Previous

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project NASA - JPL/EBASCO Location PASADENA, CA. Depth 653 Date MARCH 2/90

Drillhole No. MW-3 Sampling Zone No. 2 (CONTINUED) Starting Time 7:20 a.m. Finishing Time 9:25 AM.

Technicians ER/KS/DMC, DAVE NYE

Water Level Inside MP Casing (Beginning of Session) 166.31' FROM TOP OF 7½" (End of Session) 167.98'

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

COUNTER TOP 771 192.9 m VONS DRINKING WATER USED AS RINSE

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS ALL SAMPLES COLLECTED WITH 4×250 ml SAMPLE BOTTLES					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft, BRT)	Valve Open Time	Valve Closed Time	Water Level in MP (ft, BRT)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	156.48	8:40:00		157.85	—	REJECT RUN
2	✓	✓	✓	✓	✓	157.93	8:21:30	8:24:00	157.92	~1l	
3	✓	✓	✓	✓	✓	158.00	8:57:00	8:59:30	157.99		
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume :

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) R1 - REJECT AS VALVE OPENED PRIOR TO ACTIVATION @ PORT. - DE-CON BOTTLES.
R3 pH 7.05, T° = 15.6°C, Sc = 380 μmhos.

270789

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project NASA · JPL / EBASCO Location Pasadena California Depth 653' Date Mar 1/90

Drillhole No. MW-3 Sampling Zone No. 2 Starting Time 1:25 PM Finishing Time 5:20 PM

Technicians KS / DMc

Water Level Inside MP Casing (Beginning of Session) See Zone 4 Sheet (End of Session) 166.37' FROM TOP OF 7½" STEEL CASING.

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

COUNTER 197.8 m

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS All Collected with 4x250 ml S.S. Bottles					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft, m)	Valve Open Time	Valve Closed Time	Water Level in MP (ft, m)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	155.98	2:16:30	2:19:00	155.97	~1 l	
2	✓	✓	✓	✓	✓	156.08	2:54:00	2:56:30	156.07	~1 l	
3	✓	✓	✓	✓	✓	156.16	3:29:00	3:31:30	156.17	~1 l	
4	✓	✓	✓	✓	✓	156.25	4:06:00	4:08:30	156.25	~1 l	
5	✓	✓	✓	✓	✓	156.34	4:50:15	4:52:45	156.34	~1 l	
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume :

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) R1, VERY SLIGHT HAZE ph: 8.12 T = 18.1 Sc: 320

270789

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project NASA - JPL / EBASCO Location PASADENA, CA. Depth 239' Date MARCH 2, 1990

Drillhole No. MW-4 Sampling Zone No. 8 Starting Time 11:05 AM Finishing Time 3:45 PM

Technicians ER/KS/DMC/ ES 504 DES 290, SIE RARE

Water Level Inside MP Casing (Beginning of Session) 148.57' (End of Session) SEE ZONE #6

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

DEPTH COUNTER 72.7 m

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS 4 x 250 ml SAMPLE BOTTLES					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft, m)	Valve Open Time	Valve Closed Time	Water Level in MP (ft, m)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	138.88	11:44:15	11:46:45	138.87	NIL	VACUUM 7-10 NO SAMPLE
2	✓	✓	✓	✓	✓	138.58	12:55:00	12:57:30	138.58	~1 l	
3	✓	✓	✓	✓	✓	139.52	1:17:00	1:19:30	139.52	~1 l	
4	✓	✓	✓	✓	✓	139.56	1:37:00	1:39:30	139.56	~1 l	
5	✓	✓	✓	✓	✓	139.62	1:57:00	1:59:30	139.62	~1 l	
6	✓	✓	✓	✓	✓	139.65	2:16:15	2:18:45	139.65	~1 l	
7	✓	✓	✓	✓	✓	139.72	2:37:00	2:39:30	139.71	~1 l	
8	✓	✓	✓	✓	✓	139.76	3:00:00	3:02:30	139.75	~1 l	
9	✓	✓	✓	✓	✓	139.81	3:21:00	3:23:30	139.81	~1 l	
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume :

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) R_2 = ph: 7.40, T° = 19.1°C, Sc: 500 µmhos. CLEAR

ph: 7.78, T° = 18.7°C, Sc 450 µmhos CLEAR

270789

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project NASA JPL / EBASCO Location PASADENA, CA. Depth 149 ft. Date MARCH 3/90

Drillhole No. MW-4 Sampling Zone No. 10 Starting Time 12:20 PM. Finishing Time 4:20 PM

Technicians ER/KS/DMC/MARK CUTLER

Water Level Inside MP Casing (Beginning of Session) See Zone #6 (End of Session) 148.12 from top of MP with Flushing Adapter, 1.470 above Mid Coupling #69

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

COUNTER DEPTH : 45.6 m

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS 4x250 ml SS SAMPLE BOTTLES.					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft, AK)	Valve Open Time	Valve Closed Time	Water Level in MP (ft, AK)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	140.69	12:43:00	12:45:30	140.68	~1 l	
2	✓	✓	✓	✓	✓	140.70	12:59:00	1:01:30	140.67	~1 l	
3	✓	✓	✓	✓	✓	140.72	1:16:00	1:18:30	140.69	~1 l	
4	✓	✓	✓	✓	✓	140.74	1:32:30	1:35:00	140.73	~1 l	
5	✓	✓	✓	✓	✓	140.76	1:48:00	1:50:30	140.75	~1 l	
6	✓	✓	✓	✓	✓	140.78	2:03:30	2:06:00	140.75	~0.9 l	
7	✓	✓	✓	✓	✓	140.79	2:22:00	2:24:30	140.77	~1 l	
8	✓	✓	✓	✓	✓	140.81	2:38:00	2:40:30	140.78	~1 l	
9	✓	✓	✓	✓	✓	140.83	2:55:00	2:57:30	140.81	~1 l	
10	✓	✓	✓	✓	✓	140.84	3:12:00	3:14:30	140.80	~1 l	
11	✓	✓	✓	✓	✓	140.85	3:28:15	3:30:45	140.83	~1 l	
12	✓	✓	✓	✓	✓	140.86	3:43:00	3:45:30	140.84	~1 l	
13	✓	✓	✓	✓	✓	140.89	3:58:15	4:00:45	140.86	~1 l	
14	✓	✓	✓	✓	✓	140.88	4:12:30	4:15:00	140.86	~1 l.	
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume : _____

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) _____

270789

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project NASA - JPL/EBASCO. Location PASADENA, CA. Depth 321' Date MARCH 2/90

Drillhole No. MW-4 Sampling Zone No. 6 Starting Time 3:50 PM Finishing Time 5:10 PM

Technicians ER/KS/DMC

Water Level Inside MP Casing (Beginning of Session) SEE ZONE 8 (End of Session) —

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

DEPTH ON COUNTER 97.6 m

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft, m)	Valve Open Time	Valve Closed Time	Water Level in MP (ft, m)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	139.52	4:00:00	4:02:30	139.50	~1 l	
2	✓	✓	✓	✓	✓	139.57	4:26:45	4:29:15	139.56	~1 l	
3	✓	✓	✓	✓	✓	139.62	4:48:30	4:51:00	139.61	~1 l	
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume : CLEAR

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) R1 pH = 8.23 T = 18.4°C Sc = 360 µmhos

270789

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project JPL - NASA / EBASCO Location PASADENA, CALIFORNIA Depth 321' Date MARCH 3/90

Drillhole No. MW-4 Sampling Zone No. 6 Starting Time 10:00 AM Finishing Time 12:10 PM

Technicians ER/KS/DMC/MARK CUTLER. ES 504, DES 290, SIR REEL

Water Level Inside MP Casing (Beginning of Session) 147.70' FROM TOP MP W/ FLUSHING ADAPTER. (End of Session) SEE ZONE 10

1.470' S/W ABOVE MID CPLG #69

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

DEPTH COUNTER 99.3

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS (FROM TOP OF FLUSHING COLLAR) 4x250ml SAMPLE BOTTLES					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft, m)	Valve Open Time	Valve Closed Time	Water Level in MP (ft, m)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	139.67	10:26:00	10:28:30	139.67	~1 l	
2	✓	✓	✓	✓	✓	139.74	10:52:30	10:54:00	139.73	~1 l	
3	✓	✓	✓	✓	✓	139.78	11:16:00	11:18:30	139.78	~1 l	
4	✓	✓	✓	✓	✓	139.82	11:38:00	11:40:30	139.83	~1 l	
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume : _____

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) _____

270789

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project JPL NASA / EBASCO Location Pasadena California Depth 391' 119m Date Mar 5/90

Drillhole No. MW 4 Sampling Zone No. 4 Starting Time 7:30 AM Finishing Time 11:15 AM

Technicians DMc / KS / ER

Water Level Inside MP Casing (Beginning of Session) 148.21 (End of Session) See Zone #2

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

Counter 119.5

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS (All Collected with 4x250 ml S.S. Bottles)					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft)	Valve Open Time	Valve Closed Time	Water Level in MP (ft)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	140.00	7:45:00	7:45:30	139.98	~1 l	
2	✓	✓	✓	✓	✓	140.09	8:09:30	8:12:00	140.07	~1 l	
3	✓	✓	✓	✓	✓	140.17	8:30:30	8:33:00	140.16	~1 l	
4	✓	✓	✓	✓	✓	140.25	8:59:30	9:02:00	140.18	~1 l	
5	✓	✓	✓	✓	✓	140.38	9:28:00	9:30:30	140.34	~1 l	
6	✓	✓	✓	✓	✓	140.42	9:52:30	9:55:00	140.41	~1 l	
7	✓	✓	✓	✓	✓	140.55	10:09:30	10:12:00	143.5	—	Decon. Bottles
8	✓	✓	✓	✓	✓	143.60	10:44:30	10:47:00	143.59	~1 l	
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume :

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) pH = 7.26 T = 16.5 Sc = 320 CLEAR

7.49 T = 16.2 Sc 311 11:00

270789

Westbay Instruments Inc.

Groundwater Sampling

FIELD DATA SHEET

Project NASA-JPL / EBASCO Location Pasadena CA. Depth 156m 512' Date Mar 5 1990

Drillhole No. MW-4 Sampling Zone No. 2 Starting Time 11:15 AM Finishing Time 2:40 PM

Technicians K.S. E.R. DMC

Water Level Inside MP Casing (Beginning of Session) See Zone 4 (End of Session) 152.19' FROM TOP MP (1.0 ft TEMP S/U FROM MID COUPLING #69.)

Sampler Probe Preparation - See Sampling Plan Collection Bottle Preparation - See Sampling Plan

SURFACE FUNCTION CHECKS						SAMPLE COLLECTION CHECKS All collected with 4x250 ml S.S Bottles					
Run No.	Activation	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Water Level in MP (ft, ~~m~~)	Valve Open Time	Valve Closed Time	Water Level in MP (ft, ~~m~~)	Volume Retrieved (l)	Sample Container Type
1	✓	✓	✓	✓	✓	143.17	11:27:30	11:30:00	143.16	≈1	
2	✓	✓	✓	✓	✓	143.27	11:58:00	12:00:30	143.26	≈1	
3	✓	✓	✓	✓	✓	143.37	12:27:15	12:29:45	143.35	≈1	
4	✓	✓	✓	✓	✓	143.46	12:51:00	12:53:30	143.44	1l	
5	✓	✓	✓	✓	✓	143.52	1:21:00	1:23:30	143.50	1l	
6	✓	✓	✓	✓	✓	143.60	1:45:45	1:48:15	143.59	≈1l	
7	✓	✓	✓	✓	✓	143.77	2:16:15	2:18:45	143.73	≈1l	
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Total Volume : 7l

FIELD DETERMINATIONS (APPEARANCE, pH, S.C. , etc.) pH 7.38 T=16.6°C Sc417 @ 11:47 Clear
pH 7.59 T 16.8°C Sc425 @ 2:36

270789

APPENDIX C

Laboratory Analytical Reports for Groundwater

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 02/28/90
DATE REPORTED: 03/16/90

LAB NUMBER: 25522

CLIENT: EBASCO SERVICES, INC.

REPORT ON: TWO WATER SAMPLES

PROJECT #: 7708.016

LOCATION: JPL-ESI, PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA

DATE RECEIVED: 02/28/90
DATE ANALYZED: 03/05/90
DATE REPORTED: 03/16/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN AQUEOUS SOLUTIONS BY IR
EXTRACTION: EPA 3510 SEPERATORY FUNNEL

LAB ID	SAMPLE ID	TPH (mg/L)
1	MW-3-0	ND (0.2)
2	MW-3-1	ND (0.2)

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference):	2
Accuracy (Spike % Recovery):	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-1
CLIENT:EBASCO SERVICES, INC.
PROJECT #:7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-0

DATE RECEIVED: 02/28/90
DATE EXTRACTED:03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/16/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	114

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-2
CLIENT:EBASCO SERVICES, INC.
PROJECT #:7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-1

DATE RECEIVED: 02/28/90
DATE EXTRACTED:03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/16/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	114

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
SAMPLE ID: MW-3-0

DATE RECEIVED: 02/28/90
DATE ANALYZED: 03/08/90
DATE REPORTED: 03/16/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	8	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	105	
Toluene-d8	100	
Bromofluorobenzene	95	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
SAMPLE ID: MW-3-1

DATE RECEIVED: 02/28/90
DATE ANALYZED: 03/08/90
DATE REPORTED: 03/16/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	7	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	104
Toluene-d8	100
Bromofluorobenzene	99

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-0

DATE RECEIVED: 02/28/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/16/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-1
SAMPLE ID: MW-3-0

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5

HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	55
Phenol-d5	42
2,4,6-Tribromophenol	76
Nitrobenzene-d5	63
2-Fluorobiphenyl	67
Terphenyl-d14	65

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-1

DATE RECEIVED: 02/28/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/16/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-2
SAMPLE ID: MW-3-1

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	55
Phenol-d5	45
2,4,6-Tribromophenol	91
Nitrobenzene-d5	77
2-Fluorobiphenyl	83
Terphenyl-d14	80

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-0

DATE RECEIVED: 02/28/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/16/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN AQUEOUS SOLUTIONS

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.04	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.1	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	1	98	Mercury	4	98
Arsenic	5	101	Molybdenum	16	93
Barium	<1	106	Nickel	2	109
Beryllium	<1	114	Selenium	2	124
Cadmium	<1	96	Silver	<1	104
Chromium	<1	103	Thallium	12	89
Cobalt	<1	106	Vanadium	<1	108
Copper	<1	107	Zinc	6	110
Lead	<1	108			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-1

DATE RECEIVED: 02/28/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/16/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN AQUEOUS SOLUTIONS

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.04	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	0.01	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	ND (0.01)	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	1	98	Mercury	4	98
Arsenic	5	101	Molybdenum	16	93
Barium	<1	106	Nickel	2	109
Beryllium	<1	114	Selenium	2	124
Cadmium	<1	96	Silver	<1	104
Chromium	<1	103	Thallium	12	89
Cobalt	<1	106	Vanadium	<1	108
Copper	<1	107	Zinc	6	110
Lead	<1	108			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA

DATE RECEIVED: 02/28/90
DATE ANALYZED: 03/05/90
DATE REPORTED: 03/16/90

TOTAL STRONTIUM ANALYSIS IN AQUEOUS SOLUTIONS, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/Kg)
1	MW-3-0	0.60
2	MW-3-1	0.53

DETECTION LIMIT = 0.05 mg/L

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	1
Accuracy (Spike % Recovery)	101

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25522
CLIENT: EBASCO SERVICES, INC.
PROJECT #:7708.016
LOCATION: JPL-ESI, PASADENA

DATE RECEIVED: 02/28/90
DATE ANALYZED: 03/08-09
DATE REPORTED: 03/16/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	MW-3-0	ND	mg/L	0.02
2	MW-3-1	ND	mg/L	0.02

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	3
Accuracy (Spike % Recovery):	98

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

184

Project Name: JPL-EXI
Project Address: PASADENA, CALIF.
Ebasco OFS #: NASA 7708.016

Sampling Date: 2-27-90

Shipment Date: 2-28-90

Shipping Number:

Sampler: (Name) M. CUTLER

Sampler: (Signature) M. Cutler

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK

Reports to Be Sent to: M. CUTLER

Laboratory Instructions: SEE BELOW

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
MW-I-0	AM-PM	WAIT TO WHEN TO HNO3	—	1 L GLASS AND PLASTIC	X		7 BOTTLES																								
MW-I-1	AM-PM	" "	—	" "	X		"																								

COMMENTS: ANALYZE SAMPLES FOR TITLE 22 METALS PLUS STRONTIUM, VOLATILE ORGANICS (624), SEMIVOLATILE ORGANICS (625), PESTICIDES AND PCB'S (608), TPH (418.1), AND CYANIDE (9010).

USE DRINKING WATER DETECTION LIMITS!

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	2-28-90	[illegible]			
Company: EBASCO	Time: 1129	Company:	Company:	Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023. Phone (213) 269-7421. Fax (213) 268-5328

DATE RECEIVED: 03/02/90
DATE REPORTED: 03/15/90

LAB NUMBER: 25525

CLIENT: EBASCO

REPORT ON: TWO WATER SAMPLES

PROJECT #: 7708.016

LOCATION: JPL-ESI, PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 03/02/90
DATE REPORTED: 03/15/90

LAB NUMBER: 25525

CLIENT: EBASCO

REPORT ON: TWO WATER SAMPLES

PROJECT #: 7708.016

LOCATION: JPL-ESI, PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/05/90
DATE REPORTED: 03/15/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN AQUEOUS SOLUTIONS BY IR
EXTRACTION: EPA 3510 SEPERATORY FUNNEL

LAB ID	SAMPLE ID	TPH (mg/L)
1	MW-3-2	ND (0.2)
2	MW-3-3	ND (0.2)

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference):	<1
Accuracy (Spike % Recovery):	97

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-1
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-3-2

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	6	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	109%
Toluene-d8	98%
Bromofluorobenzene	96%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-2
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-3-3

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	107%	
Toluene-d8	95%	
Bromofluorobenzene	98%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-1
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL-ESI; PASADENA
SAMPLE ID: MW-3-2

DATE RECEIVED: 03/02/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-1
SAMPLE ID: MW-3-2

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	17	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	50%
Phenol-d5	39%
2,4,6-Tribromophenol	65%
Nitrobenzene-d5	67%
2-Fluorobiphenyl	68%
Terphenyl-d14	65%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-2
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL-ESI; PASADENA
SAMPLE ID: MW-3-3

DATE RECEIVED: 03/02/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-2
SAMPLE ID: MW-3-3

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5

HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	55%
Phenol-d5	44%
2,4,6-Tribromophenol	76%
Nitrobenzene-d5	73%
2-Fluorobiphenyl	72%
Terphenyl-d14	73%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-1
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA
SAMPLE ID: MW-3-2

DATE RECEIVED: 03/02/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/15/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4%
Accuracy (Spike % Recovery)	114%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-2
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA
SAMPLE ID: MW-3-3

DATE RECEIVED: 03/02/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/15/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4%
Accuracy (Spike % Recovery)	114%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-1
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-2

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.03	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.003)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.03	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	1	98	Mercury	4	96
Arsenic	5	101	Molybdenum	16	93
Barium	<1	106	Nickel	2	109
Beryllium	<1	114	Selenium	2	124
Cadmium	<1	96	Silver	<1	104
Chromium	<1	103	Thallium	12	89
Cobalt	<1	106	Vanadium	<1	108
Copper	<1	107	Zinc	6	110
Lead	<1	108			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525-2
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-3

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.02	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.003)	5
Mercury	ND (0.001)	0.2
Molybdenum	0.02	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.02	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	1	98	Mercury	4	96
Arsenic	5	101	Molybdenum	16	93
Barium	<1	106	Nickel	2	109
Beryllium	<1	114	Selenium	2	124
Cadmium	<1	96	Silver	<1	104
Chromium	<1	103	Thallium	12	89
Cobalt	<1	106	Vanadium	<1	108
Copper	<1	107	Zinc	6	110
Lead	<1	108			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/05/90
DATE REPORTED: 03/15/90

TOTAL STRONTIUM ANALYSIS IN AQUEOUS SOLLUTIONS, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/L)
1	MW-3-2	0.43
2	MW-3-3	0.21

LIMIT OF DETECTION = 0.05 mg/L.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	1
Accuracy (Spike % Recovery)	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25525
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/08-09
DATE REPORTED: 03/15/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	MW-3-2	ND	mg/L	0.02
2	MW-3-3	ND	mg/L	0.02

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	3%
Accuracy (Spike % Recovery):	98%

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 03/05/90
DATE REPORTED: 03/19/90

LAB NUMBER: 25536

CLIENT: EBASCO SERVICES, INC.

REPORT ON: THREE MONITORING WELL SAMPLES

PROJECT #: JPL-ESI

LOCATION: PASADENA, CA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/15/90
DATE REPORTED: 03/19/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN AQUEOUS SOLUTIONS BY IR
EXTRACTION: EPA 3510 SEPERATORY FUNNEL

LAB ID	SAMPLE ID	TPH (mg/L)
1	MW-3-4	0.5
2	MW-3-5	0.4

LIMIT OF DETECTION = 0.2 mg/L.

QA/QC DATA SUMMARY:

Precision (Relative % Difference):	4
Accuracy (Spike % Recovery):	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
SAMPLE ID: MW-3-4

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/08/90
DATE REPORTED: 03/19/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	102%
Toluene-d8	99%
Bromofluorobenzene	102%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-3
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
SAMPLE ID: MW-3-4 FB

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/08/90
DATE REPORTED: 03/19/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	104%
Toluene-d8	107%
Bromofluorobenzene	98%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-3-4

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/19/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-1
SAMPLE ID: MW-3-4

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	37%
Phenol-d5	28%
2,4,6-Tribromophenol	80%
Nitrobenzene-d5	74%
2-Fluorobiphenyl	73%
Terphenyl-d14	73%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-3-5

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/19/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-2
SAMPLE ID: MW-3-5

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5

HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	43%
Phenol-d5	29%
2,4,6-Tribromophenol	74%
Nitrobenzene-d5	74%
2-Fluorobiphenyl	70%
Terphenyl-d14	64%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-3-4

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/19/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	114

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-3-5

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/19/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	114

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-3-4

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/19/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.04	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.01)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	0.02	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.06	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	<1	79
Arsenic	7	102	Molybdenum	6	96
Barium	1	105	Nickel	7	107
Beryllium	<1	110	Selenium	4	104
Cadmium	<1	99	Silver	3	91
Chromium	<1	106	Thallium	8	104
Cobalt	<1	105	Vanadium	<1	106
Copper	<1	109	Zinc	<1	108
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/13/90
DATE REPORTED: 03/19/90

TOTAL STRONTIUM ANALYSIS IN AQUEOUS SOLUTIONS, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/L)
1	MW-3-4	0.43

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	2
Accuracy (Spike % Recovery)	113

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25536
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/16-19
DATE REPORTED: 03/19/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	MW-3-4	ND	mg/L	0.02

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	5%
Accuracy (Spike % Recovery):	100%

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

186

Project Name: JPL-EST
Project Address: PASADENA, CALIF.
Ebasco OFS #: NASA 7108.016

Sampling Date: 3-1-90

Sampler: (Name) A. LOAN

Shipment Date: 3-2-90

Sampler: (Signature) M. Cutler for A. LOAN

Shipping Number: _____

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	VOA (624)	SEMI-VOA (625)	PEST + PCB (608)	T22 METALS PLUS STRONTIUM	TPH (418.1)	CYANIDE (9010)	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
MW-3-4	AM-AM	NONE TO NaOH TO HNO_3	—	1 LITER TO 40 ML	X		8 BOTTLES	X	X	X	X	X	X																		
MW-3-5	PM	" "	—	"	X		4 BOTTLES		X	X		X																			
MW-3-4-FR	AM	NONE	—	40 ML	X			X																							

COMMENTS: USE DRINKING WATER DETECTION LIMITS.

THE REST OF SAMPLE MW-3-5 WILL FOLLOW.

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	3-2-90	J. P. [illegible]			
Company: EBASCO	Time:	Company: CoT LAB	Company:	Time:	Company:

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-1
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-3-5

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	110%
Toluene-d8	94%
Bromofluorobenzene	95%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-2
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-4-2

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	104%	
Toluene-d8	103%	
Bromofluorobenzene	96%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-3
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-4-3

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	101%
Toluene-d8	102%
Bromofluorobenzene	94%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-4
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-4-3-FB

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	106%
Toluene-d8	101%
Bromofluorobenzene	94%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-5
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-4-1

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	108%	
Toluene-d8	102%	
Bromofluorobenzene	94%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-6
CLIENT: EBASCO
PROJECT #: 7708.016
SAMPLE ID: MW-4-0

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	107%
Toluene-d8	106%
Bromofluorobenzene	101%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-2
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL-ESI; PASADENA
SAMPLE ID: MW-4-2

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-2
SAMPLE ID: MW-4-2

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5

HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	48%
Phenol-d5	44%
2,4,6-Tribromophenol	72%
Nitrobenzene-d5	70%
2-Fluorobiphenyl	74%
Terphenyl-d14	79%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-3
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL-ESI; PASADENA
SAMPLE ID: MW-4-3

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

LABORATORY NUMBER: 25526-3
SAMPLE ID: MW-4-3

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5

HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	59%
Phenol-d5	45%
2,4,6-Tribromophenol	84%
Nitrobenzene-d5	76%
2-Fluorobiphenyl	77%
Terphenyl-d14	80%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-4
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL-ESI; PASADENA
SAMPLE ID: MW-4-3-FB

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-4
SAMPLE ID: MW-4-3-FB

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	61%
Phenol-d5	46%
2,4,6-Tribromophenol	68%
Nitrobenzene-d5	82%
2-Fluorobiphenyl	80%
Terphenyl-d14	80%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-5
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL-ESI; PASADENA
SAMPLE ID: MW-4-1

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-5
SAMPLE ID: MW-4-1

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5

HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	63%
Phenol-d5	49%
2,4,6-Tribromophenol	84%
Nitrobenzene-d5	81%
2-Fluorobiphenyl	83%
Terphenyl-d14	81%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-6
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL-ESI; PASADENA
SAMPLE ID: MW-4-0

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/05/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-6
SAMPLE ID: MW-4-0

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	51%
Phenol-d5	46%
2,4,6-Tribromophenol	65%
Nitrobenzene-d5	79%
2-Fluorobiphenyl	78%
Terphenyl-d14	78%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-2
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA
SAMPLE ID: MW-4-2

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/15/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4%
Accuracy (Spike % Recovery)	114%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-3
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA
SAMPLE ID: MW-4-3

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/15/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4%
Accuracy (Spike % Recovery)	114%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-4
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA
SAMPLE ID: MW-4-3-FB

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/15/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4%
Accuracy (Spike % Recovery)	114%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-5
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA
SAMPLE ID: MW-4-1

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/15/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4%
Accuracy (Spike % Recovery)	114%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-6
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA
SAMPLE ID: MW-4-0

DATE RECEIVED: 03/05/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/15/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4%
Accuracy (Spike % Recovery)	114%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-1
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-3-5

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.02	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	0.01	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	0.04	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.2	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	2	102
Arsenic	7	102	Molybdenum	1	96
Barium	1	105	Nickel	2	105
Beryllium	<1	113	Selenium	4	104
Cadmium	<1	96	Silver	<1	101
Chromium	<1	106	Thallium	8	104
Cobalt	5	106	Vanadium	2	108
Copper	2	107	Zinc	<1	107
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-2
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-4-2

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	ND (0.01)	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	0.01	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.04	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	2	102
Arsenic	7	102	Molybdenum	1	96
Barium	1	105	Nickel	2	105
Beryllium	<1	113	Selenium	4	104
Cadmium	<1	96	Silver	<1	101
Chromium	<1	106	Thallium	8	104
Cobalt	5	106	Vanadium	2	108
Copper	2	107	Zinc	<1	107
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-3
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-4-3

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.03	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.11	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	2	102
Arsenic	7	102	Molybdenum	1	96
Barium	1	105	Nickel	2	105
Beryllium	<1	113	Selenium	4	104
Cadmium	<1	96	Silver	<1	101
Chromium	<1	106	Thallium	8	104
Cobalt	5	106	Vanadium	2	108
Copper	2	107	Zinc	<1	107
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-4
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-4-3-FB

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	ND (0.01)	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.02	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	2	102
Arsenic	7	102	Molybdenum	1	96
Barium	1	105	Nickel	2	105
Beryllium	<1	113	Selenium	4	104
Cadmium	<1	96	Silver	<1	101
Chromium	<1	106	Thallium	8	104
Cobalt	5	106	Vanadium	2	108
Copper	2	107	Zinc	<1	107
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-5
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-4-1

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.05	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.06	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	2	102
Arsenic	7	102	Molybdenum	1	96
Barium	1	105	Nickel	2	105
Beryllium	<1	113	Selenium	4	104
Cadmium	<1	96	Silver	<1	101
Chromium	<1	106	Thallium	8	104
Cobalt	5	106	Vanadium	2	108
Copper	2	107	Zinc	<1	107
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526-6
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL-ESI, PASADENA
SAMPLE ID: MW-4-0

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/07/90
DATE REPORTED: 03/15/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.05	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.03	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	2	102
Arsenic	7	102	Molybdenum	1	96
Barium	1	105	Nickel	2	105
Beryllium	<1	113	Selenium	4	104
Cadmium	<1	96	Silver	<1	101
Chromium	<1	106	Thallium	8	104
Cobalt	5	106	Vanadium	2	108
Copper	2	107	Zinc	<1	107
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA

DATE RECEIVED: 03/02/90
DATE ANALYZED: 03/06/90
DATE REPORTED: 03/15/90

TOTAL STRONTIUM ANALYSIS IN AQUEOUS SOLUTIONS, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/L)
1	MW-3-5	0.18
2	MW-4-2	0.54
3	MW-4-3	0.27
4	MW-4-3-FB	ND (0.05)
5	MW-4-1	0.42
6	MW-4-0	0.45

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	13
Accuracy (Spike % Recovery)	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25526
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI; PASADENA

DATE RECEIVED: 03/05/90
DATE ANALYZED: 03/08-09
DATE REPORTED: 03/15/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	MW-3-5	ND	mg/L	0.02
2	MW-4-2	ND	mg/L	0.02
3	MW-4-3	ND	mg/L	0.02
4	MW-4-3-FB	ND	mg/L	0.02
5	MW-4-1	ND	mg/L	0.02
6	MW-4-0	ND	mg/L	0.02

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	3%
Accuracy (Spike % Recovery):	98%

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL-ESI
Project Address: PASADENA, CALIF
Ebasco OFS #: NASA 7708.016

Sampling Date: 3-2-90 TO 3-3-90

Sampler: (Name) D. NYE / M. CUTLER

Shipment Date: 3-4-90

Sampler: (Signature) M. Cutler

Shipping Number: _____

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazardous ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK / TONY

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	# TITLE 22 METALS PLUS STRONTIUM	624	608	625	418.1	CYANIDE (9010)	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
SOIL-7-6	10:00 AM 3-2-90	NONE	—	500 ML GLASS		X		HOLD FOR COMPOSITE																							
MW-3-5	AM 3-2-90	NONE TO NaOH	—	1 LITER TO 40 ML	X		4 BOTTLES	X	X				X																		
MW-4-2	AM-PM 3-2-90	NONE TO NaOH TO HNO_3	—	1 LITER TO 40 ML	X		8 BOTTLES	X	X	X	X	X	X																		
MW-4-3	3-2-90 TO 3-3-90	NONE TO NaOH TO HNO_3	—	1 LITER TO 40 ML	X		8 BOTTLES	X	X	X	X	X	X																		
MW-4-3-FB	3-3-90	" "	—	" "	X		8 BOTTLES (FIELD BLANK)	X	X	X	X	X	X																		
MW-4-1	3-3-90	" "	—	" "	X		8 BOTTLES	X	X	X	X	X	X																		
MW-4-0	3-3-90	" "	—	" "	X		8 BOTTLES	X	X	X	X	X	X																		

COMMENTS: USE DRINKING WATER DETECTION LIMITS ON WATER SAMPLES.

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	3-4-90	[illegible]			
Company: EBASCO	Time: 12:30	Company: Curtis & Tompkins	Company:	Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 03/06/90
DATE REPORTED: 03/20/90

LAB NUMBER: 25567

CLIENT: EBASCO SERVICES, INC.

REPORT ON: TWO MONITORING WELL SAMPLES

PROJECT #: JPL-ESI

LOCATION: PASADENA, CA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/06/90
DATE ANALYZED: 03/15/90
DATE REPORTED: 03/20/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN AQUEOUS SOLUTIONS BY IR
EXTRACTION: EPA 3510 SEPERATORY FUNNEL

LAB ID	SAMPLE ID	TPH (mg/L)
1	MW-4-4	ND (0.2)
2	MW-4-5	0.5

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference):	<1
Accuracy (Spike % Recovery):	99

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
SAMPLE ID: MW-4-4

DATE RECEIVED: 03/06/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/20/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	107%
Toluene-d8	99%
Bromofluorobenzene	94%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
SAMPLE ID: MW-4-5

DATE RECEIVED: 03/06/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/20/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	104%	
Toluene-d8	101%	
Bromofluorobenzene	99%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-4-4

DATE RECEIVED: 03/06/90
DATE EXTRACTED: 03/09/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/20/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-1
SAMPLE ID: MW-4-4

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	61%
Phenol-d5	47%
2,4,6-Tribromophenol	93%
Nitrobenzene-d5	81%
2-Fluorobiphenyl	80%
Terphenyl-d14	84%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-4-5

DATE RECEIVED: 03/06/90
DATE EXTRACTED: 03/09/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/20/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-2
SAMPLE ID: MW-4-5

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5

HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	63%
Phenol-d5	47%
2,4,6-Tribromophenol	71%
Nitrobenzene-d5	80%
2-Fluorobiphenyl	74%
Terphenyl-d14	72%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-4-4

DATE RECEIVED: 03/06/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/20/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	114

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-4-5

DATE RECEIVED: 03/06/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/19/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	114

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-4-4

DATE RECEIVED: 03/06/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/20/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.02	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.01)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	0.01	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.02	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	<1	79
Arsenic	7	102	Molybdenum	6	96
Barium	1	105	Nickel	7	107
Beryllium	<1	110	Selenium	4	104
Cadmium	<1	99	Silver	3	91
Chromium	<1	106	Thallium	8	104
Cobalt	<1	105	Vanadium	<1	106
Copper	<1	109	Zinc	<1	108
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-4-5

DATE RECEIVED: 03/06/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/20/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.04	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.01)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	0.02	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.01	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	<1	79
Arsenic	7	102	Molybdenum	6	96
Barium	1	105	Nickel	7	107
Beryllium	<1	110	Selenium	4	104
Cadmium	<1	99	Silver	3	91
Chromium	<1	106	Thallium	8	104
Cobalt	<1	105	Vanadium	<1	106
Copper	<1	109	Zinc	<1	108
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/06/90
DATE ANALYZED: 03/13/90
DATE REPORTED: 03/20/90

TOTAL STRONTIUM ANALYSIS IN AQUEOUS SOLUTIONS, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/L)
1	MW-4-4	0.30
2	MW-4-5	0.40

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	2
Accuracy (Spike % Recovery)	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25567
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/06/90
DATE ANALYZED: 03/16-19
DATE REPORTED: 03/20/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	MW-4-4	ND	mg/L	0.02
2	MW-4-5	ND	mg/L	0.02

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	5%
Accuracy (Spike % Recovery):	100%

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL-ESI
Project Address: PASADENA, CALIF.
Ebasco OFS #: NASA 7708.016

Sampling Date: 3-5-90

Sampler: (Name) M. CUTLER / A. LOAN

Shipment Date: 3-6-90

Sampler: (Signature) M. Cutler

Shipping Number: _____

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK / TONY

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	TITLE 22 METALS PLUS STRONTIUM	624	625	608	418.1	CYANIDE (9010)	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
SOIL-7-7	7:10 AM	NONE	—	500 ML GLASS JAR		X		SEE			BELOW																					
MW-4-4	AM	NONE TO NaOH TO HNO3	—	1 LITER TO 40 ML	X		8 BOTTLES	X	X	X	X	X	X																			
MW-4-5	PM	" "	—	" "	X		8 BOTTLES	X	X	X	X	X	X																			

COMMENTS: USE DRINKING WATER DETECTION LIMITS ON WATER SAMPLES

COMPOSITE SAMPLE # SOIL-7-7 WITH SAMPLES # SOIL-7-1, SOIL-7-2, SOIL-7-3, SOIL-7-4, SOIL-7-5, AND SOIL-7-6. ANALYZE COMPOSITE [redacted] FOR VOLATILE ORGANICS (8240), SEMIVOLATILE ORGANICS (8270), TITLE 22 METALS PLUS STRONTIUM, PESTICIDES + PCB'S (8080), TPH (418.1), AND CYANIDE (9010).

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	3-6-90	J.P. [illegible]			
Company: EBASCO	Time: 10:00 AM	Company: C&T LAB	Company:	Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 02/21/90
DATE REPORTED: 03/02/90

LAB NUMBER: 25473

CLIENT: EBASCO

REPORT ON: ONE WATER SAMPLE

PROJECT #: JPL-ESI

LOCATION: PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-1
CLIENT: EBASCO
PROJECT #: JPL-ESI
LOCATION: PASADENA

DATE RECEIVED: 02/21/90
DATE ANALYZED: 03/01/90
DATE REPORTED: 03/02/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN AQUEOUS SOLUTIONS BY IR
EXTRACTION: EPA 3510 SEPERATORY FUNNEL

LAB ID	SAMPLE ID	TPH (mg/L)
1	MW-5	0.5

DETECTION LIMIT = 0.2 mg/L

QA/QC DATA SUMMARY:	
Precision (Relative % Difference):	9
Accuracy (Spike % Recovery):	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-1
CLIENT: EBASCO
PROJECT #: JPL-ESI; PASADENA
SAMPLE ID: MW-5

DATE RECEIVED: 02/21/90
DATE ANALYZED: 02/27/90
DATE REPORTED: 03/02/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	13	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	104%
Toluene-d8	102%
Bromofluorobenzene	99%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-2
CLIENT: EBASCO
PROJECT #: JPL-ESI; PASADENA
SAMPLE ID: MW-5D

DATE RECEIVED: 02/21/90
DATE ANALYZED: 02/27/90
DATE REPORTED: 03/02/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	13	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	107%
Toluene-d8	105%
Bromofluorobenzene	96%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-1
CLIENT: EBASCO
PROJECT #: JPL-ESI
LOCATION: PASADENA
SAMPLE ID: MW-5

DATE RECEIVED: 02/21/90
DATE EXTRACTED: 02/22/90
DATE ANALYZED: 02/23/90
DATE REPORTED: 03/02/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-1
SAMPLE ID: MW-5

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	52%
Phenol-d5	40%
2,4,6-Tribromophenol	86%
Nitrobenzene-d5	75%
2-Fluorobiphenyl	78%
Terphenyl-d14	68%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-2
CLIENT: EBASCO
PROJECT #: JPL-ESI
LOCATION: PASADENA
SAMPLE ID: MW-5D

DATE RECEIVED: 02/21/90
DATE EXTRACTED: 02/22/90
DATE ANALYZED: 02/23/90
DATE REPORTED: 03/02/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-2
SAMPLE ID: MW-5D

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	50%
Phenol-d5	39%
2,4,6-Tribromophenol	90%
Nitrobenzene-d5	80%
2-Fluorobiphenyl	90%
Terphenyl-d14	78%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-1
CLIENT: EBASCO
PROJECT #: JPL-ESI
LOCATION: PASADENA
SAMPLE ID: MW-5

DATE RECEIVED: 02/21/90
DATE EXTRACTED: 02/28/90
DATE ANALYZED: 02/28/90
DATE REPORTED: 03/02/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	11
Accuracy (Spike % Recovery)	115

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473-1
CLIENT: EBASCO
PROJECT #: JPL-ESI
LOCATION: PASADENA
SAMPLE ID: MW-5

DATE RECEIVED: 02/21/90
DATE ANALYZED: 02/26/90
DATE REPORTED: 03/02/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.05)	15
Arsenic	ND (0.005)	5
Barium	0.05	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	0.02	25
Lead	0.0045	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	0.02	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.23	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	2	93	Mercury	<1	99
Arsenic	<1	115	Molybdenum	<1	94
Barium	<1	104	Nickel	5	103
Beryllium	<1	112	Selenium	1	106
Cadmium	<1	93	Silver	<1	83
Chromium	2	104	Thallium	<1	117
Cobalt	2	103	Vanadium	2	105
Copper	3	104	Zinc	1	103
Lead	2	88			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473
CLIENT: EBASCO
PROJECT #: JPL-ESI
LOCATION: PASADENA

DATE RECEIVED: 02/21/90
DATE ANALYZED: 02/27/90
DATE REPORTED: 03/02/90

TOTAL STRONTIUM ANALYSIS IN AQUEOUS WASTES, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/L)
1	MW-5	0.50

LIMIT OF DETECTION = 0.05 mg/L.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	8
Accuracy (Spike % Recovery)	101

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25473
CLIENT: EBASCO
PROJECT #: JPL-ESI
LOCATION: PASADENA

DATE RECEIVED: 02/21/90
DATE ANALYZED: 03/02/90
DATE REPORTED: 03/02/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	MW-5	ND	mg/L	0.02

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery):	85

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL-GSI
Project Address: PASADENA, CALIF.
Ebasco OFS #: NASA 7707.016

Sampling Date: 2-20-90

Sampler: (Name) M. CUTLER

Shipment Date:

Sampler: (Signature) M. Cutler

Shipping Number:

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ___	Other ___
MW-5	2:45pm	NONE TO NaOH to HNO_3	—	1 LITER TO 40 ML	X																											
MW-5D	2:45pm	" "	—	" "	X																											

COMMENTS:
ANALYZE SAMPLE MW-5 FOR TITLE 22 METALS PLUS STRONTIUM (ICP/AA), VOLATILE ORGANICS (624), SEMIVOLATILE ORGANICS (625), PESTICIDES + PCB'S (608), TPH (418.1), AND CYANIDE (9010). ANALYZE SAMPLE MW-5D FOR VOLATILE ORGANICS (624) AND SEMIVOLATILE ORGANICS (625). [USE DRINKING WATER DETECTION LIMITS!!]

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	2-21-90	[illegible]			[illegible]
Company: EBASCO	Time: 9:40 AM	Company: 4-SPEED	Company:	Time:	Company: C&T

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 03/07/90
DATE REPORTED: 03/21/90

LAB NUMBER: 25566

CLIENT: EBASCO SERVICES, INCORPORATED

REPORT ON: ONE MONITORING WELL SAMPLE

PROJECT #: JPL/ESI

LOCATION: PASADENA, CA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/07/90
DATE ANALYZED: 03/15/90
DATE REPORTED: 03/21/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN AQUEOUS SOLUTIONS BY IR
EXTRACTION: EPA 3510 SEPERATORY FUNNEL

LAB ID	SAMPLE ID	TPH (mg/L)
1	MW-6	2.0

DETECTION LIIT = 0.2 mg/L.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference):	<1
Accuracy (Spike % Recovery):	101

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566-1
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI; PASADENA
SAMPLE ID: MW-6

DATE RECEIVED: 03/07/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/21/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	24	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	6	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	105%	
Toluene-d8	102%	
Bromofluorobenzene	93%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566-1
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-6

DATE RECEIVED: 03/07/90
DATE EXTRACTED: 03/09/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/21/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566-1
SAMPLE ID: MW-6

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	61%
Phenol-d5	45%
2,4,6-Tribromophenol	78%
Nitrobenzene-d5	82%
2-Fluorobiphenyl	84%
Terphenyl-d14	83%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566-1
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-6

DATE RECEIVED: 03/16/90
DATE EXTRACTED: 03/08/90
DATE ANALYZED: 03/09-14
DATE REPORTED: 03/21/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	114

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566-1
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA
SAMPLE ID: MW-6

DATE RECEIVED: 03/07/90
DATE ANALYZED: 03/09/90
DATE REPORTED: 03/21/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN SOILS AND WASTES
EXTRACTION: CAC SECTION 66700 WASTE EXTRACTION TEST

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	0.008	15
Arsenic	ND (0.005)	5
Barium	0.02	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	ND (0.01)	560
Cobalt	ND (0.01)	80
Copper	ND (0.02)	25
Lead	ND (0.005)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.13	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	4	100	Mercury	4	102
Arsenic	7	102	Molybdenum	6	96
Barium	1	105	Nickel	7	107
Beryllium	<1	110	Selenium	4	104
Cadmium	<1	95	Silver	3	94
Chromium	<1	106	Thallium	8	104
Cobalt	<1	105	Vanadium	<1	106
Copper	<1	109	Zinc	<1	108
Lead	13	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/07/90
DATE ANALYZED: 03/13/90
DATE REPORTED: 03/21/90

TOTAL STRONTIUM IN AQUEOUS SOLUTIONS, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/L)
1	MW-6	0.66

LIMIT OF DETECTION = 0.05 mg/L.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	2
Accuracy (Spike % Recovery)	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25566
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/07/90
DATE ANALYZED: 03/16,19
DATE REPORTED: 03/21/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	MW-6	ND	mg/L	0.02

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	5
Accuracy (Spike % Recovery):	100

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

187

Project Name: JPL - ESI
Project Address: PASADENA, CALIF
Ebasco OFS #: NASA 7708.016

Sampling Date: 3-6-90

Sampler: (Name) M. CUTLER

Shipment Date: 3-7-90

Sampler: (Signature) M. Cutler

Shipping Number:

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK / TONY

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	TITLE 22 METALS PLUS STRONTIUM	624	625	608	418.1	CYANIDE (9010)	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other
MW-6	1:00PM	NONS TO NaOH TO HNO3	—	1 LITER TO 40 ML	X		8 BOTTLES	X	X	X	X	X	X																		

COMMENTS: USE DRINKING WATER DETECTION LIMITS

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Hans W. Papenguth	3/7/90	J. Middleton			
Company: Ebasco Environmental	Time: 10:10	Company: 4-SPEED	Company:	Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 03/15/90
DATE REPORTED: 03/28/90

LAB NUMBER: 25619

CLIENT: EBASCO SERVICES, INC.

REPORT ON: FOUR WATER SAMPLES

PROJECT #: 7708.016

LOCATION: JPL/ESI

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL/ESI

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/23/90
DATE REPORTED: 03/28/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN AQUEOUS SOLUTIONS BY IR
EXTRACTION: EPA 3510 SEPERATORY FUNNEL

LAB ID	SAMPLE ID	TPH (mg/L)
1	MW-7	1.1

LIMIT OF DETECTION : 0.2 mg/L

QA/QC DATA SUMMARY:	
Precision (Relative % Difference):	<1
Accuracy (Spike % Recovery):	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
SAMPLE ID: MW-7

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/20/90
DATE REPORTED: 03/28/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	8	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	23	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	200	5
bromodichloromethane	TRACE	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	22	5
dibromochloromethane	TRACE	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	15	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	95%
Toluene-d8	102%
Bromofluorobenzene	102%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
SAMPLE ID: TRIP BLANK

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/16/90
DATE REPORTED: 03/28/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	103%
Toluene-d8	103%
Bromofluorobenzene	98%

PAGE 5 OF 12
AND
PAGE 6 OF 12
ARE
ARE LOCATED IN APPENDIX F

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL/ESI
SAMPLE ID: MW-7

DATE RECEIVED: 03/15/90
DATE EXTRACTED: 03/21/90
DATE ANALYZED: 03/21/90
DATE REPORTED: 03/28/90

METHOD: EPA 625
BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/L--	
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	5
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	ND	5
N-Nitrosodiphenylamine	ND	5

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-1
SAMPLE ID: MW-7

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/L--	
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	5
Dibenzo (a,h) anthracene	ND	5
Benzo (g,h,i) perylene	ND	5
HSL COMPOUNDS		
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	25%
Phenol-d5	26%
2,4,6-Tribromophenol	19%
Nitrobenzene-d5	57%
2-Fluorobiphenyl	64%
Terphenyl-d14	71%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL/ESI
SAMPLE ID: MW-7

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/19-21
DATE REPORTED: 03/28/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS IN AQUEOUS SOLUTIONS

METAL	RESULT	REGULATORY LIMITS STLC
	--mg/L--	
Antimony	ND (0.005)	15
Arsenic	ND (0.005)	5
Barium	0.03	100
Beryllium	ND (0.01)	0.75
Cadmium	ND (0.001)	1
Chromium (total)	0.02	560
Cobalt	ND (0.01)	80
Copper	0.02	25
Lead	ND (0.003)	5
Mercury	ND (0.001)	0.2
Molybdenum	ND (0.01)	350
Nickel	ND (0.01)	20
Selenium	ND (0.005)	1
Silver	ND (0.02)	5
Thallium	ND (0.005)	7
Vanadium	ND (0.02)	24
Zinc	0.25	250

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	2	101	Mercury	11	122
Arsenic	2	104	Molybdenum	1	96
Barium	<1	105	Nickel	2	110
Beryllium	<1	114	Selenium	12	106
Cadmium	6	106	Silver	1	88
Chromium	1	100	Thallium	<1	98
Cobalt	1	105	Vanadium	<1	112
Copper	<1	109	Zinc	1	105
Lead	2	99			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL/ESI

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/20/90
DATE REPORTED: 03/28/90

TOTAL STRONTIUM IN AQUEOUS SOLUTIONS

C&T ID	SAMPLE ID	STRONTIUM (mg/L)
1	MW-7	0.32

ND = NONE DETECTED; LIMIT OF DETECTION IS INDICATED IN PARENTHESES.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery)	99

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-1
CLIENT:EBASCO SERVICES, INC.
PROJECT #:7708.016
LOCATION: JPL/ESI
SAMPLE ID: MW-7

DATE RECEIVED: 03/15/90
DATE EXTRACTED:03/21/90
DATE ANALYZED: 03/21/90
DATE REPORTED: 03/28/90

METHOD: EPA 608
ORGANOCHLORINE PESTICIDES AND PCBS IN WATER
EXTRACTION METHOD: EPA 3510

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
alpha-BHC	ND	0.2
beta-BHC	ND	0.2
gamma-BHC	ND	0.2
delta-BHC	ND	0.2
Heptachlor	ND	0.2
Aldrin	ND	0.2
Heptachlor Epoxide	ND	0.2
Endosulfan I	ND	0.2
Dieldrin	ND	0.2
pp-DDE	ND	0.2
Endrin	ND	0.2
Endosulfan II	ND	0.2
Endosulfan Sulfate	ND	0.2
4,4-DDD	ND	0.2
Endrine Aldehyde	ND	0.2
pp-DDT	ND	0.2
Chlordane	ND	2.0
Toxaphene	ND	2.0
Methoxychlor	ND	2.0
PCB 1016	ND	2.0
PCB 1221	ND	2.0
PCB 1232	ND	2.0
PCB 1242	ND	2.0
PCB 1248	ND	2.0
PCB 1254	ND	2.0
PCB 1260	ND	2.0

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	11
Accuracy (Spike % Recovery)	83

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
LOCATION: JPL/ESI
SAMPLE ID: MW-7

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/23/90
DATE REPORTED: 03/28/90

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CYANIDE	ND	mg/L	0.02	EPA 335.2

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference):	3
Accuracy (Spike % Recovery):	89

ıSCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
0 West MacArthur Boulevard, Santa Ana, California 92704
l) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

ıject Name: JPL-ESI
ıject Address: Pasadena, Calif.
asco OFS #: NASA 7708.016

Sampling Date: 3-14-90

Shipment Date: 3-15-90

Shipping Number:

mpler: (Name) H. Papenguth

mpler: (Signature) Hans W. Papenguth

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

alysis Laboratory: Curtis & Tompkins

lifornia DHS Certification Number:

ıoratory Contact: Jack

ports to Be Sent to: M. Cutler

ıoratory Instructions: See below

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics (624)	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other
W-7	12:00	none to NaOH to HNO3	—	1 l to 40 ml	X		8 bottles																								
ip blanks	—	none	—	40 ml	X		1 bottle			✓	✓																				
Y-4	12:45	ice	—	40 ml	X		2 bottles			✓	✓																				
HY-6	13:30	ice	—	40 ml	X		2 bottles			✓	✓																				

MMENTS: Analyze MW-7 samples for Title 22 metals plus Sr; Pesticides and PCBs (608); Volatile organics (624); emivolatile organics (625); TPH 418.1; and cyanide (9010);
Analyze HY-4 and HY-6 for V.O.; Analyze trip blanks for V.O.

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	3-15-90	J.P. [illegible]			
mpany: EBASCO	Time: 10:30 AM	Company: CET LAB	Company:	Time:	Company:

APPENDIX D

Laboratory Analytical Reports for Drill Cuttings

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 02/02-09/90
DATE REPORTED: 02/22/90

LAB NUMBER: 25421

CLIENT: EBASCO SERVICES INCORPORATED

REPORT ON: ONE COMPOSITE SAMPLE

PROJECT #: 7708.016

LOCATION: J.P.L./E.S.I., PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25421
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: J.P.L./E.S.I, PASADENA

DATE RECEIVED: 02/01-06/90
DATE ANALYZED: 02/19/90
DATE REPORTED: 02/22/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN SOILS & WASTES BY IR
EXTRACTION: EPA 3550 SONICATION

LAB ID	SAMPLE ID	TPH (mg/Kg)
8	COMPOSITE (SOIL;4-1,4-2,4-3,4-4,4-5,4-6,4-7)	19

DETECTION LIMIT = 5mg/Kg.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference)	2
Accuracy (Spike % Recovery):	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25421-8
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: J.P.L./E.S.I.
SAMPLE ID: COMPOSITE
(SOIL;4-1,4-2,4-3,4-4,4-5,4-6,4-7)

DATE RECEIVED: 02/01-09/90
DATE EXTRACTED: 02/20/90
DATE ANALYZED: 02/20/90
DATE REPORTED: 02/22/90

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
pp-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Ensosulfan Sulfate	ND	50
4,4-DDD	ND	50
Endrine Aldehyde	ND	50
pp-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	5
Accuracy (Spike % Recovery)	107

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25421-8
CLIENT: EBSACO
PROJECT #: 7708.016
SAMPLE ID: COMPOSITE(SOIL;4-1,4-2,4-3,4-4,4-5, 4-6,4-7)

DATE RECEIVED: 02/01-09/90
DATE ANALYZED: 02/14/90
DATE REPORTED: 02/22/90

METHOD: EPA 8240
VOLATILE ORGANICS IN SOILS

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	91%	
Toluene-d8	105%	
Bromofluorobenzene	97%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25421-8
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: J.P.L./E.S.I., PASADENA
SAMPLE ID: COMPOSITE(SOIL;4-1,4-2,4-3,4-4,4-5, 4-6,4-7)

DATE RECEIVED: 02/01-09/9
DATE EXTRACTED: 02/14/90
DATE ANALYZED: 02/14/90
DATE REPORTED: 02/22/90

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25421-8
SAMPLE ID: COMPOSITE(SOIL;4-1,4-2,4-3,4-4,4-5, 4-6,4-7)

EPA 8270

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330
HSL COMPOUNDS		
Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroanline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	82%
Phenol-d5	87%
2,4,6-Tribromophenol	91%
Nitrobenzene-d5	84%
2-Fluorobiphenyl	94%
Terphenyl-d14	85%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25421-8
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: J.P.L./E.S.I., PASADENA
SAMPLE ID: COMPOSITE
(SOIL;4-1,4-2,4-3,4-4,4-5,4-6,4-7)

DATE RECEIVED: 02/01-09/90
DATE ANALYZED: 02/15/90
DATE REPORTED: 02/22/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS 10 x STLC	TTLC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	29	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	ND (0.5)	10	100
Chromium	2.6	5,600	2,500
Cobalt	2.3	800	8,000
Copper	6.1	250	2,500
Lead	ND (2.5)	50	1,000
Mercury	ND (0.02)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	1.6	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	7.0	240	2,400
Zinc	13	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	2	87	Mercury	<1	95
Arsenic	21	101	Molybdenum	<1	77
Barium	3	99	Nickel	11	100
Beryllium	3	90	Selenium	14	105
Cadmium	19	84	Silver	3	97
Chromium	1	101	Thallium	9	100
Cobalt	3	99	Vanadium	2	98
Copper	3	102	Zinc	3	99
Lead	13	97			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25421-8
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: J.P.L./E.S.I., PASADENA
SAMPLE ID: COMPOSITE
(SOIL;4-1,4-2,4-3,4-4,4-5,4-6,4-7)

DATE RECEIVED: 02/01-09/90
DATE ANALYZED: 02/15-21/90
DATE REPORTED: 02/22/90

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CYANIDE	ND	mg/Kg	1.0	EPA 335.2
METALS:				
STRONTIUM	14	mg/Kg	2.5	FAA

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	CYANIDE	STRONTIUM
Precision (Relative % Difference):	<1	7
Accuracy (Spike % Recovery):	85	104

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

182

Project Name: JPL-EXPANDED SITE INSPECTION
Project Address: PASADENA CA
Ebasco OFS #: NASA 7708.016

Sampling Date: 2-1-90

Sampler: (Name) M. CUTLER

Shipment Date: 2-2-90

Sampler: (Signature) M. Cutler

Shipping Number:

HAZARD IDENTIFICATION:

Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED

Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other
SOIL-4-1	14:15	BLUEICE	—	250 ML GLASS JAR		X																										

COMMENTS: HOLD FOR MORE SAMPLES TO COMPOSITE WITH.
LAB METHODS TO FOLLOW.

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	2-2-90	Joy Hall			
Company: EBASCO	Time: 11:30 AM	Company: CIT	Company:	Time:	Company:

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: J.P.L. / E.S.I.
Project Address: Pasadena, Calif
Ebasco OFS #: NASA 7708.016

Sampling Date: 2/2/90

Sampler: (Name) Michael Barnes

Shipment Date: 2/2/90

Sampler: (Signature) Michael Barnes

Shipping Number:

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☐
Toxic ☒ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory:

California DHS Certification Number:

Laboratory Contact:

Reports to Be Sent to: Mark Cutler

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other
Soil-4-2	10:30	Blue Ice		8 oz glass Jar		X																									
Soil-4-3	14:10	Blue Ice		8 oz glass Jar		X																									
Soil-4-4	18:20	Blue Ice		8 oz glass Jar		X																									

COMMENTS: Hold For additional Samples to run composite Sample.
Analysis will be phoned in when well is completed

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mike Barnes	2/2/90	[signature]			
any:	Time:	[illegible]	ompar	Time:	any:

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

183

Project Name: JPL EXPANDED SITE INSPECTION
Project Address: PASADENA, CA
Ebasco OFS #: NASA 7705.016

Sampling Date: 2-5-90

Sampler: (Name) M. BARNES

Shipment Date: 2-6-90

Sampler: (Signature) M. Cutler for M. Barnes

Shipping Number

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazardous ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
SOIL-4-5	11:40AM	ICE	—	250 ML GLASS JAR		X																									
SOIL-4-6	15:26	ICE	—	250 ML GLASS JAR		X																									

COMMENTS:
HOLD FOR COMPOSITE
LAB METHODS TO FOLLOW

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	2-6-90	[illegible]			
Company: EBASCO	Time: 9:30 AM	Company: CoT	Company:	Time:	Company:

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL/ESI
Project Address: Pasadena, CA
Ebasco OFS #: NASA 7708.016

Sampling Date: 2/6/90

Sampler: (Name) Michael Barnes

Shipment Date:

Sampler: (Signature) Michael Barnes

Shipping Number

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☐
Toxic ☒ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory:

California DHS Certification Number:

Laboratory Contact:

Reports to Be Sent to: Mark Cutler

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
Soil-4-7		Blue Ice		8 oz. glass Jar		X						See						Below													

COMMENTS: Please composite samples Soil-4-7, Soil-4-6, Soil-4-5, Soil-4-4, Soil-4-3, Soil-4-2 and Soil-4-1. Analyze composite for Volatile Organics (8240), Semi Volatiles (8270), Title 22 metals plus Strontium (ICP/AA), Pesticides/PCB's (8080), TPH (418.1) and cyanide (9010)

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Michael Barnes	2/6/90	[illegible]			
Company: EBASCO	Time: 30	Company: [illegible]	Company	Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 01/17-25
DATE REPORTED: 01/31/90

LAB NUMBER: 25343

CLIENT: EBASCO

REPORT ON: ONE COMPOSITE SOIL SAMPLE

PROJECT #: 7708.018

LOCATION: JPL, PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25343
CLIENT: EBASCO
PROJECT #: 7708.018
LOCATION: JPL, PASADENA

DATE RECEIVED: 01/17-25
DATE ANALYZED: 01/25/90
DATE REPORTED: 01/31/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN SOILS & WASTES BY IR
EXTRACTION: EPA 3550 SONICATION

LAB ID	SAMPLE ID	TPH (mg/Kg)
1	COMPOSITE OF SOIL-3-1 TO 3-8	ND (10)

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery):	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25343-1
CLIENT: EBASCO
PROJECT #: 7708.018; JPL, PASADENA
SAMPLE ID: COMPOSITE SOIL-3-1 TO 3-8

DATE RECEIVED: 01/17-25
DATE ANALYZED: 01/27/90
DATE REPORTED: 01/31/90

METHOD: EPA 8240
VOLATILE ORGANICS IN SOILS

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	87%	
Toluene-d8	100%	
Bromofluorobenzene	90%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25343-1
CLIENT: EBASCO
PROJECT #: 7708.018
LOCATION: JPL, PASADENA
SAMPLE ID: COMPOSITE OF SOIL-3-1 TO 3-8

DATE RECEIVED: 01/17-25
DATE EXTRACTED: 01/26/90
DATE ANALYZED: 01/27/90
DATE REPORTED: 01/31/90

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25343-1
SAMPLE ID: COMPOSITE OF SOIL-3-1 TO 3-8

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330
HSL COMPOUNDS		
Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroanline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	73%
Phenol-d5	75%
2,4,6-Tribromophenol	99%
Nitrobenzene-d5	78%
2-Fluorobiphenyl	83%
Terphenyl-d14	80%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25343-1
CLIENT: EBASCO
PROJECT #: 7708.018
LOCATION: JPL, PASADENA
SAMPLE ID: COMPOSITE OF SOIL-3-1 TO 3-8

DATE RECEIVED: 01/17-25
DATE EXTRACTED: 01/29/90
DATE ANALYZED: 01/29/90
DATE REPORTED: 01/31/90

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
pp-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Ensosulfan Sulfate	ND	50
4,4-DDD	ND	50
Endrine Aldehyde	ND	50
pp-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	1
Accuracy (Spike % Recovery)	90

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25343-1
CLIENT: EBASCO
PROJECT #: 7708.018
LOCATION: JPL, PASADENA
SAMPLE ID: COMPOSITE OF SOIL-3-1 TO 3-8

DATE RECEIVED: 01/17-25
DATE ANALYZED: 01/30/90
DATE REPORTED: 01/31/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS 10 x STLC	TTLC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	30	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	ND (0.5)	10	100
Chromium	2.6	5,600	2,500
Cobalt	2.5	800	8,000
Copper	5.6	250	2,500
Lead	3.8	50	1,000
Mercury	0.19	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	1.7	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	6.5	240	2,400
Zinc	13	2,500	5,000
Strontium	18		

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	2	95	Mercury	5	110
Arsenic	1	87	Molybdenum	<1	79
Barium	1	95	Nickel	2	86
Beryllium	1	110	Selenium	19	97
Cadmium	2	89	Silver	<1	91
Chromium	2	103	Thallium	1	83
Cobalt	1	100	Vanadium	2	104
Copper	1	79	Zinc	3	96
Lead	2	96	Strontium	9	106

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25343
CLIENT: EBASCO
PROJECT #: 7708.018
LOCATION: JPL, PASADENA

DATE RECEIVED: 01/17-25
DATE ANALYZED: 01/31/90
DATE REPORTED: 01/31/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	COMPOSITE OF SOIL-3-1 TO 3-8	ND	mg/Kg	0.01

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	6
Accuracy (Spike % Recovery):	93

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL EXPANDED SITE INSPECTION
Project Address: PASADENA, CA
Ebasco OFS #: NASA 770E-016

Sampling Date: 1-18-90

Sampler: (Name) M. CUTLER

Shipment Date:

Sampler: (Signature) M. Cutler

Shipping Number

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK

Reports to Be Sent to: M. CUTLER

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ___	Other ___
SOIL-3-3	1:00pm	ICE	—	250 ML GLASS JAR		X																										

COMMENTS:
HOLD FOR MORE SAMPLES TO COMPLETE WITH. ANALYSES METHODS TO FOLLOW.

THE 3 LARGE ZIPLOCK BAGS OF CUTTINGS ARE TO BE MIXED FOR A SIEVE ANALYSIS. (GRAIN SIZE DISTRIBUTION)

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
D. Farah	1/19/90	John P. [illegible]		Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 02/13-14/90
DATE REPORTED: 02/27/90

LAB NUMBER: 25447

CLIENT: EBASCO

REPORT ON: ONE COMPOSITE SAMPLE

PROJECT #: 7708.016

LOCATION: JPL/ESI PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI PASADENA

DATE RECEIVED: 02/13-14
DATE ANALYZED: 02/26/90
DATE REPORTED: 02/27/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN SOILS & WASTES BY IR
EXTRACTION: EPA 3550 SONICATION

LAB ID	SAMPLE ID	TPH (mg/Kg)
5	COMPOSITE OF SOIL-5-1, 5-2, 5-3 AND 5-4	63

LIMIT OF DETECTION = 10 mg/Kg.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery):	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447-5
CLIENT: EBASCO
PROJECT #: 7708.016; JPL/ESI PASADENA
SAMPLE ID: COMPOSITE OF SOIL-5-1 THROUGH -4

DATE RECEIVED: 02/13-14
DATE ANALYZED: 02/21/90
DATE REPORTED: 02/27/90

METHOD: EPA 8240
VOLATILE ORGANICS IN SOILS

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	104%	
Toluene-d8	103%	
Bromofluorobenzene	99%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447-5
CLIENT: EBASCO
PROJECT #: 7I708.016
LOCATION: JPL/ESI PASADENA
SAMPLE ID: COMPOSITE OF SOIL-5-1 THROUGH -4

DATE RECEIVED: 02/13-14
DATE EXTRACTED: 02/20/90
DATE ANALYZED: 02/20/90
DATE REPORTED: 02/27/90

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447-5 EPA 8270
SAMPLE ID: COMPOSITE OF SOIL-5-1 THROUGH -4

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330
HSL COMPOUNDS		
Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroanline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	78%
Phenol-d5	82%
2,4,6-Tribromophenol	79%
Nitrobenzene-d5	77%
2-Fluorobiphenyl	86%
Terphenyl-d14	74%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447-5
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI PASADENA
SAMPLE ID: COMPOSITE OF SOIL-5-1 THROUGH -4

DATE RECEIVED: 02/13-14
DATE EXTRACTED: 02/20/90
DATE ANALYZED: 02/20/90
DATE REPORTED: 02/27/90

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
pp-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Ensosulfan Sulfate	ND	50
4,4-DDD	ND	50
Endrine Aldehyde	ND	50
pp-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	5
Accuracy (Spike % Recovery)	107

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447-5
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI PASADENA
SAMPLE ID: COMPOSITE OF SOIL-5-1 THROUGH -4

DATE RECEIVED: 02/13-14
DATE ANALYZED: 02/21/90
DATE REPORTED: 02/27/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS 10 x STLC	TTLC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	51	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.8	10	100
Chromium	4.2	5,600	2,500
Cobalt	4.6	800	8,000
Copper	8.2	250	2,500
Lead	ND (2.5)	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	2.6	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	13	240	2,400
Zinc	27	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	3	97	Mercury	6	104
Arsenic	3	82	Molybdenum	<1	92
Barium	8	103	Nickel	10	93
Beryllium	13	94	Selenium	4	110
Cadmium	<1	85	Silver	<1	88
Chromium	2	93	Thallium	1	99
Cobalt	6	92	Vanadium	1	90
Copper	8	103	Zinc	7	100
Lead	9	76			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447
CLIENT: EBASCO
PROJECT #: 7708.016
LOCATION: JPL/ESI PASADENA

DATE RECEIVED: 02/13-14
DATE ANALYZED: 02/21/90
DATE REPORTED: 02/27/90

TOTAL STRONTIUM IN SOIL AND WASTES BY FLAME AAS

C&T ID	SAMPLE ID	STRONTIUM (mg/Kg)
5	COMPOSITE OF SOIL-5-1 THROUGH -4	27

LIMIT OF DETECTION = 2.5 MG/KG.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	13
Accuracy (Spike % Recovery)	101

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25447
CLIENT: EBASCO
PROJECT #:7708.016
LOCATION: JPL/ESI PASADENA

DATE RECEIVED: 02/13-14
DATE ANALYZED: 02/21/90
DATE REPORTED: 02/27/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
5	COMPOSITE OF SOIL-5-1 THROUGH -4	ND	mg/Kg	0.1

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery):	85

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

Project Name: JPL/ESI
Project Address: Pasadena, California
Ebasco OFS #: NASA 7708.016

Sampling Date: 2/13/90

Sampler: (Name) Hans Papenguth

Shipment Date: 2/13/90

Sampler: (Signature) Hans W. Papenguth

Shipping Number:

Analysis Laboratory: Curtis and Tompkins

California DHS Certification Number:

Laboratory Contact: Jack

Reports to Be Sent to: Mark Cutler

Laboratory Instructions: See below

DOROTHY,
COULD YOU PLEASE CALL CURTIS + TOMPKINS 213-269-7421 AND HAVE THEM PICK UP THESE SAMPLES. ~~[illegible]~~
THANKS
MARK
P.S. COULD YOU HAVE THEM SIGN THIS CHAIN-OF-CUSTODY

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile	Turpen	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other
soil-5-4	~~[illegible]~~ qm	ice		250 ml glass jar		X											

(See Below)

COMMENTS: Please composite samples soil-5-1, soil-5-2, soil-5-3, and soil-5-4.
Analyze composite for volatile organics (8240), semi-volatiles (8270), title 22 metals plus strontium (ICP/AAS), pesticides/PCBs (8080), TPH (418.1), and cyanide (9010).

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Hans W. Papenguth	2/14/90	[signature]			
Company:	Time:	Company:	Company:	Time:	Company:

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL/ESI
Project Address: Pasadena, California
Ebasco OFS #: NASA 7708.016

Sampling Date: 12/12/90

Sampler: (Name) Michael Barnes

Shipment Date: 12/13/90

Sampler: (Signature) Michael Barnes

Shipping Number:

HAZARD IDENTIFICATION:

Reactive ☐ Nonhazard ☒
Toxic ☒ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED

Normal ☒
Rush ☐

Analysis Laboratory: Curtis and Tompkins

California DHS Certification Number:

Laboratory Contact: Jack

Reports to Be Sent to: Mark Cutler

Laboratory Instructions: See below

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ___	Other ___
Soil-5-1	9:15	Ice		250 ml glass Jar	~~X~~	X																									
Soil-5-2	10:00	Ice		250 ml glass Jar	~~X~~	X																									
Soil-5-3	15:30	Ice		250 ml glass Jar	~~X~~	X																									

COMMENTS: Please hold Samples for Composite.
Lab methods to follow.

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Michael Barnes	12/13/90	J.P.M. 12/13			
Company: Ebasco	Time: 9:30 A.M.	Company: Curtis & Tompkins	Company:	Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 02/27/90
DATE REPORTED: 03/08/90

LAB NUMBER: 25501

CLIENT: EBASCO SERVICES, INC.

REPORT ON: ONE SOIL COMPOSITE SAMPLE

PROJECT #: JPL-ESI

LOCATION: PASADENA, CA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25501
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 02/27/90
DATE ANALYZED: 03/01/90
DATE REPORTED: 03/08/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN SOILS & WASTES BY IR
EXTRACTION: EPA 3550 SONICATION

LAB ID	SAMPLE ID	TPH (mg/Kg)
	COMPOSITE OF SOIL SAMPLES:	
7	6-1,6-2,6-3,6-4,6-5,6-6	43

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:	
Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery):	97

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25501-7
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
SAMPLE ID: COMPOSITE OF 6-1,2,3,4,5,6

DATE RECEIVED: 02/27/90
DATE ANALYZED: 02/28/90
DATE REPORTED: 03/08/90

METHOD: EPA 8240
VOLATILE ORGANICS IN SOILS

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	102%
Toluene-d8	109%
Bromofluorobenzene	95%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25501-7
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: COMPOSITE OF 6-1,2,3,4,5,6

DATE RECEIVED: 02/27/90
DATE EXTRACTED: 02/28/90
DATE ANALYZED: 02/28/90
DATE REPORTED: 03/08/90

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25501-7
SAMPLE ID: COMPOSITE OF 6-1,2,3,4,5,6

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330
HSL COMPOUNDS		
Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroanline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	73%
Phenol-d5	77%
2,4,6-Tribromophenol	79%
Nitrobenzene-d5	70%
2-Fluorobiphenyl	79%
Terphenyl-d14	68%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25501-7
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: COMPOSITE OF 6-1,2,3,4,5,6

DATE RECEIVED: 02/27/90
DATE ANALYZED: 03/02/90
DATE REPORTED: 03/08/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS 10 x STLC	TTLC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	46	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.6	10	100
Chromium	3.7	5,600	2,500
Cobalt	3.3	800	8,000
Copper	4.9	250	2,500
Lead	5.7	50	1,000
Mercury	ND (0.1)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	2.1	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Strontium	23		
Thallium	ND (5.0)	70	700
Vanadium	11	240	2,400
Zinc	23	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	95	Mercury	<1	100
Arsenic	<1	94	Molybdenum	<1	92
Barium	4	93	Nickel	2	86
Beryllium	8	98	Selenium	25	103
Cadmium	8	78	Silver	<1	86
Chromium	2	77	Strontium	4	102
Cobalt	2	92	Thallium	<1	98
Copper	2	89	Vanadium	8	90
Lead	4	78	Zinc	7	91

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25501
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 02/27/90
DATE ANALYZED: 03/02/90
DATE REPORTED: 03/08/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
7	COMPOSITE OF SOIL SAMPLES: 6-1,6-2,6-3,6-4,6-5,6-6	ND	mg/Kg	0.1

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery):	85

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25501-7
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL-ESI
LOCATION: PASADENA, CA
SAMPLE ID: COMPOSITE OF 6-1,2,3,4,5,6

DATE RECEIVED: 02/27/90
DATE EXTRACTED: 02/28/90
DATE ANALYZED: 02/28/90
DATE REPORTED: 03/08/90

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
pp-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Ensosulfan Sulfate	ND	50
4,4-DDD	ND	50
Endrine Aldehyde	ND	50
pp-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	10
Accuracy (Spike % Recovery)	69

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: NASA JPL ESI
Project Address: PASADENA, CA
Ebasco OFS #: NASA 7708.016

Sampling Date: 2/23/90

Shipment Date: 2/23/90

Shipping Number:

Sampler: (Name) Hans W. Papenguth

Sampler: (Signature) Hans W. Papenguth

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS + TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK

Reports to Be Sent to: MR. CUTLER

Laboratory Instructions: SEE BELOW

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
[redacted]																															
SOIL-6-6	8:10AM	ICE	—	250 ML GLASS JAR		X							SEE BELOW																		

COMMENTS: COMPOSITE WITH SAMPLES SOIL-6-1, SOIL-6-2, SOIL-6-3, SOIL-6-4, SOIL-6-5 AND ANALYZE FOR VOLATILE ORGANICS (624), SEMIVOLATILE ORGANICS (625), CYANIDE (9010), TPH (418.1), PESTICIDES AND PCB'S (608), AND TITLE 22 METALS PLUS STRONTIUM (ICP/AA).

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Hans W. Papenguth	2/23/90	J.P. [illegible]			
Company: Ebasco	Time: 2:15 pm	Company: CAT LAB	Company:	Time:	Company:

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL - ESI
Project Address: Pasadena, California
Ebasco OFS #: NASA 7708.016

Sampling Date: 2/15/90 - 2/16/90

Sampler: (Name) Hans Papenguth / M. Cutler

Shipment Date: 2/16/90

Sampler: (Signature) Hans W. Papenguth / M. Cutler

Shipping Number: _____

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: Curtis and Tompkins

California DHS Certification Number:

Laboratory Contact: Jack

Reports to Be Sent to: Mark Cutler

Laboratory Instructions:

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
Soil-6-1	2-15-90 14:45	blue ice		250 ml		X								(See Below)																	
Soil-6-2	2-15-90 15:20	blue ice		250 ml		X																									
Soil-6-3	2-15-90 16:40	blue ice		250 ml		X																									
Soil-6-4	2-16-90 8:00AM	ice		250 ML		X																									
Soil-6-5	2-16-90 2:15pm	ice		250ML		X																									

COMMENTS: hold samples for compositing - lab methods to follow

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Hans W. Papenguth	2/16/90	Paul Mead			
Company: Ebasco Environmental	Time: 11:30	Company: Curtis & Tompkins	Company:	Time:	Company:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 03/12/90
DATE REPORTED: 03/21/90

LAB NUMBER: 25602

CLIENT: EBASCO SERVICES, INCORPORATED

REPORT ON: ONE COMPOSITE SAMPLE

PROJECT #: JPL/ESI

LOCATION: PASADENA, CA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/12/90
DATE ANALYZED: 03/15/90
DATE REPORTED: 03/21/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN SOILS & WASTES BY IR
EXTRACTION: EPA 3550 SONICATION

LAB ID	SAMPLE ID	TPH (mg/Kg)
1	COMPOSITE OF SOIL'S 7-1 TO 7-7	440

DETECTION LIMIT = 10 mg/Kg

QA/QC DATA SUMMARY:	
Precision (Relative % Difference)	2
Accuracy (Spike % Recovery):	102

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL/ESI
SAMPLE ID: COMPOSITE OF SOIL'S 7-1 TO 7-7

DATE RECEIVED: 03/12/90
DATE ANALYZED: 03/17/90
DATE REPORTED: 03/21/90

METHOD: EPA 8240
VOLATILE ORGANICS IN SOILS

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
total-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5
QA/QC SUMMARY: SURROGATE RECOVERIES		
1,2-Dichloroethane-d4	96%	
Toluene-d8	104%	
Bromofluorobenzene	95%	

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602-1
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA
SAMPLE ID: COMPOSITE OF SOIL'S 7-1 TO 7-7

DATE RECEIVED: 03/12/90
DATE EXTRACTED: 03/15/90
DATE ANALYZED: 03/15/90
DATE REPORTED: 03/21/90

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	DETECTION LIMIT
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602-1
SAMPLE ID: COMPOSITE OF SOIL'S 7-1 TO 7-7

BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	DETECTION LIMIT
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330
HSL COMPOUNDS		
Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroanline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:	
2-Fluorophenol	74%
Phenol-d5	80%
2,4,6-Tribromophenol	93%
Nitrobenzene-d5	82%
2-Fluorobiphenyl	86%
Terphenyl-d14	95%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602-1
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA
SAMPLE ID: COMPOSITE OF SOIL'S 7-1 TO 7-7

DATE RECEIVED: 03/12/90
DATE EXTRACTED: 03/15/90
DATE ANALYZED: 03/15/90
DATE REPORTED: 03/21/90

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	DETECTION LIMIT
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
pp-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Ensosulfan Sulfate	ND	50
4,4-DDD	ND	50
Endrine Aldehyde	ND	50
pp-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	74

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA
SAMPLE ID: COMPOSITE OF SOIL'S 7-1 TO 7-7

DATE RECEIVED: 03/12/90
DATE ANALYZED: 03/16/90
DATE REPORTED: 03/21/90

METHODS: EPA 6010/7000
CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS 10 x STLC	TTLC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	52	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.82	10	100
Chromium	5.6	5,600	2,500
Cobalt	4.6	800	8,000
Copper	7.7	250	2,500
Lead	4.4	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	3.3	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	12	240	2,400
Zinc	27	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	2	93	Mercury	5	112
Arsenic	<1	80	Molybdenum	<1	90
Barium	8	114	Nickel	12	111
Beryllium	6	98	Selenium	15	104
Cadmium	3	87	Silver	<1	80
Chromium	9	102	Thallium	2	98
Cobalt	16	93	Vanadium	10	92
Copper	1	89	Zinc	9	93
Lead	2	94			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/12/90
DATE ANALYZED: 03/19/90
DATE REPORTED: 03/21/90

TOTAL STRONTIUM ANALYSIS IN SOIL AND WASTE, FAAS

C&T ID	SAMPLE ID	STRONTIUM (mg/Kg)
1	COMPOSITE OF SOIL'S 7-1 TO 7-7	24

LIMIT OF DETECTION = 2.5 mg/Kg

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	<1
Accuracy (Spike % Recovery)	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25602
CLIENT: EBASCO SERVICES, INCORPORATED
PROJECT #: JPL/ESI
LOCATION: PASADENA, CA

DATE RECEIVED: 03/12/90
DATE ANALYZED: 03/19/90
DATE REPORTED: 03/21/90

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
1	COMPOSITE OF SOIL'S 7-1 TO 7-7	ND	mg/Kg	0.1

ND = NOT DETECTED.

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 03/28/90
DATE REPORTED: 04/04/90

LAB NUMBER: 25678

CLIENT: EBASCO SERVICES INCORPORATED/
ENVIROSPHERE DIVISION

REPORT ON: ONE SOIL SAMPLE

PROJECT #: NASA 7708.016

LOCATION: JPL - ESI, PASADENA, CALIF.

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25678-5
CLIENT: EBASCO SERVICES INCORPORATED/
ENVIROSPHERE DIVISION
PROJECT #: NASA 7708.016
LOCATION: JPL - ESI, PASADENA, CALIF.

DATE RECEIVED: 03/28/90
DATE ANALYZED: 04/02/90
DATE REPORTED: 04/04/90

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN SOILS & WASTES BY IR
EXTRACTION: EPA 3550 SONICATION

LAB ID	SAMPLE ID	TPH (mg/Kg)
1	Composite: Soil-7-1A, Soil-7-2A, Soil-7-3A & Soil-7-4A	176

LIMIT OF DETECTION = 10 mg/Kg

QA/QC DATA SUMMARY:

Precision (Relative % Difference):	<1
Accuracy (Spike % Recovery):	94

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

195

Project Name: JPL-ESI
Project Address: PASADENA, CALIF.
Ebasco OFS #: NASA 7708.016

Sampling Date: 3-27-90

Sampler: (Name) M. CUTLER

Shipment Date: 3-28-90

Sampler: (Signature) M. Cutler

Shipping Number: _____

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: CURTIS AND TOMPKINS

California DHS Certification Number:

Laboratory Contact: JACK/TONY

Reports to Be Sent to: M. CUTLER

Laboratory Instructions: SEE BELOW

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	TPH (418.1)	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ____	Other ____
SOIL-7-1A	10:30	NONE	—	500 ML GLASS JAR		X		SEE BELOW													—										
SOIL-7-2A	10:30	"	—	"		X																									
SOIL-7-3A	10:30	"	—	"		X																									
SOIL-7-4A	10:30	"	—	"		X																									

COMMENTS: COMPOSITE THESE FOUR SOIL SAMPLES AND ANALYZE COMPOSITE FOR TOTAL PETROLEUM HYDROCARBONS (418.1).

3/28/90

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Marie Cutler	3-28-90	Neal W. Botha			
Company: EBASCO	Time: 1:20 p.m.	Company: Curtis & Tompkins	Company:	Time:	Company:

APPENDIX E

Laboratory Analytical Reports for Sieve Analyses

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 01/19/90
DATE REPORTED: 01/24/90

LAB NUMBER: 25327

CLIENT: EBASCO SERVICES, INC.

REPORT ON: TWO SOIL SAMPLES

PROJECT #: 7708-016

LOCATION: JPL, PASADENA

RESULTS: SEE ATTACHED

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25327-2
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL, PASADENA
SAMPLE ID: MW-3, 140-160

DATE RECEIVED: 01/19/90
DATE ANALYZED: 01/23/90
DATE REPORTED: 01/24/90

ANALYSIS: SIEVE ANALYSIS
METHOD REFERENCE: ASTM C136

SIEVE SIZE	PERCENT PASSING
3/8"	100
NO.4	100
NO.10	93
NO.20	69
NO.40	59
NO.60	52
NO.100	45
NO.200	37

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25327-3
CLIENT: EBASCO
PROJECT #: 7708-016
LOCATION: JPL, PASADENA
SAMPLE ID: MW-3, 160-180

DATE RECEIVED: 01/19/90
DATE ANALYZED: 01/23/90
DATE REPORTED: 01/24/90

ANALYSIS: SIEVE ANALYSIS
METHOD REFERENCE: ASTM C136

SIEVE SIZE	PERCENT PASSING
3/8"	100
NO.4	95
NO.10	75
NO.20	52
NO.40	45
N0.60	39
NO.100	34
NO.200	26

SIEVE ANALYSIS

PROJECT JPL-ESI

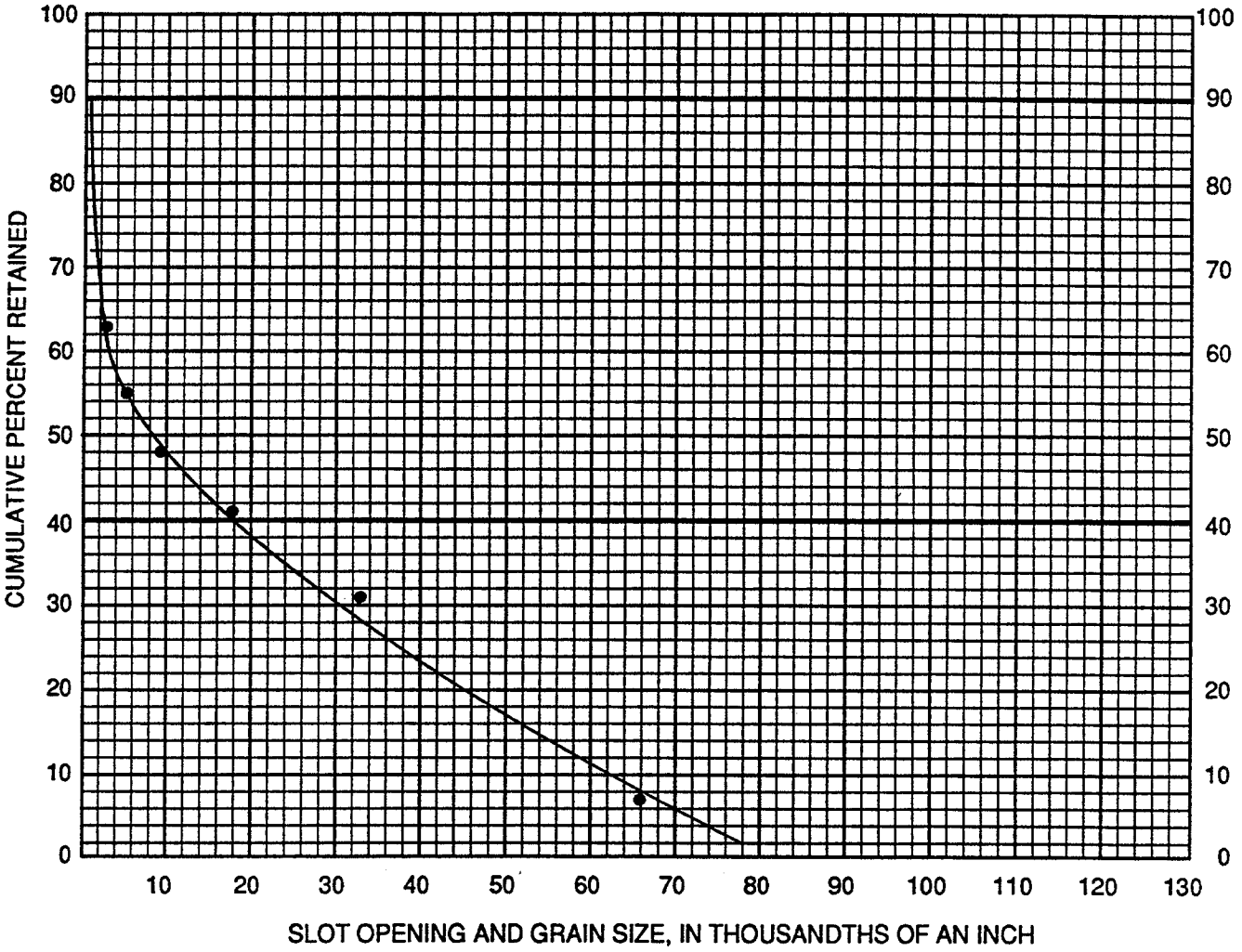
WELL MW-3

LOCATION Arroyo Seco

DEPTH 140 ft. - 160 ft

DATE 01-24-90

LAB Curtis and Tompkins



SIEVE SIZE (in)	CUMULATIVE PERCENT RETAINED		
.375	0		
.187	0		
.066	7		
.0331	31		
.018	41		
.0098	48		
.0059	55		
.0029	63		
SCREEN SLOT	.010 in.		

Notes: Sample collected from mud rotary drill cuttings.

Recommended Slot Opening: .010 in.

SIEVE ANALYSIS

PROJECT JPL-ESI

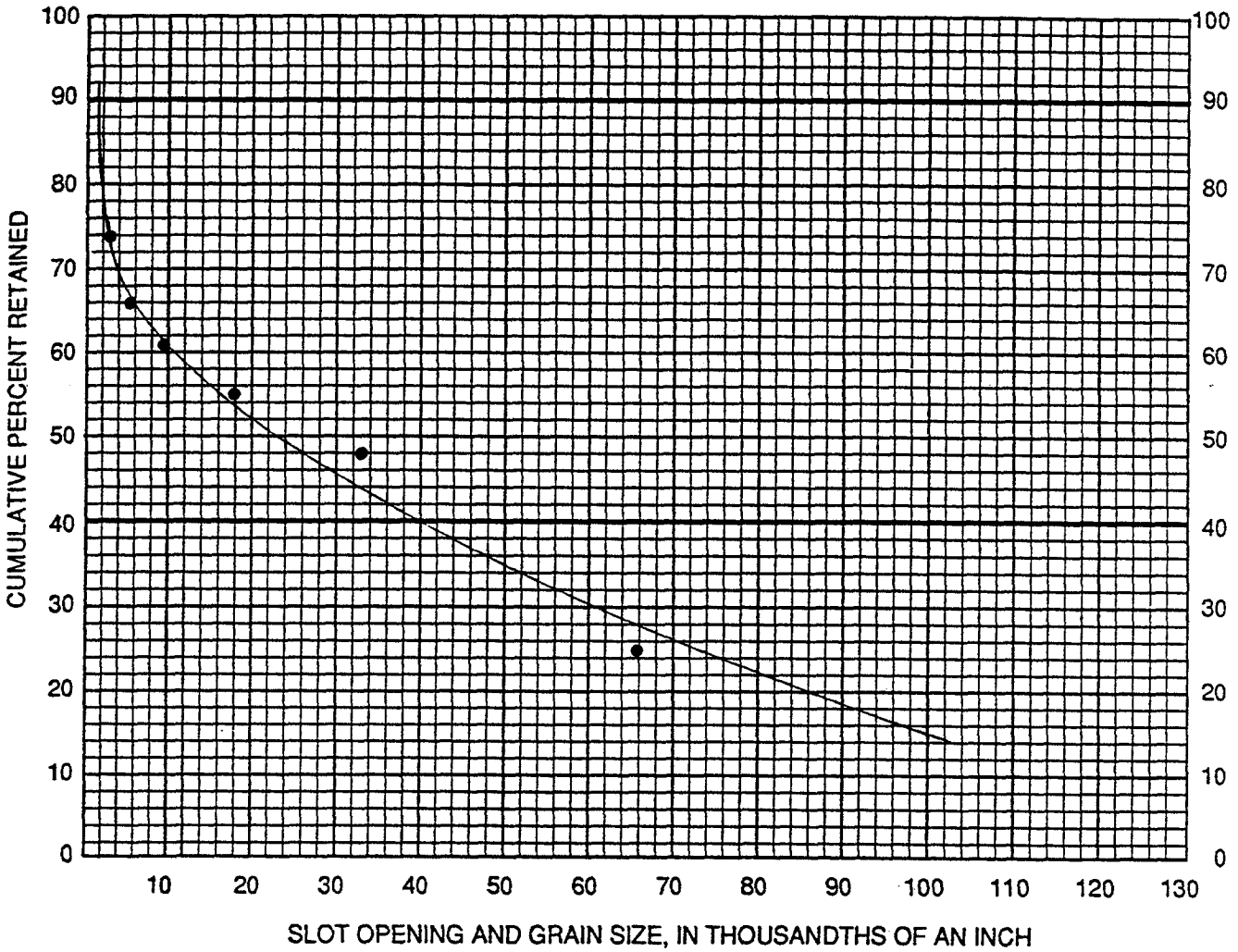
WELL MW-3

LOCATION Arroyo Seco

DEPTH 160 ft. - 180 ft

DATE 01-24-90

LAB Curtis and Tompkins



SIEVE SIZE (in)	CUMULATIVE PERCENT RETAINED		
.375	0		
.187	5		
.066	25		
.0331	48		
.018	55		
.0098	61		
.0059	66		
.0029	74		
SCREEN SLOT	.010 in.		

Notes: Sample collected from mud rotary drill cuttings.

Recommended Slot Opening: .010 in.

APPENDIX F

Laboratory Analytical Reports for JPL Fire Hydrant Water

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-3
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
SAMPLE ID: HY-4

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/17/90
DATE REPORTED: 03/28/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	34	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	16	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	13	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	TRACE	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	102%
Toluene-d8	98%
Bromofluorobenzene	101%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 25619-4
CLIENT: EBASCO SERVICES, INC.
PROJECT #: 7708.016
SAMPLE ID: HY-6

DATE RECEIVED: 03/15/90
DATE ANALYZED: 03/17/90
DATE REPORTED: 03/28/90

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	DETECTION LIMIT
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	36	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	16	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	13	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	5
bromoform	TRACE	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5
HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	101%
Toluene-d8	97%
Bromofluorobenzene	100%

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD
REQUEST FOR ANALYSIS

EBASCO

Project Name: JPL-ESI
Project Address: Pasadena, Calif.
Ebasco OFS #: NASA 7708.016

Sampling Date: 3-14-90

Sampler: (Name) H. Papenguth

Shipment Date: 3-15-90

Sampler: (Signature) Hans W. Papenguth

Shipping Number: _____

HAZARD IDENTIFICATION:
Reactive ☐ Nonhazard ☒
Toxic ☐ Flammable ☐
Infectious ☐ Skin Irritant ☐

TURNAROUND TIME REQUIRED
Normal ☒
Rush ☐

Analysis Laboratory: Curtis & Tompkins

California DHS Certification Number:

Laboratory Contact: Jack

Reports to Be Sent to: M. Cutler

Laboratory Instructions: See below

ANALYSES REQUIRED

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION: WATER	SOIL	OTHER (Describe)	pH	Oil and Grease	Halogenated Volatile Organics (624)	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other ___	Other ___
MW-7	12:00	none to NaOH to HNO3	—	1 l to 40 ml	X		8 bottles																								
trip blanks	—	none	—	40 ml	X		1 bottle			✓	✓																				
HY-4	12:45	ice	—	40 ml	X		2 bottles			✓	✓																				
HY-6	13:30	ice	—	40 ml	X		2 bottles			✓	✓																				

COMMENTS: Analyze MW-7 samples for Title 22 metals plus Sr; Pesticides and PCBs (608); Volatile organics (624); Semivolatile organics (625); TPH 418.1; and cyanide (9010);
Analyze HY-4 and HY-6 for V.O.; Analyze trip blanks for V.O.

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Mark Cutler	3-15-90	J.P. [illegible]			
Company: EBASCO	Time: 10:30 AM	Company: CET LAB	Company:	Time:	Company:

APPENDIX G

Petrex Report on Soil Gas Survey

FINAL REPORT ON THE FINDINGS
OF THE PETREX SOIL GAS COLLECTOR
ANALYSIS CONDUCTED FOR EBASCO
ENVIRONMENTAL SERVICES, INC.
AT AN UNDISCLOSED LOCATION

PREPARED BY: DATE:

James C. Hickey 4/9/90

James C. Hickey, Technical Director

APPROVED BY: DATE:

James H. Viellenave 4/9/90

James H. Viellenave, Vice President

NORTHEAST RESEARCH INSTITUTE, INC.
605 PARFET STREET, SUITE 100
LAKEWOOD, COLORADO 80215
(303) 238-0090

R895BJCH2

INTRODUCTION

The PETREX Division of Northeast Research Institute, Inc. (NERI) was requested by Ebasco Environmental Services (EES) to provide and analyze a number of soil gas collectors which were deployed by EES at an undisclosed location.

STUDY OBJECTIVES

The objectives of this study were to analyze thirty PETREX soil gas collectors for the purpose of identifying any detected volatile organic and semi-volatile organic compounds (VOC and SVOC). The resultant data was to be compiled and reported in tabular form to EES.

SURVEY DESIGN

Thirty (30) PETREX collectors were provided to EES for deployment by Ebasco personnel at an undisclosed location. All responsibility for quality control/quality assurance in the field was accepted by EES.

RESULTS

The analytical results of the PETREX soil gas collectors returned to NERI by EES are tabulated and reported on Table 1.

Two travel blank samples were employed to maintain quality assurance/quality control. These samples were transported and handled similarly to the survey samples, however they were never exposed to the environment. The results from

Table 1: PETREX Soil Gas Results ***
(in Ion Counts)
Project 895B: Ebasco Environmental Services
Santa Ana, California

Sample Number		BTX	TCA	Freon 11or113	TCE	PCE
1	*	21952.00	0.00	0.00	0.00	1817.00
2		2681.00	1880.00	230.00	0.00	1765.00
3		5052.00	2648.00	216.00	0.00	2713.00
4	*	48011.00	0.00	0.00	0.00	7260.00
5	*	18147.00	0.00	0.00	0.00	2135.00
6		1002.00	1526.00	143.00	0.00	207.00
7		1079.00	0.00	140.00	0.00	0.00
8	*	43874.00	0.00	0.00	0.00	14329.00
9		2629.00	1070.00	187.00	0.00	7549.00
10		3129.00	6267.00	0.00	0.00	7787.00
11		6620.00	3054.00	0.00	0.00	6433.00
12		804.00	915.00	0.00	0.00	795.00
13		1683.00	0.00	227.00	0.00	1551.00
14	**	4623.00	1635.00	0.00	0.00	2979.00
15		4571.00	4852.00	403.00	0.00	8296.00
16		3857.00	4323.00	344.00	0.00	9044.00
17	*	110465.00	0.00	0.00	0.00	4809.00
18	*	7163.00	1772.00	0.00	0.00	7210.00
19		1858.00	1556.00	443.00	0.00	5585.00
20		10904.00	0.00	14956.00	0.00	28569.00
21		3459.00	0.00	3690.00	0.00	33336.00
22		3855.00	0.00	616.00	0.00	9895.00
23		2913.00	0.00	412.00	0.00	8771.00
24		2519.00	0.00	1096.00	0.00	18239.00
25		847.00	1308.00	425.00	0.00	7276.00
26		698.00	848.00	0.00	0.00	2010.00
27		936.00	1771.00	0.00	0.00	4324.00
28		2382.00	3412.00	293.00	1275.00	6706.00
29	?	428369.00	148892.00	137616.00	0.00	118473.00
30		9911.00	0.00	0.00	0.00	10658.00
31	*	17125.00	0.00	0.00	0.00	17307.00
32		974.00	0.00	529.00	0.00	12169.00
33		3818.00	7590.00	1547.00	0.00	59904.00
34		2275.00	2346.00	752.00	756.00	2442.00
35		4820.00	5349.00	0.00	1046.00	3866.00
36		3705.00	6200.00	0.00	0.00	5156.00
37		2760.00	2058.00	150.00	668.00	2244.00
38		2387.00	1395.00	156.00	0.00	1884.00
39		2031.00	25001.00	3139.00	26668.00	18590.00
40		14506.00	0.00	0.00	127919.00	7238.00
47		628.00	0.00	223.00	0.00	0.00
48		1343.00	0.00	712.00	0.00	0.00

* = Presence of naturally occurring hydrocarbons interfering with identification of BTX and resulting in an anomalous BTX response

** = Sample tube broken during shipment at those locations.

*** = Chloroform was detected on three samples; #30 @ 38698, #31 @ 42732, and #37 @ 3298

? = Heavily loaded sample with numerous hydrocarbon compounds compounding interpretation of all reported compounds.

0.00 = Compound not detected or verified

travel blank samples show only low levels of normal atmospheric compounds. Further details concerning the PETREX methods are included in the PETREX Protocol in Attachment 1.

DISCUSSION

Compound Identification

Several different VOC's were detected in the soil gas collectors used by EES. The chlorinated hydrocarbons tetrachloroethylene (PCE), trichloroethylene (TCE), trichloroethane (TCA) and freons 11/113, along with the aromatic hydrocarbons benzene, toluene, and xylenes (BTX), were detected and reported in Table 1. Additionally, chloroform, was detected in sample numbers 30/31 (duplicate pair) and 37. The aromatic hydrocarbons are typically constituents of most refined petroleum products such as fuels and lubricants, while the chlorinated solvents are commonly used as solvents or degreasers.

Compounds were identified by using a combination of molecular ion, fragment, and isotope mass spectral peaks. The Table 1 was prepared by selecting one or several indicator peaks to represent the relative abundance of a given compound or range of compounds in the soil gas (see Table 2).

Table 2
Indicator Peaks for Compounds

Compound	Mass Spectral Indicator Peaks
Tetrachloroethylene	164
Benzene, Toluene, Xylenes, Ethylbenzene (BTXE)	78, 92, 106
Trichloroethylene	130
Trichloroethane	97
Freon 11/113	103

The ability to detect different VOCs in soil gas is dependent upon various physiochemical properties of the materials involved. The physical characteristics of a particular compound (i.e., vapor pressure, solubility, etc.) will determine how it partitions into the vapor phase in the vadose zone. Additionally, the chemical and physical nature of the local lithologies and soils will influence the behavior and composition of soil gases. Therefore, the detection of different contaminants through soil gas will vary, and values for different compounds cannot be directly compared. Values for the same compound can be compared to distinguish potentially higher and lower contaminant levels. This information is useful for identifying source areas, migration pathways, and the areal extent of contamination.

The identification of the BTX was complicated by the presence of terpenes in several samples as noted on Table 1. Terpenes are a class of naturally occurring compounds which are produced by local vegetation (i.e., pine trees) or their derivatives. Certain terpenoid compounds have masses which coincide with other VOCs of interest such as toluene.

ATTACHMENT 1

PETREX SOIL GAS PROTOCOL

INTRODUCTION

The Petrex Static Collection Technique provides a means by which trace quantities of subsurface derived organic compounds can be detected and collected at the earth's surface. It is integrative, thereby eliminating the short-term variations associated with other gas/vapor detection methods. The Petrex Technique directly collects and records a broad range of organic compounds emanating from subsurface sources.

SOIL GAS COLLECTOR PREPARATION

Soil gas collectors are prepared as follows:

1. Adsorption wires (after construction) are cleaned by heating to 358°C in a high vacuum system.
2. Wires are packed under an inert atmosphere in airtight tubes.
3. One collector out of every thirty is checked for cleanliness by mass spectrometry. Based on the results, the group of thirty collectors is approved for release into the field.

SAMPLER SHIPMENT AND FIELD HANDLING

Two transportation blanks are included with each shipment. Transportation blank samplers are stored unopened until analysis with the field samplers.

SOIL GAS COLLECTOR INSTALLATION

The collector consists of a ferromagnetic wire coated with an activated adsorbent. Each sample is typically placed in a shallow hole, 20-30 cm deep, within a protective container. The hole is backfilled and the location is marked. The collector is left in the ground for as long as 45 days, then retrieved and sealed in its container for transportation back to the laboratory for analysis.

MASS SPECTROMETER TUNING

An Extranuclear Quadrupole Mass Spectrometer equipped with a Curie-point pyrolysis/thermal desorption inlet is used for collector analysis. Mass assignment and resolution are manually adjusted using a perfluorotributylamine (PFTBA) standard. A linear correction, based on the known spectrum of PFTBA, is calculated. This correction is applied to a second PFTBA spectrum. If correct mass (M/Z) values are obtained, the operator proceeds to the next tuning step. If not, the procedure is repeated until correct masses are obtained.

Peak intensity ratios are set from the major peaks in the PFTBA spectrum using the following values:

Mass (M/Z)		Spectrum Intensities
69	=	100%
131	=	25% ± 5%
219	=	35% ± 5%

During tuning, the ion signal for mass (M/Z) 69 of PFTBA is measured at a preset sample pressure and detector voltage and compared to previous values at the same setting.

Electron energy is set to 70 electron volts and emission is set at 12 milliseconds. All other operating parameters, such as scans, scan range, and mass offset, are established in the computer program. These values may only be changed by the laboratory manager.

Tuning is performed at the beginning of a run so that an individual survey is analyzed at the same set of instrument conditions. The samples are analyzed in random order.

LABORATORY ANALYSIS

Machine background analyses are performed periodically (approximately every 20 samples) to assure that there is no carryover between successive samples. If there are peaks which are not related to atmospheric gases, the supervisor is notified and the mass spectrometer is shut down and cleaned as necessary.

A written sample number record is kept during the analysis to prevent accidental sample number duplication. The mass spectrometer control program contains appropriate "flag statements" that prompt the operator with a warning if an input sample number has already been analyzed. The operator then checks the current number, along with the disk storage location of the previously entered number to identify the true sample number.

COMPOUND IDENTIFICATION

Compound identification is based on molecular weight, compound fragmentation, and isotope distribution, as applicable. Each compound exhibits a unique mass spectral signature. NERI/Petrex maintains a large library of spectra for individual compounds, accessible by computer. In addition, the company maintains a large library of commonly used chemical mixtures, e.g., gasolines, diesels, industrial oils and solvents, coatings, and plastics. These are used to assist in both compound and mixture identifications.

Indicator peaks, indicative of the compound and away from interference by other compounds, are selected for data presentation and mapping.

RELATIVE FLUX DETERMINATION

The process of determining ion counts (fluxes) of indicator peaks for the specified compounds is totally computerized. Sample locations on a base map are digitized as X-Y coordinates and flux data for the given compounds are plotted at respective locations. All flux data are then extracted from the original data file for subsequent processing.

Mapping of the relative flux data occurs after contour intervals for each compound or component class are determined. In order to establish the contour intervals, factors such as flux distribution, physiochemical considerations, and component-source material relationship (if known) are taken into account for each compound or class, in each area, on an individual basis. Each map is then contoured by hand, or in special cases, computer contoured. The resultant contour zones for each compound or component in each area are color-coded on a relative basis.

It should be noted that the reported ion counts are representative of a flux which is proportional to the component's emanation rate at a particular sample location and is not a measure of concentration. Flux values for one compound cannot be quantitatively compared to flux values for different compounds. At this time, there has been no absolute equation established from which subsurface compound concentrations can be calculated from surficial flux levels.

TABLE 1a

PETREX TIME TRIAL SOIL GAS RESULTS
(in Ion Counts)

Sample Number	BTX	TCA	Freon 11 or 113	TCE	PCE
41	NA	0	0	0	1,664
42	NA	0	0	0	9,118
43	NA	0	0	0	7,375
44	NA	0	0	0	17,576
45	NA	1,635	0	0	17,293
46	NA	2,324	12,326	2,735	28,041

NOTES:

Results from the time trial tests should not be directly compared to the sample results in Table 1 becasue of variation in analytical instrument calibration and sampling time duration.

NA = not available.

APPENDIX H

Geophysical Logs

welenco

GAMMA-GUARD LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC

WELL MW-3

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. ____ TWP. ____ RGE. ____

OTHER SERVICES:
E-LOG
CALIPER

Permanent Datum: G.L. Elev. ____
Log Measured From G.L. ____ Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ____
D.F. ____
G.L. ____

Date	1-25-90			
Run No.	ONE			
Depth—Driller	730'			
Depth—Logger	729'			
Btm. Log Inter.	728'			
Top Log Inter.	0'			
Casing—Driller	10½" @ 22'	@	@	@
Casing—Logger	22'			
Bit Size	9 7/8"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	PIT			
R_m @ Meas. Temp.	9.6 @ 75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4@ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	0 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. CALDWELL	MR. MELCHIOR	MR. TOMCZYK

EQUIPMENT DATA

LOGGING DATA

Run No.	ONE
Log Type	GR-G
Speed Ft./Min.	35
T.C. Sec.	–
Sens. Settings	200/300
Zero Div. L or R	3L
API Units/Div.	10
Log Start Time	–
Log End Time	–
Pumping Rate	–
Fluid Level	–
Formation Factor	7.00

Gamma Ray

Run No.	ONE
Tool Model No.	MW-1
Diameter	3"
Detector Model No.	–
Type	SCINT.
Length	4"

General

Hoist Truck No.	L103 BFL
Instrument Truck No.	L103 BFL
Tool Serial No.	77-82

RESISTIVITY ohms. m²/m

GUARD

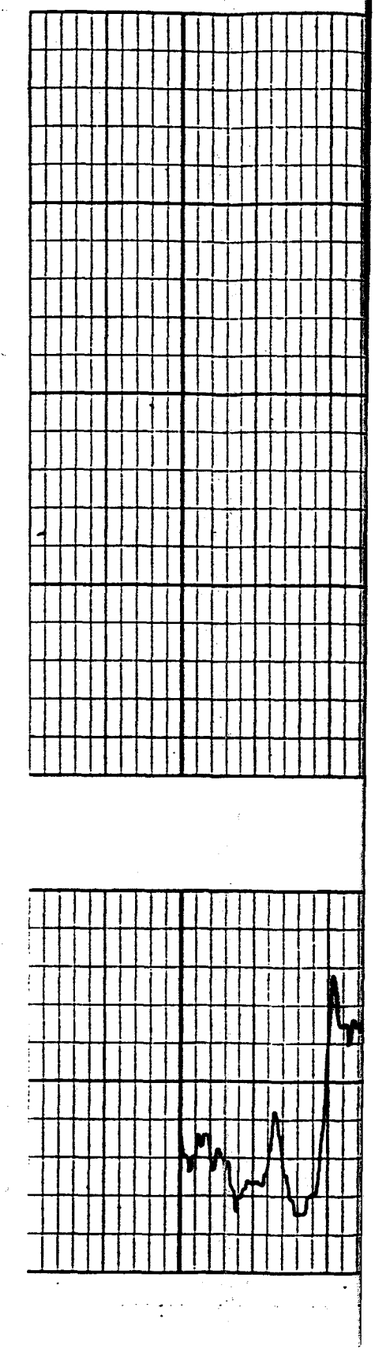
0 500 1000 1500 2000

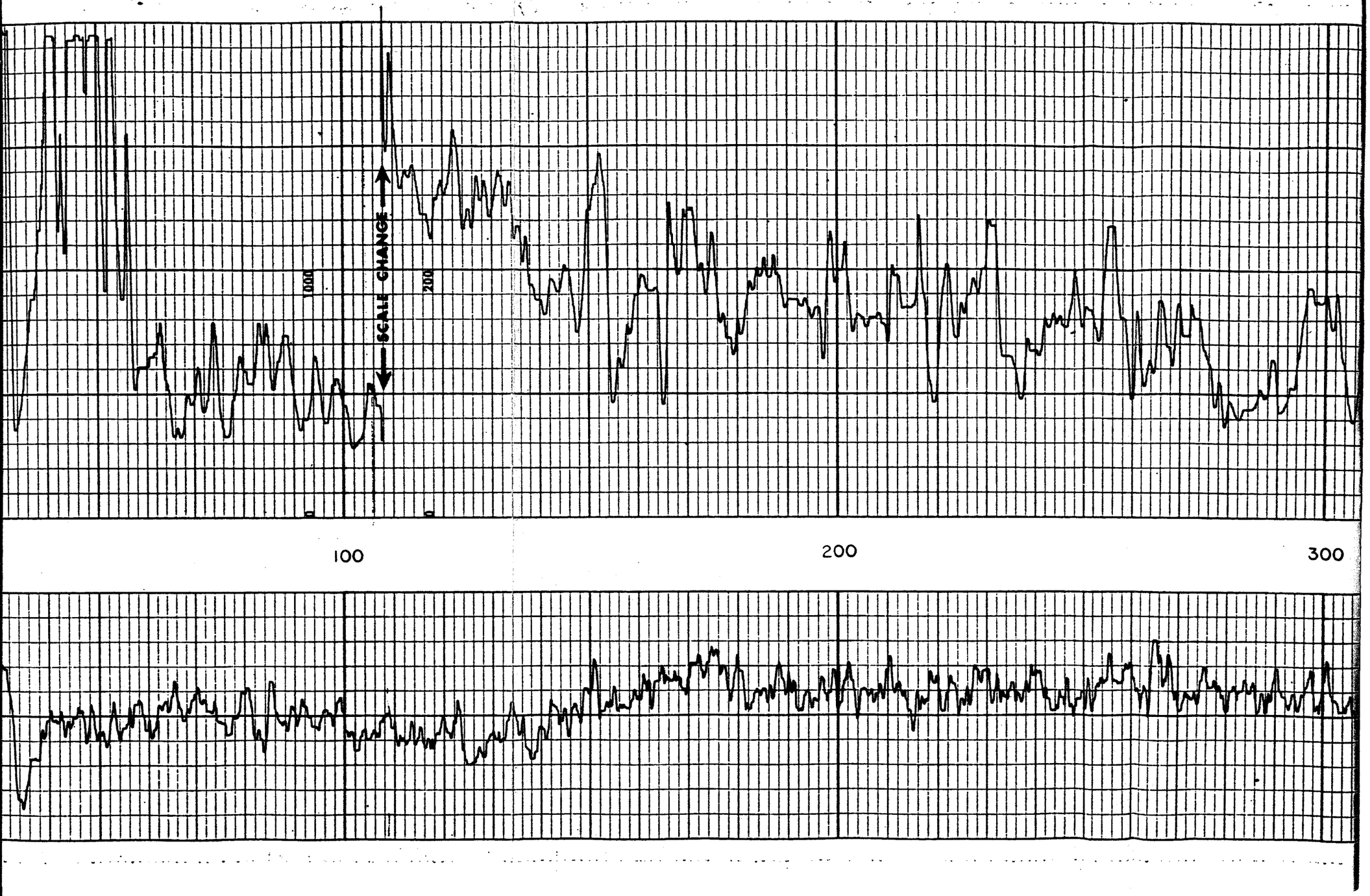
0 100 200 300 400

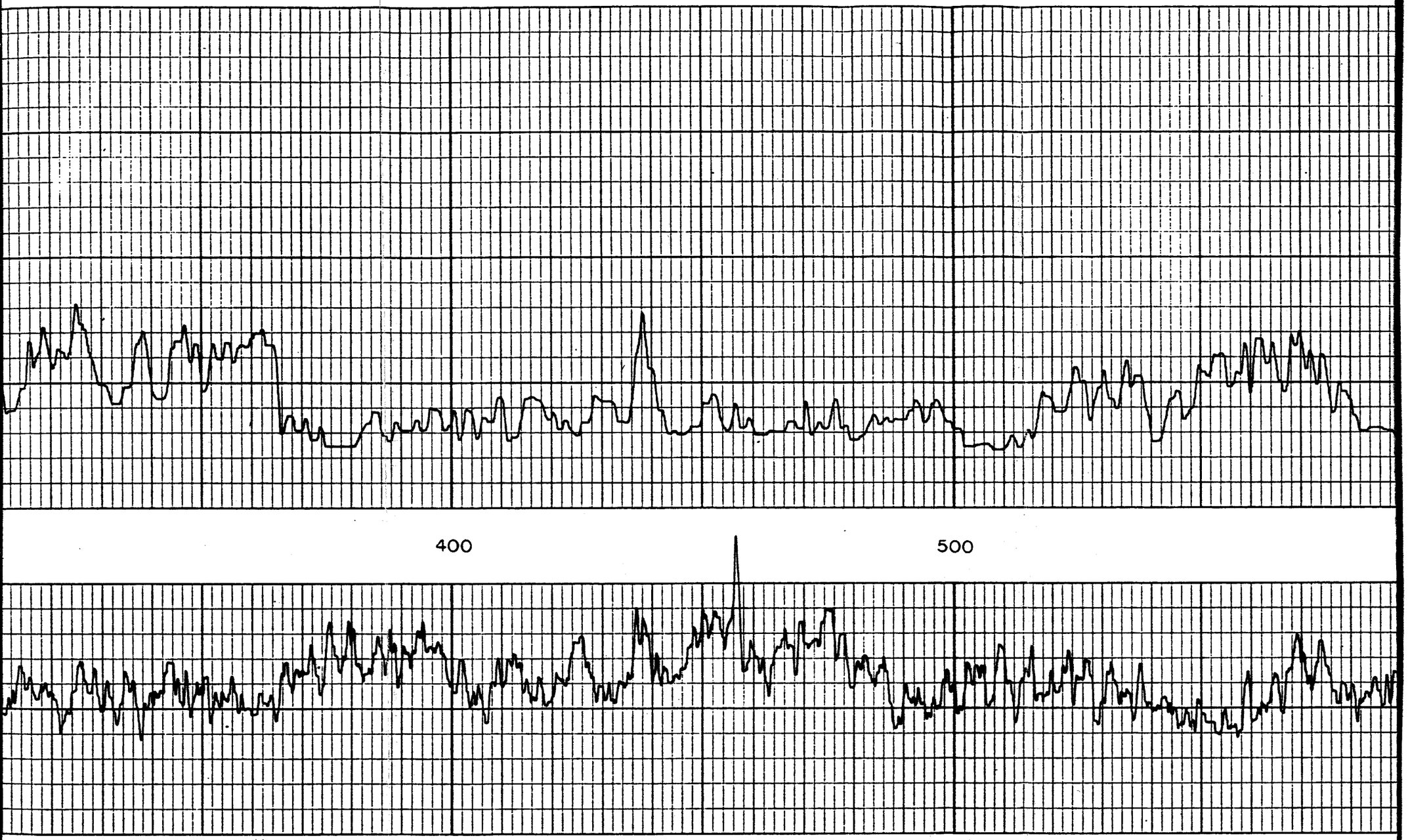
Depths

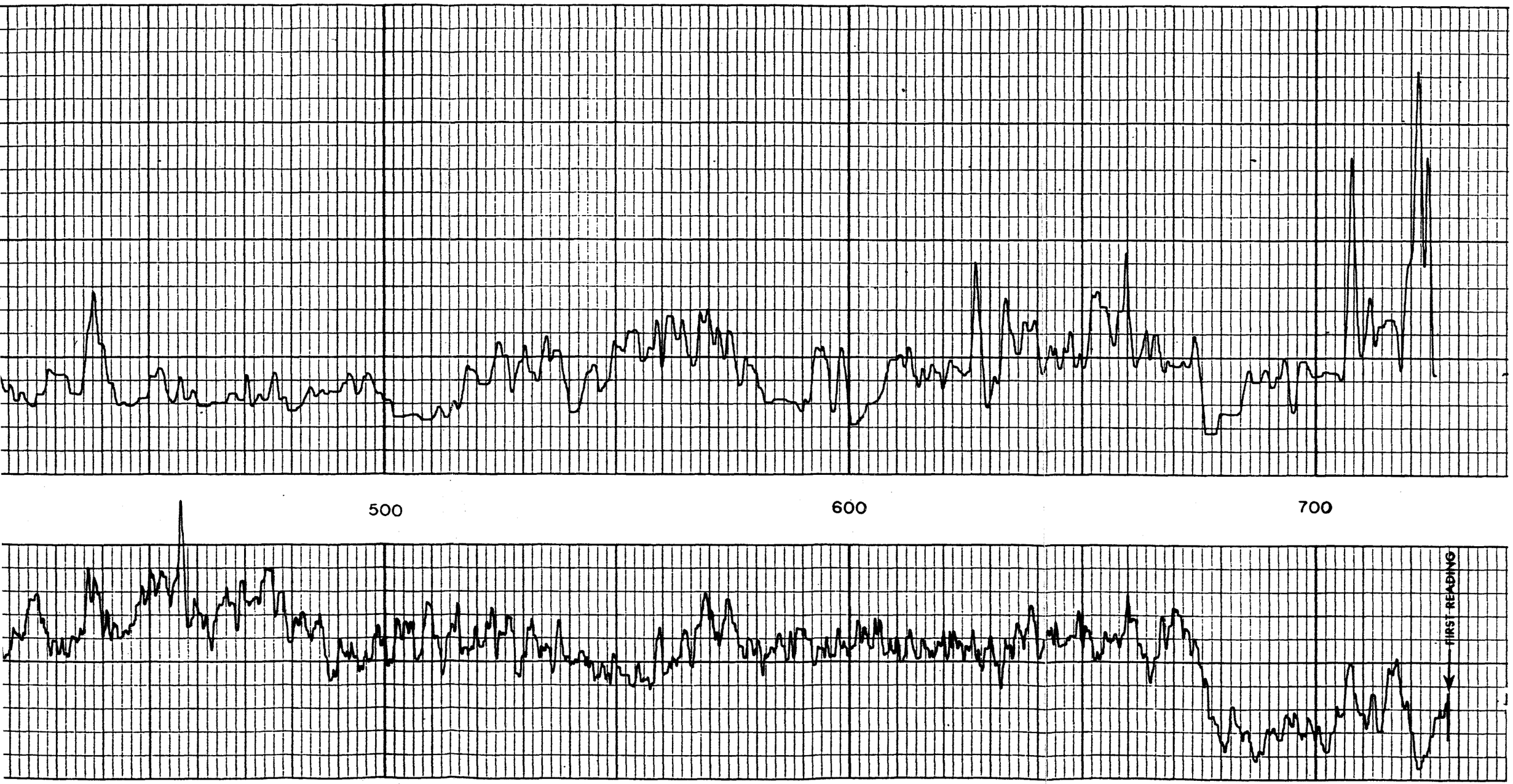
GAMMA-RAY API Units

30 130




SCALE CHANGE
1000
200
100
200
300


400
500



2

welenco

Caliper

COMPANY BEYLIK DRILLING, INC

WELL MW-3

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. TWP. RGE.

OTHER SERVICES:
E-LOG
GAMMA-GUARD

PERMANENT DATUM G.L. ELEV.
LOG MEASURED FROM G.L. FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM G.L.

ELEV.: K.B.
D.F.
G.L.

DATE	1-25-90		
RUN NO.	ONE		
TYPE LOG	CALIPER		
DEPTH-DRILLER	730'		
DEPTH-LOGGER	–		
BOTTOM LOGGED INTERVAL	710'		
TOP LOGGED INTERVAL	0'		
TYPE FLUID IN HOLE	BENTONITE MUD		
MAX. REC. TEMP., DEG. F.	N/A		
RECORDED BY	D.L. CRAIG		
WITNESSED BY	MR. CUTLER	MR. CALDWELL	MR. MELCHIOR

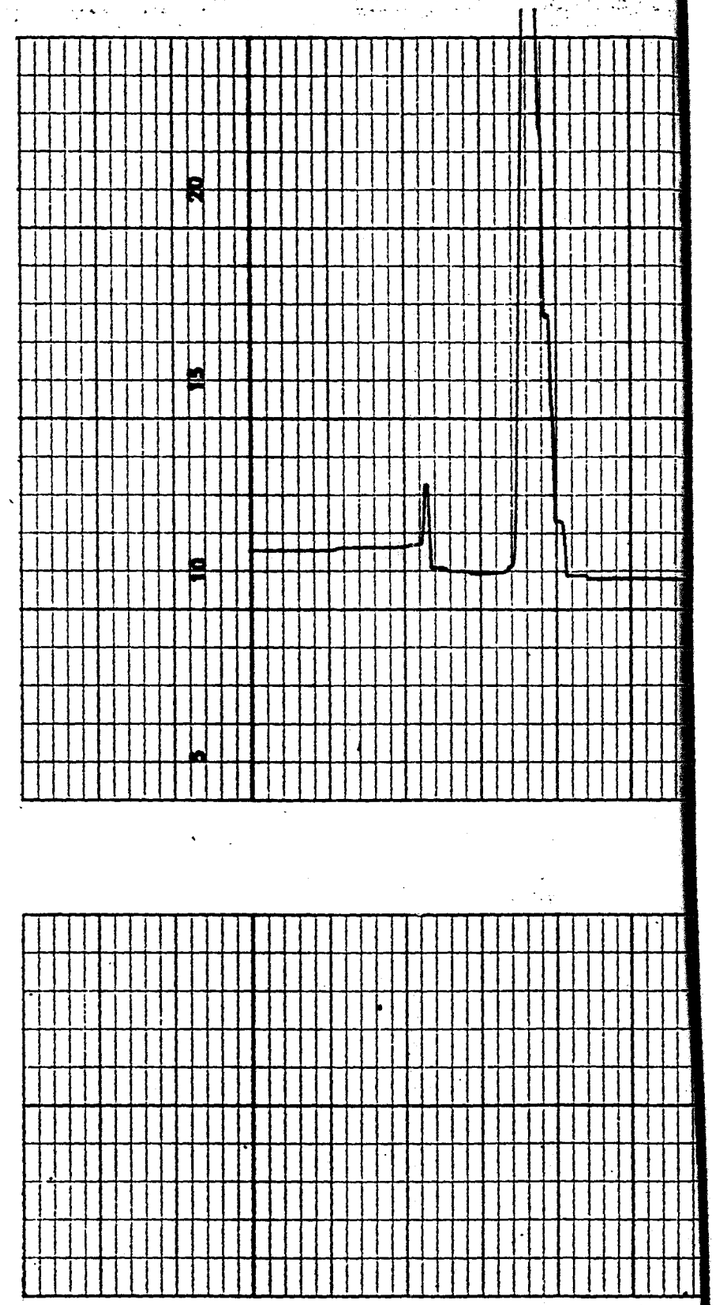
RUN	BORE-HOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	9 7/8	22'	730'	10½"ID	–	0'	22'

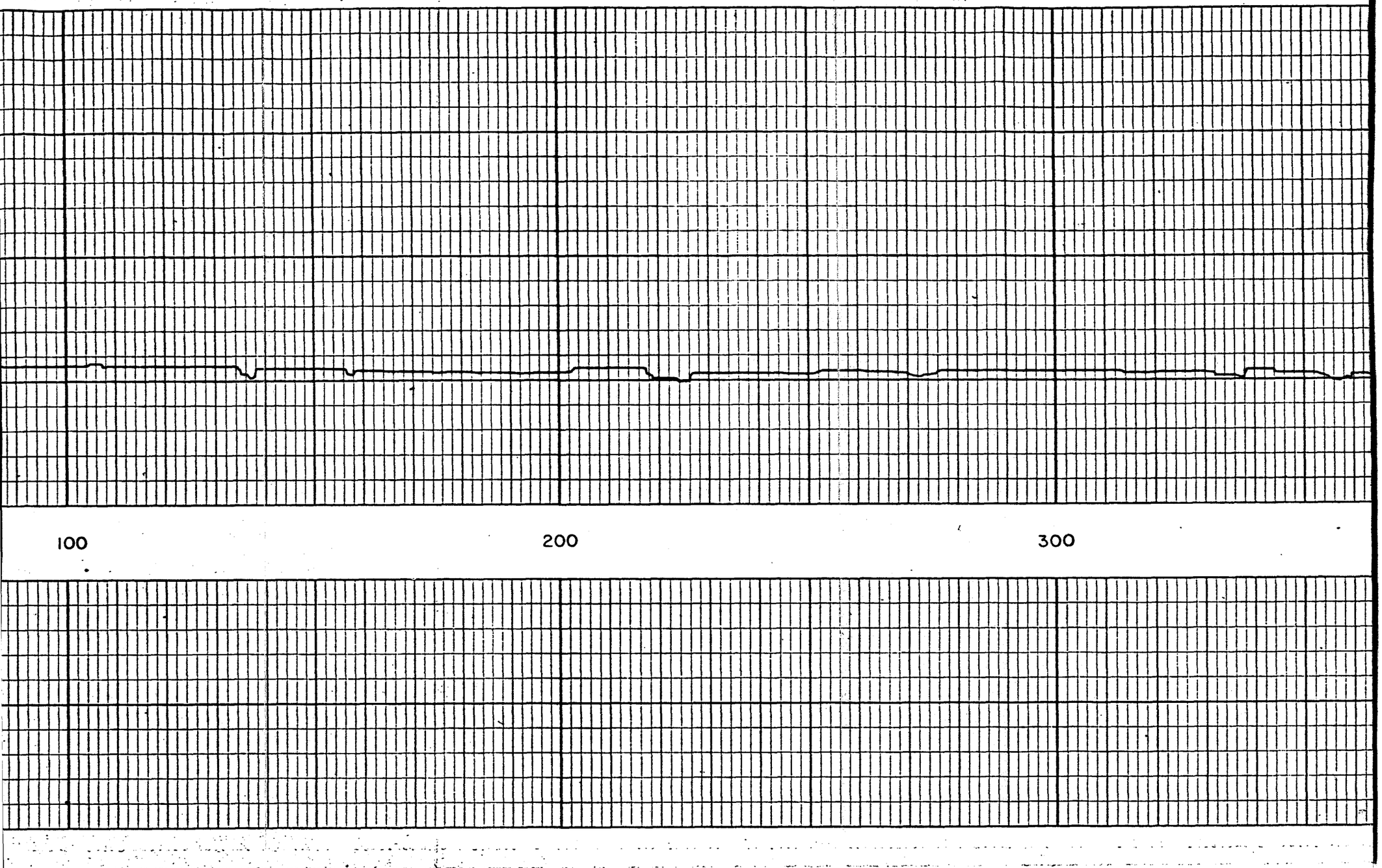
Remarks:

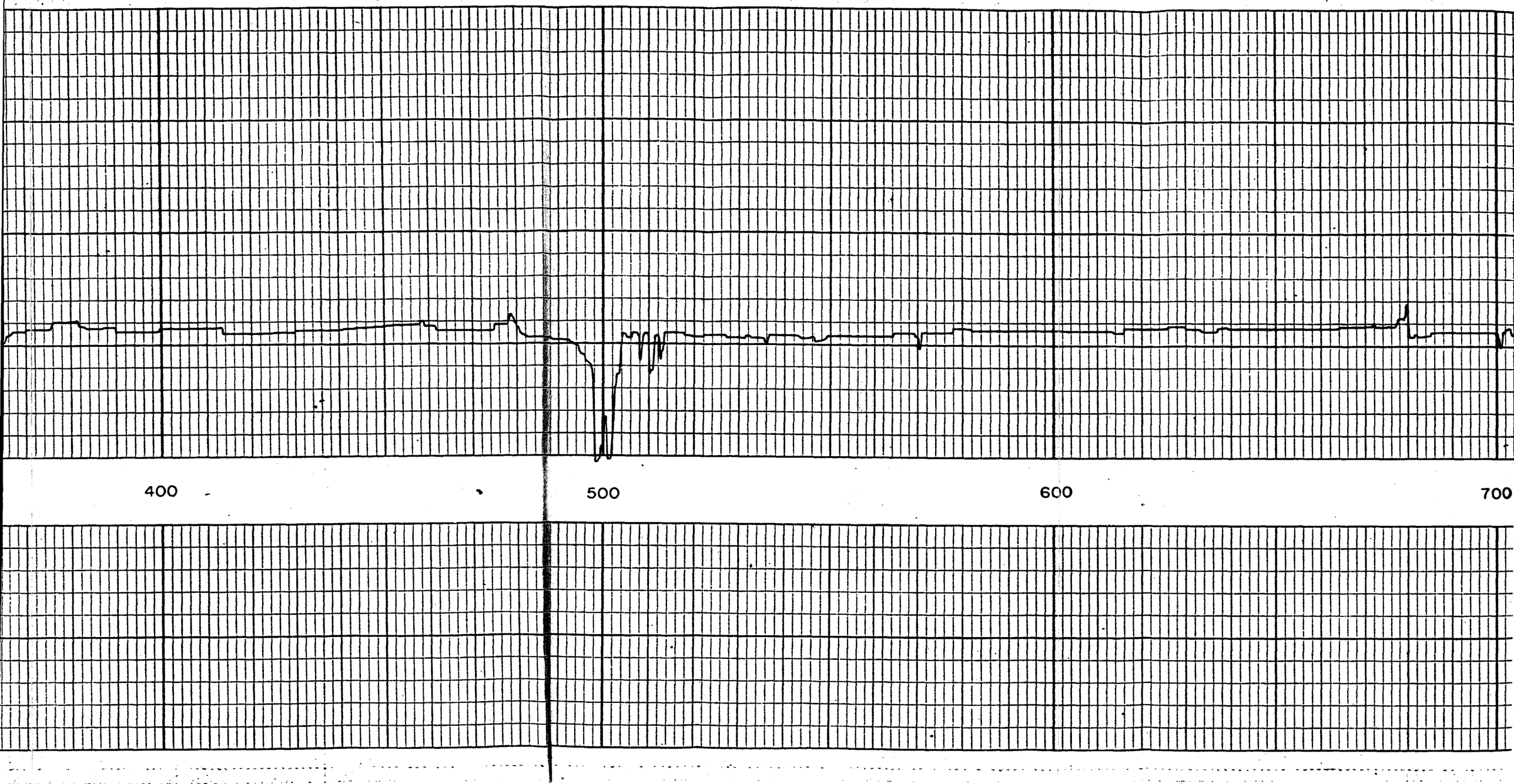
Fold Here

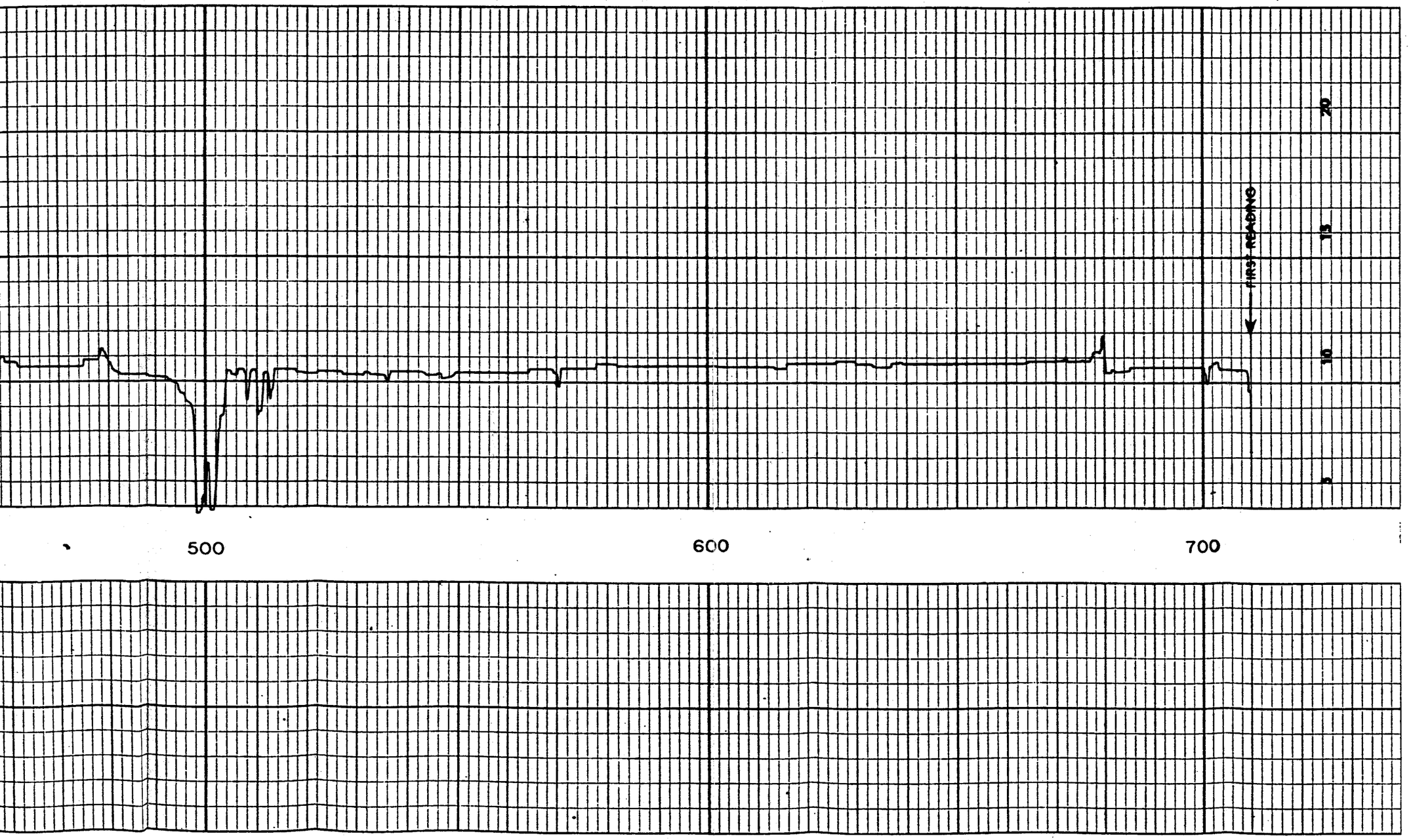
CALIPER
Average Diameter Inches

DEPTHS




100
200
300


400
500
600
700



3

welenco

ELECTRIC LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC

WELL MW-3

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. ____ TWP ____ RGE. ____

OTHER SERVICES:
GAMMA-GUARD
CALIPER

Permanent Datum: G.L., Elev. ____
Log Measured From G.L., ____ Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ____
D.F. ____
G.L. ____

Date	1-25-90			
Run No.	ONE			
Depth—Driller	730'			
Depth—Logger	729'			
Btm. Log Inter.	728'			
Top Log Inter.	22'			
Casing—Driller	10½" @ 22'	@	@	@
Casing—Logger	22'			
Bit Size	9 7/8"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	PIT			
R_m @ Meas. Temp.	9.6 @ 75°F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4 @ 75°F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	M	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	0 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. CALDWELL	MR. MELCHIOR	MR. TOMCZYK

Fold Here

This Heading and Log Conform To API RP 31

REMARKS

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole
NORMALS	108'	0–1000 OHM-M	0–200 OHM-M

Changes in Mud Type or Additional Samples

Date | Sample No.	Dens. | Visc.	pH | Fluid Loss	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} | R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT
–	–	– ml	–	@ °F	@ °F	@ °F	–	@ °F	@ °F	@ °F

Equipment Data

Run No.	Tool Type	Pad Type	Tool Position	Other
ONE	NORMALS	–	FREE	

RESISTIVITY ohms. m²/m

RESISTANCE Detail Curve

RESISTIVITY ohms. m²/m

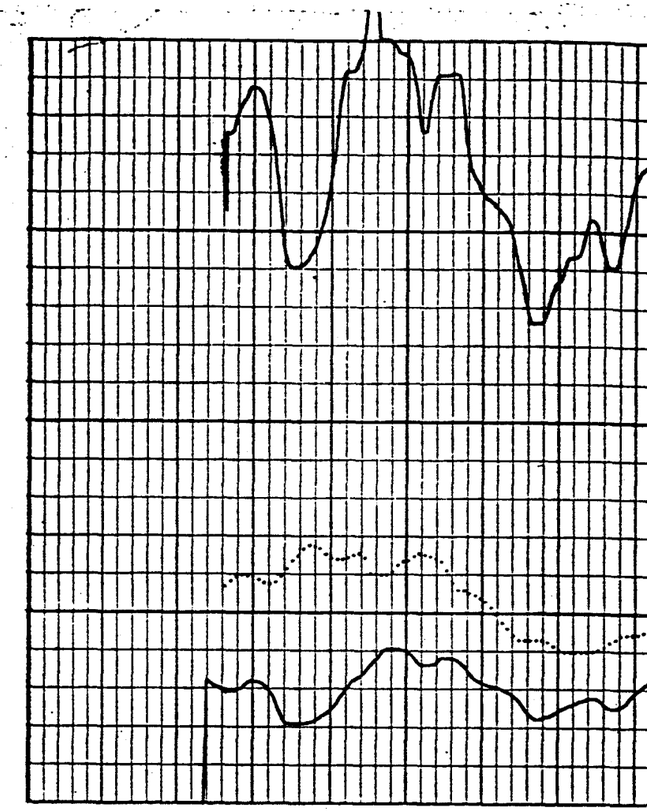
SHORT NORMAL 16 Inch 0 200 1000

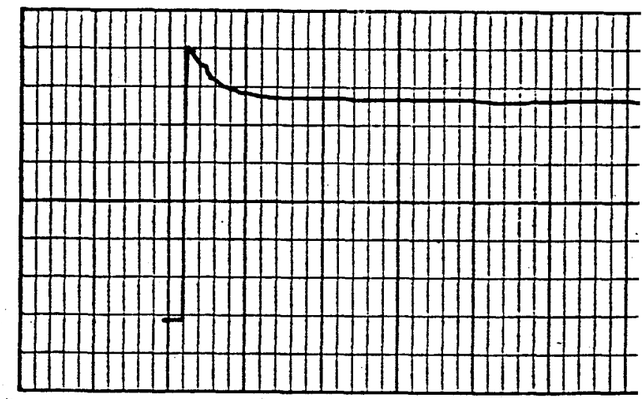
LONG NORMAL 64 Inch 0 200 1000

Depths

SPONTANEOUS POTENTIAL millivolts

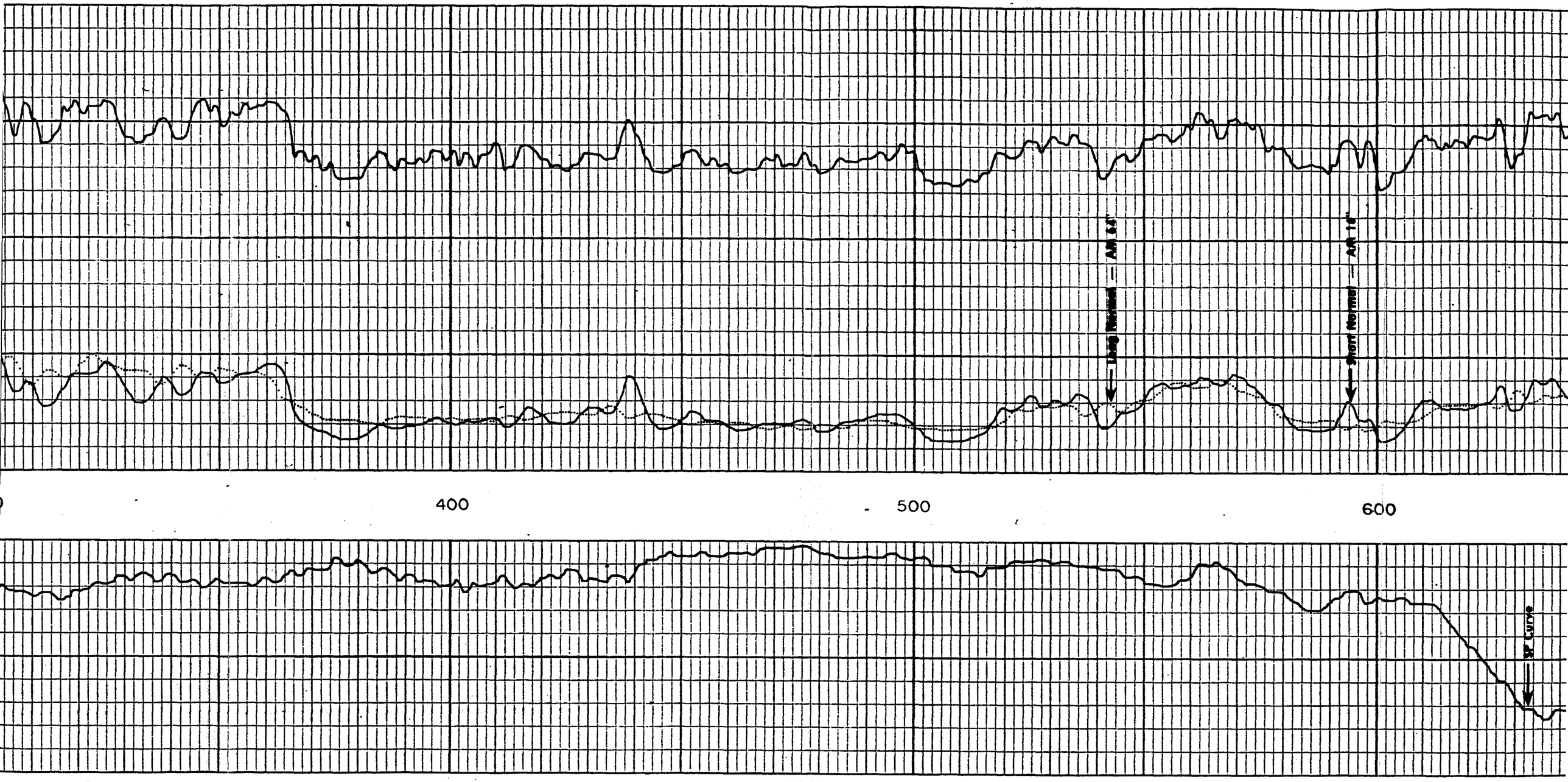
20 + –

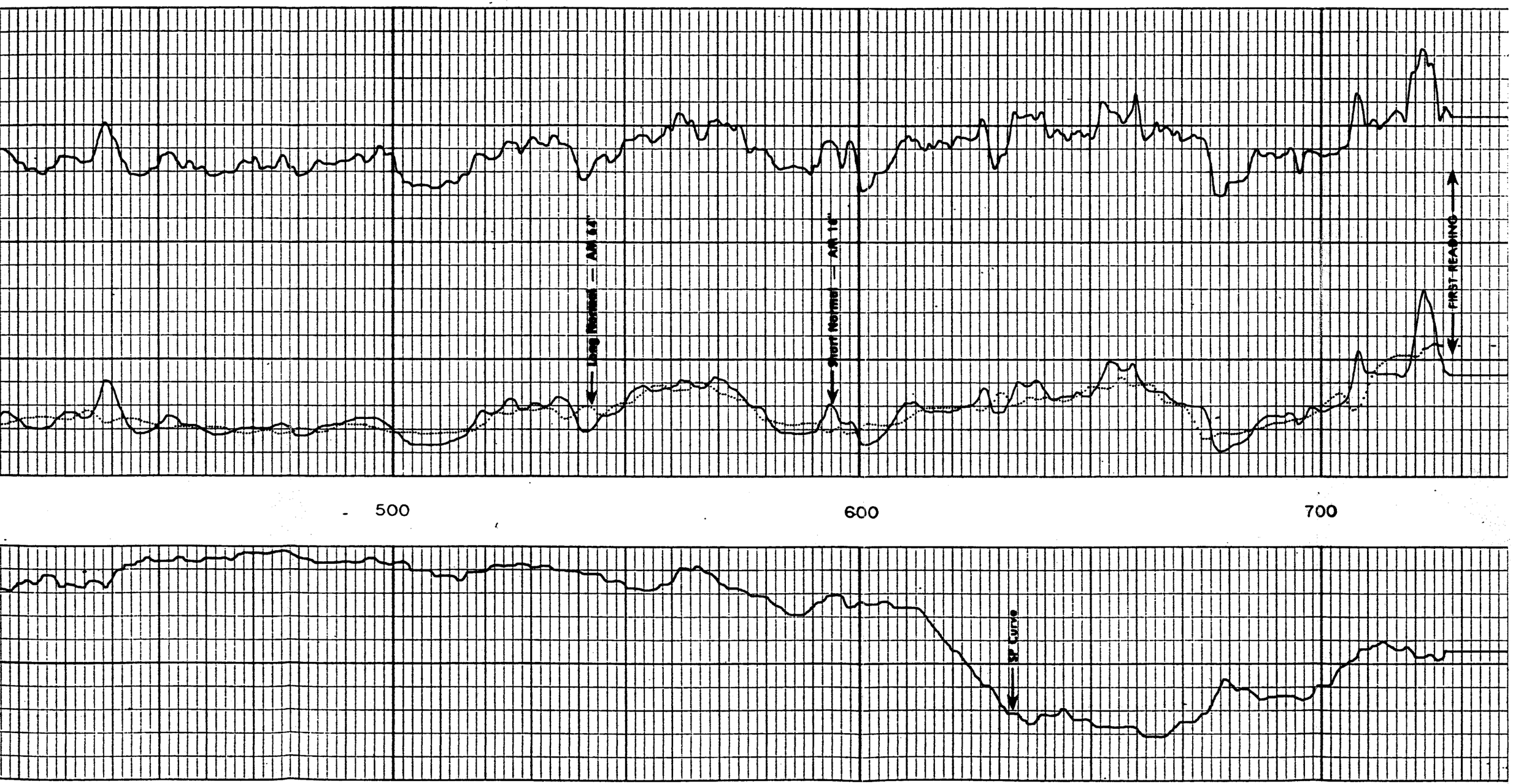




6

1000
0
SCALE CHANGE
200
0
Long Normal – AM 64"
Single Point Curve
Short Normal – AM 16"
100
200
300
SP Curve


Long Normal — AM 14'
Short Normal — AM 16'
SP Curve
400
500
600


Long Normal — AM 16"
Short Normal — AM 16"
FIRST READING
500
600
700
SP Curve

welenco

ELECTRIC LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC.

WELL MW-4

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. ____ TWP. ____ RGE. ____

OTHER SERVICES: GAMMA-GUARD, SONIC/VDL

Permanent Datum: G.L. Elev. ____
Log Measured From G.L. ____ Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ____ D.F. ____ G.L. ____

Date	2-7-90			
Run No.	ONE			
Depth—Driller	605'			
Depth—Logger	605'			
Btm. Log Inter.	603'			
Top Log Inter.	18'			
Casing—Driller	16" @ 18'	@	@	@
Casing—Logger	18'			
Bit Size	12 1/4"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	MUD TANK			
R_m @ Meas. Temp.	11.0 @ 75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4 @ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	15 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. BARNES		

This Heading and Log Conform To API RP 31

Fold Here

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole
NORMALS	120'	0-1000 OHM-M	0-200 OHM-M

Equipment Data

Run No.	Tool Type	Pad Type	Tool Position
ONE	NORMALS	–	FREE
			Other

REMARKS

Changes in Mud Type or Additional Samples

Date | Sample No.	Depth—Driller	Type Fluid in Hole	Dens. | Visc.	pH | Fluid Loss	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} | R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT
–			–	– ml		@ °F	@ °F	@ °F	–	@ °F	@ °F	@ °F

CONSULTANTS: EBASCO ENVIRONMENTAL

RESISTIVITY ohms. m²/m

RESISTIVITY ohms. m²/m

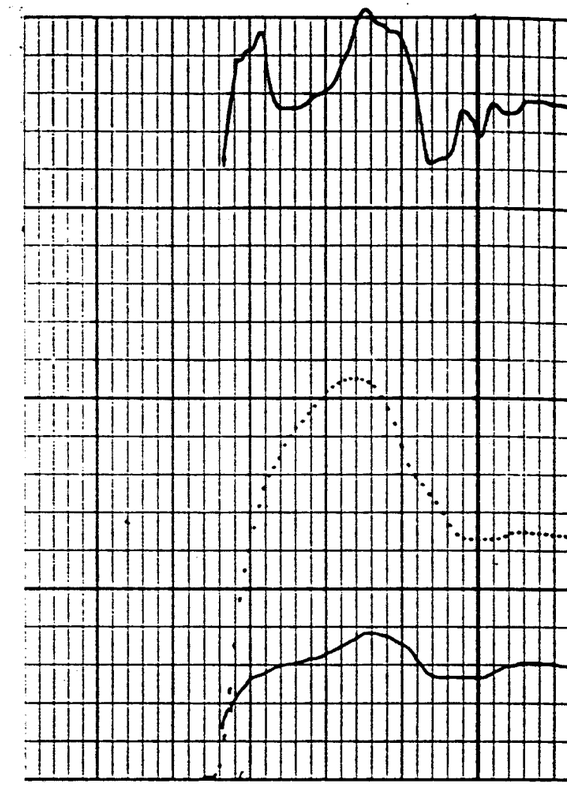
SHORT NORMAL 16 Inch: 0 – 1000; 0 – 200

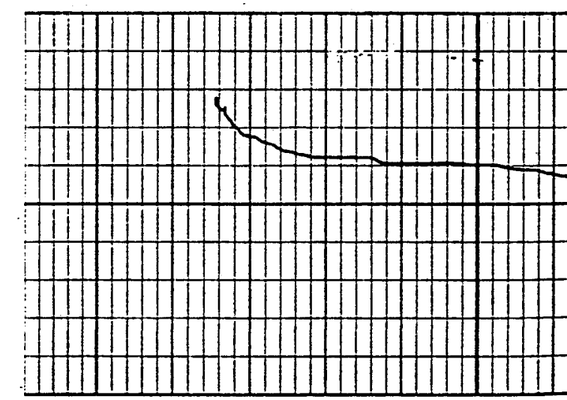
LONG NORMAL 64 Inch: 0 – 1000; 0 – 200

RESISTANCE Detail Curve

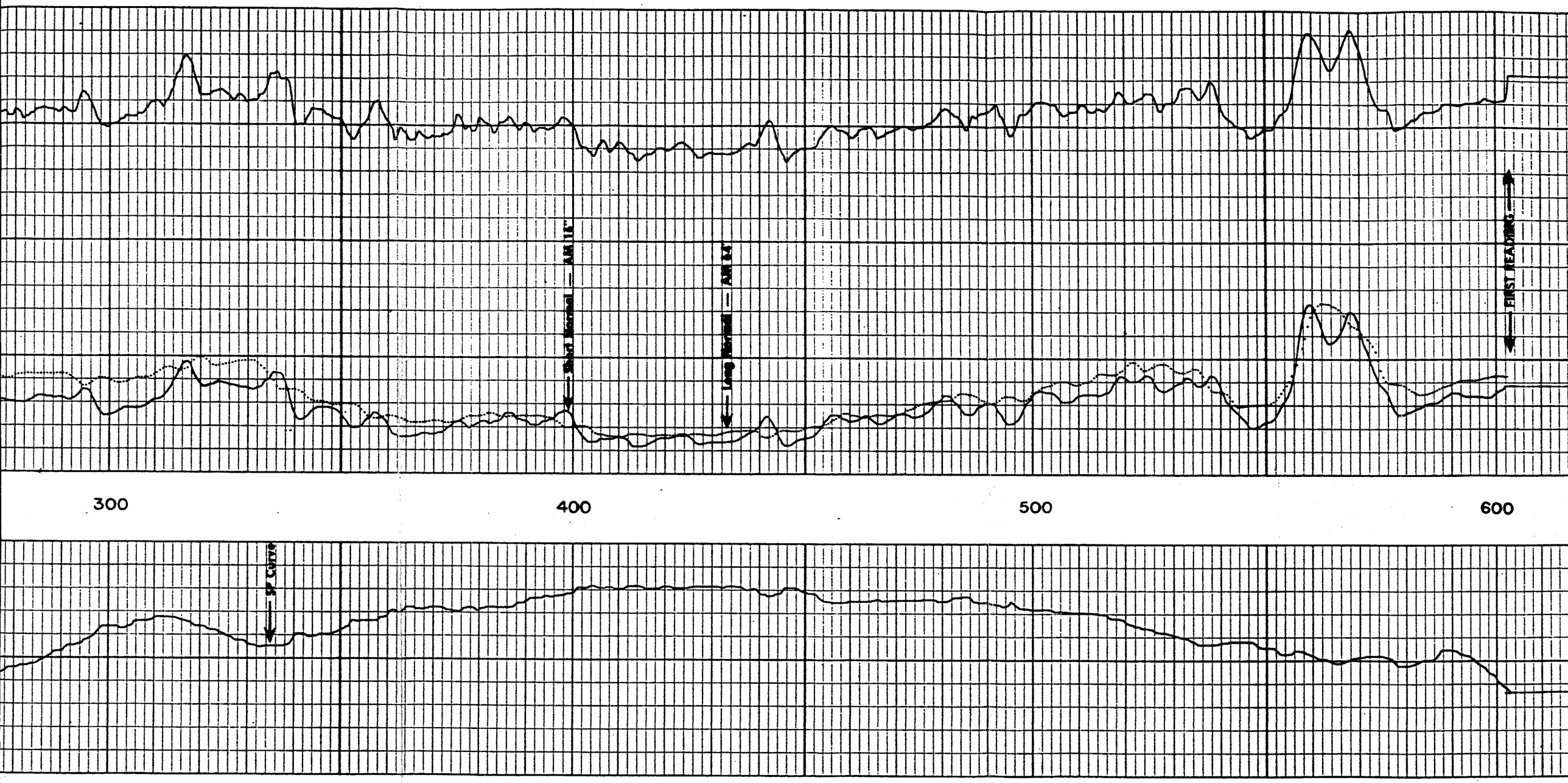
Depths

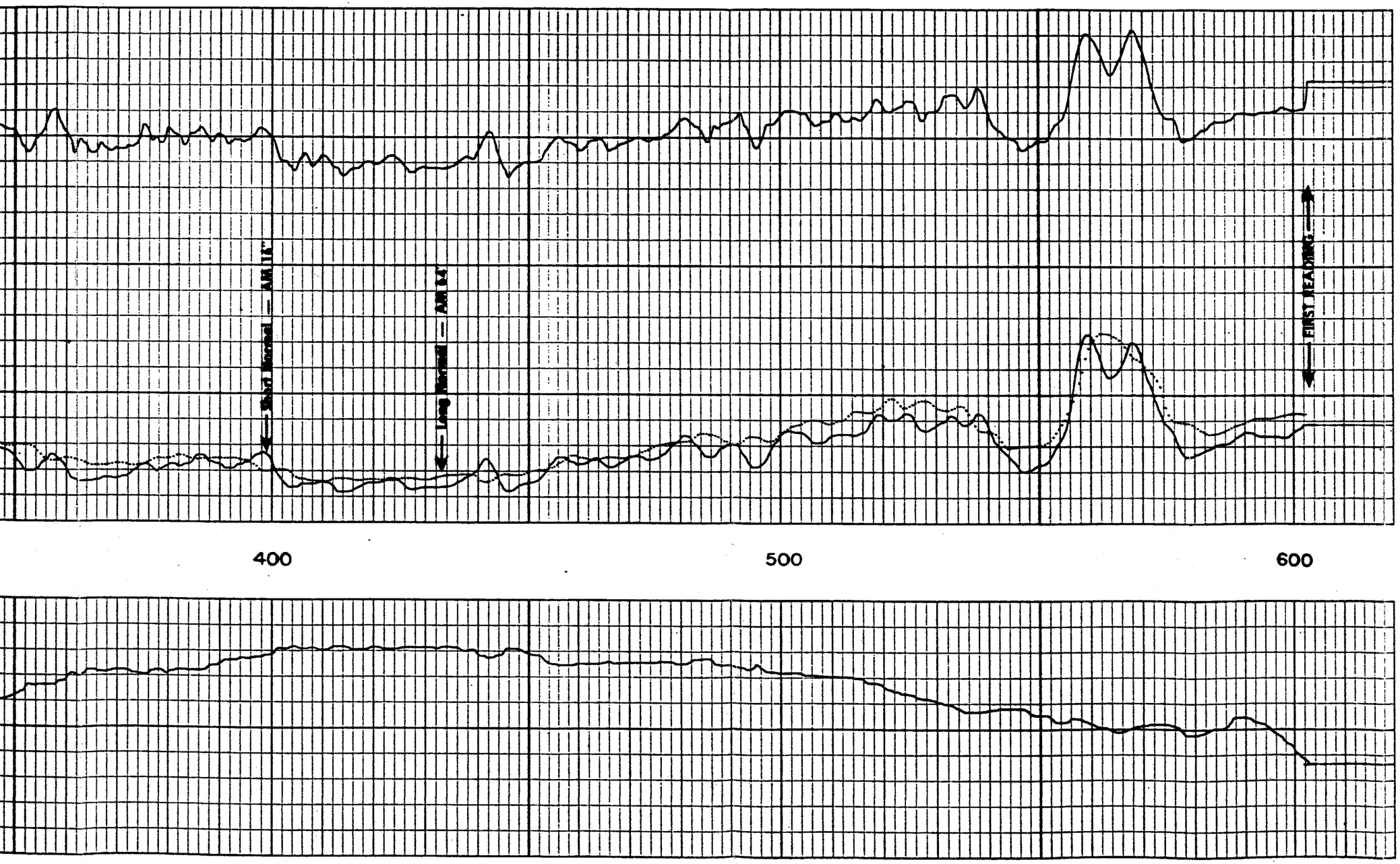
SPONTANEOUS POTENTIAL millivolts: 20 (+ / –)





1000
0
200
0
SCALE CHANGE
Long Normal — AM 64"
Short Normal — AM 16"
100
200
300
SP Curve
SP Curve


Short Normal — AM 18"
Long Normal — AM 64"
FIRST READING
SP Curve
300
400
500
600


Short Normal — AM 16"
Long Normal — AM 14'
FIRST READING
400
500
600

welenco

GAMMA-GUARD LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC.

WELL MW-4

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC ____ TWP ____ RGE ____

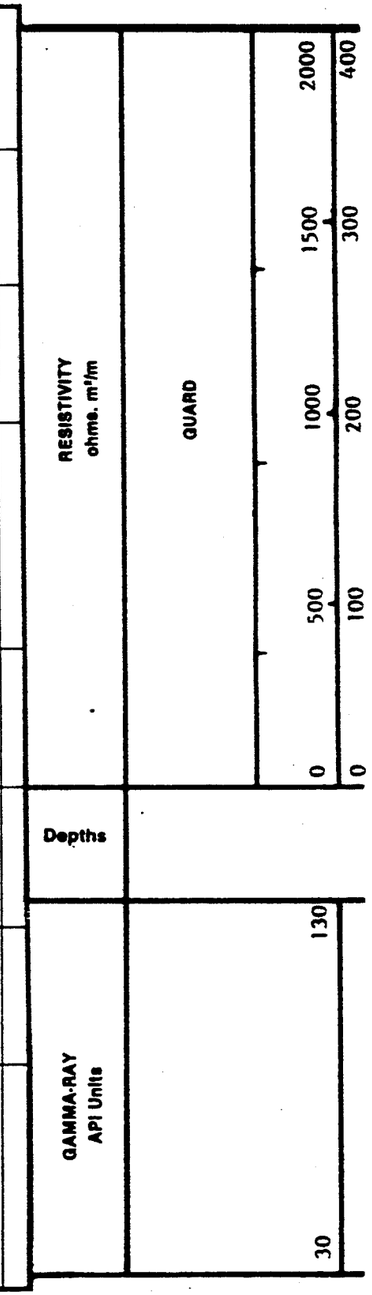
OTHER SERVICES:
E-LOG
SONIC/VDL

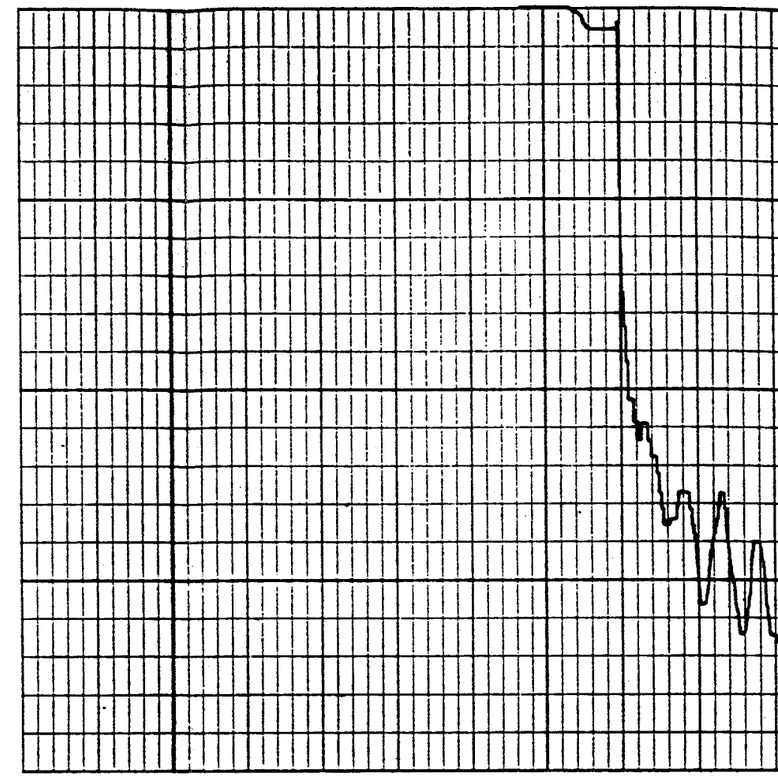
Permanent Datum: G.L. Elev. ____
Log Measured From G.L. ____ Ft. Above Perm. Datum
Drilling Measured From G.L.

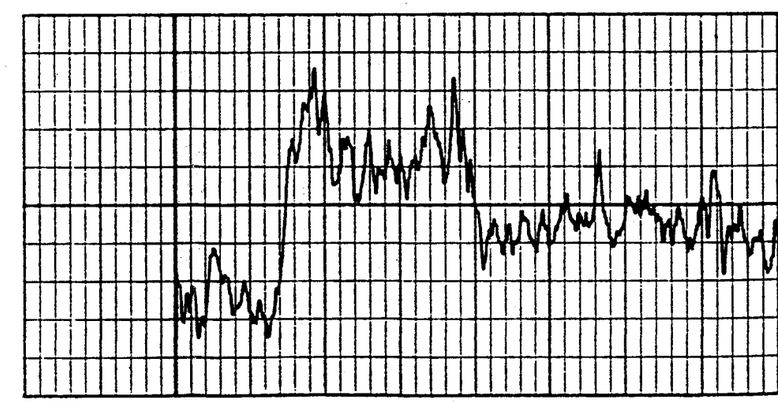
Elev.: K.B. ____
D.F. ____
G.L. ____

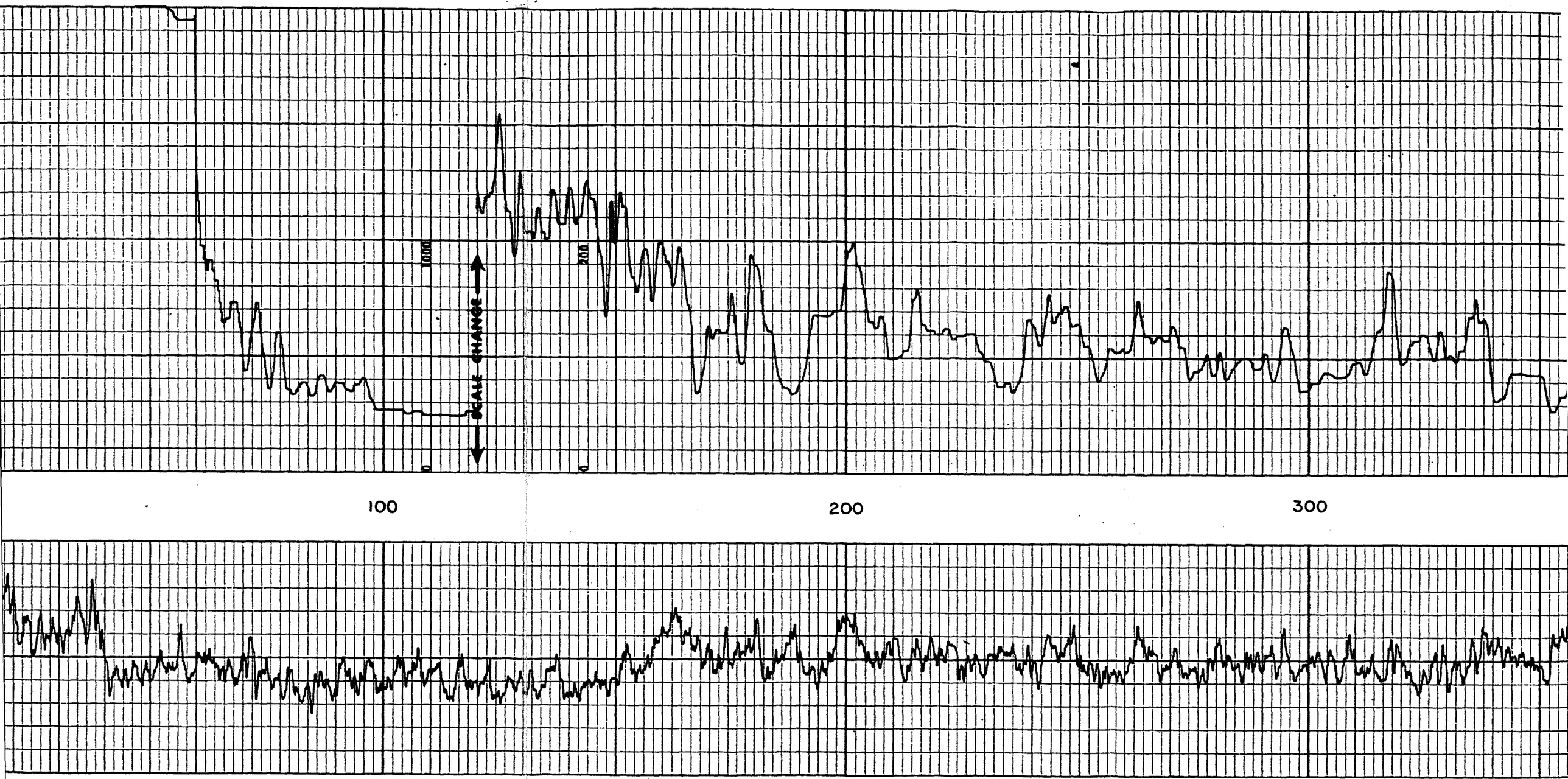
Date	2-7-90			
Run No.	ONE			
Depth—Driller	605'			
Depth—Logger	605'			
Btm. Log Inter.	604'			
Top Log Inter.	0'			
Casing—Driller	16" @ 18'	@	@	@
Casing—Logger	18'			
Bit Size	12 1/4"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	MUD TANK			
R_m @ Meas. Temp.	11.0 @ 75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4 @ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	15 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. BARNES	DR. MELCHIOR	

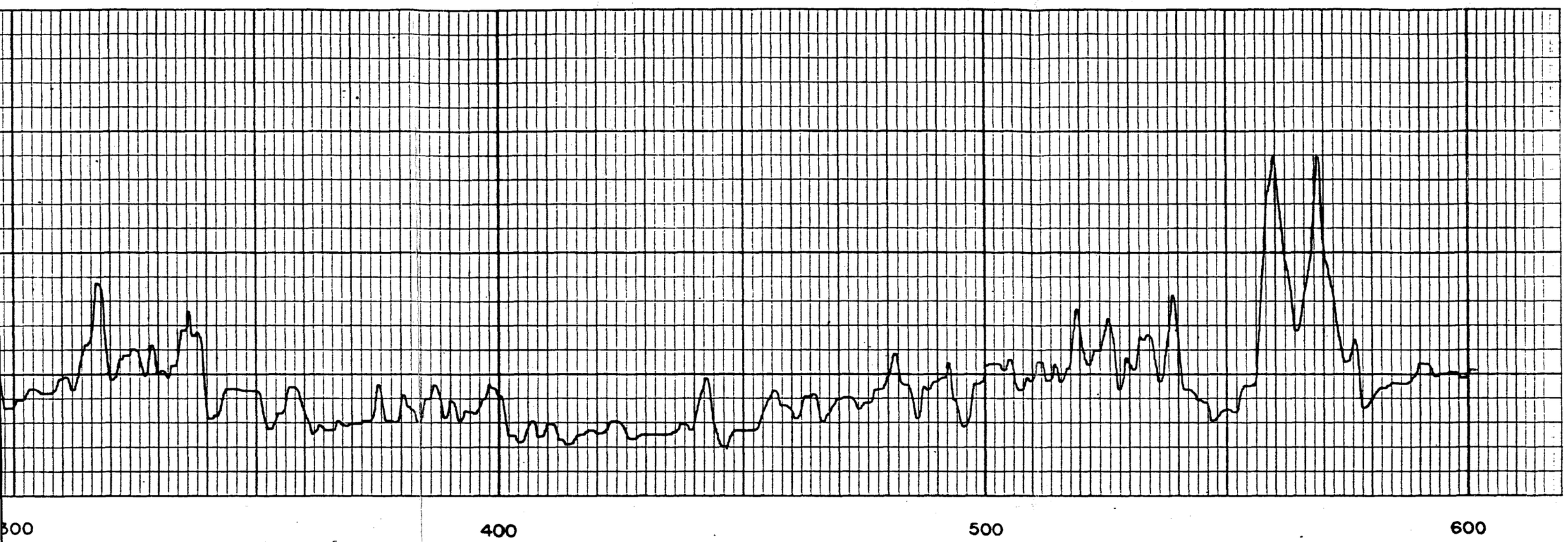
EQUIPMENT DATA		
LOGGING DATA		
	Run No.	ONE
	Log Type	GR-G
	Speed Ft./Min.	35
	T.C. Sec.	–
	Sens. Settings	200/300
	Zero Div. L or R	3L
	API Units/Div.	10
	Log Start Time	–
	Log End Time	–
	Pumping Rate	–
	Fluid Level	–
	Formation Factor	7.00
Gamma Ray	Run No.	ONE
	Tool Model No.	MW-1
	Diameter	3"
	Detector Model No.	–
	Type	SCINT.
	Length	4"
General	Hoist Truck No.	L103 BFL
	Instrument Truck No.	L103 BFL
	Tool Serial No.	77-82

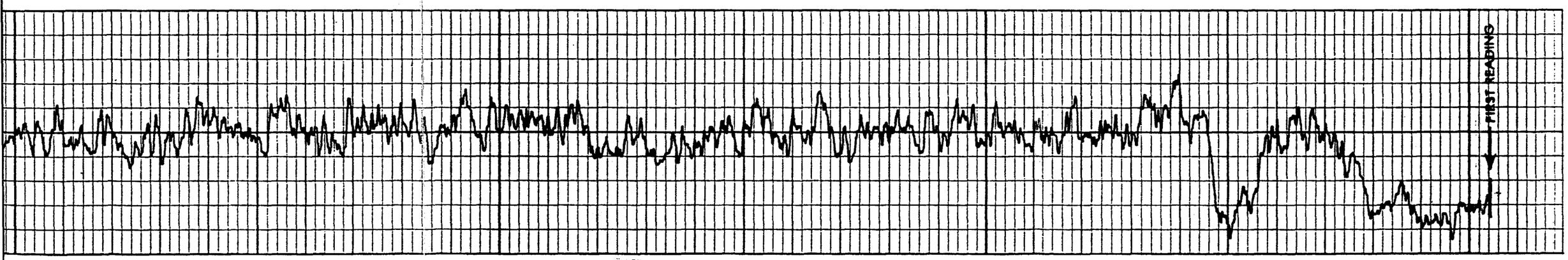







1000
200
SCALE CHANGE
100
200
300


300
400
500
600


FIRST READING

welenco

SONIC/VARIABLE DENSITY WAVEFORM

COMPANY: BEYLIK DRILLING, INC.

WELL: MW-4

FIELD: JPL PASADENA

STATE: CALIFORNIA COUNTY: LOS ANGELES

LOCATION:

SEC. ____ TWP. ____ RGE. ____

OTHER SERVICES:
E-LOG
GAMMA-GUARD

PERMANENT DATUM: G.L. ELEV. ____
LOG MEASURED FROM: G.L. FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM: G.L.

ELEV.: K.B. ____
D.F. ____
G.L. ____

DATE	2-7-90		
RUN NO.	ONE		
TYPE LOG	SONIC/VDL		
DEPTH-DRILLER	605'		
DEPTH-LOGGER	605'		
BOTTOM LOGGED INTERVAL	593'		
TOP LOGGED INTERVAL	155'		
TYPE FLUID IN HOLE	BENTONITE MUD		
MAX. REC. TEMP., DEG. F.	N/A		
RECORDED BY	D.L. CRAIG		
WITNESSED BY	MR. CUTLER	MR. BARNES	DR. MELCHIOR

RUN NO.	BORE-HOLE RECORD BIT	FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
1	12 1/4	18'	605'	16"	–	0'	18'

Remarks: VDL PHOTOGRAPHED ON THE 3 FT. RECEIVER.

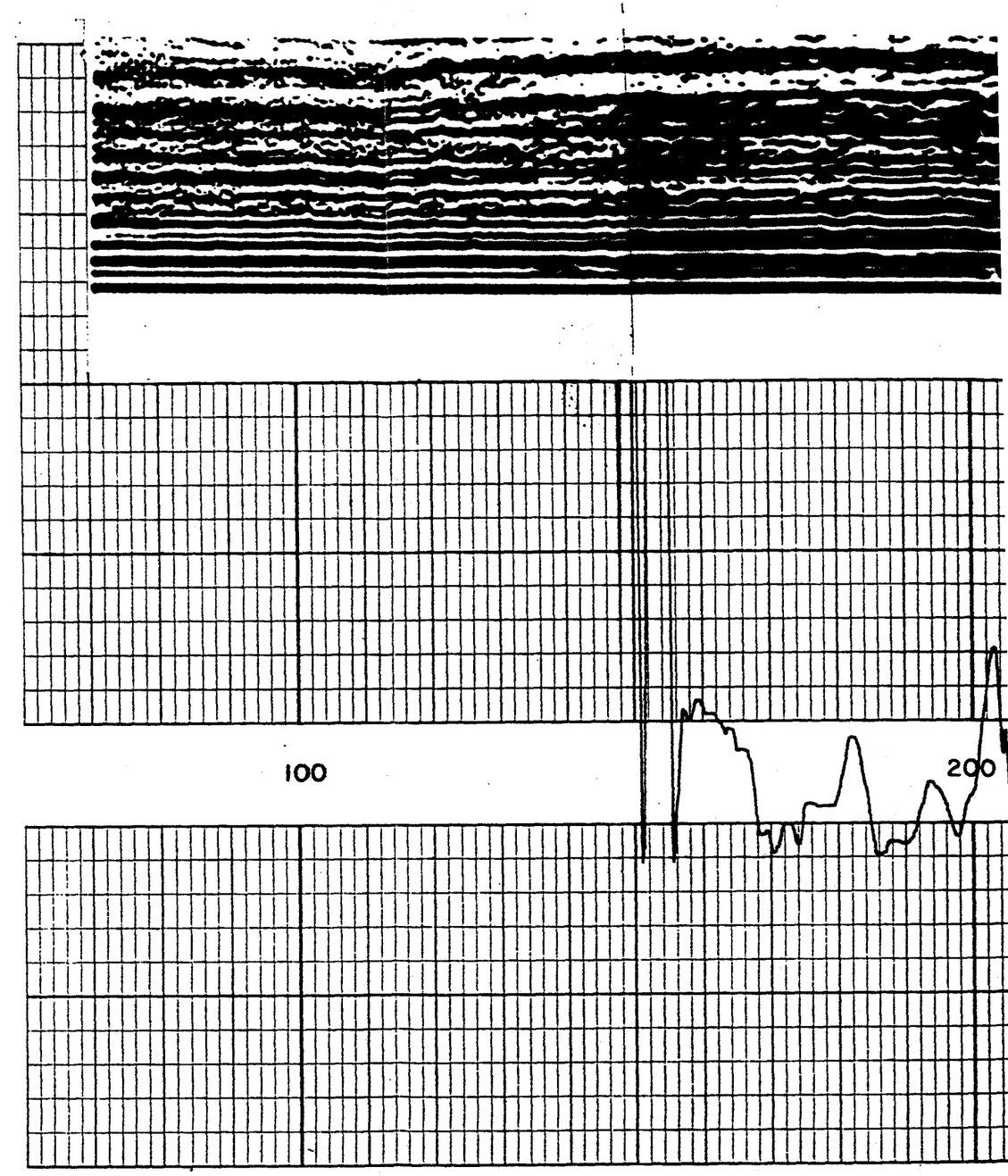
CONSULTANTS: EBASCO ENVIRONMENTAL.

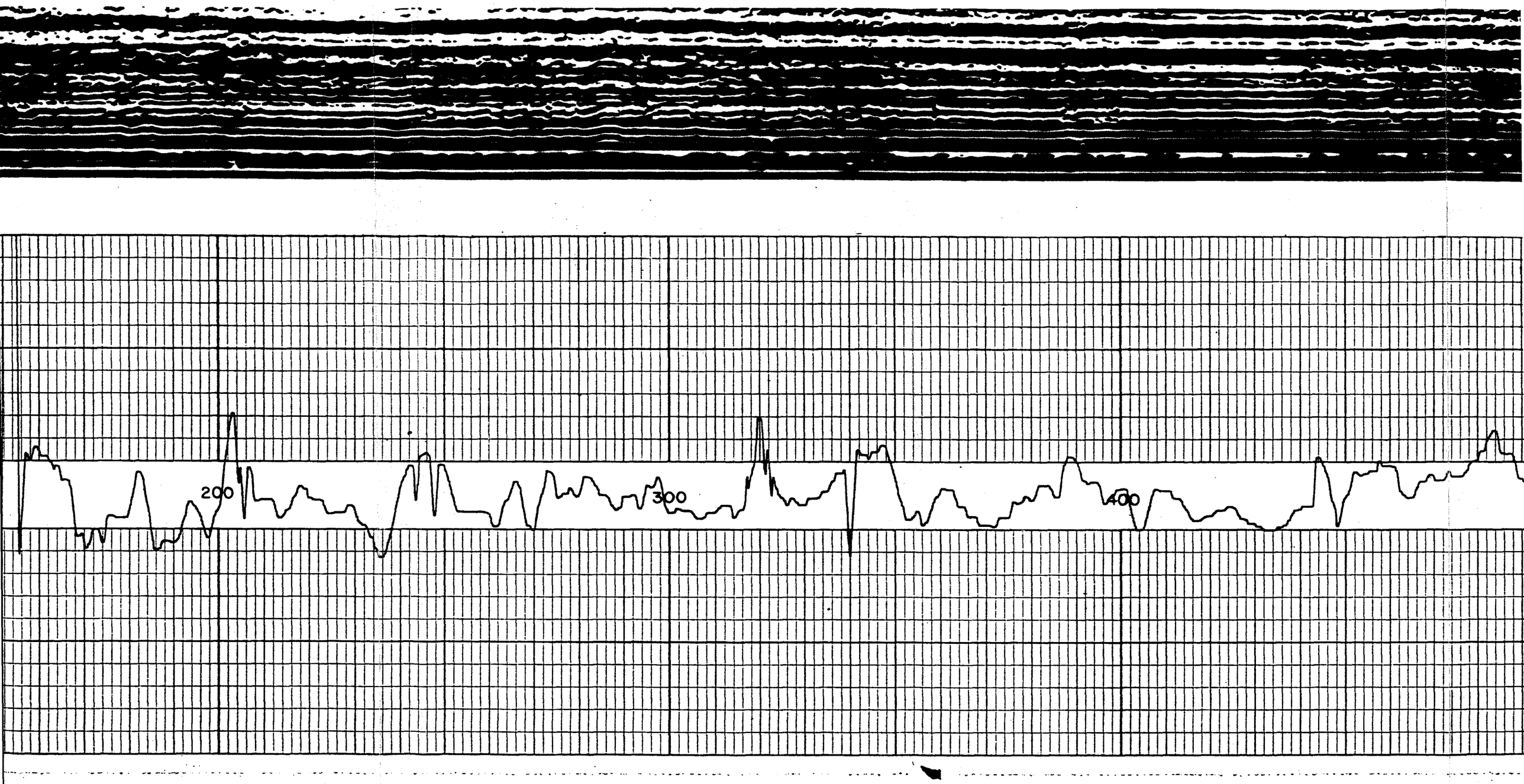
Fold Here

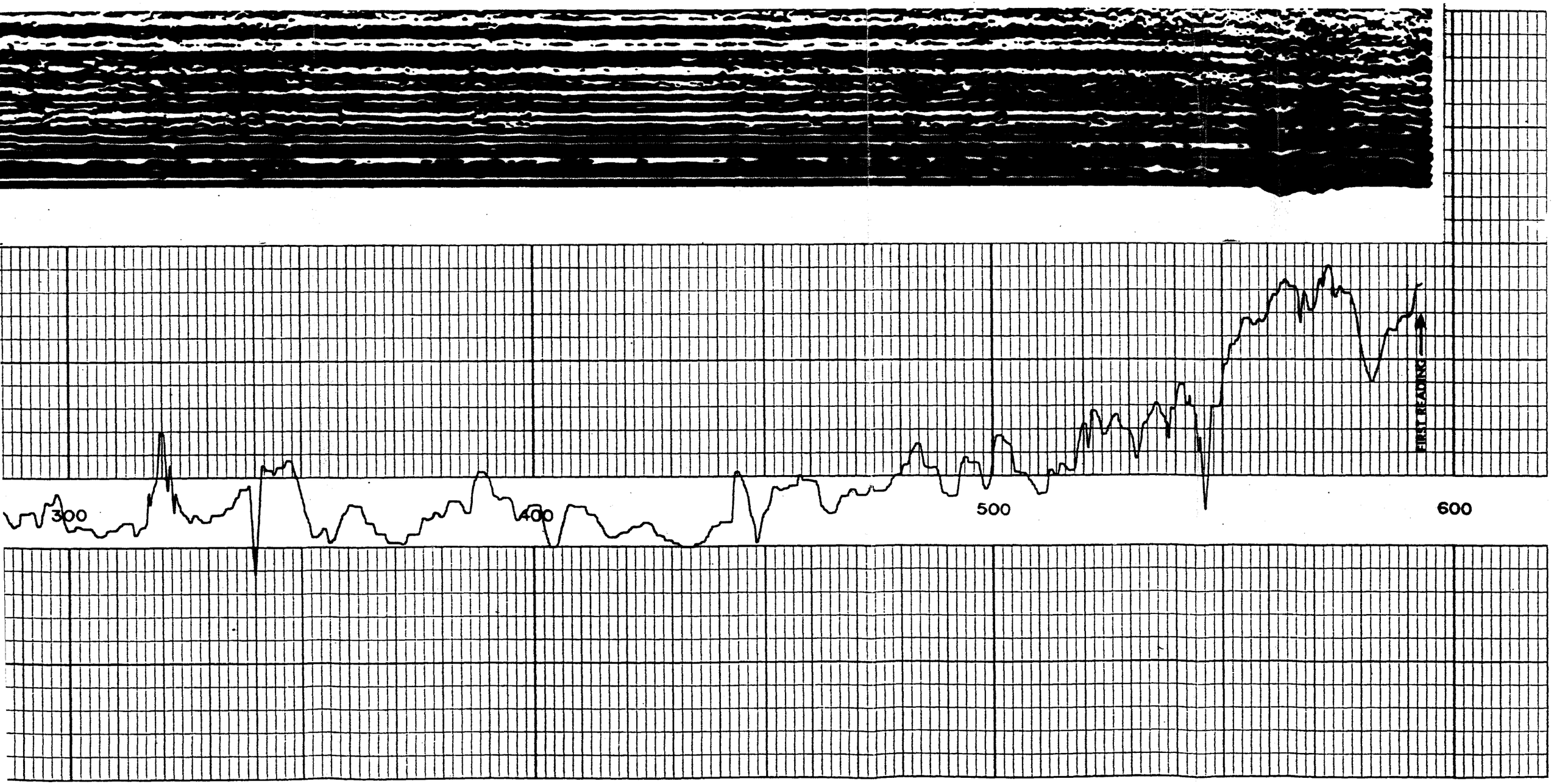
VARIABLE DENSITY

INTERVAL TRANSIT TIME MICROSECONDS PER FOOT

DEPTHS




200
300
400


300
400
500
600
FIRST READING

welenco

Gamma-Ray Neutron Log

COMPANY: BEYLIK DRILLING
WELL: MW-5
FIELD: JET PROPULSION LAB.
STATE: CALIFORNIA COUNTY: LOS ANGELES

LOCATION:
SEC. ____ TWP. ____ RGE. ____

OTHER SERVICES: NONE

PERMANENT DATUM: GROUND LEVEL ELEV. ____
LOG MEASURED FROM: G.L. 0 FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM: GROUND LEVEL

ELEV.: K.B. ____ D.F. ____ G.L. ____

DATE	2-13-90		
RUN NO.	ONE		
TYPE LOG	GR/NEUTRON		
DEPTH-DRILLER	145'		
DEPTH-LOGGER	145'		
BOTTOM LOGGED INTERVAL	143'		
TOP LOGGED INTERVAL	0'		
TYPE FLUID IN HOLE	WATER		
MAX. REC. TEMP., DEG. F.	N/A		
RECORDED BY	RIDDER		
WITNESSED BY	--		

RUN NO.	BORE-HOLE RECORD BIT	FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
1	11"	SURFACE	145'	11"	DUAL	SURFACE	145'
				8"	WALL	"	"

EQUIPMENT DATA

Gamma Ray		Neutron	
Run No.	ONE	Run No.	ONE
Tool Model No.	COSMOS	Log Type	N/N
Diameter	1 11/16"	Tool Model No.	COSMOS
Detector Model No.	--	Diameter	1 11/16"
Type	GEIGER	Detector Model No.	--
Length	18"	Type	He3
Distance to N. Source	6'	Length	6"
		Source Model No.	71-1
		Serial No.	243
		Spacing	13"
		Type	Am241Be
		Strength	

General

Hoist Truck No.	DV-1
Instrument Truck No.	DV-1
Tool Serial No.	210

LOGGING DATA

General

Run No.	Depths From	Depths To	Speed FT/Min.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.
1	0'	142'	15	5	100/300	2L	10

Gamma Ray

Run No.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.

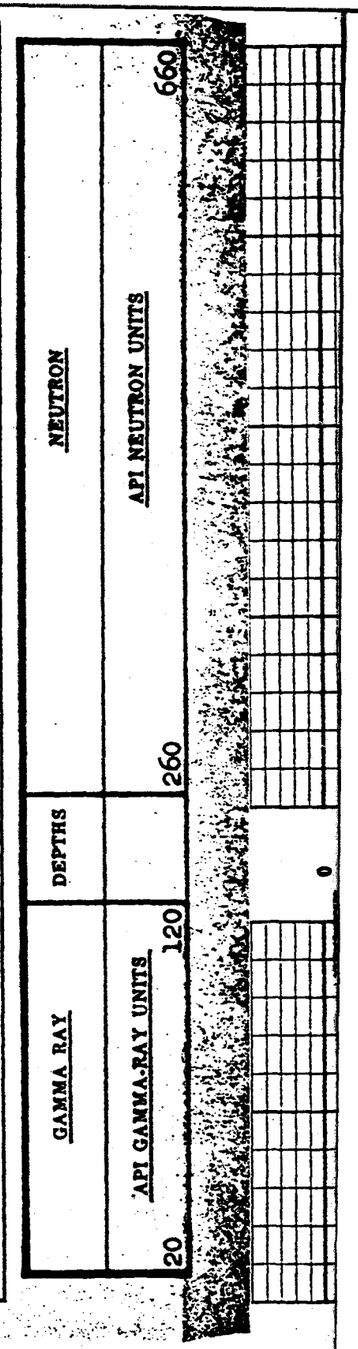
Neutron

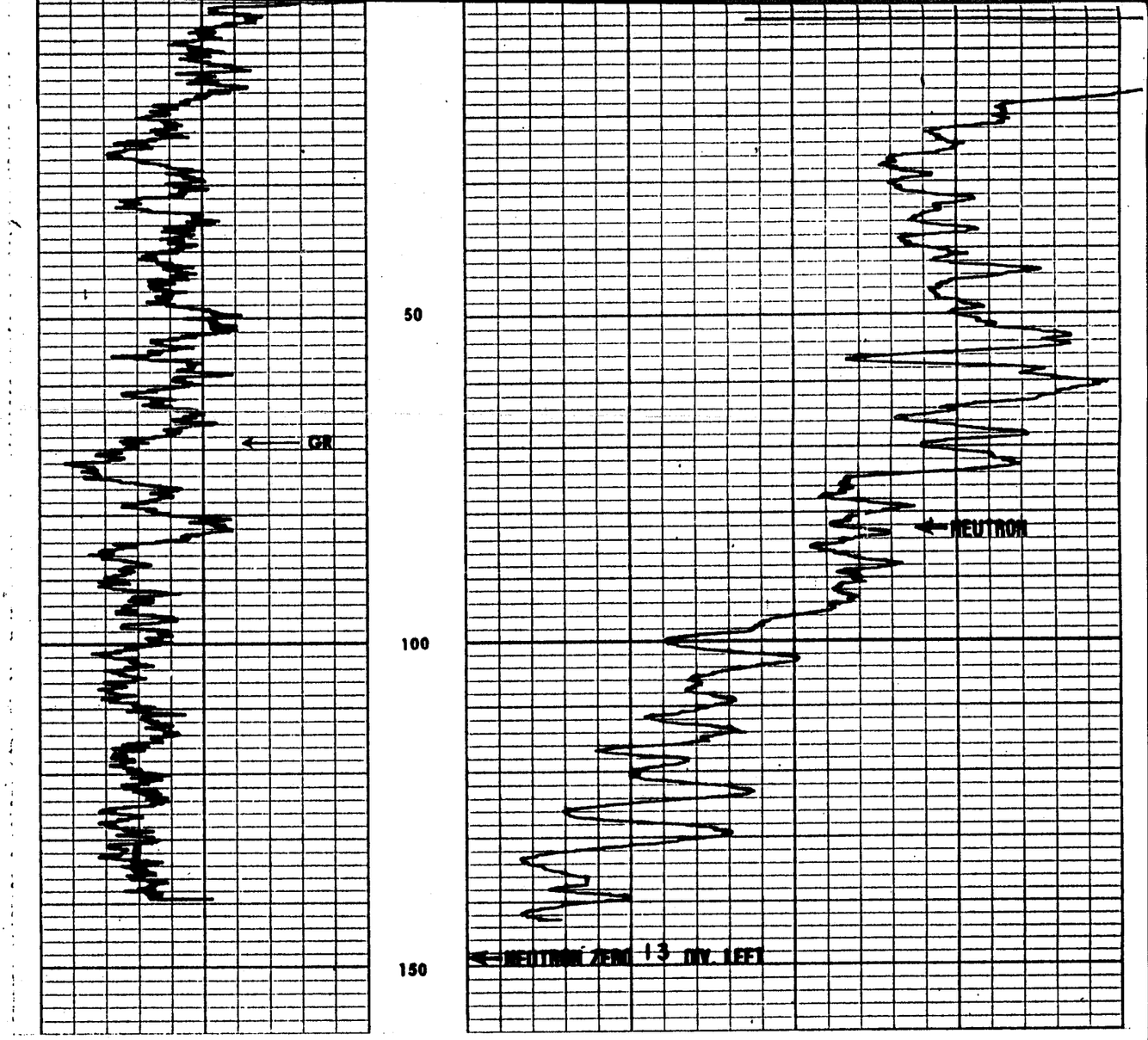
Run No.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units per Log Div.
	2	1000/740	13L	20

Reference Literature:

Remarks:

Fold Here




50
100
150
GR
NEUTRON
NEUTRON ZERO 13 DIV. LEFT

welenco

Gamma-Ray Neutron Log

COMPANY: BEYLIK DRILLING, INC.

WELL: MW-6

FIELD: JPL PASADENA

STATE: CALIFORNIA COUNTY: LOS ANGELES

LOCATION: WEST LOT

OTHER SERVICES: NONE

SEC. ____ TWP. ____ RGE. ____

PERMANENT DATUM: G.L. ELEV. ____ ELEV.: K.B. ____

LOG MEASURED FROM: G.L. FT. ABOVE PERM. DATUM D.F. ____

DRILLING MEASURED FROM: G.L. G.L. ____

DATE	2-24-90		
RUN NO.	ONE		
TYPE LOG	GAMMA-NEUTRON		
DEPTH-DRILLER	247'		
DEPTH-LOGGER	246'		
BOTTOM LOGGED INTERVAL	245'		
TOP LOGGED INTERVAL	0'		
TYPE FLUID IN HOLE	WATER		
MAX. REC. TEMP., DEG. F.	N/A		
RECORDED BY	D.L. CRAIG		
WITNESSED BY	MR. PAPENGUTH	MR. CUTLER	MR. R. BEYLIK

RUN	BORE-HOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	11"	0'	247'	8"	–	0'	247'
				11"	–	0'	247'

EQUIPMENT DATA

Gamma Ray		Neutron	
Run No.	ONE	Run No.	ONE
Tool Model No.	GNC27XL5A	Log Type	N-N
Diameter	1 11/16"	Tool Model No.	GNC27XL5A
Detector Model No.	-	Diameter	1 11/16"
Type	GEIGER	Detector Model No.	-
Length	18"	Type	He 3
Distance to N. Source	6'	Length	6"
		Source Model No.	71-1
		Serial No.	930
		Spacing	13"
		Type	Am24 Be
		Strength	3 Ci

General

Hoist Truck No.	L103 BFL
Instrument Truck No.	L103 BFL
Tool Serial No.	951

LOGGING DATA

General

Run No.	Depths From	Depths To	Speed Ft/Min.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.
1	245'	0'	30	3	100/909	3L	10

Neutron

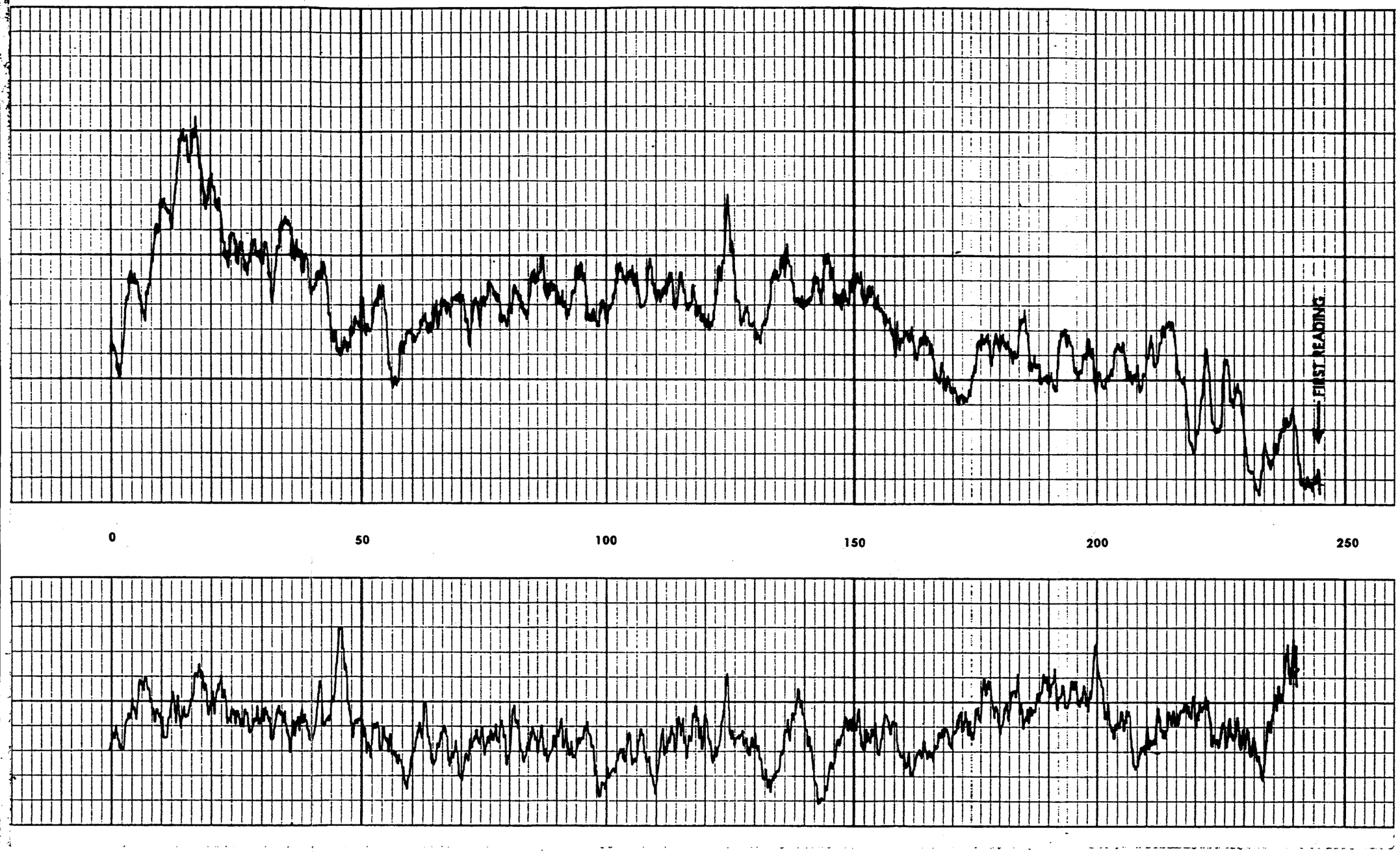
T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units per Log Div.
1	100/114	5L	30

Reference Literature:

Remarks: CONSULTANTS: EBASCO ENVIRONMENTAL

Fold Here

GAMMA RAY	DEPTHS	NEUTRON
API GAMMA-RAY UNITS 30 130	150	API NEUTRON UNITS 750


FIRST READING
0
50
100
150
200
250

welenco

Gamma-Ray Neutron Log

COMPANY: BEYLIK DRILLING
WELL: MW-7
FIELD: JET PROPULSION LAB.
STATE: CALIFORNIA COUNTY: LOS ANGELES

LOCATION:
SEC. TWP. RGE.

OTHER SERVICES: NONE

PERMANENT DATUM: GROUND LEVEL ELEV.
LOG MEASURED FROM: G.L. 0 FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM: GROUND LEVEL

ELEV.: K.B. D.F. G.L.

DATE	3-5-90		
RUN NO.	ONE		
TYPE LOG	GR/NEUTRON		
DEPTH-DRILLER	275'		
DEPTH-LOGGER	274'		
DEPTH LOGGED INTERVAL	273'		
TOP LOGGED INTERVAL	0'		
TYPE FLUID IN HOLE	WATER		
MAX. REC. TEMP., DEG. F.	N/A		
RECORDED BY	RIDDER		
WITNESSED BY	M. CUTLER		

RUN	BORE-HOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	11"	G.L.	275'	8"	DUAL	G.L.	275'
				11"	WALL	G.L.	275'

EQUIPMENT DATA

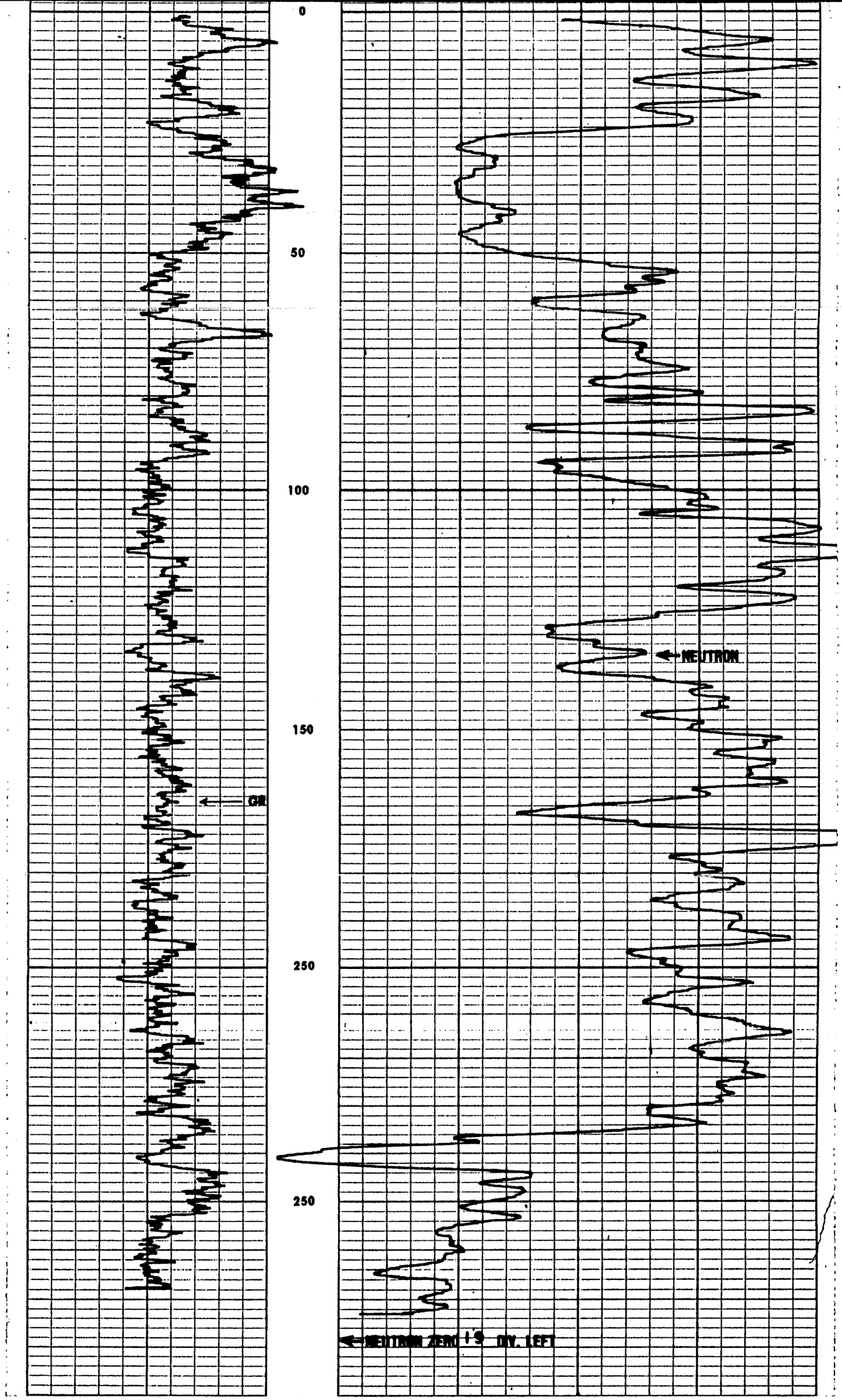
	Gamma Ray		Neutron	
Run No.	ONE		ONE	
Log Type			N/N	
Tool Model No.	COSMOS		COSMOS	
Diameter	1 11/16"		1 11/16"	
Detector Model No.	--		--	
Type	GEIGER		He3	
Length	18"		6"	
Distance to N. Source	6'			
Source Model No.			71-1	
Serial No.			243	
Spacing			13"	
Type			Am241Be	
Strength			5C1	

General

Hoist Truck No.	DV-1
Instrument Truck No.	DV-1
Tool Serial No.	210

LOGGING DATA

| General | | | |


0
50
100
150
250
250
GR
NEUTRON
NEUTRON ZERO 1.9 DIV. LEFT