Balance Due Per Prior Statement: 7810-007845 \$ 531,60 TOTAL BALANCE DUE: PAYMENT DUE UPON RECEIPT Statements unpaid as of September 15, 1990 are delinquent. To ensure proper credit, please identify your remittance with the following numbers: 0145.1/080190. 145/JCZTO ENSURE PROPER CREDIT. PLEASE IDENTIFY YOUR REMITTANCE WITH OUR NUMBER(S):

<u> </u>	- G.
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OCT 5 1990

EXPLORATION DEPT.

ORIGINAL

(.024) 1-279-05-543

Y89-ZS-436

Science Applications International Corporation An Employee-Owned Company

'October 2, 1990

Asarco, Inc. 180 Maiden Lane New York, NY 10038 Attn: Fred Graybeal, Chief Geologist

RE: Agreement of 11/16/88 Exp. Date: 11/15/90

INVOICE #2

Costs incurred August 18 through September 14, 1990:

LABOR	CURRENT HOURS	CUMULATIVE HOURS	RATE/HR.	CURRENT	CUMULATIVE
D. Davidson F. Zafran C. Manikas Clerical	3.00 hrs 0.00 hrs 0.00 hrs 0.00 hrs	13.00 hrs	0\$100.00 /hr 0 80.76 /hr 0 60.00 /hr 0 30.00 /hr	\$300.00 0.00 0.00 0.00	\$3,100.00 1,049.88 0.00 105.00
Total:	3.00 hrs	47.50 hrs		\$300.00	\$4,254.88
<u>OTHER DIRECT C</u> Communicati Travel Computer	<u>:OSTS</u> .on & Reprodu	\$15.25 0.00 0.00	\$317.29 857.80 1.50		
Subtotal ODC's Plus 25% of Total ODC's					\$1,176.59 294.15
Total OI)C's			\$19.06	\$1,470.74
Total Co	osts Claimed		Ĕ₩	\$319.06 7 87-17-	\$5,725.62

TOTAL AMOUNT DUE THIS INVOICE:

Totel Am

\$319.06

PLEASE REMIT PAYMENT TO:

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION c/o First National Bank of Maryland Account No. 401-9197-2 P. O. Box 64115 Baltimore, MD 21264

REFER QUESTIONS TO: (615) 481-2126, Robin Lomax

z Piose t

P.O. Box 2501, 800 Oak Ridge Turnpike, Oak Ridge, Tennessee 37830 (615) 482-9031 FAX (615) 482-6828 Other SAIC Offices. Albuquerque, Boston, Colorado Springs, Dayton, Huritsville, Las Vegas, Los Angeles. McLean, Orlando, Palo Alto, San Diego, Seattle, and Tucson

Value: \$20,000.00



Southwestern Exploration Division

January 30, 1991

R.L. Brown New York Office

> Santa Cruz Project Pinal County, AZ

Here are three copies of my April 13, 1978 Peripheral Lands Report. These are the best copies that could be made given the short time frame and other demands on the draftsman.

If these capies are less than suitable for your use, please let me know and better quality copies will be made immediately.

H. G. Krein

H.G. Kreis

HGK:mek Encs.

cc: W.L. Kurtz J.D. Sell



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January 14, 1983

R. L. Brown New York Office

> Parks-Salyer Area Santa Cruz Project Pinal County, AZ

A year or two ago Mr. T. C. Osborne reviewed the possibility of drilling on Mining Department land adjacent to Parks-Salyer. As pointed out by H. G. Kreis then, and reiterated in the attached memo, a potential exists for zero to 100 million tons of 1% chalcocite ore. This potential ore might be as shallow as 400 feet or as deep as 2000 feet.

The drilling of one rotary hole now, while drilling costs are cheap, on Mining Department ground would help determine the potential and whether additional holes will be required to establish a mineral inventory.

Knowledge of the mineral inventory on the Mining Department ground and Parks-Salyer might help in any discussions/negotiations with Getty concerning the "greater" Santa Cruz area.

W. L. Kurtz

WLK/cg

Attachment

cc: TEScartaccini (w/Attach.) JDSell HGKreis



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Southwestern Exploration Division

December 16, 1981

TO: W.D. Payne

FROM: H.G. Kreis 74. G. Krein

Parks-Salyer Area Santa Cruz Project Pinal County, Arizona

W/ new Gr atg

Attached is a map showing potential copper reserves on the Parks-Salyer land and the adjoining Sacaton Mine land. The geology and potential for copper reserves have been discussed verbally. In summary, there is a potential reserve of 10 to 100 million tons at 0.8 to 1.3% copper(chalcocite) in and immediately north of SC-26. The top of this potential reserve is estimated to be 800' to 1500' deep; however, unpredictable faulting could cause part of the reserve to be within 400' of the surface.

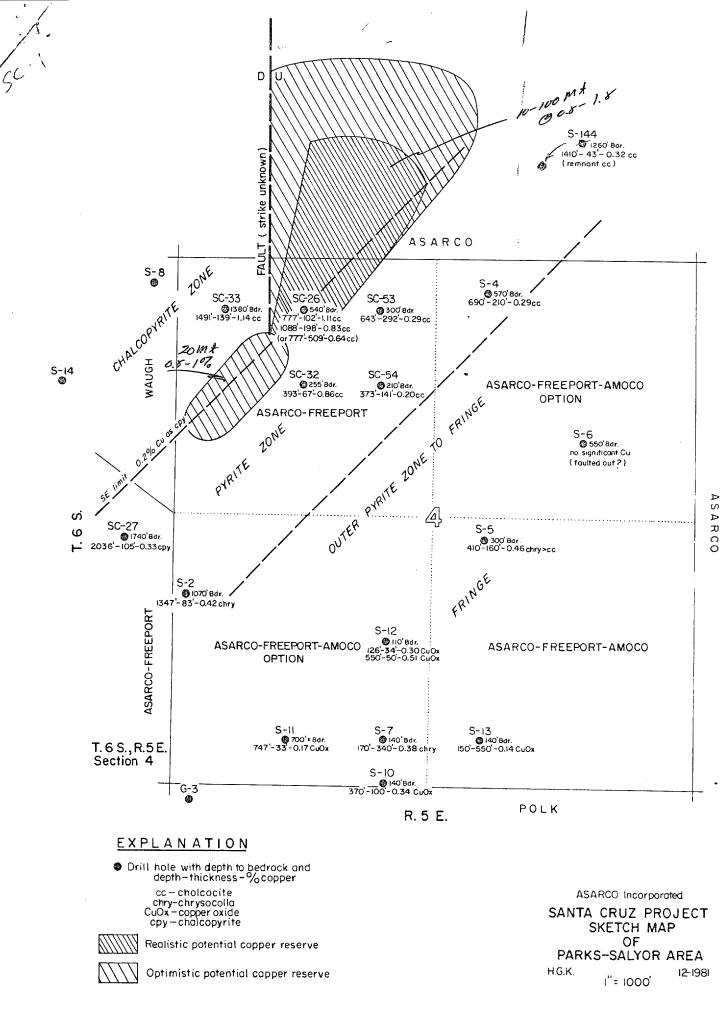
An optimistic potential reserve exists 1000' southwest of SC-26. It amounts to 20 million tons at 0.8to 1.0% copper(chalcocite). This potential reserve is small, and the possibility of its occurrence is highly speculative. The top of this reserve could be within 400' of the surface.

By copy of this letter, I am forwarding copies of the attached map to F.T. Graybeal and W.L. Kurtz.

HGK/mlm

Attachments

c: F.T. Graybeal, w. maps (2) W.L. Kurtz, w. map (1)



New York, April 7, 1982

MEMORANDUM FOR: Mr. R. L. Brown

Parks-Salyer Area Santa Cruz Project Arizona

There is a remote possibility that copper mineralization of ore grade may occur in this area at open pit depths which might sustain the Sacaton operation if the mineralization were found quickly. Possible areas of interest are shown on the map accompanying a brief note by Mr. H. G. Kreis, which is attached.

I learned yesterday that J. B. Montgomery will be in Tucson next week and I discussed with him possible geophysical methods by which areas of shallow bedrock areas might be located. Minimal seismic coverage would cost \$12,000, is not flexible, and may have problems distinguishing bedrock-conglomerate contacts from bedding in the conglomerate (which is tilted) and flat faults. Gravity and resistivity have been fooled in the past in the Santa Cruz-Sacaton area and the error in these measurements can be as much as the maximum alluvial cover tolerable for an economic open pit operation.

Mr. Montgomery said he thought a few resistivity probes would still be useful, particularly since he was going to be in Tucson and that perhaps 12 points could be estimated in one week. He discussed this with Mr. Nicholls who called to inquire what the maximum depth of interest would be and I suggested 600 feet as the maximum depth for the probe. I have discussed this subject with Mr. Anzalone and he will meet with Mr. Montgomery and Mr. Kreis in Tucson, Monday, April 12.

Areas to be probed would be the area south and west of SC-32 on the Parks-Salyer ground and the area north and northeast of SC-26 and 53 on ground controlled by the Mining Department. It should be kept in mind that depth-to-bedrock measurements may only be semi-quantitative and it would be my recommendation that any <u>relatively</u> shallow bedrock target be drilled, regardless of the depth estimate. Assuming that 300 ft. might be a maximum alluvial cover which could be economically stripped (assuming grades and tonnages similar to Sacaton) a mud rotary drilling program in the area of relatively shallow bedrock might be completed with perhaps 10 holes, 300 ft. deep, at a total cost of \$30,000 (\$10/ft.). Drilling on the Parks-Salyer block would be shared equally by Freeport, if they agreed to the program.

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APR 1 2 1982

EXPLOPATION DEPARTMENT

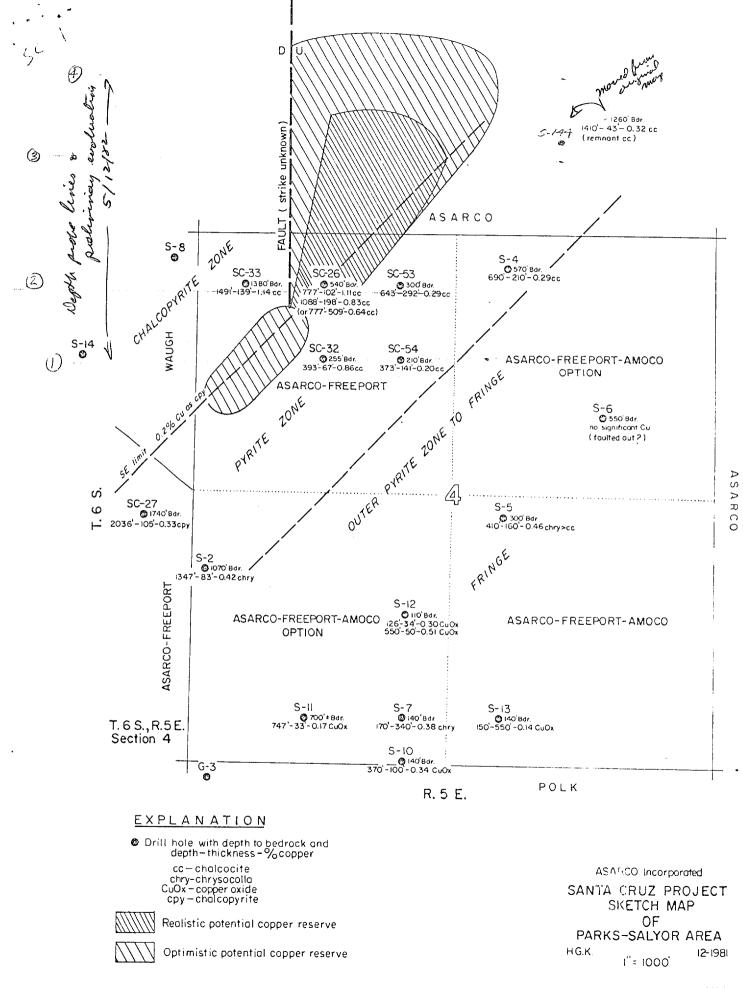
Although chances must be considered slim for discovery of ore under shallow alluvial cover, the existence of shallow bedrock in this area was widely discounted until SC-26 was drilled and the relatively low cost of the proposed drilling justifies a last-ditch attempt to keep the Sacaton Unit operating - hopefully at increased copper prices. I also recall that R. B. Cummings made a study of the shallow pediment possibilities southeast of S-144 and this area should also be part of the review. The Geophysical Department will cover the expense of the resistivity survey.

3.T. Hayleal

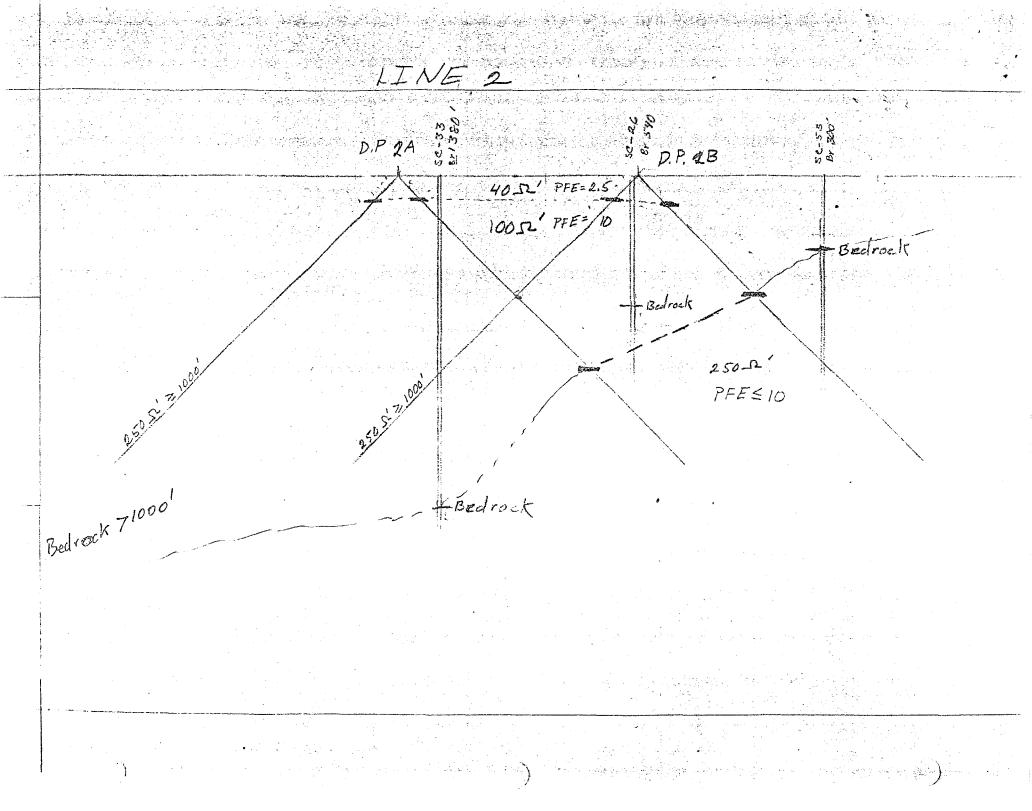
F. T. Graybeal

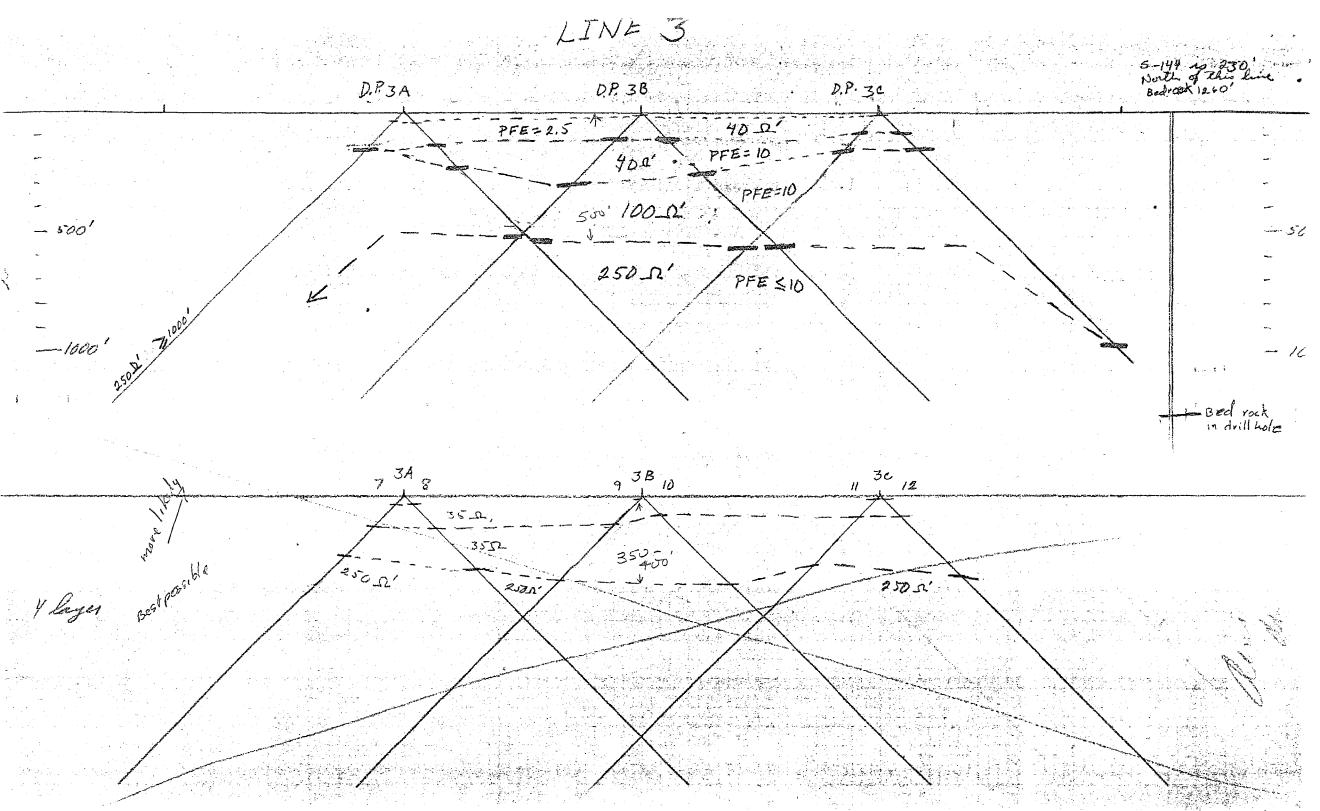
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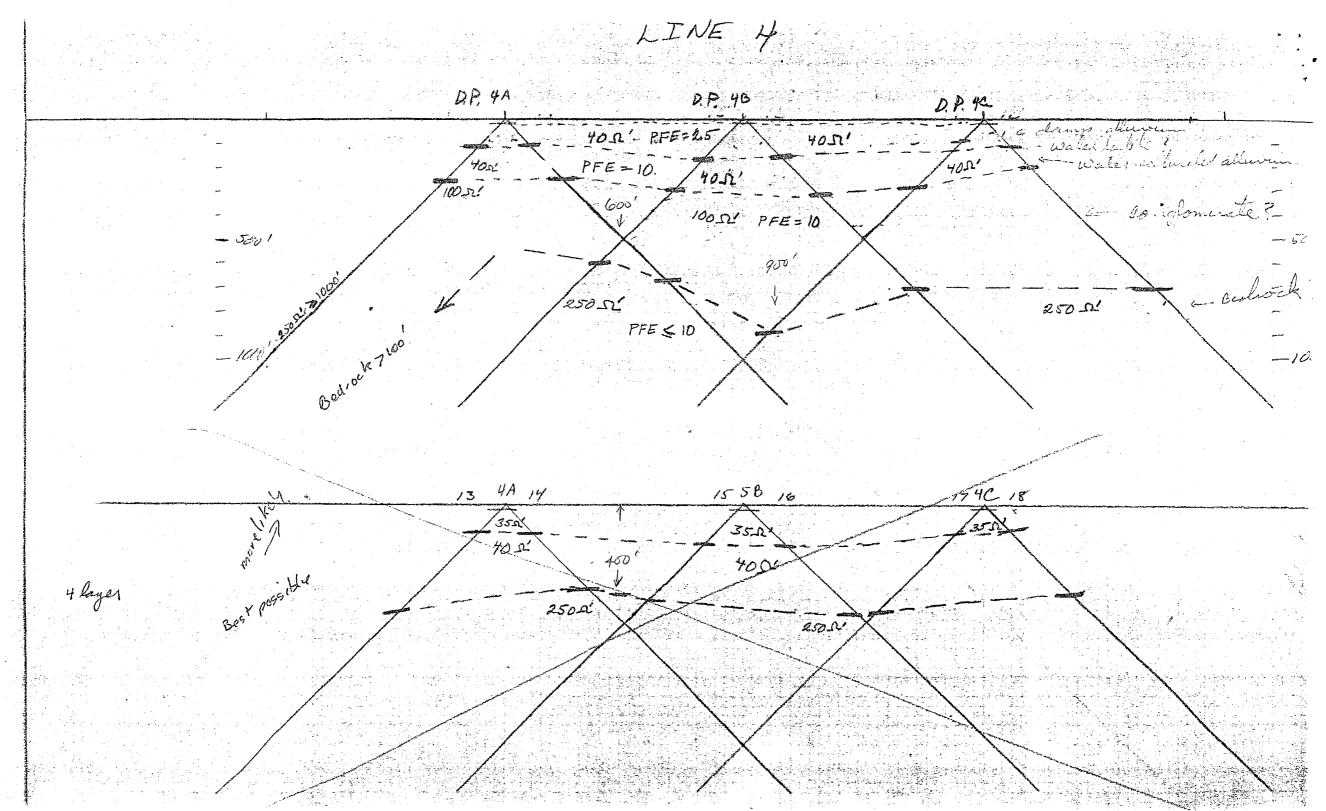
cc: WLKurtz - wo/attach. EBNicholls- w/attach. SAAnzalone- wo/attach.

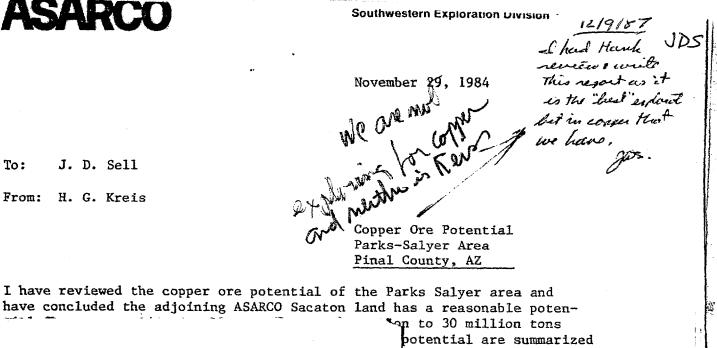


LINE 1 5 D.P. 1A PFE = 2.5 401 PFA = 10 10051 Bedrock ecors 250 N' PFES 10 Bedrock 7 1000; 250 5- 71000 scale linch = 400 feet









From:

R. L. Brown

To:

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ASARCO Incorporated

DEC 2 1 1987

SW Exploration

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December 9, 1987

F.T. Graybeal New York Office

> Copper Ore Potential Parks-Salyer Area Pinal County, AZ

I submit H.G. Kreis' renewed interest memo on the Parks-Salyer exploration potential.

As confirmed by T.E. Scartaccini, the expansion of the Mission Complex will soon take some of the Sacaton mill capacity away for use in the expansion.

Further, as noted previously, most of the exploration potential is on the Mining Department land and Mr. Anzalone has been unable to spark any interest in a test of the potential.

Nevertheless, the ease of the test and the potential reward is such that the five-hole test should be seriously considered.

James to Seco

James D. Sell

JDS:mek att.

cc: W.L. Kurtz H.G. Kreis



November 17, 1987

To: J.D. Sell

From: H.G. Kreis

Copper Ore Potential Parks-Salyer Area Pinal County, AZ

Now that copper prices have returned to a highly profitable level, I feel the attached 11-29-84 memo on the Parks-Salyer Area is worthy of reconsideration. In summary I would like to say there is an excellent potential for discovering 1.5% copper mineralization in the north end of the Parks-Salyer horst block where it is present under the Asarco's Sacaton Mine land. Copper is predicted to be present in the form of chalcocite and/or copper oxide mineralization, both of which are readily leachable. Although the top of the copper mineralization is most likely at a depth of 1000 feet, there is a 10% probability that open pittable copper mineralization occurs near the surface, and it is for this open pittable potential that I recommend drilling a few drill holes to test the depth of the mineralization.

Besides the high copper prices, there is another reason for drilling the Parks-Salyer horst block at this time. If an open pittable copper reserve is found on Asarco's land adjoining the Parks-Salyer property of the Asarco-Freeport Santa Cruz Joint Venture, the northern portion of the Parks-Salyer land may have to be used for the fringes of an open-pit mine or for dump room of an open-pit mine, or for an environmental buffer zone between the pit and future commercial or residential development to the south.

If the exploration drill holes recommended in the attached memo are drilled, we may want to use them for ground-water depth and quality data.

H. G. Krein

H. G. Kreis

HGK:mek Att.

cc: W.L. Kurtz

ASARCO

Southwestern Exploration Division

November 29, 1984

I had Hank review with This resort as it is the "best" explored bet in concer that we have ,

To: J. D. Sell

From: H. G. Kreis

Copper Ore Potential Parks-Salyer Area Pinal County, AZ

I have reviewed the copper ore potential of the Parks Salyer area and have concluded the adjoining ASARCO Sacaton land has a reasonable potential for an open pit mineable reserve of 10 million to 30 million tons at 1.5% copper. The salient features of this ore potential are summarized as follows:

- 1) The top of the ore could be within 200' of the surface of the ground.
- 2) A grade of 1.5% Cu is permissible because such grades occur in the Hanna-Getty deposit and the Sacaton deposit. Also, the sulfide zoning patterns in the area of potential are conducive to strong chalcocite enrichment.
- The ore would be millable, be it chalcocite-chalcopyrite or atacamite.
- 4) There is an idle ASARCO mill nearby.
- 5) Smelter feed would be provided by the milling of ore.
- 6) ASARCO owns the land. There are no royalties or acquisition costs of any kind.
- A minimum amount of time would be required to go into production, say two years for stripping.
- 8) The only substantial capital cost would be for stripping down to the ore.
- 9) The cost and time to do an initial drill hole evaluation of this ore potential would be \$11,000 and one week of time.
- 10) The risks involved in this \$11,000 exploration expenditure are more than offset by the potential profits, cash flow, and smelter feed from open pitable high grade ore.

The chances for developing a mineable reserve from this ore potential are better than average. In my opinion, based on eight years of experience in the Sacaton-Santa Cruz area, the testing of this potential has a far better chance for success than the original, initial drilling off the Sacaton outcrop.

The geologic features in the above summary stress an optimistic interpretation of the potential for ore. The following paragraphs will present some of the justification for this optimistic interpretation.

The attached plan shows the area in which chalcocite enriched ore is most likely to occur. The red colored area has the best potential for finding chalcocite enriched ore, and it is within this area that shallow bedrock is most likely to occur.

You will note that the potential for chalcocite enriched ore occurs in the Parks-Salyer horst block. The south end of the Parks-Salyer horst block is well documented by the Santa Cruz Project and AMOCO drill holes, and it covers approximately one square mile of area. Interestingly, nearly half of the area has the top of bedrock within 300' of the surface of the ground.

The north end of the Parks-Salyer horst block, as contoured in the attached map, is not well defined. The drill holes on the Sacaton land are too widely spaced to predict the size and depth of the north end. The attached map shows an optimistic interpretation of the size and depth using the Sacaton horst block as a model. The lateral dimensions are supported by a resistivity survey (ASARCO, 1982); however, the same survey predicts the top of bedrock at 600'. Geophysically and geologically, bedrock depths are most likely to be on the order of 300' to 800' in depth. Nonetheless, there is a reasonable potential for local bedrock depths as shallow as 100'. Only drilling can determine the depth to bedrock.

The potential for chalcocite enrichment in the north end of the Parks-Salyer block is predicted from the positive results of SC-26 and from projections of the sulfide zoning patterns. Drill hole SC-26 has a chalcocite enriched intercept of 421' at 0.65% Cu which includes 212' at 1.05% Cu. The sulfide zoning patterns show SC-26 is on the edge of the most favorable environment for enrichment, the outer chalcopyrite zone (see attached map). Therefore, better chalcocite enrichment is to be expected west and north of SC-26. West of SC-26 is drill hole SC-33. Hole SC-33 is in an obvious fault gap and the supergene zone has been faulted out leaving only 139' at 1.14% Cu as a sliver in the fault zone. North of SC-26 is the predicted chalcocite enrichment in the north end of the Parks-Salyer horst block.

It's potential grade of 1.5% Cu is, again, an optimistic interpretation; but, the potential is there. The sulfide zoning patterns projected north of SC-26 are conducive to strong leaching and enrichment (described in detail in my memo to you of July 20, 1983). Furthermore, the Santa CruzSacaton area hosts known reserves of 291 million tons at 1.10% Cu; and, of this tonnage, 64 million tons has an average grade of 1.43% Cu.

There is a remote potential for 2% Cu in the area of potential, and it is worth mentioning. Although it may not be found in the area of potential, there is a reasonable likelihood of it occurring somewhere in the Santa Cruz-Sacaton area. The geology of the Santa Cruz-Sacaton area is very similar to that of the Ray-Inspiration-Miami districts, and these districts contained at least 100 million tons at 2% Cu.

The amount of tons of chalcocite enriched rock in the north end of the Parks-Salyer horst is open to much conjecture because of the unpredictable effects of faulting, oxidation, and erosion. As shown in the attached map there is ample room for 100 million tons, but a single fault or destructive oxidation could mean no tonnage at all. On the other hand, faulting or erosion may have stripped the leached capping off the top of the chalcocite blanket so ore occurs within 100' of the top of bedrock. All things considered, the Parks-Salyer horst has a reasonable potential for 30 million to 50 million tons of 1.5% Cu; and, of this amount, 10 million to 30 million tons may be open pit mineable if the top of the ore is found within 200' of the surface.

Testing the open pit potential of the Parks-Salyer horst block would require an expenditure of \$11,000 for five drill holes, each 300' deep. All of the expenditure would be "put in the ground." No further expenditures for geology, geophysics, or land acquisition are needed.

Five proposed rotary drill holes, shown on the attached map, are recommended to locate a 1000' x 1000' horst like pinnacle of bedrock. The drilling of these holes would take a week's time.

In summary, the north end of the Parks-Salyer horst block has a potential for 30 million to 50 million tons of which 10 million to 30 million tons at 1.5% Cu may be open pit mineable. This potential is on ASARCO's land, a mile from ASARCO's idle Sacaton mill. Testing of the potential will require an \$11,000 exploration expenditure to drill five holes, each 300' deep. This expenditure is justified by the potential for open pit ore, and it is enhanced by the nearby ASARCO mill and ASARCO's future needs for smelter feed.

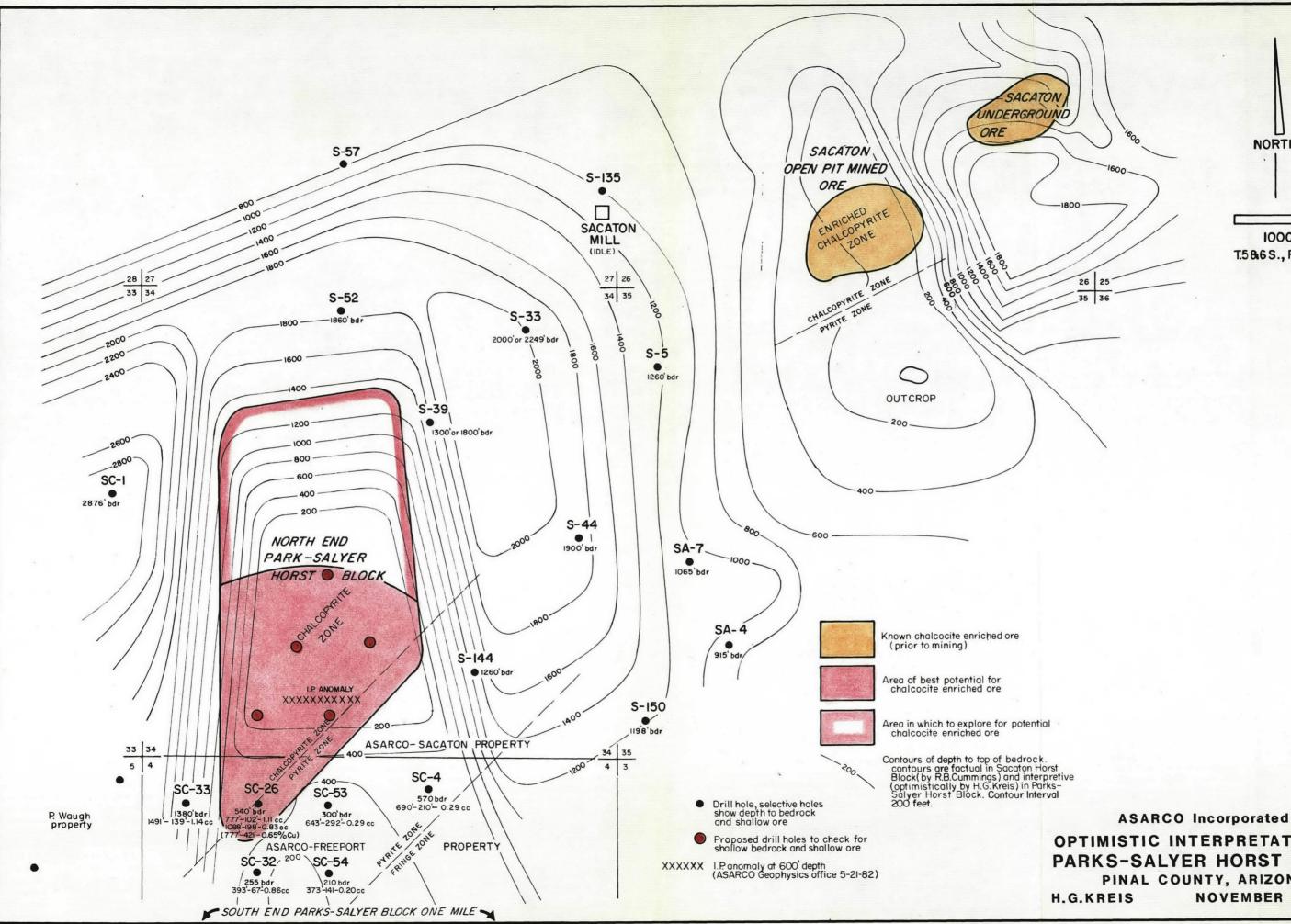
7. G. Krein

H. G. Kreis

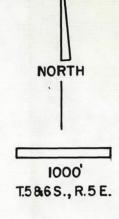
HGK/cg

Attachment

XC: FTS FEE Show SAX TES 12/0184



OPTIMISTIC INTERPRETATION OF PARKS-SALYER HORST BLOCK PINAL COUNTY, ARIZONA **NOVEMBER 20,1984**







Southwestern Exploration Division

March 8, 1990

W.L. Kurtz

Land Use Santa Cruz Project Pinal County, Arizona

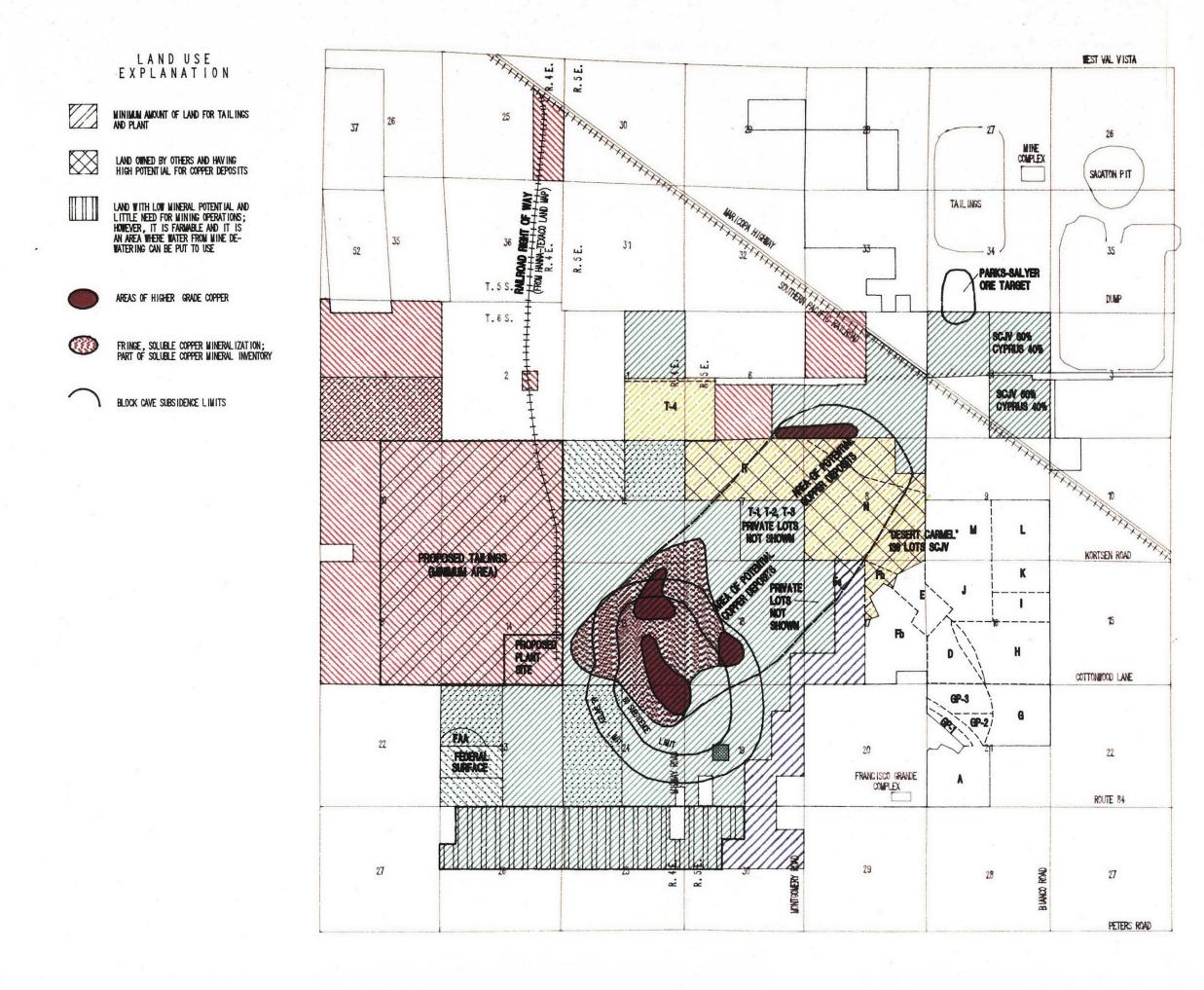
Attached is a map which shows (1) the land status of the Santa Cruz project area without regard to Simmons' options, (2) the area in which more copper deposits are likely to be discovered, and (3) future land needs if the Santa Cruz South deposit is ever conventionally mined.

H.G. Their

H. G. Kreis

HGK:mek Att.

cc: R.L. Brown F.T. Graybeal J.D. Sell A.R. Raihl W.D. Gay



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OWNERSHIP EXPLANATION

SANTA CRUZ JO INT VENTURE PROPERTY:



HANNA-TEXACO PROPERTY:



SURFACE AND MINERAL (UNDER OPTION TO SIMMONS-DEVCOR)

TEXACO PROPERTY:

SURFACE AND MINERAL (UNDER OPTION TO SIMMONS-DEVCOR)

SIMMONS-DEVCOR PROPERTY:



NORTH SANTA CRUZ PROJECT FUTURE LAND USE MAP PINAL COUNTY, ARIZONA

-	••••••	
0	2000*	4000'
HGKreis		March 1990
	n 6857 hgk/dan tuc file SC-UNDA 1	2-20-50

FILE

ASADOO HANNE

NOV 1 5 1991

SW EXPINIATION

ASARCO SANTA CRUZ INC. P. O. Box 5747 Tucson, Arizona 85703

November 7, 1991

FREEPORT Mining Company P. O. Box 61520 New Orleans, LA 70161

Attention: R. J. Hickson

SANTA CRUZ PROJECT

In accordance with the Santa Cruz Joint Venture dated July 1, 1977, we charge you as follows for October, 1991:

<u>Our E. A. No. 0075 - The Lands</u> General Administrative Charges Salaries Overhed on Salaries Property Taxes Pump Repair Legal Fees	\$50.00 210.96 68.00 115,328.42 17,436.30 507.18	133,600.86
<u>Our E. A. No. 0087 - Peripheral Lands</u>		
General Administrative Charges Lease Payment Property Taxes	50.00 (1,000.00)	1/2= \$8,727,86
Topercy Taxes	17,455.72	16,505.72
<u>Our E.A. No. 0134 - Mooney Tract</u> Property Taxes	2,742.82	2,742.82
<u>Our E.A. No. 0196 - Amoco Land</u> Property Taxes	9,090.62	9,090.62
		<u>161,940.02</u>
1/2 to Freeport-McMoran Balance brought forward Payment received from Freeport-McMora In Situ Leach Project October charges	80,970.01 14,438.02 (14,438.02) <u>13,599.79</u>	
Balance due		<u>\$94,569.80</u>
cc: Controller/Att: LAMoccia JDSell Freeport Mining Co. File		