486

Kennedy/Jenks Consultants

2151 Michelson Drive, Suite 100
Irvine, CA 92612-1311

Groundwater Status Report

Boeing Realty Corporation
FormerC-6 Facility
Los Angeles, California

VOLUME II

27 October 2000

Prepared for

Boeing Realty Corporation
3760 Kilroy Airport Way, Suite 500
Long Beach, CA 90806

K/J 004020.00

TABLE OF CONTENTS

VOLUME II

LIST OF APPENDICES

APPENDIX TITLE

APPENDIX A HYDROGEOLOGIC INFORMATION
- REGIONAL INFORMATION
  - West Coast Basin Regional Cross-Section Segments
  - Map showing location of West Coast Barrier
- WELL INFORMATION FOR THE SITE AND THE FORMER ILM SITE
  - Summary of Well Construction Details
  - Well Location Maps for Site
  - Borehole/Well Completion Logs P Wells and DB Borings
  - Borehole/Well Completion Logs WCC and DAC Wells
  - Borehole/Well Completion Logs BL and TMW Wells
- TRICO BOREHOLE LOGS
- DEL AMO STUDY AREA
  - Well Location Map
  - Structural Contour and Isopach Maps for Hydrostratigraphic Units
  - Comparison of Stratigraphic Nomenclature

APPENDIX B WATER LEVEL DATA
- INDUSTRIAL LIGHT METALS SITE
  - Water Level Summary Table – Time Series
- DEL AMO STUDY AREA
  - Time Series Groundwater Contour Maps
  - Vertical Gradient Summary Table

APPENDIX C WATER CHEMISTRY DATA
- INDUSTRIAL LIGHT METALS SITE
  - Summary of Groundwater Analytical Results – VOCs
  - Summary of Groundwater Analytical Results – Total Petroleum Hydrocarbons
  - Summary of Groundwater Analytical Results – Metals
  - Summary of Natural Attenuation Parameters
- DEL AMO STUDY AREA
  - Trilinear Piper Diagrams

APPENDIX D AQUIFER TEST DATA
- FORMER BOEING C-6 FACILITY
  - Aquifer Testing and Analysis
- DEL AMO STUDY AREA
  - Summaries of Aquifer Test Results
  - Map showing Aquifer Test Well Locations

APPENDIX E WATER SUPPLY WELLS IN SITE VICINITY
- INDUSTRIAL LIGHT METALS SITE
  - Summary Table of Offsite Ground Water Extraction Wells within 0.5 Miles of Former ILM Site
  - Map Showing Offsite Ground Water Extraction Wells within 0.5 Miles of Former ILM Site

TABLE OF CONTENTS

VOLUME II

DEL AMO STUDY AREA
Wells of Record Within 2-Mile Radius of Study Area – US EPA

APPENDIX F TECHNICAL MEMORANDUM AND SELECTED SECTIONS OF THE DEL AMO RECORD OF DECISION (SECTIONS 1 THROUGH 6)

APPENDIX G REFERENCE LISTS
FORMER C-6 FACILITY
INTERNATIONAL LIGHT METALS SITE
DEL AMO STUDY AREA

Appendix A

BOE-C6-0139555

Appendix A
Hydrogeologic Information

REGIONAL INFORMATION

West Coast Basin Regional Cross-Section Segments

Map showing location of West Coast Barrier

WELL INFORMATION FOR SITE AND THE FORMER ILM SITE

Summary of Well Construction Details

Well Location Maps

Borehole/Well Completion Logs

TRICO BOREHOLE LOGS

DEL AMO STUDY AREA

Well Location Map

Structural Contour and Isopach Maps for Hydrostratigraphic Units

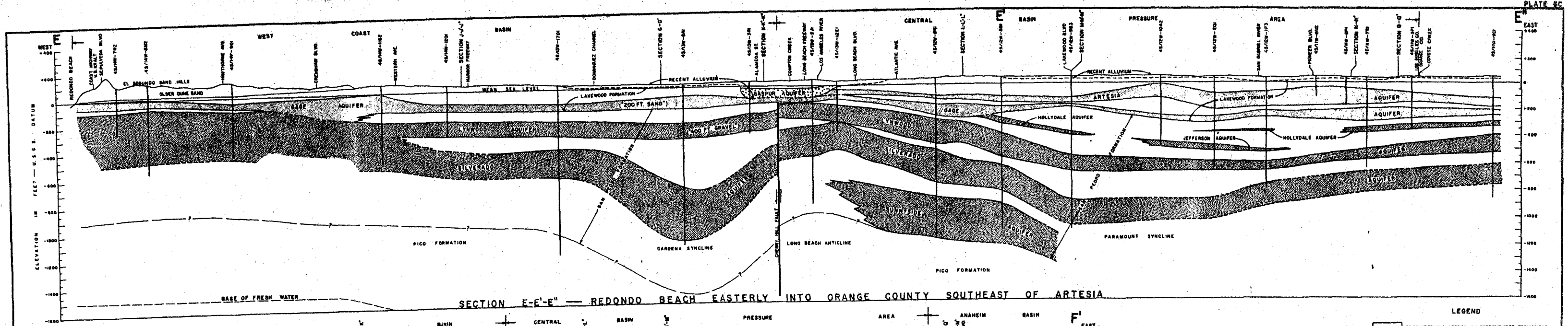
Comparison of Stratigraphic Nomenclature

REGIONAL INFORMATION

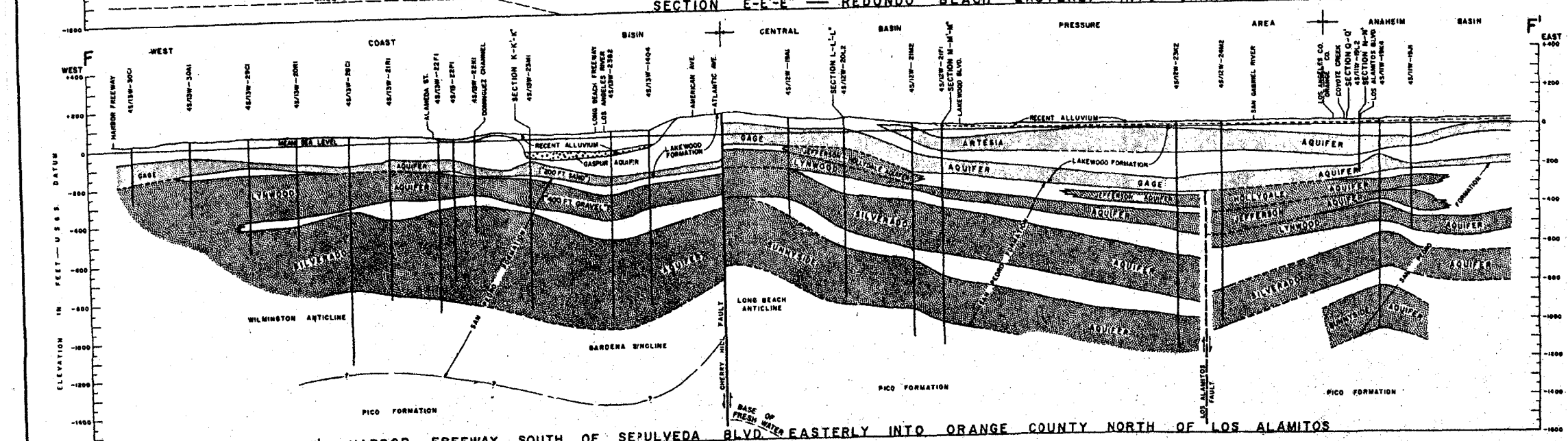
West Coast Basin Regional Cross-Section Segments

BOE-C6-0139558

PLATE 6C



SECTION E-E'-E" — REDONDO BEACH EASTERLY INTO ORANGE COUNTY SOUTHEAST OF ARTESIA



SECTION F-F' — HARBOR FREEWAY SOUTH OF SEPULVEDA BLVD. EASTERLY INTO ORANGE COUNTY NORTH OF LOS ALAMITOS

LEGEND

- AQUICLUDES AND DEEPER UNDIFFERENTIATED FORMATIONS
- AQUIFERS IN RECENT ALLUVIUM (INCLUDES THE GASPUR AND BALLONA AQUIFERS)
- AQUIFERS IN LAKEWOOD FORMATION (INCLUDES THE ARTESIA, EXPOSITION, GAGE, AND GARDENA AQUIFERS)
- AQUIFERS IN SAN PEDRO FORMATION (INCLUDES THE HOLLYDALE, JEFFERSON, LYNWOOD, SILVERADO, AND SUNNYSIDE AQUIFERS)
- WATER WELLS
- OIL WELLS
- FAULTS

NOTE: LOCATIONS OF GEOLOGIC SECTIONS ARE SHOWN ON PLATE 3A AND 3B

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN CALIFORNIA DISTRICT

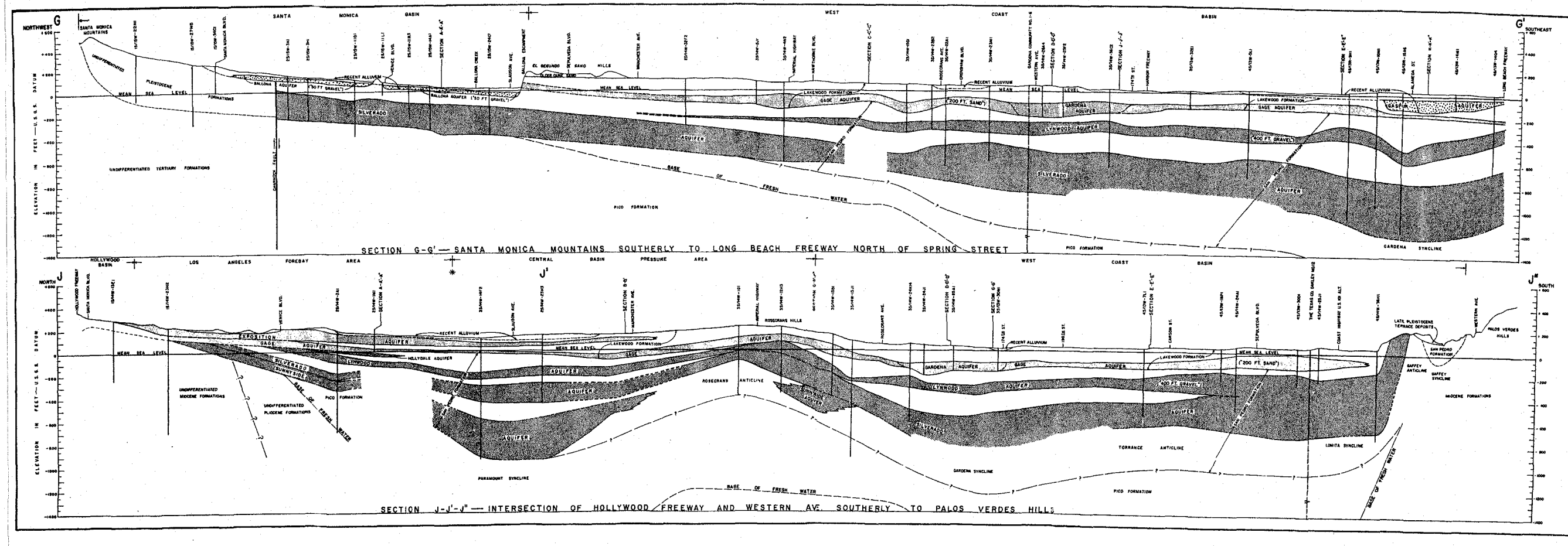
GROUND WATER GEOLOGY OF THE COASTAL PLAIN OF LOS ANGELES COUNTY

IDEALIZED GEOLOGIC SECTIONS E-E'-E" AND F-F'-F" 1960

HORIZONTAL SCALE OF FEET
2000 0 2000 4000 6000

J961

BOE-C6-0139559



LEGEND

- AQUICLUDES AND DEEPER UNDIFFERENTIATED FORMATIONS
- AQUIFERS IN RECENT ALLUVIUM (INCLUDES THE GASPUR AND BELLONA AQUIFERS)
- AQUIFERS IN LAKEWOOD FORMATION (INCLUDES THE ARTESIA, EXPOSITION, GAGE, AND GARDENA AQUIFERS)
- AQUIFERS IN SAN PEDRO FORMATION (INCLUDES THE HOLLYDALE, JEFFERSON, LYNWOOD, SILVERADO, AND SUNNYSIDE AQUIFERS)
- WATER WELLS
- OIL WELLS
- FAULTS

BOUNDARY BETWEEN FOREBAY AND PRESSURE AREA AS SHOWN ON PLATE 2 OF THIS REPORT

NOTE: LOCATIONS OF GEOLOGIC SECTIONS ARE SHOWN ON PLATE 3A AND 3B

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
SOUTHERN CALIFORNIA DISTRICT

GROUND WATER GEOLOGY OF THE COASTAL PLAIN OF LOS ANGELES COUNTY

IDEALIZED GEOLOGIC SECTIONS G-G' AND J-J'-J"

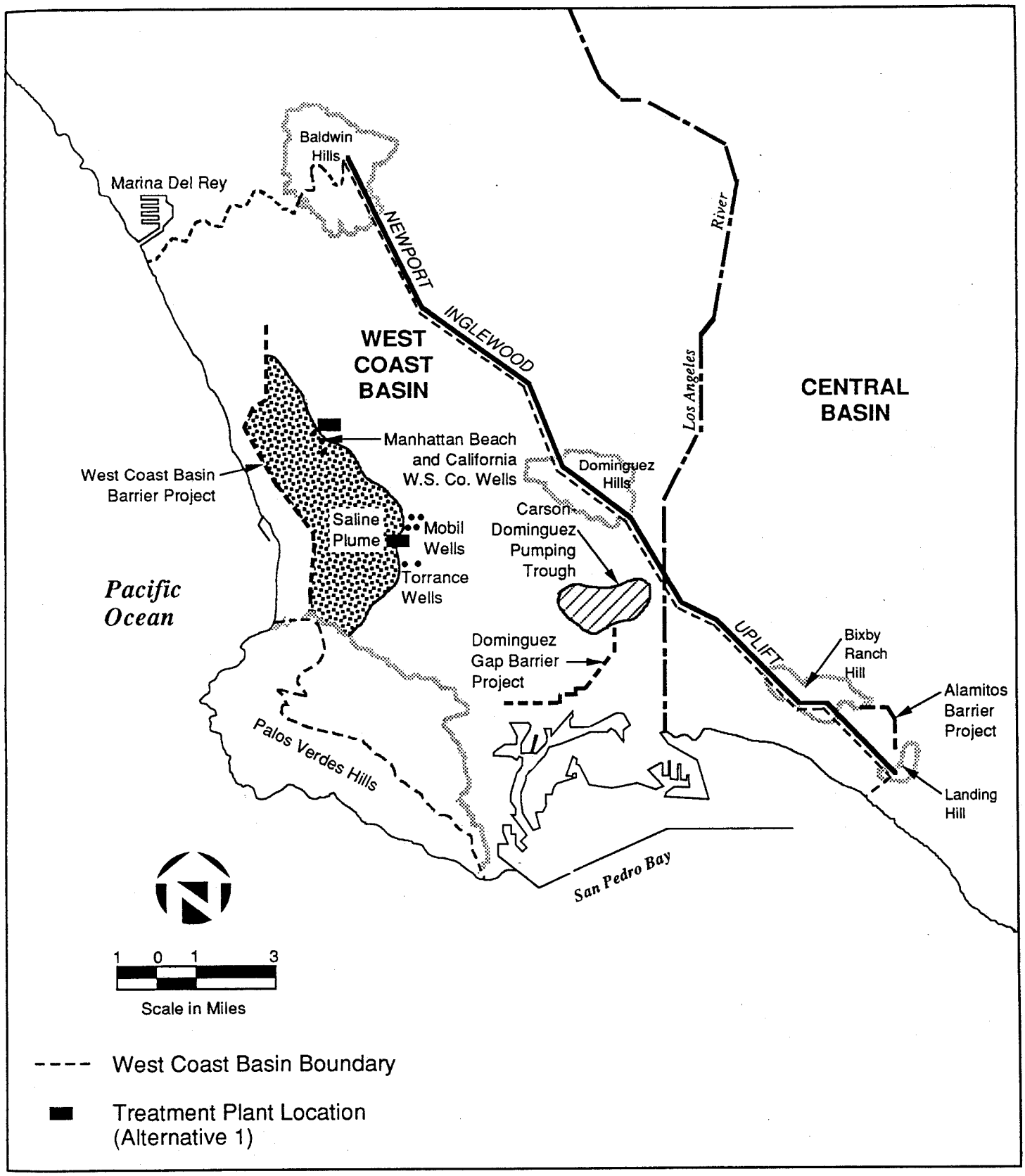
HORIZONTAL SCALE OF FEET
2000 0 2000 4000 6000

1961

BOE-C6-0139560

REGIONAL INFORMATION

Map showing location of West Coast Barrier



Location Map of the West Coast Basin
West Coast Basin Plume Mitigation Study
Executive Summary

JMM

WELL INFORMATION FOR THE SITE AND FORMER ILM SITE

Summary of Well Construction Details

TABLE 4.1

SUMMARY OF WELL CONSTRUCTION DETAILS
FORMER ILM FACILITY & BRC PROPERTY
LOCKHEED MARTIN CORPORATION
TORRANCE, CALIFORNIA

WELL ID	COMPLETION DATE	DRILLING METHOD	WELL INFORMATION														
			Borehole Diameter (inches O.D.)	Well Casing Diameter & Type	Measuring Point Evaluation (feet msl)	Borehole Depth (feet bgs)	Well Depth (feet)	Slotted Interval	Formation Slotted	Slot Size & Type (inches)	Filter Pack Material	Filter Pack Thickness (feet)	Seal Type	Seal Thickness (feet)	Pump System (dedicated/ nondedicated)	Type of Pump	Recent Depth to Water (feet bgs) [date]
P-1	8-16-94	HSA	10.5	4" Sch. 40, PVC	55.21	82.5	80.5	60.5-80.5	Lower Sand Unit	0.020	Lonestar #3 Sand	25	Bentonite Chips	3	nondedicated	2" Redi-Flo used for purging	68.14 [7/99]
P-2	8-18-94	HSA	10.5	4" Sch. 40, PVC	59.11	72	71	61-71	Lower Sand Unit	0.020	Lonestar #3 Sand	13	Bentonite Chips	3	nondedicated	2" Redi-Flo used for purging	67.35 [7/99]
P-3	8-18-94	HSA	10.5	4" Sch. 40, PVC	59.87	75	72	57-72	Lower Sand Unit	0.020	Lonestar #3 Sand	20	Bentonite Chips	3	nondedicated	2" Redi-Flo used for purging	70.71 [7/99]
P-4 (well abandoned 10/97)	8-16-94	HSA	10.5	4" Sch. 40, PVC	60.54	81	78	63-78	Lower Sand Unit	0.020	Lonestar #3 Sand	20	Bentonite Chips	4	nondedicated	2" Redi-Flo used for purging	74.04 [7/97]
P-5	8-17-94	HSA	10.5	4" Sch. 40, PVC	55.04	81	79	59-79	Lower Sand Unit	0.020	Lonestar #3 Sand	24	Bentonite Chips	3	nondedicated	2" Redi-Flo used for purging	67.02 [7/99]
P-6 (well abandoned 10/97)	3-1-95	HSA	10	4" Sch. 40, PVC	58.13	80	78	58 - 78	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22.5	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	73.09 [7/97]
P-6B	11-24-97	HSA	10	4" Sch. 40, PVC	55.83	81	80	60-80	Lower Sand Unit	0.020	Lonestar #3 Sand	23	Bentonite Pellets	3	nondedicated	2" Redi-Flo used for purging	69.43 [7/99]
P-7	3-2-95	HSA	10	4" Sch. 40, PVC	53.92	84.5	82.5	62.5-82.5	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22.5	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	67.86 [7/99]
P-8 (well abandoned 8/96)	3-6-95	HSA	10	4" Sch. 40, PVC	56.32	95	90	65 - 90	Lower Sand Unit	0.020	Lonestar #2/16 Sand	32	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	76.58 [7/96]
P-9 (well abandoned 10/97)	3-7-95	HSA	10	4" Sch. 40, PVC	60.48	86	83	63 - 83	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22.5	Bentonite Chips	5 (56 - 61 ft) / 2.5 (83.5 - 86 ft)	nondedicated	2" Redi-Flo used for purging	72.66 [7/97]
P-9B	10-7-97	HSA	10	4" Sch. 40, PVC	57.54	77	77	57-77	Lower Sand Unit	0.020	Lonestar #2/16 Sand	23	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	68.51 [7/99]
P-10	3-3-95	HSA	10	4" Sch. 40, PVC	57.64	78.5	76	61-76	Lower Sand Unit	0.020	Lonestar #2/16 Sand	17.5	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	68.10 [7/99]
P-11 (well abandoned 10/97)	11-16-95	HSA	10	4" Sch. 40, PVC	63.83	74.5	74	59-74	Lower Sand Unit	0.020	Lonestar #2/16 Sand	17.5	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	73.63 [7/97]
P-12 (well damaged 7/99)	11-20-95	HSA	10	4" Sch. 40, PVC	59.73	80.5	80	65-80	Lower Sand Unit	0.020	Lonestar #2/16 Sand	17.5	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	72.16 [3/99]

TRC

BOE-C6-0139564

TABLE 4.1

SUMMARY OF WELL CONSTRUCTION DETAILS
FORMER ILM FACILITY & BRC PROPERTY
LOCKHEED MARTIN CORPORATION
TORRANCE, CALIFORNIA
(Continued)

WELL ID	COMPLETION DATE	DRILLING METHOD	WELL INFORMATION														
			Borehole Diameter (inches O.D.)	Well Casing Diameter & Type	Measuring Point Evaluation (feet msl)	Borehole Depth (feet bgs)	Well Depth (feet)	Slotted Interval	Formation Slotted	Slot Size & Type (inches)	Filter Pack Material	Filter Pack Thickness (feet)	Seal Type	Seal Thickness (feet)	Pump System (dedicated/ nondedicated)	Type of Pump	Recent Depth to Water (feet bgs) [date]
P-13 (well abandoned 10/97)	11-17-95	HSA	10	4" Sch. 40, PVC	59.97	84	82	62-82	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22	Bentonite Pellets	5 (55-60 ft.) 2 (82-84 ft.)	nondedicated	2" Redi-Flo used for purging	73.68 [7/97]
P-14 (well abandoned 10/97)	11-14-95	HSA	10	4" Sch. 40, PVC	63.71	85.3	85	65-85	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22.3	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	77.95 [7/97]
P-15 (well abandoned 10/97)	11-22-95	HSA	10	4" Sch. 40, PVC	56.40	80	79.5	59.5-79.5	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22.5	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	70.95 [7/97]
P-16A	11-29-95	HSA	10	4" Sch. 40, PVC	52.76	87	87	67-87	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	66.72 [7/99]
P-16B (well destroyed 8/96)	12-3-95	Rotosonic	8	4" Sch. 40, PVC	56.51	120	116.5	101.5-116.5	Lower Sand Unit	0.020	Lonestar #2/16 Sand	21.5	Bentonite Pellets	3	nondedicated	2" Redi-Flo used for purging	72.73 [6/96]
P-16C	8-7-96	HSA	10	4" Sch. 40, PVC	52.35	119	118	103-118	Lower Sand Unit	0.020	Lonestar #2/16 Sand	18	Bentonite Pellets	3	nondedicated	2" Redi-Flo used for purging	66.43 [7/99]
P-17	12-6-95	HSA	10	4" Sch. 40, PVC	54.83	120	85	65-85	Lower Sand Unit	0.020	Lonestar #2/16 Sand	23	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	68.50 [7/99]
P-18 (well abandoned 10/97)	12-5-95	HSA	10	4" Sch. 40, PVC	60.16	100	85	65-85	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22	Bentonite Pellets	6	nondedicated	2" Redi-Flo used for purging	75.29 [7/97]
P-19 (well abandoned 10/97)	12-4-95	HSA	10	4" Sch. 40, PVC	62.85	100	85	65-85	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22	Bentonite Chips	6	nondedicated	2" Redi-Flo used for purging	78.11 [7/97]
P-20	11-22-95	HSA	10	4" Sch. 40, PVC	55.30	80	78	58-78	Lower Sand Unit	0.020	Lonestar #2/16 Sand	24	Bentonite Pellets	5.8	nondedicated	2" Redi-Flo used for purging	68.37 [7/99]
P-21 (well abandoned 10/97)	11-30-95	HSA	10	4" Sch. 40, PVC	62.34	100	85	65-85	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	77.65 [7/97]
P-22	11-29-95	HSA	10	4" Sch. 40, PVC	54.49	108	87	67-87	Lower Sand Unit	0.020	Lonestar #2/16 Sand	22	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	68.64 [7/99]
P-23 (well abandoned 10/97)	11-17-95	HSA	10	4" Sch. 40, PVC	60.19	75.3	75	65-75	Lower Sand Unit	0.020	Lonestar #2/16 Sand	12.3	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	72.74 [7/97]
P-24	11-20-95	HSA	10	4" Sch. 40, PVC	59.89	75	75	65-75	Lower Sand Unit	0.020	Lonestar #2/16 Sand	12	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	72.00 [7/99]

TRC

BOE-C6-0139565

TABLE 4.1

SUMMARY OF WELL CONSTRUCTION DETAILS
FORMER ILM FACILITY & BRC PROPERTY
LOCKHEED MARTIN CORPORATION
TORRANCE, CALIFORNIA
(Continued)

WELL ID	COMPLETION DATE	DRILLING METHOD	WELL INFORMATION														
			Borehole Diameter (inches O.D.)	Well Casing Diameter & Type	Measuring Point Evaluation (feet msl)	Borehole Depth (feet bgs)	Well Depth (feet)	Slotted Interval	Formation Slotted	Slot Size & Type (inches)	Filter Pack Material	Filter Pack Thickness (feet)	Seal Type	Seal Thickness (feet)	Pump System (dedicated/ nondedicated)	Type of Pump	Recent Depth to Water (feet bgs) [date]
P-25 (well abandoned 11/97)	11-27-95	HSA	10	4" Sch. 40, PVC	60.45	80	79.5	64.5-79.5	Lower Sand Unit	0.020	Lonestar #2/16 Sand	17.5	Bentonite Pellets	5	nondedicated	2" Redi-Flo used for purging	74.76 [7/97]
BL-1	2-2-99	HSA	8	2" Sch. 40, PVC	58.34	81.5	81.5	61.5-81.5	Lower Sand Unit	0.010	#2/12 RMC Lonestar	25	Bentonite Chips	2	nondedicated	2" Redi-Flo used for purging	70.72 [7/99]
BL-2	2-3-99	HSA	8	2" Sch. 40, PVC	58.15	82	81.5	61.5-81.5	Lower Sand Unit	0.010	#2/12 RMC Lonestar	24	Bentonite Chips	4	nondedicated	2" Redi-Flo used for purging	71.32 [7/99]
BL-3	2-8-99	HSA	8	2" Sch. 40, PVC	59.33	82	82	62-82	Lower Sand Unit	0.010	#2/12 RMC Lonestar	23.5	Bentonite Chips	6	nondedicated	2" Redi-Flo used for purging	73.16 [7/99]
BL-4	2-16-99	HSA	8	2" Sch. 40, PVC	55.04	79	78.5	58.5-78.5	Lower Sand Unit	0.010	#2/12 RMC Lonestar	24	Bentonite Chips	6	nondedicated	2" Redi-Flo used for purging	69.47 [7/99]
BL-5	2-4-99	HSA	8	2" Sch. 40, PVC	55.18	78.5	78	58-78	Lower Sand Unit	0.010	#2/12 RMC Lonestar	23.5	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	67.71 [7/99]
BL-6	2-4-99	HSA	8	2" Sch. 40, PVC	54.7	78.5	78	58-76	Lower Sand Unit	0.010	#2/12 RMC Lonestar	23.5	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	67.53 [7/99]
BL-7	2-8-99	HSA	8	2" Sch. 40, PVC	55.19	78.5	78	58-78	Lower Sand Unit	0.010	#2/12 RMC Lonestar	24.5	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	68.63 [7/99]
BL-8	2-16-99	HSA	8	2" Sch. 40, PVC	57.13	81	80	60-80	Lower Sand Unit	0.010	#2/12 RMC Lonestar	24	Bentonite Chips	5	nondedicated	2" Redi-Flo used for purging	71.42 [7/99]

99-2IKVRpts/DrGrWaRcFa (12/28/99/rm)

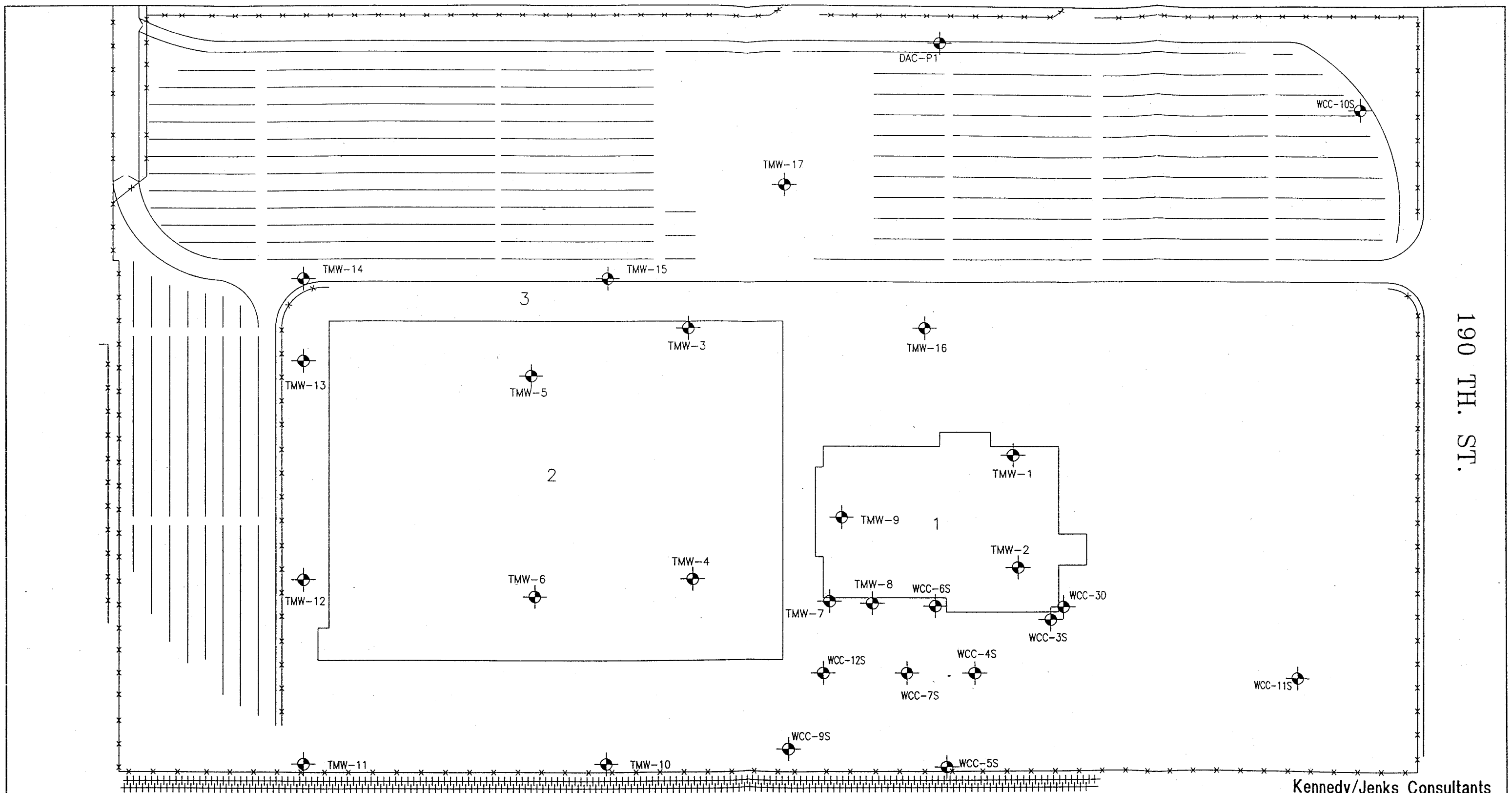
feet msl — Feet above mean sea level
feet bgs — Feet below ground surface
Inches O.D. — Inches outer diameter
HSA — Hollow-stem auger drill rig
NA — Not available
PVC — Polyvinyl chloride

TRC

BOE-C6-0139566

BOEING C-6 AND ILM WELL INFORMATION

Well Location Maps Boeing and ILM



LEGEND

TMW-9 Monitoring Well Location, Designation

N

0 200

Scale in Feet

Note: Recent wells installed by others are not included on this map.

Kennedy/Jenks Consultants

Boeing Realty Corporation
C6 Facility

Monitoring Well Locations

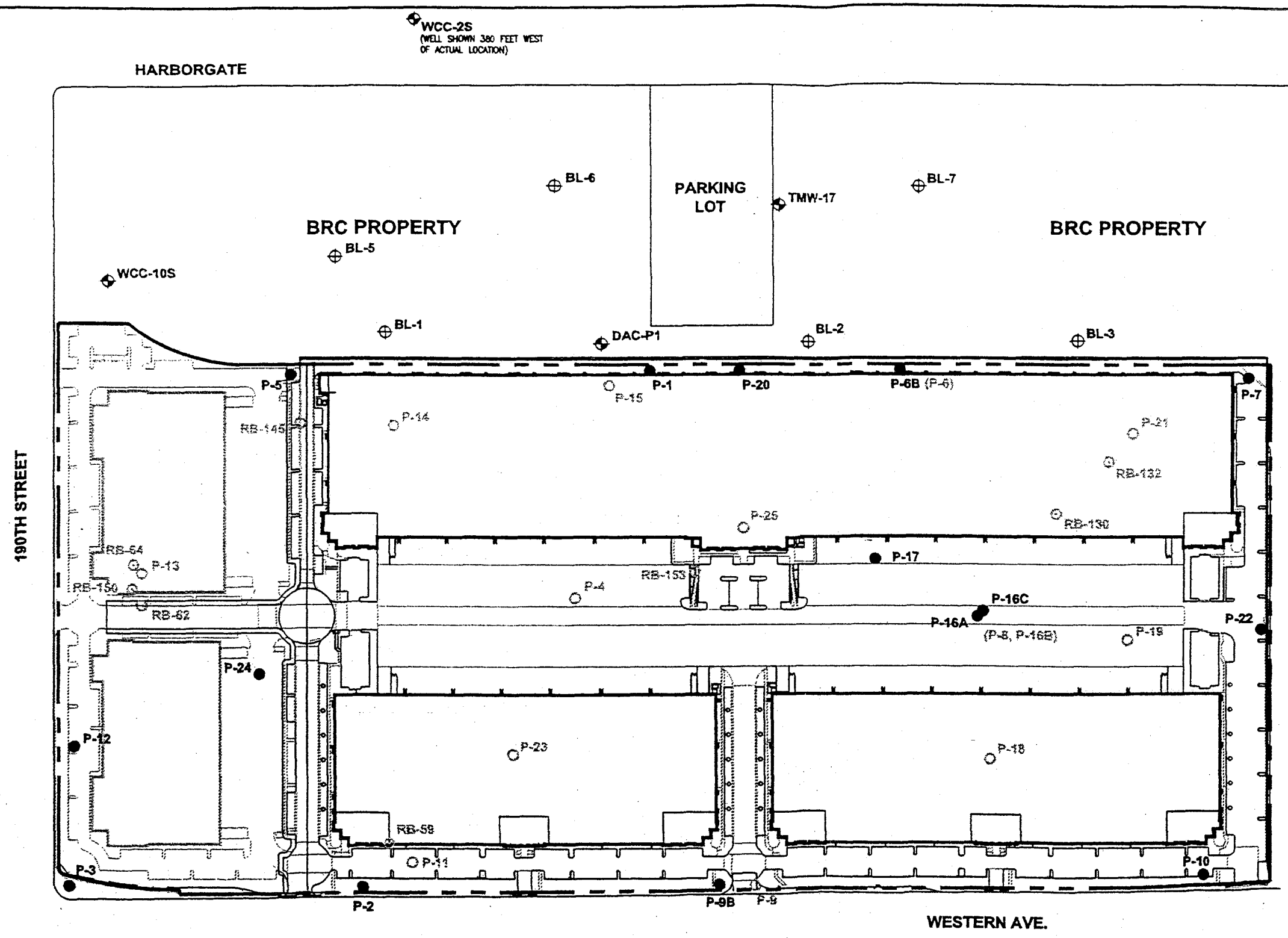
April 2000
K/J 994001.00

Figure 2

4-00-400602.dwg

BOE-C6-0139568

99-200GW-01 REV. 12/28/99



LEGEND

- FORMER ILM PROPERTY BOUNDARY
- BUILDING LOCATION
- PROPOSED/PLANNED BUILDING LOCATION
- P-1 — EXISTING MONITORING WELLS ON FORMER ILM FACILITY
- BL-1 — TEMPORARY OFFSITE GROUND WATER MONITORING WELLS ON BRC PROPERTY (WELLS INSTALLED IN FEBRUARY 1999)
- OTHER OFFSITE BRC PROPERTY GROUND WATER MONITORING WELLS
- P-4 — ABANDONED GROUND WATER MONITORING WELLS ON FORMER ILM FACILITY (WELLS ABANDONED IN 1996 AND 1997)
- RB-130 — HYDROPUNCH GROUND WATER SAMPLING LOCATIONS MARCH 1995

0 250 500 FEET
SCALE

NOTES:

1. FIGURE SHOWS STATUS OF WELLS (e.g. EXISTING OR ABANDONED) AS OF NOVEMBER 1999. FORMER WELL P-6 WAS LOCATED AT THE PRESENT P-6B LOCATION. FORMER WELLS P-8 AND P-16B WERE LOCATED AT THE PRESENT P-16A AND P-16C LOCATIONS.

SOURCE: 1. FREEMONT ASSOCIATES, INC. / HILL PINCKERT ARCHITECTS BUILDING PLAN, AUGUST 1999.

GROUND WATER MONITORING WELL LOCATION MAP

FORMER INTERNATIONAL LIGHT METALS FACILITY
TORRANCE, CALIFORNIA

TRC | FIGURE 4.1

BOE-C6-0139569

WELL INFORMATION FOR THE SITE AND FORMER ILM SITE

Well Location Maps

WELL INFORMATION FOR THE SITE AND FORMER ILM SITE

Borehole/Well Completion Logs for P Wells and DB Borings

BORING AND WELL CONSTRUCTION LOG

FORMER ILM FACILITY BORING LOGS (Well I.D.)	McDONNELL DOUGLAS C-6 FACILITY (Well I.D.)	DOUGLAS AIRCRAFT CO. (Well I.D.)	BOEING REALTY CORPORATION (Well I.D.)
P1	WCC-01D	DAC-P1	BL-1
P2	WCC-01S		BL-2
P3	WCC-02S		BL-3
P4	WCC-03S		BL-4
P5	WCC-03D		BL-5
P6	WCC-04S		BL-6
P6B	WCC-05S		BL-7
P7	WCC-07S		BL-8
P8	WCC-10S		
P9	WCC-11S		
P9B	WCC-12S		
P10			
P11B			
P12			
P13B			
P14			
P15			
P16A			
P16B			
P16C			
P17			
P18			
P19			
P20			
P21			
P22			
P23			
P24			
P25			
DB-1			
DB-2			

GERAGHTY & MILLER, INC.

BORING LOG

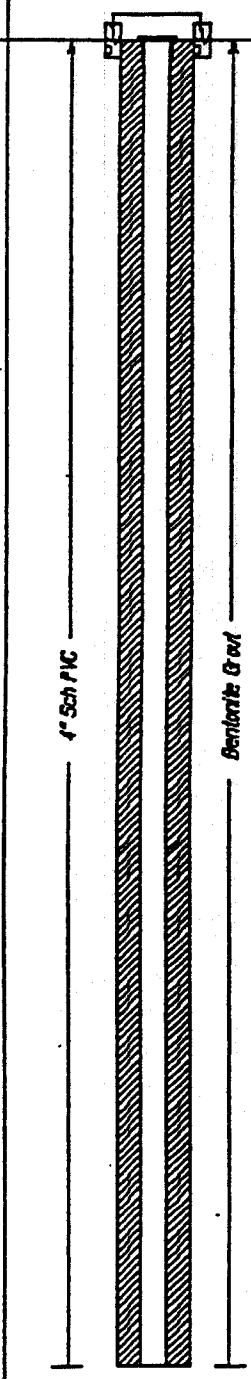
PROJECT International Light Metals
ATION 19200 S. Western
METHOD Hollow Stem Auger
ING METHOD CNSS
BOREHOLE DIAMETER 10.5 inches O.D.

PROJECT NO. CAO 217.012
LOGGED BY Derrick Willis
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER Dino Selders

BORING P-1
DATE STARTED 8/16/94
DATE COMPLETED 8/16/94
BORING DEPTH 82.5 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								6 inches conrete, 5 inches gravel
				7		GP		
						ML		SILT with fine Sand, some Clay, dark brown to black, stiff.
						SC		Clayey SAND, fine grained, brown, brittle.
				1				
						SP		SAND, fine grained, some Silt, tan, loose.
				0				
						ML		Clayey SILT, light olive brown (2.5Y, 5/4), semi-stiff, slightly moist.
					8			
				< 1	10			
	100 %		P1 @ 7a		17			
						CL		Silty CLAY, light olive brown (2.5Y, 5/4), semi-stiff, slighty moist.
10					11			
				< 1	12			
	100 %		P1 @ 10		15			
15								

WELL DIAGRAM



DEPTH (ft): 5, 10, 15

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-1

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
					8	CL		Sandy CLAY, sand is very fine grained, medium olive (5Y, 5/4), soft, slightly moist.		
				< 1	11					
	100 %		P1 @ 15		17					
						ML				
					14			Clayey SILT with minor very fine grained Sand, medium olive (5Y, 5/4), semi-stiff, slightly moist, clayey at top.		20
				2	20					
	100 %		P1 @ 20		32				4" Sch PVC / Bentonite Grout	
						SP				
25					10			SAND, very fine grained, with Silt, olive (5Y, 5/6), loose, slighty moist.		25
				1	16					
	100 %		P1 @ 25a		24					
30										30

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-1

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
					14	SP		SAND, very fine grained, with minor Silt, olive yellow (5Y, 6/6), loose, slighty moist, abundant shell fragments, minor cementing.		
				< 1	14					
	100 %		P1 @ 30		25					
					26			SAND, very fine grained, pale olive (5Y, 6/4), loose, slightly moist, minor shell fragments at top 6 inches.		35
				1	30					
	100 %		P1 @ 35		40				4" Sch PVC / Bentonite Grout	
40					14			SAND, very fine grained to fine grained, pale olive (5Y, 6/4), loose, slightly moist, abundant shell fragments, minor cementing.		40
				2	14					
	100 %		P1 @ 40		15					
45										45

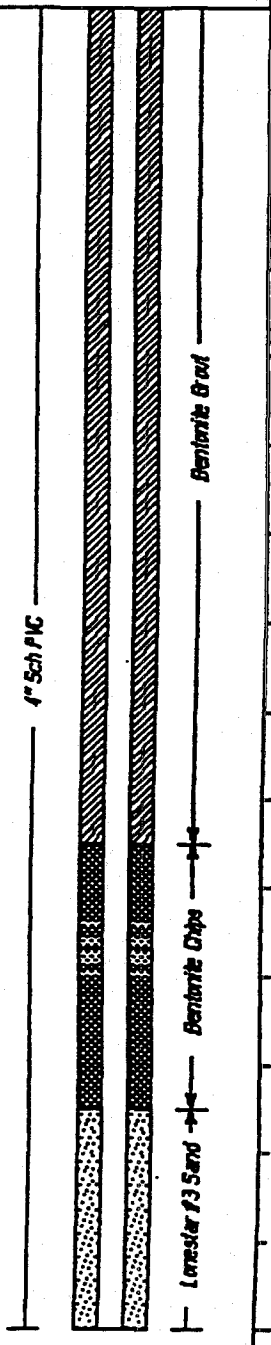
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-1

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				3	17	SP		SAND, very fine grained, pale olive (5Y, 6/3), loose, slightly moist.
					23			
	100 %		P1 @ 45		25			
				4	15			SAND, very fine grained with Silt, pale olive (5Y, 6/3), loose, slightly moist.
					30			
	100 %		P1 @ 50a		42			
55				8	27			SAND with Silt, very fine grained, pale olive (5Y, 6/3), loose, slightly moist, iron staining and clayey at base (bottom 3 inches).
					42			
	100 %		P1 @ 55		50@3"			
60						SM		

WELL DIAGRAM



DEPTH (ft): 50, 55, 60

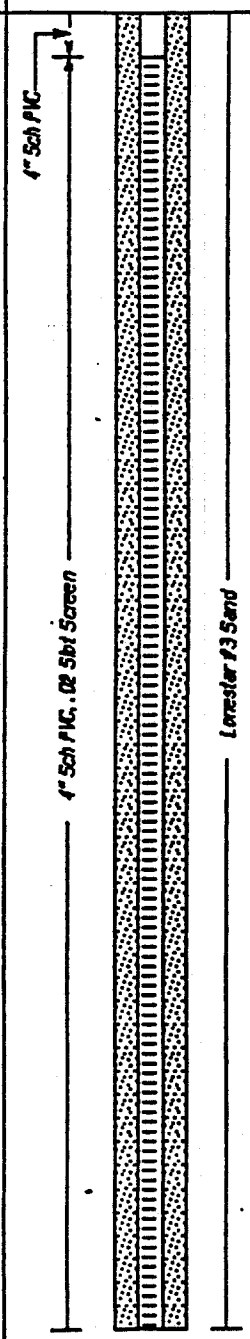
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-1

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
					20	SM		Silty SAND, very fine grained, olive yellow (5Y, 6/6), loose, slightly moist.
				< 1	42			
	100 %		P1 @ 60		50@5"			
						SP		SAND, very fine to fine grained, olive (5Y, 5/4), loose, slightly moist, with reddish tinge at base.
				6	20			
	100 %		P1 @ 61.5		50@5"			
					19			SAND, very fine to fine grained, olive (5Y, 5/6), loose, slightly moist, with reddish tinge at base.
				9	46			
	100 %		P1 @ 63		50@4"			
								SAND, very fine grained, olive (5Y, 5/6), loose, moist, with orange tinge.
				5	29			
	100 %		P1 @ 64.5		50@3"			
					16			SAND, very fine grained, olive (5Y, 5/4), loose, moist, with orange tinge.
				7.5	37			
	100 %		P1 @ 66		50			
					20			SAND, very fine grained, light olive brown (2.5Y, 5/6), loose, moist, with orange tinge.
				7	46			
	100 %		P1 @ 67.5		50@3"			
								SAND, very fine grained, light olive brown (2.5Y, 5/6), loose, moist, slightly clayey at base, with orange tinge.
				4.3	30			
70	100 %		P1 @ 69		50@5"			
								SAND, very fine grained with minor Silt, light olive brown (2.5Y, 5/4), semi loose, wet.
				66	33			
	100 %		P1 @ 70.5		50@5"			
								SAND with Silt, very fine grained, light olive brown (2.5Y, 5/4), semi loose, water saturated.
				20	30			
	100 %		P1 @ 72		50@4"			
								SAND with minor Silt, very fine grained, light olive brown (2.5Y, 5/4), semi-loose, water saturated.
				50	42@3"			
75	100 %		P1 @ 73.5		50@3"			

WELL DIAGRAM



DEPTH (ft): 65, 70, 75

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

_CT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-1

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
				85	46	SP		SAND, with minor Silt, very fine grained, light olive brown (2.5Y, 5/4), semi-loose, water saturated.		
	100 %		P1 @ 75.0		50@3"					
				60	23			SAND with Silt, very fine grained, light olive brown (2.5Y, 5/4), semi-soft, water saturated.	4" Sch PVC, .02 Slot Screen; Lonestar #3 Sand	
	100 %		P1 @ 76.5		50@5"					
				60	20	SC		Clayey SAND, very fine grained, light olive brown, loose, water saturated.		
	100 %		P1 @ 78.0		32 / 50@4"					
				70	20			Clayey SAND, very fine grained, with high clay content, light olive brown, loose, water saturated.		80
	100 %		P1 @ 79.5		50@4"					
				25	8	CL		CLAY, light olive brown (2.5Y, 5/4), stiff, slightly moist.		
	100 %		P1 @ 81		16 / 31					
85								End of Boring @ 82.5 ft.		85
90								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		90

GERAGHTY & MILLER, INC.

BORING LOG

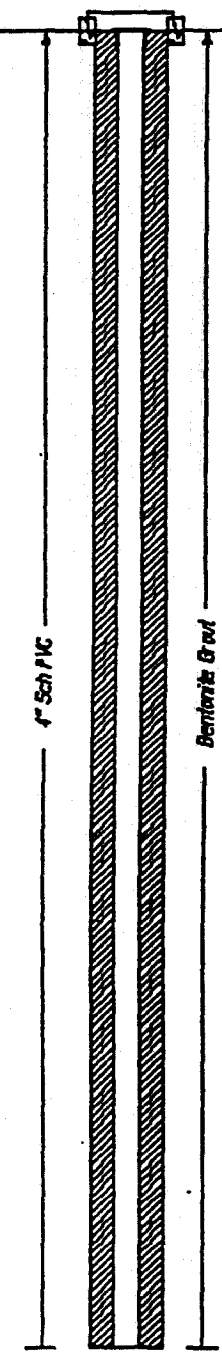
PROJECT: International Light Metals
LOCATION: 19200 S. Western
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: CMSS
BOREHOLE DIAMETER: 10.5 inches O.D.

PROJECT NO.: CAO 217.012
LOGGED BY: Lance King
DRILL CO.: Gregg Drilling and Testing, Inc.
RIG TYPE: B-61
DRILLER: Craig Winegarner

BORING: P-2
DATE STARTED: 8/18/94
DATE COMPLETED: 8/19/94
BORING DEPTH: 72.0 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						GW		3 inch asphalt, Gravel fill
						CL		Clay with Silt, dark brown, plastic to stiff.
				< 1				
						SP		
				< 1				SAND, fine grained, trace silt, tan, loose.
5								
				< 1				SAND, fine grained, trace silt, tan, loose.
						CL		
					9			CLAY with Silt, light olive brown (2.5Y, 5/4), stiff, slightly moist.
				< 1	13			
	100 %		P2 @ 7a		17			
10								
					7			Silty CLAY, light olive brown (2.5Y, 5/4), stiff, slightly moist.
				< 1	9			
	100 %		P2 @ 10		12			
15								
					7			Silty CLAY, light olive brown (2.5Y, 5/4), stiff, slightly moist.
				< 1	10			
	100 %		P2 @ 15		10			
20								

WELL DIAGRAM



GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-2

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
	100 %		P2 @ 20	< 1	6, 9, 10	CL		Silty CLAY, light olive brown (2.5Y, 5/4), stiff, slightly moist, some dark flecks (clay blebs).		
						SP				
25	0 %		P2 @ 25a	10	9, 16, 19			SAND, very fine to fine grained, light olive brown (2.5Y, 5/6), loose slightly moist, shell fragments, trace clay blebs.		25
30	100 %		P2 @ 30	10	16, 22, 33			SAND, very fine grained, olive (5Y, 5/4), loose, slightly moist, shell fragments.	4" Sch PVC; Bentonite Grout	30
35	100 %		P2 @ 35	170	7, 10, 14			SAND, very fine to fine grained, light olive grey (5Y, 6/2), loose, slightly moist, abundant shell fragments.		35
40								Silty SAND, very fine grained, olive (5Y, 5/6), loose, slightly moist, mottled iron staining.		40

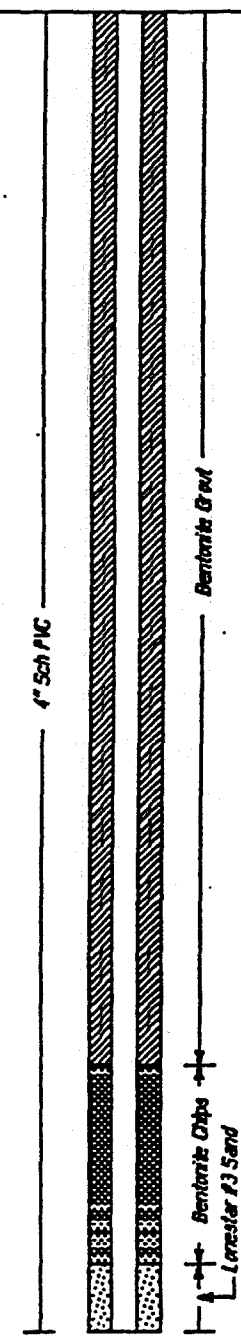
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-2

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				4750	15	SP		SAND, very fine to fine grained, light olive grey (5Y, 6/2), loose, slightly moist.
					18			
	100 %		P2 @ 40		23			
45				6700	10			SAND, very fine to fine grained, light olive grey (5Y, 6/2), loose, slightly moist.
					16			
	[illegible] %		P2 @ 45		17			
50				4900	21			SAND, very fine to fine grained, olive yellow (2.5Y, 6/6), loose, slightly moist.
					28			
	100 %		P2 @ 50a		36			
55				1000	22			SAND, very fine to fine grained, light olive brown (2.5Y, 5/6), loose, slightly moist, heavily iron stained, some mottled.
					27			
	100 %		P2 @ 55		31			
60								

WELL DIAGRAM



DEPTH (ft): 45, 50, 55, 60

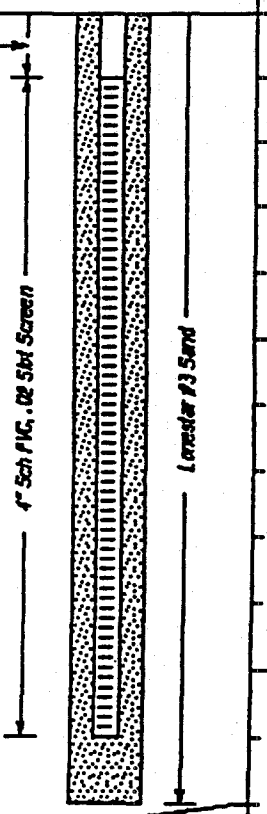
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-2

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				4800	38	SP		SAND, very fine to fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist, clay blebs (trace) at base, some clay lenses 1 mm thick in sample.
					50			
	100 %		P2 @ 60		> 50			
				5500	23			SAND, very fine grained with trace clay blebs, light yellowish brown (2.5Y, 6/4), loose, slightly moist, some iron staining, changes to olive yellow (2.5Y, 6/6) at 60.5 feet.
					28			
	100 %		P2 @ 61.5		31			
				5200	26			
					31			
	100 %		P2 @ 63		37			SAND, very fine grained, olive yellow (2.5Y, 6/6), loose, slightly moist, iron staining, trace clay blebs.
85				7500	27			
					33			
	100 %		P2 @ 64.5		39			SAND, very fine to fine grained, light olive brown (2.5Y, 5/6), loose, moist (wet in shoe), very minor clay blebs.
				260	17			
					23			
	100 %		P2 @ 66		29			SAND, very fine to fine grained, light olive brown (2.5Y, 5/6), loose, wet.
				15	14			
					15			SAND, very fine to fine grained, light olive brown (2.5Y, 5/4), loose, water saturated.
	100 %		P2 @ 67.5		19			
				125	8	SM		Clayey SAND, very fine grained, grades to CLAY over 2 inches, light olive brown to light browninsh grey (2.5Y, 5/6) to (2.5Y, 6/2), stiff to semi-plastic, water saturated to slightly moist, patches of iron staining in clay.
70					12			
	100 %		P2 @ 69		13			
				80	8	CL		CLAY with some Silt, light brownish grey (2.5Y, 6/2), semi-plastic, slightly moist, patches of iron staining.
					14			
	100 %		P2 @ 70.5		17			
75								End of Boring @ 72.0 feet
80								

WELL DIAGRAM



This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

BORING LOG

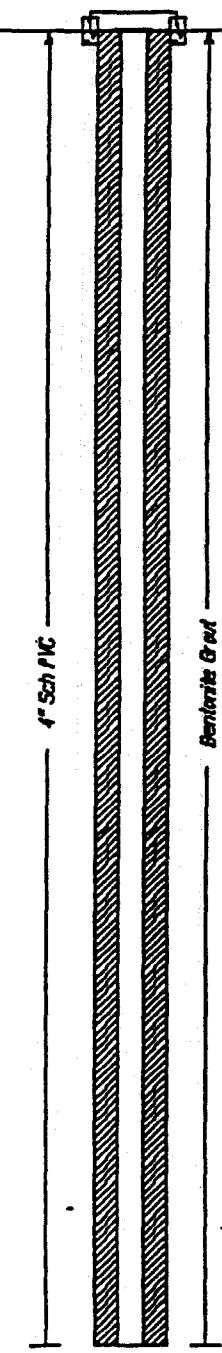
PROJECT International Light Metals
LOCATION 19200 S. Western
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10.5 inches O.D.

PROJECT NO. CAO 217.012
LOGGED BY Lance King
DRILL CO. Gregg
RIG TYPE B-61
DRILLER Craig Winegarner

BORING P-3
DATE STARTED 8/18/94
DATE COMPLETED 8/18/94
BORING DEPTH 75.0 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								6" concrete, 5" gravel
						SM		SILT with Clay, trace fine Sand, dark brown, stiff.
						ML		SILT, some clay, brown, stiff.
5						SP		SAND, fine grained, some Clay, tan, loose.
						CL		
					8			Silty CLAY, olive brown (2.5Y, 4/4), stiff, slightly moist.
				< 1	9			
	100 %		P3 @ 7a		12			
10					11			
				< 1	14			Silty CLAY, olive (5Y, 4/4), stiff, slightly moist.
	100 %		P3 @ 10		17			
15					4			
				< 1	7			Silty CLAY, olive (5Y, 4/3), stiff, slightly moist.
	100 %		P3 @ 15		8			
20								

WELL DIAGRAM



GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

:CT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-3

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
	100 %		P3 @ 20	< 1	11, 14, 9	CL		Silty CLAY, olive (5Y, 4/3), stiff, slightly moist, with white patches (shells).		
25	100 %		P3 @ 25	< 1	10, 13, 17			Silty CLAY, olive (5Y, 5/4), stiff, slightly moist.		25
						SM				
30	100 %		P3 @ 30	< 1	17, 12, 14			Silty SAND, very fine grained, with Clay, light brownish grey (2.5Y, 6/2), friable, slightly moist, olive (5Y, 5/4) where stained (iron staining), occasional pebbles, highly mottled, 60% stained, 40% grey in rough layers (interbedded), (5Y, 5/4).	4" Sch PVC; Bentonite Grout	30
						SC				
35	100 %		P3 @ 35	< 1	14, 18, 22			Clayey SAND, very fine grained, olive (5Y, 5/6), semi-loose, friable, slightly moist.		35
40						SP				40

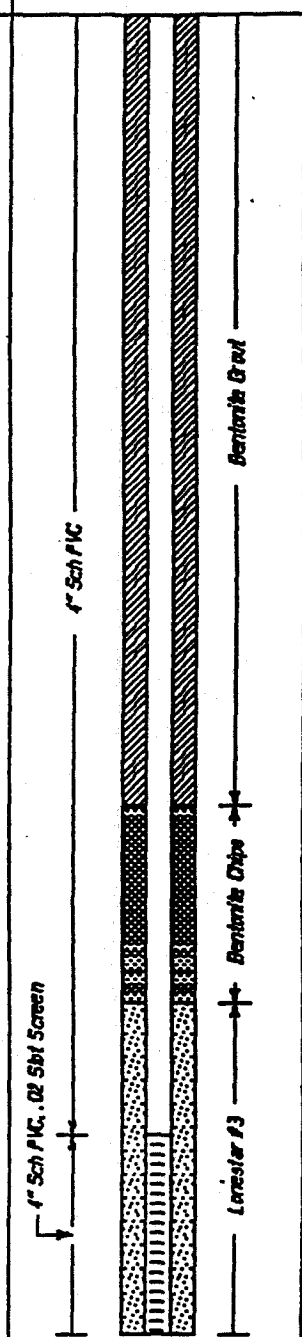
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-3

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				1	10 17 26	SP		SAND, very fine grained with clay, olive (5Y, 5/3), semi-loose, slightly moist, with interbedded layers (1-3 mm thick) of orange (iron-stained) sand.
	100 %		P3 @ 40					
45				2	16 18 27			SAND, very fine grained with trace clay blebs, olive/orange, (5Y, 5/3), loose, slightly moist, (iron stained) interlayered 1-10 mm thick.
	100 %		P3 @ 45					
50				< 1	22 27 31			SAND, very fine grained, olive (5Y, 5/4), loose, slightly moist.
	100 %		P3 @ 50					
55				2	28 30 37	SC		SAND, very fine grained, olive (5Y, 5/4), loose, slightly moist. Clayey SAND, very fine grained, olive with orange, semi-loose, mottled, abundant clay blebs, (iron staining) throughout.
	100 %		P3 @ 55					
80						SP		

WELL DIAGRAM



GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-3

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
				15	33	SP		SAND, very fine-grained, pale olive (5Y, 6/3), loose, slightly moist.		
					40					
	100 %		P3 @ 60		50					
				40	26			SAND, very fine grained, olive (5Y, 5/4), loose, slightly moist.		
					33					
	100 %		P3 @ 61.5		39					
				20	28			SAND, very fine grained, light olive brown (2.5Y, 5/6), loose, slightly moist, with orange (iron stained) mottling.		
					35					
	100 %		P3 @ 63		42					
65				20	28			SAND, very fine grained, light olive brown, (2.5Y, 5/6), loose, slightly moist, with orange (iron stained) mottling.	4" Sch PVC, .02 Slot Screen; Lonestar #3	65
					40					
	100 %		P3 @ 64.5		44					
				10	34			SAND, very fine grained, pale olive yellow, (2.5Y, 6/6), loose, slightly moist, with occassional (10%) orange (iron stained) mottling.		
					39					
	100 %		P3 @ 66		45					
				35	23			SAND, very fine grained, olive (5Y, 5/4), loose, moist, with occassional orange (iron stained) blebs and stringers.		
					39					
	100 %		P3 @ 67.5		46					
				2	19			SAND, very fine grained, olive (5Y, 5/4), loose, wet, with occassional iron stained blebs.		
70					26					70
	100 %		P3 @ 69		33					
				1	18			SAND, very fine grained, olive with orange (5Y, 4/3), loose, water saturated, (iron stained) mottling.		
					25					
	100 %		P3 @ 70.5		31					
				< 1	18	CL		CLAY with Silt, olive (5Y, 4/4), semi-stiff, slightly moist.		
					31					
	100 %		P3 @ 72		40					
				< 1	37	CL		CLAY with minor Silt lenses, olive grey (5Y, 4/2), very stiff, slightly moist, with occassional orange (iron stained) silt lenses.		
					60					
	100 %		P3 @ 73.5							
75								End of Boring @ 75.0 feet		75
								This work was performed under my supervision and I concur with the findings.		
								Anthony C. Ward, CA R.G. #4782		
80										80

GERAGHTY & MILLER, INC.

BORING LOG

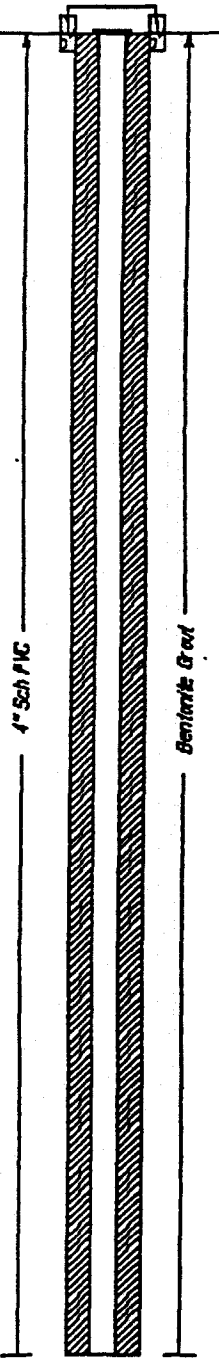
PROJECT: International Light Metals
LOCATION: 19200 S. Western
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: CMSS
BOREHOLE DIAMETER: 10.5 inches O.D.

PROJECT NO.: CAO 217.012
LOGGED BY: Derrick Willis
DRILL CO.: Gregg Drilling and Testing Inc.
RIG TYPE: B-61
DRILLER: Dino Selders

BORING: P-4
DATE STARTED: 8/16/94
DATE COMPLETED: 8/16/94
BORING DEPTH: 81.0 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				0				6 inches conrete
				0		CL		CLAY, some Silt, dark brown, stiff.
				7		ML		Clayey SILT with Sand, dark brown, stiff, brittle.
						CL		CLAY, with Silt, dark brown, stiff, brittle.
				2	13			Silty CLAY, light olive brown (2.5Y, 5/4), slightly moist, stiff, with olive brown streaks.
					13			
	100 %		P4 @ 7a		19			
						ML		
10					8			Clayey SILT, light olive brown (2.5Y, 5/4), semi-loose, slightly moist.
				3	5			
	100 %		P4 @ 10		6			
15								

WELL DIAGRAM



DEPTH (ft): 5, 10, 15

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

_CT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-4

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
				5	9	ML		Clayey SILT, light olive brown (2.5Y, 5/4), semi-stiff, slightly moist.	4" Sch PVC; Bentonite Grout	
					11					
	100 %		P4 @ 15		15					
				8	9			Clayey SILT with minor very fine grained Sand, olive brown (2.5Y, 4/4), semi-loose (crumbly), slightly moist.		20
					15					
	100 %		P4 @ 20		16					
25				5	12			SILT with Clay, light olive brown (2.5Y, 5/6), crumbly, slightly moist.		25
					15					
	100 %		P4 @ 25a		15					
						SM				
30										30

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-4

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
				4	10	SM		Silty SAND, very fine grained, light olive brown (2.5Y, 5/6), loose, slightly moist, trace shell fragments.		
					21					
	100 %		P4 @ 30		30					
						CL				
				11	13			Silty CLAY, olive (5Y, 5/4), semi-soft, slightly moist, with thin reddish orange very fine grained stringers.		35
					27					
	100 %		P4 @ 35		32				4" Sch PVC; Bentonite Grout	
40				11	15			CLAY with very fine grained Sand, olive brown (2.5Y, 4/4), semi-soft, semi plastic, slightly moist, with orange (iron stained), sand stringers (roughly 1 mm – 5 mm thick) throughout.		40
					18					
	100 %		P4 @ 40		22					
						SP				
45										45

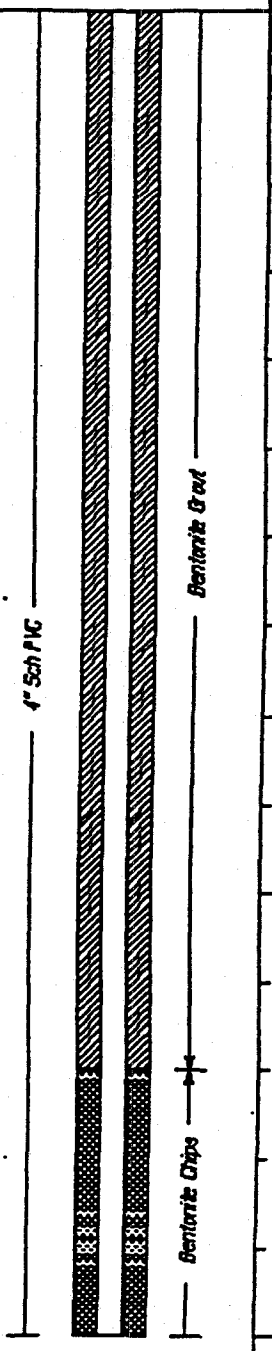
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-4

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				6	15	SP		SAND, very fine grained with minor Silt, olive (5Y, 5/4), loose, slightly moist.
					18			
	100 %		P4 @ 45		24			
				7	16			SAND, very fine grained with minor Silt, olive (5Y, 5/4), loose, slightly moist.
					25			
	100 %		P4 @ 50a		37			
55				22				SAND, very fine grained with minor Silt and minor Clay lenses, olive (5Y, 5/4), loose, slightly moist.
	100 %		P4 @ 55		NA			
60								

WELL DIAGRAM



DEPTH (ft): 50, 55, 60

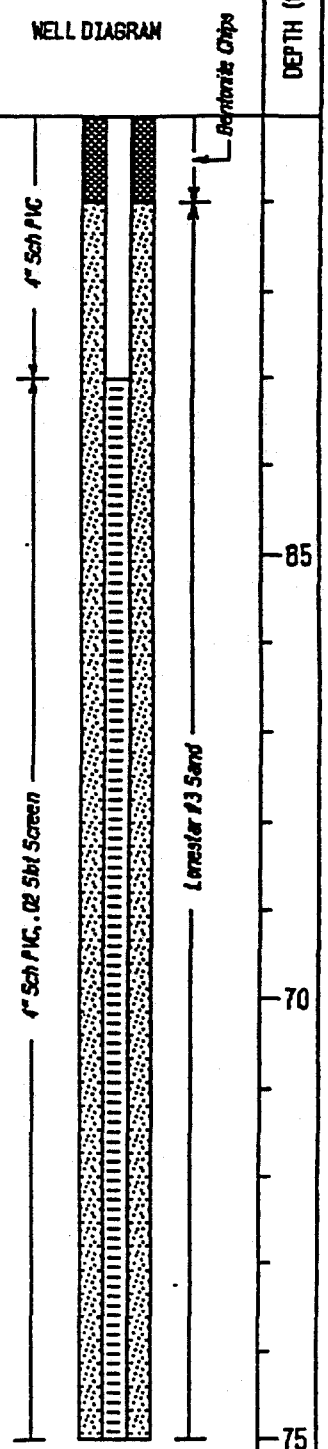
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-4

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				11	19	SP		SAND, very fine grained, olive (5Y, 5/4), loose, slightly moist, with trace of orange (iron stained) sand stringers.
	100 %		P4 @ 60		50@5"			
				5	39			SAND, very fine grained, olive (5Y, 5/6), loose, slightly moist, with trace of orange (iron stained) sand stringers.
	100 %		P4 @ 61.5		50@4"			
				15	25			SAND, very fine grained, olive yellow (5Y, 6/6), loose, slightly moist, with iron stained (mottled).
	100 %		P4 @ 63		50			
				6	22			SAND, very fine grained, pale olive (5Y, 6/4), loose, slightly moist, with minor iron stained (orange mottled).
	100 %		P4 @ 64.5		50@5"			
				12	11			SAND, very fine grained, pale olive (5Y, 6/4), loose, slightly moist, with minor iron stained (orange mottled).
	100 %		P4 @ 66		50			
				13	18			SAND, very fine grained, olive (5Y, 5/6), loose, slightly moist, orange iron stained.
	100 %		P4 @ 67.5		50@5"			
				2	47			SAND, very fine grained, olive (5Y, 5/6), loose, slightly moist, orange iron stained.
70	100 %		P4 @ 69		50@5"			
				10.5	15			SAND, very fine grained, olive (5Y, 5/6), loose, slightly moist, orange iron stained.
	100 %		P4 @ 70.5		50@5"			
				20	20			SAND, very fine grained, olive (5Y, 5/6), loose, moist to very moist at base, orange iron stained.
	100 %		P4 @ 72		50@3"			
				25	20			SAND, very fine grained, olive (5Y, 5/4), loose, water saturated, with orange mottled.
	60 %		P4 @ 73.5		50@4"			
75								

WELL DIAGRAM



DEPTH (ft): 85, 70, 75

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-4

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
					22	SP		SAND, very fine-grained, olive (5Y, 5/4), loose, water saturated, with orange mottled.	4" Sch PVC, .02 Slot Screen; Lonestar #3 Sand	
				8	45					
	100 %		P4 @ 75		50@3"					
					18			SAND, very fine grained, Clay at base, olive (5Y, 5/4), loose, water saturated, with orange mottled.		
					25					
	100 %		P4 @ 76.5		50@3"					
					22	CL		CLAY, olive (5Y, 5/4), soft, plastic, slightly moist at base.		
					46					
	NA		P4 @ 78		50@3"					
					9			CLAY, olive (5Y, 5/4), semi soft, plastic, slightly moist.		
				6	10					80
	100 %		P4 @ 79.5		12					
								End of Boring @ 81.0 feet		
85										85
90										90

This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

BORING LOG

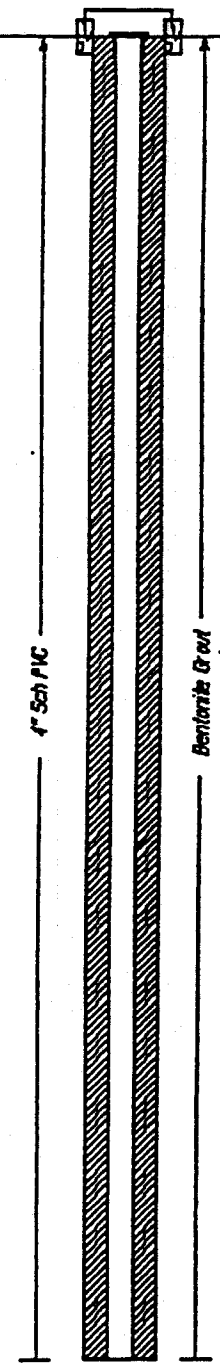
PROJECT: International Light Metals
LOCATION: 19200 S. Western
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: CMSS
BOREHOLE DIAMETER: 10.6 inches O.D.

PROJECT NO.: CAO 217.012
LOGGED BY: Derrick Willis
DRILL CO.: Gregg Drilling and Testing, Inc.
RIG TYPE: B-61
DRILLER: Dino Salders

BORING: P-5
DATE STARTED: 8/17/94
DATE COMPLETED: 8/17/94
BORING DEPTH: 81.0 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				1		ML		SILT with Clay, some Sand, black, stiff, plastic.
				0		SM		Silty SAND, fine grained, brown to tan.
				0				SAND, some Silt, fine grained, tan, loose.
					9	CL		Silty CLAY, olive brown (2.5Y, 4/4), semi-stiff, slightly moist.
				< 1	14			
	100 %		P5 @ 7a		14			
10						ML		
					9			Clayey SILT, olive brown (2.5Y, 4/4), semi-loose, slightly moist.
				< 1	10			
	100 %		P5 @ 10		10			
15								

WELL DIAGRAM



DEPTH (ft): 5, 10, 15

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-5

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
					6	ML		Clayey SILT, olive brown (2.5Y, 4/4), semi-loose, slightly moist.		
				< 1	9					
	100 %		P5 @ 15		12					
						CL				
					4			CLAY with Silt, olive brown (2.5Y, 4/4), soft, semi-plastic, slightly moist to moist.		20
				< 1	5					
	100 %		P5 @ 20		7				4" Sch PVC / Bentonite Grout	
						ML				
25					7					25
				< 1	11			Clayey SILT, light olive brown (2.5Y, 5/4), semi-stiff, crumbly, slightly moist.		
	NA		P5 @ 25a		13					
						SP				
30										30

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

.CT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-5

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
	NA		P5 @ 30	< 1	12, 14, 17	SP		SAND, very fine grained with Silt, light olive brown (2.5Y, 5/6), loose, slightly moist.	4" Sch PVC; Bentonite Grout	
35	100 %		P5 @ 35	< 1	12, 17, 27			SAND, very fine to fine grained, trace Silt, some Clay blebs, olive yellow (2.5Y, 6/6), loose, slightly moist, drill cuttings 35' to 40' – shell fragments.		35
40	100 %		P5 @ 40	< 1	19, 26, 31			SAND, very fine to fine grained with clay blebs, light yellowish brown (2.5Y, 6/4), loose, slightly moist, shell fragments (trace).		40
45										45

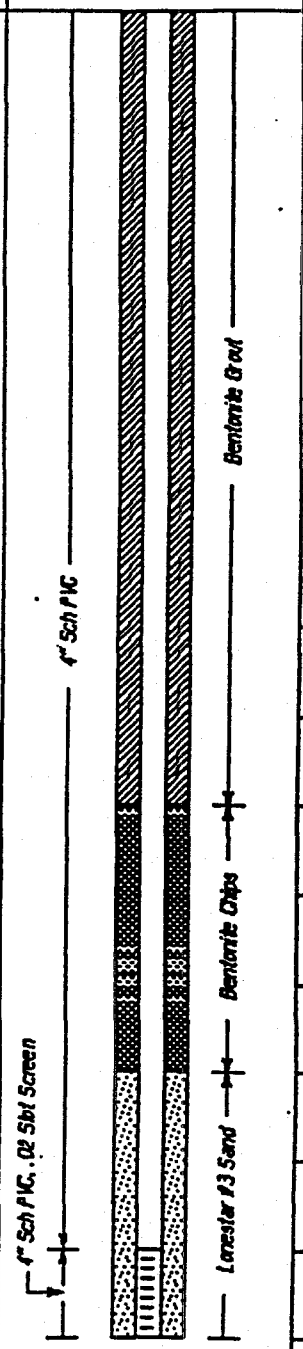
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-5

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
					14	SP		SAND, very fine to fine grained, light olive brown (2.5Y, 5/4), loose, slightly moist, abundant shell fragments.
				< 1	19			
	100 %		P5 @ 45		25			
					19			SAND, very fine to fine grained with Clay, light olive brown (2.5Y, 5/4), loose, slightly moist, trace shell fragments.
				< 1	36			
	100 %		P5 @ 50a		38			
55					16			SAND, very fine to fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist, some (2.5Y, 6/8) blebs.
				< 1	38			
	100 %		P5 @ 55		50			
60								

WELL DIAGRAM



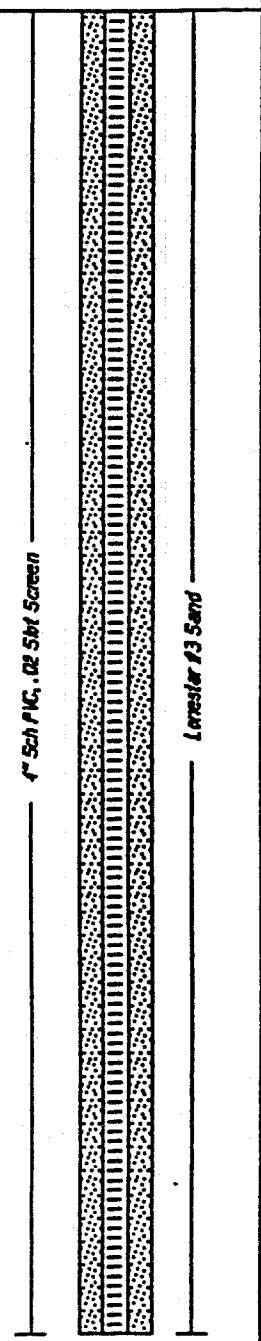
DEPTH (ft): 50, 55, 60

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

CT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-5

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
					14	SP		SAND, very fine to fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist, trace of highly broken shell fragments.		
				< 1	25					
	100 %		P5 @ 60		31					
					15			SAND, very fine to fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist, trace of highly broken shell fragments.		
				< 1	32					
	100 %		P5 @ 61.5		39					
					18			SAND, very fine to fine grained, trace Clay blebs, light yellowish brown (2.5Y, 6/4), loose, slightly moist.		
				< 1	27					
	100 %		P5 @ 63		30					
					12			SAND, very fine to fine grained, trace (larger 1 cm) Clay blebs, light yellowish brown (2.5Y, 6/4), highly rounded, loose, slightly moist, more clay toward bottom, blebs, < 1 mm shell fragments (trace).		65
				< 1	35					
	100 %		P5 @ 64.5		40					
					18			SAND, very fine to fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist to moist, fewer clay blebs (less than 5 cm), < 1 mm shell fragments, some calcite, cementing.		
				< 1	28					
	100 %		P5 @ 66		26					
					19			SAND, very fine to fine grained, light olive brown (2.5Y, 5/4), loose, moist, more cementing, up to 1.5 cm chunks, < 1 mm shell fragments.		
				< 1	22					
	100 %		P5 @ 67.5		25					
					15			SAND, fine grained, light brownish grey (2.5Y, 6/2), loose, moist, abundant, shell fragments up to 2 mm.		
				< 1	20					
70	100 %		P5 @ 69		20					70
					18			SAND, fine grained, greyish brown (2.5Y, 5/2), loose, water saturated, abundant shell fragments.		
				500	18					
	100 %		P5 @ 70.5		22			SAND, very dark grey (7.5YR, N3), loose, water saturated, abundant shell fragments, hydrocarbon stained.		
					8					
				1000	20			SAND, fine grained, very dark grey (7.5YR, N3), loose, water saturated, roughly 40% shell fragments.		
	100 %		P5 @ 72		17					
					9			SAND, very fine grianed to fine grained, abundant shell fragments roughly 10%, dark grey (2.5Y, N4), loose, water saturated, some clay at the bottom.		
					18					
	100 %		P5 @ 73.5		20					
75						ML				75



GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012 BORING NO. P-5

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
	100 %		P5 @ 75		NA	ML		Clayey SILT, 40% shell fragments, light brownish grey (2.5Y, 6/2), water saturated.	4" Sch PVC, .02 Slot Screen; Lonestar #3 Sand	
	100 %		P5 @ 76.5		10, 17, 21	SC		Clayey SAND, 30% shell fragments, light olive brown (2.5Y, 5/4), loose, water saturated.		
	100 %		P5 @ 78		5, 11, 12	SP		SAND, fine grained, roughly 40% shell fragments, light olive brown (2.5Y, 5/4), loose, plastic, turns to olive brown clay (2.5Y, 4/4).		
	100 %		P5 @ 79.5		4, 7, 10	CL		CLAY, dark grey (2.5Y, N4), plastic, slightly moist, trace shell fragments.		80
85								End of Boring @ 81.0 feet		85
90								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		90

GERAGHTY & MILLER, INC.

BORING LOG

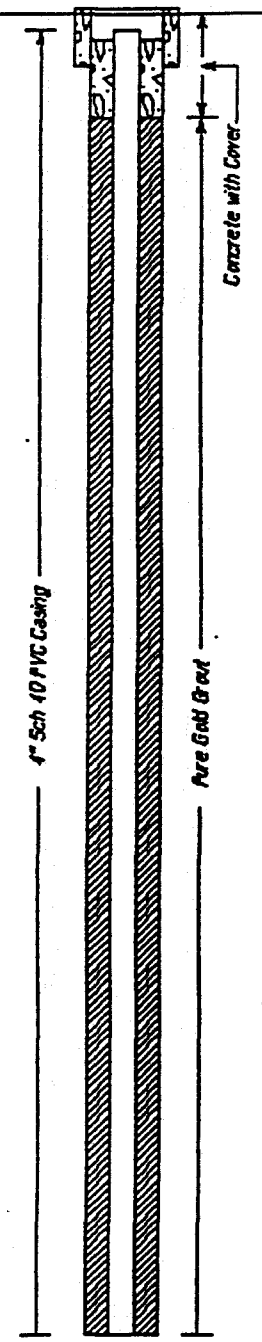
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.012.002
LOGGED BY N. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-6
DATE STARTED 3/1/95
DATE COMPLETED 3/1/95
BORING DEPTH 80 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (10")
								Asphalt (8")
						CL		CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
					7			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
	100		P-6 @ 50	0.8	9			
5	100		P-6 @ 5		13			
						ML		
					9			SILT, little fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist to slightly moist.
				0.8	9			
10	100		P-6 @ 10		14			
					7			SILT, little fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist to slightly moist.
				1.4	10			
15	100		P-6 @ 15		11			
					9			SILT, little fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist to slightly moist.
				3.2	10			
20	100		P-6 @ 20		16			
					9			SILT, some fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist to slightly moist.
	100		P-6 @ 250	2.8	14			
25	100		P-6 @ 25		18			

WELL DIAGRAM



GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

.CT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-6

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
						SP				
					9			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), non plastic, moist.		
				3.2	15					
30	100		P-6 @ 30		20					30
					15			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), non plastic, moist, some shell fragments, slightly cemented.		
				2.4	21					
35	100		P-6 @ 35		30					35
					14			SAND, very fine to fine grained, little Silt, yellowish brown (10YR, 5/6), non plastic, moist, some shell fragments, slightly cemented.		
				2.2	23					
40	100		P-6 @ 40		28					40
						ML				
					20			SILT, some fine to very fine grained Sand, dark yellowish brown (10YR, 4/6), low plasticity, moist.		
				3.9	26					
45	100		P-6 @ 45		33					45
						SP				
					21			SAND, very fine to fine grained, trace Silt, olive brown (2.5Y, 4/3), moist.		
	100		P-6 @ 50D	2.5	31					
50	100		P-6 @ 50		36					50

WELL DIAGRAM: 1" Sch 40 PVC Casing; Pure Gold Grout

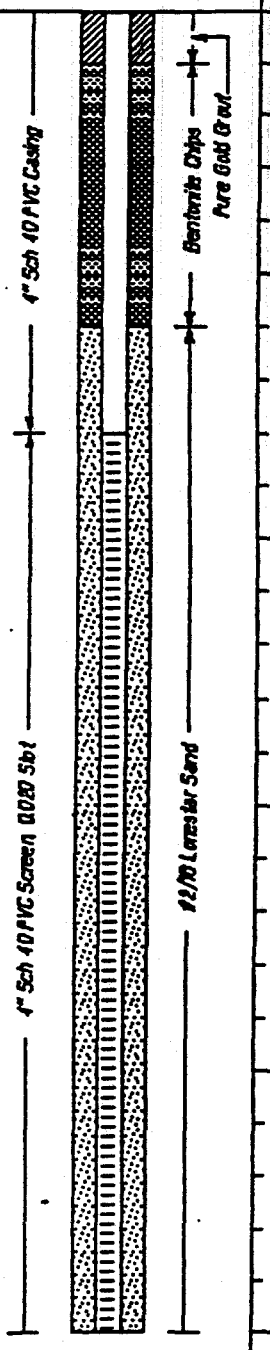
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-6

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				3.1	19			SAND, very fine to fine grained, trace Silt, olive brown (2.5Y, 4/3), moist.
					26			
55	100		P-6 @ 55		41			
				2.9	22			SAND, very fine to fine grained, trace Silt, olive brown (2.5Y, 4/3), moist.
					39			
60	100		P-6 @ 60		49			
				2.1	23			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
					46			
65	100		P-6 @ 65		55			
				2.3	30			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
					34			
	100		P-6 @ 66.5		48			
				1.4	31			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.
					40			
	100		P-6 @ 68		56			
				1.2	28			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.
					36			
	100		P-6 @ 69.5		51			
70				6.8	26			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), water saturated, hit water at 70.5 ft.
					40			
	100		P-6 @ 71		48			
				4.6	25			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), water saturated.
					37			
	100		P-6 @ 72.5		47			
				3.9	40			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), water saturated.
					41			
	100		P-6 @ 74		58			
				4.1	31			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), water saturated.
75					40			

WELL DIAGRAM



DEPTH (ft): 55, 60, 65, 70, 75

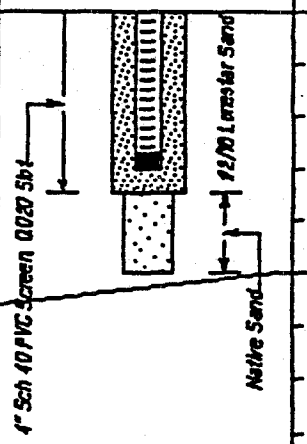
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-6

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
	100		P-6 @ 75.5	4.1	52	SP		
				4.0	30	SM		SAND, very fine grained, some Silt, dark yellowish brown (10YR, 5/6), non plastic, water saturated.
					42			
	100		P-6 @ 77		50			
				3.8	32	ML		SILT, some very fine grained Sand, trace to little Clay, dark yellowish brown (10YR, 4/4), non to low plasticity, moist to wet.
					39			
	100		P-6 @ 78.5		46			
				3.9	28	CL		CLAY, some Silt, little to some very fine grained Sand, dark yellowish brown (10YR, 4/4), low to moderate plasticity, very moist.
					35			
80	100		P-6 @ 80		41			End of Boring @ 80.0 ft. Set 4 inch well.
85								
90								
95								
100								

WELL DIAGRAM



This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

PAGE 4 OF 4

GERAGHTY & MILLER, INC.

WELL LOG

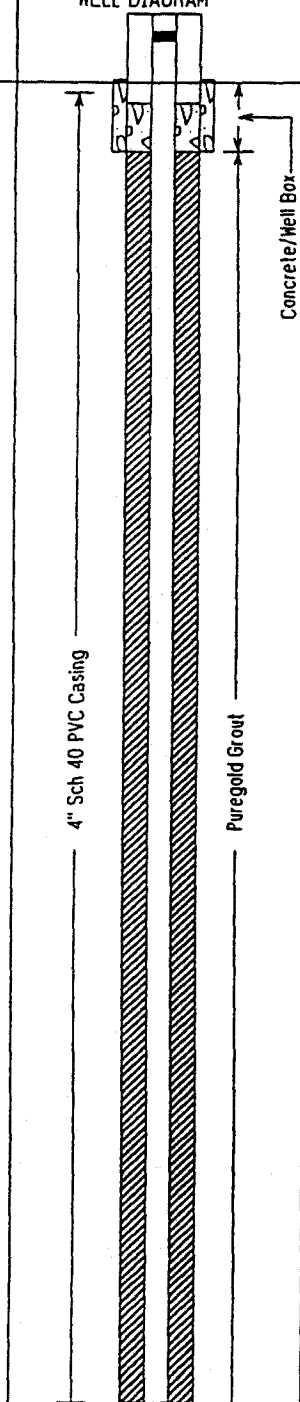
PROJECT International Light Metals
LOCATION 19200 S. Western Ave. Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CA0217.034.001
LOGGED BY Lara Urizar
DRILL CO. Gregg Drilling & Testing, Inc.
RIG TYPE CME 75
DRILLER Rick Hastings

BORING P-6B
DATE STARTED 11/24/97
DATE COMPLETED 11/24/97
BORING DEPTH 81.5 ft.

DEPTH (ft)	RECOVERY %	SAMP.INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		Surface is soil, gravel and cobbles to 1 inch. SILT, low plasticity, Sand, fine grained, dark brown (10YR 3/3), silghty moist.
5								
10								Same as above.
						CL		
15								CLAY, low plasticity, trace Sand, fine grained, dark brown (10YR 4/3), slighty moist.
20								Silty CLAY, low plasticity, olive brown (2.5Y 4/4), slighty moist.
						SP		
25								SAND, fine grained, olive yellow (2.5Y 6/6), loose, slighty moist.
30								Same as above.
								Same as above.

WELL DIAGRAM



DEPTH (ft): 5, 10, 15, 20, 25, 30, 35

GERAGHTY & MILLER, INC.

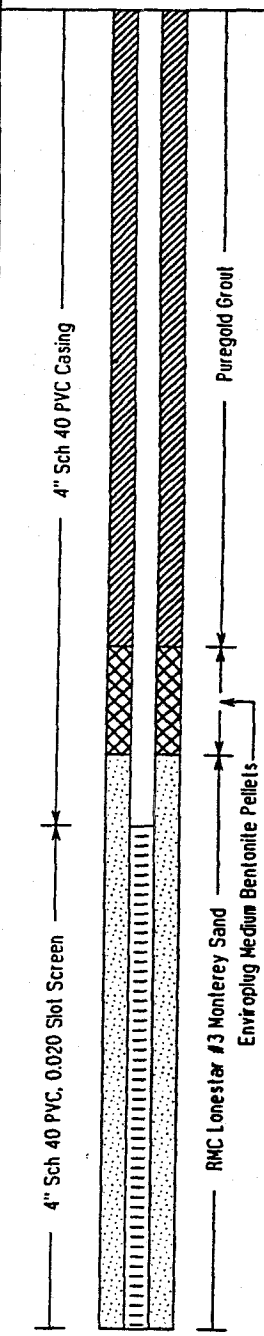
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.034.001 BORING NO. P-6B

DEPTH (ft)	RECOVERY %	SAMP.INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		SAND, fine grained, trace Silt, light olive brown (2.5Y 5/4), trace shell fragments, loose, slighty moist.
42								
								Same as above.
47						CL		CLAY with Silt and Sand, low plasticity, fine grained, olive brown (2.5Y 4/4), slighty moist.
52								
								Same as above.
57						SP		SAND, fine grained, trace Silt, trace clay, olive brown (2.5Y 4/4), loose, slighty moist.
62								
						SM		SAND, fine grained, pale olive (5Y 6/3), trace Silt, loose, slighty moist.
67			P-6B @ 66.5	NR	50/5			Silty SAND, fine grained, olive brown (2.5Y 4/4), loose, slighty moist.
			P-6B @ 68	NR	50/6			Same as above.
								Same as above, very moist at top of sampler.
			P-6B @ 70	NR	30/6 50/4			Silty SAND, fine grained, light olive brown (2.5Y 5/4), saturated.
72								

WELL DIAGRAM



DEPTH (ft): 42, 47, 52, 57, 62, 67, 72

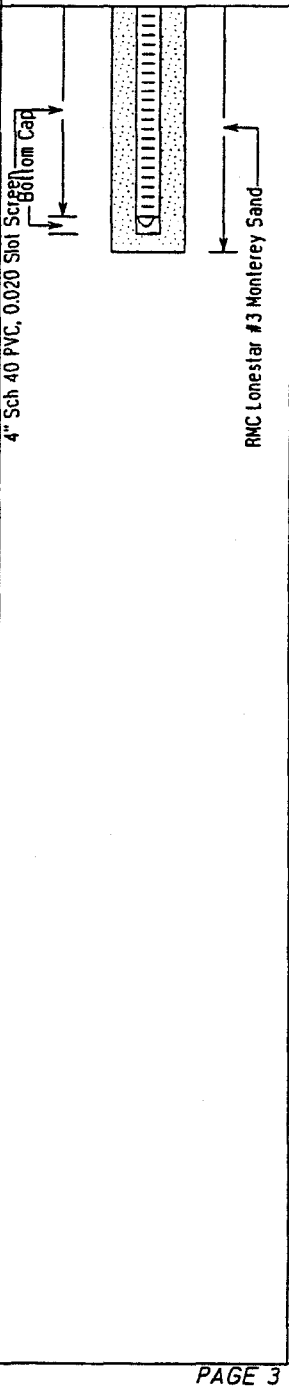
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.034.001 BORING NO. P-6B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
		X	P-6B @ 75	NR	50/6	SM		Same as above.		
		X	P-6B @ 76.5	NR	50/5			SILT with Sand, fine grained, olive (5Y 5/3), saturated.		
								Same as above.		
79						SC		Silty SAND, fine grained, olive (5Y 4/3), saturated.		79
								Sandy CLAY, fine grained, low to medium plasticity, olive (5Y 4/3), saturated.		
								Total Depth of Boring: 81.5 feet bgs.		
84										84
89										89
94										94
99										99
104										104
										109



GERAGHTY & MILLER, INC.

BORING LOG

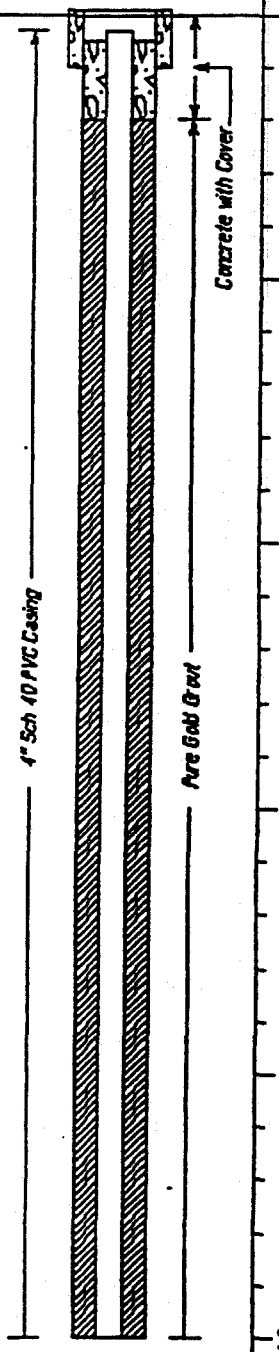
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.012.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-7
DATE STARTED 3/2/95
DATE COMPLETED 3/2/95
BORING DEPTH 84.5 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (12")
								Asphalt (8")
						CL		CLAY, little Silt, little very fine grained Sand, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
					4			CLAY, little Silt, little very fine grained Sand, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
	100		P-7 @ 5D	2.1	7			
5	100		P-7 @ 5		8			
						ML		SILT, little fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
					8			SILT, little fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
				3.2	10			
10	100		P-7 @ 10		15			
					12			SILT, little fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
				10.4	16			
15	100		P-7 @ 15		20			
					9			SILT, little fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
				4.8	14			
20	100		P-7 @ 20		15			
						SM		
					9			SAND, very fine to fine grained, some Silt, yellowish brown (10YR, 5/6), non plastic, moist.
	100		P-7 @ 25D	7.9	12			
25	100		P-7 @ 25		15			

WELL DIAGRAM



DEPTH (ft): 5, 10, 15, 20, 25

GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-7

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SM				
						SP				
					10			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
				9.2	10					
30	100		P-7 @ 30		9					30
					16			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
				11.4	22					
35	100		P-7 @ 35		29					35
					21			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
				17.2	26					
40	100		P-7 @ 40		30					40
					17			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist, some iron oxide staining.		
				4.6	23					
45	100		P-7 @ 45		29					45
					14			SAND, very fine to fine grained, trace Silt, pale brown (10YR, 6/3), moist.		
	100		P-7 @ 500	6.9	26					
50	100		P-7 @ 50		33					50

4" Sch 40 PVC Casing

Pure Gold Grout

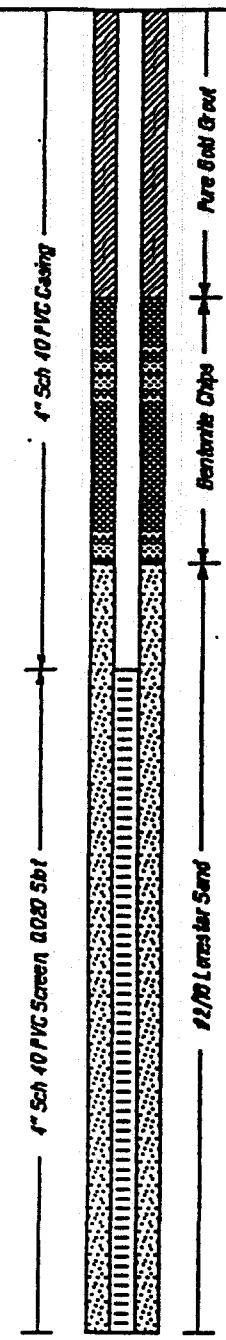
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

.CT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-7

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
	100		P-7 @ 55	8.8	32, 50, 56			SAND, very fine to fine grained, trace Silt, pale brown (10YR, 6/3), moist.
55								
	100		P-7 @ 60	7.3	29, 42, 52			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
60								
65	100		P-7 @ 66.5	3.9	34, 51, 58			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
	100		P-7 @ 68	4.8	31, 56, 61			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.
	100		P-7 @ 69.5	1.9	36, 59, 67			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.
70	100		P-7 @ 71	30.2	35, 56, 62			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist to wet.
	100		P-7 @ 72.5	25.2	44, 52, 66			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), water saturated, hit water at 71.2 to 71.5 ft.
	10		P-7 @ 74	35.5	29, 36, 41			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
75				17.1	34, 40			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.

WELL DIAGRAM



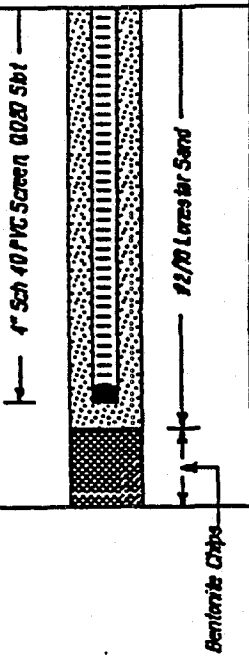
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-7

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
	100		P-7 @ 75.5	17.1	51	SP		SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
				15.2	27			
					35			
	100		P-7 @ 77		38			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
				19.4	25			
					36			
	100		P-7 @ 78.5		38			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
				13.6	24			
					29			
	100		P-7 @ 80		35			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
80				9.3	21			
					31			
	100		P-7 @ 81.5		33			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
				10.1	16			
					23			
	100		P-7 @ 83		27			
				4.1	18	CL		CLAY, pale olive (5Y, 6/3), high plasticity, stiff, very moist.
					25			
	100		P-7 @ 84.5		32			
85								End of Boring @ 84.5 ft. Set 4 inch well.
90								
95								
100								

WELL DIAGRAM



DEPTH (ft): 80, 85, 90, 95, 100

This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

BORING LOG

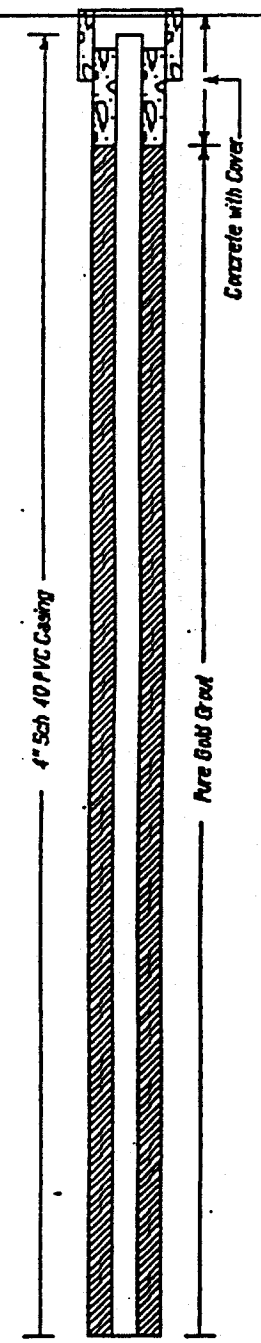
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.012.002
LOGGED BY M. Shiplone
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-8
DATE STARTED 3/6/95
DATE COMPLETED 3/6/95
BORING DEPTH 95.0 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (12")
						SP		SAND, fine to medium grained, little Silt, yellowish red (5YR, 5/6), wet.
						CL		
					4			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
	100		P-8 @ 50	4.1	5			
5	100		P-8 @ 5		6			
						ML		
					7			SILT, little very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, slightly moist.
				1.3	6			
10	100		P-8 @ 10		11			
					9			SILT, little very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, slightly moist.
				5.5	15			
15	100		P-8 @ 15		19			
					11			SILT, little very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, slightly moist.
				3.1	12			
20	100		P-8 @ 20		16			

WELL DIAGRAM

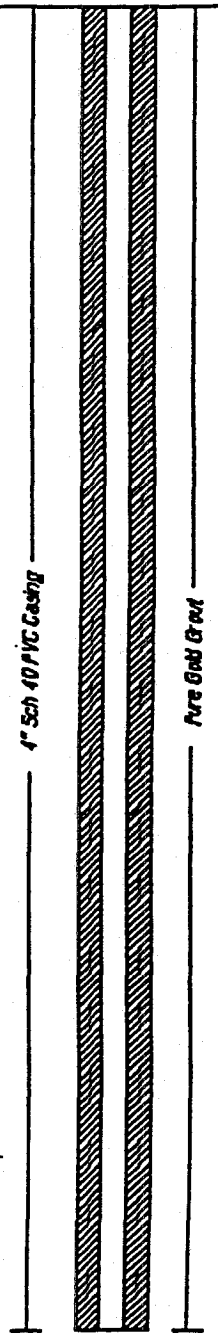


GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

:CT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-8

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
					12			SILT, little very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, slightly moist, some iron oxide staining.		
	100		P-8 @ 25D	4.6	20					
	100		P-8 @ 25		22					
25										25
						SP				
					13			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), slightly moist.		
				19.2	18					
	100		P-8 @ 30		24					
30										30
					15			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), slightly moist.		
				2.1	19					
	100		P-8 @ 35		27					
35										35
					18			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.		
				1.6	27					
	100		P-8 @ 40		36					
40										40

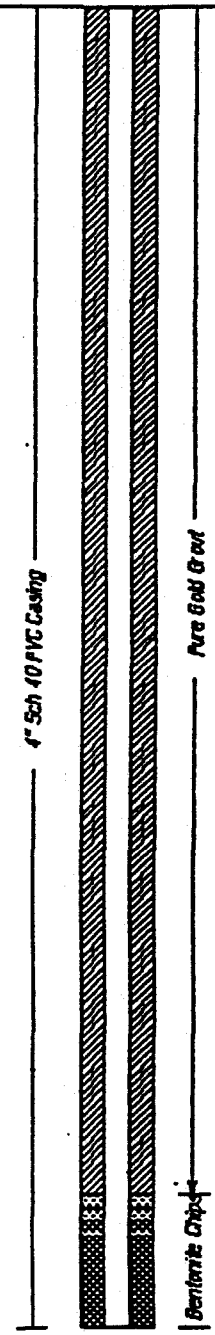


GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-8

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
					26			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.		
				3.6	30					
	100		P-8 @ 45		41					
45										45
					32			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.		
	100		P-8 @ 500	3.9	50					
	100		P-8 @ 50		57					
50										50
					36			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.		
				4.6	45					
	100		P-8 @ 55		59					
55										55
					41			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.		
				4.5	50					
	100		P-8 @ 60		62					
60										60



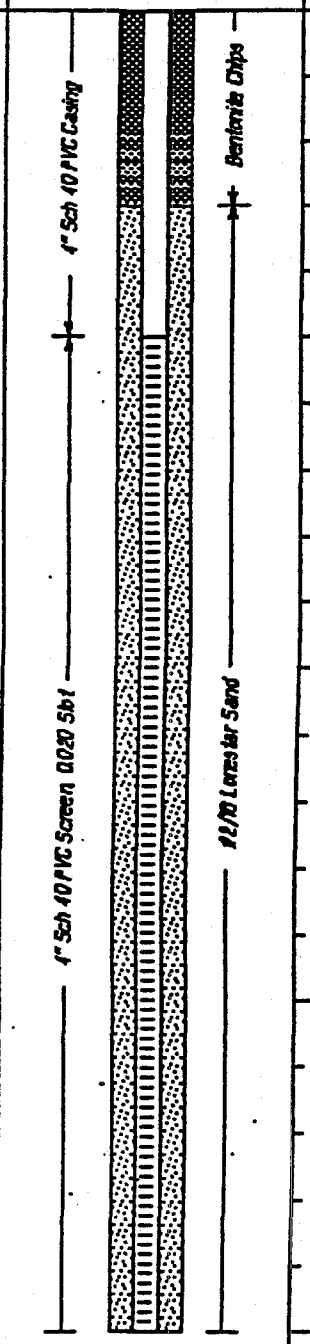
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

:CT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-8

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
65					46			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.
				2.1	56			
	100		P-8 @ 66.5		62			
					100/4in			SAND, very fine grained, yellowish brown (10YR, 5/6), some rock fragments, well cemented, no sample taken.
70					100/2in			Sandstone, rock Cobble, will auger to 71 to 72 ft.
					83			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), very moist, rock fragments in top ring.
				1.6	85			
	80		P-8 @ 73		100			
					68			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), very moist to wet, water encountered at 74.0 to 74.2 ft.
				11.2	70			
	75		P-8 @ 74					
					44			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
				12.6	47			
75	100		P-8 @ 75.5		61			
					40			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
				19.6	56			
	100		P-8 @ 77		65			
					38			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
				12.6	42			
	100		P-8 @ 78.5		47			
					32			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
				11.1	40			
80	100		P-8 @ 80		44			

WELL DIAGRAM



DEPTH (ft): 65, 70, 75, 80

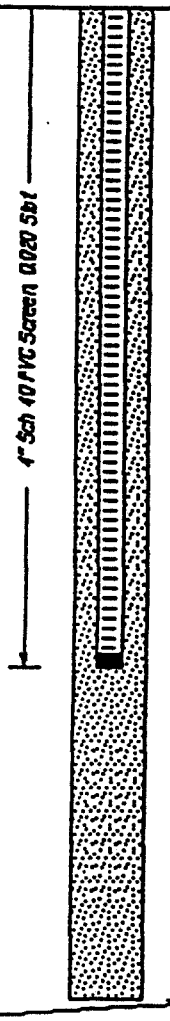
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

CT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-8

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
				10.8	30	SP		SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
					38			
	100		P-8 @ 81.5		42			
				11.9	28			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
					34			
	100		P-8 @ 83		36			
				14.5	22			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
					30			
	100		P-8 @ 84.5		37			
85				23.9	25			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
					26			
	100		P-8 @ 86		32			
				26.5	28			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
					34			
	100		P-8 @ 87.5		39			
				29.6	27			SAND, very fine to fine grained, light yellowish brown (10YR, 6/4), water saturated.
					33			
	100		P-8 @ 89.0		41			
				22.5	30			SAND, very fine to fine grained, some medium grained Sand, light yellowish brown (10YR, 6/4), water saturated.
					39			
90	100		P-8 @ 90.5		45			
				14.1	33			SAND, very fine to fine grained, some medium to coarse grained Sand, light yellowish brown (10YR, 6/4), water saturated.
					42			
	100		P-8 @ 92		46			
				13.3	33			SAND, very fine to fine grained, some medium to coarse grained Sand, light yellowish brown (2.5Y, 6/4), water saturated.
					41			
	100		P-8 @ 93.5		45			
				11.2	35	SP CL		SAND, very fine to fine grained, some medium to coarse grained Sand, light yellowish brown (2.5Y, 6/4), water saturated, few thin (1-inch) clay sand interbeds.
					43			
95	100		P-8 @ 95		47			
100								

WELL DIAGRAM



End of Boring @ 95.0 ft. Set 4" well.

This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

BORING LOG

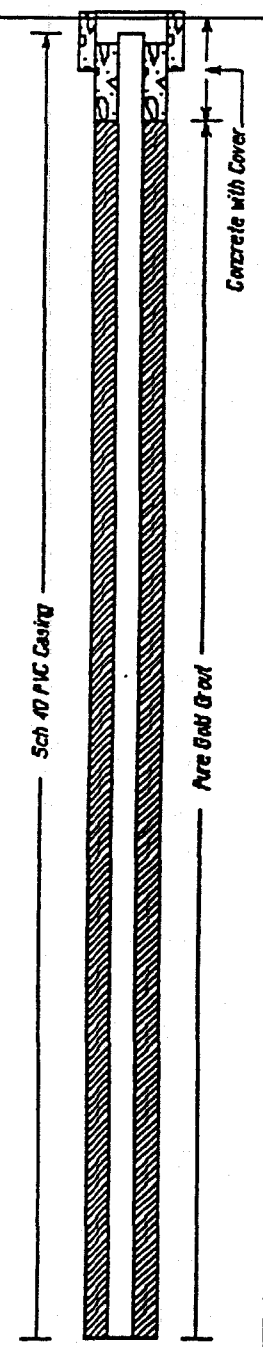
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 Inches O.D.

PROJECT NO. CAO 217.012.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-9
DATE STARTED 3/7/95
DATE COMPLETED 3/7/95
BORING DEPTH 86.0 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Asphalt (12")
				0.4	3, 4	SP		Gravelly SAND, little Silt, little Clay, yellowish red (5YR, 5/8), low plasticity, moist.
	100		P-9 @ 2.5		4	CL		CLAY, little Silt, little very fine grained Sand, dark olive gray (5Y, 3/2), high plasticity, moist.
	100		P-9 @ 5D	0.6	5, 7			CLAY, little Silt, little very fine grained Sand, dark olive gray (5Y, 3/2), high plasticity, moist.
5	100		P-9 @ 5		6			
						ML		
				1.1	7, 9			SILT, little very fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), slightly moist to moist.
10	100		P-9 @ 10		13			
				1.0	5, 7			SILT, some very fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), slightly moist to moist.
15	100		P-9 @ 15		8			
						SM		
				0.9	9, 10			SAND, little to some Silt, yellowish brown (10YR, 5/6), non plastic, moist.
20	100		P-9 @ 20		15			
						SP		
	.00		P-9 @ 25D	1.0	7, 14			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.
25	100		P-9 @ 25		18			

WELL DIAGRAM

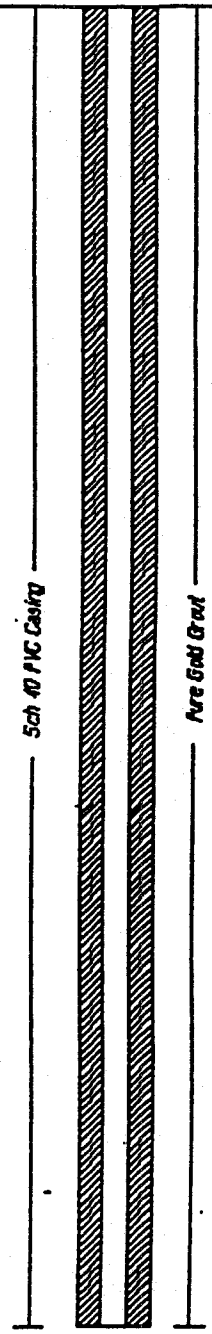


GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

_CT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-9

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
					11			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
				1.1	19					
30	100		P-9 @ 30		25					30
					9			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
				0.8	20					
35	100		P-9 @ 35		22					35
					14			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
				0.7	26					
40	100		P-9 @ 40		31					40
					20			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
				1.2	31					
45	100		P-9 @ 45		38					45
					29			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), moist.		
	100		P-9 @ 50D	0.6	34					
50	100		P-9 @ 50		37					50



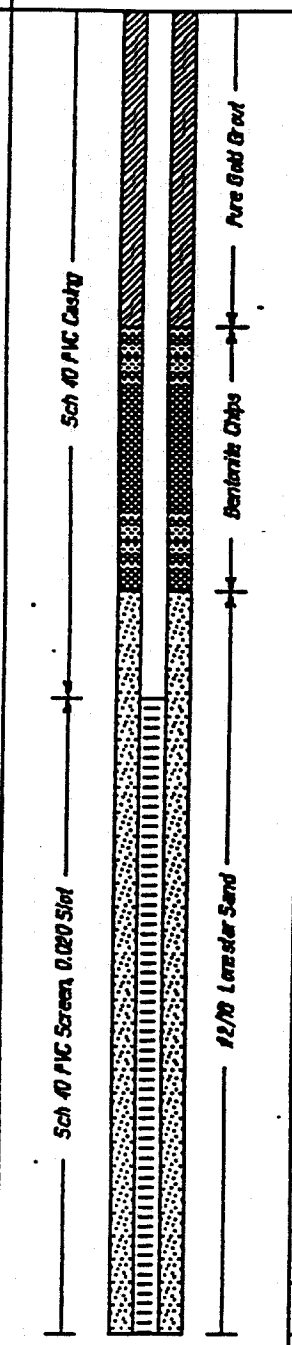
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-9

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				0.9	19, 26, 40			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), very moist.
55	100		P-9 @ 55					
				0.8	21, 27, 34			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), very moist.
60	100		P-9 @ 60					
65				0.6	20, 30, 37			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), very moist.
	100		P-9 @ 66.5					
				1.7	23, 32, 39			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), very moist.
	100		P-9 @ 68					
				2.2	26, 40, 42			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), very moist to wet.
	100		P-9 @ 69.5					
70				3.0	14, 19, 26			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated, water encountered at 70 ft.
	100		P-9 @ 71					
				3.6	14, 17, 21			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
	100		P-9 @ 72.5					
				7.0	12, 15, 18			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
	00		P-9 @ 74					
75				6.2	16, 23			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.

WELL DIAGRAM



DEPTH (ft): 55, 60, 65, 70, 75

GERAGHTY & MILLER, INC.

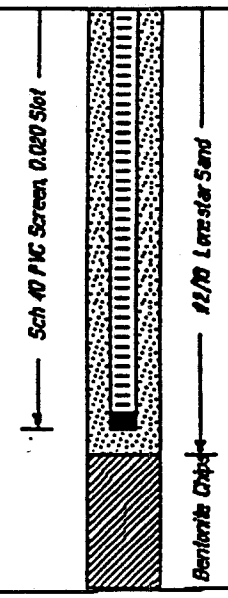
BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-9

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
	100		P-9 @ 75.5	6.2	29	SP		SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/4), water saturated.
				6.7	19 30			
	100		P-9 @ 77		33			SAND, very fine to fine grained, little Silt, yellowish brown (10YR, 5/4), water saturated.
				3.5	17 28			
	100		P-9 @ 78.5		31			
				3.1	14 15	SM		SAND, very fine grained, some Silt, dark yellowish brown (10YR, 5/4), non plastic, water saturated.
80	100		P-9 @ 80		19			
				3.0	13 16			SAND, very fine grained, some Silt, dark yellowish brown (10YR, 5/4), non plastic, water saturated.
	100		P-9 @ 81.5		20			
				1.5	15 20	SM ML		SAND, very fine grained, some Silt, trace Clay, dark yellowish brown (10YR, 5/4), non plastic, water saturated.
	100		P-9 @ 83		27			
				0.5	12 14	ML CL		Silty CLAY, olive (5Y, 5/3), high plasticity, stiff, moist.
	100		P-9 @ 84.5		16			
85				0.4	8 11	CL		CLAY, some Silt, olive gray (5Y, 4/2), high plasticity, stiff, moist.
	100		P-9 @ 86		11			

End of Boring @ 86.0 ft. Set 4 inch well.

WELL DIAGRAM



This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

WELL LOG

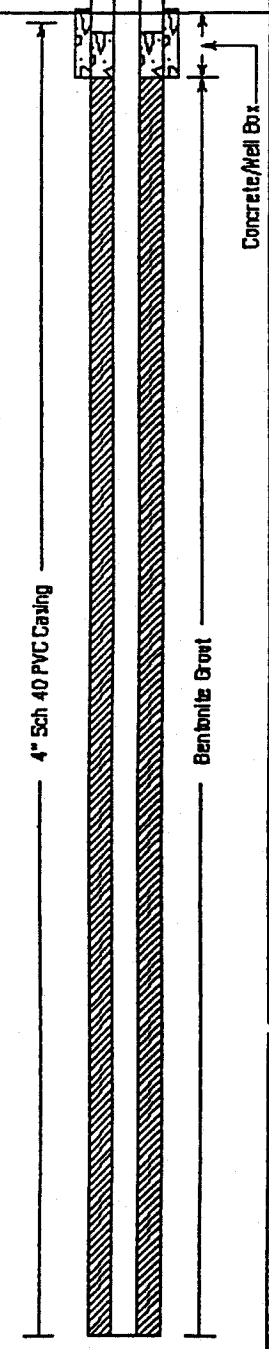
PROJECT International Light Metals
LOCATION 19200 S. Western Ave. Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CA0217.034.001
LOGGED BY Bettie Bechtel
DRILL CO. Gregg Drilling & Testing, Inc.
RIG TYPE Mobile B-53
DRILLER Jeff

BORING P-9B
DATE STARTED 10/07/97
DATE COMPLETED 10/07/97
BORING DEPTH 77 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		
10		X						SILT.
15		X						SILT.
20		X						SILT with little Sand.
						SM		
25		X						SAND, very fine grained, little Silt.
						SP		
30		X						SAND, very fine grained.
35		X						Same as above.
40								

WELL DIAGRAM



GERAGHTY & MILLER, INC.

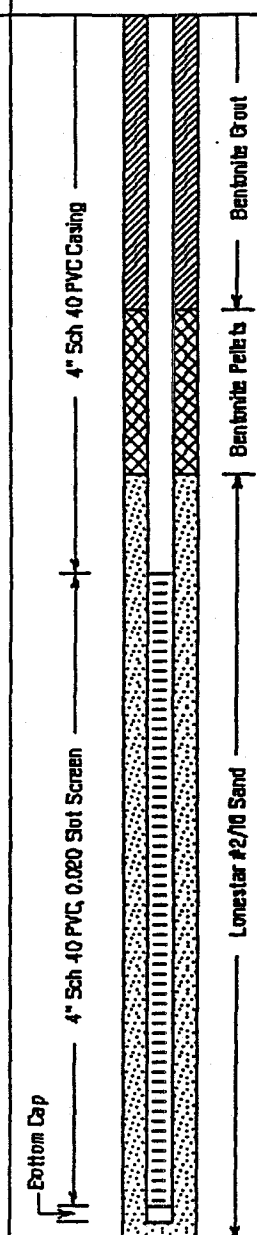
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.034.001 BORING NO. P-8B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
		X				SP		Same as above.
45		X						Same as above.
50		X						Same as above.
55		X						Same as above.
60		X						Same as above.
	NR		P-8B @ 63.5	NR	NR			
65		X						Same as above.
								SAND, very fine grained, very wet.
	NR		P-8B @ 66.5	NR	NR			SAND, very fine grained, saturated.
70								Same as above.
	NR	X	P-8B @ 70	NR	NR			
75								Same as above.
	NR	X	P-8B @ 75	NR	NR			
						CL		CLAY.
80								Total Depth of Boring: 77 feet bgs.

WELL DIAGRAM



DEPTH (ft): 45, 50, 55, 60, 65, 70, 75, 80

GERAGHTY & MILLER, INC.

BORING LOG

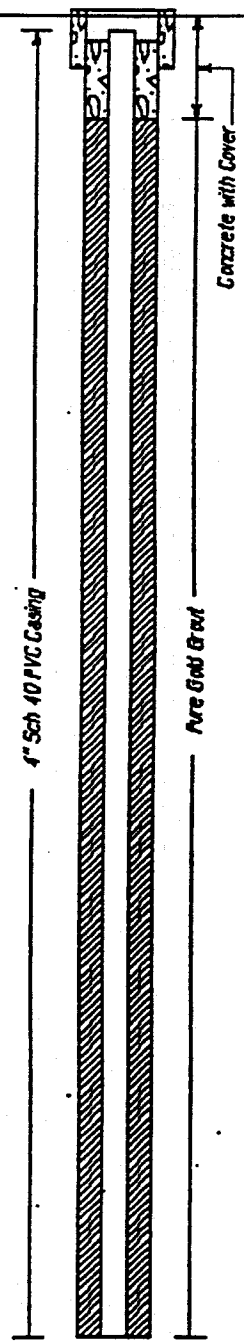
PROJECT International Light Metals
ATION 19200 S. Western, Torrance, CA
METHOD Hollow Stem Auger
ING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.012.002
LOGGED BY N. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-10
DATE STARTED 3/3/95
DATE COMPLETED 3/3/95
BORING DEPTH 78.5 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Asphalt (6")
				0.4	4 4 9	CL		CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
	100		P-10 @ 15					
						ML		SILT, some very fine grained Sand, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
	80		P-10 @ 50	0.4	100	SM		SAND, very fine to fine grained, little to some Silt, yellowish brown (10YR, 5/6), well cemented, dry to slightly moist.
5	80		P-10 @ 5		150			
						SP		
				0.4	18 24 24			SAND, very fine grained, trace Silt, yellowish brown (10YR,5/6), poorly to moderately cemented, dry.
10	100		P-10 @ 10					
				0.4	14 17 22			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist.
15	100		P-10 @ 15					
				0.4	19 24 26			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist.
20	100		P-10 @ 20					
				0.4	15 20 24			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist.
	100		P-10 @ 250					
25	100		P-10 @ 25					

WELL DIAGRAM



GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

ECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-10

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				0.4	19 25 29			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist.		
30	100		P-10 @ 30							30
				0.4	18 26 31			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.		
35	100		P-10 @ 35							35
				0.4	24 30 35			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.	4" Sch 40 PVC Casing Pure Gold Grout	
40	100		P-10 @ 40							40
				0.4	16 28 37			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.		
45	100		P-10 @ 45							45
	100 100		P-10 @ 500 P-10 @ 50	0.4	21 27 37			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.		
50										50

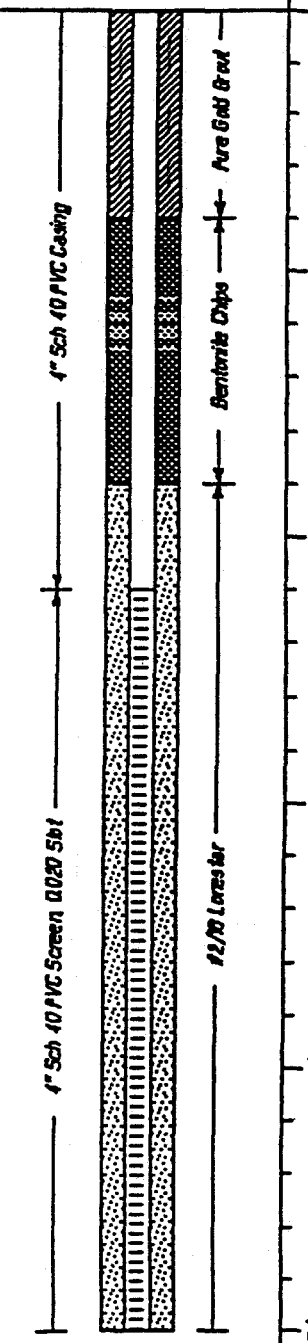
GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-10

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				0.4	17 29 40			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.
55	100		P-10 @ 55					
				0.4	30 37 46			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.
60	100		P-10 @ 60					
65				0.4	38 53 61			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.
	100		P-10 @ 66.5					
				0.4	27 41 56			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, moist to very moist.
	100		P-10 @ 68					
				0.4	40 46 63			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, water saturated, water at 69 ft.
	100		P-10 @ 69.5					
70				0.4	38 48 55			SAND, very fine to fine grained, trace Silt, yellowish brown (10YR, 5/8), non cemented, water saturated.
	100		P-10 @ 71					
				0.4	18 22 27			SAND, very fine to fine grained, dark yellowish brown (10YR, 4/6), water saturated.
	100		P-10 @ 72.5					
				0.4	13 17 20			SAND, very fine to fine grained, dark yellowish brown (10YR, 4/6), water saturated.
	30		P-10 @ 74					
				0.4	10 15			SAND, very fine to fine grained, dark yellowish brown (10YR, 4/6), water saturated.
75								

WELL DIAGRAM

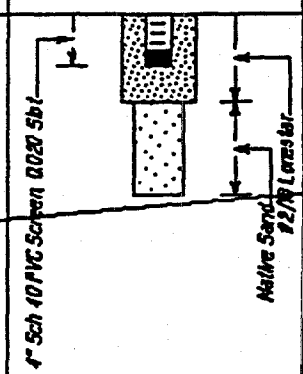


GERAGHTY & MILLER, INC.

BORING LOG
(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.012.002 BORING NO. P-10

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
	100		P-10 @ 75.5	0.4	19	SP		SAND, very fine to fine grained, dark yellowish brown (10YR, 4/6), water saturated.		
				0.4	12					
					17					
	100		P-10 @ 77		29	CL		CLAY, little to some Silt, olive (5Y, 5/4), high plasticity, stiff, slightly moist to moist.		
				0.4	19					
					25					
	100		P-10 @ 78.5		30			CLAY, little to some Silt, olive (5Y, 5/4), high plasticity, stiff, slightly moist to moist.		
								End of Boring @ 78.5 ft. Set 4 inch well.		
80										80
85										85
90										90
95										95
100										100



This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

WELL LOG

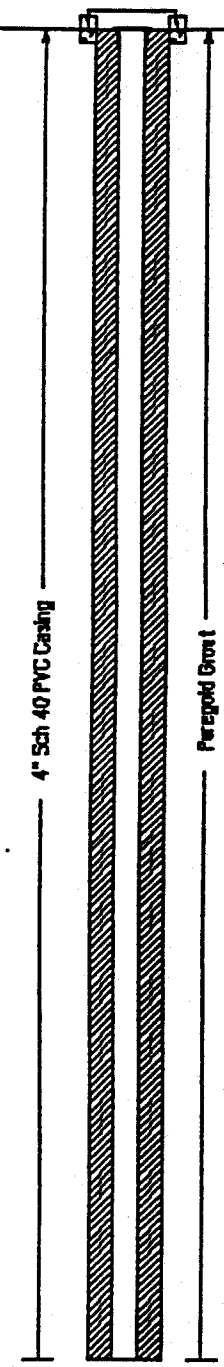
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
DRILLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-11B
DATE STARTED 11/16/95
DATE COMPLETED 11/16/95
BORING DEPTH 74.5 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
						ML		
					4			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
				0.0	7			
5	100		P-11B @ 5		7			
					17			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
				0.0	26			
10	100		P-11B @ 10		33			
					10			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
				0.0	11			
15	100		P-11B @ 15		13			
						SM		
					13			Silty SAND, very fine grained, some Silt, brownish yellow (10YR, 6/6), moist.
				0.0	17			
20	100		P-11B @ 20		18			

WELL DIAGRAM



DEPTH (ft): 5, 10, 15, 20

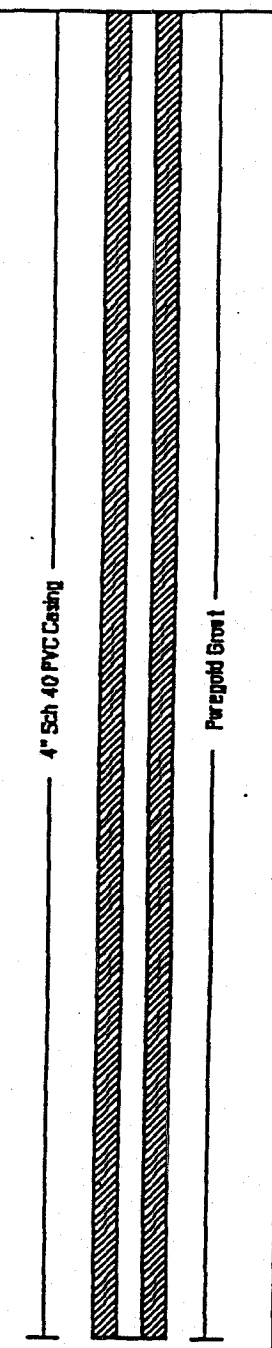
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-11B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SM				
						SP				
					8			SAND, very fine grained, yellowish brown (10YR, 5/6), moist.		
				0.0	13					
	100		P-11B @ 25		17					
25										25
					16			SAND, very fine grained, yellowish brown (10YR, 5/6), moist.		
				0.0	22					
	100		P-11B @ 30		27					
30										30
					11			SAND, very fine grained, yellowish brown (10YR, 5/6), moist.		
				61.2	13					
	100		P-11B @ 35		22					
35										35
					13			SAND, very fine grained, yellowish brown (10YR, 5/6), moist.		
				12.3	18					
	100		P-11B @ 40		24					
40										40



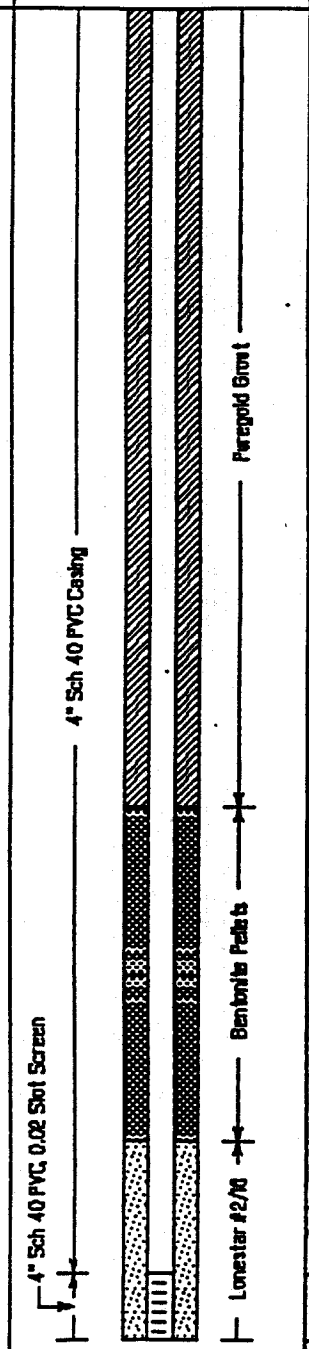
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

CT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-11B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				28.1	10 17 20			SAND, very fine grained, light gray (10YR, 7/1), moist.		
45	100		P-11B @ 45							45
				45.8	14 23 28			SAND, very fine grained, light gray (10YR, 7/1), moist.		
50	100		P-11B @ 50							50
				24.2	23 30 37			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		
55	100		P-11B @ 55							55
				28.7	17 23 28			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		
60	100		P-11B @ 60							60



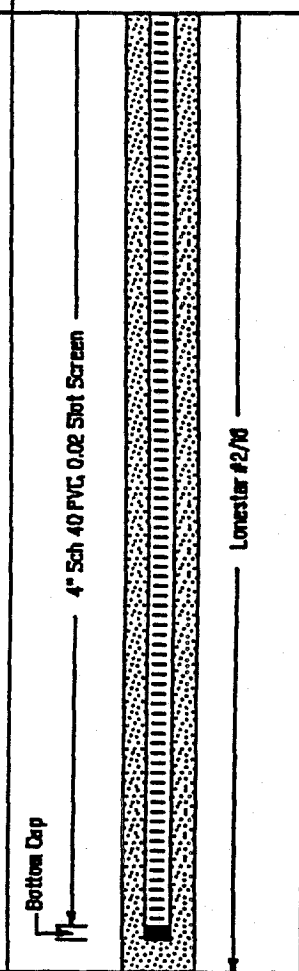
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-11B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				48.1	11			SAND, very fine grained, yellowish brown (10YR, 5/8), wet.		
					21					
	100		P-11B @ 65		24					
85										85
								Water encountered at 68 ft.		
					14			SAND, very fine grained, yellowish brown (10YR, 5/8), water saturated.		
			P-11B @ 70	38.2	20					
	100				26					
70										70
					7					
				7.3	12	ML CL		SILT, little Clay, light olive brown (2.5Y, 5/3), moderate to high plasticity, moist.		
	100		P-11B @ 74		14					
75								End of Boring @ 74.5 ft. Set 4-inch groundwater monitoring well at 74 ft. COMMENTS: Location of monitoring well P-11.		75
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward, CA R.G. #4782		
80										80



GERAGHTY & MILLER, INC.

WELL LOG

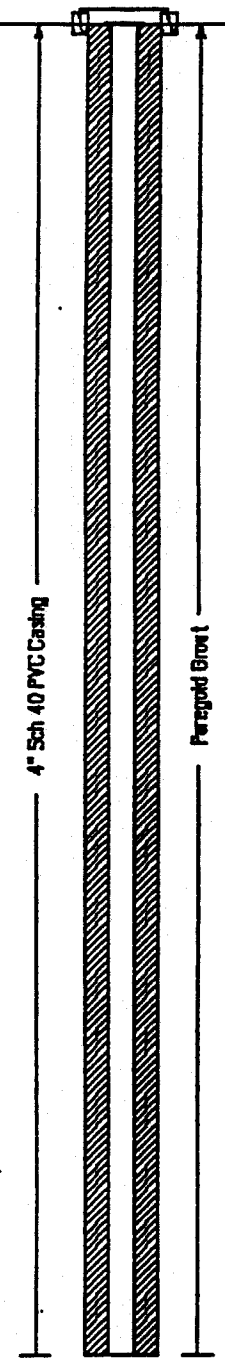
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-12
DATE STARTED 11/13/95
DATE COMPLETED 11/20/95
BORING DEPTH 80.5 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (6")
						SM		
				0.0	3, 5, 5			SAND, very fine grained, some Silt, strong brown (7.5YR, 4/6), low plasticity, moist.
5	100		P-12 @ 5					
						CL		CLAY, trace Silt, dark olive gray (7.5YR, 4/6), high plasticity, stiff, moist.
				0.0	11, 14, 15	ML		SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/6), non to low plasticity, moist.
10	100		P-12 @ 10					
				0.0	10, 13, 16			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/6), non to low plasticity, moist.
15	100		P-12 @ 15					
				230	10, 14, 17			SILT, trace Clay, increasing in fine grained Sand, dark yellowish brown (10YR, 4/6), non to low plasticity, moist.
20	100		P-12 @ 20					
						SM		
				619	7, 8, 12			Silty SAND, very fine grained, some Silt, yellowish brown (10YR, 5/6), non plastic, moist.
25	100		P-12 @ 25					

WELL DIAGRAM



GERAGHTY & MILLER, INC.

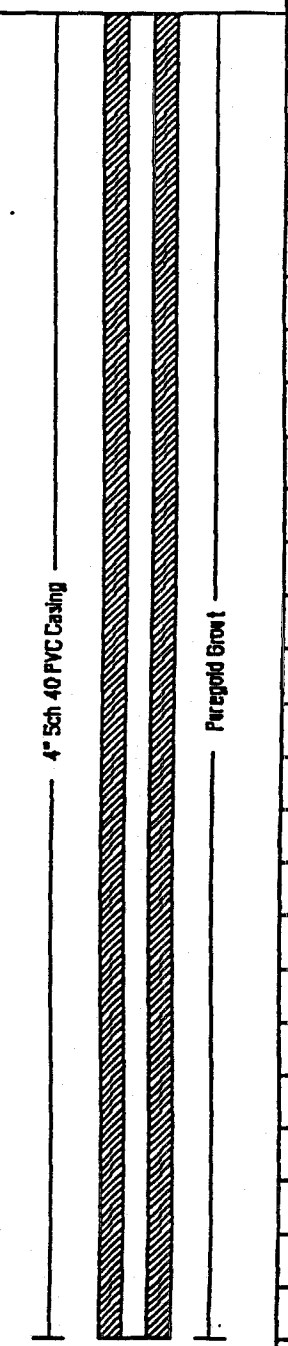
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-12

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SM		
						SM ML		
					14			Silty SAND, very fine grained, increasing in Silt, yellowish brown (10YR, 5/6), non plastic, moist.
				1834	17			
30	100		P-12 @ 30		21			
					16			Silty SAND, very fine grained, increasing in Silt, yellowish brown (10YR, 5/6), non plastic, moist.
				>2500	20			
35	100		P-12 @ 35		27			
						ML		
					16			SILT, some very fine grained Sand, olive brown (2.5Y, 4/3), non plastic, moist.
				>2500	24			
40	100		P-12 @ 40		30			
						SP		
					17			SAND, very fine grained, trace Silt, light olive brown (2.5Y, 5/4), non plastic, moist.
				1483	20			
45	100		P-12 @ 45		28			
						CL ML		
					20			CLAY, some Silt, olive (5Y, 5/4), low plasticity, slightly moist.
				>2500	28			
50	100		P-12 @ 50		31			

WELL DIAGRAM



DEPTH (ft): 30, 35, 40, 45, 50

GERAGHTY & MILLER, INC.

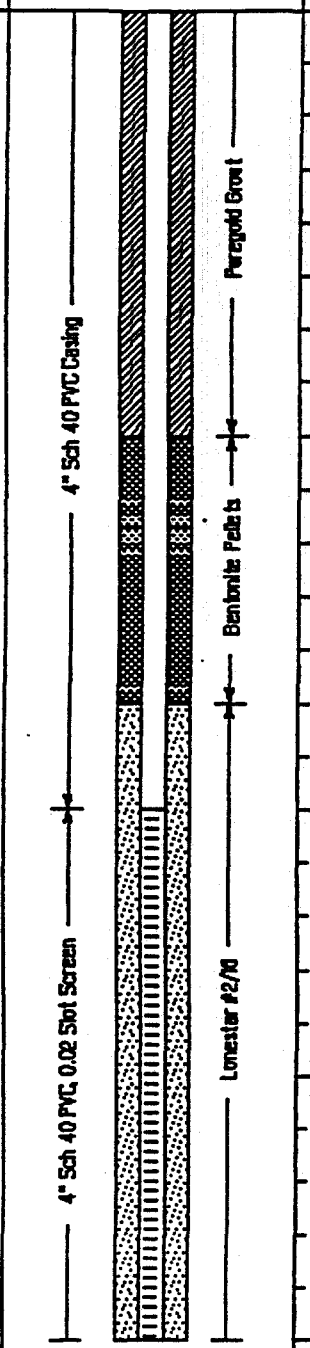
WELL LOG

(continuation)

_CT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-12

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		
						SP		
	100		P-12 @ 55	423	12, 17, 24			SAND, very fine grained, little Silt, olive (5Y, 5/3), moist.
55								
	100		P-12 @ 60	0.0	21, 27, 34			SAND, very fine grained, little Silt, olive (5Y, 5/3), moist.
60								
	100		P-12 @ 65	0.0	23, 30, 37			SAND, very fine grained, little Silt, light yellowish brown (10YR, 6/4), moist.
65								
	100		P-12 @ 70	461	26, 30, 39			SAND, very fine grained, little Silt, light yellowish brown (10YR, 6/4), very moist.
70								
	100		P-12 @ 75	1734	14, 23, 28			SAND, very fine grained, little Silt, light yellowish brown (10YR, 6/4), water saturated, water encountered at 75 ft-bgs.
75								

WELL DIAGRAM



DEPTH (ft): 55, 60, 65, 70, 75

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-12

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
					12					
				9.6	13	SP/ML		Clayey SILT, trace fine grained Sand, olive (5Y, 5/4), moderate plasticity, moist.		
80	100		P-12 @ 80		18					80
								End of Boring @ 80.5 ft. Set 4-inch groundwater monitoring well at 80 ft.	4" Sch 40 PVC, 0.06 Slot Screen; Bottom Cap; Lonestar #2/16	
85										85
90										90
95										95
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		
100										100

GERAGHTY & MILLER, INC.

WELL LOG

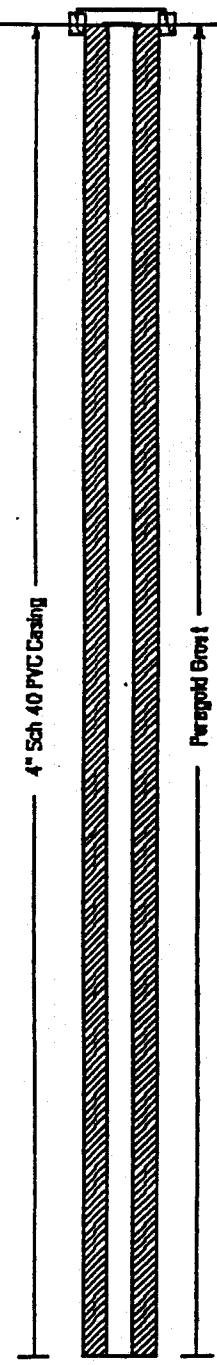
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
DRILLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-13B
DATE STARTED 11/16/95
DATE COMPLETED 11/17/95
BORING DEPTH 84 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		
				3.8	4, 6, 8			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
5	100		P-13B @ 5					
						ML		
				2.1	7, 8, 10			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
10	100		P-13B @ 10					
				6.2	7, 14, 17			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
15	100		P-13B @ 15					
				8.8	6, 6, 8			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
20	100		P-13B @ 20					
				7.1	9, 11, 14			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
25	100		P-13B @ 25					

WELL DIAGRAM



GERAGHTY & MILLER, INC.

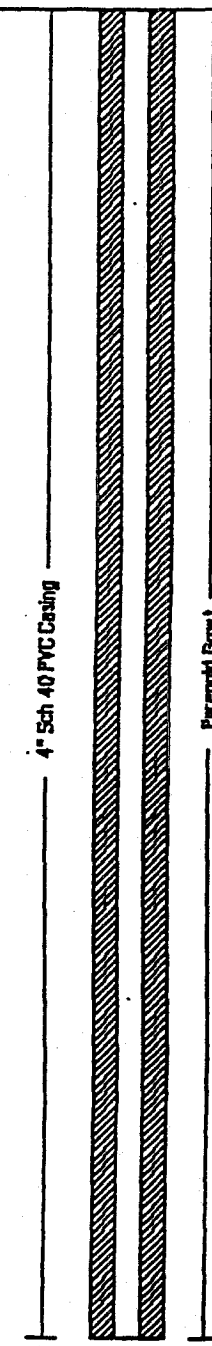
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-13B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		
						SP		
	100		P-13B @ 30	1.8	12, 17, 20			SAND, very fine grained, trace to little Silt, yellowish brown (10YR, 5/6), moist.
30								
	100		P-13B @ 35	2.4	19, 27, 30			SAND, very fine grained, trace to little Silt, light olive brown (2.5Y, 5/4), moist.
35								
	100		P-13B @ 40	5.1	20, 29, 36			SAND, very fine grained, light olive brown (2.5Y, 5/4), moist.
40								
	100		P-13B @ 45	13.5	17, 25, 37			SAND, very fine grained, little Silt, light olive brown (2.5Y, 5/4), moist.
45								
	100		P-13B @ 50	13.4	13, 21, 26			SAND, very fine grained, little Silt, light olive brown (2.5Y, 5/4), very moist, some FeO_2 staining.
50								

WELL DIAGRAM



DEPTH (ft): 30, 35, 40, 45, 50

GERAGHTY & MILLER, INC.

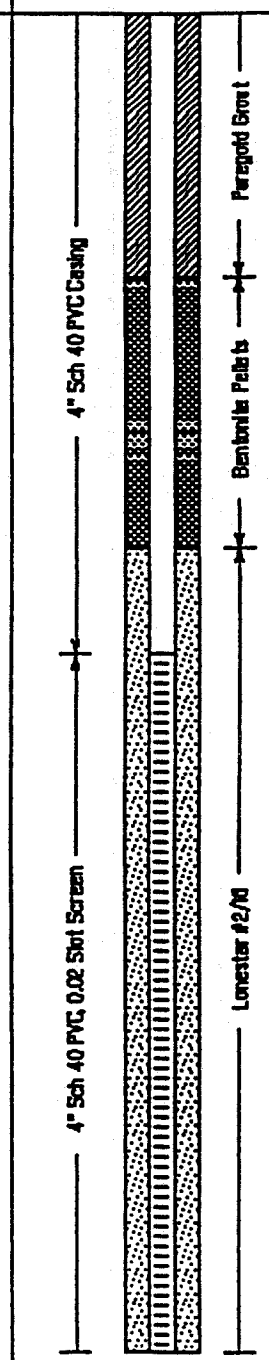
WELL LOG

(continuation)

JT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-13B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
						SM		
					11			Silty SAND, very fine grained, some Silt, light olive brown (2.5Y, 5/4), very moist.
				0.7	18			
55	100		P-13B @ 55		18			
						ML		
					12			SILT, little very fine grained Sand, olive (5Y, 4/4), moderate plasticity, moist.
			P-12B @ 60D	0.7	18			
60	100		P-13B @ 60		21			
						SP		
					8			SAND, trace Silt, light yellowish brown (2.5Y, 6/4), moist.
				2.2	15			
65	100		P-13B @ 65		18			
					11			SAND, trace Silt, light yellowish brown (2.5Y, 6/4), very moist.
			P-13B @ 70	0.0	18			
70	100				21			
								Water encountered at 73 ft-bgs.
					8			SAND, trace Silt, light yellowish brown (2.5Y, 6/4), water saturated.
				0.8	13			
75	100		P-13B @ 75		17			

WELL DIAGRAM



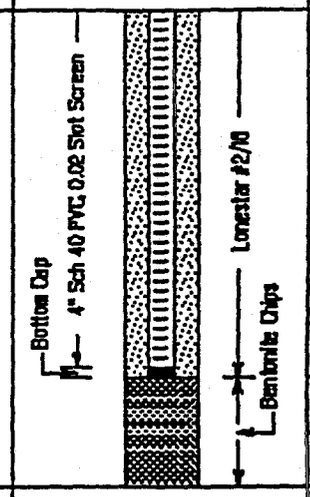
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-13B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
						ML SM		Sandy SILT, very fine grained Sand, olive brown (2.5Y, 4/4), water saturated.		
				0.0	10 13 17					
80	100		P-13B @ 80							80
						ML				
				0.0	8 14 20			SILT, trace Clay, very fine grained Sand, olive (5Y, 4/3), very moist.		
	100		P-13B @ 84							
85								End of Boring @ 84.0 ft. Set 4-inch groundwater monitoring well at 82 ft.		85
90								COMMENTS: * Location of monitoring well P-13.		90
95										95
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		
100										100



GERAGHTY & MILLER, INC.

WELL LOG

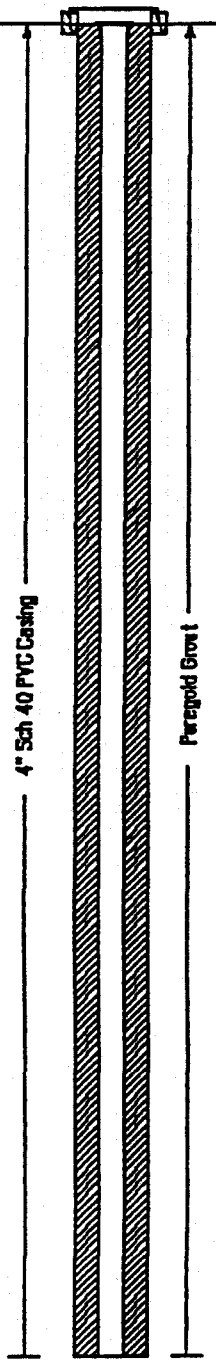
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-14
DATE STARTED 11/14/95
DATE COMPLETED 11/14/95
BORING DEPTH 85.3 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		
				0.0	7, 7, 10			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
5	100		P-14 @ 5					
						ML		
				0.0	8, 8, 13			SILT, trace Clay, trace very fine grained Sand, yellowish brown (10YR, 5/6), non plastic, stiff, slightly moist.
10	100		P-14 @ 10					
						ML/SM		
				0.0	7, 11, 12			SILT, trace Clay, increasing in very fine grained Sand, yellowish brown (10YR, 5/6), non plastic, stiff, slightly moist.
15	100		P-14 @ 15					
						ML		
				0.0	5, 8, 9			SILT, trace Clay, little very fine grained Sand, yellowish brown (10YR, 5/6), non plastic, stiff, slightly moist.
20	100		P-14 @ 20					
				0.0	5, 6, 11			SILT, trace Clay, trace very fine grained Sand, yellowish brown (10YR, 5/6), non plastic, stiff, slightly moist.
25	100		P-14 @ 25					

WELL DIAGRAM



GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-14

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
						SP				
				0.0	13 15 27			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		
30	100		P-14 @ 30							30
				0.0	8 12 17			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		
35	100		P-14 @ 35							35
				0.0	26 30 37			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.	4" Sch 40 PVC Casing; Peregold Grout	
40	100		P-14 @ 40							40
				0.0	20 28 31			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		
45	100		P-14 @ 45							45
						ML				
				0.0	12 15 18			SILT, little very fine grained Sand, olive (5Y, 5/3), moderate plasticity, moist.		
50	100		P-14 @ 50							50

GERAGHTY & MILLER, INC.

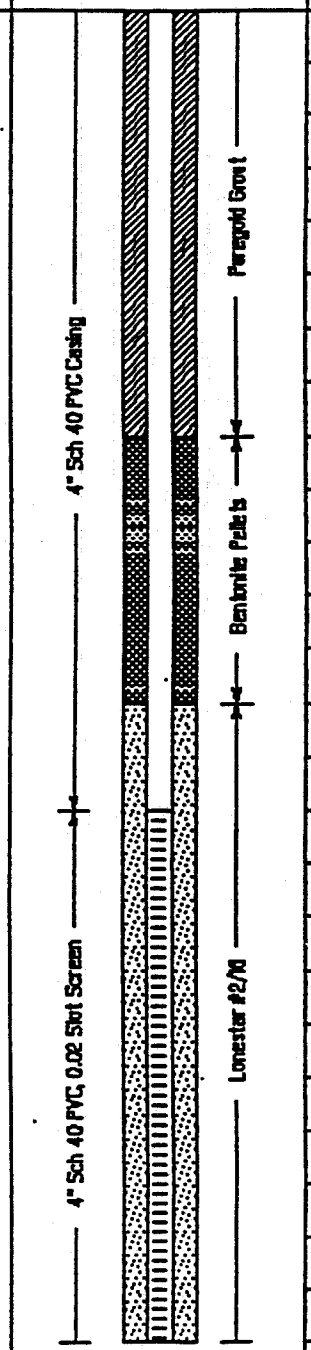
WELL LOG

(continuation)

.CT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-14

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		
	100		P-14 @ 55	0.0	11, 16, 17			SILT, increasing in very fine grained Sand, olive (5Y, 5/3), moderate plasticity, moist.
55								
						SM		
	100		P-14 @ 60	0.0	10, 13, 18			Silty SAND, very fine grained, little to some Silt, very dark gray (5Y, 3/1), non plastic, very moist.
60								
						SP		
	100		P-14 @ 65	44.0	8, 14, 17			SAND, very fine grained, little Silt, dark yellowish brown (10YR, 4/4), moist to very moist.
65								
	100		P-14 @ 70	101	8, 15, 16			SAND, very fine grained, trace to no Silt, dark yellowish brown (10YR, 4/4), moist to very moist.
70								
								Water encounterd at 73.5 ft-bgs.
	100		P-14 @ 75	1857	8, 13, 21			SAND, very fine grained, trace to no Silt, dark yellowish brown (10YR, 4/4), water saturated.
75								

WELL DIAGRAM



DEPTH (ft): 55, 60, 65, 70, 75

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-14

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				1216	12 16 17			SAND, little Silt, dark yellowish brown (10YR, 4/4), water saturated.		
80	100		P-14 @ 80							80
				1718	10 13 16			SAND, trace Silt, olive (10YR, 5/4), water saturated, numerous shell fragments.		
	100		P-14 @ 83							
				431	8 14 19					
	100		P-14 @ 84.5			CL		Silty CLAY, olive (10YR, 5/4), high plasticity, moist to water saturated.	Bottom Cap; 4" Sch 40 PVC, 0.02 Slot Screen; Lonestar #2/16	
85										85
								End of Boring @ 85.3 ft. Set 4-inch groundwater monitoring well at 85 ft.		
90										90
95										95
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward Anthony C. Ward, CA R.G. #4782		
100										100

GERAGHTY & MILLER, INC.

WELL LOG

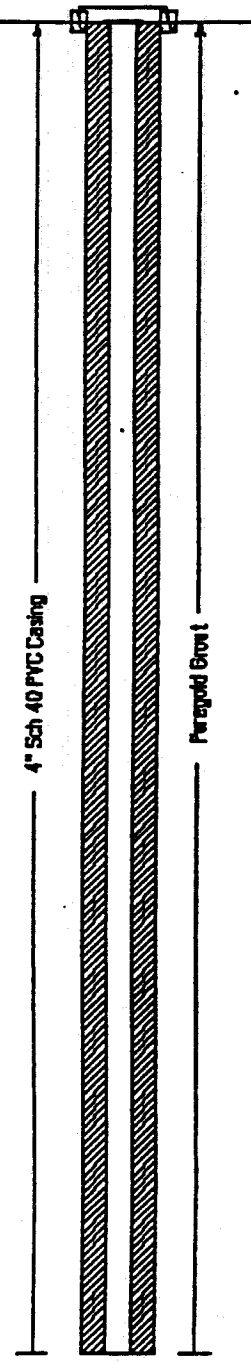
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-15
DATE STARTED 11/21/95
DATE COMPLETED 11/22/95
BORING DEPTH 80 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
					4			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
				2.0	12			
5	100		P-15 @ 5		13			
						ML		
					10			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), moderate plasticity, moist.
				4.5	10			
10	100		P-15 @ 10		18			
					7			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), moderate plasticity, moist.
				8.0	8			
15	100		P-15 @ 15		10			
					8			SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), moderate plasticity, moist.
				12.7	8			
20	100		P-15 @ 20		14			
						SP		
					10			SAND, very fine grained, little Silt, yellowish brown (10YR, 5/6), moist.
				28.8	13			
25	100		P-15 @ 25		17			

WELL DIAGRAM



GERAGHTY & MILLER, INC.

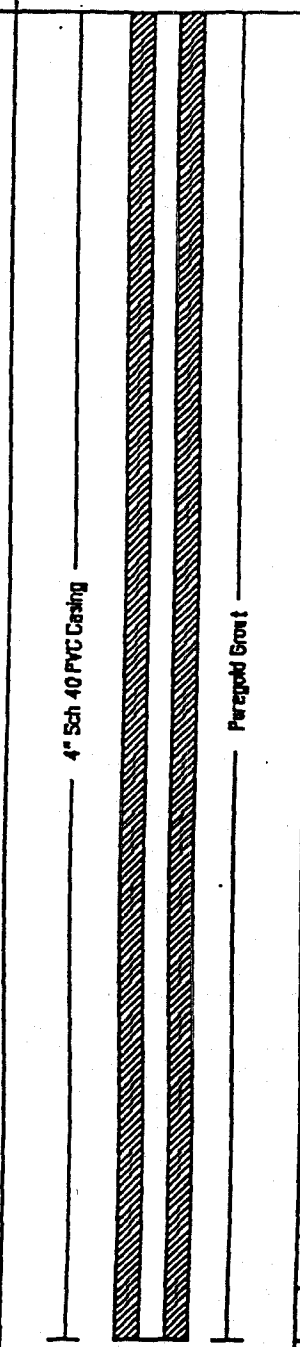
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-15

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				8.4	13 / 18 / 20			SAND, very fine grained, little Silt, yellowish brown (10YR, 5/6), moist.
30	100		P-15 @ 30					
				3.4	15 / 22 / 26			SAND, very fine grained, little Silt, yellowish brown (10YR, 5/6), moist.
35	100		P-15 @ 35					
						SM		
				44.3	16 / 23 / 30			Silty SAND, very fine grained, some Silt, light olive brown (2.5Y, 5/3), moist.
40	100		P-15 @ 40					
						ML		
			P-15 @ 45D	56.2	8 / 13			SILT, little very fine grained Sand, light olive brown (2.5Y, 5/4), non to low plasticity, moist.
45	100		P-15 @ 45		18			
						SP		
				64.6	11 / 14			SAND, trace Silt, brownish yellow (10YR, 6/6), moist.
50	100		P-15 @ 50		18			

WELL DIAGRAM



DEPTH (ft): 30, 35, 40, 45, 50

GERAGHTY & MILLER, INC.

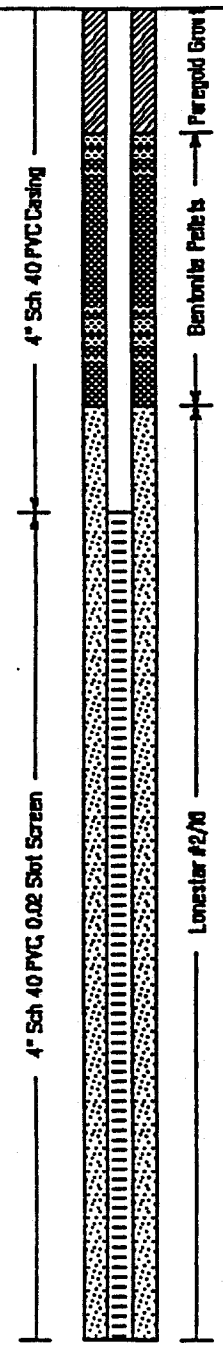
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-15

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
	100		P-15 @ 55	45.8	22, 36, 41			SAND, trace Silt, light yellowish brown (10YR, 6/4), very moist.
55								
	100		P-15 @ 60	9.8	37, 50			SAND, trace Silt, light yellowish brown (10YR, 6/4), very moist.
60								
	100		P-15 @ 65	38.0	28, 36, 39			SAND, trace Silt, light yellowish brown (10YR, 6/4), very moist.
65								
								Water encountered at 68.5 to 69.0 ft-bgs.
	100		P-15 @ 70	248	14, 22, 27			SAND, trace Silt, light yellowish brown (10YR, 6/4), water saturated.
70								
	100		P-15 @ 75	355	17, 22, 31			SAND, trace Silt, light yellowish brown (10YR, 6/4), water saturated.
75								

WELL DIAGRAM



DEPTH (ft): 55, 60, 65, 70, 75

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-15

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP		SAND, trace Silt, light yellowish brown (10YR, 6/4), water saturated.		
				12	13 15 10	SP CL		Silty CLAY, olive (5Y, 5/3), high plasticity, stiff, moist.	Slot Screen Lonestar #2/12	
80	100		P-15 @ 80					End of Boring @ 80.0 ft. Set 4-inch groundwater monitoring well at 84.5 ft.	4" Sch 40 PVC 0.02 Bottom Cap	80
85										85
90										90
95										95
100								This work was performed under my supervision and I concur with the findings. Anthony C. Ward Anthony C. Ward, CA R.G. #4782		100

GERAGHTY & MILLER, INC.

WELL LOG

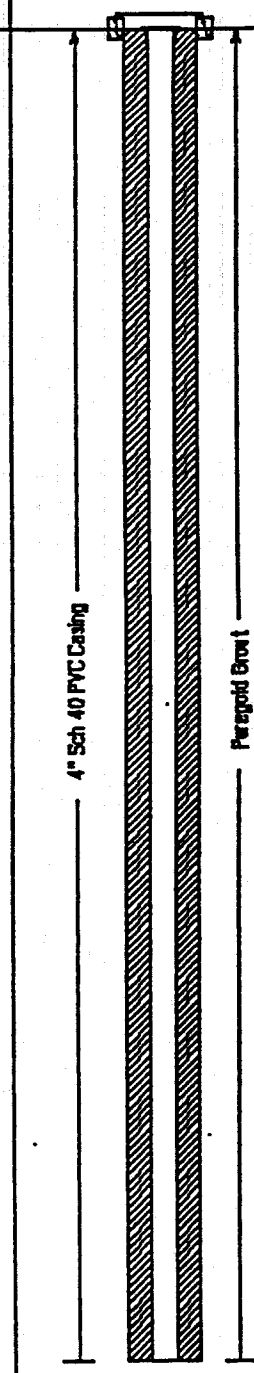
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
METHOD Hollow Stem Auger
DRILLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shiplone
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER T. Garver

BORING P-16A
DATE STARTED 11/29/95
DATE COMPLETED 11/29/95
BORING DEPTH 87 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		
					7			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
				0.0	9			
5	100		P-16A @ 5		12			
						ML		
					8			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
				0.0	12			
10	100		P-16A @ 10		16			
					9			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
				0.0	14			
15	100		P-16A @ 15		21			
					8			SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
				0.0	16			
20	100		P-16A @ 20		25			
					9			SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.
				0.0	14			
25	100		P-16A @ 25		22			

WELL DIAGRAM



DEPTH (ft): 5, 10, 15, 20, 25

GERAGHTY & MILLER, INC.

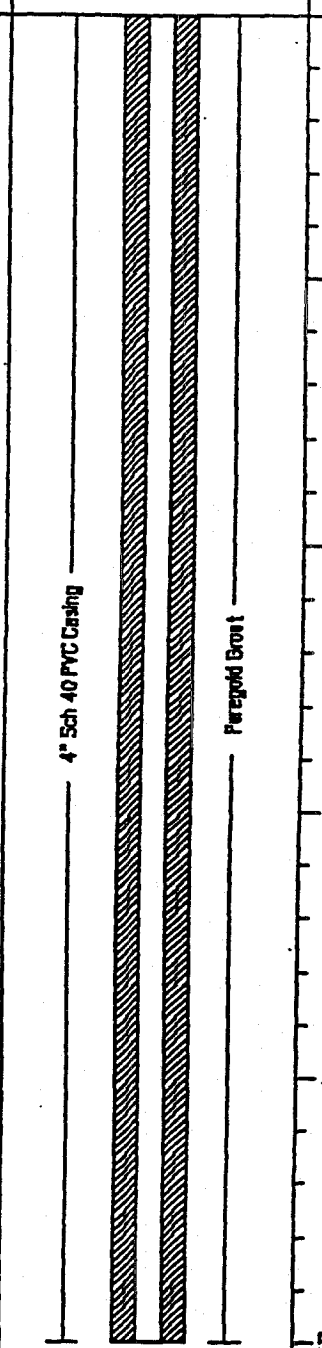
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-10A

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		
						SP		
				0.0	18, 33, 45			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.
30	100		P-10A @ 30					
				0.0	10, 24, 38			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.
35	100		P-10A @ 35					
				0.0	13, 30, 50			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.
40	100		P-10A @ 40					
				0.0	30, 50/5			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.
45	100		P-10A @ 45					
				0.0	12, 30, 44			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.
50	100		P-10A @ 50					

WELL DIAGRAM



DEPTH (ft): 30, 35, 40, 45, 50

GERAGHTY & MILLER, INC.

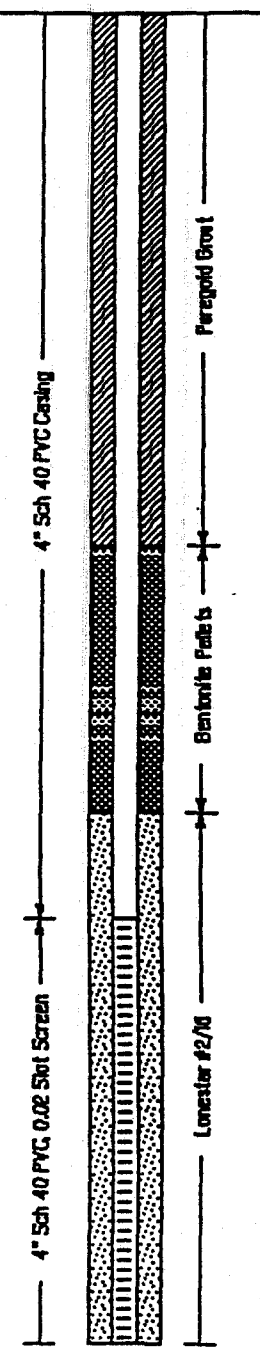
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-10A

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
	100		P-10A @ 55	0.0	18, 40, 50/5			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.
55								
	100		P-10A @ 60	0.0	34, 38, 50			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.
60								
	100		P-10A @ 65	0.0	22, 30, 50			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.
65								
	100		P-10A @ 70	0.0	16, 50/6			SAND, very fine grained, yellowish brown (10YR, 5/8), very moist.
70								
								Water encountered at 73.5 ft-bgs.
	100		P-10A @ 75	103	20, 50/6			SAND, very fine grained, yellowish brown (10YR, 5/8), water saturated.
75								

WELL DIAGRAM



DEPTH (ft): 55, 60, 65, 70, 75

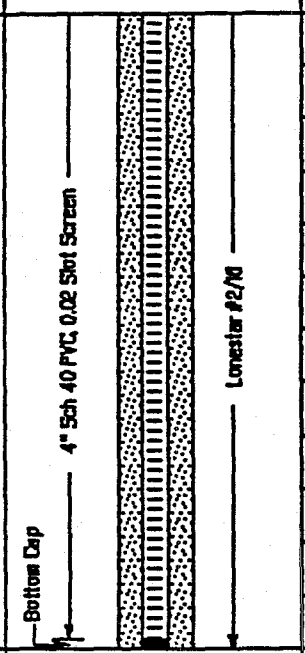
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-10A

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				79.7	18 50/6			SAND, very fine grained, yellowish brown (10YR, 5/8), water saturated.		
80	100		P-10A @ 80							80
				48.6	12 38 50			SAND, very fine grained, yellowish brown (10YR, 5/8), water saturated.		
	100		P-10A @ 82							
				82.4	13 25 44			SAND, very fine grained, yellowish brown (10YR, 5/8), water saturated.		
85	100		P-10A @ 85							85
				82.7	16 30 46			SAND, very fine grained, yellowish brown (10YR, 5/8), water saturated.		
	100		P-10A @ 87							
								End of Boring @ 87.0 ft. Set 4-inch groundwater monitoring well at 87 ft.		
90										90
95										95
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward Anthony C. Ward, CA R.G. #4782		
100										100



GERAGHTY & MILLER, INC.

BORING LOG

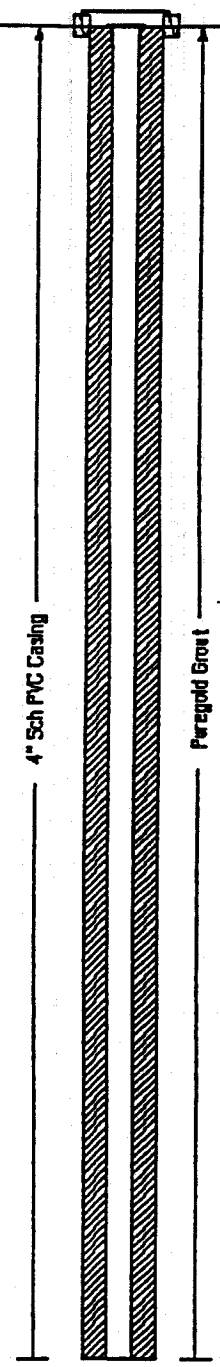
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILLING METHOD Rotosonic
DRILLING METHOD Core Barrel
BOREHOLE DIAMETER 8 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY B. Bechtel/D. Willis
DRILL CO. Lang
RIG TYPE Rotosonic
DRILLER D. Casey

BORING P-16B
DATE STARTED 12/2/95
DATE COMPLETED 12/3/95
BORING DEPTH 120 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		
				0.0	7, 8, 12			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist. (*)
5	100		P-16A @ 5					
						ML		
				0.0	8, 12, 16			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist. (*)
10	100		P-16A @ 10					
				0.0	8, 14, 21			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist. (*)
15	100		P-16A @ 15					
				0.0	8, 16, 25			SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist. (*)
20	100		P-16A @ 20					
				0.0	8, 14, 22			SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist. (*)
25	100		P-16A @ 25					

WELL DIAGRAM



DEPTH (ft): 5, 10, 15, 20, 25

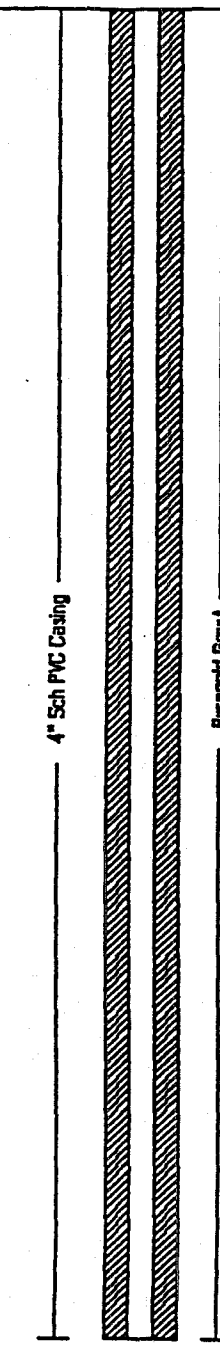
GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-10B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
						SP				
					18			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist. (*)		
				0.0	33					
30	100		P-10A @ 30		45					30
					10			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist. (*)		
				0.0	24					
35	100		P-10A @ 35		38					35
					13			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist. (*)		
				0.0	30					
40	100		P-10A @ 40		50					40
					30			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist. (*)		
				0.0	50/5					
45	100		P-10A @ 45							45
					12			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist. (*)		
				0.0	30					
50	100		P-10A @ 50		44					50



GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-16B

DEPTH (ft)	RECOVERY %	SAMP.INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				0.0	18 40 50/5			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist. (*)		
55	100		P-16A @ 55							55
				0.0	34 38 50			SAND, very fine grained, yellowish brown (10YR, 5/8), moist. (*)		
60	100		P-16A @ 60							60
				0.0	22 30 50			SAND, very fine grained, yellowish brown (10YR, 5/8), moist. (*)	4" Sch PVC Casing Peregold Grout	
65	100		P-16A @ 65							65
			P-16A @ 70	0.0	16 50/6			SAND, very fine grained, yellowish brown (10YR, 5/8), very moist. (*)		
70	100									70
				103	20 50/6			Water encountered at 73.5 ft-bgs. (*) SAND, very fine grained, yellowish brown (10YR, 5/8), water saturated. (*)		
75	100		P-16A @ 75							75

GERAGHTY & MILLER, INC.

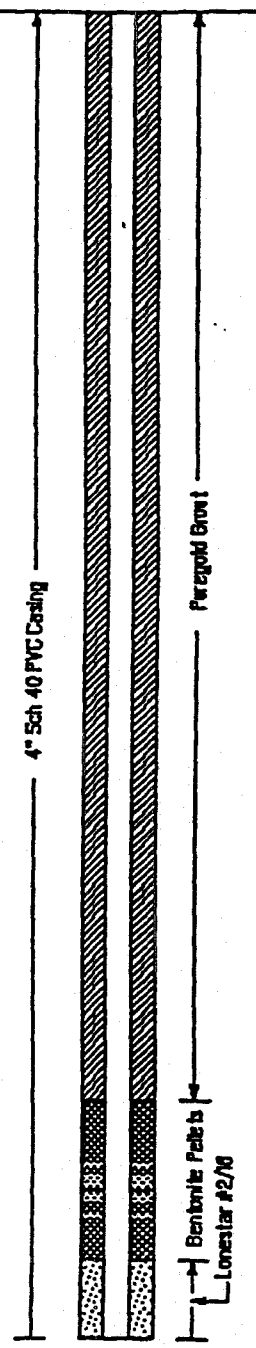
BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18B

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		(*) THE FIRST 80 FT OF LITHOLOGIC DESCRIPTION WAS TAKEN FROM BORING P-18A
80	NA	2.5-3	NA	NA	NA			SAND, very fine grained, minor Clay, light olive brown (2.5Y, 5/6), loose, wet to water saturated, homogeneous, 95% silica, 3-4% black grains, 1-2% feldspars, grains are subrounded.
85								SAND, very fine grained, minor Clay, light olive brown (2.5Y, 5/6), loose, water saturated, homogeneous, 95% silica, 3-4% black grains, 1-2% feldspars, grains are subrounded.
								Color change to yellowish brown (10YR, 5/6).
	NA	2.5-3	NA	NA	NA			Color change to light olive brown (2.5Y, 5/6), slightly more clay.
	NA	2.5-3	NA	NA	NA			SAND, very fine grained, few coarser grains, light olive brown (2.5Y, 5/4), water saturated, subrounded to subangular, more feldspar (3%).
90	NA	1-2.5	NA	NA	NA			
						SC		Clayey SAND, very fine grained, few coarser grains, light olive brown (2.5Y, 5/4), dense, iron staining in stringers.
	NA	0.5-2	NA	NA	NA	SW		
						SP		SAND, fine to medium grained, minor Clay, with gravel (1.5 - 6 cm), light yellowish brown (2.5Y, 6/4), water saturated, loose, some iron staining in stringers.
	NA	0.5-2.5	NA	NA	NA			
95	NA	0.5-2	NA	NA	NA			SAND, fine to medium grained, little Clay, light olive brown (2.5Y, 5/4), loose, water saturated, few blebs of clay.
	100	0.5-1.5	NA	< 1	NA	SW		SAND, fine to medium grained, few coarser grains, some Clay, yellowish brown (10YR, 5/6), loose, water saturated, homogeneous, 3-5% feldspar, 1-2% black grains.
100								SAND, fine to medium grained, trace Clay blebs, brownish yellow (2.5Y, 5/6), very loose, water saturated.

WELL DIAGRAM



DEPTH (ft): 80, 85, 90, 95, 100

GERAGHTY & MILLER, INC.

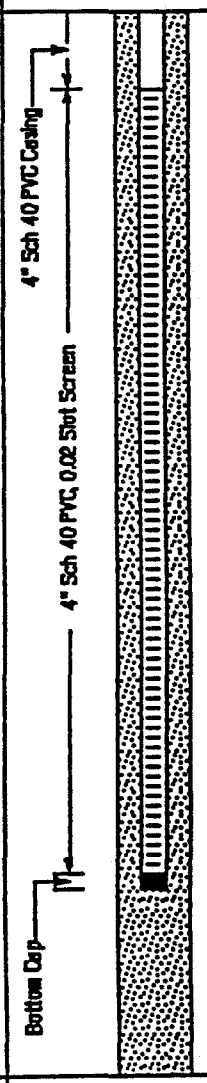
BORING LOG

(continuation)

CT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-10B

DEPTH (ft)	RECOVERY %	WENT. SCALE	SAMPLE NO.	PID (ppm)	UNCND STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SW		SAND, fine to medium grained, trace Clay blebs, brownish yellow (2.5Y, 5/6), very loose, water saturated.
						SP		SAND, fine to medium grained, trace Clay, brownish yellow (2.5Y, 5/6), very loose, water saturated, 1-2% elongated clay blebs 1-10 cm long and 0.5-3 cm thick.
105						SW		SAND, fine to medium grained, light olive brown (2.5Y, 5/6), very loose, water saturated, 95% silica, 3-4% feldspar, 1-2% black minerals, heavily Fe stained stringers 1-3 cm thick from 105-108 ft (orange).
	NA	0.5-1.5	P-10B @ 110	<1	NA			
110								
115								As above, with no Fe stained stringers and trace clay.
	NA	NA	NA	<1	>5	ML		Sandy, Clayey, SILT, olive (5Y, 5/3), very stiff, slightly moist, 20% sand, 20% clay, 60% silt, massive.
	NA	NA	P-10B @ 119	NA	0.5	CL		CLAY, dark gray (5Y, 4/1), plastic, soft, slightly moist, massive, fat.
120								End of Boring @ 120 ft. Set 4-inch groundwater monitoring well at 116.5 ft.
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782
125								

WELL DIAGRAM



DEPTH (ft): 105, 110, 115, 120, 125

GERAGHTY & MILLER, INC.

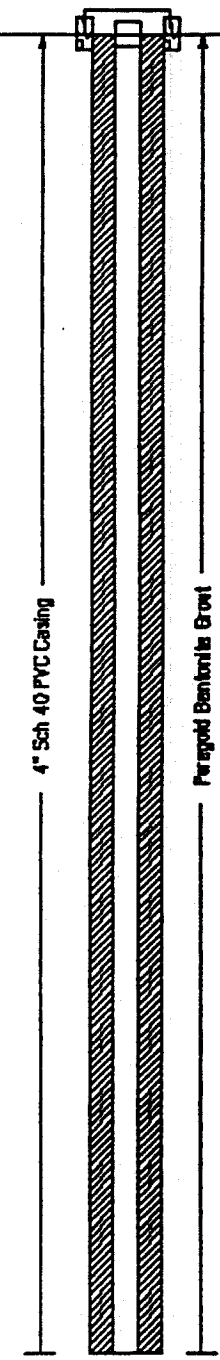
WELL LOG

PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 6 and 10 inches O.D.

PROJECT NO. CA0217.020
LOGGED BY Lara Urizar
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE M-12
DRILLER Dino Seldors

BORING P-16C
DATE STARTED 8/7/96
DATE COMPLETED 8/7/96
BORING DEPTH 120 ft.

DEPTH (ft)	RECOVERY %	SAMP.INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
								Concrete		
						CL		CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.		5
						ML		SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.		10
								SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.		15



GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.020 BORING NO. P-16C

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML		SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.		
21									4" Sch 40 PVC Casing	21
								SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, moist.	Paragold Bentonite Grout	
26						SP				26
								SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.		
31										31

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.020 BORING NO. P-16C

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP		SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.	4" Sch 40 PVC Casing; Peregold Bentonite Grout	
37								SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.		37
42								SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.		42
										47

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.020 BORING NO. P-16C

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP		SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.	4" Sch 40 PVC Casing; Pureguid Bentonite Grout	
53								SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.		53
58								SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		58
63								SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		63

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.020 BORING NO. P-16C

DEPTH (ft)	RECOVERY %	SAMP.INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
	55		NA	0.0	10 10 27			SAND, very fine grained, light yellowish brown (10YR 6/4), loose, slightly moist.		
	75		NA	0.0	16 33 40			SAND, very fine grained, trace silt laminae, yellowish brown (10YR 5/6), iron oxide staining, slightly orange near laminae, semi-loose, slightly moist.		
	60		NA	0.0	12 28 40			SAND, trace silt, very fine grained, trace silt laminae, iron oxide staining, slightly orange near laminae, semi-loose, moist.		69
	75		NA	0.0	27 38 45			SAND, as above, silt laminae (friable siltstone), lenses of fine to medium grained sand, iron oxide staining, slightly orange, moist.		
	80		NA	0.0	26 50 50			SAND, as above, trace silt, some iron oxide staining, semi-loose, wet. Groundwater at 72 feet, trace clay, slight partially lithified silt, iron oxide staining.		
74	55		NA	0.0	10 24 36			SAND, trace silt, light brownish yellow (10 YR 6/4), loose, water saturated.	4" Sch 40 PVC Casing Pure Gold Bentonite Grout	74
79										79

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.020 BORING NO. P-10C

DEPTH (ft)	RECOVERY %	SAMP.INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP		SAND, very fine grained, minor Clay, light olive brown (2.5Y, 5/6), loose, wet to water saturated, homogeneous, 95% silica, 3-4% black grains, 1-2% feldspars, grains are subrounded.	4" Sch 40 PVC Casing; Pergold Bentonite Grout; Bentonite Pellets	
85								SAND, very fine grained, minor Clay, light olive brown (2.5Y, 5/6), loose, water saturated, homogeneous, 95% silica, 3-4% black grains, 1-2% feldspars, grains are subrounded.		85
								Color change to yellowish brown (10YR, 5/6).		
								Color change to light olive brown (2.5Y, 5/6), slightly more clay.		
90								SAND, very fine grained, few coarser grains, light olive brown (2.5Y, 5/4), water saturated, subrounded to subangular, more feldspar (3%).		90
						SC		Clayey SAND, very fine grained, few coarser grains, light olive brown (2.5Y, 5/4), dense, iron staining in stringers.		
						SW		SAND, fine to medium grained, minor Clay, with gravel (1.5 - 6 cm), light yellowish brown (2.5Y, 6/4), water saturated, loose, some iron staining in stringers.		
						SP		SAND, fine to medium grained, little Clay, light olive brown (2.5Y, 5/4), loose, water saturated, few blebs of clay.		
95								SAND, fine to medium grained, few coarser grains, some Clay, yellowish brown (10YR, 5/6), loose, water saturated, homogeneous, 3-5% feldspar, 1-2% black grains.		95
						SW				

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

JECT International Light Metals PROJECT NO CAD217.020 BORING NO. P-16C

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SW		SAND, fine to medium grained, trace Clay blebs, brownish yellow (2.5Y, 5/6), very loose, water saturated.	4" Sch 40 PVC Casing; Bentonite Pellets	
								SAND, fine to medium grained, trace Clay blebs, brownish yellow (2.5Y, 5/6), very loose, water saturated.		101
						SP		SAND, fine to medium grained, trace Clay, brownish yellow (2.5Y, 5/6), very loose, water saturated, 1-2% elongated clay blebs 1-10 cm long and 0.5-3 cm thick.		
						SW		SAND, fine to medium grained, light olive brown (2.5Y, 5/6), very loose, water saturated, 95% silica, 3-4% feldspar, 1-2% black minerals, heavily Fe stained stringers 1-3 cm thick from 105-108 ft (orange).	4" Sch 40 PVC, 0.02 Slot Screen; Lonestar #2/16	106
106										
111										111

BOE-C6-0139660

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CA0217.020 BORING NO. P-10C

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SW		As above, with no Fe stained stringers and trace clay.	Bottom Well Cap; 4" Sch 40 PVC, 0.02 Slot Screen; Lonestar #2/16	
117						ML		Sandy, Clayey, SILT, olive (5Y, 5/3), very stiff, slightly moist, 20% sand, 20% clay, 60% silt, massive.		117
						CL		CLAY, dark gray (5Y, 4/1), plastic, soft, slightly moist, massive, fat.		
122								End of Boring @ 120 ft. Set 4 inch groundwater monitoring well at 118 ft-bgs Comments: Drilled with a 8 in. auger to 74 ft-bgs. Pulled auger and drilled with 10 in. auger to 120 ft-bgs. Pulled auger out and redrilled to 118 ft-bgs. Lithologic information from P-10A was used to complete this log from 0-65 ft-bgs. Lithologic information from P-10B was used to complete this log from 74-120 ft-bgs.		122
127								This work was performed under my supervision and I concur with the findings. Anthony C. Ward Anthony C. Ward, CA R.G. #4782		127

GERAGHTY & MILLER, INC.

WELL LOG

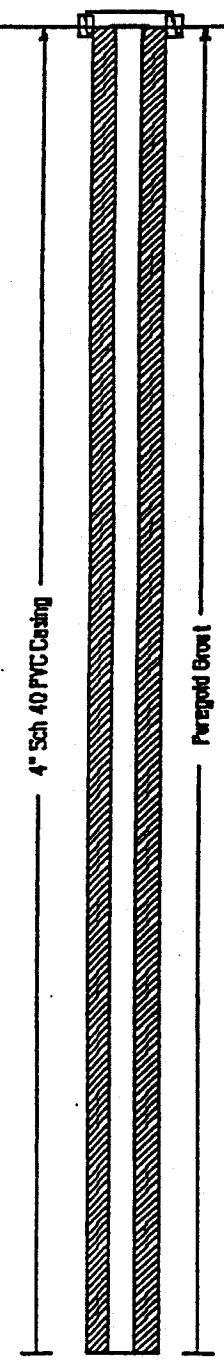
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY B. Bechtel
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-17
DATE STARTED 12/6/95
DATE COMPLETED 12/6/95
BORING DEPTH 120 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (12")
						CL		
				4.1	7, 7, 8			CLAY, trace Silt, few coarse grained Sand, dark grayish brown (2.5Y, 4/2), moderate plasticity, slightly moist.
5	100		P-17 @ 5					
						ML		
				4.3	8, 9, 10			SILT, light olive brown (2.5Y, 5/4), non plastic, slightly moist.
10	100		P-17 @ 10					
				4.4	8, 8, 12			SILT, light olive brown (2.5Y, 5/4), non plastic, slightly moist, occassional pebbles approximately 1 cm diameter.
15	100		P-17 @ 15					
				5.3	6, 7, 11			SILT, trace Clay, light olive brown (2.5Y, 5/4), non plastic, slightly moist.
20	100		P-17 @ 20					
				5.5	13, 18, 20			SILT, little Clay, trace very fine grained Sand, light olive brown (2.5Y, 5/4), non plastic, contains yellow streaks and spots (2.5Y, 6/8).
25	100		P-17 @ 25					

WELL DIAGRAM



GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-17

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
30	100		P-17 @ 30	14.3	12, 18, 24			SILT, some Clay, olive (5Y, 5/3), non plastic, slightly moist, heavy iron staining.		30
						SP				
35	100		P-17 @ 35	5.4	18, 20, 31			SAND, very fine grained, little Clay, olive yellow (2.5Y, 6/6), loose, slightly moist, clay is in small blebs.		35
40	100		P-17 @ 40	6.3	22, 28, 34			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist, iron staining in mottled pattern.	4" Sch 40 PVC Casing; Paragold Grout	40
45	100		P-17 @ 45	10.3	23, 28, 40			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist, iron staining in mottled pattern, silty clay in bottom of shoe.		45
						SM				
50	100		P-17 @ 50	8.6	24, 31, 38			Silty SAND, very fine grained, light olive brown (2.5, 5/4), loose, slightly moist.		50

GERAGHTY & MILLER, INC.

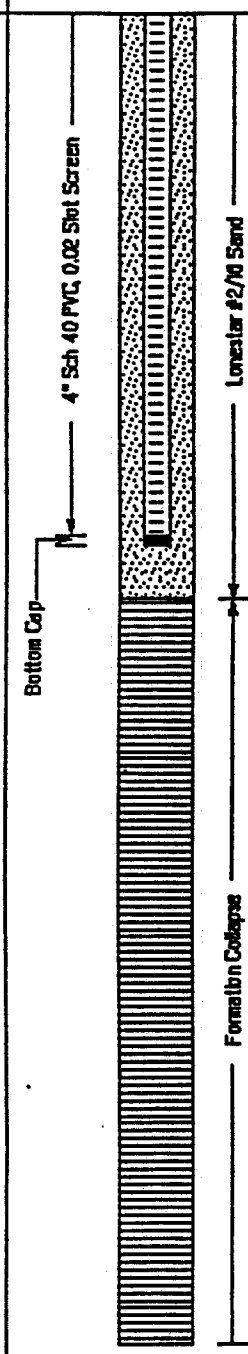
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-17

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				187	25 30 39			SAND, very fine grained, light olive brown (2.5Y, 5/4), loose, water saturated, few clay blebs approximately 0.5 cm or less in diameter.
80	100		P-17 @ 80					
				155	28 33 39			SAND, very fine grained, trace Clay, light olive brown, slightly dense, water saturated.
85	100		P-17 @ 85					
				132	14 18 23			SAND, very fine grained, trace Clay, light olive brown, slightly dense, water saturated.
90	100		P-17 @ 90					
				264	20 26 32			SAND, medium grained, trace Clay, light yellowish brown (2.5Y, 6/4), loose, water saturated.
95	100		P-17 @ 95					
				137	24 28 32			SAND, medium grained, trace Clay, light yellowish brown (10YR, 6/4), loose, water saturated.
100	100		P-17 @ 100					

WELL DIAGRAM



DEPTH (ft): 80, 85, 90, 95, 100

GERAGHTY & MILLER, INC.

WELL LOG

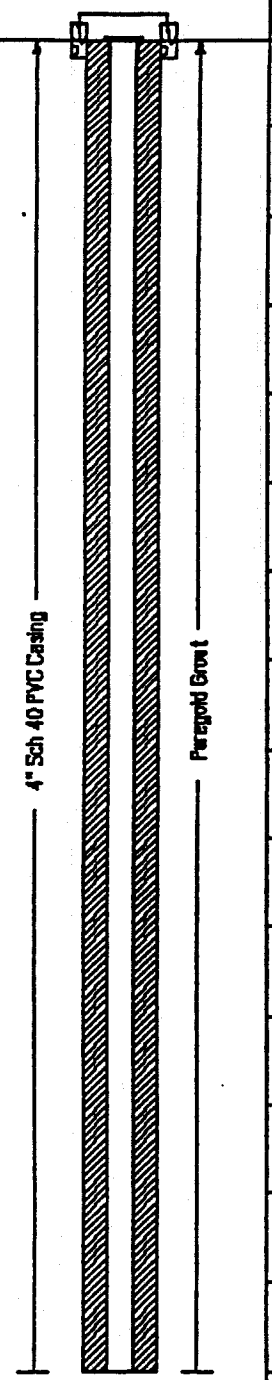
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
METHOD Hollow Stem Auger
LING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY B. Bechtel
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-18
DATE STARTED 12/5/95
DATE COMPLETED 12/5/95
BORING DEPTH 100 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (6")
						CL		
					4			Silty CLAY, dark grayish brown (10YR, 4/2), moderate plasticity, moderately stiff, slightly moist.
				3.0	6			
	100		P-18 @ 5		8			
						ML		
					6			SILT, trace Clay, light olive brown (2.5Y, 5/6), non plastic, slighlty moist.
				2.7	8			
10	100		P-18 @ 10		8			
					9			SILT, trace Clay, light olive brown (2.5Y, 5/6), non plastic, dry.
				2.8	17			
15	100		P-18 @ 15		23			

WELL DIAGRAM



DEPTH (ft): 5, 10, 15

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
						CL				
					11			Silty CLAY, yellowish brown (2.5Y, 6/4), stiff, iron staining in small nodules.		
				3.2	17					
	100		P-18 @ 20		28					20
						ML			4" Sch 40 PVC Casing; Paragold Grout	
					13			Clayey SILT, some very fine grained Sand, light olive brown (2.5Y, 5/4), non plastic, slightly moist, heavy iron staining.		
				3.8	32					
	100		P-18 @ 25		21					25
					18			Sandy SILT, very fine grained Sand, olive yellow (2.5Y, 6/6), non plastic, slightly moist, heavy iron staining.		
				3.5	23					
	100		P-18 @ 30		30					30

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18

DEPTH (ft)	RECOVERY %	SAMP.INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
						SP				
					20			SAND, very fine grained, olive yellow (2.5Y, 6/6), loose, slightly moist.		
				2.5	23					
	100		P-18 @ 35		28					35
					22			SAND, very fine grained, olive yellow (2.5Y, 6/6), loose, slightly moist.	4" Sch 40 PVC Casing; Paragold Grout	
				2.5	30					
	100		P-18 @ 40		37					40
					30			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist.		
				2.5	38					
	100		P-18 @ 45		46					45

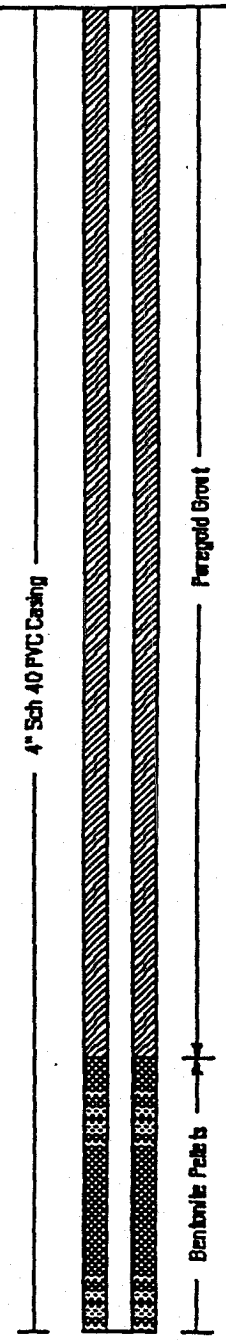
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				2.3	28			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist.		
					33					
	100		P-18 @ 50		38					
50										50
				2.4	20			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist.		
					28					
	100		P-18 @ 55		38					
55										55
				2.2	28			SAND, very fine grained, olive yellow (2.5Y, 6/6), loose, slightly moister, little iron staining in streaks.		
					40					
	100		P-18 @ 60		48					
80										80



GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
					30			SAND, very fine grained, olive yellow (2.5Y, 6/6), loose, slightly moister.		
				2.0	37					
	100		P-18 @ 65		42					65
					28			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, moist.		
			P-18 @ 70	2.8	36					
	100				38					
70										70
					16			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, water saturated, water encountered at 74 ft-bgs.		
				7.1	20					
	100		P-18 @ 75		28					
75										75

WELL DIAGRAM: 4" Sch 40 PVC Casing; 4" Sch 40 PVC, 0.02 Slot Screen; Bentonite Pellets; Lonestar #2/10

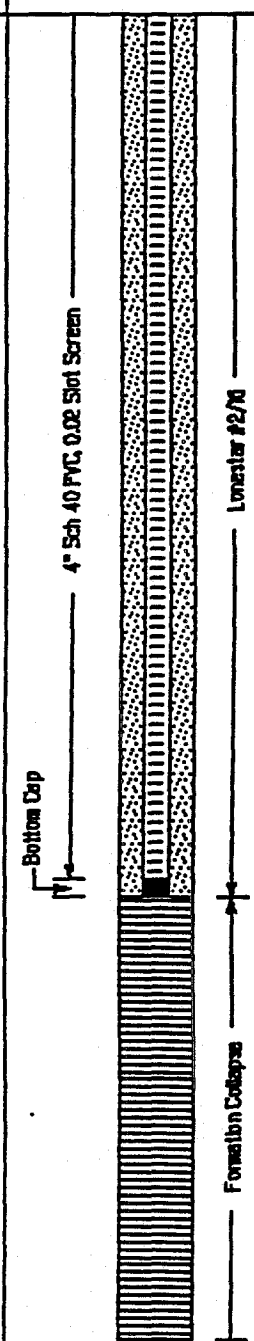
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				8.2	20 26 30			SAND, very fine grained, olive yellow (2.5Y, 6/6), loose, water saturated.		
80	100		P-18 @ 80							80
				4.0	22 30 36			SAND, very fine grained, trace Clay, light yellowish brown (2.5Y, 6/4), loose to dense, water saturated, some iron stained spots.		
85	100		P-18 @ 85							85
				4.3	18 23 28			SAND, medium grained, some Clay, light olive brown (2.5Y, 5/4), loose, water saturated.		
90	100		P-18 @ 90							90



GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
					NA			SAND, medium grained, some Clay, light olive brown (2.5Y, 5/4), loose, water saturated.		
				3.2	NA					
	100		P-18 @ 85		NA				Formation Collapse	95
								Heaving SANDS, no sample taken at 100 ft-bgs.		
100								End of Boring @ 100 ft. Set 4-inch groundwater monitoring well at 85 ft.		100
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		
105										105

GERAGHTY & MILLER, INC.

WELL LOG

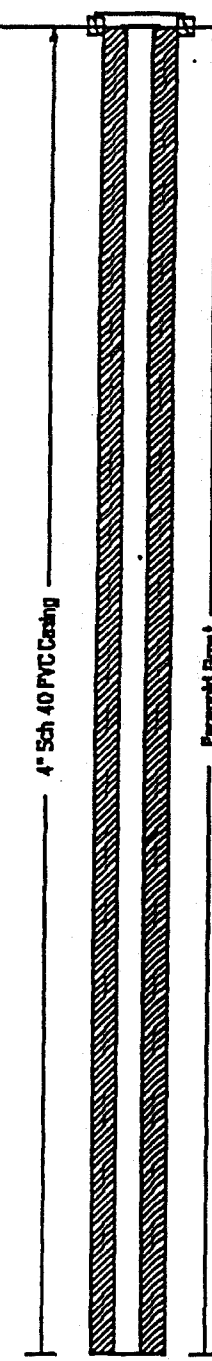
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY B. Bechtel
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-19
DATE STARTED 12/4/95
DATE COMPLETED 12/4/95
BORING DEPTH 100 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		Asphalt (3")
5	100		P-19 @ 5	0.8	6, 6, 8			SILT, with Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), stiff, slightly moist.
	100		P-19 @ 10	1.1	7, 9, 12			SILT, light olive brown (2.5Y, 5/4), slightly plastic, slightly moist.
15	100		P-19 @ 15	0.8	11, 12, 15			SILT, light olive brown (2.5Y, 5/4), slightly plastic, slightly moist.
20	100		P-19 @ 20	0.5	9, 13, 14			SILT, light olive brown (2.5Y, 5/4), slightly plastic, slightly moist.
25	100		P-19 @ 25	0.7	10, 13, 17			SILT, trace very fine grained Sand, light olive brown (2.5Y, 5/6), moderately loose, slightly moist, micaceous.
						SM		
30	100		P-19 @ 30	0.7	11, 11, 16	SP		Silty SAND, very fine grained, light olive brown (2.5Y, 5/4), loose, slightly moist, iron staining. Shoe contains very fine grained SAND, light yellowish brown (2.5Y, 6/4).

WELL DIAGRAM



DEPTH (ft): 5, 10, 15, 20, 25, 30

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

...ECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-18

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
35	100		P-18 @ 35	0.7	13, 18, 23	SP		SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist.	4" Sch 40 PVC Casing; Paragold Grout; Paragold Medium Chips	35
40	100		P-18 @ 40	1.0	12, 18, 20			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, moist.		40
45	100		P-18 @ 45	0.8	13, 15, 21			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, moist.		45
50	100		P-18 @ 50	0.8	14, 23, 29			SAND, very fine grained, yellow (2.5Y, 7/6), loose, slightly moist.		50
55	100		P-18 @ 55	1.0	22, 25, 29			SAND, very fine grained, yellow (2.5Y, 7/6), loose, slightly moist.		55
60	100		P-18 @ 60	1.2	17, 23, 28			SAND, very fine grained, olive yellow (2.5Y, 6/6), loose, slightly moist.		60

GERAGHTY & MILLER, INC.

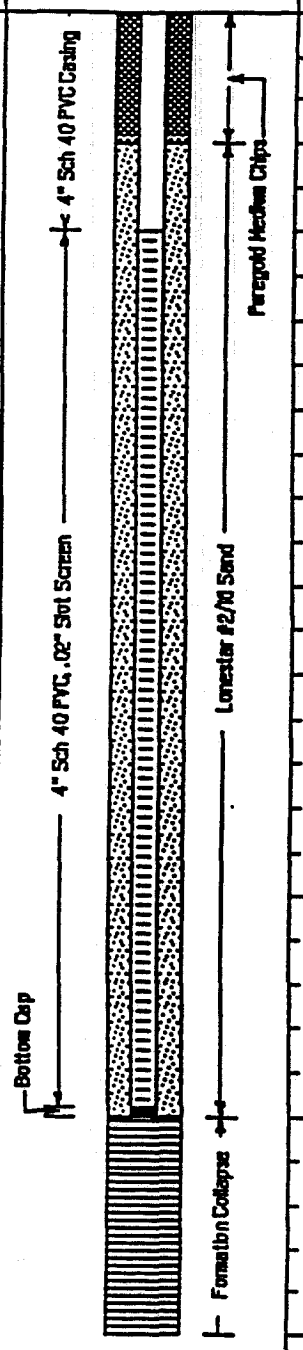
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-19

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
85	100		P-19 @ 65	1.2	20 33 40			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, slightly moist.
70	100		P-19 @ 70	1.4	30 37 23			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, moist.
								Water encountered at 72 ft-bgs.
75	100		P-19 @ 75	52.0	32 40 42			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, water saturated.
80	100		P-19 @ 80	45.4	25 35 38			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, water saturated.
85	100		P-19 @ 85	17.0	27 36 41			SAND, very fine grained, light yellowish brown (2.5Y, 6/4), loose, water saturated.
						SC		
90	100		P-19 @ 90	89.8	39 42 48			Clayey SAND, medium grained, light olive brown (2.5Y, 5/6), loose, water saturated.

WELL DIAGRAM



DEPTH (ft): 85, 70, 75, 80, 85, 90

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-19

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SC				
						SP		SAND, medium grained, trace Clay, olive yellow (2.5Y, 6/6), loose, water saturated.		
				48.6	28 30 48					
95	100		P-19 @ 95					No sample taken at 100 ft-bgs.	Formation Collapse	95
								End of Boring @ 100 ft. Set 4 in. groundwater monitoring well at 85 ft.		100
105										105
110										110
115								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		115
120										120

GERAGHTY & MILLER, INC.

WELL LOG

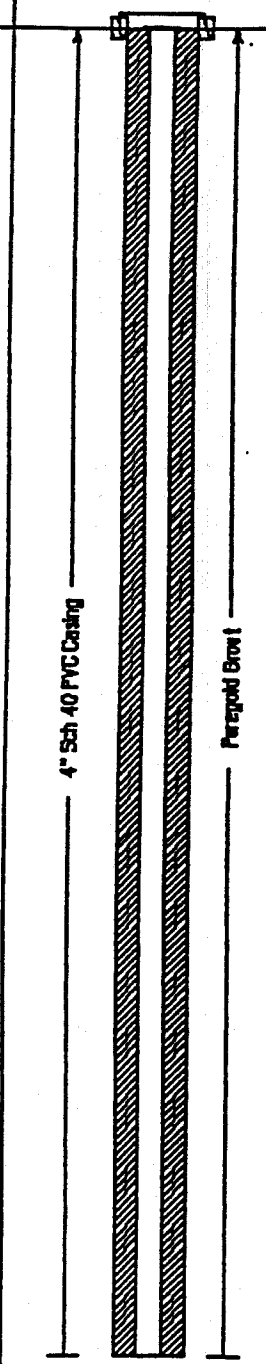
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrence, CA
DRILL METHOD Hollow Stem Auger
DRILLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY B. Bechtel/M. Shiplone
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-20
DATE STARTED 11/21/95
DATE COMPLETED 11/22/95
BORING DEPTH 80 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
5	100		P-20 @ 5	0.0	5, 7, 12	CL		CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
10	100		P-20 @ 10	0.0	8, 9, 10	ML		SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
15	100		P-20 @ 15	0.0	7, 13, 14			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
20	100		P-20 @ 20	0.0	11, 12, 15			SILT, trace Clay, increasing in very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
25	100		P-20 @ 25	0.0	10, 12, 17	SP		SAND, very fine grained, little Silt, brownish yellow (10YR, 6/6), moist.

WELL DIAGRAM



GERAGHTY & MILLER, INC.

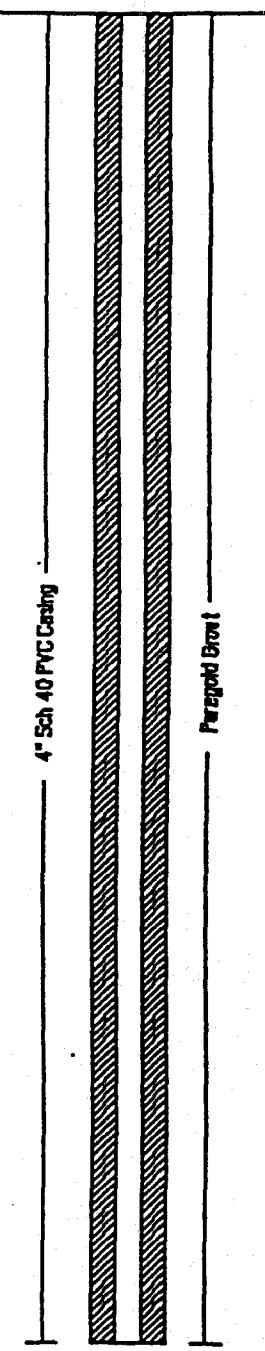
WELL LOG

(continuation)

JT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-20

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				0.0	11 16 23			SAND, very fine grained, little Silt, brownish yellow (10YR, 6/6), moist.
30	100		P-20 @ 30					
				0.0	14 19 25			SAND, very fine grained, little Silt, brownish yellow (10YR, 6/6), moist, shell fragments.
35	100		P-20 @ 35					
						SP SM		
				2.0	11 13 23			SAND, some Silt, light olive brown (2.5Y, 5/3).
40	100		P-20 @ 40					
						SP		
				2.1	8 16 20			SAND, less Silt, light olive brown (2.5Y, 5/3).
45	100		P-20 @ 45					
				5.2	16 20 23			SAND, less Silt, light olive brown (2.5Y, 5/3).
50	100		P-20 @ 50					

WELL DIAGRAM



DEPTH (ft): 30, 35, 40, 45, 50

GERAGHTY & MILLER, INC.

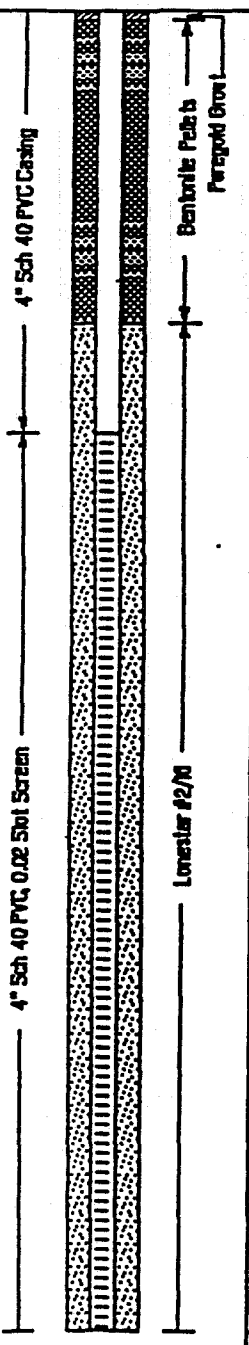
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-20

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
	100		P-20 @ 55	0.0	18, 20, 32			SAND, less Silt, brown (7.5YR, 4/4), moist.
55								
	100		P-20 @ 60	2.1	38, 50/6			SAND, less Silt, light olive brown (2.5Y, 5/4), moist.
60								
	100		P-20 @ 65	1.5	20, 22, 37			SAND, less Silt, brownish yellow (10YR, 6/6), moist.
65								
								Water encountered at 68 ft-bgs.
	100		P-20 @ 70	12	17, 23, 28			SAND, less Silt, brownish yellow (10YR, 6/6), water saturated.
70								
						SM		
	100		P-20 @ 75	58.3	18, 24, 33			Silty SAND, very fine grained, light olive brown (2.5Y, 5/4), moist, micaceous.
75								

WELL DIAGRAM



DEPTH (ft): 55, 60, 65, 70, 75

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-20

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SM				
						CL		Silty CLAY, light olive brown (2.5Y, 5/4), micaceous.		
					9					
				48.6	13			Silty CLAY, light olive brown (2.5Y, 5/4), micaceous.		
80	100		P-20 @ 80		16			End of Boring @ 80.0 ft. Set 4-inch groundwater monitoring well at 78 ft.	4" Sch 40 PVC, 0.02 Slot Screen, Bottom Cap; Lonestar #2/16	80
85										85
90										90
95										95
100										100

This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

WELL LOG

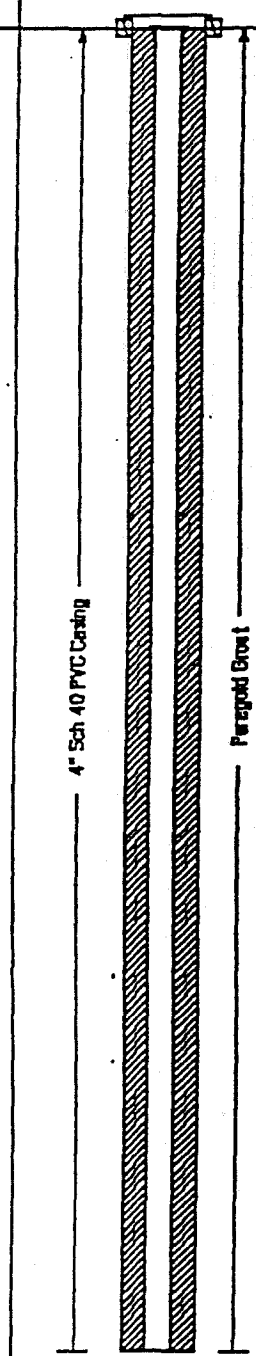
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 Inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shiplone
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-21
DATE STARTED 11/30/95
DATE COMPLETED 11/30/95
BORING DEPTH 100 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (12")
								Base Rock (6")
						CL		
5	100		P-21 @ 5	6.2	5, 7, 10			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
						ML		
10	100		P-21 @ 10	5.3	6, 7, 8			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
15	100		P-21 @ 15	4.2	8, 8, 12			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
20	100		P-21 @ 20	4.8	8, 11, 14			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
						SP		
25	100		P-21 @ 25	6.7	11, 16, 19			SAND, very fine grained, trace Silt, brownish yellow (10YR, 6/6), moist.
30	100		P-21 @ 30	5.1	14, 20, 20			SAND, very fine grained, trace Silt, brownish yellow (10YR, 6/6), moist.

WELL DIAGRAM



GERAGHTY & MILLER, INC.

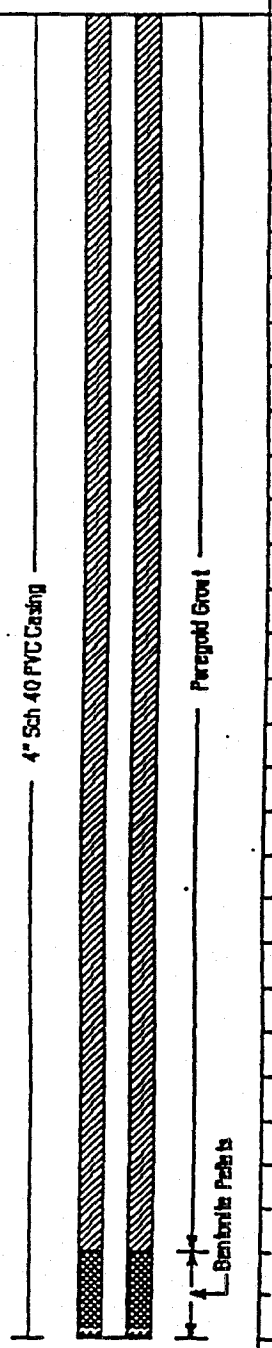
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-21

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				5.6	20 27 31			SAND, very fine grained, trace Silt, brownish yellow (10YR, 6/8), moist.
35	100		P-21 @ 35					
						ML		
			P-21 @ 40D	7.8	17 24 30			SILT, little very fine grained Sand, light olive brown (2.5Y, 5/3), non plastic, moist.
40	100		P-21 @ 40					
						SP		
	100			6.6	11 24 33			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
45	100		P-21 @ 45					
				7.8	17 28 30			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
50	100		P-21 @ 50					
				8.7	20 28 36			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
55	100		P-21 @ 55					
				7.5	20 35 45			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist.
60	100		P-21 @ 60					

WELL DIAGRAM



DEPTH (ft): 35, 40, 45, 50, 55, 60

GERAGHTY & MILLER, INC.

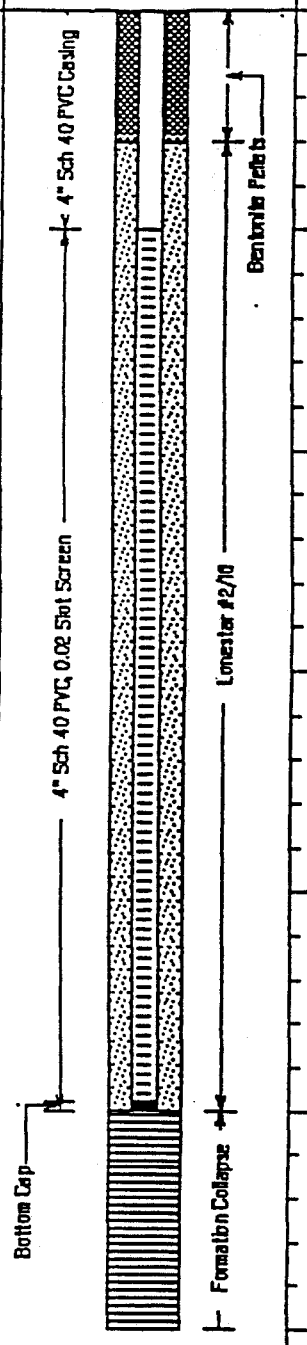
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-21

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
85	100		P-21 @ 65	10.4	43 50/0			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/8), very moist.
70	100		P-21 @ 70	13.2	36 40 47			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/8), very moist to wet.
75	100		P-21 @ 75	130	30 50/0			Water encountered at 73.5 ft-bgs. SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/8), water saturated.
80	100		P-21 @ 80	135	20 27 29			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/8), water saturated.
85	100		P-21 @ 85	19	21 29 37			SAND, very fine to medium grained, trace Silt, yellowish brown (10YR, 5/8), water saturated.
90	100		P-21 @ 90	263	22 31 38			SAND, fine to medium grained, dark yellowish brown (10YR, 4/8), water saturated.

WELL DIAGRAM



GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-21

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP		SAND, fine to medium grained, dark yellowish brown (10YR, 4/6), water saturated.	Formation Collapse	
				128	13 17 23					
95	100		P-21 @ 95							95
								End of Boring @ 100 ft. Set 4-inch groundwater monitoring well at 85 ft.		100
105										105
110										110
115								This work was performed under my supervision and I concur with the findings. Anthony C. Ward Anthony C. Ward, CA R.G. #4782		115
120										120

GERAGHTY & MILLER, INC.

WELL LOG

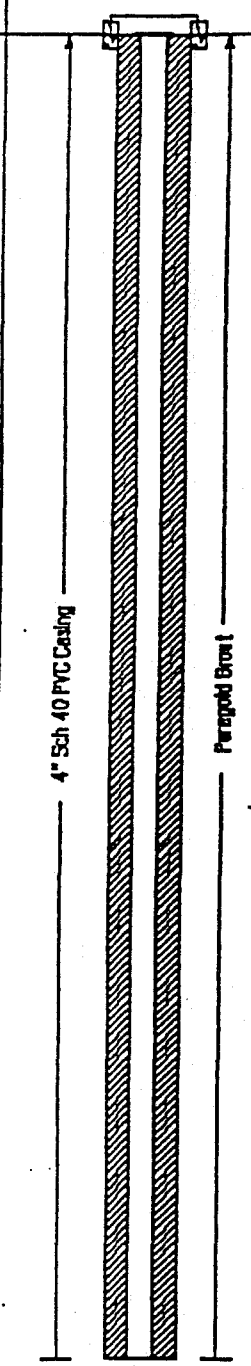
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER T. Garver

BORING P-22
DATE STARTED 11/27/95
DATE COMPLETED 11/29/95
BORING DEPTH 108 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						CL		Asphalt (3")
				0.0	7, 12, 18			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
5	100		P-22 @ 5					
						ML		
				0.0	12, 24, 38			SILT, trace Clay, trace, very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, slightly moist to moist.
10	100		P-22 @ 10					
				0.0	8, 12, 17			SILT, trace Clay, trace, very fine grained Sand, dark yellowish brown (10YR, 4/4), non plastic, slightly moist to moist.
15	100		P-22 @ 15					
						SM		
				0.0	12, 16, 25			Silty SAND, very fine grained, some Silt, browish yellow (10YR, 6/8), non plastic, slightly moist.
20	100		P-22 @ 20					

WELL DIAGRAM



GERAGHTY & MILLER, INC.

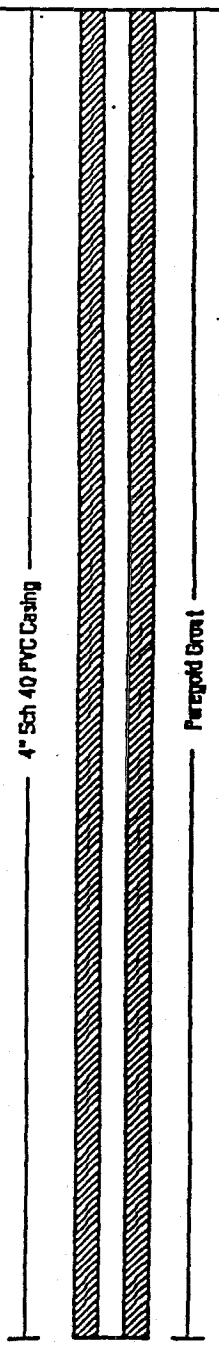
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-22

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SM		
				0.0	7, 11, 18			Silty SAND, very fine grained, some Silt, brownish yellow (10YR, 6/8), non plastic, slightly moist.
25	100		P-22 @ 25					
						SM/SP		
				0.0	8, 12, 17			SAND, very fine grained, some Silt, brownish yellow (10YR, 6/8), slightly moist to moist.
30	100		P-22 @ 30					
						SP		
				10.8	12, 20, 28			SAND, very fine grained, less Silt, brownish yellow (10YR, 6/8), slightly moist to moist.
35	100		P-22 @ 35					
				0.0	14, 21, 27			SAND, very fine grained, brownish yellow (10YR, 6/8), slightly moist to moist.
40	100		P-22 @ 40					

WELL DIAGRAM



DEPTH (ft): 25, 30, 35, 40

GERAGHTY & MILLER, INC.

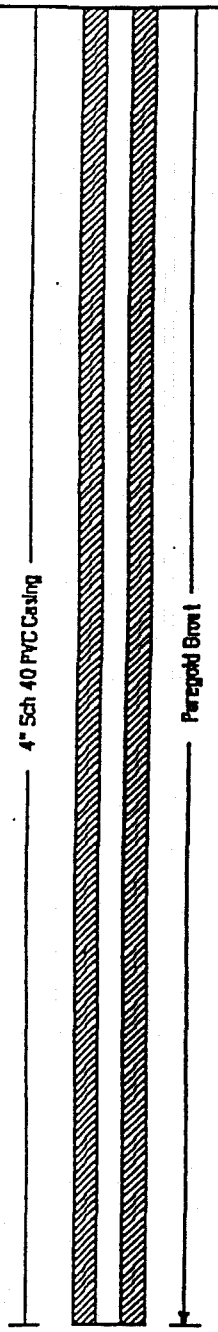
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-22

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				0.0	10 18 22			SAND, very fine grained, brownish yellow (10YR, 6/6), slightly moist to moist.
45	100		P-22 @ 45					
				8.5	10 15 23			SAND, very fine grained, brownish yellow (10YR, 6/6), slightly moist to moist.
50	100		P-22 @ 50					
				16.5	11 14 20			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), moist.
55	100		P-22 @ 55					
				16.4	12 22 30			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), moist.
80	100		P-22 @ 60					

WELL DIAGRAM



DEPTH (ft): 45, 50, 55, 80

GERAGHTY & MILLER, INC.

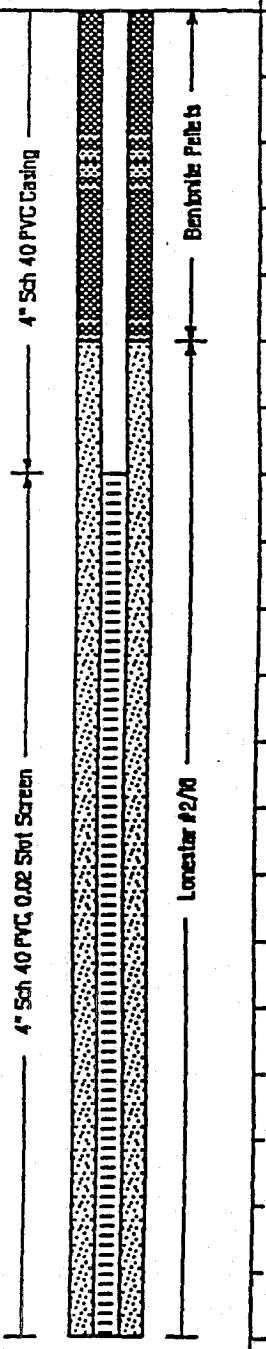
WELL LOG

(continuation)

CT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-22

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				7.8	16 28 40			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), very moist.
85	100		P-22 @ 65					
				2.5	18 23 41			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), wet to water saturated.
70	100		P-22 @ 70					
				54.8	11 32 45			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), wet to water saturated.
75	100		P-22 @ 75					Water encountered at 75.5 ft-bgs.
				31.6	13 30 47			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), water saturated.
80	100		P-22 @ 80					

WELL DIAGRAM



DEPTH (ft): 85, 70, 75, 80

GERAGHTY & MILLER, INC.

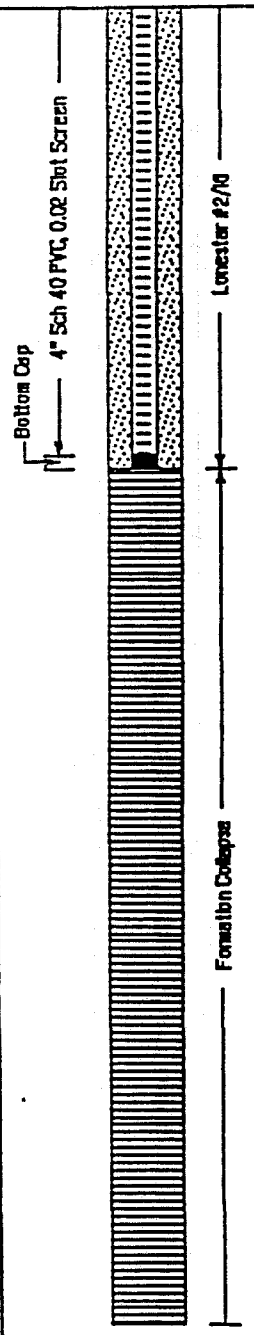
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-22

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				8.2	18 50/6			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), water saturated.
85	100		P-22 @ 85					
				NA	15 21 36			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), water saturated, some interbeds (0.5 inch) of silty sand and silt.
	NA		P-22 @ 88					
				NA	11 18 28			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), water saturated.
90	NA		P-22 @ 90					
				NA	14 22 30			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), water saturated.
	NA		P-22 @ 93					
				0.0	13 21 30			SAND, fine to medium grained, yellowish brown (10YR, 5/6), water saturated.
95	NA		P-22 @ 95					
				NA	8 16 24			SAND, fine to medium grained, dark red (2.5YR, 4/6), water saturated.
	NA		P-22 @ 98					
				NA	10 16 25			SAND, fine to medium grained, dark red (2.5YR, 4/6), water saturated.
100	NA		P-22 @ 100					

WELL DIAGRAM



DEPTH (ft): 85, 90, 95, 100

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-22

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP				
				NA	13 / 17			SAND, fine to medium grained, dark red (2.5YR, 4/6), water saturated.		
	NA		P-22 @ 102		22					
				NA	11 / 18			SAND, fine to medium grained, dark red (2.5YR, 4/6), water saturated.	Formation Collapse	
105	NA		P-22 @ 105		28					105
						ML CL		Clayey SILT, olive (5Y, 5/4), high plasticity, stiff, slightly moist.		
				0.0	8 / 12					
	NA		P-22 @ 108		18					
								End of Boring @ 108 ft. Set 4-inch groundwater monitoring well at 87 ft.		
110										110
115										115
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		
120										120

GERAGHTY & MILLER, INC.

WELL LOG

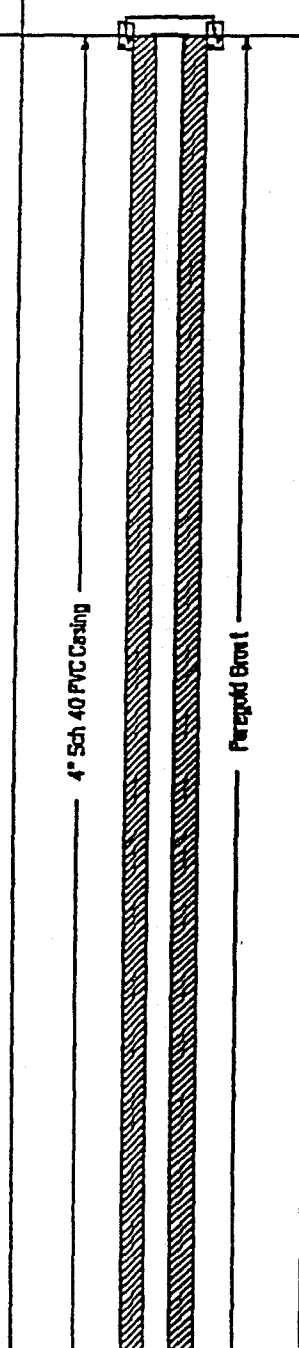
OJECT International Light Metals
CATION 19200 S. Western, Torrance, CA
RILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shiplone
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-23
DATE STARTED 11/17/95
DATE COMPLETED 11/17/95
BORING DEPTH 75.3 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
								Sand (8")
						CL		
				0.0	6			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
					8			
5	100		P-23 @ 5		8			
						ML		
				0.0	7			SILT, trace Clay, trace very fine grained Sand, yellowish brown (10YR, 5/6), non to low plasticity, moist.
					11			
10	100		P-23 @ 10		14			
				0.3	10			SILT, trace Clay, trace very fine grained Sand, yellowish brown (10YR, 5/6), non to low plasticity, moist.
					11			
15	100		P-23 @ 15		16			
						ML SM		
				0.0	12			SILT, trace Clay, increasing in very fine grained Sand, yellowish brown (10YR, 5/6), non to low plasticity, moist.
					14			
20	100		P-23 @ 20		18			

WELL DIAGRAM



GERAGHTY & MILLER, INC.

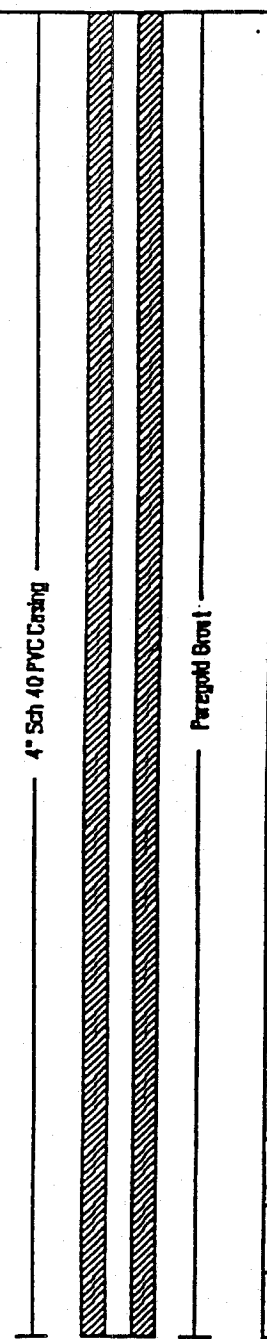
WELL LOG

(continuation)

.CT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-23

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML SM		
						SP		
					15			SAND, little Silt, yellowish brown (10YR, 5/4), slightly moist to moist.
				0.0	22			
25	100		P-23 @ 25		25			
						ML		
					11			SILT, trace very fine grained Sand, olive (5Y, 5/3), non plastic, slightly moist.
	100		P-23 @ 30D	2.4	13			
30	100		P-23 @ 30		17			
						SM		
					20			Silty SAND, very fine grained, some Silt, yellowish brown (10YR, 5/6), slightly moist to moist.
				3.8	27			
35	100		P-23 @ 35		30			
						ML		
					8			SILT, little Clay, light olive brown (2.5Y, 5/4), moderate plasticity, moist.
				4.2	16			
40	100		P-23 @ 40		21			

WELL DIAGRAM



DEPTH (ft): 25, 30, 35, 40

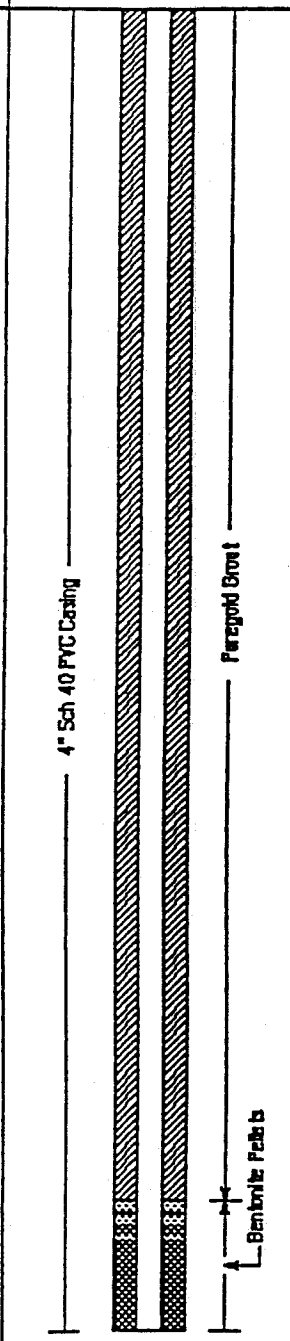
GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-23

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						ML				
						SP				
					38			SAND, very fine grained, light gray (2.5Y, 7/1), slightly moist to moist.		
				0.0	50/6					
	100		P-23 @ 45							
45										45
					27			SAND, very fine grained, light gray (2.5Y, 7/1), slightly moist to moist.		
				0.0	36					
	100		P-23 @ 50		42					
50										50
					32			SAND, very fine grained, light gray (2.5Y, 7/1), slightly moist to moist.		
				0.0	65					
	100		P-23 @ 55							
55										55
					28			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.		
				1.1	30					
	100		P-23 @ 60		41					
60										60



GERAGHTY & MILLER, INC.

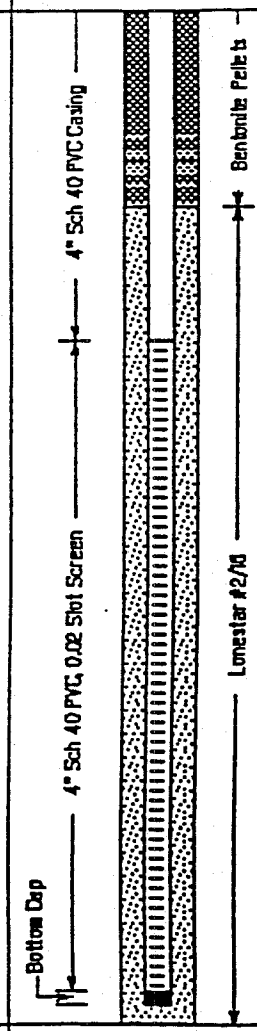
WELL LOG

(continuatio

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-23

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				0.0	21			SAND, very fine grained, yellowish brown (10YR, 5/8), moist.
					32			
65	100		P-23 @ 65		40			
				0.1	17			SAND, very fine grained, yellowish brown (10YR, 5/8), wet.
					22			
70	100		P-23 @ 70		30			
								Water encountered at 72 ft-bgs.
				8.5	15			SAND, very fine grained, yellowish brown (10YR, 5/3), water saturated. (top 0.5 ft of sample)
					16	ML		SILT, trace Clay, olive (5Y, 5/3), low plasticity, moist. (bottom 1 ft of sample).
75	100		P-23 @ 75		17			
80								

WELL DIAGRAM



End of Boring @ 75.3 ft. Set 4-inch groundwater monitoring well at 75 ft.

This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

WELL LOG

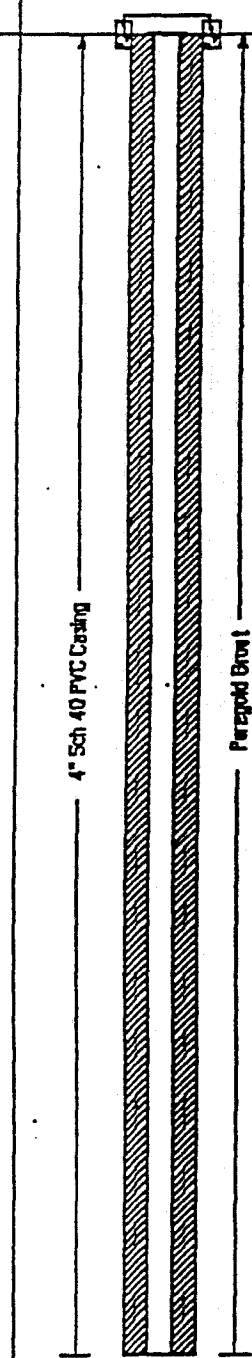
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CMSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shiplone
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER C. Winegarner

BORING P-24
DATE STARTED 11/16/95
DATE COMPLETED 11/20/95
BORING DEPTH 75 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
					4			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
				0.0	7			
5	100		P-24 @ 5		11			
						ML		
					8			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
				0.0	10			
10	NA		P-24 @ 10		10			
					8			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
				0.0	9			
15	100		P-24 @ 15		15			
					14			SILT, trace Clay, trace very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
	100		P-24 @ 200	0.0	15			
20	100		P-24 @ 20		23			

WELL DIAGRAM



GERAGHTY & MILLER, INC.

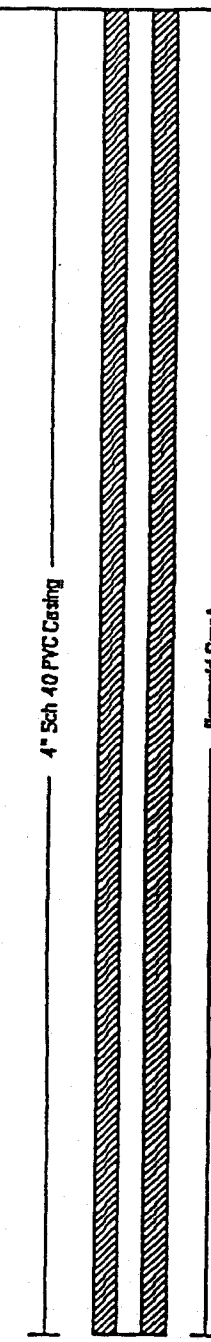
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-24

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		
						ML SM		
				0.0	11			SILT, trace Clay, increasing very fine grained Sand, dark yellowish brown (10YR, 4/4), non to low plasticity, moist.
					16			
25	100		P-24 @ 25		20			
						SP		
				0.0	14			SAND, very fine grained, yellowish brown (10YR, 5/8), slightly moist to moist.
					16			
30	100		P-24 @ 30		24			
						ML		
				33.1	8			SILT, little very fine grained Sand, yellowish brown (10YR, 5/8), non plastic, moist.
					16			
35	100		P-24 @ 35		28			
				34.2	16			SILT, increasing in very fine grained Sand, yellowish brown (10YR, 5/8), non plastic, moist.
					28			
40	100		P-24 @ 40		34			

WELL DIAGRAM



DEPTH (ft): 25, 30, 35, 40

GERAGHTY & MILLER, INC.

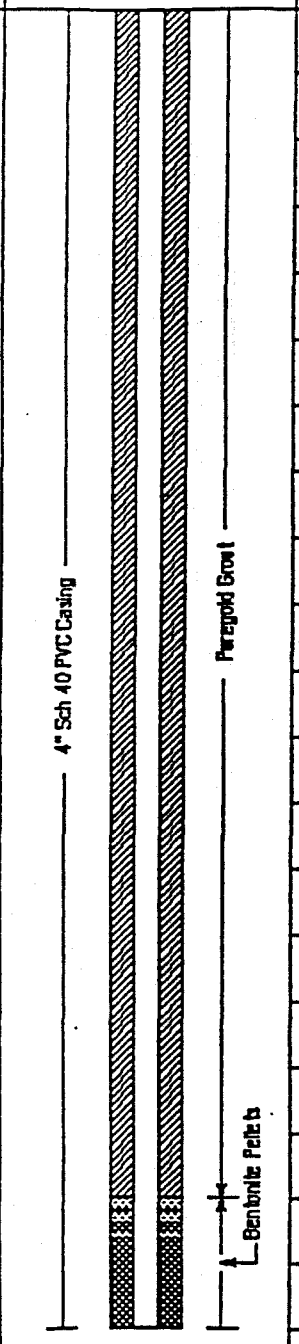
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-24

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						ML		
				105	13 15 23			SILT, little Clay, olive (5Y, 5/3), low plasticity, slightly moist.
45	100		P-24 @ 45					
				249	10 12 17			SILT, little Clay, olive (5Y, 5/3), low plasticity, slightly moist.
50	100		P-24 @ 50					
						SP		
				60.8	12 20 27			SAND, very fine grained, trace Silt, light olive brown (2.5Y, 5/3), moist.
55	100		P-24 @ 55					
				0.0	25 37 43			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
60	100		P-24 @ 60					

WELL DIAGRAM



DEPTH (ft): 45, 50, 55, 60

GERAGHTY & MILLER, INC.

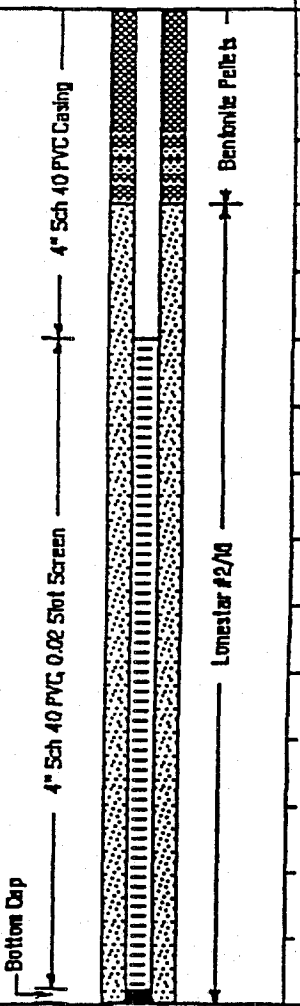
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-24

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				0.0	18			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), moist.
					28			
85	100		P-24 @ 65		36			
				168	18			SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), very moist to wet.
			P-24 @ 70		26			
70	100				33			
								Water encounterd at 73 ft-bgs.
					8			Top 0.5 ft: SAND, very fine grained, trace Silt, yellowish brown (10YR, 5/6), water saturated.
				225	15	SP ML		SILT, trace Clay, very fine grained Sand, olive brown (2.5Y, 4/4), non plastic, moist.
75	100		P-24 @ 75		17			
								End of Boring @ 75 ft. Set 4-inch groundwater monitoring well at 75 ft.
								This work was performed under my supervision and I concur with the findings.
								Anthony C. Ward, CA R.G. #4782
80								

WELL DIAGRAM



GERAGHTY & MILLER, INC.

WELL LOG

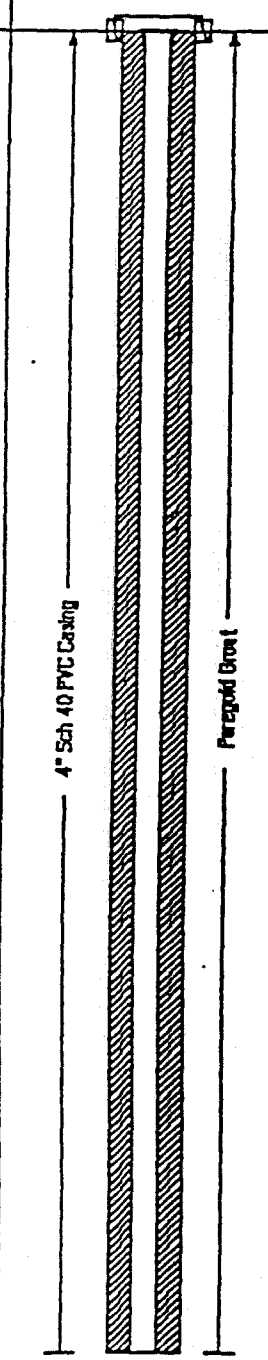
PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Hollow Stem Auger
SAMPLING METHOD CNSS
BOREHOLE DIAMETER 10 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY M. Shipione
DRILL CO. Gregg Drilling and Testing, Inc.
RIG TYPE B-61
DRILLER T. Garver

BORING P-25
DATE STARTED 11/27/95
DATE COMPLETED 11/27/95
BORING DEPTH 80 ft.

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
								Concrete (8")
						CL		
				1.6	6 / 7 / 7			CLAY, little Silt, dark olive gray (5Y, 3/2), high plasticity, stiff, moist.
5	100		P-25 @ 5					
						ML		
				2.4	8 / 14 / 17			SILT, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
10	100		P-25 @ 10					
				4.2	7 / 10 / 12			SILT, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
15	100		P-25 @ 15					
				3.7	11 / 15 / 18			SILT, trace Clay, dark yellowish brown (10YR, 4/4), non plastic, moist.
20	100		P-25 @ 20					
						SP		
				7.3	12 / 16 / 22			SAND, trace Silt, yellowish brown (10YR, 5/6), non plastic, slightly moist.
25	100		P-25 @ 25					

WELL DIAGRAM



DEPTH (ft): 5, 10, 15, 20, 25

GERAGHTY & MILLER, INC.

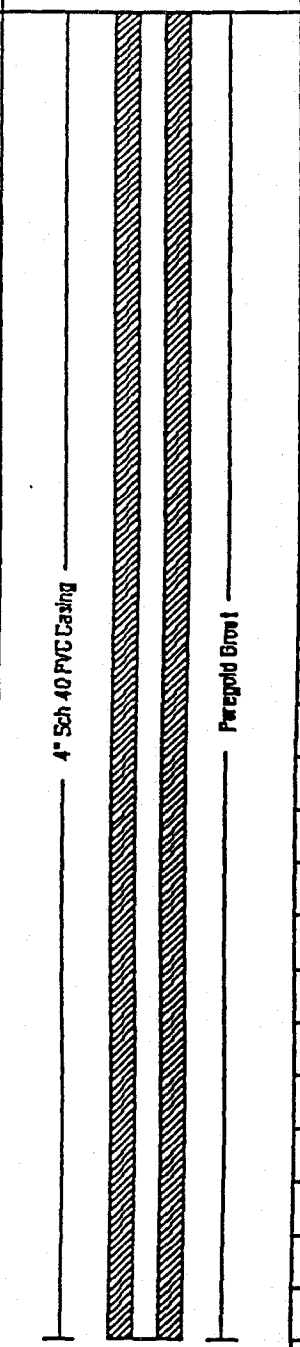
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-25

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				4.3	11 14 16			SAND, trace Silt, yellowish brown (10YR, 5/6), non plastic, slightly moist.
30	100		P-25 @ 30					
						ML		
				38.1	15 18 26			SILT, trace very fine grained Sand, yellowish brown (10YR, 5/4), non plastic, moist.
35	100		P-25 @ 35					
						ML/SM		
				48.3	17 26 35			SILT, increasing in very fine grained Sand, yellowish brown (10YR, 5/4), non plastic, moist.
40	100		P-25 @ 40					
						SP		
				38.8	11 21 28			SAND, trace Silt, yellowish brown (10YR, 5/6), slightly moist to moist.
45	100		P-25 @ 45					
				3.8	16 23 28			SAND, trace Silt, yellowish brown (10YR, 5/6), moist.
50	100		P-25 @ 50					

WELL DIAGRAM



DEPTH (ft): 30, 35, 40, 45, 50

GERAGHTY & MILLER, INC.

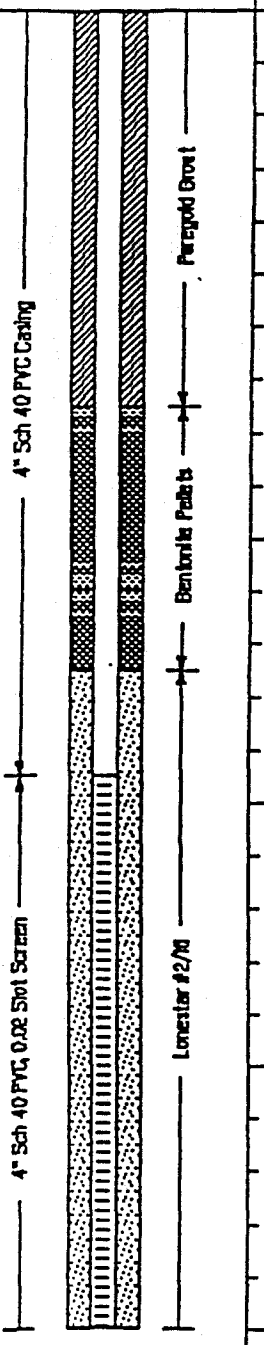
WELL LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. P-25

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL
						SP		
				52.1	11 14 23			SAND, trace Silt, light olive brown (2.5Y, 5/4), moist.
55	100		P-25 @ 55					
				4.2	12 16 22			SAND, trace Silt, light olive brown (2.5Y, 5/4), moist.
80	100		P-25 @ 60					
				106	14 18 24			SAND, trace Silt, light olive brown (2.5Y, 5/4), moist.
85	100		P-25 @ 65					
			P-25 @ 70	83	13 20 35			SAND, trace Silt, light olive brown (2.5Y, 5/4), very moist.
70	100							
								Water encountered at 72.5 ft-bgs.
				236	13 20 33			SAND, trace Silt, light olive brown (2.5Y, 5/4), water saturated.
75	100		P-25 @ 75					

WELL DIAGRAM



DEPTH (ft): 55, 80, 85, 70, 75

GERAGHTY & MILLER, INC.

WELL LOG

(continuation)

CT International Light Metals PROJECT NO CAD 217.020.002 BORING NO. P-25

DEPTH (ft)	RECOVERY %	SAMP. INTERVAL	SAMPLE NO.	PID (ppm)	BLOWS/6 in.	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL	WELL DIAGRAM	DEPTH (ft)
						SP		SAND, trace Silt, light olive brown (10YR, 5/6), water saturated. (top 0.5 ft of sample)		
					10					
				755	15	ML		Clayey SILT, olive brown (2.5Y, 4/3), moderate plasticity, slightly moist to moist.		
80	100		P-25 @ 80		18			End of Boring @ 80.0 ft. Set 4-inch groundwater monitoring well at 79.5 ft.	Slot Screen; 4" Sch 40 PVC, 0.02 Bottom Cap; Lonestar #2/10	80
85										85
90										90
95										95
100										100

This work was performed under my supervision and I concur with the findings.

Anthony C. Ward

Anthony C. Ward, CA R.G. #4782

GERAGHTY & MILLER, INC.

BORING LOG

PROJECT International Light Metals
TION 19200 S. Western, Torrance, CA
METHOD Rotosonic
ING METHOD Core Barrel
BOREHOLE DIAMETER 8, 6, and 5 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY D. Willis
DRILL CO. Lang
RIG TYPE Rotosonic
DRILLER D. Casey

BORING DB-1
DATE STARTED 11/20/95
DATE COMPLETED 11/28/95
BORING DEPTH 225 ft.

DEPTH (ft)	RECOVERY %	WENT. SCALE (Φ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	NA	NA	< 1	1	CL		Very Sandy CLAY, with Silt, yellowish brown (10YR, 5/8), loose, soft, slightly moist, unconsolidated.	HNU BACKGROUND: 0.8 ppm SAMPLE TYPE: Bag COMMENTS: * Grain size is recorded in Wentworth Scale in third column, (see attached grain size scale). * Unconfined strength is recorded in the sixth column.	
5	100	NA	NA	< 1	NA	SC		Clayey SAND, very fine grained, with Silt, yellowish brown (10YR, 5/8), loose, soft, slightly moist.		5
10								Clayey SAND, very fine grained, with Silt, yellowish brown (10YR, 5/8), loose, soft, slightly moist. Gradational contact.		10
	100	2.5	NA	< 1	NA	SP		SAND, very fine grained, with Silt, light yellowish brown (10YR, 6/8), loose, slightly moist, grains are subangular.		
15								As Above		15
	100	2.5-3	NA	< 1	NA			SAND, very fine grained, minor Silt, yellowish brown (10YR, 6/8), loose, slightly moist, angular to subangular, 95% silica, 5% dark grains, homogeneous, no obvious bedding.		
								As above		
	NA	2.5-3	NA	< 1	NA					
20										20

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	PENT. SCALE (#)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SP				
25	100	3	NA	< 1	NA			SAND, very fine grained, with Silt, light yellowish brown (10YR, 6/4), loose, slightly moist, subangular, thinly bedded (horizontal 1-2 mm) with (1-2%) clay/silt blebs, 5-10 mm diameter.		25
30	100	2.5	NA	< 1	NA			SAND, very fine grained, pale brown (10YR, 7/4), loose, slightly moist, subangular, horizontal bedding 1-10 mm thick.		30
								SAND, very fine grained, pale brown (10YR, 7/4), loose, slightly moist, subangular, horizontal bedding 1-10 mm thick.		
35	100	2.5	NA	<1	NA			SAND, very fine grained, light yellowish brown (10YR, 6/4), loose, slightly moist, subangular, 95% silica, 5% olivine, no obvious bedding, < 1% gravel sized quartz grains.		35
								As above		
40	NA	2.5	NA	< 1	NA			SAND, very fine grained, light yellowish brown (10YR, 6/4), loose, slightly moist, subangular, 95% silica, 5% olivine, < 1% gravel sized quartz grains, with minor (1%) silt blebs 5-10 mm diameter.		40

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	PENT. SCALE (°)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SP				
	100	2.5	NA	NA	NA			SAND, very fine grained, light yellowish brown (10YR, 6/4), loose, slightly moist, (95% silica, 5% dark grains, subangular with 1% silt blebs oriented horizontally.		
45	100	2.5	NA	NA	NA			As above		45
	NA	2.5	NA	NA	NA			As Above		
50	NA	2.5	DB-1 @ 50	NA	NA			As above		50
	100	1.5-3	NA	NA	NA			SAND, very fine grained, brownish yellow (10YR, 6/6), loose, slightly moist, angular, no obvious bedding.		
55	100	1.5-3	NA	NA	NA			As above		55
	90	2-3	NA	< 1	NA			SAND, very fine grained, yellowish brown (10YR, 5/8), loose, slightly moist, angular to subangular.		
60										60

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	WENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCOND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SP		As above		
	NA	3	NA	<1	NA	SM		Silty SAND, very fine grained, light brownish gray (10YR, 6/2), semi-loose, slightly moist, subangular.		
	NA	2-2.5	NA	NA	NA	SP		SAND, very fine grained, yellowish brown (10YR, 5/8), loose, slightly moist, angular to subangular, no obvious bedding.		
	NA	2-2.5	NA	<1	NA			SAND, very fine grained, brownish yellow (10YR, 6/8), slightly moist to moist, minor (<1%) silt blebs 1-2 cm diameter (oblong horizontally).		
65										65
	NA	2.5	NA	<1	NA			SAND, very fine grained, yellowish brown (10YR, 5/4), moist to wet, minor silt laminae (1-5 mm thick, olive green), abundant iron stained sand lenses (orange), horizontal bedding.		
70										70
	NA	2.5	NA	<1	NA			SAND, very fine grained, yellowish brown (10YR, 5/4), moist to wet, minor silt laminae (olive to black, 1-5 mm thick) contorted but horizontal, abundant Fe stained sand lenses.		
	100	2.5-3	NA	<1	NA			SAND, very fine grained, yellowish brown (10YR, 5/4), loose, water saturated.	First occurence of groundwater.	
75										75
	NA	NA	NA	<1	2.5	CL		Sandy Silty CLAY, olive (5Y, 4/4), plastic, very stiff, slightly moist, occasional (2-3%) Fe stained silt/sand laminae 1-3 mm thick.		
	100	NA	NA	NA	2.7	ML		Clayey SILT, minor interlayered very fine grained Sand, olive (5Y, 4/4), very stiff, slightly moist, semi-consolidated, horizontal bedding.		
80										80

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	PENT. SCALE (ft)	SAMPLE NO.	PID (ppm)	UNCOND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						ML				
	100	NA	NA	< 1	1	CL		CLAY, minor Silt, dark gray (2.5Y, 4/1), semi-plastic, soft, slightly moist.		
85	100	NA	NA	NA	4.2			Very Sandy CLAY, some fine grained Sand (20-30%), olive (5Y, 4/3), semi-stiff, slightly moist, some Fe staining, thinly bedded (1-5 mm thick).	Set 8-inch drill pipe as temporary casing.	85
	NA	0.5-1.5	NA	NA	NA	SC		Clayey SAND, fine to medium grained, dark yellowish brown (10YR, 3/6), soft, wet, > 80% silica.		
	100	0.5-3	NA	< 1	NA	SW		SAND, very fine to medium grained, with Clay, dark yellowish brown (10YR, 4/4), loose, very wet, well graded, massive.		
90								As above		90
	100	0.5-2.5	NA	< 1	NA			SAND, very fine to medium grained, with Clay, dark yellowish brown (10YR, 4/4), loose, water saturated.	Second occurence of groundwater.	
								As Above		
	100	0.5-2.5	NA	< 1	NA			SAND, fine to medium grained, with minor Clay, yellowish brown (10YR, 4/4), loose, very wet, with orange Fe staining mottling, > 80% silica.		
95	NA	0.5-2.5	DB-1 @ 96	NA	NA					95
	100	1-2.5	DB-1 @ 97	NA	NA	SC		Very Clayey SAND, very fine to medium grained, olive (5Y, 4/3), loose, wet, > 80% silica, 10% clay.		
100										100

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	MENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SC		Very Clayey SAND, very fine to medium grained, olive (5Y, 4/3), loose, water saturated, > 80% silica, 10% clay.		
	100	3.5	NA	< 1	4.0					
	100	NA	NA	NA	2.0	CL		Clayey SAND, very fine grained, with Silt, olive (5Y, 4/3), semi-stiff, massive.	Set 8-inch drill pipe as temporary casing.	
								CLAY, very dark grayish brown (2.5YR, 3/2), medium stiff, massive, slightly moist.		
								As above		
105	100	1-2	NA	NA	NA	SC		Clayey SAND, fine to medium grained, dark gray (2.5Y, 4/1), loose, moist to wet, > 80% silica, massive.		105
	80	1-2	NA	< 1	NA			Clayey SAND, fine to medium grained, light olive brown (2.5Y, 5/4), loose, moist to wet, > 80% silica, massive.		
110	NA	0.5-1.5	NA	< 1	NA	SP		SAND, fine to medium grained, light olive brown (2.5Y, 5/4), loose, wet, 85% silica, 3% olivine, 2% feldspars/magnetite, massive.		110
115	NA	0.5-1.5	NA	< 1	NA			As Above		115
120										120

CT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	MENT. SCALE ϕ	SAMPLE NO.	PID (ppm)	UNCND STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	NA	0.5-1	NA	NA	NA	SP		SAND, fine to medium grained, light olive brown (2.5Y, 5/4), very loose, wet, well sorted, 95% silica, 3-5% olivine, 1% feldspars.		
	NA	NA	NA	NA	4.0	CL		Silty CLAY, olive brown (2.5Y, 4/4), stiff, slightly moist.	Advanced 8-inch drill pipe as temporary casing.	
125										125
	100	3.5	NA	< 1	0.5			Sandy CLAY, very fine grained Sand, dark gray (5Y, 4/1), plastic, moist, gradational contact to underlying clayey sand.		
	NA	3-3.5	NA	NA	NA	SC		Clayey SAND, very fine grained, dark olive gray (5Y, 3/2), loose, moist to wet.		
	NA	NA	NA	NA	3.0	CL		Silty CLAY, with minor fine grained Sand, olive (5Y, 4/4) grades to gray (2.5Y, 5/1) at base, medium stiff, massive, slightly moist, gradational contact to clayey sand below.		
130										130
	NA	2-2.5	NA	NA	3.0	SC		Clayey SAND, very fine grained, gray (2.5Y, 4/1), loose, moist, 15% clay, sand is > 95% silica.		
	NA	NA	NA	NA	2.7	CL		Sandy CLAY, very fine grained Sand, with Silt, dark gray (5Y, 4/1), medium stiff, some fine contorted olive silt interlaminae.		
	NA	0.5-2	NA	< 1	NA	SP		SAND, fine to medium grained, very loose, massive, very wet, 97% silica, 1% olivine, 1% feldspars.		
135										135
								As above		
140										140

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	PENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SP				
145	60	1.5-2.5	NA	< 1	NA			SAND, very fine to fine grained, olive gray (5Y, 5/2), loose, water saturated, 80% silica, 5-10% olivine.	Third occurence of groundwater.	145
	NA	1.5-2.5	DB-1 @ 148	NA	NA					
150										150
	100	1-2	DB-1 @ 152	NA	NA	SW		SAND, very fine to medium grained, olive gray (5Y, 5/2), very loose, water saturated, 80% silica, 7% olivine, 1-2% feldspars.		
155								As above		155
160										160

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

F. _T International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	WENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SW		SAND, very fine to medium grained, olive gray (5Y, 5/2), loose, water saturated, 60% silica, 7% olivine, slightly more fines towards 185 ft with 2-5% clay.		
								Gradational contact.		
185	100	1.5-3	NA	NA	NA	SP		SAND, very fine to fine grained, with minor Clay (5%), olive gray (5Y, 4/2), loose, water saturated, sand is 65-60% silica and 10% olivine.		185
170										170
175	80	2-3	NA	< 1	NA			SAND, very fine grained, with minor Clay, dark gray (5Y, 4/1), very loose, water saturated, 80% silica and 20% olivine, massive.		175
180										180

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	PENT. SCALE (°)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SP				
185	100	2-3	NA	NA	NA			As above		185
	100	3-3.5	NA	NA	NA	SC		Clayey SAND, very fine grained, dark grayish brown (2.5Y, 4/2), medium dense, water saturated, sand is 50-70% silica and 30-40% olivine and 10% feldspars/magnetite, 10% clay fraction, massive. Very minor (0.1%) bivalve fragments 1 mm thick in size, fragment abundance increases to 0.5% and fragment size increases to 1-10 mm at 187 ft, clay increases to 15% at 187 ft.		190
190										
195										195
	NA	3-3.5	NA	< 1	NA			As above		
								Clayey SAND, very fine grained, gray (2.5Y, 5/1), loose, 50% sand, 5% clay, 45% bivalve and fossil fragments, fragments are not cemented or replaced and are 1-10 mm in size.		
200										200

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	WENT. SCALE ϕ	SAMPLE NO.	PID (ppm)	UNCND STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	NA	NA	NA	NA	SC		Clayey SAND, very fine grained, gray (2.5Y, 5/1), loose, very wet to saturated, fossils consist of bivalvia, gastropoda, turritelid, crinoidea.		
	100	NA	NA	NA	NA	SW		SAND, very fine to medium grained, with minor clay, gray (5Y, 5/1), very loose, very wet to water saturated, sand is 80-90% silica, 8-9% olivine, 1% feldspars/magnetite. more clay towards base.		
205										205
								Gradational Contact		
	100	NA	NA	NA	2.0	CL		Very Sandy Silty CLAY, very fine grained Sand, dark olive gray (5Y, 3/2), plastic, soft, very moist to wet, 1-2 mm thick horizontal laminae, 10-20% sand, sand interbeds 1-3 cm thick towards base.		
210										210
	NA	1.5-2.5	NA	NA	NA	SP		SAND, very fine grained, very dark gray (5Y, 3/1), loose, very wet, sand is 80% silica and 10-15% olivine and 0.5% fossil fragments 1-2 mm thick.		
215										215
220						CL				220

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-1

DEPTH (ft)	RECOVERY %	MENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	NA	NA	NA	NA	3.75	CL		Silty CLAY, dark gray (2.5Y, 4/2), medium stiff, slightly moist, minor sand/clay interlaminations throughout 1-5mm thick, bedding always horizontal.		
225								End of Boring @ 225 ft. Borehole backfilled with Puregold grout.		225
230										230
235										235
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		
240										240

GERAGHTY & MILLER, INC.

BORING LOG

PROJECT International Light Metals
LOCATION 19200 S. Western, Torrance, CA
DRILL METHOD Rotosonic
SAMPLING METHOD Core Barrel
BOREHOLE DIAMETER 8 and 6 inches O.D.

PROJECT NO. CAO 217.020.002
LOGGED BY D. Willis
DRILL CO. Lang
RIG TYPE Rotosonic
DRILLER D. Casey

BORING DB-2
DATE STARTED 11/29/95
DATE COMPLETED 12/1/95
BORING DEPTH 228 ft.

DEPTH (ft)	RECOVERY %	WENT. SCALE *	SAMPLE NO.	PID (ppm)	UNCND STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	3.5	NA	2.0	NA	CL		Silty CLAY, dark olive gray (5Y, 3/1), very stiff, massive, slightly moist, consolidated.	HNU BACKGROUND: 0.3 – 1.8 ppm SAMPLE TYPE: Ring COMMENTS: * Grain Size is recorded in Wentworth Scale in the third column (see attached grain size scale). * Unconfined Strength is recorded in the sixth column.	
5										5
	100	NA	NA	2.0	NA	ML		Clayey SILT, very minor fine grained Sand (towards base), olive (5Y, 4/3), loose, crumbly, slightly moist.		
10								Clayey SILT, 10% very fine grained Sand, olive (5Y, 4/3), loose, crumbly, slightly moist.		10
	NA	4	NA	NA	NA			Clayey SILT, olive (5Y, 4/3), semi-stiff, crumbly, massive, slightly moist.		
15	100	NA	NA	NA	0.75			Clayey SILT, with very minor very fine grained Sand (10%), olive (5Y, 4/4), <1% fine grained sand randomly distributed, slightly more clay towards base, 70% silt, 20% clay, 10% sand.		15
20										20

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	WENT. SCALE (°)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	NA	NA	NA	NA	ML		As above		
25	80	NA	NA	NA	NA			As above, slightly sandier (20% sand).		25
	10	2-3	NA	NA	NA	SP		SAND, very fine grained, light olive brown (2.5Y, 5/6), loose, slightly moist, very poorly graded, 90% silica, 5% olivine.		
30	100	2-3	NA	NA	< 1			As above		30
35	100	2-3	NA	NA	NA			As above		35
	100	2-3	NA	NA	NA			SAND, very fine grained, light olive brown (2.5Y, 5/6), loose, slightly moist, minor clay laminae and blebs (1%) up to 1 cm thick, horizontal.		
	100	2-3	NA	NA	NA			As above		
40										40

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	PENT. SCALE (ft)	SAMPLE NO.	PID (ppm)	UNCONO. STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SP				
	100	2-3	NA	< 1	NA			As above, with clay interlaminai and blebs, slightly more prevalent (2%) and slightly thicker (up t 2 cm).		
45	100	2-3	NA	NA	< 1			As above		45
				< 1				As above, with silty sand interbeds (10 cm thick), horizontal bedding.		
50	100	2.5	DB-2 @ 50	< 1	NA			SAND, very fine grained, olive yellow (5Y, 5/6), loose, slightly moist, very poorly graded, very minor (1%) silt/clay interlaminae near base.		50
55	100	1-2	NA	NA	NA			SAND, very fine to fine grained, yellowish brown (10YR, 5/6), loose, bivalves throughout, 10% fragments (1-30 mm thick), calcareous.		55
								As above, but olive (5Y, 5/4), partially cemented.		
								SAND, very fine to fine grained, yellowish brown (10YR, 5/6), loose, bivalves throughout, 10% fragments (1-30 mm thick), calcareous.		
	100	1-2	NA	< 1	NA			As Above		
60										60

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	PENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SP		SAND, fine grained, olive (5Y, 5/6), very loose, slightly moist, with very minor (1%) silt/clay blebs, 5-20 mm thick by 20-30 mm long, horizontal.		
	100	1.5-2.5	NA	NA	NA					
	NA	NA	NA	< 1	NA			As above, except moist to very moist at 66 ft-bgs.		
65										65
	NA	NA	NA	< 1	NA			As above, except very moist at 67 ft to wet at 71 ft-bgs.		
70										70
	100	1-2.5	NA	NA	NA			SAND, very fine to medium grained, olive (5Y, 4/3), loose, very wet, with silt interlaminae 1-2 cm thick near top.		
75	NA	NA	NA	1.5	NA			As above, except water saturated.	First occurrence of groundwater.	75
	100	2-2.5	NA	NA	NA	SC		Clayey SAND, very fine to fine grained, olive (5Y, 4/3), soft, wet to water saturated, 70% sand, 30% clay.		
80										80

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	PENT. SCALE ϕ	SAMPLE NO.	PID (ppm)	UNCND STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						SC				
	100	1.5-3	NA	2	NA	SP		SAND, very fine to fine grained (predominantly very fine grained), olive (5Y, 4/3), loose, moist to wet. minor (<1%) thin (<1mm) clay interlaminae (horizontal).		
85								As above		85
	100	1.5-3	NA	NA	NA					
	100	2-2.5	NA	NA	NA	SC		Clayey SAND, very fine to fine grained, olive (5Y, 4/3), soft, moist, 30% clay, 70% sand.		
	100	1-2	NA	NA	NA	SP		SAND, fine to medium grained, olive yellow (5Y, 5/8), loose, water saturated, 97% silica, 3% olivine.	Second occurrence of groundwater at 87 ft-bgs.	
90	NA	NA	NA	2	NA			As above		90
	100	1-2	NA	NA	NA			As above		
95										95
	100	0.5-1	NA	NA	NA			SAND, fine to medium grained, olive yellow (5Y, 5/8), loose, water saturated, 97% silica, 3% olivine, with stringer of medium grained sand 10 cm thick at 98 ft-bgs, orange (Fe stained) and loose.		
100	NA	NA	DB-2 @ 100	NA	NA					100

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	WENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	NA	DB-2 @ 101	NA	NA	SP				
	100	2.5-3	NA	< 1	> 5	SC		Clayey SAND, very fine grained, olive (5Y, 4/3), very stiff, massive, slightly moist.		
	NA	1-2	NA	NA	NA	SP		SAND, fine to medium grained, olive (5Y, 4/4), loose, water saturated.		
						SC		Clayey SAND, very fine grained, olive (5Y, 4/3), very stiff, massive, slightly moist.		
	100	1-2	NA	NA	NA	SP		SAND, fine to medium grained, olive (5Y, 4/3), loose, water saturated.		
105	100	NA	NA	< 1	NA			As Above		105
110	100	NA	NA	< 1	NA			As Above		110
115	100	2.5-3	NA	< 1	NA	SC		Clayey SAND, very fine grained, dark olive gray (5Y, 3/2), loose, slightly moist to moist, 80-90% sand, 10% clay present in stringers 1-3 cm thick, 70% olivine, 30% silica.		115
120	100	NA	NA	NA	3.0	CL		Very Silty Sandy CLAY, very fine grained Sand, dark olive gray (5Y, 3/2), stiff, slightly moist, 50% clay, 30% silt, 20% sand, very thinly bedded to laminated.		120

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	WENT. SCALE ϕ	SAMPLE NO.	PID (ppm)	UNCND STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
						CL				
	100	NA	NA	< 1	NA			As above, except slightly sandier towards base, gradational contact.	Set 8-inch drill pipe as temporary casing.	
125	NA	2.5-3	NA	NA	1.0	SC		Clayey SAND, very fine grained, dark olive gray (5Y, 3/2), plastic, soft, massive, slightly moist, 70% sand, 30% clay, 70% olivine, 30% silica, gradational contact.		125
	100	2.5	NA	NA	NA	SP		SAND, very fine grained, olive gray (5Y, 4/2), loose, slightly moist, very poorly graded, 60% olivine, 40% silica.		
130	100	3-3.5	NA	< 1	NA	SP ML		SILT, SAND, very fine grained, interbeds, sand is olive (5Y, 4/2), silt is dark gray, interbeds and interlaminae are 2-10 mm thick horizontal, slightly contorted.		130
	100	3-3.5	NA	< 1	NA			As above		
	100	0.5-1.5	NA	NA	NA	SP		SAND, fine to medium grained, olive (5Y, 5/3), loose, wet, 80% silica, 7% olivine, 3% feldspars, gradational contact.		
135	100	1-2.5	NA	NA	NA	SC		Clayey SAND, fine grained, dark olive gray (5Y, 3/2), semi loose, wet.		135
	100	NA	NA	< 1	3.0	CL		Silty CLAY, dark olive gray (5Y, 3/2), plastic, soft, massive, moist, malleable, sandy towards base.		
140						SP				140

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT: International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	PENT. SCALE (ft)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	1.5-2.5	NA	NA	NA	SP		SAND, fine to very fine grained, olive (5Y, 4/3), loose, massive, wet, slightly clayey at top, 80% silica, 20% olivine.		
145	100	0-2	NA	< 1	NA	SW		SAND, fine to medium grained, olive gray (5Y, 4/2), very loose, water saturated, 95% silica, 5% olivine.	Third occurrence of groundwater at 145 ft-bgs.	145
	NA	NA	DB-2 @ 143	NA	NA					
150								As above		150
	NA	NA	DB-2 @ 152	NA	NA					
155	100	NA	NA	< 1	NA			As above		155
180										180

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	MENT. SCALE (°)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	NA	1-3	NA	< 1	NA	SW		SAND, very fine to medium grained, predominately fine grained, olive gray (5Y, 3/2), very loose, water saturated, 85% silica, 5% olivine.		
185	100	0-2	NA	< 1	NA			SAND, very fine to medium grained, olive gray (5Y, 4/2), very loose, water saturated, 85% silica, 3% olivine, 2% limonite/magnetite.		185
170								As Above		170
175	NA	NA	NA	< 1	NA			As Above		175
180	100	2-2.5	NA	NA	NA	SP / SW		SAND, very fine grained, dark olive gray (5Y, 3/2), loose, massive, wet, 65% silica, 35% olivine.		180

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

.CT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	PENT. SCALE Φ	SAMPLE NO.	PID (ppm)	UNCND STRENGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	0.5-2.0	NA	NA	NA	SW		SAND, very fine to fine grained, olive gray (5Y, 4/2), loose, wet to water saturated.		
	100	2-2.5	NA	NA	NA	SP		SAND, very fine grained, dark olive gray (5Y, 3/2), loose, wet.		
185	100	2-2.5	NA	1.2	NA			As above		185
190		2-2.5	NA	NA	NA			As above, except water saturated.		190
195	100	2.5-3	NA	1.5	NA			SAND, very fine grained, dark olive gray (5Y, 3/2), medium dense, wet, 60% silica, 40% olivine.		195
200						SC				200

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

PROJECT International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	PENT. SCALE (ft)	SAMPLE NO.	PID (ppm)	UNCONO. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	3-3.5	NA	< 2	NA	SC		Very Clayey SAND, very fine grained, dark olive gray (5Y, 3/1), soft, moist, very minor (0.1%) bivalve fragments 1-10 mm long scattered throughout, 55%, sand, 40% clay, 5% silt.		
205								As above, gradational contact.		205
	100	1.5-3	NA	NA	NA	SP		SAND, very fine to fine grained, dark olive gray (5Y, 3/2), medium dense, 50-60% silica, 40-50% olivine, minor bivalve fragments 1-5 mm throughout (0.1%).		
	100	0.5-3	NA	NA	NA	SW		SAND, very fine to medium grained, olive gray (5Y, 5/2), loose, highly fossilerous, 15% fossi fragments 1-10 mm in size (bivalve, turritelid, and gastropods).		
210	NA	NA	NA	< 2	2.5	CL		Sandy, Silty CLAY, dark olive gray (5Y, 3/2), massive plastic at base, moist, 50% clay, 30% sand, 20% silt, very fine grained sand interbeds top 5-15 mm thick, horizontal bedding.		210
	100	2-3	NA	NA	NA	SP		SAND, very fine to fine grained, olive gray (5Y, 3/2), loose, moist, minor clay blebs 1-2 cm thick.		
215	NA	NA	NA	< 2	NA			As above		215
	100	NA	NA	NA	3	CL		Sandy CLAY, dark olive gray (5Y, 3/2), medium stiff, slightly moist, minor very fine grained sand interbeds 1-2 cm thick near top, bedding horizontal, minor silt interlaminae near top.		
220						SC				220

GERAGHTY & MILLER, INC.

BORING LOG

(continuation)

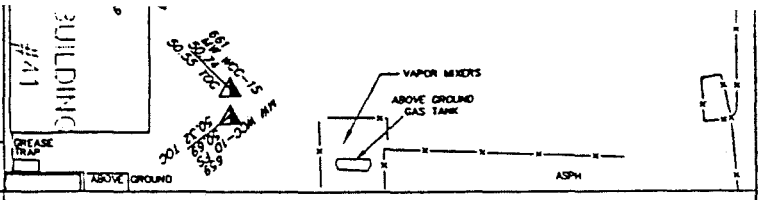
PROJECT: International Light Metals PROJECT NO CAO 217.020.002 BORING NO. DB-2

DEPTH (ft)	RECOVERY %	WENT. SCALE (ϕ)	SAMPLE NO.	PID (ppm)	UNCND. STRNGTH (tons/ft²)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION OF MATERIAL		DEPTH (ft)
	100	3	NA	< 2	NA	SC		Clayey SAND, very fine grained, dark olive gray (5Y, 3/2), medium dense, massive, moist to very moist, 70% sand, 30% clay, 60-80% green grains, 10-20% silica.		
						CL		Gradational contact, clay with 10% very fine grained sand.		
225										225
	100	NA	NA	< 2	2.5			CLAY, plastic, soft, massive, slightly moist to moist.		
								End of Boring @ 228 ft. Borehole backfilled with Puregold grout.		
230										230
235										235
								This work was performed under my supervision and I concur with the findings. Anthony C. Ward. Anthony C. Ward, CA R.G. #4782		
240										240

WELL INFORMATION FOR THE SITE AND FORMER ILM SITE

Borehole/Well Completion Logs for WCC and DAC Wells

INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility	
Location: Los Angeles, CA	
Site Id: WCC-01S	Elevation: 50.74'
Datum: Mean Sea Level	Total Depth: 91.00'
X Coordinate: 12738.89	Y Coordinate: 13194.03
Date Started: 03/25/87	Date Completed: 03/25/87
Consulting Firm: WOODWARD-CLYDE	
Contractor: DATUM EXPLORATION	
Logged By: S. DONALDSON	Certified By: B. JACOBS

Annular Fill:
type: Cement fm: 0.00' to: 2.50'
type: Grout fm: 2.50' to: 72.00'
type: Bentonite Pellets fm: 72.00' to: 74.00'

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 77.00' to: 87.00'

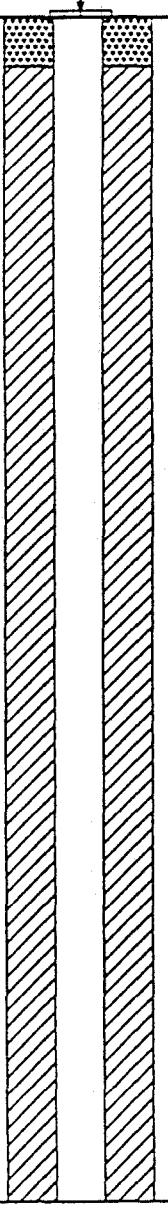
Blank Casing:
type: PVC dia: 2.00in fm: 0.0' to: 77.00'

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Drilling Method: HOLLOW-STEM AUGER

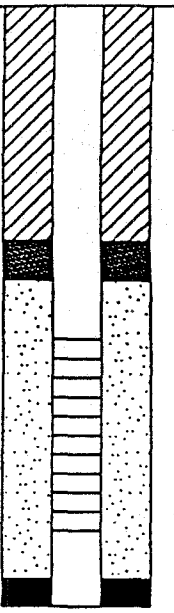
Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
				1-2 ppm	AS		Asphalt.
					SP		Damp reddish-brown, SILTY SAND (SP) with clay and gravel. Becomes black.
							Becomes reddish-brown, no gravel.
10							Becomes medium brown.
					SC		CLAYEY SAND (SC).
					SP		
20							
					ML		Stiff, damp, medium brown, CLAYEY SILT (ML) with some fine sand.
30							Becomes hard with more clay
					VA		Lense of volcanic (?) angular gravel.
					ML		
40							Becomes moist and hard.
	59		1				
					CL		Very hard, moist, dark brown, SILTY CLAY (CL).
50							Lenses of very hard, carbonate cemented concretions.
			2	1 ppm			
							Increasing silt.

Well Construction
MP. EL. 50.70

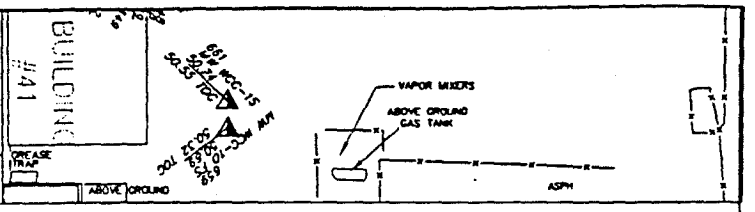


Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-01S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
	57		3	7.5 ppm	SP		Medium dense, dry, tan, fine SAND (SP)	
					CL			
					SP		Dense, dry, whitish-tan, fine SAND (SP).	
70	50 5"		4	2.5 ppm			Becomes damp and very dense.	
					ML		Very stiff, damp, dark brown SILT (ML).	
	50 5"		5	7.8 ppm			Becomes wet. Water encountered at 74.5 feet.	
					SP		Very dense, wet, brown, fine SAND (SP).	
	12		6					
80								
90					CL		Stiff, moist, dark brown, SILTY CLAY (CL). Bottom of boring at 91 feet.	
100								
110								
120								
130								
140								



INTEGRATED
Environmental Services, Inc.



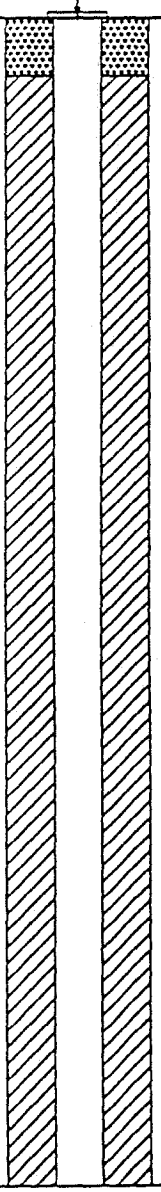
Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA		Annular Fill:		
Site Id: WCC-01D	Elevation: 50.69'	type: Cement	fm: 0.00'	to: 3.00'
Datum: Mean Sea Level	Total Depth: 140.00'	type: Grout	fm: 3.00'	to: 109.00'
X Coordinate: 12739.11	Y Coordinate: 13181.09	type: Bentonite Pellets	fm: 109.00'	to: 114.00'
Date Started: 06/28/89	Date Completed: 06/30/89	Screens: type: Slotted size: 0.010in dia: 4.00in	fm: 120.00'	to: 140.00'
Consulting Firm: WOODWARD-CLYDE		Blank Casing: type: PVC dia: 4.00in	fm: 0.0'	to: 120.00'
Contractor: BEYLIK DRILLING		Conductor Casing: type: dia: 0.00in	fm: 0.00'	to: 0.00'
Logged By: H. REYES	Certified By: M. RAZMDJOO	Drilling Method: HOLLOW-STEM AUGER		

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
					AS		6-inch Asphalt concrete over 6-inch base material.
					SC		Dark yellowish-brown, CLAYEY SAND (SC) fine grained, with small diameter gravel.
					CL		Dark yellowish-brown, SILTY CLAY (CL), with fine grained sand.
20							
30							Dark yellowish-brown, SILTY CLAY (CL), micaceous.
					SM		Dark yellowish-brown, SILTY SAND (SM), fine grained.
40							
					CL		Dark yellowish-brown, SILTY CLAY (CL).
					SM		Dark yellowish-brown, SILTY SAND (SM), fine grained.
50							
					SP/SM		Olive brown, medium grained SAND (SP-SM) with small diam. gravel and shell fragments

Well Construction

MP. EL. 50.45



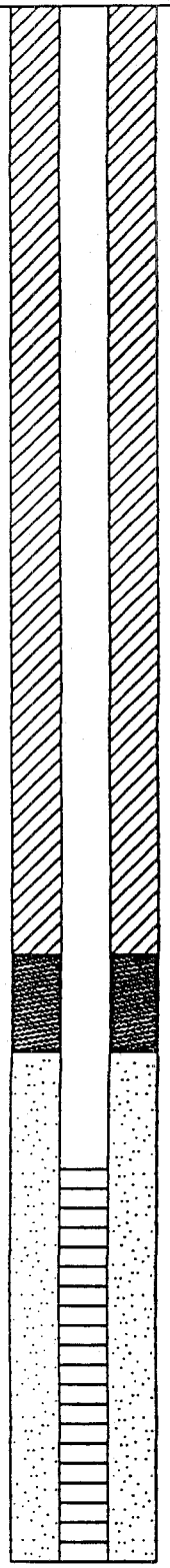
Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-01D

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
					CL		Dark yellowish-brown, SILTY SANDS (SM), fine grained.
					SP/SM		Yellowish-brown, fine grained SAND (SP-SM) with small diam. gravel and shell fragments.
70							
							Becomes olive brown.
							Olive brown, fine grained SAND (SP-SM) with shell fragments.
80							
							Becomes medium grained.
90							
							Abundant shell fragments.
100							
					CL		Bluish-gray and light yellowish-brown, SILTY CLAY (CL).
110							
					SP/SM		Olive brown, fine to medium grained SAND (SP-SM).
120		1			ML		Hard , olive, SILT (ML), micaceous (SILTSTONE).
					SP		Olive brown, medium grained SAND (SP).
					ML		Moist, olive SILT (ML), micaceous.
		2			SM		Olive, SILTY SAND (SM), fine grained.
					SP		Dark yellowish-brown, medium grained SAND (SP).
130		3					
		4					
					CL		Dark yellowish-brown and bluish-gray SILTY CLAY (SP).
140							

Bottom of boring at 140 feet.

Initial drilling and sampling was completed on 28 June 1989. Boring was enlarged and well was constructed on 29 and 30 June 1989.

Well Construction



INTEGRATED
Environmental Services, Inc.

Project Name: McDonnell Douglas C-6 Facility	
Location: Los Angeles, CA	
Site Id: WCC-02S	Elevation: 50.83'
Datum: Mean Sea Level	Total Depth: 90.50'
X Coordinate: 12234.27	Y Coordinate: 13451.60
Date Started: 10/28/87	Date Completed: 10/28/87
Consulting Firm: WOODWARD-CLYDE	
Contractor: A&R DRILLING, INC.	
Logged By: H. REYES	Certified By: B. JACOBS

Annular Fill:
type: Cement fm: 0.00' to: 6.00'
type: Grout fm: 6.00' to: 56.00'
type: Bentonite Pellets fm: 56.00' to: 63.00'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 70.00' to: 90.00'

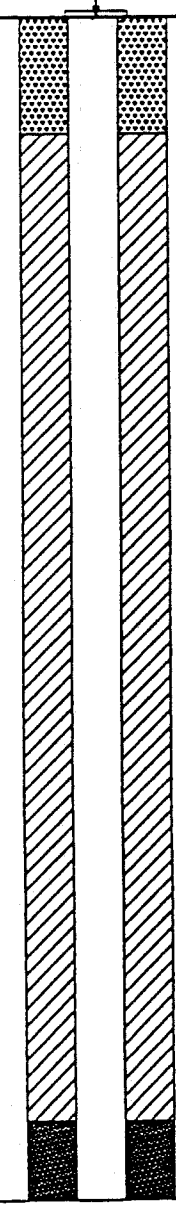
Blank Casing:
type: PVC dia: 4.00in fm: 0.0' to: 70.00'

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Drilling Method: HOLLOW-STEM AUGER

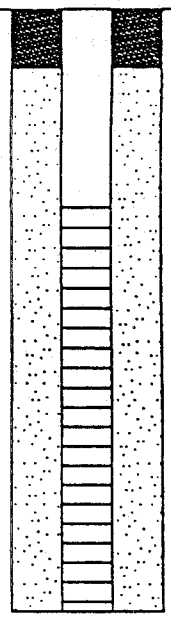
Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
				5 ppm	AS		Asphalt.
					CL		Medium stiff, very moist, dark yellowish brown, SANDY CLAY (CL).
							Becomes very dark grayish brown.
10							Color change to yellowish brown. Becomes stiffer, less moisture, SANDY CLAY (CL).
20							Continued SANDY CLAY (CL). Less stiff, more moist.
							Grades to SILTY CLAY (CL).
30							
40							Stiff, moist, olive brown, SILTY CLAY (CL).
					SM		Dense, moist, olive brown, fine grained SILTY SAND (SM) with shells.
	34		1	5 ppm			
50							
	60		2	5 ppm	SP/SM		Very dense, damp, strong brown, fine grained SAND to SILTY SAND (SM), iron oxide staining.

Well Construction
MP. EL. 50.59

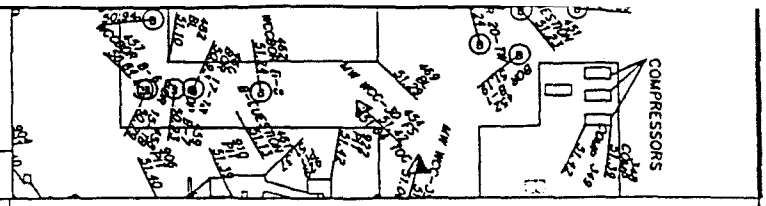


Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-02S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
					SM		Becomes SILTY SAND (SM).	
	42		3	6 ppm			Dense, moist, olive, fine grained SILTY SAND (SM), some iron oxide stains.	
70								
							Becomes wet. Water encountered at 73 feet.	
	68		4	6 ppm			Very dense, wet, olive brown, fine grained SILTY SAND (SM).	
80								
							Very dense, wet, olive, fine grained to very fine grained SILTY SAND (SM), micaceous, with some clay interbedding and iron oxide staining.	
	50 /3"		5	5 ppm				
90							Bottom of boring at 90.5 feet.	
							*NOTE: 48 gallons of city water used to offset hydrostatic head of flowing sands during well installation	
100								
110								
120								
130								
140								



INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA

Site Id: WCC-03D	Elevation: 51.42'
Datum: Mean Sea Level	Total Depth: 140.00'
X Coordinate: 12583.61	Y Coordinate: 13265.87
Date Started: 06/23/89	Date Completed: 06/27/89
Consulting Firm: WOODWARD-CLYDE	
Contractor: BEYLIK DRILLING	
Logged By: H. REYES	Certified By: M. RAZMDJOO

Annular Fill:
type: Cement fm: 0.00' to: 5.00'
type: Grout fm: 5.00' to: 106.00'
type: Bentonite Pellets fm: 106.00' to: 115.00'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 120.00' to: 140.00'

Blank Casing:
type: PVC dia: 4.00in fm: 0.0' to: 120.00'

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

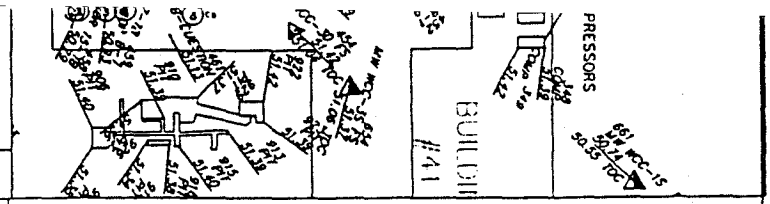
Drilling Method: HOLLOW-STEM AUGER

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
					AS/CO		6-inch asphalt and concrete cover.	MP. EL. 51.18
					SM		6-inch base material.	
							Dark yellowish-brown, fine grained SILTY SAND (SM).	
10							Dark yellowish-brown, fine grained SILTY SAND (SM) with some clay.	
20							Becomes olive brown, fine to medium grained SILTY SAND (SM).	
30							Becomes clayey with some calcareous nodules.	
							Olive brown, fine to medium grained SILTY SAND (SM) with trace of clay, some calcareous nodules.	
40					CL		Olive brown SILTY CLAY (CL), with coarse grained sand.	
50					SM		Olive brown, fine grained SAND (SM) with some coarse grained sand and abundant shell fragments.	

Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-03D

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
70							More coarse grained sand.	
					SP		Olive brown, medium grained SAND (SP).	
							Olive brown, fine to medium grained SAND (SM) with abundant shell fragments.	
80							Lense of dark yellowish-brown, coarse grained SAND (SP), slight chemical odor - drilling mud foamed up.	
90							Lens of dark yellowish-brown coarse grained SAND (SP).	
100							Grayish brown, fine to medium grained SAND (SM) with abundant shell fragments.	
110					CL		Dark yellowish-brown, SILTY CLAY (CL).	
120					SM		Olive brown, fine grained SILTY SAND (SM).	
					ML		Olive brown SANDY SILT (ML), micaceous.	
					SM		Olive brown, fine to medium grained SILTY SAND (SM).	
					CH		Olive brown CLAY (CH).	
					SP		Olive brown, medium grained SAND (SP).	
130							Hard reddish-brown SANDSTONE.	
							Hard, light yellowish-brown to bluish-gray, SILTY CLAYSTONE.	
140							Bottom of boring at 140 feet. Initial drilling and sampling was completed on 23 and 26 June 1989. Boring was enlarged and well was constructed on 27 June 1989.	

INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility

Location: los Angeles, CA

Site Id: WCC-03S	Elevation: 51.37'
Datum: Mean Sea Level	Total Depth: 92.00'
X Coordinate: 12608.51	Y Coordinate: 13238.90
Date Started: 10/26/87	Date Completed: 10/26/87
Consulting Firm: WOODWARD-CLYDE	
Contractor: A&R DRILLING, INC.	
Logged By: H. REYES	Certified By: B. JACOBS

Annular Fill:
type: Cement fm: 0.00' to: 6.00'
type: Grout fm: 6.00' to: 58.50'
type: Bentonite Pellets fm: 58.50' to: 64.00'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 69.00' to: 89.00'

Blank Casing:
type: PVC dia: 4.00in fm: 0.0' to: 69.00'

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

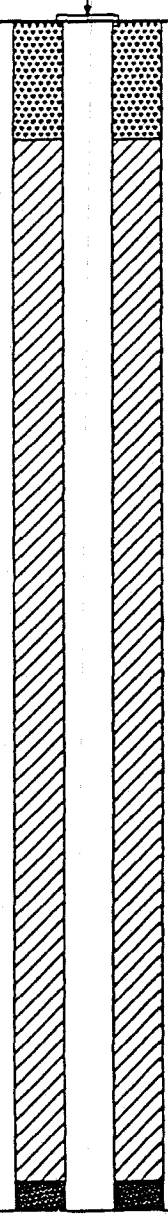
Drilling Method: HOLLOW-STEM AUGER

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Material Description
				4-6 ppm	AS	Asphalt.
					SM	Damp, very dark grayish-brown, fine grained SILTY SAND (SM) with small gravel.
					CL	Soft, very moist, dark gray yellowish-brown, stiff.
						Becomes less moist, dark yellowish-brown, stiff.
10						Continued SILTY CLAY (CL). Becomes more stiff, no detectable odor.
20					SC/CL	Dense, moist, yellowish-brown, CLAYEY SAND to SANDY CLAY (SC-CL). -No odor-
					CL	Grades to SILTY CLAY (CL). Stiff, moist, dark yellowish-brown SILTY CLAY
						-No odor-
30					VA	Lense of volcanic ash.
					CL	
40						Stiff, moist, olive brown SILTY CLAY (CL).
					ML	Lens of stiff, moist, olive SANDY SILT (ML), micaceous with decomposed peices of roots. -Earthy odor-
	25		1	25 ppm	CL	Stiff, moist, olive brown SILTY CLAY (CL) continued.
50					SM	Clay becomes more stiff, interbedded with lenses of dense, moist, yellowish-brown, medium grained SILTY SAND (SM) with shells, partially cemented and crystalized calcite. -Moderate chemical odor-
	30		2	570 ppm		

Graphic Log

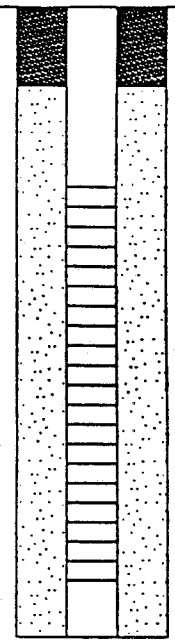
Well Construction

MP. EL. 51.37

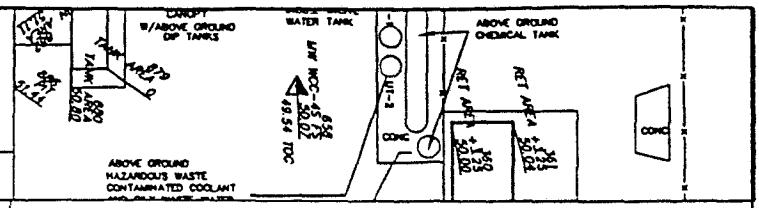


Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-03S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
					SM/SP		Dense, moist, yellowish-brown to olive-gray, very fine grained SILTY SAND to SAND (SM_SP), micaceous. -Moderate to strong chemical odor-	
	46		3	440 ppm				
					ML		Very stiff, very moist, olive brown, SANDY SILT (ML), micaceous with iron oxide stains. -Strong chemical odor-	
70	35		4	1000+ ppm				
					SP/SM		Becomes wet. Water encountered. Very dense, wet, olive brown, fine grained SAND (SP) to SILTY SAND (SM). -Strong chemical odor-	
	59		5	1000+ ppm				
80			6	1000+ ppm			Becomes medium grained.	
							Very dense, saturated, olive-brown, fine to medium grained SAND (SP-SM) with some silt. -Moderate to strong chemical odor-	
90							Bottom of boring at 92.0 feet.	
							*NOTE: Used 59 gallons of city water to offset hydrostatic head of flowing sands during well installation	
100								
110								
120								
130								
140								



INTEGRATED
Environmental Services, Inc.



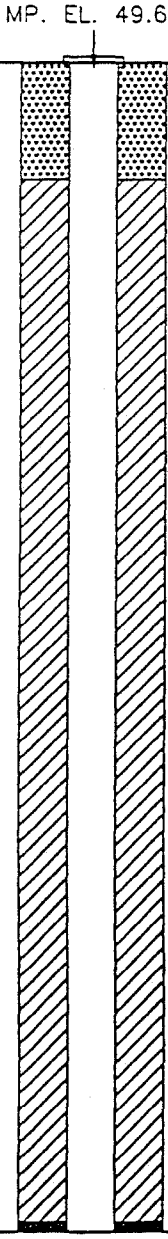
Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA		Annular Fill:		
Site Id: WCC-04S	Elevation: 50.07'	type: Cement	fm: 0.00'	to: 6.00'
Datum: Mean Sea Level	Total Depth: 91.50'	type: Grout	fm: 6.00'	to: 59.50'
X Coordinate: 12741.35	Y Coordinate: 13075.30	type: Bentonite Pellets	fm: 59.50'	to: 65.00'
Date Started: 10/27/87	Date Completed: 10/27/87	Screens: type: Slotted size: 0.010in dia: 4.00in	fm: 70.00'	to: 90.00'
Consulting Firm: WOODWARD-CLYDE		Blank Casing: type: PVC dia: 4.00in	fm: 0.0'	to: 70.00'
Contractor: A&R DRILLING, INC.		Conductor Casing: type: dia: 0.00in	fm: 0.00'	to: 0.00'
Logged By: H. REYES	Certified By: B. JACOBS	Drilling Method: HOLLOW-STEM AUGER		

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
				4-6 ppm	AS		Asphalt
					CL		Moist, grayish-brown, SILTY CLAY with some SAND (CL).
							Moist, dark yellowish-brown SILTY CLAY (CL). - No odor -
10							
20							
30							
					VA		Lense of dark greenish-black volcanic angular gravel.
					CL		Moist, dark yellowish-brown SILTY CLAY (CL).
40							
	18		1	8 ppm			Very stiff, organic roots and plant detritus with organic iron oxide staining. - No odor -
50							
	23		2	8 ppm			- No odor -

Well Construction

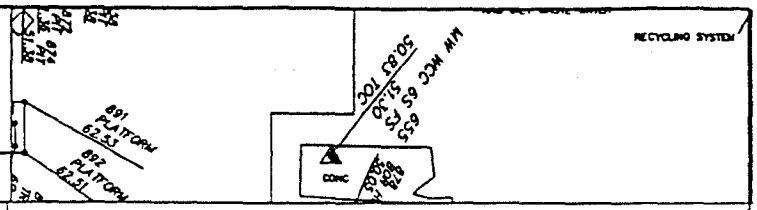
MP. EL. 49.69



Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-04S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
							Occasional fossiliferous gravel.	
	43		3	5 ppm	SM		- No odor - Hard light oliv brown, fine SANDY SILT to SILT to fine SILTY SAND (SM).	
70								
	42		4	7 ppm	CL		Becomes wet. Water encountered at 75 feet. Hard, damp, light olive brown SILTY CLAY (CL) with iron oxide staining.	
					SP		Very dense, light olive brown, fine grained SAND (SP) with little silt.	
80	45		5	8 ppm	SP		2-inch layer of CLAY (CL). - No odor -	
							Very dense, wet, light olive brown, fine grained SAND(SP) with little silt.	
90			6	8 ppm	CL/ML		Moist, light olive brown, SILTY CLAY (ML-CL). - No odor - Bottom of boring at 91.5 feet.	
100							*NOTE: 45 gallons of city water used to offset hydrostatic head at flowing sands during well installation.	
110								
120								
130								
140								

INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA	
Site Id: WCC-05S	Elevation: 48.74'
Datum: Mean Sea Level	Total Depth: 91.00'
X Coordinate: 12963.89	Y Coordinate: 12998.69
Date Started: 11/24/87	Date Completed: 11/24/87
Consulting Firm: WOODWARD-CLYDE	
Contractor: A&R DRILLING, INC.	
Logged By: B. JACOBS	Certified By: H. REYES

Annular Fill:
type: Cement fm: 0.00' to: 5.00'
type: Grout fm: 5.00' to: 51.00'
type: Bentonite Pellets fm: 51.00' to: 63.50'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 61.00' to: 91.00'

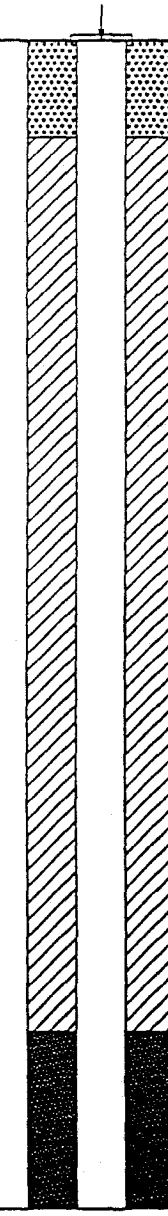
Blank Casing:
type: PVC dia: 4.00in fm: 0.0' to: 61.00'

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Drilling Method: HOLLOW-STEM AUGER

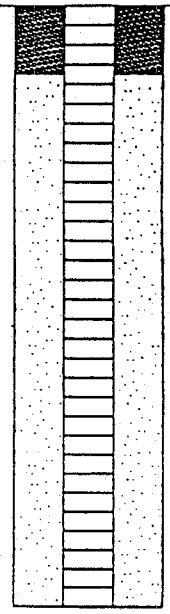
Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
				3-4 ppm	CL/ML		Moist, dark olive brown, CLAYEY SILT (CL-ML) with little sand.
10					CL		Moist, moderate brown SILTY CLAY (CL) with some sand..
							Becomes more silty.
20							Becomes dark yellowish-brown.
30							
40							Moist, dark yellowish-brown SILTY CLAY (CL) with some organic roots and iron oxide staining.
	34		1	3 ppm	SP		- No odor - Dense, moist, dusky yellow to light olive brown fine grained SAND (SP) with little silt.
50							
	37		2	5 ppm			Interbeds of silty sands and clay. - No odor -

Well Construction

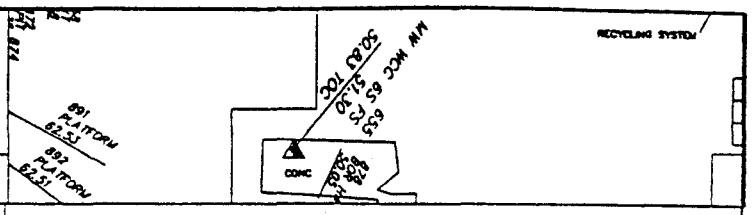


Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-05S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
	70		3	4 ppm			Becomes very dense.- No odor -	
70								
					SM/ML		Becomes wet. Water encountered at 73 feet.	
	35		4	3 ppm			Dense, wet, moderate olive brown, fine grained SILTY SAND (SM-ML). -No odor-	
80								
							No sample collected	
90							Bottom of boring at 91.5 feet.	
							*NOTE: 55 gallons of city water used to aid well installation.	
100								
110								
120								
130								
140								



INTEGRATED Environmental Services, Inc.



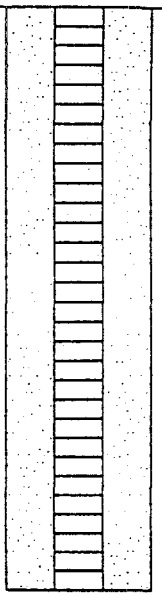
Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA		Annular Fill: type: Grout fm: 0.00' to: 51.00'; type: Bentonite Pellets fm: 51.00' to: 54.00'; type: Sand Filter fm: 54.00' to: 90.00'
Site Id: WCC-06S	Elevation: 51.30'	
Datum: Mean Sea Level	Total Depth: 91.00'	
X Coordinate: 12580.23	Y Coordinate: 12953.10	Screens: type: Slotted size: 0.010in dia: 4.00in fm: 60.00' to: 90.00'
Date Started: 09/22/89	Date Completed: 09/22/89	Blank Casing: type: PVC dia: 4.00in fm: 0.0' to: 60.00'
Consulting Firm: WOODWARD-CLYDE		
Contractor: GREGG DRILLING		Conductor Casing: type: dia: 0.00in fm: 0.00' to: 0.00'
Logged By: H. REYES	Certified By: M. RAZMDJOO	Drilling Method: HOLLOW-STEM AUGER

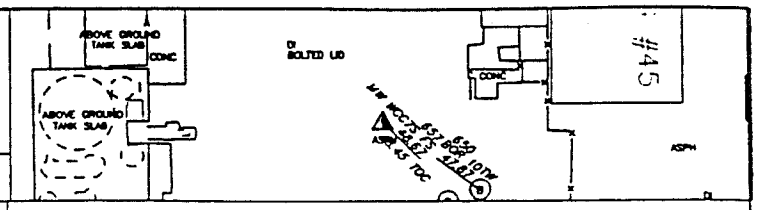
Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction (MP. EL. 50.95)
				16 ppm	AS		4-inch asphalt/ concrete over 6-inch base material.	
					CL		Moist, dark olive brown, SANDY CLAY (CL).	
							Becomes dark brown.	
	49		1	16 ppm			Becomes hard, dark yellowish-brown.	
10							Becomes SILTY CLAY (CL).	
					MH			
	33		2	16 ppm			Becomes more silty.	
20							Becomes dark yellowish-brown.	
	40		3	16 ppm				
					CL			
30					SP			
					CL			
	49		4	19 ppm	ML		Moist, dark yellowish-brown SILTY CLAY (CL) with some organic roots and iron oxide staining.	
40								
					SM			
	63		5	16 ppm			- No odor -	
	47		6				Dense, moist, dusky yellow to light olive brown fine grained SAND (SP) with little silt.	
50								
					ML			
				18 ppm			Interbeds of silty sands and clay. - No odor -	

Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-06S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
					SM			
	89		7	19 ppm			*Becomes very dense.- No odor -*	
70								
					SP/SM		Becomes wet. Water encountered at 73 feet.	
	99 67		8	1000+ ppm	SM		Dense, wet, moderate olive brown, fine grained SILTY SAND (SM-ML). -No odor-	
80	99 86		9	720 ppm				
	99 71		10	25 ppm				
							No sample collected	
90	91		11	46 ppm			Bottom of boring at 91.5 feet. *NOTE: 55 gallons of city water used to aid well installation.	
100								
110								
120								
130								
140								



INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA

Site Id: WCC-07S	Elevation: 48.67'
Datum: Mean Sea Level	Total Depth: 90.50'
X Coordinate: 12730.37	Y Coordinate: 12868.64
Date Started: 06/08/89	Date Completed: 06/08/89
Consulting Firm: WOODWARD-CLYDE	
Contractor: A&R DRILLING, INC.	
Logged By: R. GLOESMAN	Certified By: M. RAZMDJOO

Annular Fill:
type: Grout fm: 0.00' to: 49.00'
type: Bentonite Pellets fm: 49.00' to: 54.00'
type: Sand Filter fm: 54.00' to: 90.50'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 60.00' to: 90.00'

Blank Casing:
type: PVC dia: 4.00in fm: 0.0' to: 60.00'

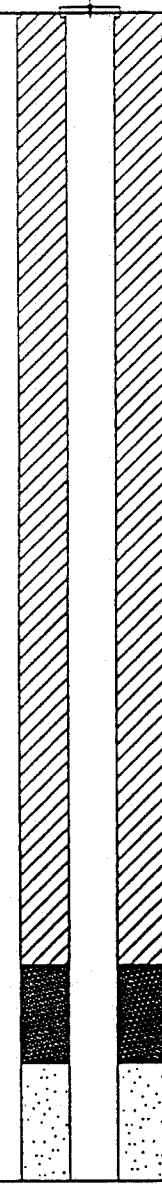
Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Drilling Method: HOLLOW-STEM AUGER

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
				10 ppm	AS/CO		6-inch asphalt/ concrete over 8-inch base material.
	31		1	1 ppm	AS		Hard, moist, black, SANDY CLAY (CL).
	45		2	1 ppm	CL		Becomes dark yellowish-brown.
10	36		3	1 ppm	SM		Medium dense, moist, olive brown, fine grained SILTY SAND (SM).
	14		4	3 ppm			Becomes dark yellowish-brown, with trace of clay, some decomposed roots.
20	25		5	2 ppm	CL		Hard, moist, dark olive brown, fine grained SANDY CLAY (CL) with root holes.
	31		6	2 ppm	SM		Dense, moist, olive brown, fine grained SILTY SAND (SM).
30	41		7	2 ppm			With root holes and small nodules of calcium carbonate (HCL Reaction).
	32		8	2 ppm			Dense, moist, olive brown, fine grained SILTY SAND (SM) with root holes and CaCo nodules.
40	25		9	3 ppm	SP		Medium dense, moist, dark brown to olive brown, medium grained SAND (SP).
	44		10	2 ppm	SP/SM		Dense, moist, olive brown, fine grained SILTY SAND to SILTY SAND (SP-SM).
							Zone of hard, damp, light brown, calcareous material (sand and shell fragments).
50	19		11	3 ppm	CL		Very stiff, moist, olive CLAY (CL) mixed with shell fragments and calcareous nodules (appears to be gouge zone).
	35		12	2 ppm	SM		Dense, moist, olive fine grained SILTY SAND (SM).
					CL		Dense, moist, olive SANDY CLAY (CL) with some iron oxide staining.
	38		13	1 ppm	SM/SP		Dense, moist, olive brown fine grained SILTY SAND to SAND (SM-SP).

Well Construction

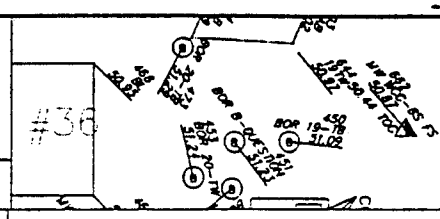
MP. EL. 48.29



Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-07S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
					SP		Dense, very moist, olive gray, fine grained SAND (SP).	
	43		14	1 ppm				
					SM		Dense, very moist, olive, fine grained SILTY SAND (SM), micaceous.	
70	44		15	3 ppm				
							Becomes saturated.	
	44		16	9 ppm				
							Dense, saturated, olive, fine grained SILTY SAND (SM), micaceous.	
							Sand becomes fine to medium grained.	
80	35		17	13 ppm				
							Becomes very dense, *medium grained with few coarse grains, less silt, few shell* fragments .	
	69		18	7 ppm				
							Becomes dense, medium to coarse grained, more silt, no shell fragments.	
90	37		19	0 ppm				
							Bottom of boring at 90.5 feet.	
							*NOTE: Upon completion of drilling and sampling added approximately 60 gallons of tap water to prevent heaving sand coming inside the augers.	
100								
110								
120								
130								
140								

INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA	
Site Id: WCC-08S	Elevation: 50.87'
Datum: Mean Sea Level	Total Depth: 90.00'
X Coordinate: 12737.32	Y Coordinate: 13318.91
Date Started: 06/12/89	Date Completed: 06/12/89
Consulting Firm: WOODWARD-CLYDE	
Contractor: A&R DRILLING, INC.	
Logged By: P. CLOESMAN	Certified By: M. RAZMDUOO

Annular Fill:
type: Grout fm: 0.00' to: 49.50'
type: Bentonite Pellets fm: 49.50' to: 54.00'
type: Sand Filter fm: 54.00' to: 90.00'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 59.50' to: 89.50'

Blank Casing:
type: PVC dia: 10.00in fm: 0.0' to: 59.50'

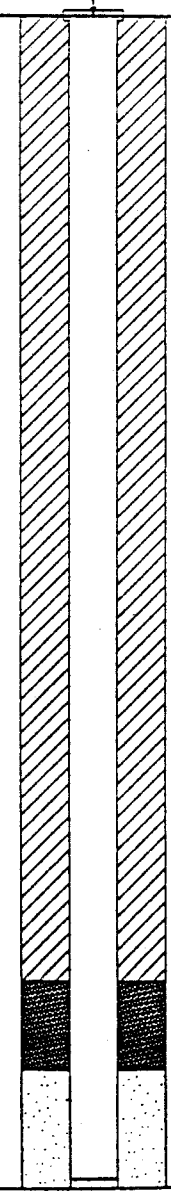
Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Drilling Method: HOLLOW-STEM AUGER

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Material Description
				11 ppm	AS	8-inch asphalt/ concrete.
	12		1	0 ppm	SC	Base material, medium dense, moist, yellowish-brown CLAYEY SAND (SC), decomposed granite.
					CL	Stiff, very moist, very dark gray, SANDY CLAY (CL).
	55		2	13 ppm	CL/SC	Hard, moist, dark yellowish brown, SANDY CLAY to fine grained CLAYEY SAND(CL-SC).
0	82		3	30 ppm	CL	Hard, moist, olive brown, SILTY CLAY (CL).
					SM	Medium dense, moist, olive brown, fine grained SILTY SAND (SM).
	20		4	41 ppm		
					CL	Very stiff to hard, moist, olive brown, SILTY CLAY (CL), with CaCo veinlets.
20	26		5	46 ppm		
	33		6	24 ppm	SM/ML	Dense, moist, olive brown, fine grained SILTY SAND (SM-ML) with some iron oxide staining hair like root holes.
					CL	Hard, moist, dark olive brown, fine grained SANDY CLAY (CL) with caliche veinlets.
30	32		7	21 ppm		
					SP/SM	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SM-ML).
	31		8	43 ppm	SM	Becomes more silty grades to (SM). Dense, moist, olive brown, fine grained SILTY SAND (SM).
						Medium dense, moist, dark brown to olive brown, medium grained SAND (SP).
40	24		9	43 ppm	ML	Stiff to very stiff, moist, olive brown, SANDY SILT (ML).
					SM	Dense, moist, olive brown, fine grained SILTY SAND (SM) with abundant calcareous nodules.
	31		10	46 ppm	CL	
					SC	Medium dense, moist to very moist , olive gray and yellowish-brown, mottled, grained CLAYEY SAND (SC).
50	13		11	48 ppm		
					SM	Dense, moist, olive brown, fine grained SILTY SAND (SM), with abundant shell fragments which are cemented together forming coquina.
	43		12	72 ppm		
	26		13	70 ppm	ML	Very stiff to hard, moist, olive, SANDY SILT (ML), micaceous, with iron oxide staining.

Well Construction

MP. EL. 50.56



Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-08S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
					ML		Very stiff to hard, moist, olive, SANDY SILT (ML), micaceous, with iron oxide staining.	
	83		14	100 ppm	SM		Very dense, moist, light olive brown, fine grained SILTY SAND (SM), micaceous.	
70	71		15	100 ppm			Becomes very moist to saturated.	
	38		16	100 ppm	ML		Hard, saturated, olive, SANDY SILT (ML), micaceous.	
80	21		17	32 ppm	SM/SP		Medium dense, saturated, light gray, fine to medium grained SILTY SAND (SM-SP).	
			18				(Unable to collect sample due to existence of 8 feet of heaving sand inside the auger. Added 5 gallons of water to prevent heaving sand coming into augers.	
90							Bottom of boring at 90 feet.	

*NOTE: 1. Boring was initially drilled with an 8-inch outside diameter and samples were taken. Upon completion of sampling, boring was enlarged with 10-inch outside diameter and well was installed.

2. Added 40 gallons of water prior to installation of well casing.

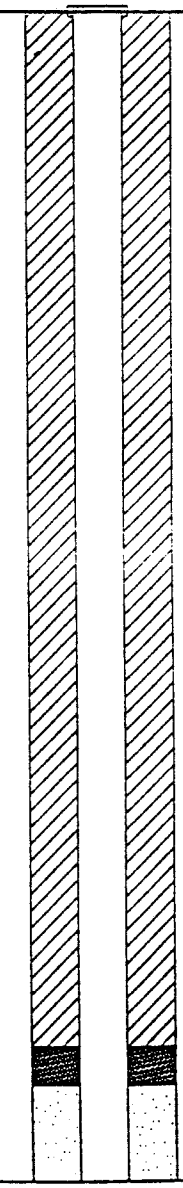
INTEGRATED
Environmental Services, Inc.

BUILDING #66

Project Name: McDonnell Douglas C-6 Facility

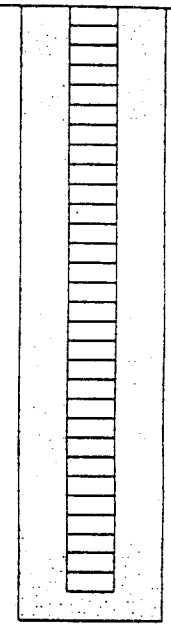
Location: Los Angeles, CA		Annular Fill: type: Grout fm: 0.00' to: 53.00' type: Bentonite Pellets fm: 53.00' to: 55.00' type: Sand Filter fm: 55.00' to: 91.50'
Site Id: WCC-09S	Elevation: 46.32'	
Datum: Mean Sea Level	Total Depth: 91.50'	
X Coordinate: 12926.87	Y Coordinate: 12827.94	Screens: type: Slotted size: 0.010in dia: 4.00in fm: 80.00' to: 90.00'
Date Started: 09/20/89	Date Completed: 09/21/89	Blank Casing: type: PVC dia: 4.00in fm: 0.0' to: 80.00'
Drilling Firm: [illegible]		
Operation: OREGI DRILLING		Conductor Casing: type: dia: 0.00in fm: 0.0' to: 0.0'
Logged By: M. PEE	Certified By: M. PAZMOOD	Drilling Method: HOLLOW-STEM AUGER

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
				6 ppm	AS/CO		4-inch asphalt/ concrete over 6-inch base material.
					AS		
					CL		Very stiff to hard, moist, dark, yellowish-brown SILTY CLAY (CL) with fine grained sand.
	45		1	6 ppm			
0	31		2	0 ppm			
					MH		Stiff, moist, dark yellowish-brown, CLAYEY SILT (MH), micaceous.
	15		3	7 ppm			
							Becomes very stiff to hard.
20	34		4	7 ppm			
					CL		Very stiff to hard, moist, dark brown to olive brown, SILTY CLAY (CL).
	43		5	6.6 ppm			
					SM		Very dense, moist, olive brown, fine grained SILTY SAND (SM), with some clay veinlets.
30	80		6	6.9 ppm			
					MH		Very stiff to hard, moist, dark olive brown, CLAYEY SILT (MH).
	9 38		7	6 ppm			
40	48		8	6.8 ppm	CL		Hard, moist, dark olive brown, SILTY CLAY (CL) with stringers of black mineral pyrouote.
	65		9	6.5 ppm			Contains abundant shell fragments.
					SM		Very dense, damp, light yellowish-brown to olive brown, fine to medium grained SILTY SAND (SM).
50	89		10	8.7 ppm			
	36		11	6.7 ppm	CL		Very stiff to hard, moist to very moist, olive, SILTY CLAY (CL) with iron oxide staining.
					SP		Lense of dense, damp, yellowish-brown, fine grained SAND (SP).

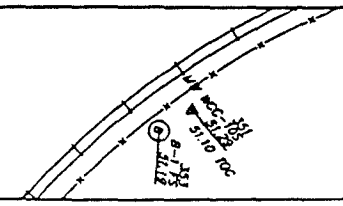


Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-09S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
	91		12	6.5 ppm	CL		Very stiff to hard, moist to very moist, olive, SILTY CLAY (CL) with iron oxide staining.	
					SM		Very dense, very moist, dark brown, fine grained SILTY SAND (SM), micaceous.	
	89		13	6 ppm				
70	83		14	6 ppm	ML		Hard, saturated, olive, SANDY SILT (ML), micaceous.	
					SP/SM		Medium dense, saturated, olive brown, medium grained SAND (SP-SM), micaceous.	
	26		15	6 ppm			Medium dense to very dense, saturated, olive brown, fine to medium grained SAND (SP-SM), micaceous.	
80	99		16	6.5 ppm				
	90		17	6.2 ppm				
90	75		18	5.5 ppm	ML		Hard, saturated, olive SANDY SILT (ML).	
							Bottom of boring at 91.5 feet.	



INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA	
Site Id: WCC-10S	Elevation: 51.29'
Datum: Mean Sea Level	Total Depth: 90.80'
X Coordinate: 11338.90	Y Coordinate: 14038.95
Date Started: 06/07/89	Date Completed: 06/07/89
Consulting Firm: WOODWARD-CLYDE	
Contractor: A&R DRILLING, INC.	
Logged By: F. REYES	Certified By: B. JACOBS

Annular Fill:
type: Grout fm: 0.00' to: 49.00'
type: Bentonite Pellets fm: 49.00' to: 54.00'
type: Sand Filter fm: 54.00' to: 90.80'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 60.00' to: 90.00'

Blank Casing:
type: PVC dia: 4.00in fm: 0.0' to: 60.00'

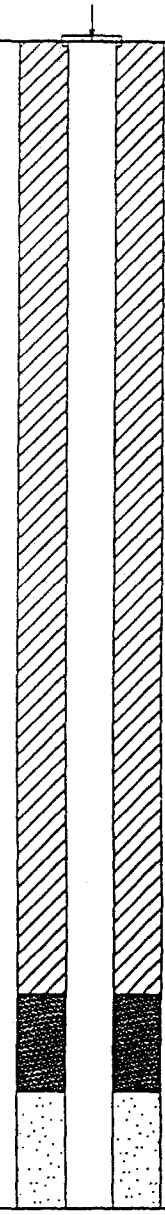
Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Drilling Method: HOLLOW-STEM AUGER

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description
				6 ppm	AS/CO		3 1/2 -inch asphalt/ concrete over 9-inch base material.
					CL		Soft, very moist to saturated, black, SANDY CLAY (CL)
							Becomes very stiff, moist, dark yellowish brown.
	24		1	1 ppm			
					SM		Medium dense, moist, olive brown, fine grained SILTY SAND (SM), with trace of clay.
10	13		2	1 ppm			
							No clay.
	25		3	2 ppm			
							Becomes very stiff to hard.
20	21		4	0 ppm	CL		Very stiff to hard, moist, dark yellowish-brown, SANDY CLAY (CL).
	61		5	0 ppm			Contains large nodules of calcium carbonate (HCL Reaction).
					SM		Dense, moist, olive brown, fine grained SILTY SAND (SM).
30	36		6	1 ppm			
					SP/SM		Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).
	32		7	2 ppm			
					SP		Dense to very dense, damp, pale brown, fine grained SAND (SP).
40	46		8	1 ppm			
	55		9	2 ppm			
50	43		10	2 ppm			Becomes olive brown.
	32		11	1 ppm			
					SW		Dense, moist, olive brown, medium grained GRAVELLY SAND (SW), gravel 1/4" - 1/2" diameter.
					SC		Very dense, moist, dark olive, fine grained CLAYEY SAND (SC).
	90		12	1 ppm	SM		Very dense, moist, olive, fine grained SILTY SAND (SM).

Well Construction

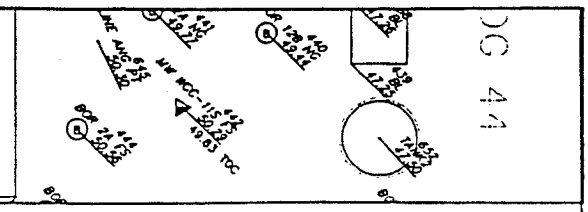
MP. EL. 51.12



Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-10S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
	74		13	3 ppm				
70	51		14	ppm			Becomes wet, olive brown.	
	99 26		15	10 ppm				
80	99 5		16	6 ppm			Becomes olive, micaceous.	
	42		17	6 ppm			Becomes medium grained with shell fragments. (Added 25 gallons water to prevent surging sand coming inside the augers.)	
90	3 /3"		18	6 ppm			Bottom of boring at 90.8 feet.	
							NOTE: Added 40 gallons of water prior to installation of well casing.	
100								
110								
120								
130								
140								

INTEGRATED
Environmental Services, Inc.



Project Name: McDonnell Douglas C-6 Facility

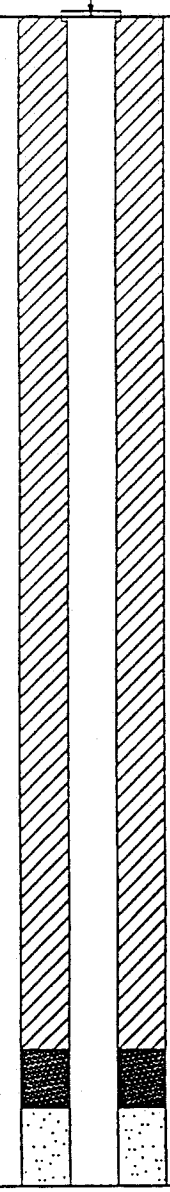
Location: Los Angeles, CA		Annular Fill:		
Site Id: WCC-11S	Elevation: 50.29'	type: Grout	fm: 0.00'	to: 53.00'
		type: Bentonite Pellets	fm: 53.00'	to: 56.00'
Datum: Mean Sea Level	Total Depth: 91.00'	type: Sand Filter	fm: 56.00'	to: 91.00'
X Coordinate: 12744.01	Y Coordinate: 13870.68	Screens: type: Slotted size: 0.010in dia: 4.00in	fm: 60.00'	to: 90.00'
Date Started: 09/12/90	Date Completed: 09/13/90	Blank Casing: type: PVC dia: 4.00in	fm: 0.0'	to: 60.00'
Consulting Firm: WOODWARD-CLYDE				
Contractor: A&R DRILLING, INC.		Conductor Casing: type: dia: 0.00in	fm: 0.00'	to: 0.00'
Logged By: H. REYES	Certified By: M. RAZMDJOO	Drilling Method: HOLLOW-STEM AUGER		

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Material Description
					SM/FL	Damp, yellowish-brown, fine grained SILTY SAND (SM).
					ML/FL	Moist, olive brown, SANDY SILT (ML).
	4		1	44 ppm	CL/FL	Soft, wet, black, SANDY CLAY (CL).
					CL	Very stiff, moist, yellowish-brown, SILTY CLAY (CL).
10	27		2	50 ppm		
	10		3	34 ppm	ML	Medium dense, moist, dark olive brown, SANDY SILT (ML), micaceous.
20	8		4	42 ppm		Becomes loose, more SANDY.
	12		5	33 ppm		Becomes medium dense, more micaceous.
30	13		6	39 ppm		Medium dense, moist, dark olive brown, SANDY SILT (ML), micaceous.
	28		7	32 ppm		
40	15		8	50 ppm		With some CLAY.
					SP	Medium dense, moist, dark yellowish-brown, fine to medium grained SAND (SP).
	21		9	50 ppm		
50	36		10	61 ppm	SM	Dense, very moist, olive brown, fine grained SILTY SAND (SM).
					GP	Lense of dense, moist, gray GRAVEL (GP), rounded, 1 inch size.
	26		11	62 ppm	MH	Very stiff, very moist, olive, CLAYEY SILT (MH), micaceous, with iron oxide staining.
					SM	Dense, moist, olive brown, fine grained SILTY SAND (SM).

Graphic Log

Well Construction

MP. EL. 50.11



Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-11S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
	33		12	43 ppm	SP		Becomes less SILTY, grading to SAND (SP).	
							Becomes more SILTY, micaceous.	
	50		13	52 ppm				
70	44		14	56 ppm	SP/SM		Becomes wet, dark, olive gray, fine grained SAND with SILT (SP-SM), very micaceous. Dense, wet, dark olive gray, fine grained SAND with SILT (SP-SM), very micaceous.	
	46		15	46 ppm	ML		Dense, wet, olive SANDY SILT (ML), thinly bedded.	
					SP/SM		Very dense, wet, olive brown, fine to medium grained SAND with SILT (SP-SM).	
80	57		16	43 ppm				
90							Bottom of boring at 91 feet.	
100								
110								
120								
130								
140								

INTEGRATED
Environmental Services, Inc.

BUILDING #40

Project Name: McDonnell Douglas C-6 Facility

Location: Los Angeles, CA

Site Id: WCC-12S	Elevation: 47.31'
Datum: Mean Sea Level	Total Depth: 91.50'
X Coordinate: 12749.25	Y Coordinate: 12715.20
Date Started: 09/17/90	Date Completed: 09/17/90
Consulting Firm: WOODWARD-CLYDE	
Contractor: A&R DRILLING, INC.	
Logged By: H. REYES	Certified By: M. RAZMDJOO

Annular Fill:
type: Grout fm: 0.00' to: 52.50'
type: Bentonite Pellets fm: 52.50' to: 55.00'
type: Sand Filter fm: 55.00' to: 91.50'

Screens:
type: Slotted size: 0.010in dia: 4.00in fm: 60.00' to: 90.00'

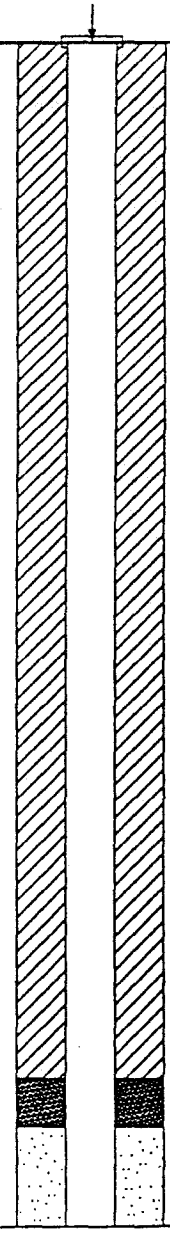
Blank Casing:
type: PVC dia: 4.00in fm: 0.0' to: 60.00'

Conductor Casing:
type: dia: 0.00in fm: 0.00' to: 0.00'

Drilling Method: HOLLOW-STEM AUGER

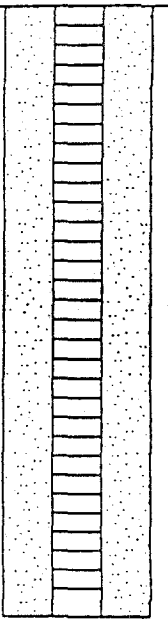
Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Material Description
					AS	6 inches asphalt/concrete.
					CL/FL	Moist, dark yellowish-brown, SANDY CLAY with GRAVEL (CL-GP).
					SM	Medium dense, moist, dark yellowish-brown, fine grained SILTY SAND (SM).
	24		1	22 ppm		
10	15		2	28 ppm		With trace CLAY.
					ML/SM	Medium dense, moist, olive brown, SANDY SILT to SILTY SAND (ML-SM).
	18		3	34 ppm		
20	25		4	34 ppm		Becomes moist to very moist.
					CL	Very stiff, moist, olive brown SANDY CLAY (CL).
	23		5	30 ppm		
					SP/SM	Dense, moist, olive brown, fine grained SAND with SILT (SP-SM).
30	34		6	36 ppm		
	24		7	38 ppm	ML	Medium dense, moist, olive brown, SANDY SILT (ML), with trace CLAY.
					SP	Dense, moist, yellowish-brown, medium grained SAND (SP).
40	35		8	37 ppm		
					SM	Medium dense, moist, yellowish brown, fine grained SILTY SAND (SM), with abundant shells.
	27		9	38 ppm		
50	24		10	44 ppm	MH/CL	Very stiff, very moist, mottled (olive and yellowish-brown), CLAYEY SILT to SILTY CLAY (MH-CL), with iron oxide veinlets..
	24		11	44 ppm	SM	Medium dense, moist to very moist, olive, fine grained SILTY SAND (SM).

Well Construction
MP. EL. 47.18



Project Name: McDonnell Douglas C-6 Facility | Site Id: WCC-12S

Depth (ft)	Blow Count	Recovery	Sample No.	Organic Vapor	USCS Code	Graphic Log	Material Description	Well Construction
	42		12	42 ppm	ML		Dense, moist, olive brown, SANDY SILT (ML), with some iron oxide veinlets.	
	45		13	46 ppm	SM		Dense, wet, olive, fine grained SILTY SAND (SM).	
70	34		14	48 ppm				
	64		15	90 ppm	SP		Very dense, wet, dark yellowish-brown, medium grained SAND (SP).	
80	63		16	64 ppm	SM		Very dense, wet, olive, fine grained SILTY SAND (SM).	
	54		17	66 ppm	SP/SM		Very dense, wet, olive gray, medium grained SAND with SILT (SM-SP).	
90	35		18	58 ppm	SC		Dense, wet olive brown, fine grained CLAYEY SAND (SC), with abundant shell fragments. Bottom of boring at 91.5 feet.	
100								
110								
120								
130								
140								



BORING LOCATION	See Location Map	ELEVATION AND DATUM	52.43 Feet above MSL
DRILLING AGENCY	Gregg Drilling, Inc.	DRILLER C. Swenson	DATE STARTED 9-25-89 / DATE FINISHED 9-25-89
DRILLING EQUIPMENT	Mobile B-57 With 11-Inch O.D., H.S.A.	COMPLETION DEPTH (ft) 90.0	ROCK DEPTH (ft) –
TYPE OF WELL CASING	PVC Sch. 40 / SCREEN PERFORATION 0.010 Inch	DIAMETER OF BORING (in.) 11	DIAMETER OF WELL (IN.) 4
TYPE/SIZE OF SAND PACK	Monterey #0/30	TYPE/THICKNESS OF SEAL(S)	(1/9") Bentonite Pellets, 3 Feet/Volclay Grout 47 Feet/ Concrete Plug 5 Feet
No. OF SAMPLES	DIST. – / UNDIST. 10	CORE –	LOGGED BY H. Reyes / CHECKED BY P. Gloesman
WATER DEPTH (ft)	FIRST 73.7 / COMPL –	24 HRS. 71.05	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	3 inch AC, 3 inch of base sandy gravel. Very moist, black, CLAY (CH).								1020	
5	Hard, moist, very dark brown, SILTY CLAY (CL), with fine grained sand.			1	X	35	8.8	8.4	1030	
10	Becomes very stiff, moist, olive brown SILTY CLAY (CL).									
15	Very stiff, very moist, olive brown, CLAYEY SILT (MH).			2	X	25	8.6	7.8	1037	
20										
25	Dense, moist, olive brown, SILTY fine grained SAND (SM), some shell fragments.			3	X	39	84	7.8	1046	
30	Becomes very dense, yellowish brown with more shells.									
35				4	X	146	8.0	7.8	1057	

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

LOG OF BORING DAC-P1

Fig. 1

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	O.V.A. (ppm) Back-Ground	Drilling Rate (Time)	REMARKS
	Very dense, yellowish brown, SILTY fine grained SAND (SM), with shell fragments.			4		146	8.0	7.8	1057	
40										
45										
	Very stiff, moist, olive, SANDY SILT (ML), with iron oxide staining.			5		60	11.0	6.5	1107	
50	Very dense, moist, light olive to light olive gray, SILTY fine grained SAND (SM).									
55				6		92	7.5	6.2	1121	
60										
65				7		100	8.5	7.7	1134	
70										
75	Very dense, saturated, olive brown, SILTY fine grained SAND (SM).			8		100	68	7.5	1240	

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

CONT. LOG OF BORING DAC-P1

Fig. 2

WOODWARD-CLYDE CONSULTANTS

DEPTH (ft)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	O.V.A. (ppm) Back-Ground	Drilling Rate (Time)	REMARKS
	Very dense, yellowish brown, SILTY fine grained SAND (SM), with shell fragments.			4		146	8.0	7.8	1057	
40										
45										
	Very stiff, moist, olive, SANDY SILT (ML), with iron oxide staining.			5		60	11.0	6.5	1107	
50	Very dense, moist, light olive to light olive gray, SILTY fine grained SAND (SM).									
55				6		92	7.5	6.2	1121	
60										
65				7		100	8.5	7.7	1134	
70										
75	Very dense, saturated, olive brown, SILTY fine grained SAND (SM).			8		100	68	7.5	1240	

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

CONT. LOG OF BORING DAC-P1

Fig. 2

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	O.V.A. (ppm) Back-Ground	Drilling Rate (Time)	REMARKS
	Very dense, saturated, olive brown, SILTY fine grained SAND (SM).									
80										
	Very stiff, saturated, olive to olive gray, SANDY CLAY (CL), to CLAYEY SAND (SC).									
85				9	X	36	8.5	7.5	1255	
90	Very stiff, saturated, dark gray, SANDY SILT (ML).			10	X	51	8.5	7.5	1327	
	Bottom of Boring at 91.5 Feet.									
95										
100										
105										
110										
115										

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

CONT. LOG OF BORING DAC-P1

Fig. 3

WOODWARD-CLYDE CONSULTANTS

TOTAL P.05

WELL INFORMATION FOR THE SITE AND FORMER ILM SITE

Borehole/Well Completion Logs for BL and TMW Wells

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Building 1		Boring/Well Name: TMW-1	
DRILLING COMPANY: West Hazmat	DRILLER: Ruben Lares	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger (LAR)	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 61 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 86 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 61 TO 81 FT	DATE STARTED: 6/28/98	DATE COMPLETED: 6/28/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 59 TO 86 FT	DEPTH TO WATER: 66.0 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 56 TO 59 FT	LOGGED BY: M. Balderman	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
			9 12 15							Concrete, 8"
			14 14 21	0.2				CL	7.5YR 3/3	Fine Sandy CLAY: dark brown, damp, medium stiff to stiff, mottled with CaCO3
			12 17 18	0.8	5			CL	7.5YR 3/3	hard nodules of carbonate up to 1/4", damp, medium stiff
			18 37 40	0.9	10			CL	7.5YR 4/4	Silty CLAY: brown, trace of fine sand, damp, stiff
					15					
			9 30 32	1.0	20			SM	7.5YR 4/4	Fine Silty SAND: brown, 60% sand, trace of fine mica, damp, dense
					25	No Grout				
			8 30 33	1.4	30					
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-1
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					35					
			11 38 40		40			SM	7.5YR 5/3	Fine Silty SAND: brown, 80% sand, trace of fine mica, damp, dense
					45	No Grout				
			8 40 45	2.0	50	Blank Casing		SM	7.5YR 4/2	brown, 65% sand, minor clay, very dense
					55	Bentonite Seal				
					60	Sand Filter Screened Casing				
			22 43 50	3.9	65	Depth to Water		SM/ SP &CL	7.5YR 4/2	interbedded with fine sand, moist water at 66 feet
			21 37 50	5.1						interbedded with fine sandy clay
					70					
					75					
					80	Bottom of Screen				

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Building 1		Boring/Well Name: TMW-2	
DRILLING COMPANY: West Hazmat	DRILLER: Tracy	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 62 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 87 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 62 TO 82 FT	DATE STARTED: 6/28/98	DATE COMPLETED: 6/28/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 57 TO 87 FT	DEPTH TO WATER: 67.0 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 51 TO 57 FT	LOGGED BY: J. Knight	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Concrete, 6"
								CL	2.5Y 4/4	Silty CLAY: olive brown, slightly moist, stiff
					5			ML	10YR 4/6	Clayey SILT: dark yellowish brown, slightly moist, stiff
			17 26 31	100	10				2.5Y 4/4	olive brown, hard
					15					
			10 13 30	104	20				2.5Y 5/4	decreasing clay, very stiff
					25	No Grout				
			12 21 31	190	30					
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-3
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					35					Fine Silty SAND (continued)
			12 24 30	17.5	40			SM	10YR 6/2	light brownish gray, 75% sand, damp, dense
					45	No Grout				
			24 21 30	6.3	50	Blank Casing		SM	10YR 5/4	yellowish brown, 70% sand, trace of fine mica, damp, dense
					55					
					60	Bentonite Seal Sand Filter Screened Casing				
			12 28 50 14 25 50	7.2	65	Depth to Water		CL	5GY 6/1	Silty CLAY: greenish gray, minor fine sand, moist, very stiff water at 67'
					70					
					75					sandy
					80					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-3
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80					Silty CLAY (continued)
						Bottom of Screen				
					85	Bottom of Well				
					90					Boring Terminated at 87 feet.
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Building 2, Patio 11 East		Boring/Well Name: TMW-4	
DRILLING COMPANY: West Hazmat	DRILLER: Ruben Lares	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger (LAR)	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 61 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 86 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 60 TO 80 FT	DATE STARTED: 6/30/98	DATE COMPLETED: 6/30/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 58 TO 86 FT	DEPTH TO WATER: 66.0 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 55.5 TO 58 FT	LOGGED BY: M. Balderman/ J. Knight	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Concrete, 4"
■			20 30 30	1.1				CL	7.5YR 4/4	Silty CLAY: brown, minor fine sand, damp, stiff
■	■	■	30 50	0.6	5			CL	2.5Y 4/4	Fine Sandy CLAY: olive brown, 30% fine sand, dry, hard
■	■	■	17 20 30	0.7	10			CL	10YR 5/4	Fine Sandy CLAY: yellowish brown, 35% fine sand, damp, stiff
					15					
■	■	■		0.9	20			ML	10YR 5/4	Clayey SILT: yellowish brown, minor fine sand, damp, stiff
					25	No Grout				
■	■	■	18 32 50	0.9	30			ML	10YR 5/3	Fine Sandy SILT with Clay: brown, 35% fine sand, damp, stiff
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-4
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					35					Fine Sandy SILT with Clay (continued)
			22 50	1.0	40			SM	10YR 4/3	Fine Silty SAND: brown, 70% fine sand, trace of fine mica, damp, dense
					45	No Grout				
			20 50	0	50	Blank Casing		ML	2.5Y 4/4	Fine Sandy SILT with Clay: olive brown, micaceous, moist, hard
					55					
					60	Bentonite Seal Sand Filter Screened Casing				
			18 45 50	17.1	65	Depth to Water		SM	2.5Y 4/3	Silty SAND: olive brown, fine, wet, very dense, with lenses of clayey silt water at 66'
					70					
					75					
					80	Bottom of Screen				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-4
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80					Silty SAND (continued)
					85	Bottom of Well				
										Boring Terminated at 86 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Building 2, Patio 31 West		Boring/Well Name: TMW-5	
DRILLING COMPANY: West Hazmat	DRILLER: Ruben Lares	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger (LAR)	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 61.3 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 86 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 61.3 TO 81.3 FT	DATE STARTED: 7/2/98	DATE COMPLETED: 7/2/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 58.9 TO 86 FT	DEPTH TO WATER: 65.0 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 56.2 TO 58.9 FT	LOGGED BY: M. Balderman	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Concrete, 6"
■	■	■	7 10 14	3.2				CL	5YR 4/2	Silty CLAY: dark reddish gray, minor fine sand, damp, medium stiff
■	■		25 50	7.9	5			CL	7.5YR 4/3	Fine Sandy CLAY: brown, 30% fine sand, damp, hard
■	■	■	12 17 20	22.2	10			SC/ CL	7.5YR 5/2	Fine Sandy CLAY/ Clayey SAND: brown, 50% fine sand, damp dense
					15					
■	■	■	20 50	28.0	20			CL	7.5YR 5/2	Fine Sandy CLAY: brown, 35% fine sand, damp, hard
					25	No Grout				
■	■	■	20 25 45	90	30			SP	5GY 6/1 10YR 5/6	Fine SAND with minor Silt: mottled gray and yellowish brown, trace of fine mica, damp, dense
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-5
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					35					Fine SAND with Minor Silt (continued)
			23 50	112	40				10YR 7/6	yellow
					45	No Grout				
			20 50	160	50	Blank Casing		SC	7.5YR 5/4	Fine Clayey SAND: brown, increasing clay
								CL	2.5Y 5/3	Silty CLAY: light olive brown, minor fine sand, damp, hard
					55	Bentonite Seal				
					60	Sand Filter				
						Screened Casing				
						Depth to Water				
			20 50 5 20 38	250	65			SM	2.5Y 5/3	Fine Silty SAND:light olive brown, 80% sand, trace of fine mica, wet, dense water at 65'
					70					
					75					
					80	Bottom of Screen				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-5
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80	Bottom of Screen				Fine Silty SAND (continued)
					85	Bottom of Well				
										Boring Terminated at 86 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Building 2, Patio 31 East		Boring/Well Name: TMW-6	
DRILLING COMPANY: West Hazmat	DRILLER: Ruben Lares	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger (LAR)	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 61.2 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 86 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 61.2 TO 81.2 FT	DATE STARTED: 7/1/98	DATE COMPLETED: 7/1/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 59.1 TO 86 FT	DEPTH TO WATER: 65.5 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 56.5 TO 59.1 FT	LOGGED BY: M. Balderman	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Concrete, 6"
■	■	■	3 4 8	280				CL	7.5YR 3/2	Fine Sandy CLAY: dark brown, 30% fine sand, wet, medium stiff
■	■	■	7 22 24	2900	5			SC	7.5YR 4/4	Fine Clayey SAND: brown, 60% fine sand, moist, dense
■	■	■	11 24 30	0	10			ML	10YR 5/3	Clayey SILT: brown, 20% fine sand, moist, stiff
					15					
■	■	■	12 15 17	0	20			SC	10YR 4/4	Fine Clayey SAND: dark yellowish brown, 55% sand, damp, dense
					25	No Grout				
■	■	■	31 33 50	4.3	30			SC SM	7.5YR 5/3	Fine Clayey/Silty SAND: brown, 70% sand, trace of fine mica, damp, dense
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-6

Project Name Boeing C-6

Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					35					Fine Clayey/Silty SAND (continued)
			11 14 22	2.9	40			SM	10YR 5/6	Fine Silty SAND: yellowish brown, 75% fine sand, trace of fine mica, damp, dense
					45	No Grout				
			23 50	1.4	50	Blank Casing		SM	10YR 5/4	yellowish brown
					55	Bentonite Seal				
					60	Sand Filter Screened Casing				
			22 50 25 50	0	65	Depth to Water		ML SM	2.5Y 5/2 5Y 4/2	Clayey SILT: grayish brown, 30% fine sand, moist, hard, grading to gray sand at 65' Fine Silty SAND: olive gray, 85% sand, trace of fine mica, wet, dense water at 65.5'
					70					
					75					
					80	Bottom of Screen				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-6

Project Name Boeing C-6

Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80					Fine Silty SAND (continued)
						Bottom of Screen				
					85	Bottom of Well				
										Boring Terminated at 86 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Outside the Southeast Corner of Building 1		Boring/Well Name: TMW-7	
DRILLING COMPANY: West Hazmat	DRILLER: Ruben Lares	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger (LAR)	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 64 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 89.5 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 64 TO 84 FT	DATE STARTED: 6/29/98	DATE COMPLETED: 6/29/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 62 TO 89.5 FT	DEPTH TO WATER: 66 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 56 TO 62 FT	LOGGED BY: M. Balderman	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE; ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Asphalt, 3"
■	■	■	5, 5, 6	2.3				CL	7.5YR 4/2	Silty CLAY: brown, minor fine sand, damp, soft
■	■	■	12, 50	0.7	5			ML	7.5YR 4/4	Clayey SILT: brown, 20% fine sand, damp, stiff
■	■	■	12, 30, 42	0.4	10			CL	2.5Y 5/3	Silty CLAY: light olive brown, minor fine sand and carbonate, damp, stiff
					15					
■	■	■	13, 10, 15	0.5	20			ML	2.5Y 4/3	Clayey SILT: olive brown, minor fine sand, trace of fine mica and carbonate, damp, medium stiff
					25	No Grout				
■	■	■	14, 12, 20	1.3	30			ML	2.5Y 5/4	Clayey SILT: light olive brown, minor fine sand, carbonate nodules to 3/8", damp, stiff
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-7
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	Description
					35					Clayey SILT (continued)
			12 18 31	1.7	40					
					45	No Grout				
			20 50	1.4	50			SM	10YR 6/4	Silty SAND: light yellowish brown, 70% fine sand, damp, dense
						Blank Casing				
					55					
						Bentonite Seal				
					60					
			12 17 19 11 17 21		65	Depth to Water		SM	2.5Y 4/2	Silty SAND: dark grayish brown, 75% fine sand, trace of fine mica, wet dense, with a clayey silt lense from 65 to 65.5'
						Sand Filter		SM ML	2.5Y 4/3	Fine Sandy SILT/Silty SAND: olive brown, laminated with clayey silt, wet, dense Water at 66'
						Screened Casing				
					70					
					75					
					80					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-7
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80					Fine Sandy SILT/ Silty SAND (continued)
					85	Bottom of Screen Bottom of Well				
					90					Boring Terminated at 89.5 feet.
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Outside and East of Building 1		Boring/Well Name: TMW-8	
DRILLING COMPANY: West Hazmat	DRILLER: Ruben Lares	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 61 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 86 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 61 TO 81 FT	DATE STARTED: 6/29/98	DATE COMPLETED: 6/29/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 59 TO 85.5 FT	DEPTH TO WATER: 66.4 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 55.8 TO 59 FT	LOGGED BY: M. Balderman	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE; ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Asphalt, 3"
■	■	■	6 30 32					CL	7.5YR 4/3	Silty CLAY with minor Fine Sand: brown, local fine to coarse sand partings, damp, stiff
■			8 18 40		5					
■	■	■	27 50		10			CL	7.5YR 4/4	brown, hard
					15					
■	■	■	8 20 23		20			ML	2.5Y 4/3	Clayey SILT: olive brown, 20% fine sand, damp, stiff
					25	No Grout				
■	■	■	7 14 30		30					scattered carbonate nodules to 1/4"
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-8
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	Description
					35					Sandy SILT (continued)
			12 20 30		40			ML	2.5Y 5/3	Fine Sandy SILT: light olive brown, minor clay, 30% fine sand, damp, dense
					45	No Grout				
			13 22 33		50	Blank Casing		SM	2.5Y 5/4	Fine Silty SAND: light olive brown, 70% sand, trace of fine mica, damp, dense
					55	Bentonite Seal				
					60	Sand Filter				
						Screened Casing				
			15 34 45 18 23 50		65	Depth to Water			2.5Y 4/4	olive brown, moist to wet water at 66' interbedded clayey silt from 66.5 to 67.5, then silty sand as above
					70					
					75					
					80	Bottom of Screen				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-8
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80					Fine Silty SAND (continued)
						Bottom of Screen				
					85	Bottom of Well				
										Boring Terminated at 85.5 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Building 1		Boring/Well Name: TMW-9	
DRILLING COMPANY: West Hazmat	DRILLER: Ruben Lares	Project Name: Boeing C-6	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 984006.00	
BLANK CASING: 2" PVC Schedule 40	FROM +1 TO 61 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 86 ft.
PERFORATED CASING: 2" PVC Schedule 40, 0.010" slot	FROM 61 TO 81 FT	DATE STARTED: 6/30/98	DATE COMPLETED: 6/30/98
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 59 TO 86 FT	DEPTH TO WATER: 66 ft.	
SEAL: Enviroplug Medium Bentonite Chips	FROM 56.5 TO 59 FT	LOGGED BY: J. Knight	
GROUT: No Grout (Temporary Well)	FROM TO FT	SAMPLING METHODS: 2" Split Barrel Sampler, 140 lb. Hammer	WELL COMPLETION: ☐ SURFACE HOUSING NONE ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Concrete, 8"
■	■	■	12 14 21	52.0				ML	10YR 4/6	Clayey SILT: dark yellowish brown, trace of fine sand, slightly moist, very stiff
■	■	■	12 22 40	86.0	5			CL	10YR 3/6	Silty CLAY: dark yellowish brown, some fine sandy lenses, slightly moist, hard
■	■	■	27 30 30	85.7	10				10YR 5/4	yellowish brown, dry, hard
					15					
■	■	■	12 17 23	48.2	20			ML	2.5Y 5/4	Clayey SILT: light olive brown, trace of fine sand, dry, very stiff
					25	No Grout				
■	■	■	21 28 50	51.4	30			ML	2.5Y 5/6	Sandy SILT: light olive brown, fine sand, sligtly moist, hard
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-9
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					35					Sandy SILT (continued)
			20 25 30	74.1	40			SM	2.5Y 5/6	Silty Fine SAND: light olive brown, slightly moist, dense
					45	No Grout				
			23 50	114	50	Blank Casing				increasing silt content, very dense
					55					
					60	Bentonite Seal Sand Filter Screened Casing				
			12 32 50 42 30 32	159	65	Depth to Water		SM	2.5Y 4/3	SAND with Silt: olive brown, fine, very moist, very dense, with silt lenses water at 66'
					70					
					75					
					80	Bottom of Screen				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-9
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80					SAND with Silt (continued)
						Bottom of Screen				
					85	Bottom of Well				
										Boring Terminated at 86 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-9
Project Name Boeing C-6
Project Number 984006.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
					80					SAND with Silt (continued)
						Bottom of Screen				
					85	Bottom of Well				
										Boring Terminated at 86 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: East of Building 66		Boring/Well Name: TMW-10	
DRILLING COMPANY: West Hazmat	DRILLER: Scott Campbell	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM 0 TO 60.5 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 85 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 60.5 TO 80.5 FT	DATE STARTED: 1/28/99	DATE COMPLETED: 1/28/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 57.6 TO 85 FT	DEPTH TO WATER: 65 feet	
SEAL: Medium Bentonite Chips	FROM 54.7 TO 57.6 FT	LOGGED BY: M. Balderman	
GROUT: Neat Portland Cement	FROM 0 TO 54.7 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon and CME dry core	WELL COMPLETION: ☒ SURFACE HOUSING ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
			8, 16, 20	4.2				ML	5YR 3/4	Asphalt at surface 6" gravel/asphalt base Clayey SILT with Minor Fine Sand and Sand Interbeds: dark reddish brown, damp, hard
core										
			18, 50	1.7	5			SM	5YR 3/4	Fine Silty SAND: dark reddish brown, 60% fine sand, damp, very dense
core										
			15, 35, 38	6.8	10			CL	5YR 5/4	Silty CLAY with a Trace of Fine Sand: reddish brown, damp, hard
core					15			SM	5YR 5/4	Fine Silty SAND: reddish brown, 60% sand, damp, dense
			18, 20, 22	3.4	20					
core					25					
								CL	2.5YR 4/3	Silty CLAY: reddish brown, 15% fine sand, damp, hard
			15, 30, 43	5.7	30			SM	5YR 5/4	Fine Silty SAND: reddish brown, 60% sand, damp, very dense
								SM	2.5YR 5/3	Silty SAND: reddish brown, 75% fine sand, trace of fine mica, damp, very dense
core					35			ML	2.5YR 5/3	Fine Sandy SILT with Minor Clay: reddish brown, damp, stiff

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-10
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								ML		Fine Sandy SILT with Minor Clay, continued
core								CL	2.5YR 5/3	Silty CLAY: reddish brown, minor fine sand, scattered fine calcite
								ML	2.5YR 5/3	grades to Clayey SILT
			15 22 25	10.5	40			SM	2.5YR 5/3	Fine Silty SAND: reddish brown, 60% sand, damp, dense
								CL	2.5YR 4/2	Silty CLAY: weak red, trace of fine sand, damp, hard
core					45			SM	10YR 6/1 10YR 5/2	Fine Silty SAND: mottled gray and grayish brown, 60% sand, damp, dense
									10YR 5/6	yellowish brown
										abundant calcite cement from 49.0 to 49.4 feet
			20 12 10	16.9	50					
								CL	10YR 4/4 2.5Y 6/2	Silty CLAY: mottled dark yellowish brown and light brownish gray, damp, very stiff 30% fine sand from 53.0 to 54.4 feet.
						Top of Seal 54.7 feet				
					55			SM	10YR 6/2	Fine Silty SAND: light brownish gray, 75% sand, trace of fine mica, damp, medium dense
								CL	10YR 6/2	Fine Sandy CLAY: light brownish gray, 20% sand, very stiff, damp
core						Top of Filter 57.6 feet		SM	10YR 6/2	Fine Silty SAND: light brownish gray, 75% sand, trace of fine mica, damp, medium dense
					60	Top of Screen 60.5 feet				
								ML	10YR 5/3	Fine Sandy SILT: brown, 35% sand, damp to moist, very stiff
			20 32 50	6.8				CL	10YR 6/4	Silty CLAY and Sandy CLAY: light yellowish brown, interbedded, damp, hard
			16 23 30		65	Depth to first water 65 feet		ML	10YR 4/4	Fine Silty SAND and Sandy SILT: dark yellowish brown, 50% fine sand, trace of fine mica, very moist, very dense wet at 65 feet
								SM		increase fine sand to 70%, finely laminated from 69 to 70 feet, thin interbeds of fine sandy silt from 70.0 to 70.6 feet and from 71.8 to 72.5 feet
core					70					
					75			SM	10YR 6/4 10YR 6/2	Fine to Medium Silty SAND: laminated light yellowish brown and light brownish gray, 80% sand, abundant mica, wet, very dense
								ML	2.5Y 4/2	Fine Sandy SILT: dark grayish brown, 30% sand, laminated with silty sand, wet, hard
					80	Bottom of Screen 80.5 feet				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-10
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
						Bottom of Screen 80.5 feet		ML	2.5Y 4/2	FineSandy SILT, continued
								ML	2.5Y 4/2	Fine Sandy SILT and Silty SAND: dark grayish brown, 50% fine sand, abundant fine mica, wet, very dense
core								ML	10YR 4/4	Clayey SILT: dark yellowish brown, laminated
								SM	7.5YR 4/2	Fine Silty SAND: brown, 60% sand, trace of fine mica, wet, very dense
								SP	5YR 5/1	SAND: gray, fine to medium, minor silt, wet, very dense
					85					
										Boring terminated at 85 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Northeast of Building 66		Boring/Well Name: TMW-11	
DRILLING COMPANY: West Hazmat	DRILLER: Scott Campbell	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM 0 TO 58 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 83 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 58 TO 78 FT	DATE STARTED: 2/1/99	DATE COMPLETED: 2/1/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 54.5 TO 83 FT	DEPTH TO WATER: 63 feet	
SEAL: Medium Bentonite Chips	FROM 53 TO 54.5 FT	LOGGED BY: T. Doyle	
GROUT: Neat Portland Cement	FROM 0 TO 53 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon	WELL COMPLETION: ☒ SURFACE HOUSING ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Asphalt at surface 6" gravel/asphalt base
■	■	■	8 12 10	0.9				CL	7.5YR 3/2	Silty Sandy CLAY: dark brown, 30% fine sand, damp, very stiff
■	■	■	12 14 17	2.4	5				7.5YR 5/4	brown
■	■	■	7 13 15	2.8	10					
					15					
■	■	■	9 12 14	5.2	20			ML	2.5Y 5/3	Fine Sandy SILT: light olive brown, 35% fine sand, trace of fine mica, damp to moist, very stiff
					25					
■	■	■	11 15 23	4.8	30					scattered hard caliche nodules up to 1/4"
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-11
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	Description
								ML		Fine Sandy SILT, continued
			14 22 25	5.5	40			SM	2.5Y 6/4	Fine Silty SAND: light yellowish brown, 65% sand, trace of fine mica, damp, dense
					45					
			17 17 20	2.6	50			SC	2.5Y 6/2	Fine to Coarse Clayey SAND: light brownish gray, 75% sand, trace of fine mica, cemented with calcite, dense
						Top of Seal 53 feet				
					55	Top of Filter 54.5 feet				
						Top of Screen 58 feet				
					60					
			16 20 24 15 22 27	5.8		Depth to first water 63 feet		SM	2.5Y 4/3 7.5YR 5/6	Fine Silty SAND: olive brown, 60% sand, trace of fine mica, with thin interbeds of laminated, strong brown, fine sandy silt, dense water encountered at 63 feet
					65					
					70					
					75					
						Bottom of Screen 78 feet				
					80					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-11
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								SM		Fine Silty SAND, continued
					85					Boring terminated at 83 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: South of Building 2		Boring/Well Name: TMW-12	
DRILLING COMPANY: West Hazmat	DRILLER: Scott Campbell	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM 0 TO 62 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 88 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 62 TO 82 FT	DATE STARTED: 1/27/99	DATE COMPLETED: 1/27/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 59.3 TO 88 FT	DEPTH TO WATER: 67.5 feet	
SEAL: Medium Bentonite Chips	FROM 56.7 TO 59.3 FT	LOGGED BY: M. Balderman	
GROUT: Neat Portland Cement	FROM 0 TO 56.7 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon and CME dry core	WELL COMPLETION: ☒ SURFACE HOUSING ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
			8, 12, 22							Asphalt at surface 6" gravel/asphalt base
			5, 4, 5	3.5				ML	2.5YR 3/1	Clayey SILT with Minor Fine Sand: dark reddish gray, wet, hard
			15, 18, 22	146	5					
core								ML	7.5YR 4/4	Fine Sandy SILT: brown, 30% fine sand, minor clay, damp, hard
			23, 50		10					
core					15					
								ML	10YR 5/2	Fine Sandy SILT with Clayey Silt Interbeds: grayish brown, 20-50% fine sand, damp, hard, with calcite stringers at 18-19 feet
			15, 18, 19	1.2	20			ML	7.5YR 4/4	Fine Sandy SILT: brown, 35% fine sand, damp, hard
core					25			ML	7.5YR 4/4	Grades to Clayey SILT: brown, with calcite stringers at 24-25 feet increased calcite at 28 feet
			10, 20, 25	1.2	30					
core					35			SM	7.5YR 4/4	Fine Silty SAND: brown, 70% fine sand, damp, dense, with calcite veins at 33 feet

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-12
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	Description
								SM	7.5YR 5/6	Fine Silty SAND: strong brown, 80% sand, trace of fine mica, damp, dense
core								SP	10YR 6/3	Fine SAND with Minor Silt: pale brown, damp, dense
									2.5Y 5/6	light olive brown
			20 25 28	4.9	40					grades to fine to coarse
								CL	2.5YR 6/2	Fine Sandy CLAY: pale red, 20% fine sand, damp, hard, mottled with red brown
								ML	2.5YR 6/2	Fine Sandy and Clayey SILT: pale red, 40% sand, damp, hard
core					45					interbeds of fine silty sand from 46.3 to 46.5 feet
			22 29 30	0.2	50			SM	10YR 6/6	Fine Silty SAND: brownish yellow, 80% sand, trace of fine mica, damp, very dense
								CL	7.5YR 4/4	Silty CLAY: brown, trace of fine sand, damp, hard
								SM	2.5YR 5/4	Fine Silty SAND: reddish brown, 75% sand, trace of fine mica, damp, very dense
core					55					interbeds of silty clay 55.3 to 55.7 feet
						Top of Seal 56.7 feet		ML	2.5Y 4/4	Fine Sandy SILT: olive brown, 25% fine sand, damp, hard
						Top of Filter 59.3 feet				
			22 28 30	1.9	60					40% fine sand, trace of fine mica
						Top of Screen 62 feet			2.5Y 5/4	light olive brown, moist, hard
			10 20 40	1.7						
core					65					
						Depth to water 67.5 feet		SP	2.5Y 5/1	Fine to Medium SAND with Minor Silt: gray, trace of fine mica, moist, very dense
			10 40 50/3	3.5						water at 67.5 feet
					70			ML	5Y 4/3	Clayey SILT with Minor Fine Sand: olive, wet, hard
								SM	2.5Y 4/2	Fine to Coarse Silty SAND: dark grayish brown, 70% sand, trace of fine mica, wet, very dense
								ML	2.5Y 4/2	Fine Sandy SILT: dark grayish brown, 30% fine sand, wet, hard
								SM	2.5Y 5/1	Fine to Medium Silty SAND: gray, 70% sand, trace of fine mica, wet, very dense
core					75					
								ML	2.5Y 5/4	Fine Sandy SILT: light olive brown, 30% fine sand, trace of fine mica, wet, very dense
								SM	2.5Y 5/4 2.5Y 5/1	Fine Silty SAND: light olive brown and gray, 70% sand, abundant mica, wet, very dense
					80					
						Bottom of Screen 82 feet				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-12
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								SM		Fine Silty SAND, continued
								ML	2.5YR 4/4	Fine Sandy SILT: reddish brown, 30% fine sand, trace of fine mica, wet, hard
						Bottom of Screen 82 feet				
core								SM	2.5YR 4/4	Fine Silty SAND: reddish brown, 60% fine sand, trace of fine mica, wet, very dense
										finely laminated from 84 to 85 feet
					85					
									2.5Y 5/1	gray, abundant fine shell fragments
					90					Boring terminated at 88 feet.
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: South of Building 2		Boring/Well Name: TMW-13	
DRILLING COMPANY: West Hazmat	DRILLER: Scott Campbell	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM 0 TO 60 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 85 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 60 TO 80 FT	DATE STARTED: 2/2/99	DATE COMPLETED: 2/2/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 58 TO 85 FT	DEPTH TO WATER: 66 feet	
SEAL: Medium Bentonite Chips	FROM 55 TO 58 FT	LOGGED BY: T. Doyle	
GROUT: Neat Portland Cement	FROM 0 TO 55 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon	WELL COMPLETION: ☒ SURFACE HOUSING ☐ STAND PIPE ____ FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Asphalt, 8" Gravel Base, 12"
✓	✓	✓	10 9 6	33				CL	5YR 3/2	Silty Sandy CLAY: dark brown, 20% silt, 20% sand, 60% clay, damp to wet, medium dense, high plasticity
✓	✓	✓	7 11 13	35	5					
✓	✓	✓	7 8 10	49.1	10			ML	2.5Y 6/3	Silty Sandy CLAY: light yellowish brown, 35% silt, 25% sand, 40% clay, damp, medium dense, low plasticity
					15					
✓	✓	✓	12 14 17	61.2	20			SM	2.5Y 6/3	Clayey Silty SAND: light yellowish brown, 15% clay, 25% silt, 60% fine sand, damp, medium dense
					25					
✓	✓	✓	10 15 17	20.2	30			SM	2.5Y 6/3 2.5Y 7/1	Silty SAND: mottled olive yellow and light gray, 30% silt, 70% sand, damp, dense
					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-13
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Screening (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								SM		Silty SAND, continued
			12 32 38		40			SM	2.5Y 6/3	Silty SAND: light yellowish brown, 30% silt, 70% fine sand, damp, very dense
					45					
			14 23 27		50			SM	5Y 5/2	Silty SAND: olive gray, 40% silt, 60% sand, some rust staining, damp, dense
					55	Top of Seal 55 feet				
						Top of Filter 58 feet				
					60	Top of Screen 60 feet				
			18 22 29	89.2	65	Depth to water 66 feet		SM	2.5Y 6/1	Silty SAND: gray, 20% silt, 80% fine sand, moist, very dense water encountered at 66 feet
					70					
					75					
					80	Bottom of Screen 80 feet				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-13
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								SM		Silty SAND, continued
					85					
										Boring terminated at 85 feet.
					90					
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Southwest of Building 3		Boring/Well Name: TMW-14	
DRILLING COMPANY: West Hazmat	DRILLER: Scott Campbell	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM +1 TO 65 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 90 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 65 TO 85 FT	DATE STARTED: 2/3/99	DATE COMPLETED: 2/3/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 63 TO 90 FT	DEPTH TO WATER: 72.5 feet	
SEAL: Medium Bentonite Chips	FROM 60 TO 63 FT	LOGGED BY: T. Doyle	
GROUT: Neat Portland Cement	FROM 0 TO 60 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon and CME dry core	WELL COMPLETION: ☐ SURFACE HOUSING ☒ STAND PIPE 2.5 FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
					5					Backfill Material to 10 feet
			8 10 16	6.7	10			CL	2.5YR 3/1	Silty Sandy CLAY: dark olive brown, 20% silt, 40% fine sand, 40% clay, damp, medium dense, slight plasticity
core										
			8 9 13	29.5	15					
core										
			10 24 17	19.7	20					
core					25			SM	2.5Y 6/4	Silty SAND: light yellowish brown, 30% silt, 70% fine sand, damp, dense
			10 18 16	20.1	30					
core					35					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-14
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								SM		Silty SAND, continued
core										
			12 18 22	9.5	40					
										decreasing silt, mottled with rust stains
core					45					
										shells from 47 to 49.5 feet
			15 19 30	17.4	50			SM ML	5Y 4/1	Silty SAND: dark gray, 40% silt, 5% clay, 70% fine sand, damp, dense, 55
core					55					
			17 23 25	17.4	60	Top of Seal 60 feet		SM	10YR 5/2	Silty SAND: grayish brown, 25% silt, 75% fine sand, damp, dense
						Top of Filter 63 feet				
core					65	Top of Screen 65 feet				rust staining, thin clay stringers, moist
					70					
			7 19 20	14.6		Depth to first water 72.5 feet		SM ML	2.5YR 3/3	Clayey Silty SAND: dark reddish brown, 10% clay, 30% silt, 60% fine sand water encountered at 72.5 feet
										shells from 74 to 75 feet
core					75			SM		Silty SAND: 30% silt, 70% fine sand, wet
					80					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-14
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								SM		Silty SAND, continued
core					85	Bottom of Screen 85 feet			2.5YR 6/4	light yellowish brown
					90					Boring terminated at 90 feet.
					95					
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: West of Building 3		Boring/Well Name: TMW-15	
DRILLING COMPANY: West Hazmat	DRILLER: Scott Campbell	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM 0 TO 62 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 92 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 62 TO 87 FT	DATE STARTED: 2/4/99	DATE COMPLETED: 2/4/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 60 TO 92 FT	DEPTH TO WATER: 72 feet	
SEAL: Medium Bentonite Chips	FROM 57 TO 60 FT	LOGGED BY: T. Doyle	
GROUT: Neat Portland Cement	FROM 0 TO 57 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon	WELL COMPLETION: ☐ SURFACE HOUSING ☒ STAND PIPE 2.5 FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
										Backfill Material to 5 feet
			8 12 7	8.2	5			CL	10YR 2/2	Silty Sandy CLAY: very dark brown, 20% silt, 30% sand, 50% clay, slight plasticity, damp, medium dense
			7 8 11	16.3	10			SC	2.5Y 4/4	Silty Clayey SAND: olive brown, 20% silt, 30% clay, 50% fine sand, damp, medium dense
					15					
			12 17 20	13.9	20					trace of gravel
			16 20 24	13.1	25			SM	7.5YR 5/3	Clayey Silty SAND: brown, 10% clay, 30% silt, 60% fine sand, damp, dense, trace of gravel
					30					
			18 21 22	13.2	35			SM	10YR 6/4	Silty SAND: light yellowish brown, damp, dense

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-15
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	Description
			18 21 22	13.2				SM	2.5Y 6/4	Silty SAND: light yellowish brown, 40% silt, 60% fine sand, damp, dense
					40					
			18 18 20	14.5	45					
					50					
			16 20 24	12.8	55				2.5Y 4/4	olive brown
						Top of Seal 67 feet				
					60	Top of Filter 60 feet				
						Top of Screen 62 feet				
					65					
								CL	5Y 5/2	Silty Sandy CLAY: olive green, 30% silt, 30% fine sand, 40% clay, damp, hard, slight plasticity
			12 20 29	13.2	70			SM	2.5Y 4/4	Silty SAND: olive brown, 30% silt, 70% fine sand, minor clay, moist, dense, some rust staining shell bed at 71.5 feet water encountered at 72 feet
						Depth to water 72 feet				
					75					
					80					

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-15
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	
								SM		Silty SAND, continued
					85					
						Bottom of Screen 87 feet				
					90					
					95					Boring terminated at 92 feet.
					100					
					105					
					110					
					115					
					120					
					125					

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Northeast of Building 20		Boring/Well Name: TMW-16	
DRILLING COMPANY: West Hazmat	DRILLER: Scott Campbell	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM 0 TO 56.5 FT	ELEVATION: Not Surveyed	TOTAL DEPTH: 82.5 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 56.5 TO 76.5 FT	DATE STARTED: 1/29/99	DATE COMPLETED: 1/29/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 54.5 TO 82.5 FT	DEPTH TO WATER: 65 feet	
SEAL: Medium Bentonite Chips	FROM 51.7 TO 54.5 FT	LOGGED BY: M. Balderman	
GROUT: Neat Portland Cement	FROM 0 TO 51.7 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon and CME dry core	WELL COMPLETION: ☒ SURFACE HOUSING ☐ STAND PIPE ____ FT

Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
									Asphalt at surface 8" gravel/asphalt base
							ML	2.5YR 5/2	Clayey SILT with Minor Fine Sand: weak red, damp, medium stiff
			7 10 14 12 10 11 14 18		5				
							ML	7.5YR 5/3	Clayey SILT with Minor Fine Sand: brown, damp, very stiff
			11 15 17	8.2	10				
									increasing sand below 12 feet 1-inch thickness of disseminated calcite at 13.5 feet
core					15		SM	7.5YR 5/3	Fine Silty SAND: brown, 60% sand, damp, dense
			10 14 20	12.4	20				
core							CL	7.5YR 5/2	Silty CLAY with Minor Fine Sand: brown, irregular calcite stringers, damp, hard
			12 15 30	11.5	25				
core							ML	2.5Y 5/4	Sandy SILT: light olive brown, 40% fine sand, damp, hard clayey silt interbed from 27.7 to 28 feet calcite stringers at 29.5 feet
			14 17 20	17.2	30				
core							SM	2.5Y 6/4	Fine Silty SAND: light yellowish brown, 80% sand, damp, dense
					35				

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-16
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	Description
								SM		Fine Silty SAND, continued
core										hard caliche nodules from 36.5 to 37 feet
									2.5Y 6/2	light brownish gray
			20 25 27	8.9	40					
core					45					hard calcite nodules at 47.3 feet abundant calcite cement to 50 feet
			10 14 25	13.9	50			CL	2.5Y 6/2	Silty CLAY: light brownish gray, trace of fine sand, damp to moist, hard
						Top of Seal 51.7 feet				
								CL		Sandy CLAY: 30% fine sand
						Top of Filter 54.5 feet		SM	2.5Y 7/1	Fine Silty SAND: light gray, 80% sand
core					55			ML	2.5Y 6/2	Clayey SILT: light brownish gray, trace of fine sand, damp, hard
						Top of Screen 56.5 feet		ML	2.5Y 5/2	Fine Sandy SILT: grayish brown, 40% sand, trace of fine mica, moist, hard
								SM		grades to Silty SAND
			11 16 23	22.7	60	Depth to first water 61 feet		ML		grades to Sandy SILT
								SM ML	2.5Y 5/4	water encountered at 61 feet Fine Silty SAND and Sandy SILT: light olive brown, trace of fine mica, wet, dense
								ML	2.5Y 5/3	Fine Sandy SILT: light olive brown, 30% fine sand clayey, moist, hard
core					65					
								SM	2.5Y 5/4	Fine Silty SAND: light olive brown, 50% sand
								CL	7.5YR 5/6 7.5YR 6/1	Silty CLAY: mottled strong brown and gray, trace of fine sand, wet, hard
					70					
								ML	2.5Y 5/4	Fine Sandy SILT: light olive brown, 35% sand, wet, hard
								SM	2.5Y 5/2	Fine Silty SAND: grayish brown, 65% sand, trace of fine mica, wet, dense
core					75	Bottom of Screen 76.5 feet				
					80					
										Boring terminated at 82.5 feet.

Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Building 14 Area		Boring/Well Name: TMW-17	
DRILLING COMPANY: West Hazmat	DRILLER: Steve	Project Name: Boeing C-6 Facility	
DRILLING METHOD (S): CME 75, Hollow Stem Auger	DRILL BIT (S) SIZE: 8"	Project Number: 994001.00	
BLANK CASING: 2" diam. PVC Schedule 40	FROM 0 TO 62 FT	ELEVATION: 55.54 feet MSL	TOTAL DEPTH: 87 feet
PERFORATED CASING: 2" diam. PVC Schedule 40, 0.010" slot	FROM 62 TO 82 FT	DATE STARTED: 5/10/99	DATE COMPLETED: 5/10/99
SIZE AND TYPE OF FILTER PACK: Lonestar 2/12 Sand	FROM 59 TO 87 FT	DEPTH TO WATER: 67 feet	
SEAL: Medium Bentonite Chips	FROM 56 TO 59 FT	LOGGED BY: M. Balderman	
GROUT: Neat Portland Cement	FROM 0 TO 56 FT	SAMPLING METHODS: 2" x 18" California Split-Spoon and CME dry core	WELL COMPLETION: ☐ SURFACE HOUSING ☒ STAND PIPE 3 FT

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
			23 25 30	0				CL	10YR 3/3	Silty CLAY: very dark brown, trace of sand, slightly moist, hard, low plasticity
									10YR 4/4	dark yellow brown
			13 17 22	2.2	5					trace of fine gravel
								ML	10YR 4/4	grades to Clayey SILT: very dark brown, slightly moist, hard
			14 18 21	2.2	10			ML	2.5Y 5/4	grades to SILT with Clay: light olive brown, slightly moist, hard, no plasticity, no gravel
										calcareous nodules from 12 to 13 feet
core					15				10YR 5/6	yellowish brown
										increasing clay content, moist, low plasticity
			11 16 18	10	20			ML	10YR 4/4	grades to Clayey SILT: dark yellowish brown, trace of fine sand, moist, hard, low plasticity
										small calcareous nodules from 23 to 23.5 feet
core					25				10YR 5/4	decreasing clay, yellowish brown, increasing fine sand, no plasticity
								ML	2.5Y 6/4	grades to Sandy SILT: light yellowish brown, fine sand, moist, stiff
								SM	2.5Y 6/4	grades to Silty SAND: light yellowish brown, fine, medium dense
			10 13 16	1.5	30				10YR 6/6	brownish yellow, decreasing silt, with a 3-inch layer of shells
										shells
										no shells below 33 feet
core					35			SP	10YR 6/3	grades to SAND with Silt: pale brown, fine, slightly moist, medium dense

Well Construction Log

Kennedy/Jenks Consultants

Boring/Well Name TMW-17
Project Name Boeing C-6 Facility
Project Number 994001.00

SAMPLES: Driven	Recovered	Collected	Blows per 6"	Head Space Reading (mg/L)	Depth (feet)	WELL CONSTRUCTION	Graphic Log	USCS Log	Munsell Color	Description
core								SP		SAND with Silt (continued)
			17 25 31	3	40					decreasing silt, dense
										dense shelly layer from 42.5 to 44.5 feet, densely packed, imbricated shells and scales in sandy matrix
core					45			ML	10YR 4/4	Clayey SILT: dark yellowish brown, moist, hard, with two inclusions of shelly laminae approximately 0.5 inches thick
										small carbon stringers in places
									10YR 7/2	2-inch layer of light gray silt with sand
								ML	10YR 5/4	Sandy SILT: yellowish brown, fine, moist, dense
			13 22 27	1.5	50				2.5Y 6/3	light yellowish brown
										grades to Clayey SILT: finely laminated, hard, low plasticity
									10YR 6/2	grades to Sandy SILT: light brownish gray
core					55	Top of Seal 56 feet				grades to Clayey SILT
									10YR 6/6	brownish yellow
						Top of Filter 59 feet		SP	10YR 7/1	SAND with some Silt: light gray, fine, dense, slightly moist
			12 18 23	2.8	60					
						Top of Screen 62 feet				
core					65					
				1.4		Depth to first water 67 feet			10YR 6/6	brownish yellow, moist
			8 11 13		70					
									7.5YR 5/3	brown, wet, medium dense
					75					
					80					
						Bottom of Screen 82 feet				Boring terminated at 87 feet.

ARCADIS
GERAGHTY&MILLER

LOG OF BORING BL-1

ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 2, 1999	Driller	: Tony Garver
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-1
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0						GM		GRAVEL with SAND, dark reddish brown (5YR 3/3), moist, gravel is fine to coarse, well rounded, poorly graded, sand is fine to coarse grained, poorly graded, subangular to subrounded, trace silt, FILL.
5								
10	100	☒	BL-1-10	0	13 20 21	CL		CLAY with SAND, yellowish brown (10YR 5/4), moist, hard, no dilatency, medium toughness, fine grained sand, poorly graded, clay is lean.
	85	☒	BL-1-11.5	0	11 20 22			
15								
20	100	☒	BL-1-21 BL-1-23.7	0	8 14 17	SM		SILTY SAND, yellowish brown (10YR 5/4), medium dense, moist, fine grained, poorly graded, subangular to subrounded, 50% quartz, 30% feldspar, 17% weathered biotite, 3% lithics, trace clay.
25								
30	100	☒	BL-1-31	0	8 28 32			Same as above, decrease in silt content.
35								
40	90	☒	BL-1-41	0	14 28 30			Same as above, dense, increase in weathered biotite content, decrease in feldspar content.
45								

2" Sch. 40 PVC Casing

Bentonite Grout

common\mtech5\ilm\bl1.bor

05-10-15

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-1

ILM
BRC Property

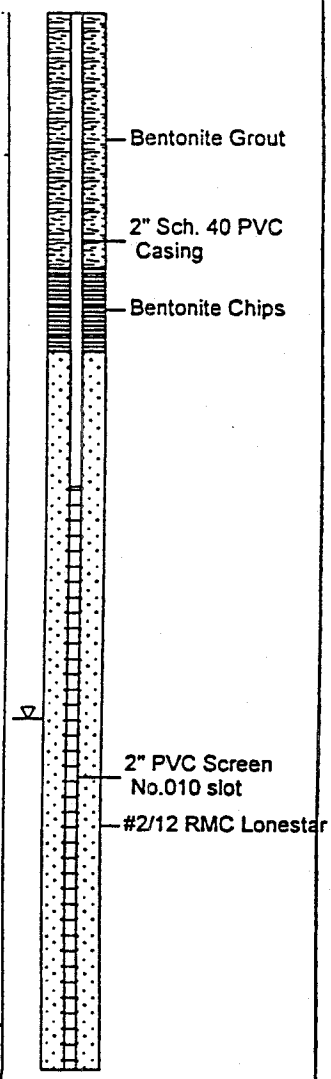
CA000280.0002.00002

Date Completed	: February 2, 1999	Driller	: Tony Garver
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
45						SM		
50	100	☒	BL-1-51	0	19 28 32			SAND with SILT, light yellowish brown (10YR 6/4), medium dense to dense, dry to moist, sand is fine grained, poorly graded, subangular to subrounded, 65% quartz, 30% feldspar, 5% weathered biotite and lithics, shell fragments, trace clay clumps.
55								
60	100	☒	BL-1-61	0	17 23 30	SP-SM		Same as above, color changes to reddish yellow (5YR 6/6), increase in shell fragments (60% shell fragments, 5% feldspar, 5% weathered biotite, 30% quartz), shells are yellowish brown (10YR 5/6) pulverized, jagged edges, medium dense, no clay.
65								
70	50	☒	BL-1-71	0	22 30 34			At 69.5', first encountered groundwater. Same as above, trace clay clumps, very dense.
75								
80	60	☒	BL-1-81	N/A	11 16 21	SC		CLAYEY SAND, yellowish brown (10YR 5/4), medium dense, moist, fine to medium grained, poorly graded, rounded to angular, 30% coarse shell fragments (max. 1"), 30% lithics, 40% quartz, oxidized.
85								
90								

Total depth of boring: 81.5 feet.

Well: BL-1
Elev.: NA



ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-2

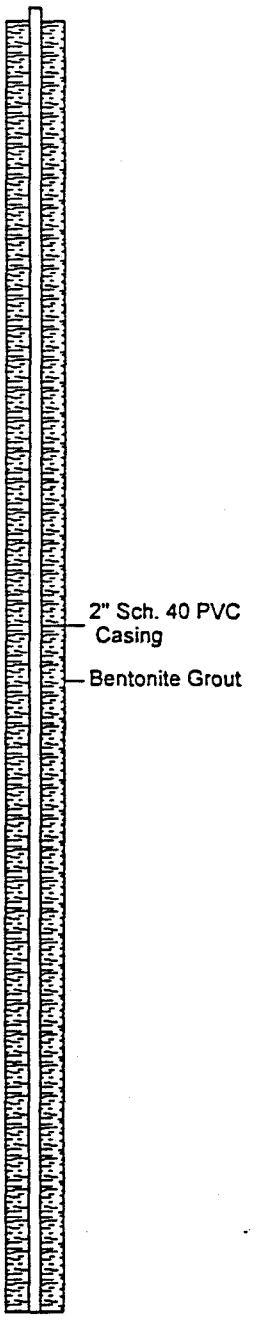
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 3, 1999	*Driller*	: *Tony Garver*
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-2
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0–6.5						GM		SILTY GRAVEL with SAND, very dark grayish brown (10YR 3/2), dry to moist, fine to coarse gravel, angular to rounded, sand is fine to medium grained, poorly graded, subangular to subrounded, FILL.
8	100	☒	BL-2-9	2	9 17 22	CL		CLAY, brown (10YR 4/3), hard, moist, no dilatency, medium toughness, lean, trace medium sand.
12	80	☒	BL-2-11.5	0	9 14 16	ML		SANDY SILT, brown (10YR 5/3), firm to hard, moist, slow dilatency, non plastic, trace mica, sand is fine grained, poorly graded, subangular to subrounded.
22	100	☒	BL-2-21.5	0	8 11 14			
27–30						SM		SILTY SAND with CLAY, brown (10YR 4/3), moist, fine grained, poorly graded, subangular to subrounded, trace mica.
32	100	☒	BL-2-31.5	0	9 16 23	SP		SAND, yellowish brown (10YR 5/4), medium dense, moist, fine grained, poorly graded, well sorted, 70% quartz, 10% feldspar, 15% weathered biotite, 5% lithics, trace silt.
42	80	☒	BL-2-41.5	2	16 26 33	SP-SM		SAND with SILT, light yellowish brown (10YR 6/4), medium dense to dense, dry to moist, fine grained, poorly graded, subangular to subrounded, 50% quartz, 10% feldspar, 10% weathered biotite, 30% shell fragments, shells are yellowish brown (10YR 5/6), slightly pulverized, with jagged edges, trace clay clumps



ommon\mtech5\ilm\bl2.bor

05-10-19

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-2

ILM
BRC Property

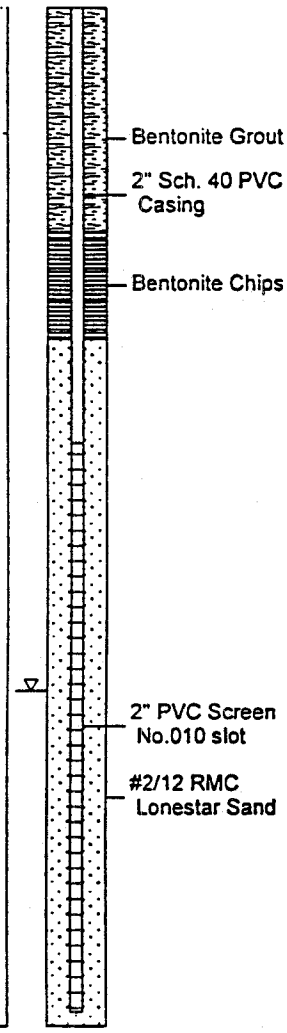
CA000280.0002.00002

Date Completed	: February 3, 1999	Driller	: Tony Garver
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-2
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
46								
48						SP-SM		
50					13 20 29			
52	90	☒	BL-2-51.5	5				SILTY SAND, brown (10YR 4/3), medium dense, dry to moist, fine grained, poorly graded, subangular to subrounded, 60% quartz, 30% feldspar, 10% weathered biotite, no shell fragments, slightly oxidized.
54								
56								
58								
60					14 18 26			Same as above, becomes 90% quartz, 5% feldspar, 5% weathered biotite, trace clay clumps.
62	100	☒	BL-2-61.5	2				
64								
66						SM		
68								
70					21 28 35			At 70.25', first encountered groundwater. Same as above, color changes to dark yellowish brown (10YR 4/4), well sorted, 65% quartz, 5% feldspar, 28% lithics, 2% weathered biotite, trace clay clumps.
72	100	☒		0				
74								
76								
78								
80					11 17 19			At 80.5', increase in silt content, becomes 60% quartz, 10% feldspar, 30% weathered biotite, trace clay, oxidized.
82	100	☒		NA				
84								
86								
88								
90								
92								

Total depth of boring: 82 feet.



common\mtech5\ilm\bl2.bor

05-10-1

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-3

ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 8, 1999	Driller	: Craig Winegarner
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-3
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0–8	100, 100, 100					GM		SILTY GRAVEL with SAND, very dark grayish brown (10YR 3/2), dry to moist, fine to coarse gravel, angular to rounded, sand is fine to medium grained, poorly graded, subangular to subrounded, FILL.
8–12	100		BL-3-10.5 BL-3-8.7	0	9 23 26	CL		CLAY, brown (10YR 4/3), dry to moist, no dilatency, hard, medium toughness, lean, trace fine sand, mottled gray, slightly calcareous, trace tiny hollow vertical tubes, dense.
12–22	100		BL-3-13	0	16 19 22	SC		CLAYEY SAND, brown (10YR 4/3), medium dense, dry to moist, fine grained, poorly graded, subangular to subrounded.
22–32	100		BL-3-23	0	13 16 19	ML		SANDY SILT, brown (10YR 4/3), hard, dry to moist, fine grained, poorly graded, subangular to subrounded, some black specks, trace clay clumps. At 23' color changed to dark yellowish brown (10YR 4/4).
32–42	100		BL-3-33	0	21 23 32	SP-SM		SAND with SILT, yellowish brown (10YR 5/4), medium dense to dense, dry to moist, fine grained, poorly graded, well sorted, subangular to subrounded, 60% quartz, 20% feldspar, 20% weathered biotite. At 41.5', same as above, 60% shell fragments, 5% weathered biotite, 5% lithics, 30% quartz, trace red (2.5YR 4/8) silty sand globules, few black (10YR 2/1) 1/2" pebbles.
42–46	100		BL-3-43	0	17 24 30	ML		SILT with SAND, dark yellowish brown (10YR 4/4), hard, moist, fine grained, poorly graded, subangular to subrounded, nonplastic, rapid dilatency, slightly oxidized.

ommon\mlech5\ilm\bl3.bor

05-10-19

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-3

ILM
BRC Property

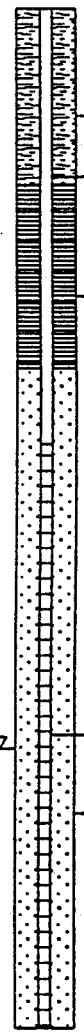
CA000280.0002.00002

Date Completed	: February 8, 1999	Driller	: Craig Winegarner
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-3
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
46								
48						ML		
50								
52	100	☒	BL-3-53	0	27 36 40			SAND with SILT, dark yellowish brown (10YR 4/4), dense, moist, fine grained, poorly graded, angular to subrounded, 40% weathered biotite, 50% quartz, 8% feldspar, 2% lithics.
54								
56								
58								
60								
62	100	☒	BL-3-63	NA	20 23 30	SP-SM		At 61.5', same as above, decrease in silt content. At 62.5', same as above, increase in mica content, increase in silt content, medium dense.
64								
66								
68								
70								
72	100	☐			47 70 93			SAND, dark yellowish brown (10YR 4/6), very dense, moist to wet, fine grained, poorly graded, subangular to subrounded, 75% quartz, 10% feldspar, 5% weathered biotite, 10% lithics, slightly oxidized.
74								
76						SP		At 72.25', first encountered groundwater.
78								
80								
82	100	☐		NA	58 70 89	SM		SILTY SAND, dark grayish brown (10YR 4/2), very dense, wet, medium grained, poorly graded, subangular to subrounded, trace clay clumps, 70% quartz, 20% feldspar, 10% weathered biotite.
84								
86								
88								
90								
92								

Total depth of boring: 82 feet.



ARCADIS
GERAGHTY&MILLER

LOG OF BORING BL-4

ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 16, 1999	Driller	: Craig Winegarner
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-4
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0						SM		SILTY SAND with GRAVEL, very dark grayish brown (10YR 3/2), moist, sand is fine to medium grained subangular to subrounded, gravel is fine to coarse, angular to rounded, FILL.
3	80			N/A		GP		GRAVEL with SAND, very dark grayish brown (10YR 3/2), moist, fine to coarse gravel, angular, volcanic detrital, sand is fine grained, poorly graded, subangular to subrounded, road base, FILL.
					11 14	CL		
	80	☒	BL-4-4.5	2	17	SC		CLAY, very dark grayish brown (10YR 3/2), firm to hard, moist, no dilatency, medium toughness, slightly mottled gray.
6					16 28			CLAYEY SAND, dark yellowish brown (10YR 4/4), medium dense, dry to moist, fine grained, poorly graded, subangular to subrounded, tiny vertical hollow tubes, gypsum strings.
	100	☒	BL-4-7	0	50			
9								SILTY SAND with CLAY, brown (10YR 4/3), dense to very dense, moist, fine grained, poorly graded, subangular to subrounded, micaceous, trace clay clumps.
12								
15								
					18 19	SM		At 16', same as above, trace fine gravel.
	100	☒	BL-4-17	0	26			
18								
21								
24								
					20 23	SP-SM		
27								

common\mtech5\ilm\bl4.bor

05-10-19

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-4

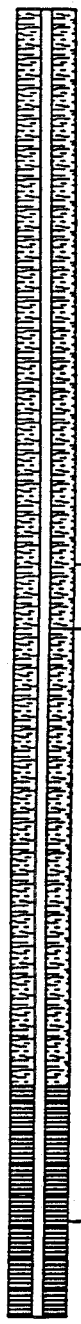
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 16, 1999	Driller	: Craig Winegarner
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-4
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
27	100	☒	BL-4-27	0	30			SAND with SILT, yellowish brown (10YR 5/4), medium dense, moist, fine grained, well sorted, poorly graded, subangular to subrounded, 80% quartz, 5% feldspar, 15% weathered biotite and lithics.
30								
33								
36					28 43	SP-SM		At 36', same as above, increase in weathered biotite content to 25%.
	100	☒	BL-4-37	0	50			At 37.5', few shell fragments.
39								
42								
45								
					16	SM		SILTY SAND, light olive brown (2.5Y 5/6), medium dense, moist, fine grained, poorly graded, subangular to subrounded, well sorted, 60% quartz, 20% feldspar, 20% weathered biotite and lithics, trace clay clumps.
	100	☒	BL-4-47	0	24 32	SP		SAND, light brownish gray (2.5Y 6/2), medium dense, moist, fine grained, well sorted, poorly graded, subangular to subrounded, 90% quartz, 10% weathered biotite.
48								
51						SM		SILTY SAND, light olive brown (2.5Y 5/6), medium dense, moist, fine grained, poorly graded, subangular to subrounded, well sorted, 60% quartz, 20% feldspar, 20% weathered biotite and lithics, trace clay clumps.
54								



05-10-19 ommon\tech5\ilm\bl4 bor

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-4

ILM
BRC Property

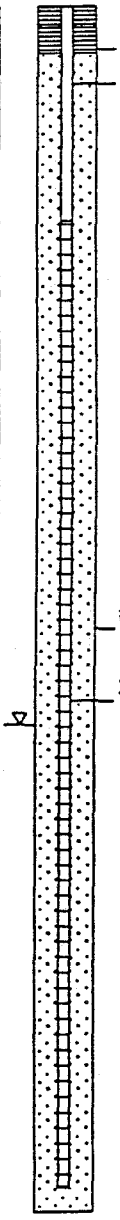
CA000280.0002.00002

Date Completed	: February 16, 1999	Driller	: Craig Winegarner
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
54								
57	100	☒	BL-4-57	0	14 20 27	SM		At 56', same as above, color change to yellowish brown (10YR 5/4), 60% quartz, 30% feldspar, 10% lithics, (no mica), oxidation in layers.
60								
63								
66	100	☒	BL-4-67	0	37 60 63	SP		SAND, yellowish brown (10YR 5/4), very dense, moist to wet, fine grained, poorly graded, well sorted, subangular to subrounded, 70% quartz, 20% feldspar, 10% weathered biotite.
69								At 69', first encountered groundwater.
72								
75								
78	100			N/A	43 56 80			
81								

Total depth of boring: 79 feet.

Well: BL-4
Elev.: NA



ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-5

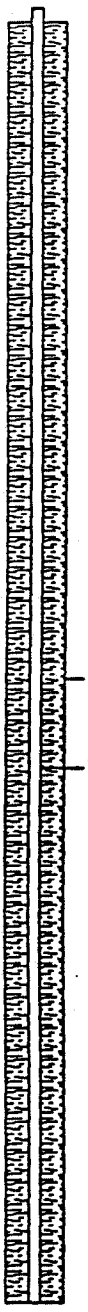
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 4, 1999	Driller	: Tony Garver
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-5
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0						GP		GRAVEL with SAND, dark reddish brown (5YR 3/2), moist, gravel is fine to coarse, angular to rounded, poorly graded, sand is fine to medium grained, poorly graded, subangular to subrounded, trace silt, FILL.
5						SM		SILTY SAND, brown (10YR 4/3), medium dense, moist, fine grained, poorly graded, subangular to subrounded, trace mica.
	100	☒	BL-5-8	1	9 11 12			
10	80	☒	BL-5-10	0	9 12 16			
15								
20	100	☒	BL-5-20	0	8 9 14			Same as above, increase in mica content.
25								
30	100	☒	BL-5-30	0	12 17 21			Same as above, decrease in silt content, becomes quartz rich.
35								
40	100	☒	BL-5-40	0	8 14 21	SP-SM		SAND with SILT, light yellowish brown (10YR 6/4), medium dense, moist to dry, fine grained, poorly graded, well sorted, subangular to subrounded, trace shell fragments, 60% quartz, 20% feldspar, 20% weathered biotite.
45								



05-10-11 common\mtech5\ilm\bl5.bor

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-5

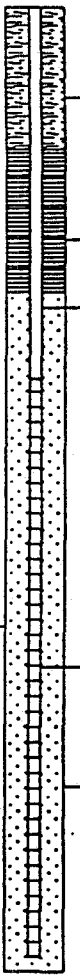
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 4, 1999	Driller	: Tony Garver
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-5
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
45						SP-SM		
50	100	☒	BL-5-50	0	17 31 26	SM		SILTY SAND, yellowish brown (10YR 5/4), medium dense, dry to moist, fine grained, poorly graded, well sorted, subangular to subrounded, 60% quartz, 20% feldspar, 20% weathered biotite, trace clay clumps.
55								
60	100	☒	BL-5-60	0	9 14 18	SP-SM		SAND with SILT, yellowish brown (10YR 5/4), medium dense, dry to moist, fine grained, poorly graded, subangular to subrounded, 70% shell fragments, 5% feldspar, 5% weathered biotite, 20% quartz, shells are pulverized with jagged edges, no clay found, 1" shell fragments.
65								At 66.6', first encountered groundwater.
70	100	☒	BL-5-70		8 10 19	SP		SAND, yellowish brown (10YR 5/4), medium dense, wet, fine grained, poorly graded, subangular to subrounded, 70% quartz, 10% feldspar, 10% lithics, 10% weathered biotite, well sorted, trace silt.
75	100	☐			15 32 40	SM		SILTY SAND, brown (10YR 4/3), dense, moist, fine grained, poorly graded, subangular to subrounded, well sorted, 70% quartz, 10% feldspar, 10% lithics, 10% weathered biotite.
80								
85								
90								



Total depth of boring: 78.5 feet.

05-10-19 ...ommon\mtech5\ilm\bl5.bor

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-6

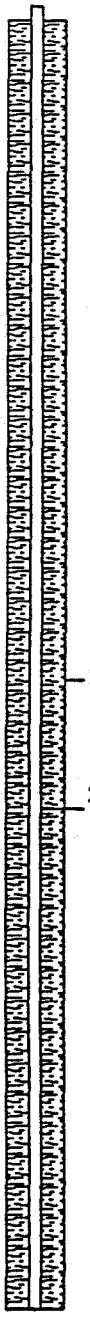
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 4, 1999	Driller	: Tony Garver
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-6
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0						GM		SILTY GRAVEL with SAND, dark grayish brown (10YR 4/2), dry to moist, gravel is fine to coarse sized, angular to subrounded, sand is fine to medium grained, poorly graded, subangular to subrounded, FILL.
2								
4								
6						CL		CLAY, brown (10YR 4/3), firm, moist, lean, no dilatency, medium toughness, trace mica.
8	100	☒	BL-6-8.5	0	7 9 10			
10	100	☒	BL-6-11	1	7 8 12	ML		SANDY SILT, yellowish brown (10YR 5/4), soft to firm, moist, slow dilatency, non plastic, sand is fine grained, poorly graded, subangular to subrounded.
12								
14								
16								
18								
20	100	☒	BL-6-21	1	9 12 14			
22								
24								
26								
28								
30	100	☒	BL-6-31 BL-6-33.7	1	9 12 18	SM		SILTY SAND, yellowish brown (10YR 5/6), medium dense, dry to moist, sand is fine grained, poorly graded, well sorted, subangular to subrounded, 60% quartz, 30% feldspar, 10% weathered biotite.
32								
34								
36								
38								
40	100	☒	BL-6-41	0	15 28 33	SP		SAND, yellowish brown (10YR 5/4), medium dense to dense, dry to moist, fine grained, poorly graded, well sorted, 65% quartz, 20% feldspar, 15% weathered biotite, trace silt.
42								
44								



common\mtech5\ilm\bl6 bor

05-10-15

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-6

ILM
BRC Property

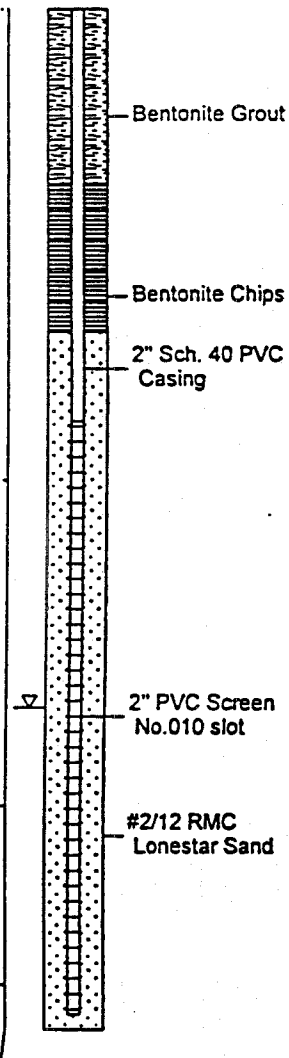
CA000280.0002.00002

Date Completed	: February 4, 1999	Driller	: Tony Garver
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-6
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
44, 46, 48, 50, 52, 54, 56	100	☒	BL-6-51	0	14 18 29	SP		Same as above, 60% shell fragments, yellowish brown in color (10YR 5/6), pulverized, with jagged edges, 35% quartz, 5% lithics, trace silt.
58, 60, 62, 64, 66, 68	100	☒	BL-6-61	1	13 19 24	SM		SILTY SAND, brown (10YR 4/3), medium dense, moist, fine grained, poorly graded, subangular to subrounded, 60% quartz, 30% feldspar, 10% weathered biotite, oxidized in layers, trace clay clumps, no shell fragments.
								At 67.7', first encountered groundwater.
70	100	☐		N/A	13 19 27			Same as above, becomes wet.
72, 74, 76						SC		CLAYEY SAND, grayish brown (10YR 5/2), medium dense, moist, fine grained, poorly graded, subangular to subrounded, no shells.
78	100	☐		N/A	19 30 35	SM		SILTY SAND, yellowish brown (10YR 5/4), dense, moist to wet, fine grained, poorly graded, subangular to subrounded, well sorted, 80% quartz, 10% feldspar, 8% lithics, 2% weathered biotite, oxidized in layers.
80, 82, 84, 86, 88								

Total depth of boring: 78.5 feet.



common\mtech5\ilm\bl6.bor

05-10-19

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-7

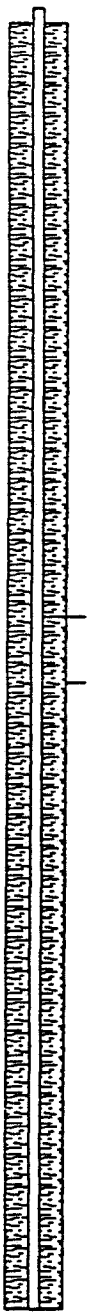
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 8, 1999	Driller	: Craig Winegamer
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-7
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0						GM		SILTY GRAVEL with SAND, very dark grayish brown (10YR 3/2), dry to moist, fine to coarse gravel, angular to rounded, sand is fine grained, trace medium and coarse grains, poorly graded, subangular to subrounded, FILL.
2								
4								
6								
8								
9	100					SM		SILTY SAND with GRAVEL, FILL.
10	75			0	9 14 16	ML		SANDY SILT, brown (10YR 4/3), medium dense, moist, fine grained, poorly graded, subangular to subrounded, small vertical hollow tubes.
12	100	☒	BL-7-12	0	7 10 14			At 11.5' color changes to yellowish brown (10YR 5/4), trace clay clumps.
14	95	☒	BL-7-14.5	4	8 8 14			
16								
18								
20								
22								
24	100	☒	BL-7-24.5	5	11 16 22	SP-SM		SAND with SILT, dark yellowish brown (10YR 4/6), medium dense, moist, fine grained, poorly graded, subangular to subrounded, trace clay clumps, 75% quartz, 10% feldspar, 15% mica (weathered biotite).
26								
28								
30								
32								
34	100	☒	BL-7-34.5	5	24 29 32	SP		SAND, light yellowish brown (10YR 6/4), dense, dry to moist, fine grained, poorly graded, well sorted, subangular to subrounded, trace silt, trace clay clumps, 55% quartz, 20% feldspar, 20% weathered biotite, 5% lithics and red chert, oxidized intermittently.
36								
38								
40								At 43', same as above, color change to brown (10YR 5/3), shell fragments (65% shell fragments, 5% weathered biotite, 25% quartz, 5% lithics).
42								



ammon\mech5\ilm\bl7.bor

05-10-19.

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-7

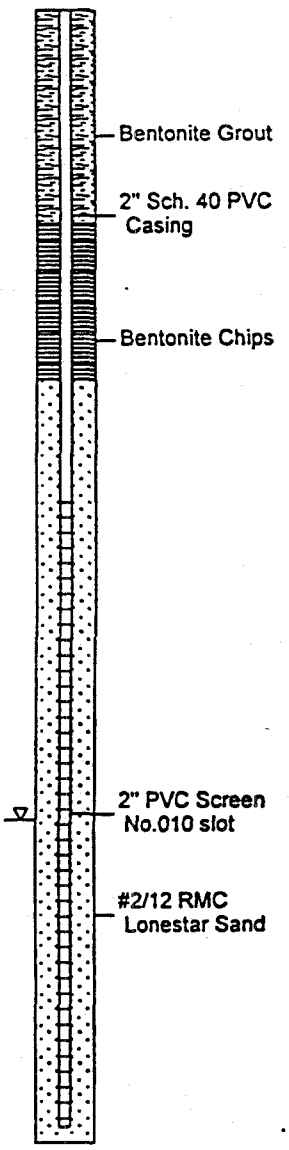
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 8, 1999	Driller	: Craig Winegamer
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-7
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
42								
44	100	☒	BL-7-44.5	5	16 20 26	SP		
						ML		SILT with SAND, yellowish brown (10YR 5/6), hard, moist to dry, slow dilatency, non plastic, micaceous, sand is fine grained, poorly graded, subangular to subrounded.
46								
48						CH		CLAY, dark grayish brown (10YR 4/2), hard, moist, fat, medium toughness, no dilatency.
50								
52								
54	100	☒	BL-7-54.5	15	19 30 32	SP-SM		SAND with SILT, dark yellowish brown (10YR 4/4), dense, moist, fine grained, poorly graded, subangular to subrounded, 40% weathered biotite, 50% quartz, 8% feldspar, 2% lithics.
56								
58								
60								
62								
64	90	☒	BL-7-64.5	10	41 60 75	SP		SAND, yellowish brown (10YR 5/4), very dense, fine grained, moist to wet, poorly graded, well sorted, subangular to subrounded, 75% quartz, 10% feldspar, 5% weathered biotite, 10% lithics, oxidized slightly.
66								
68								At 68.2', *first encountered groundwater.*
70								
72	100	☐		10	48 69 130			At 73', same as above, trace medium quartz grains, wet.
74								
76								
78	100	☐			63 75 90	SM		SILTY SAND, yellowish brown (10YR 5/4), very dense, wet, fine grained, poorly graded, well sorted, subangular to subrounded, trace clay clumps, slight oxidation, 75% quartz, 10% feldspar, 5% weathered biotite, 10% lithics.
80								
82								
84								Total depth of boring: 78.5 feet.



ommon\mtech5\ilm\bl7.bor
05-10-19

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-8

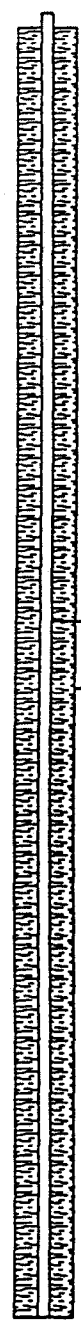
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 16, 1999	Driller	: Craig Winegamer
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-8
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
0–8						GM		SILTY GRAVEL with SAND, very dark grayish brown (10YR 3/2), dry to moist, fine to coarse gravel, angular, poorly graded, sand is fine to medium grained, poorly graded, subangular to subrounded, FILL.
8–9						CL		CLAY, very dark grayish brown (10YR 3/2), firm, moist, no dilatency, medium toughness, mottled gray, clay is lean.
9–12	100		BL-8-9.5	0	7 9 11	SC		CLAYEY SAND, brown (10YR 4/3), medium dense, moist to dry, fine grained, poorly graded, subangular to subrounded, trace gypsum strings.
12–32	100		BL-8-12	0	12 12 14	SM		SILTY SAND, brown (10YR 4/3), medium dense, dry to moist, fine grained, poorly graded, subangular to subrounded, trace mica, trace clay clumps.
32–42	100		BL-8-22	0	20 27 32	SP-SM		SAND with SILT, olive (5Y 5/4), medium dense, moist, fine grained, poorly graded, well sorted, subangular to subrounded, 70% quartz, 15% feldspar, 15% weathered biotite and lithics, oxidation present.
42–44	100		BL-8-32	0	16 22 25	SP-SM		At 41', color changes to yellowish brown (10YR 5/4), 50% quartz, 10% weathered biotite, 5% feldspar, 35% shell fragments. Fragments are pulverized with jagged edges, dense.
	100		BL-8-42	0	25 35 36	SP-SM		



common\mtech5\ilm\bl8.bor
05-10-15

ARCADIS
GERAGHTY & MILLER

LOG OF BORING BL-8

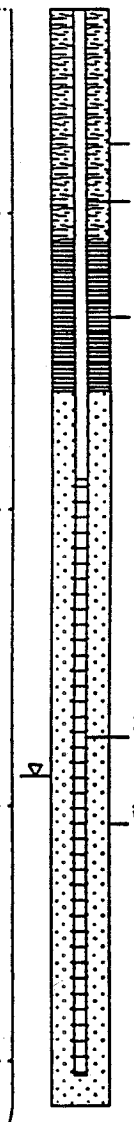
ILM
BRC Property

CA000280.0002.00002

Date Completed	: February 16, 1999	Driller	: Craig Winegarner
Logged By	: Mike Flaugher	Diameter	: 8" O.D. augers
Checked By	: Mike Flaugher		
Drilling Company	: Gregg Drilling		
Drill Rig	: Mobile B-61		

Well: BL-8
Elev.: NA

Depth in Feet	Recovery %	Sample Interval	Sample No.	PID (ppm)	Blow Count	USCS	GRAPHIC	DESCRIPTION
44, 46, 48, 50						SP-SM		
52	100	☒	BL-8-52	0	32 45 61	SM		SILTY SAND, dark grayish brown (10YR 4/2), dense to very dense, moist, fine grained, poorly graded, subangular to subrounded, 80% quartz, 5% feldspar, 15% weathered biotite, trace clay clumps, oxidized in lenses, becoming more oxidized throughout downward.
54, 56, 58, 60								
62	100	☒	BL-8-62	0	14 14 15	SC		CLAYEY SAND, reddish brown (5YR 4/3), medium dense, moist, fine grained, poorly graded, subangular to subrounded, oxidized.
64, 66, 68, 70								At 70', first encountered groundwater.
72	100	☐		N/A	22 30 38	SP		SAND, yellowish brown (10YR 5/4), very dense, wet to saturated, fine grained, poorly graded, well sorted, subangular to subrounded, 70% quartz, 20% feldspar, 10% weathered biotite.
74, 76, 78								
80	100	☐		N/A	25 80 62	SP-SM		SAND with SILT, yellowish brown (10YR 5/4), wet to saturated, fine grained, poorly graded, subangular to subrounded, well sorted, 70% quartz, 20% feldspar, 10% weathered biotite.
82, 84, 86, 88								



Total depth of boring: 81 feet.

ammon\mtech5\ilm\bl8.bor

05-10-19.

TRICO BOREHOLE LOGS

PRIVILEGED AND CONFIDENTIAL
FOR REVIEW PURPOSES ONLY

5/23

REPORT FOR FURTHER SITE INVESTIGATION AT THE TRICO INDUSTRIES FACILITY, 19706 NORMANDIE AVENUE TORRANCE, CALIFORNIA

Prepared for:

TRICO
15707 South Main Street
Gardena, California 90247
(213) 516-5000

Prepared by:

SCS Engineers
3711 Long Beach Boulevard
Ninth Floor
Long Beach, California 90807
(213) 426-9544

April 1988

File No. 18746

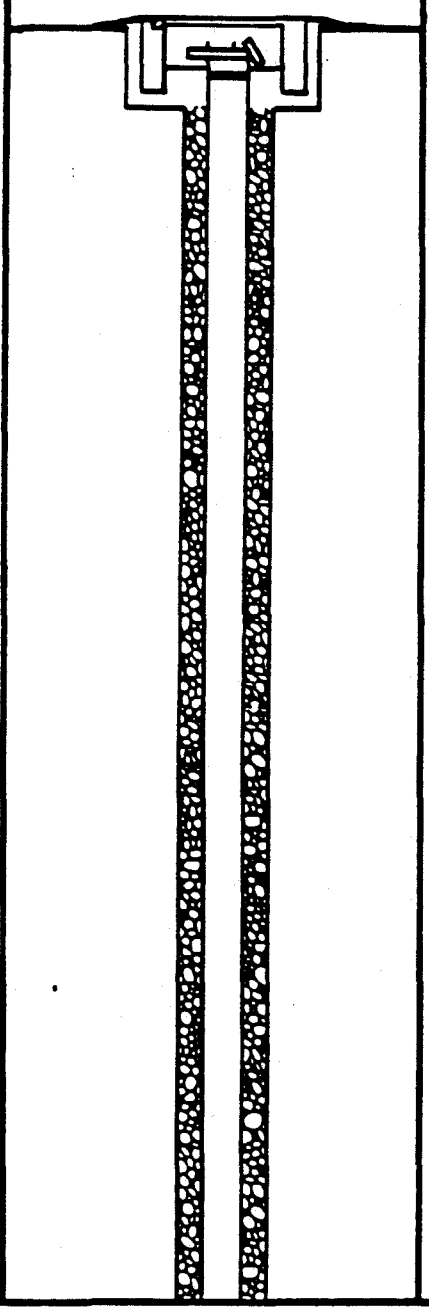
BORING LOG

SCS ENGINEERS
4014 Long Beach Blvd.
Long Beach,
California 90807-2687
(213) 426-9544
FAX (213) 427-0805

SITE INFORMATION:

Project: Trico Industries
Location: Torrance
Job No.: 18746.00
Geologist/Engineer: Greg Helland
Driller: Drilline Drilling

Hole/Well No.:MW-2
Diameter: 11"
Total Depth: 83.5"
Date Started: 3-29-88
Date Completed: 3-29-88

DEPTH (ft)	WELL CONSTRUCTION DETAIL	SAMPLE NO.	BLOW COUNTS/ FOOT	USCS SYMBOL	DESCRIPTION
0					
1					2" of asphalt
2					
3					
4					
5		3656	20	CL	5' brown silty clay, moist, very stiff, no odor. HNU 0 ppm.
6					
7					
8					
9					
10		3657	18	CL	10' light brown sandy silty clay, very fine grains, moist, very stiff, no odor, HNU 0 ppm, slight grey discoloration in upper part of sample.
11					
12					
13					
14					
15					
16					
17					
18					
19					20' light brown sandy silty clay, very fin grains, moist, hard,
20		3658	35	CL	no odor.

HOLE/WELL NO. PAGE OF

BORING LOG (cont'd)

DEPTH (ft)	WELL CONSTRUCTION DETAIL	SAMPLE NO.	BLOW COUNTS/ FOOT	USCS SYMBOL	DESCRIPTION
25					
30		3659	35	CL	30' light brown sandy silty clay, very fine grains, moist, hard, no odor.
35					
40		3660	40	CL	40' reddish brown sandy silty clay, very fine grains, soils getting sandier with depth, moist, hard, no odor.
45					

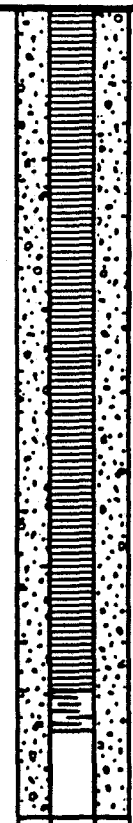
HOLE/WELL NO. PAGE OF

BORING LOG (cont'd)

DEPTH (ft)	WELL CONSTRUCTION DETAIL	SAMPLE NO.	BLOW COUNTS/ FOOT	USCS SYMBOL	DESCRIPTION
50		3661	42	CL	50' dark brown to reddish brwon slightly silty clay, no sand present in tip of sample, sandier at top of sample, moist, hard, no odor.
55					
60		3662	45	SC	60' light brown slightly clayer sand, very fine grained, moist, dense, possibly a slight sweet odor.
65					
70		3663	50	SM	70' dark brown silty sand, very fine grained, wet, dense, pyrite flakes present, no odor.

HOLE/WELL NO. PAGE OF

BORING LOG (cont'd)

DEPTH (ft)	WELL CONSTRUCTION DETAIL	SAMPLE NO.	BLOW COUNTS/ FOOT	USCS SYMBOL	DESCRIPTION
75					
80					
85					bottom of hole at 85' Well const. matl's. Casing: 0-63' 4" Sch. 40 PVC blank casing 63-83' 4" Sch. 40 PVC factory slotted casing slot size 0.020" Annular space: 0-59' bentonite grout 59-61' bentonite seal 61-83 #3 Monterey sand
90					
95					

HOLE/WELL NO. PAGE OF

18746

PRELIMINARY DRAFT REPORT FOR ADDITIONAL SITE INVESTIGATION AT THE TRICO INDUSTRIES FACILITY, 19706 NORMANDIE AVENUE TORRANCE, CALIFORNIA

Prepared for:

Haines, Russ, McMurry and de Recat
10920 Wilshire Boulevard - Suite 1000
Los Angeles, California 90024

Prepared by:

SCS Engineers
3711 Long Beach Boulevard
Ninth Floor
Long Beach, California 90807
(213) 426-9544

November 1987

File No. 18746

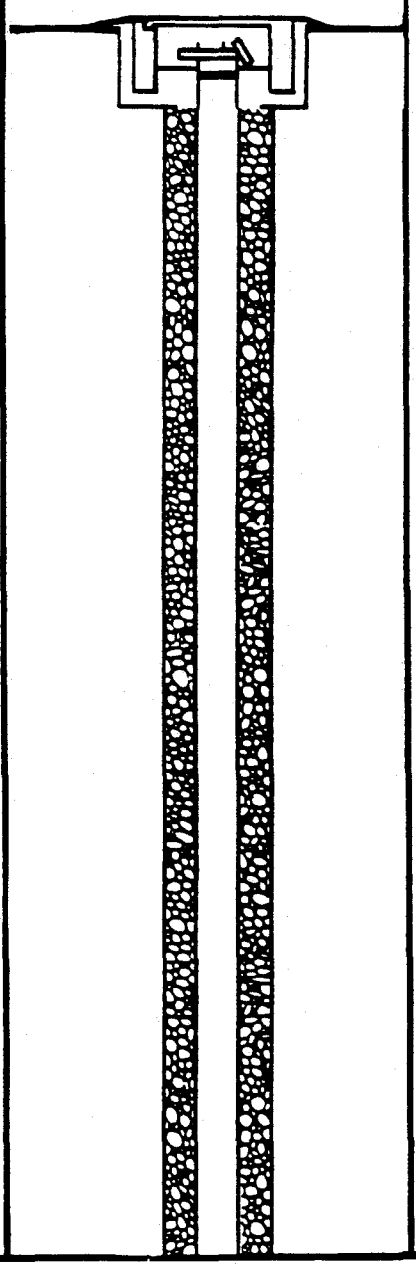
BORING LOG

SCS ENGINEERS
4014 Long Beach Blvd
Long Beach
California 90807-2687
(213) 426-9544
FAX (213) 427-0805

SITE INFORMATION:

Project: Trico Industries
Location: Torrance
Job No.: 18746.00
Geologist/Engineer: Greg Helland/Tom Morgan
Driller: H-F Drilling

Hole/Well No.:MW-1
Diameter: 10.5"
Total Depth: 85'
Date Started: 7-28-87
Date Completed: 7-28-87

DEPTH (ft)	COMPLETION DETAIL	SAMPLE NO.	BLOW COUNTS/FOOT	USCS SYMBOL	DESCRIPTION
0					2" of asphalt 2.5" of concrete
1					
2				Cl	black silty clay
3					
4				Cl	brown to light brown silty clay
5					
6					
7					
8					
9					
10		0404	23	CL	light brown silty clay, fine grains, moist, very stiff, no odor.
11					
12					
13					
14					
15					
16					
17					
18					light greenish grey, organic stained, fine silty clay, moist, very stiff, organics odor.
19		0415	35	CL	
20					

BORING LOG (cont'd)

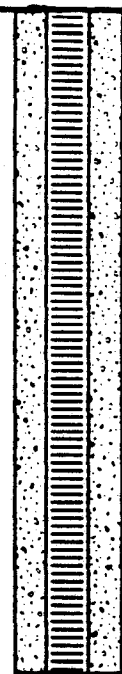
DEPTH (ft)	WELL CONSTRUCTION DETAIL	SAMPLE NO.	BLOW COUNTS/ FOOT	USCS SYMBOL	DESCRIPTION
					greenish black stained clayey silt.
					light brown clayey silt
25					
					grey green clayey silt
30		0417	40	ML to SM	light greenish grey clayey to sandy silt with organic odor, very stiff, drier than above.
35		0418	30	ML	light greenish grey silt with organic odor, stiff, wet.
40		0419	60	SW	dark greenish grey silty sand with organic odor, very stiff, moist, shell fragments present.
					less dark staining, siltier, shell frags. abundant.
45		0420	50	ML-SW	greenish grey silty mudstone, slight odor, very stiff, moist. darker grey green @48'

BOE-C6-0139831

BORING LOG (cont'd)

DEPTH (ft)	WELL CONSTRUCTION DETAIL	SAMPLE NO.	BLOW COUNTS/ FOOT	USCS SYMBOL	DESCRIPTION
50		0421	40	CL	mottled greenish yellowish grey clay, moist, very stiff, iron staining following burrowing.
					Cl% increases, but with some silt, more plastic with depth
55		0422	60	CH-MH SM	light yellow greenish grey mottled (burrowed) silty clay with sandy infillings, no odor.
					greenish grey silty clay brought up by auger
60		0423	80	SM	light olive grey silty sand with small laminae of silty clay, slightly moist, no odor.
65		0424	40	SM-ML	dark olive greenish grey silty sand with small clayey silt stringers, moist, very strong organic odor, very stiff.
					clay content increasing very moist and plastic
70		0425	40	Cl	light olive yellowish green silty clay, very moist and plastic, no odor.

BORING LOG (cont'd)

DEPTH (ft)	WELL CONSTRUCTION DETAIL	SAMPLE NO.	BLOW COUNTS/ FOOT	USCS SYMBOL	DESCRIPTION
75		0426	20	SM	medium olive green silty sand, wet, no odor, some silty clay stringers.
80					
85					bottom of hole at 85' Well const. matl's. Casing: 0-65' 4" Sch. 40 PVC blank casing 65-85' 4" Sch. 5 SST 304 Stainless Steel perforated casing slot size 0.020" Annular space: 0-54' bentonite grout 54-56' bentonite seal 56-85' #3 Monterey sand
90					
95					

DEL AMO STUDY AREA

Well Location Map

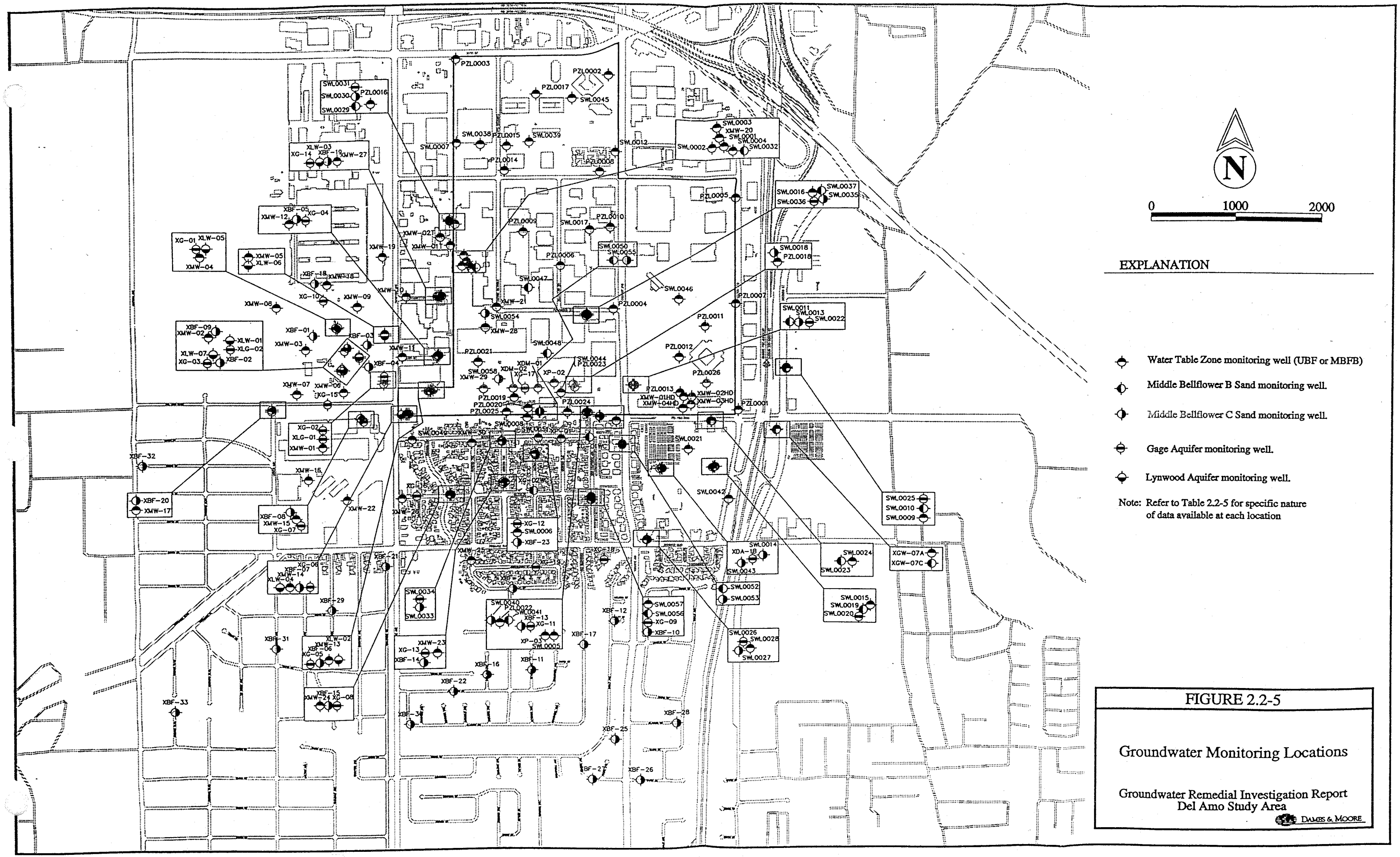


FIGURE 2.2-5

Groundwater Monitoring Locations

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

S:\DJO\NT_DWGS\22221, 10/03/96 at 15:50

BOE-C6-0139835

DEL AMO STUDY AREA

Structural Contour and Isopach Maps for Hydrostratigraphic Units

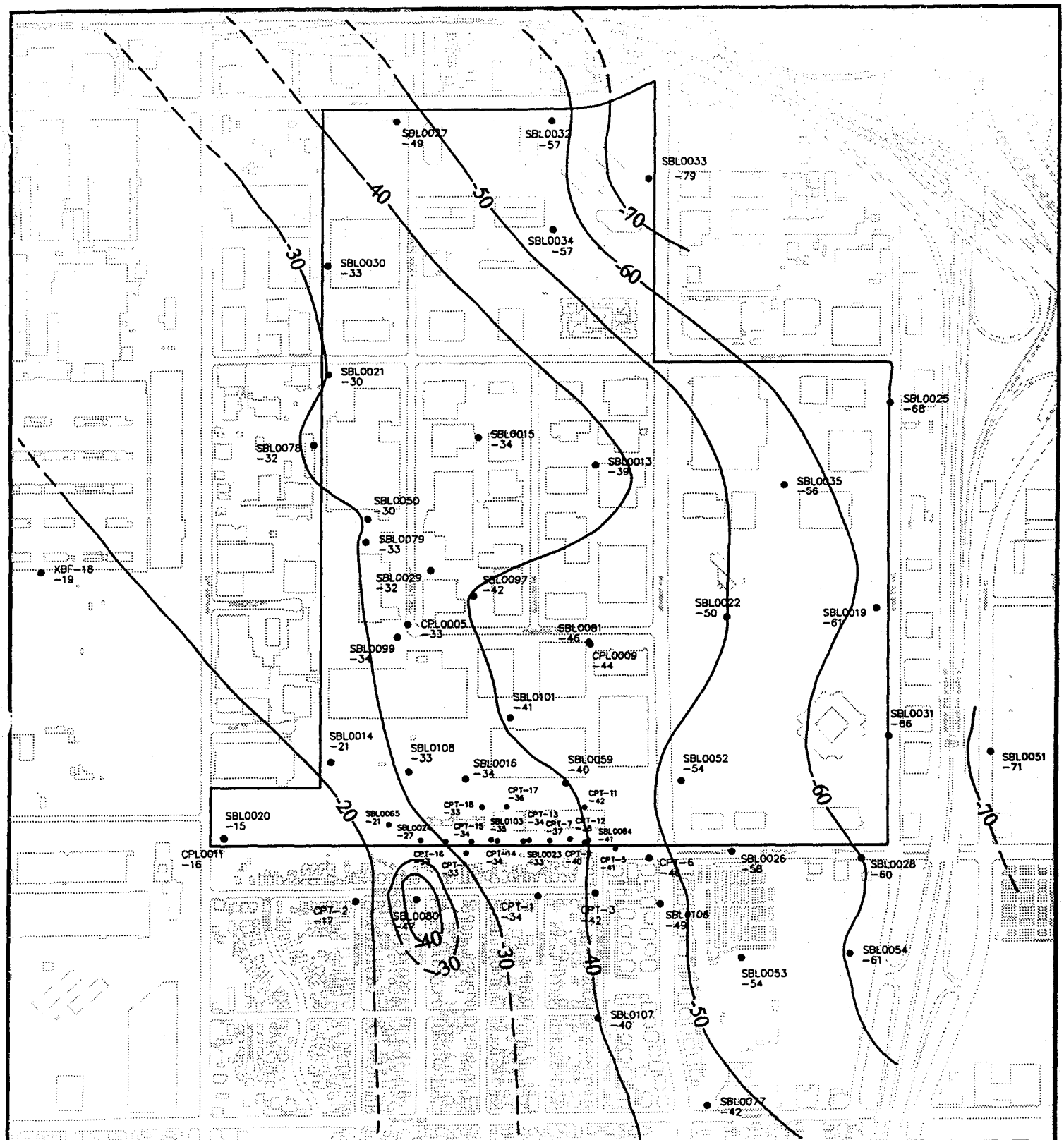


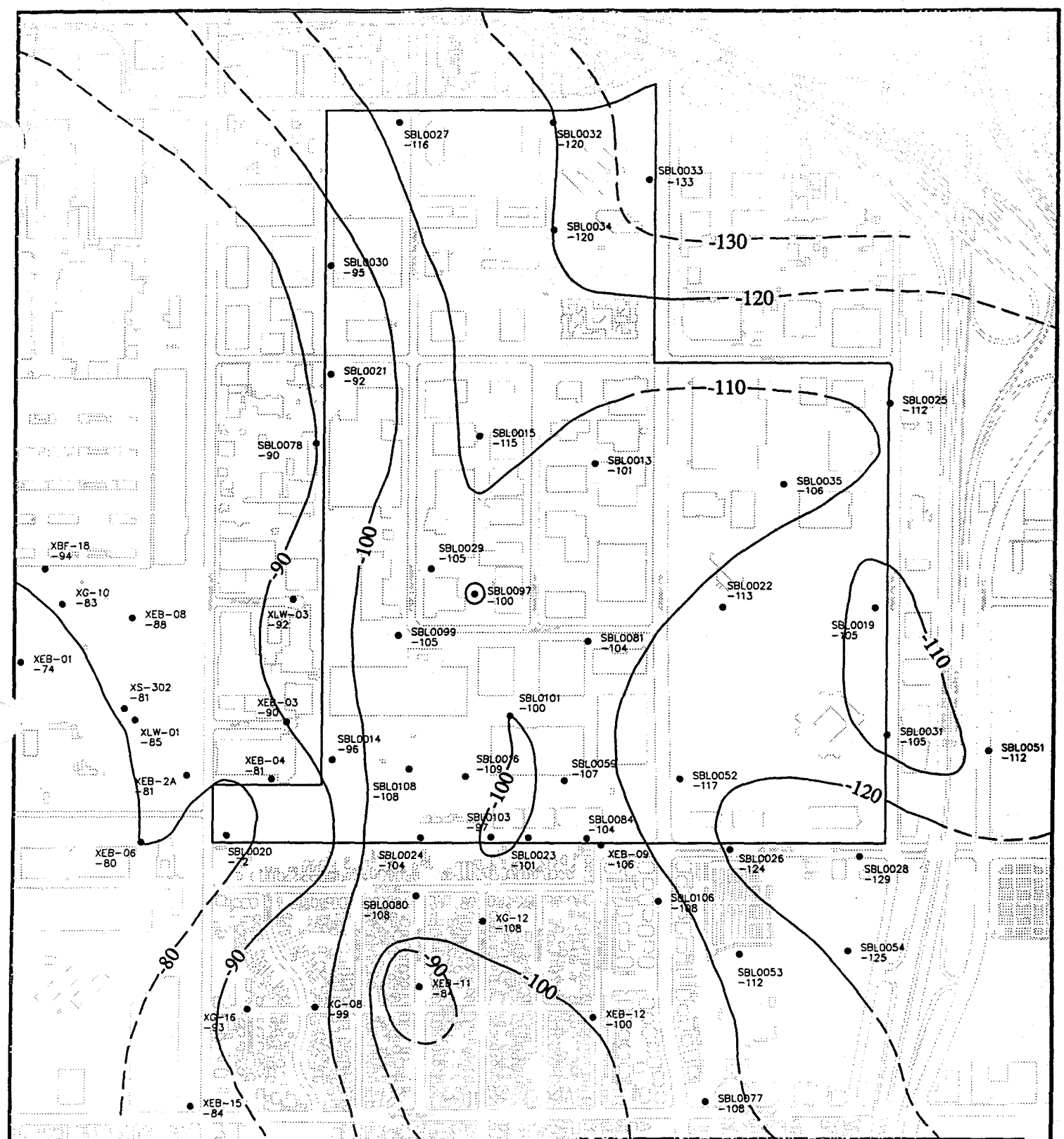
FIGURE 3.2-3

Contour Map
Base of
Upper Bellflower Aquitard

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\6ZUF3203, 04/14/98 at 13:31



EXPLANATION

CPT-6 • -46 — Control point indicating elevation of base of hydrostratigraphic unit

-20 — Elevation contour, dashed where inferred (feet MSL).

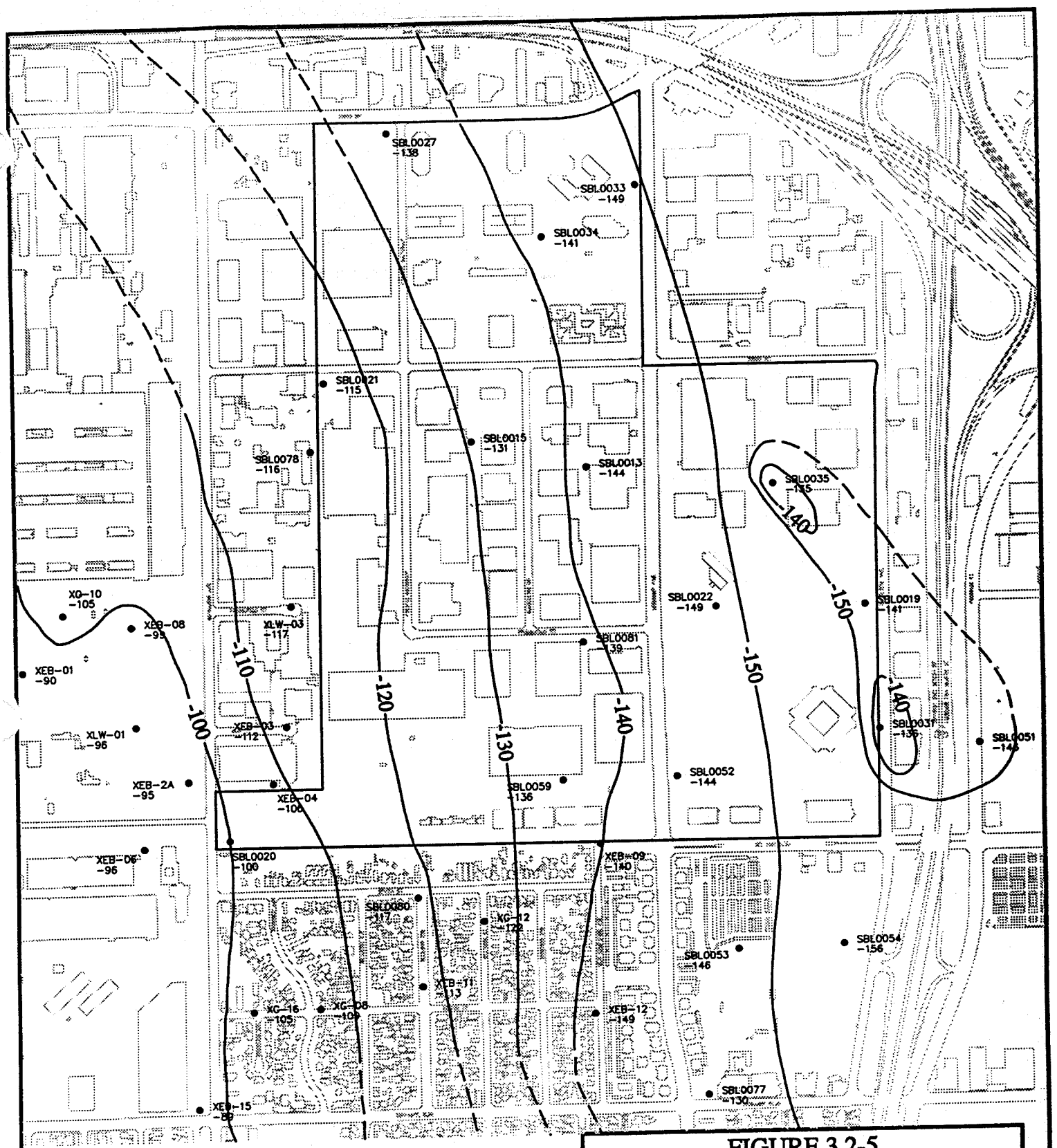
FIGURE 3.2-4

Contour Map Base of Middle Bellflower Aquitard

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\6zuf3204, 06/16/97 at 09:50



EXPLANATION

CPT-6
•
-46

Control point indicating elevation of base of hydrostratigraphic unit

-20 Elevation contour, dashed where inferred (feet MSL).

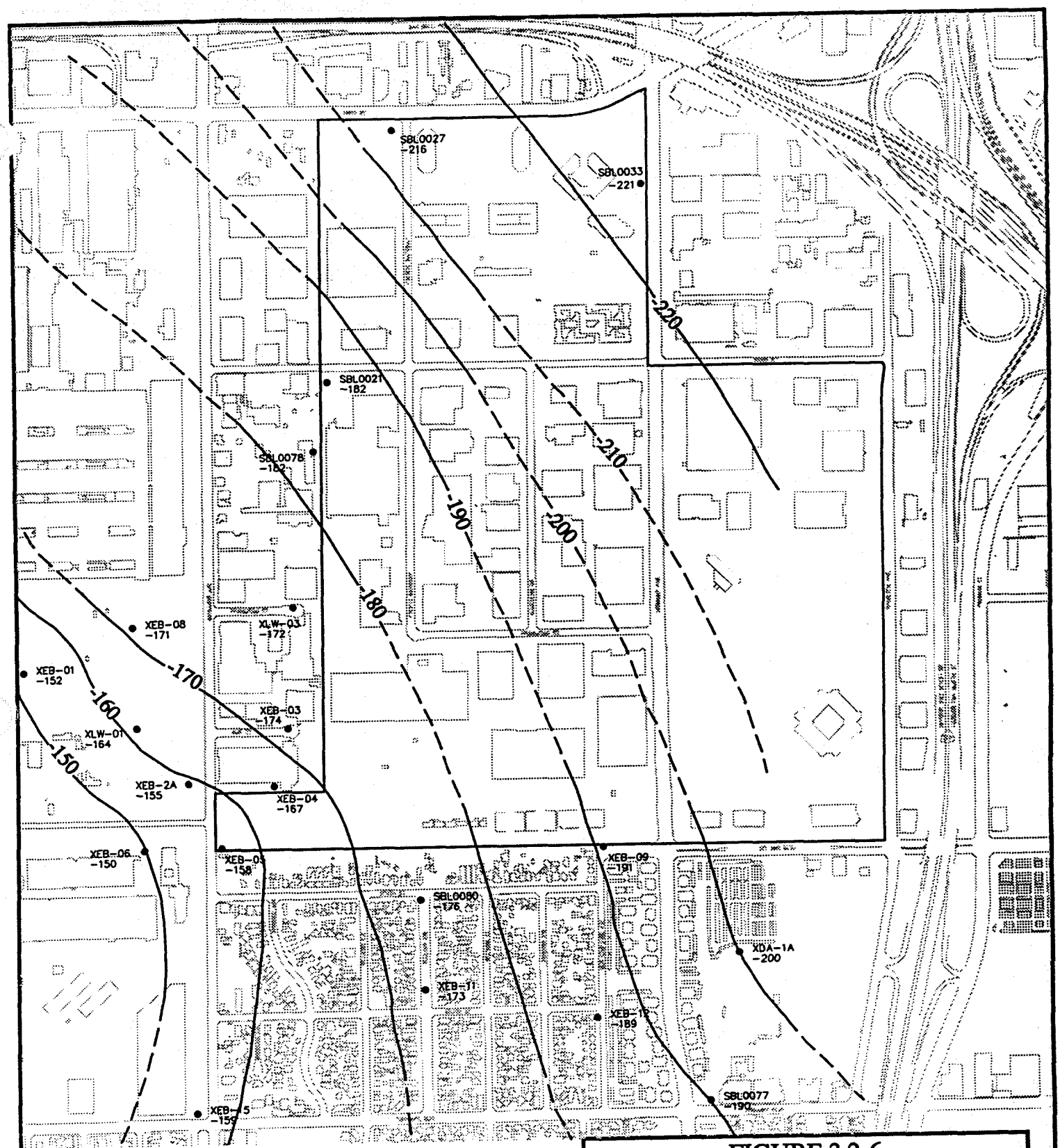
FIGURE 3.2-5

Contour Map Base of Lower Bellflower Aquitard

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\djd\ri\SEC3\6ZUF3205, 05/21/97 at 11:23



0 800 1600

N

EXPLANATION

CPT-6 • -46 — Control point indicating elevation of base of hydrostratigraphic unit

-20 — Elevation contour, dashed where inferred (feet MSL).

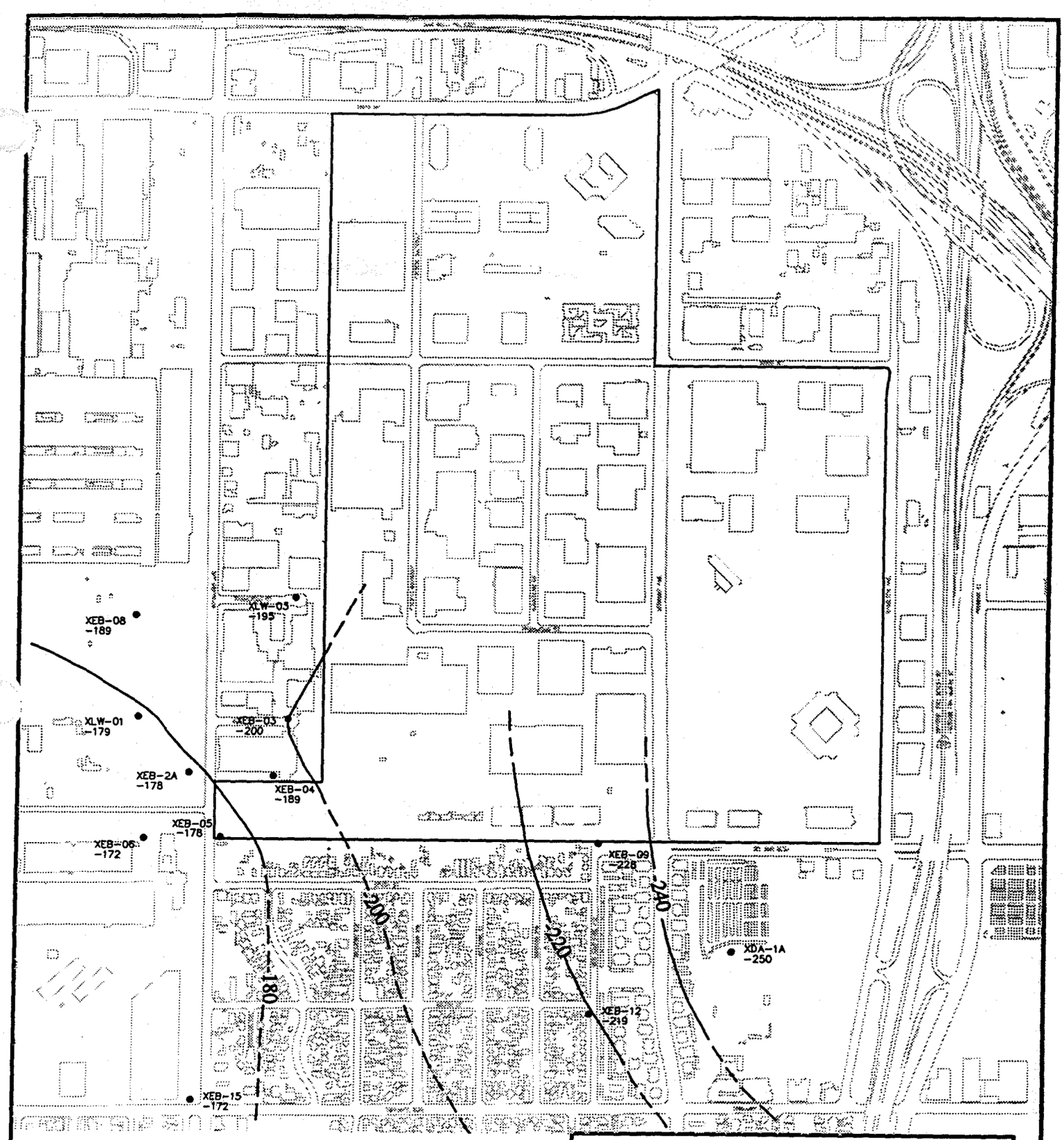
FIGURE 3.2-6

Contour Map Base of Gage Aquifer

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\djd\ri\SEC3\6ZUF3206, 05/21/97 at 11:19



0 800 1600

N

EXPLANATION

CPT-6 ● -46 — Control point indicating elevation of base of hydrostratigraphic unit

-20 — Elevation contour, dashed where inferred (feet MSL).

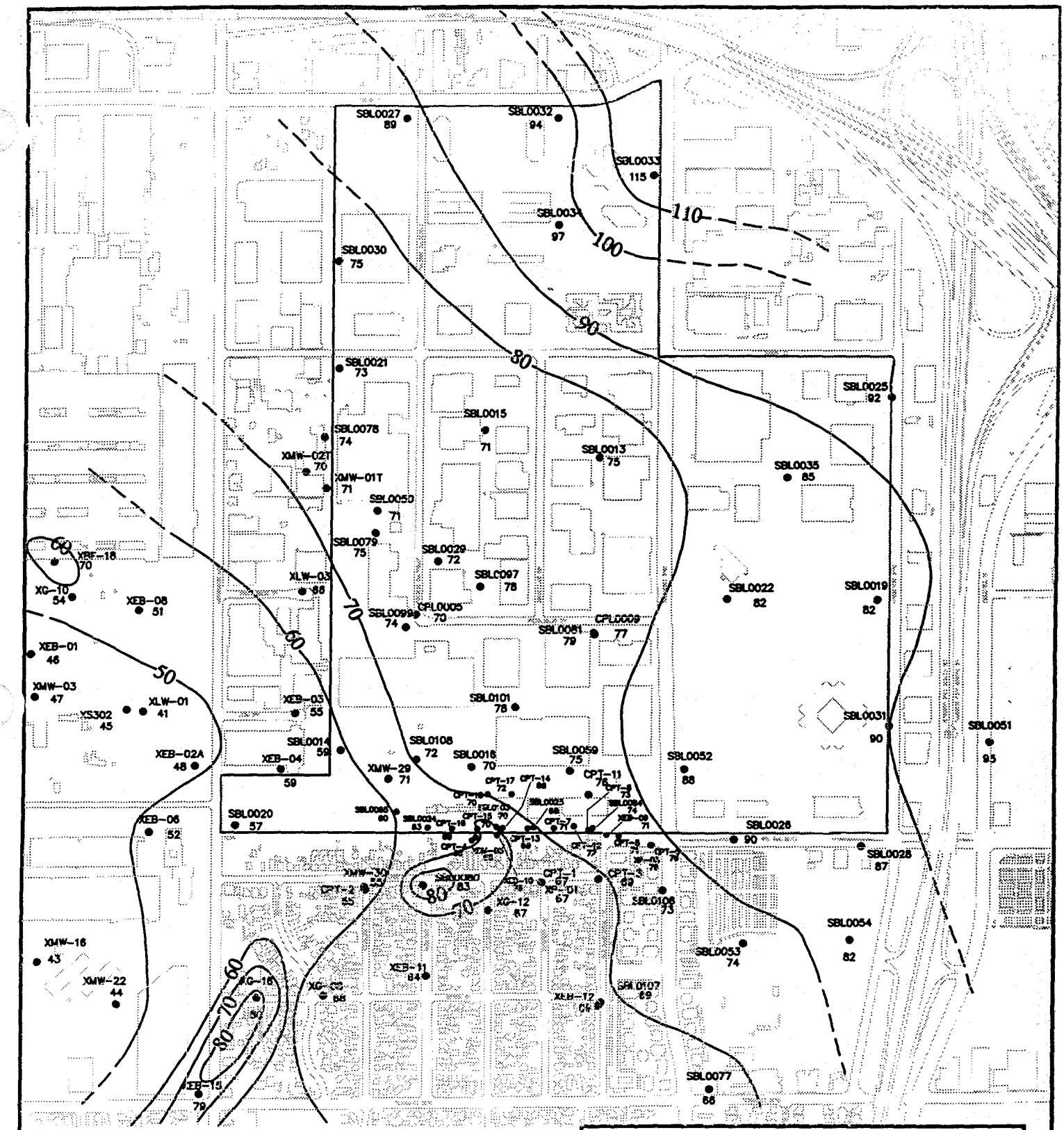
FIGURE 3.2-7

Contour Map Base of Gage-Lynwood Aquitard

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\djd\ri\SEC3\6ZUF3207, 05/21/97 at 11:20



EXPLANATION

XEB-15 ● 79 — Control point indicating thickness of hydrostratigraphic unit (usually measured from base of current unit to base of unit above)

20 — Isopach contour, dashed where inferred (feet).

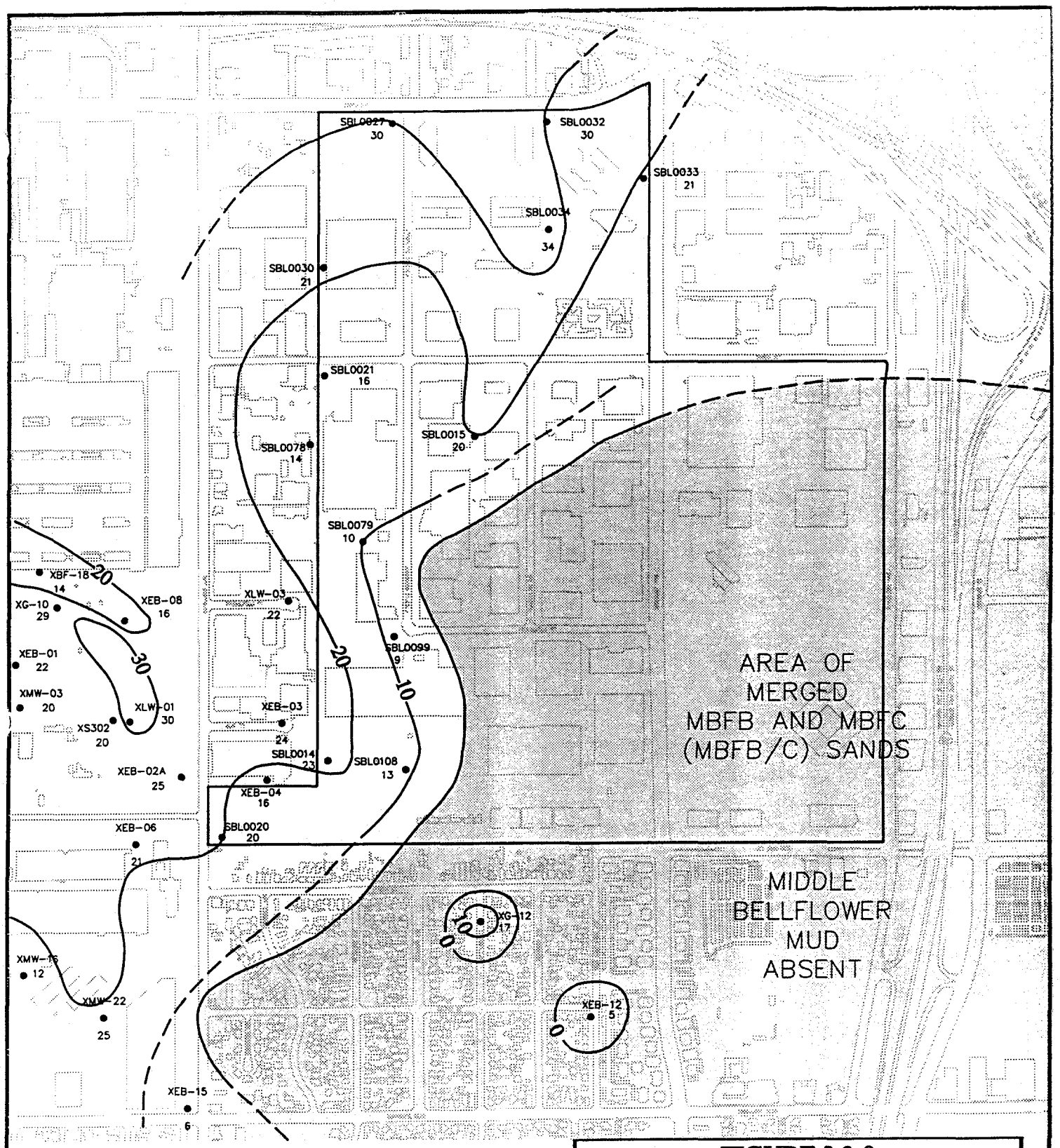
FIGURE 3.2-8

Isopach Map
Upper Bellflower Aquitard

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\djd\ri\SEC3\iso-ubf, 02/12/98 at 14:25



0 800 1600

N

EXPLANATION

XEB-15 • 10 — Control point indicating thickness of hydrostratigraphic unit in feet

20 — Thickness contour, MBF Mud Dashed where inferred

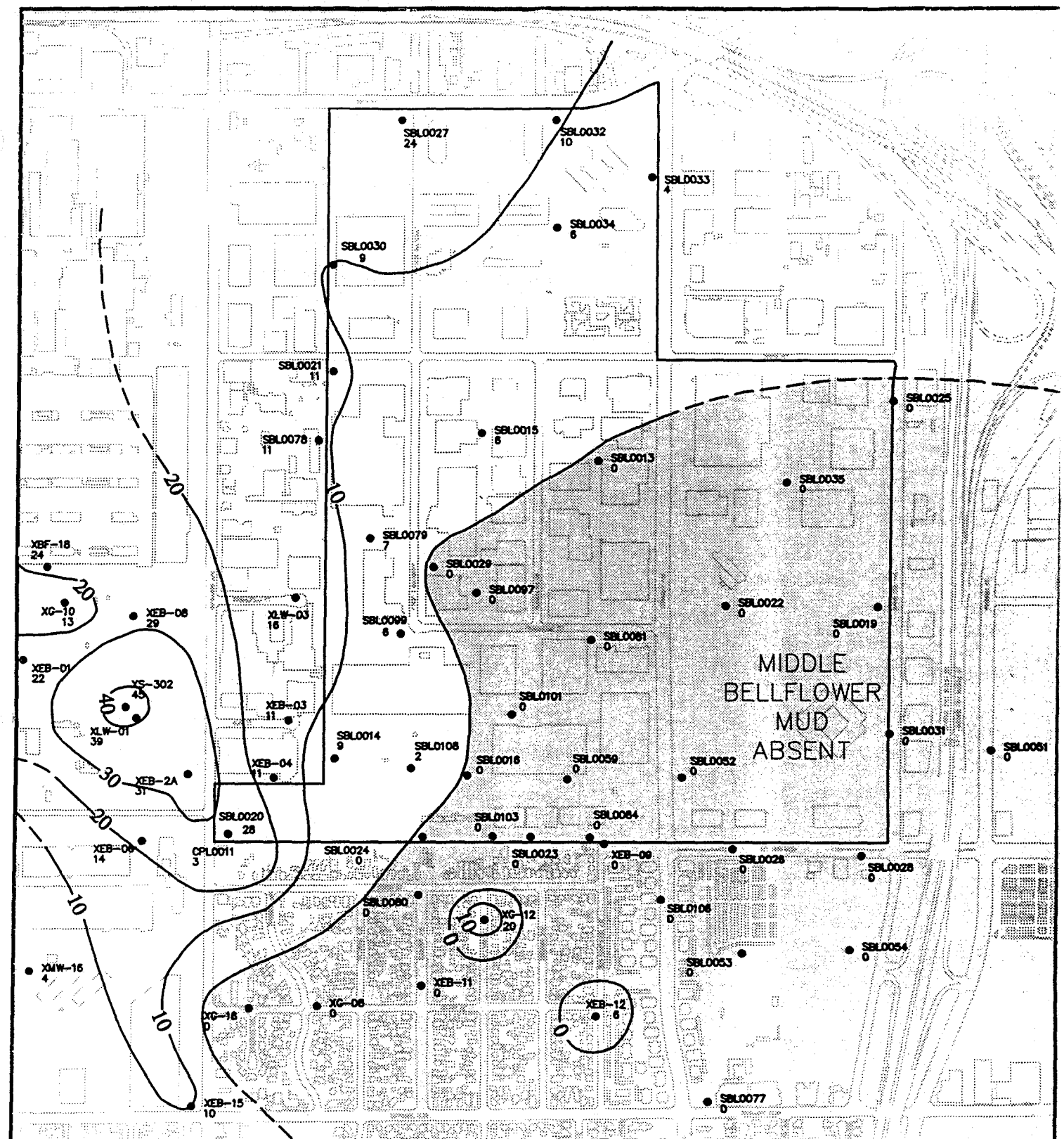
FIGURE 3.2-9

Isopach Map
Middle Bellflower B Sand

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\iso-bm1, 04/14/98 at 13:40



EXPLANATION

XEB-15 ● 10 — Control point indicating thickness of hydrostratigraphic unit in feet

20 — Thickness contour, MBF Mud Dashed where inferred

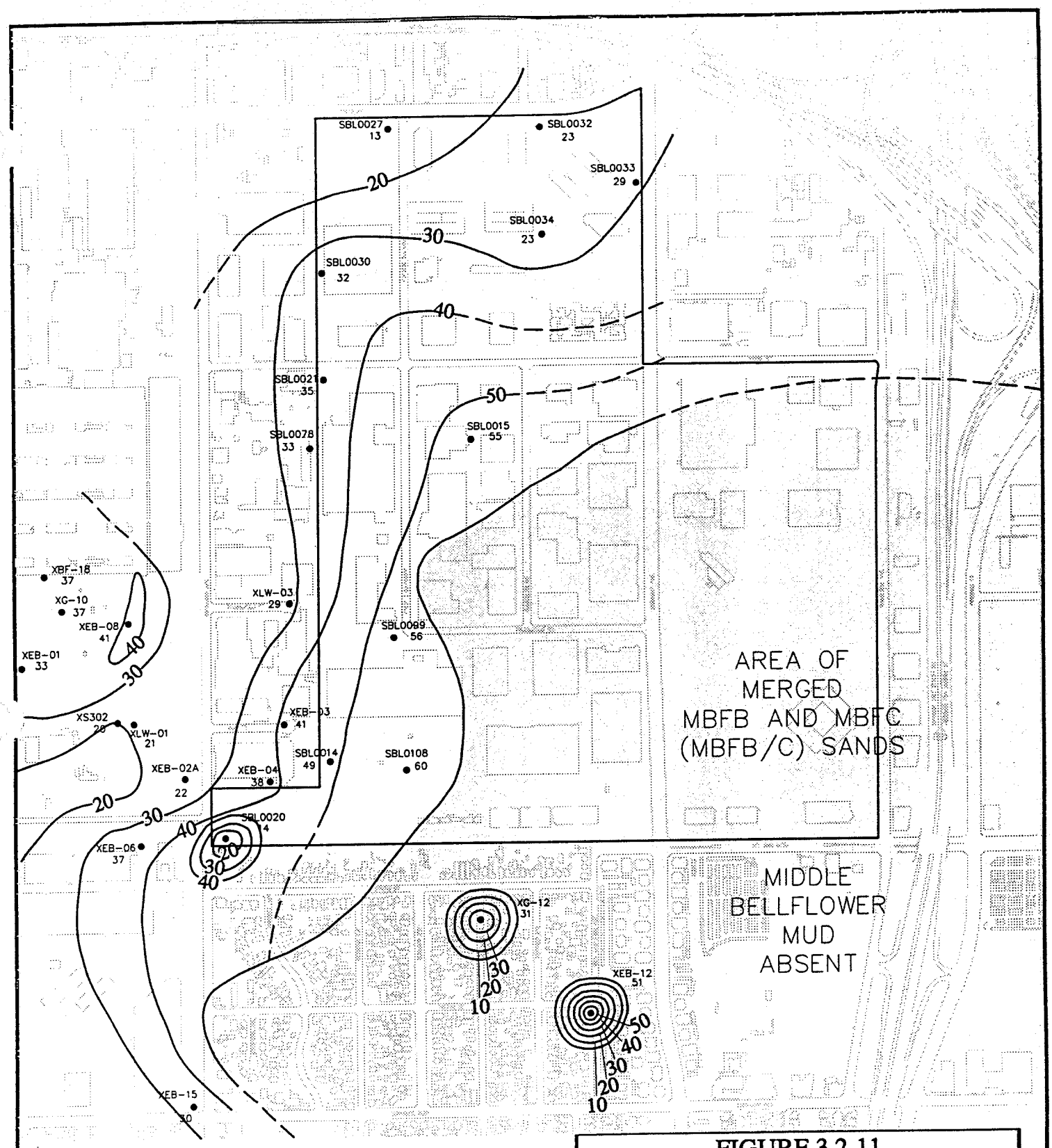
FIGURE 3.2-10

Isopach Map
Middle Bellflower Mud

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\iso-mbfm, 03/18/98 at 08:59



EXPLANATION

XEB-15 ● 10 — Control point indicating thickness of hydrostratigraphic unit in feet

-20 — Thickness contour, MBF Mud Dashed where inferred

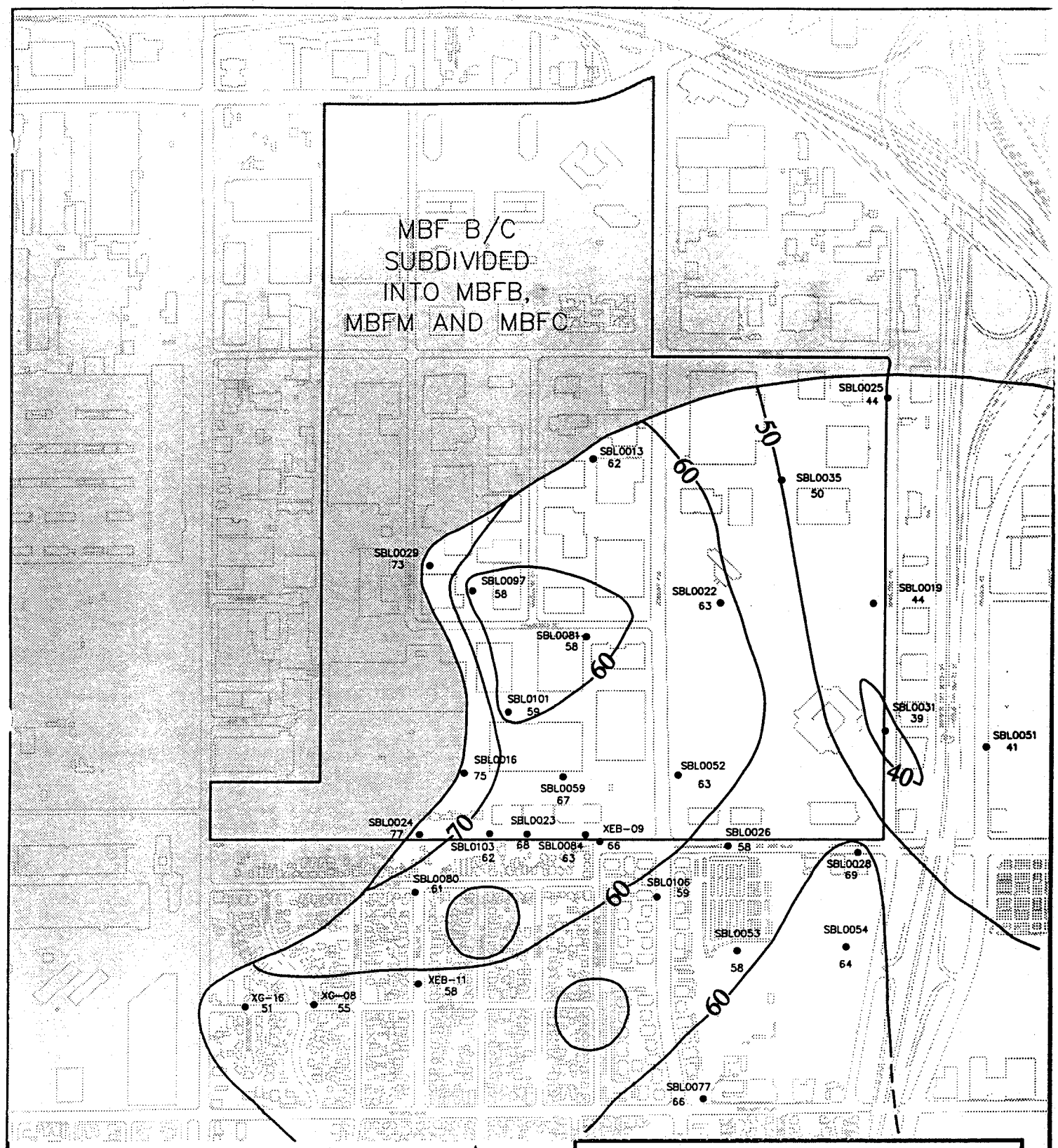
FIGURE 3.2-11

Isopach Map
Middle Bellflower C Sand

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\iso-cm1, 06/16/97 at 16:41



EXPLANATION

XEB-15 • 30 — Control point indicating thickness of hydrostratigraphic unit (usually measured from base of current unit to base of unit above)

20 — Isopach contour, dashed where inferred (feet).

Area where MBF B/C is subdivided into MBFB, MBFM and MBFC

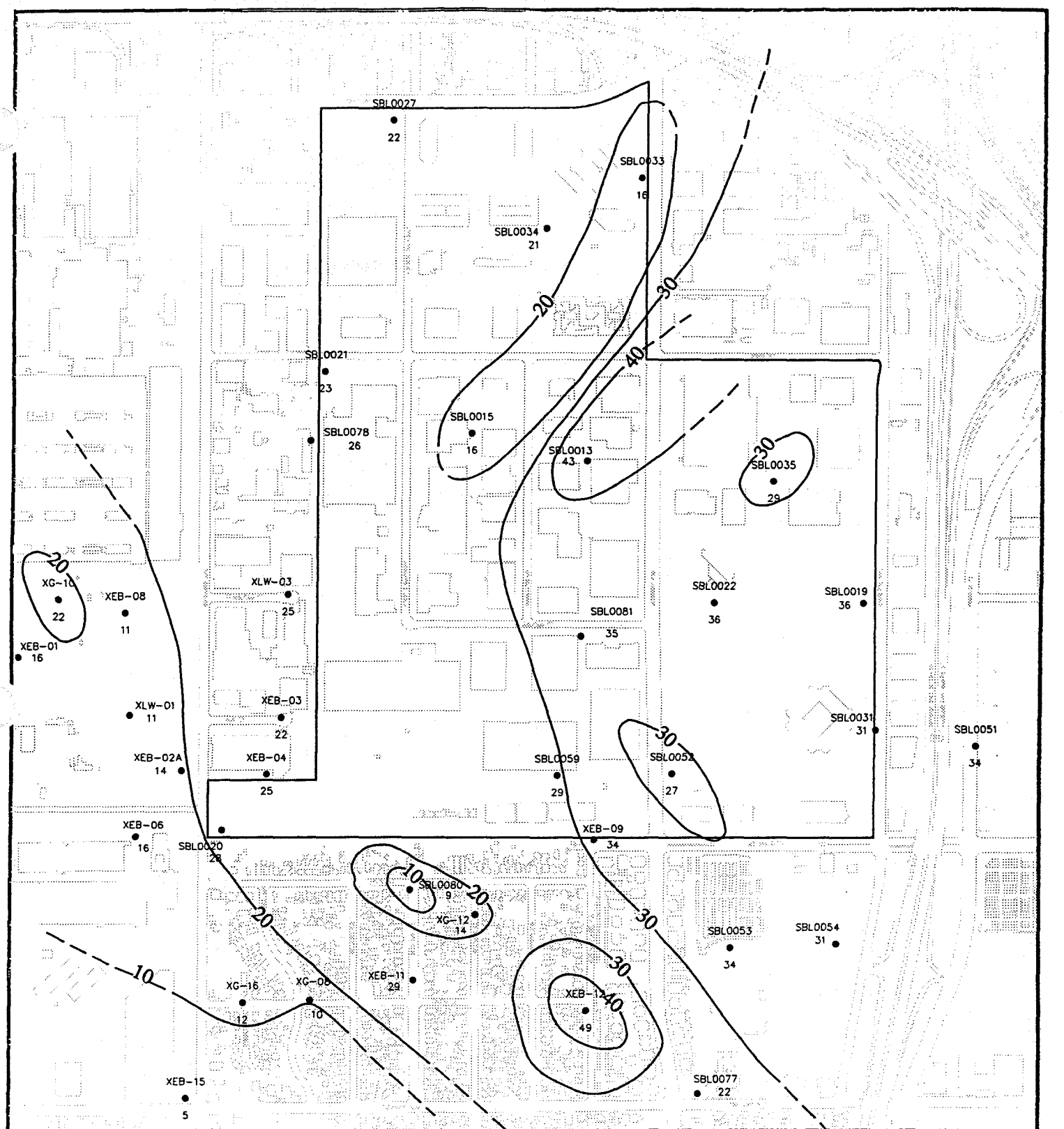
FIGURE 3.2-12

Isopach Map
Middle Bellflower B/C Sand

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\iso-bc, 04/14/98 at 14:00



0 800 1600

N

EXPLANATION

XEB-15 • 5 — Control point indicating thickness of hydrostratigraphic unit (usually measured from base of current unit to base of unit above)

20 — Isopach contour, dashed where inferred (feet).

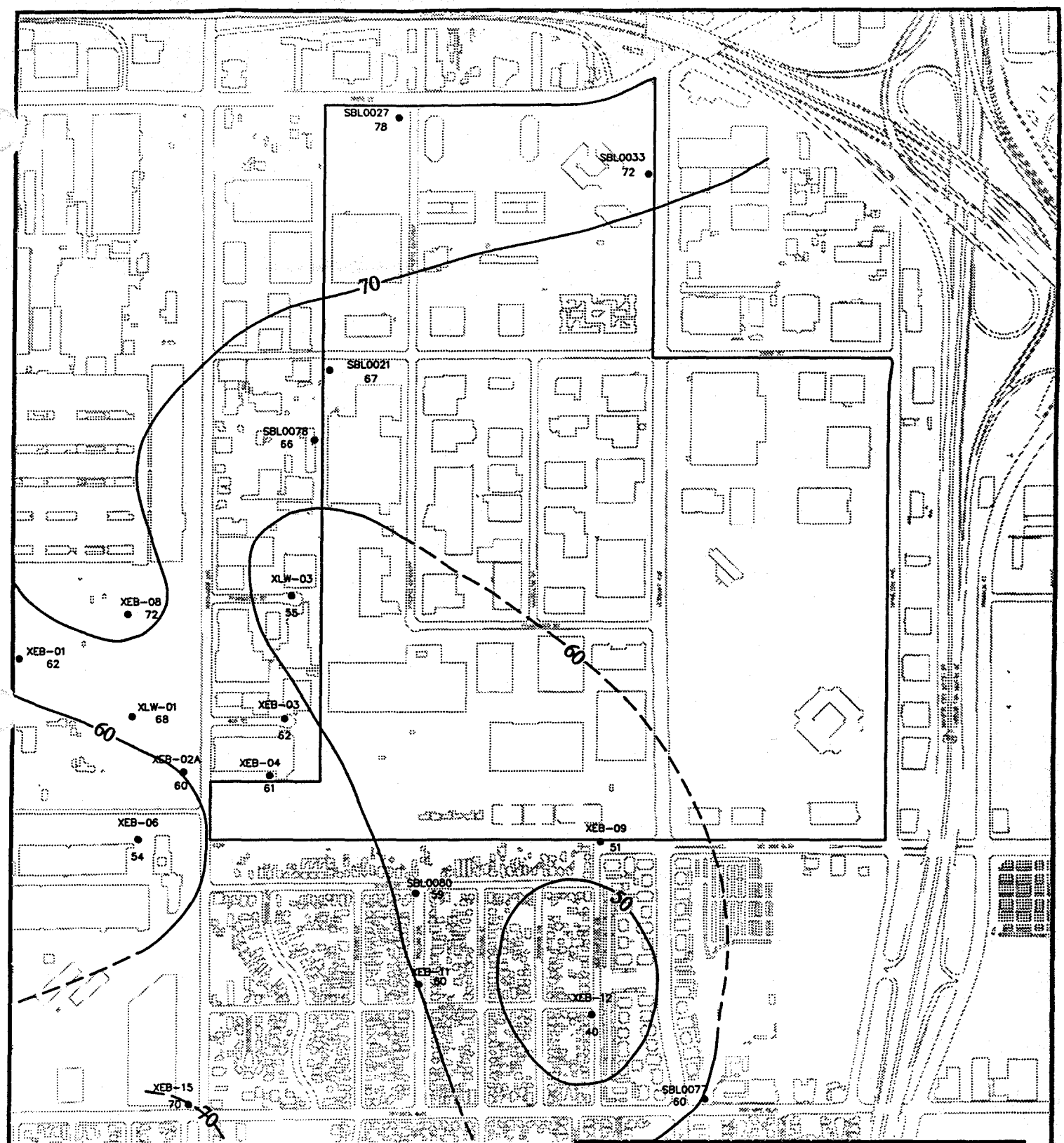
FIGURE 3.2-13

Isopach Map
Lower Bellflower Aquitard

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\iso-lbf, 06/13/97 at 16:36



0 800 1600

N

EXPLANATION

XEB-15
30 — Control point indicating thickness of hydrostratigraphic unit (usually measured from base of current unit to base of unit above)

20 — Isopach contour, dashed where inferred (feet).

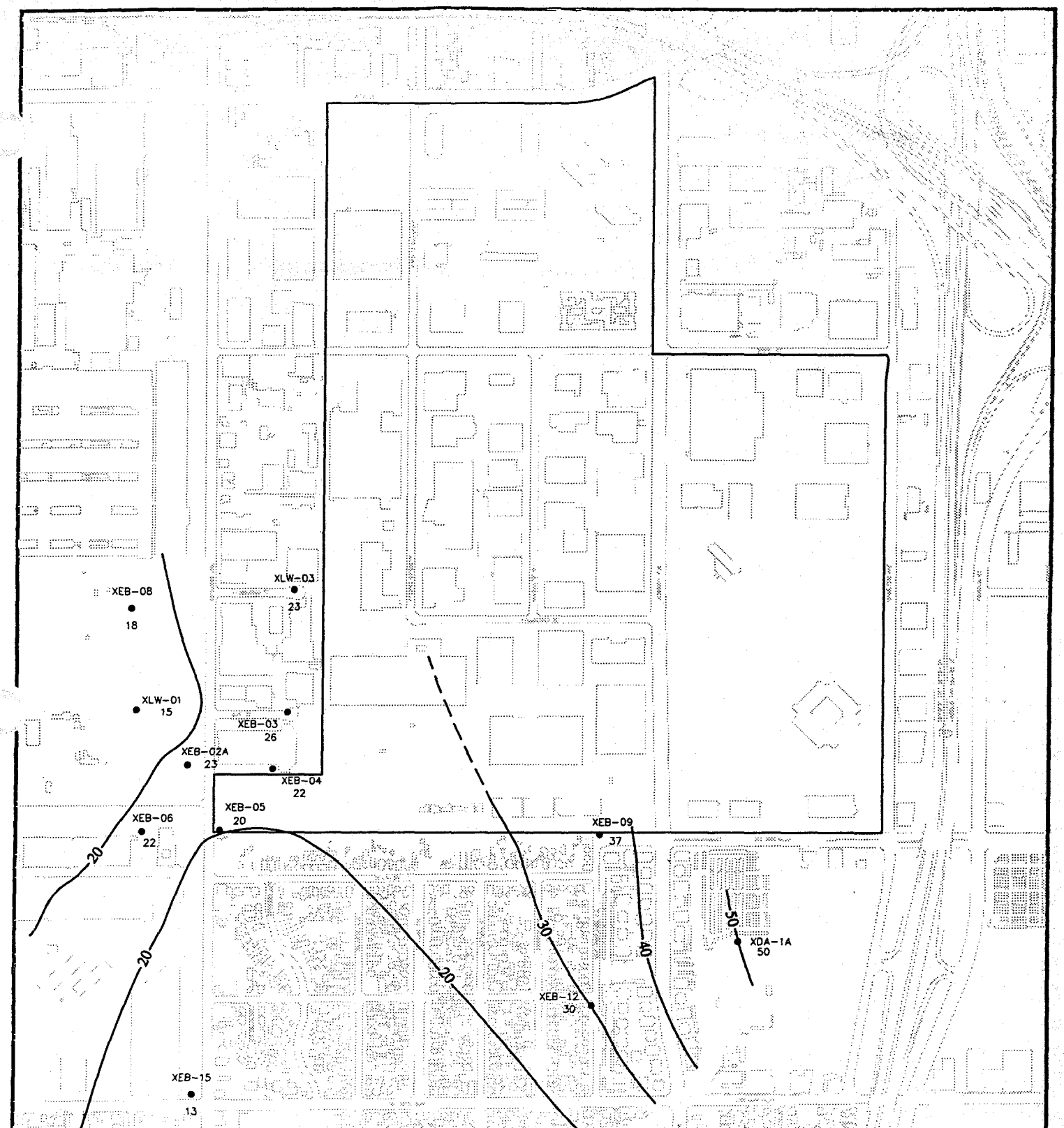
FIGURE 3.2-14

Isopach Map
Gage Aquifer

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\djd\RI\SEC3\iso-gage, 05/22/97 at 08:44



EXPLANATION

XEB-15 ● 13 — Control point indicating thickness of hydrostratigraphic unit (usually measured from base of current unit to base of unit above)

20 — Isopach contour, dashed where inferred (feet).

FIGURE 3.2-15

Isopach Map
Gage-Lynwood Aquitard

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC3\iso-gla, 06/16/97 at 11:16

DEL AMO STUDY AREA

Comparison of Stratigraphic Nomenclature

696/045D

PUBLISHED REGIONAL HYDROSTRATIGRAPHY①		REGIONAL GW MODEL LAYER NUMBER	MONTROSE HYDRO-STRATI-GRAPHY②	DEL AMO STUDY AREA HYDROSTRATIGRAPHY③		AVERAGE THICKNESS (ft)	BASE ELEV. RANGE (ft/msl)
UPPER PLEISTOCENE LAKEWOOD FORMATION	BELLFLOWER AQUITARD	1	UPPER BELLFLOWER AQUITARD	UPPER BELLFLOWER AQUITARD		74	-15 to -71
		2		MIDDLE BELLFLOWER	B-SAND	15	-35 to -91
		3			MUD	7	-36 to -103
		4	BELLFLOWER SAND		C-SAND	43	-70 to -129
		5					
		6	LOWER BELLFLOWER AQUITARD	LOWER BELLFLOWER AQUITARD		27	-100 to -156
		7					
		8					
	GAGE AQUIFER	9	GAGE AQUIFER	GAGE AQUIFER		66	-186 to -216
LOWER PLEISTOCENE SAN PEDRO FORMATION	GAGE/ LYNWOOD AQUITARD	10	GAGE/ LYNWOOD AQUITARD	GAGE/LYNWOOD AQUITARD		20②	-170 to -230②
		11					
		12					
	LYNWOOD AQUIFER	13	LYNWOOD AQUIFER	NOT REACHED		36④	-240④
	UNNAMED AQUITARD	NOT APPLICABLE	LYNWOOD-SILVERADO AQUITARD	NOT REACHED		208④	-440④
	SILVERADO AQUIFER	NOT APPLICABLE	NOT REACHED	NOT REACHED		>240④	BASE NOT REACHED

EXPLANATION

① California Department of Water Resources Bulletin 104, 1961. Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County. Appendix A – Groundwater Geology, June 1961.

Poland, J.F., A.A. Garrett and A. Sinnott, 1959. Geology, Hydrology and Chemical Character of Ground Waters in the Torrance – Santa Monica Area, California. U.S. Geological Survey Water Supply Paper 1461.

② Hargis + Associates 1992. Final Draft Remedial Investigation, Montrose Site, Torrance, CA. Volumes I through IV, October 29.

③ Current study.

④ Drillers Log, LACDPW Well No 795.

FIGURE 3.4-1

Comparison of Stratigraphic Nomenclature

Groundwater Remedial Investigation Report
Del Amo Study Area

Appendix B

BOE-C6-0139852

Appendix B
Water Level Data

INDUSTRIAL LIGHT METALS SITE

Water Level Summary Table – Time Series

DEL AMO STUDY AREA

Time Series Groundwater Contour Maps

Vertical Gradient Summary Table

INDUSTRIAL LIGHT METALS SITE

Water Level Summary Table – Time Series

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-1	52.50	8/30/94	69.50	-17.00
		10/19/94	69.05	-16.55
		12/29/94	68.94	-16.44
		1/12/95	69.02	-16.52
		3/16/95	68.90	-16.40
		4/28/95	68.67	-16.17
		5/18/95	68.61	-16.11
		6/16/95	68.56	-16.06
		7/11/95	68.58	-16.08
		8/28/95	68.33	-15.83
		9/12/95	68.36	-15.86
		10/12/95	68.37	-15.87
		11/13/95	68.36	-15.86
		12/18/95	68.93	-16.43
		1/15/96	68.87	-16.37
		3/11/96	68.00	-15.50
		4/22/96	68.01	-15.51
		5/21/96	68.02	-15.52
		6/17/96	67.52	-15.02
	56.53	7/24/96	72.62	-16.09
		8/14/96	71.54	-15.01
		9/9/96	71.51	-14.98
		7/7/97	70.67	-14.14
	55.21	3/1/99	69.16	-13.95
		7/12/99	68.14	-12.93
P-2	55.31	8/30/94	65.41	-10.10
		10/19/94	68.05	-12.74
		12/29/94	65.03	-9.72
		1/12/95	65.08	-9.77
		3/16/95	64.12	-8.81
		4/28/95	64.08	-8.77
		5/18/95	64.13	-8.82
		6/16/95	64.29	-8.98
		7/11/95	64.31	-9.00
		8/28/95	63.44	-8.13
		9/12/95	63.45	-8.14
		10/12/95	63.45	-8.14
		11/13/95	63.44	-8.13
		12/18/95	64.16	-8.85
		1/15/96	64.10	-8.79

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-2 (Cont'd)		3/11/96	64.56	-9.25
		4/22/96	64.53	-9.22
		5/21/96	64.54	-9.23
		6/17/96	64.42	-9.11
	58.91	7/24/96	68.61	-9.70
		8/14/96	NR*	–
		9/9/96	68.39	-9.48
		7/7/97	67.84	-8.93
	59.11	3/1/99	67.35	-8.24
		7/12/99	67.35	-8.24
P-3	55.94	8/30/94	68.57	-12.63
		10/19/94	68.25	-12.31
		12/29/94	68.46	-12.52
		1/12/95	68.36	-12.42
		3/16/95	68.11	-12.17
		4/28/95	67.87	-11.93
		5/18/95	67.80	-11.86
		6/16/95	67.78	-11.84
		7/11/95	67.80	-11.86
		8/28/95	67.70	-11.76
		9/12/95	67.71	-11.77
		10/12/95	67.72	-11.78
		11/13/95	67.72	-11.78
		12/18/95	68.14	-12.20
		1/15/96	68.08	-12.14
		3/11/96	67.68	-11.74
		4/22/96	NR*	–
		5/21/96	NR*	–
		6/17/96	67.46	-11.52
	59.97	7/24/96	NR*	–
		8/14/96	71.44	-11.47
		9/9/96	71.42	-11.45
		7/7/97	71.22	-11.25
	59.87	3/1/99	70.38	-10.51
		7/12/99	70.71	-10.84
P-4	56.20	8/30/94	72.20	-16.00
		10/19/94	71.76	-15.56
		12/29/94	71.68	-15.48
		1/12/95	71.72	-15.52
		3/16/95	71.45	-15.25
		4/28/95	71.02	-14.82

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-4 (Cont'd)	56.20 (Cont'd)	5/18/95	70.94	-14.74
		6/16/95	70.98	-14.78
		7/11/95	70.97	-14.77
		8/28/95	70.89	-14.69
		9/12/95	70.91	-14.71
		10/12/95	70.91	-14.71
		11/13/95	70.94	-14.74
		12/18/95	70.89	-14.69
		1/15/96	70.84	-14.64
		3/11/96	70.74	-14.54
		4/22/96	70.72	-14.52
		5/21/96	70.71	-14.51
		6/17/96	NR	--
	60.54	7/24/96	74.78	-14.24
		8/14/96	74.70	-14.16
		9/9/96	74.67	-14.13
		7/7/97	74.04	-13.50
		10/97	well abandoned	–
P-5	51.84	8/30/94	68.58	-16.74
		10/19/94	68.25	-16.41
		12/29/94	68.20	-16.36
		1/12/95	68.14	-16.30
		3/16/95	66.90	-15.06
		4/28/95	66.18	-14.34
		5/18/95	66.13	-14.29
		6/16/95	66.34	-14.50
		7/11/95	66.37	-14.53
		8/28/95	66.66	-14.82
		9/12/95	66.64	-14.80
		10/12/95	66.67	-14.83
		11/13/95	66.66	-14.82
		12/18/95	66.93	-15.09
		1/15/96	66.86	-15.02
		3/11/96	66.50	-14.66
		4/22/96	NR*	–
		5/21/96	NR*	–
		6/17/96	66.07	-14.23
	55.88	7/24/96	70.00	-14.12
		8/14/96	69.92	-14.04
		9/9/96	69.88	-14.00
		7/7/97	69.03	-13.15(1)

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-5 (Cont'd)	55.04 (Cont'd)	3/1/99	67.13	-11.25(1)
		7/12/99	67.02	-11.98
P-6	54.18	3/16/95	71.70	-17.52
		4/28/95	71.48	-17.30
		5/18/95	71.39	-17.21
		6/16/95	71.38	-17.20
		7/11/95	71.41	-17.23
		8/28/95	71.18	-17.00
		9/12/95	71.19	-17.01
		10/12/95	71.20	-17.02
		11/13/95	NR	–
		12/18/95	71.74	-17.56
		1/15/96	71.68	-17.50
		3/11/96	70.65	-16.47
		4/22/96	70.51	-16.33
		5/21/96	NR	–
		6/17/96	70.22	-16.04
	58.13	7/24/96	74.22	-16.09
		8/14/96	73.91	-15.78
		9/9/96	73.98	-15.85
		7/7/97	73.09	-14.96
		10/97	well abandoned	–
P-6B	55.83	3/1/99	69.32	-13.49
		7/12/99	69.43	-13.60
P-7	53.41	3/16/95	71.27	-17.86
		4/28/95	71.02	-17.61
		5/18/95	70.96	-17.55
		6/16/95	70.94	-17.53
		7/11/95	71.00	-17.59
		8/28/95	71.71	-18.30
		9/12/95	71.73	-18.32
		10/12/95	71.73	-18.32
		11/13/95	73.19	-19.78
		12/18/95	71.30	-17.89
		1/15/96	71.25	-17.84
		3/11/96	70.32	-16.91
		4/22/96	70.17	-16.76
		5/21/96	70.53	-17.12
		6/17/96	69.92	-16.51

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-7 (Cont'd)	57.34	7/24/96	74.92	-17.58
		8/14/96	73.79	-16.45
		9/9/96	73.75	-16.41
		7/7/97	72.79	-15.45
	53.92	3/1/99	67.75	-13.83
		7/12/99	67.86	-13.94
P-8	56.32	3/16/95	74.29	-17.97
		4/28/95	74.05	-17.73
		5/18/95	73.97	-17.65
		6/16/95	73.91	-17.59
		7/11/95	73.93	-17.61
		8/28/95	73.64	-17.32
		9/12/95	73.66	-17.34
		10/12/95	73.65	-17.33
		11/13/95	73.73	-17.41
		12/18/95	72.20	-15.88
		1/15/96	72.14	-15.82
		4/22/96	73.00	-16.68
		5/21/96	73.01	-16.69
		6/17/96	72.52	-16.20
		7/24/96	76.58	-20.26
		8/7/96	well abandoned	–
P-9	56.38	3/16/95	70.10	-13.72
		4/28/95	69.92	-13.54
		5/18/95	69.90	-13.52
		6/16/95	68.91	-12.53
		7/11/95	68.93	-12.55
		8/28/95	69.80	-13.42
		9/12/95	69.81	-13.43
		10/12/95	69.80	-13.42
		11/13/95	69.66	-13.28
		12/18/95	68.85	-12.47
		1/15/96	68.79	-12.41
		3/11/96	69.76	-13.38
		4/22/96	69.68	-13.30
		5/21/96	NR	–
		6/17/96	69.54	-13.16

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-9 (Cont'd)	60.48	7/24/96	73.72	-13.24
		8/14/96	73.55	-13.07
		9/9/96	73.52	-13.04
		7/7/97	72.66	-12.18
		10/97	well abandoned	–
P-9B	57.54	3/1/99	69.62	-12.08
		7/12/99	68.51	-10.97
P-10	57.31	3/16/95	69.60	-12.29
		4/28/95	69.40	-12.09
		5/18/95	69.32	-12.01
		6/16/95	69.26	-11.95
		7/11/95	69.30	-11.99
		8/28/95	68.98	-11.67
		9/12/95	68.98	-11.67
		10/12/95	68.98	-11.67
		11/13/95	68.97	-11.66
		12/18/95	69.33	-12.02
		1/15/96	69.27	-11.96
		3/11/96	68.73	-11.42
		4/22/96	68.75	-11.44
		5/21/96	68.74	-11.43
		6/17/96	68.66	-11.35
	61.08	7/24/96	72.58	-11.50
		8/14/96	72.55	-11.47
		9/9/96	72.52	-11.44
		7/7/97	72.42	-11.34
	57.64	3/1/99	68.83	-11.19
		7/12/99	68.10	-10.46
P-11	56.06	12/18/95	66.20	-10.14
		1/15/96	66.15	-10.09
		3/11/96	66.30	-10.24
		4/22/96	66.28	-10.22
		5/21/96	66.27	-10.21
		6/17/96	66.14	-10.08
	59.89	7/24/96	70.35	-10.46
		8/14/96	70.12	-10.23
		9/9/96	70.08	-10.19
	63.83	7/7/97	73.63	-9.80
		10/97	well abandoned	–

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-12	56.00	12/18/95	71.10	-15.10
		1/15/96	71.04	-15.04
		3/11/96	70.96	-14.96
		4/22/96	70.93	-14.93
		5/21/96	70.72	-14.72
		6/17/96	70.55	-14.55
	59.95	7/24/96	75.00	-15.05
		8/14/96	74.62	-14.67
		9/9/96	74.48	-14.53
		7/7/97	73.52	-13.57
	59.73	3/1/99	72.16	-12.43
		7/99	well damaged	–
P-13	55.78	12/18/95	71.72	-15.94
		1/15/96	71.67	-15.89
		3/11/96	71.34	-15.56
		4/22/96	71.31	-15.53
		5/21/96	71.33	-15.55
		6/17/96	70.92	-15.14
	59.97	7/24/96	75.30	-15.33
		8/14/96	74.64	-14.67
		9/9/96	74.60	-14.63
		7/7/97	73.68	-13.71
		10/97	well abandoned	–
P-14	55.92	12/18/95	71.80	-15.88
		1/15/96	71.76	-15.84
		3/11/96	71.44	-15.52
		4/22/96	71.42	-15.50
		5/21/96	71.45	-15.53
		6/17/96	71.02	-15.10
	60.04	7/24/96	75.08	-15.04
		8/14/96	75.04	-15.00
		9/9/96	75.00	-14.96
	63.71	7/8/97	77.95	-14.24
		10/97	well abandoned	–
P-15	52.64	12/18/95	68.20	-15.56
		1/15/96	68.14	-15.50
		3/11/96	68.08	-15.44
		4/22/96	68.06	-15.42
		5/21/96	68.01	-15.37
		6/17/96	67.70	-15.06

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-15 (Cont'd)	56.40	7/24/96	71.40	-15.00
		8/14/96	71.43	-15.03
		9/9/96	71.39	-14.99
		7/7/97	70.45	-14.05
		10/97	well abandoned	–
P-16A	56.43	12/18/95	73.40	-16.97
		1/15/96	73.36	-16.93
		3/11/96	73.12	-16.69
		4/22/96	72.93	-16.50
		5/21/96	72.95	-16.52
		6/17/96	72.61	-16.18
	60.49	7/24/96	76.60	-16.11
		8/14/96	76.59	-16.10
		9/9/96	76.58	-16.09
		7/7/97	75.59	-15.10
	52.76	3/1/99	66.50	-13.74
		7/12/99	66.72	-13.96
P-16B	56.51	12/18/95	73.59	-17.08
		1/15/96	73.53	-17.02
		3/11/96	73.16	-16.65
		4/22/96	73.01	-16.50
		5/21/96	73.02	-16.51
		6/17/96	72.73	-16.22
		7/24/96	NR*	–
		8/6/96	well destroyed	–
P-16C	60.44	8/14/96	76.58	-16.14
		9/9/96	76.52	-16.08
		7/7/97	75.61	-15.17
	52.35	3/1/99	66.20	-13.85
		7/12/99	66.43	-14.08
P-17	56.56	12/18/95	73.40	-16.84
		1/15/96	73.34	-16.78
		3/11/96	73.00	-16.44
		4/22/96	72.97	-16.41
		5/21/96	72.97	-16.41
		6/17/96	NR	--
	60.25	7/24/96	76.38	-16.13
		8/14/96	NR*	–
		9/9/96	NR*	–
		7/7/97	75.08	-14.83

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-17 (Cont'd)	54.83	3/1/99	68.34	-13.51
		7/12/99	68.50	-13.67
P-18	56.44	12/18/95	73.60	-17.16
		1/15/96	73.54	-17.10
		3/11/96	73.28	-16.84
		4/22/96	73.04	-16.60
		5/21/96	73.08	-16.64
		6/17/96	NR	–
	60.16	7/24/96	NR	--
		8/14/96	76.36	-16.20
		9/9/96	76.32	-16.16
		7/7/97	75.29	-15.13
		10/97	well abandoned	–
P-19	53.93	12/18/95	71.09	-17.16
		1/15/96	71.03	-17.10
		3/11/96	70.80	-16.87
		4/22/96	70.60	-16.67
		5/21/96	70.61	-16.68
		6/17/96	70.27	-16.34
	57.75	7/24/96	74.63	-16.88
		8/14/96	74.09	-16.34
		9/9/96	74.06	-16.31
	62.85	7/7/97	78.11	-15.26
		10/97	well abandoned	–
P-20	52.00	12/18/95	67.78	-15.78
		1/15/96	67.72	-15.72
		3/11/96	67.58	-15.58
		4/22/96	67.56	-15.56
		5/21/96	67.58	-15.58
		6/17/96	67.14	-15.14
	55.94	7/24/96	72.16	-16.22
		8/14/96	71.10	-15.16
		9/9/96	71.06	-15.12
		7/7/97	70.24	-14.30
	55.30	3/1/99	68.28	-12.98
		7/12/99	68.37	-13.07
P-21	54.37	12/18/95	71.48	-17.11
		1/15/96	71.42	-17.05
		3/11/96	71.10	-16.73
		4/22/96	70.95	-16.58

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-21 (Cont'd)	54.37 (Cont'd)	5/21/96	70.96	-16.59
		6/17/96	70.66	-16.29
	58.05	7/24/96	75.48	-17.43
		8/14/96	74.43	-16.38
		9/9/96	74.39	-16.34
	62.34	7/8/97	77.65	-15.31
		10/97	well abandoned	–
P-22	57.72	12/18/95	75.21	-17.49
		1/15/96	75.15	-17.43
		3/11/96	74.80	-17.08
		4/22/96	74.61	-16.89
		5/21/96	NR	–
		6/17/96	74.30	-16.58
	61.82	7/24/96	NR*	–
		8/14/96	78.17	-16.35
		9/9/96	78.13	-16.31
		7/7/97	77.24	-15.42
	54.49	3/1/99	68.39	-13.90
		7/12/99	68.64	-14.15
P-23	56.27	12/18/95	69.80	-13.53
		1/15/96	69.74	-13.47
		3/11/96	69.74	-13.47
		4/22/96	69.71	-13.44
		5/21/96	69.72	-13.45
		6/17/96	69.50	-13.23
	60.19	7/24/96	NR*	–
		8/14/96	73.34	-13.15
		9/9/96	73.30	-13.11
		7/7/97	72.74	-12.55
		10/97	well abandoned	–
P-24	56.05	12/18/95	70.50	-14.45
		1/15/96	70.43	-14.38
		3/11/96	70.22	-14.17
		4/22/96	70.20	-14.15
		5/21/96	70.22	-14.17
		6/17/96	70.90	-14.85
	60.14	7/24/96	72.80	-12.66
		8/14/96	73.88	-13.74
		9/9/96	73.84	-13.70
		7/7/97	73.17	-13.03

TRC

TABLE 4.2

WATER-LEVEL ELEVATIONS
FORMER ILM FACILITY
TORRANCE, CALIFORNIA
(Continued)

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
P-24 (Cont'd)	59.89	3/1/99	72.00	-12.11
		7/12/99	72.00	-12.11
P-25	56.35	12/18/95	72.30	-15.95
		1/15/96	72.32	-15.97
		3/11/96	72.04	-15.69
		4/22/96	72.01	-15.66
		5/21/96	73.02	-16.67
		6/17/96	71.55	-15.20
	60.45	7/24/96	76.10	-15.65
		8/14/96	75.63	-15.18
		9/9/96	75.60	-15.15
		7/7/97	74.76	-14.31
		10/97	well abandoned	–

99-2001/Rpts/DrGrWaRcFa (12/28/99/rm)

(1) A sheen of petroleum hydrocarbon was detected. Water levels did not require correction. July 1997 was the first observation of the petroleum hydrocarbon sheen in this well.

Notes:

1. Well elevations for P-11, P-14, P-19, and P-21 were resurveyed on 8/15/97 following completion of onsite regrading activities.
2. Well elevations for all existing wells were resurveyed on 3/27/99, following 1998 site development.

ft	Feet
ft msl	Feet relative to mean sea level
DTW	Depth to static water
WL	Water-level elevation
NR	Water level not recorded
NR*	Erroneous datum - not included on hydrograph or ground water elevation figures
–	Computation not completed

TRC

TABLE 4.3

WATER-LEVEL ELEVATIONS
BRC PROPERTY, TORRANCE, CALIFORNIA

WELL	DATUM ELEVATION (ft msl)	DATE	DTW (ft)	WL (ft msl)
BL-1	58.34	3/4/99	70.75	-12.41
		7/12/99	70.72	-12.38
BL-2	58.15	3/3/99	71.47	-13.32
		7/12/99	71.32	-13.17
BL-3	59.33	3/3/99	73.22	-13.89
		7/12/99	73.16	-13.83
BL-4	55.04	3/2/99	69.55	-14.51
		7/12/99	69.47	-14.43
BL-5	55.18	3/4/99	67.70	-12.52
		7/12/99	67.71	-12.53
BL-6	54.70	3/1/99	67.62	-12.92
		7/12/99	67.53	-12.83
BL-7	55.19	3/1/99	68.76	-13.57
		7/12/99	68.63	-13.44
BL-8	57.13	3/2/99	71.40	-14.27
		7/12/99	71.42	-14.29

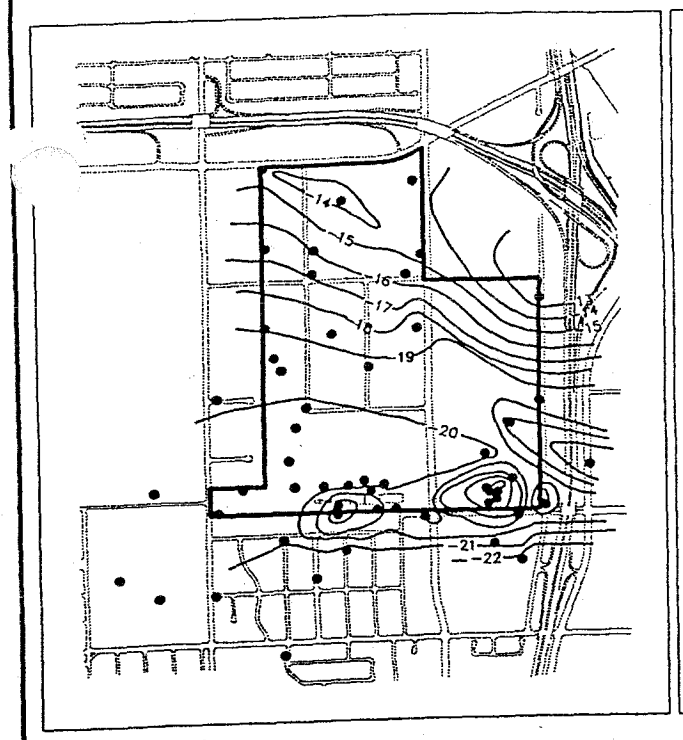
99-200 (11/3/99/mc)

ft	Feet
ft msl	Feet relative to mean sea level
DTW	Depth to static water
WL	Water-level elevation
NR	Water level not recorded

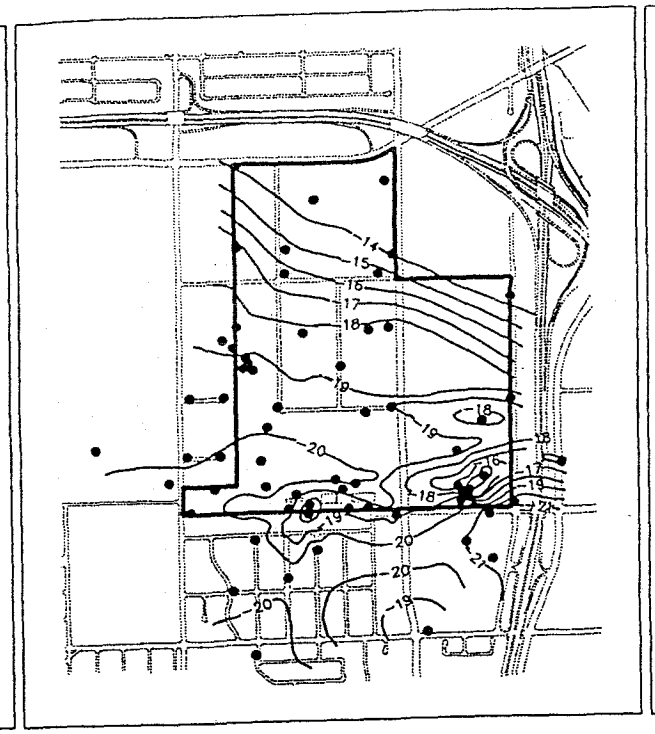
TRC

DEL AMO STUDY AREA

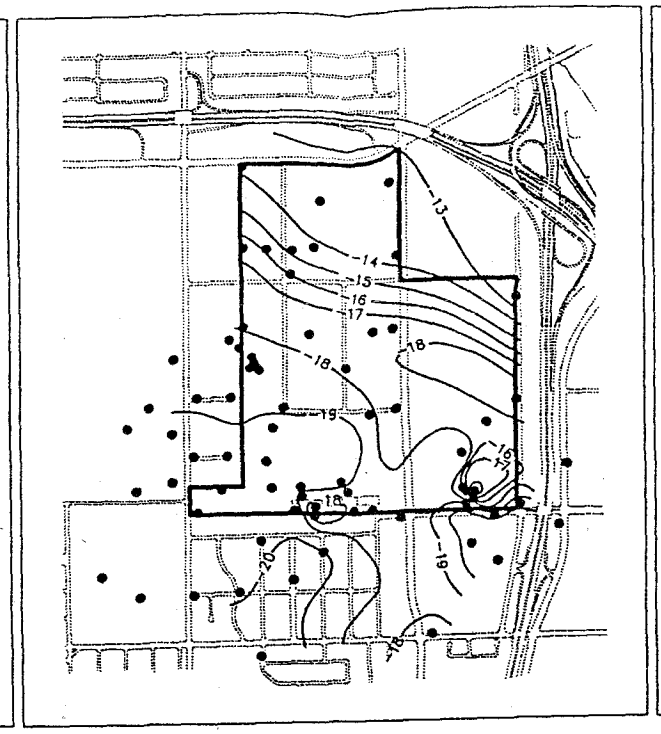
Time Series Groundwater Contour Maps



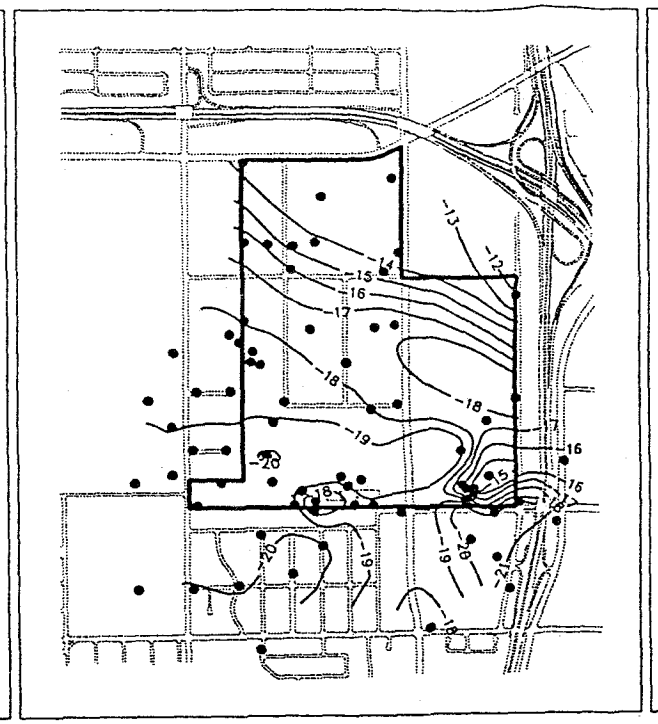
August 1993



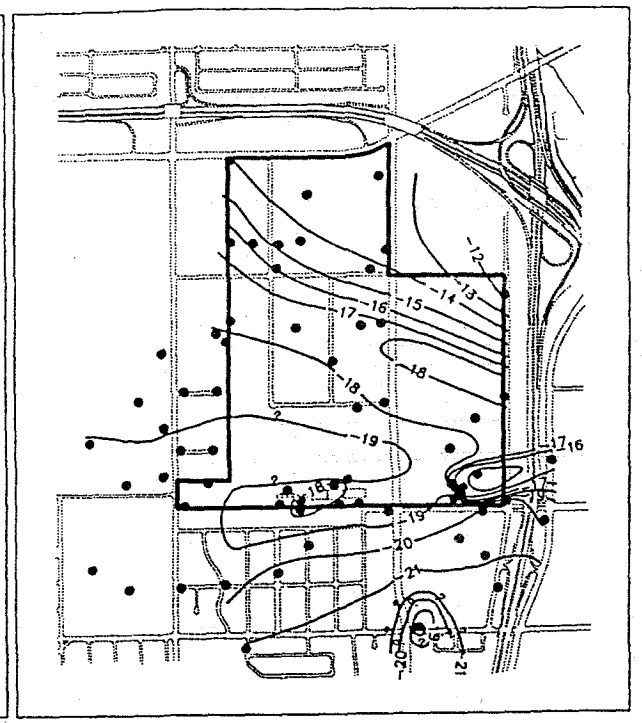
February 1994



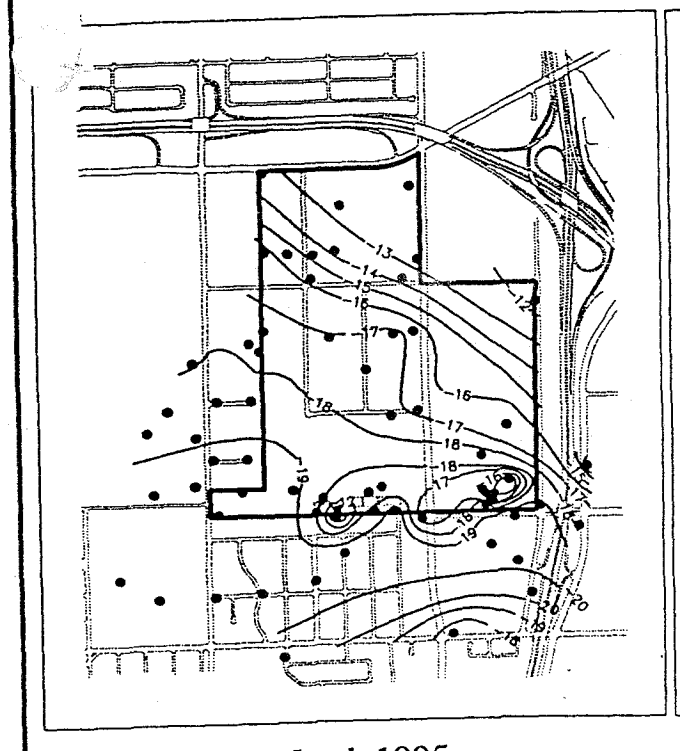
May 1994



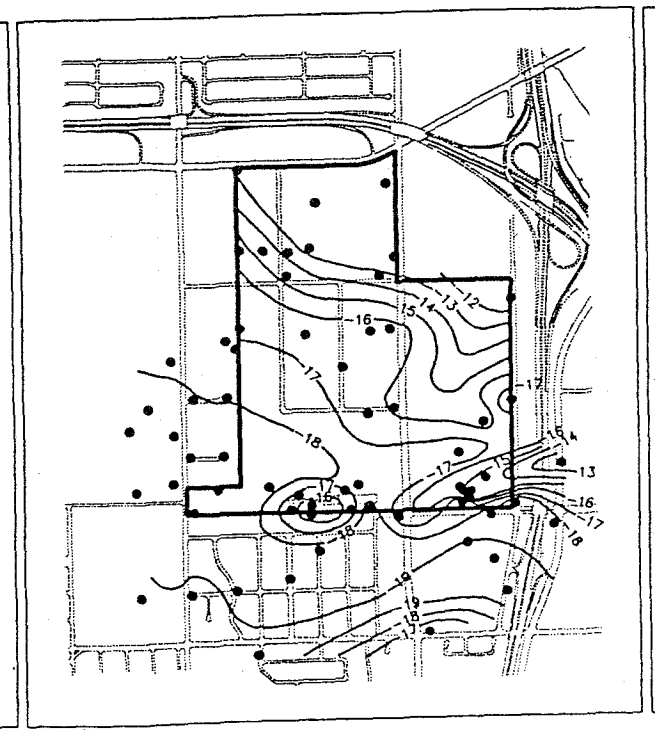
July 1994



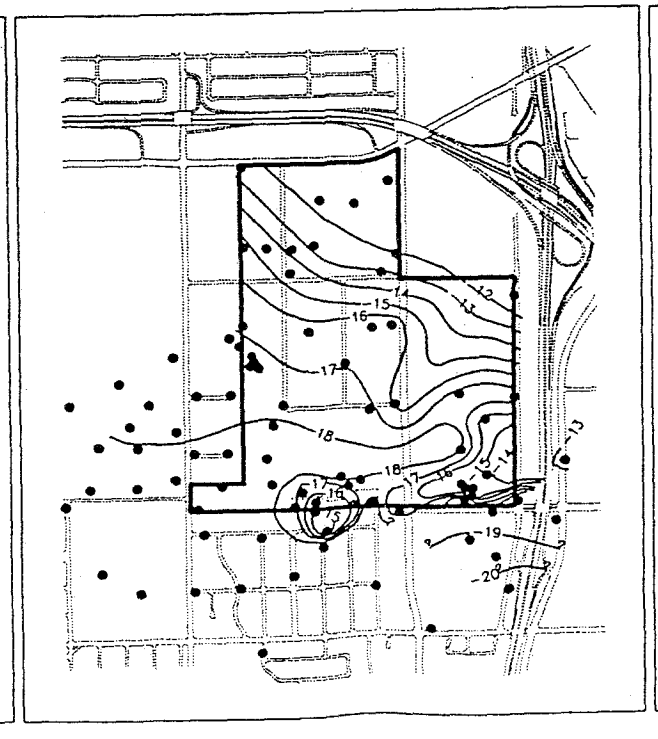
October 1994



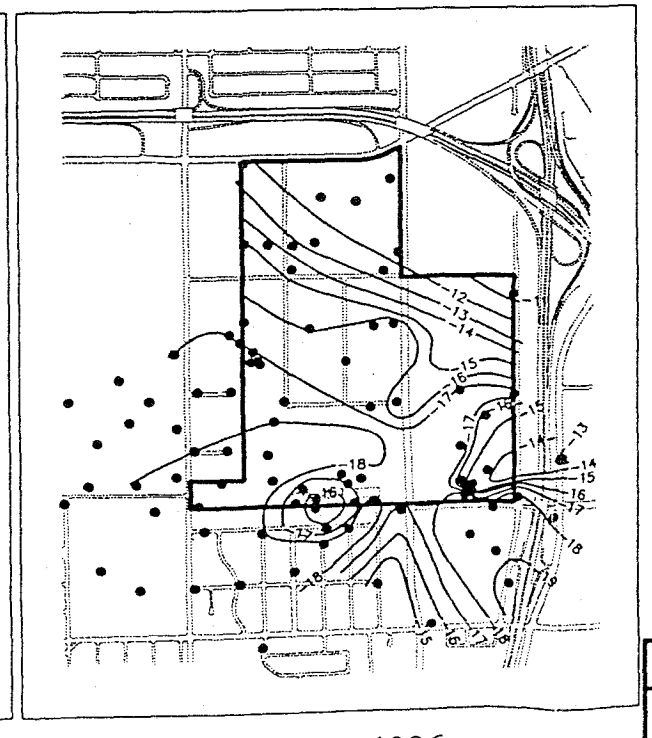
March 1995



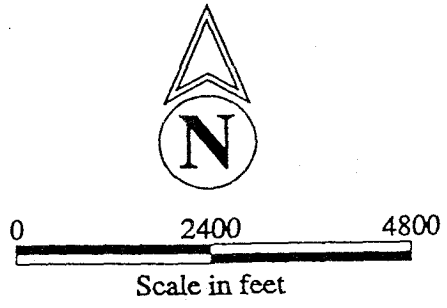
June 1995



October 1995



February 1996



EXPLANATION

- Water Table monitoring location
- Groundwater elevation contour (ft MSL)

FIGURE 4.1-4

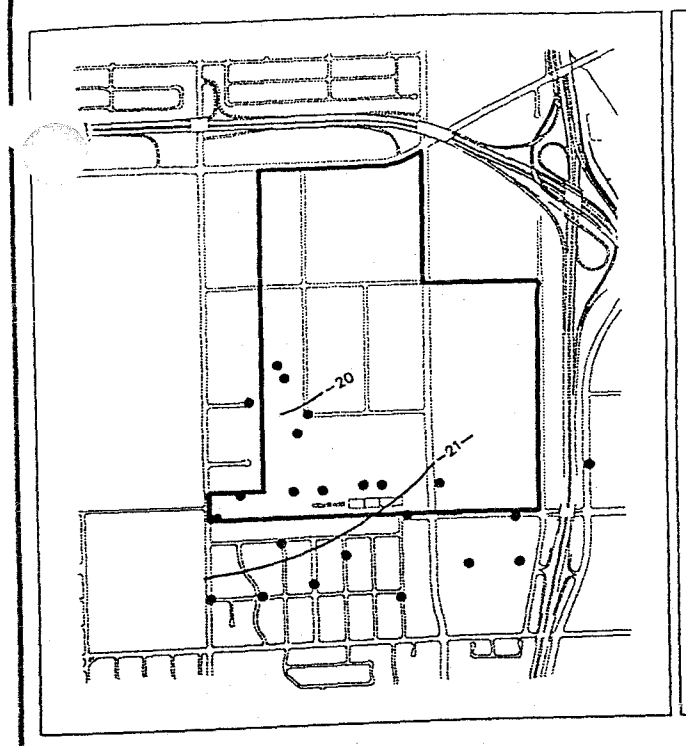
Time - Series Groundwater Contours
Water Table Zone

Groundwater Remedial Investigation
Del Amo Study Area

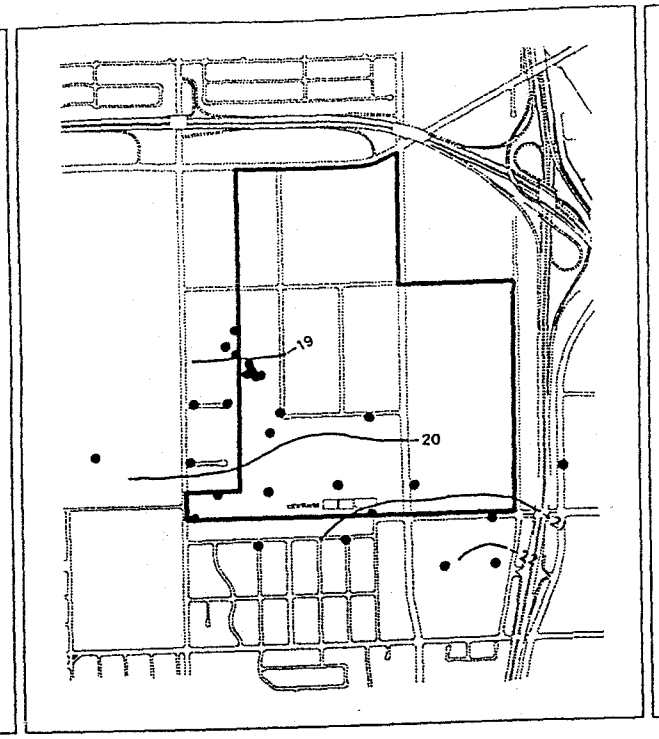
DAMES & MOORE

C:\ADWG\00216\483\CESHYPLT.DWG USING: C:\ADWG\00216\446\CESHYWPS, 09/24/96 at 12:32

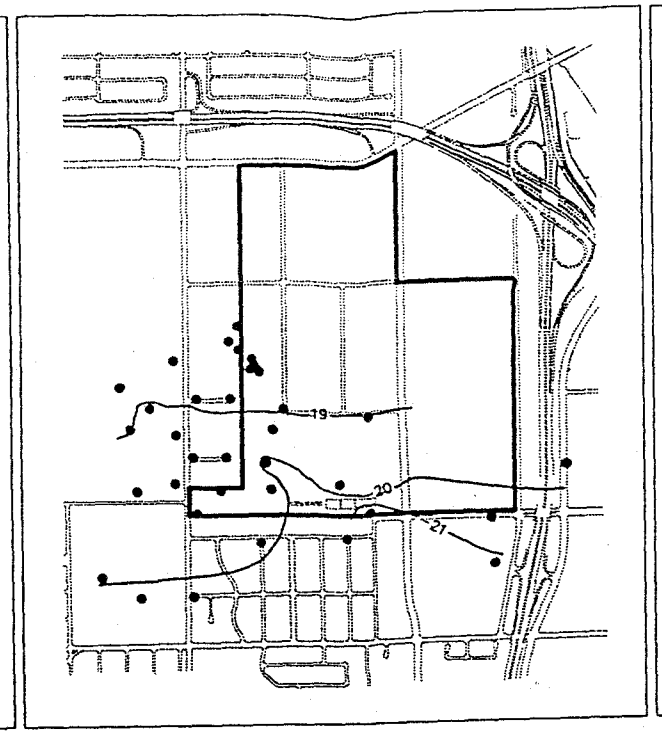
BOE-C6-0139868



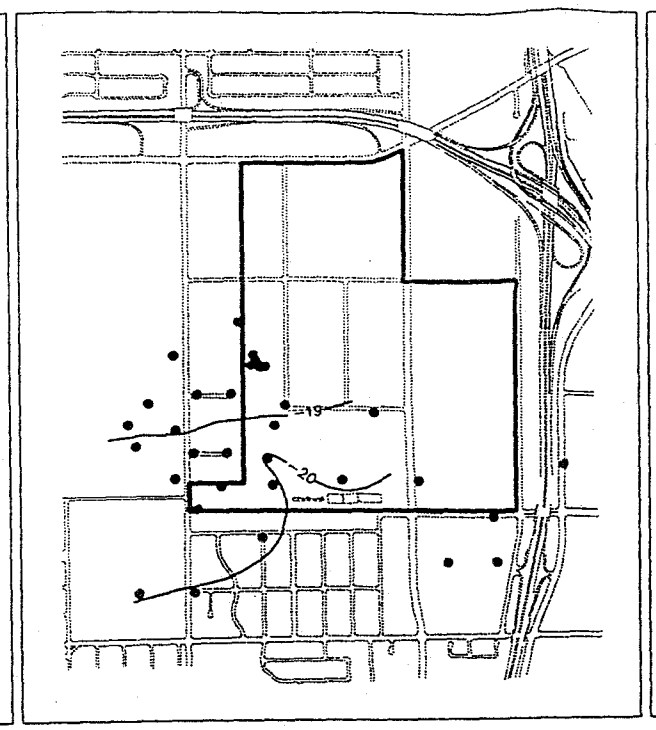
July 1993



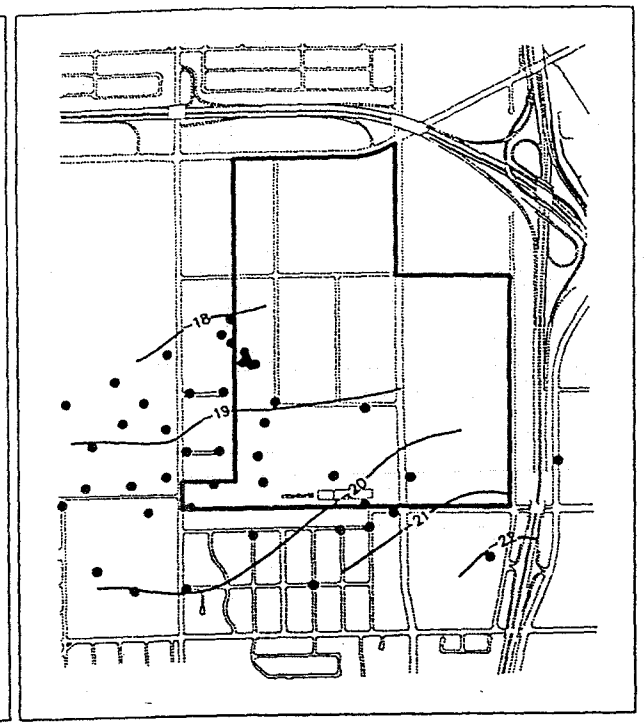
February 1994



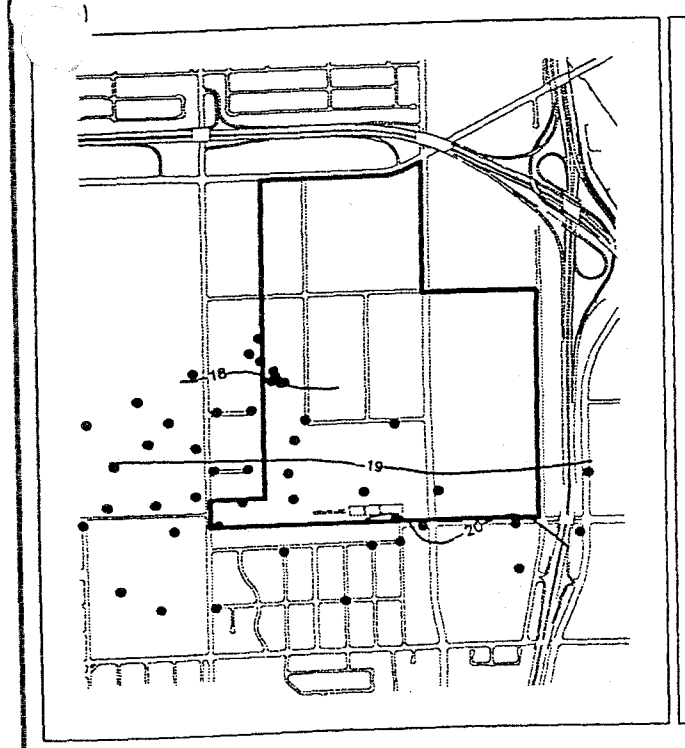
May 1994



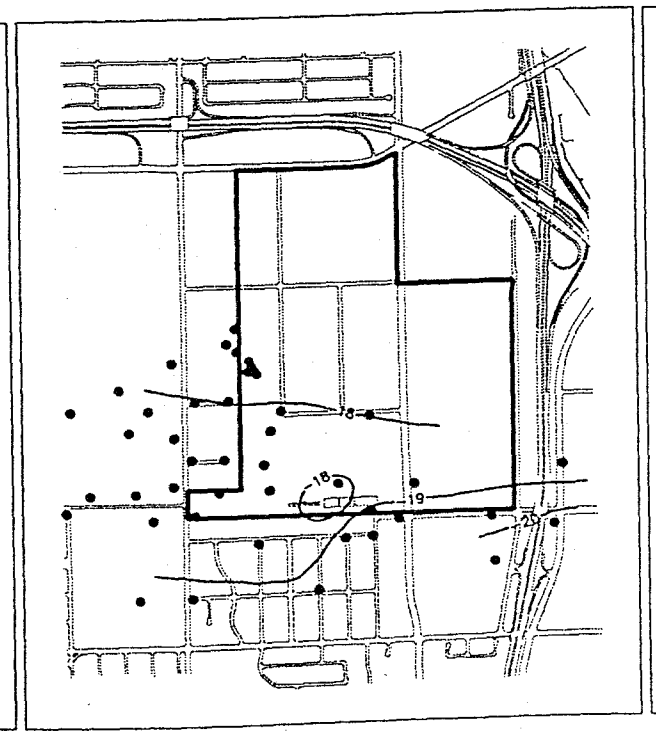
July 1994



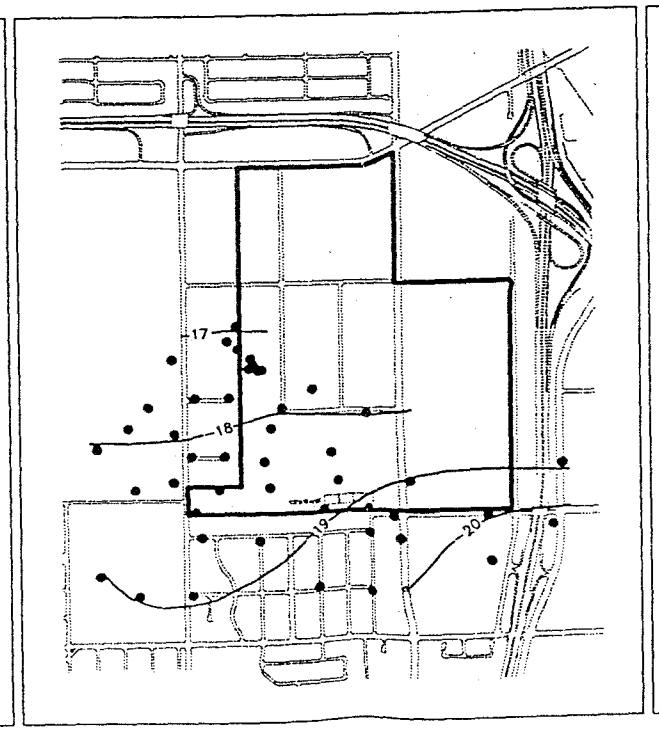
October 1994



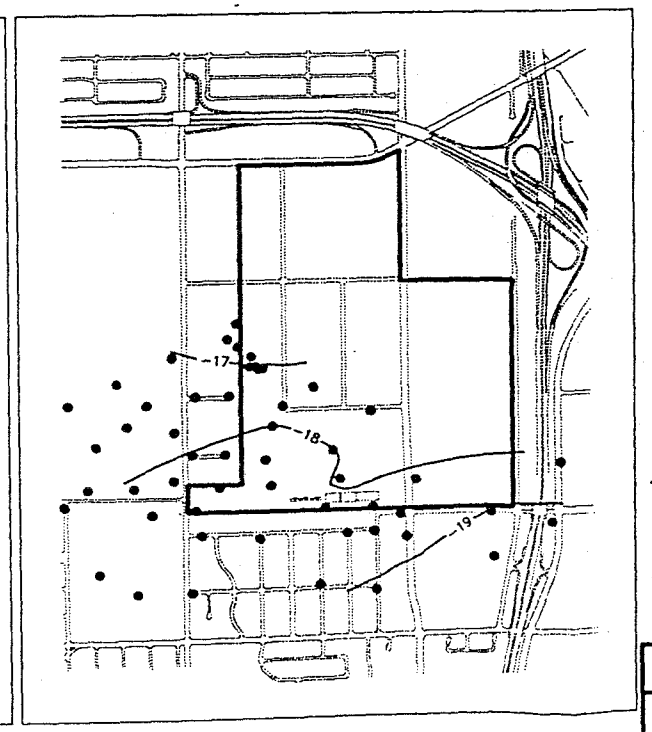
March 1995



June 1995



October 1995



February 1996

0 2400 4800

Scale in feet

EXPLANATION

- MBFB monitoring location
- Groundwater elevation contour (ft MSL)

FIGURE 4.1-6

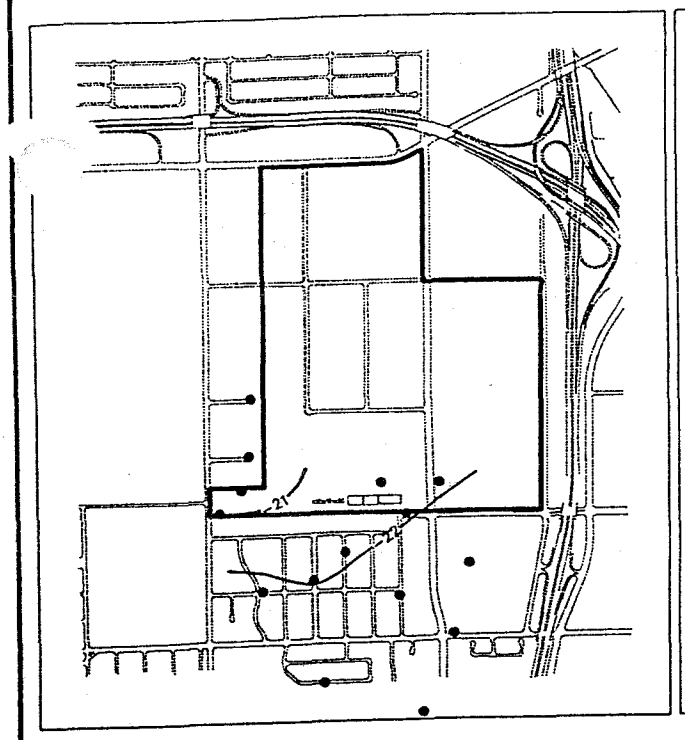
Time - Series Groundwater Contours
Middle Bellflower B Sand

Groundwater Remedial Investigation
Del Amo Study Area

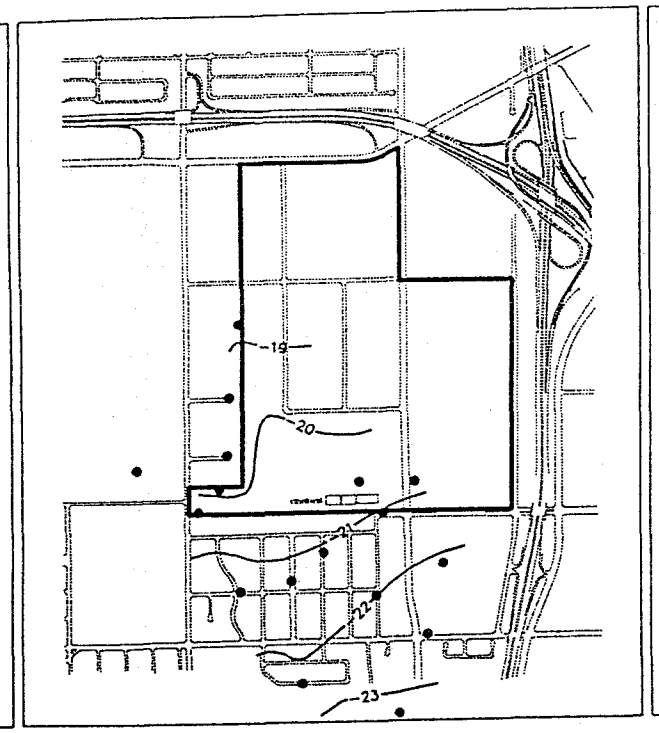
DAMES & MOORE

C:\ADWG\00216\483\CE5HYPLT.DWG USING: C:\ADWG\00216\448\SHYMBBPS, 09/19/96 at 15:00

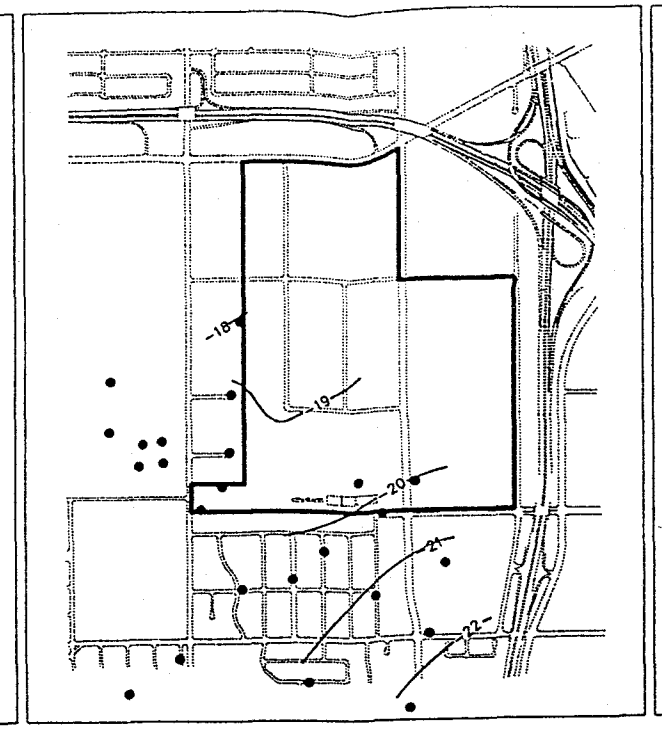
BOE-C6-0139869



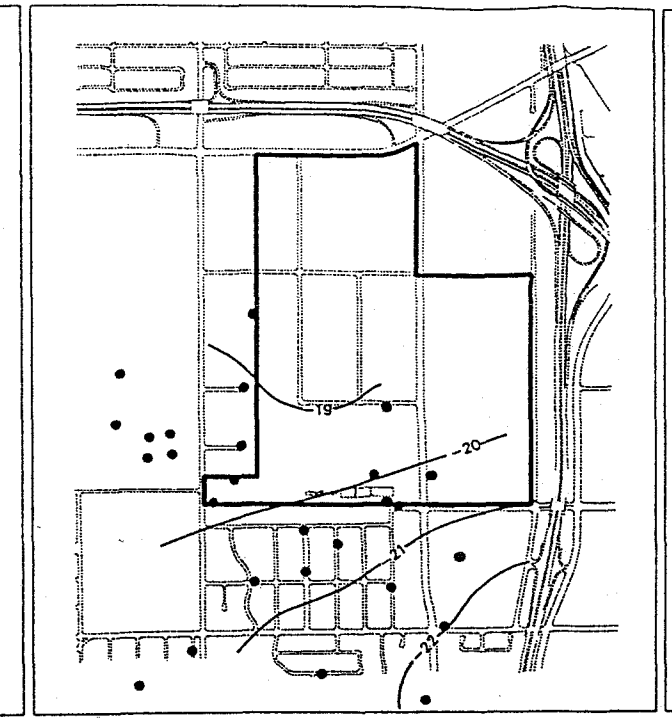
July 1993



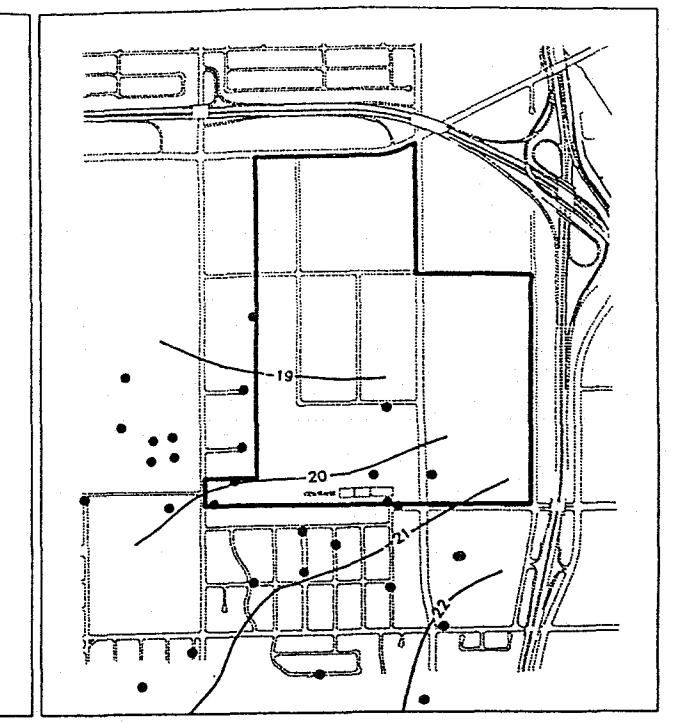
February 1994



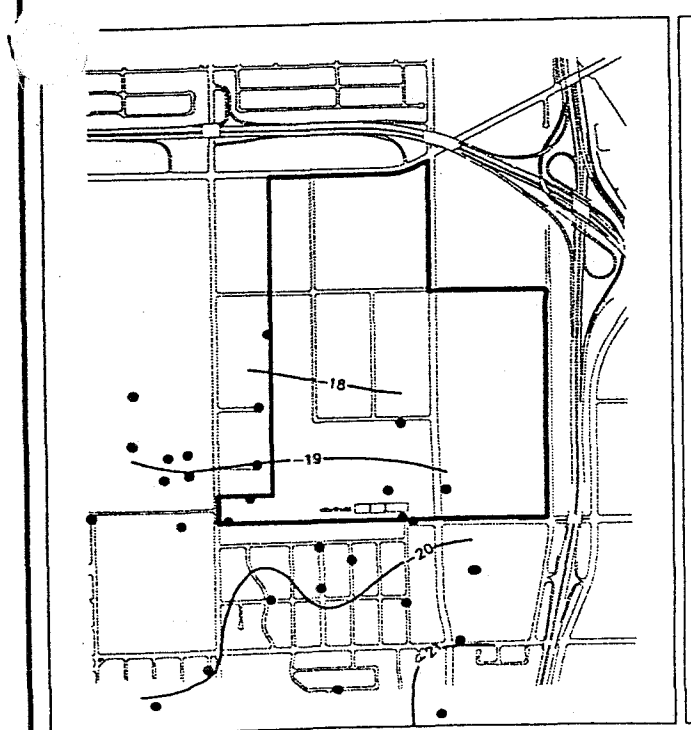
May 1994



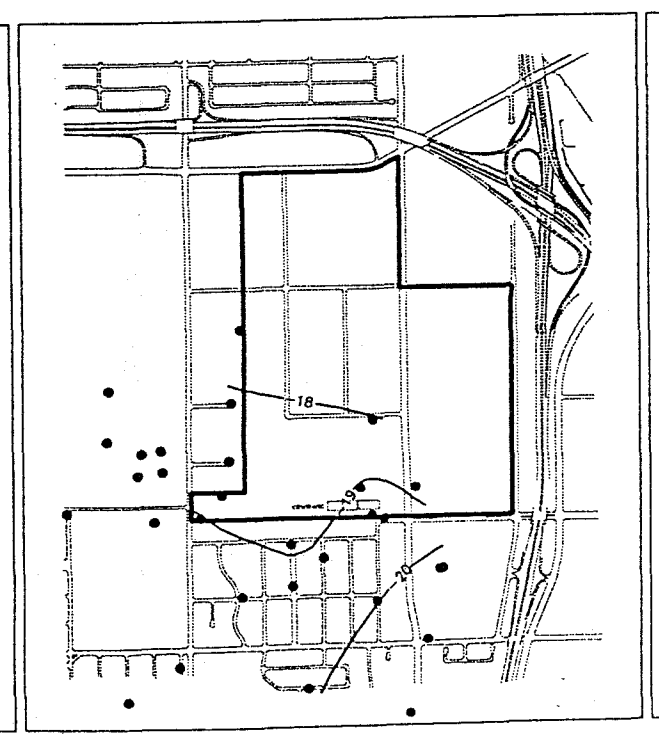
July 1994



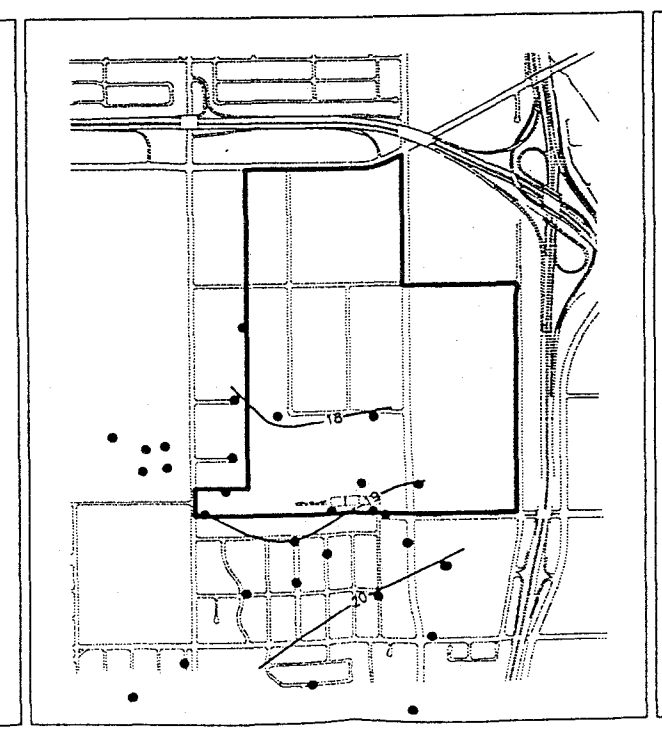
October 1994



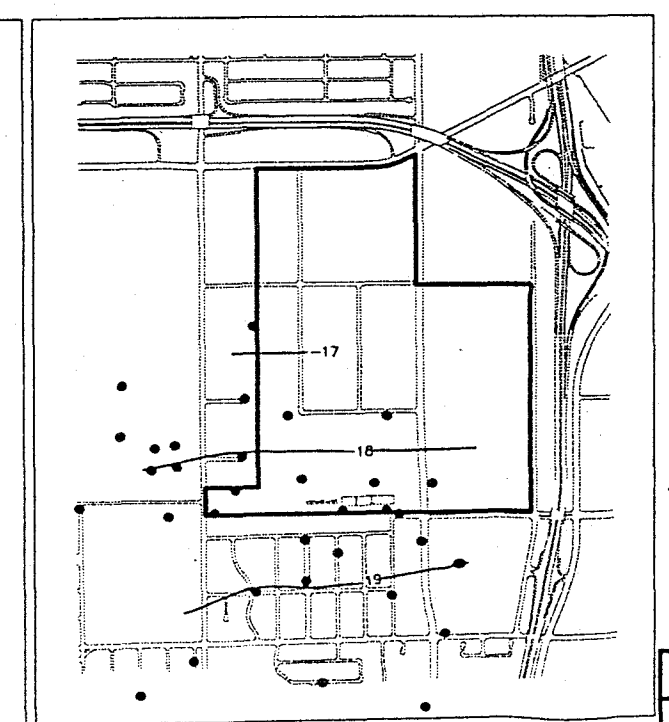
March 1995



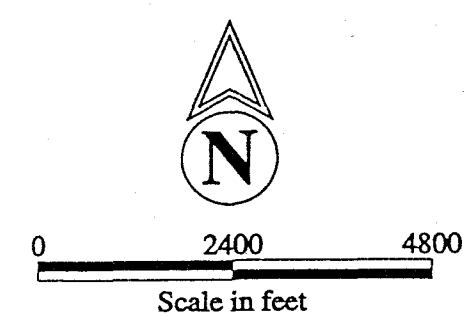
June 1995



October 1995



February 1996



EXPLANATION

- MBFC monitoring location
- Groundwater elevation contour (ft MSL)

FIGURE 4.1-8

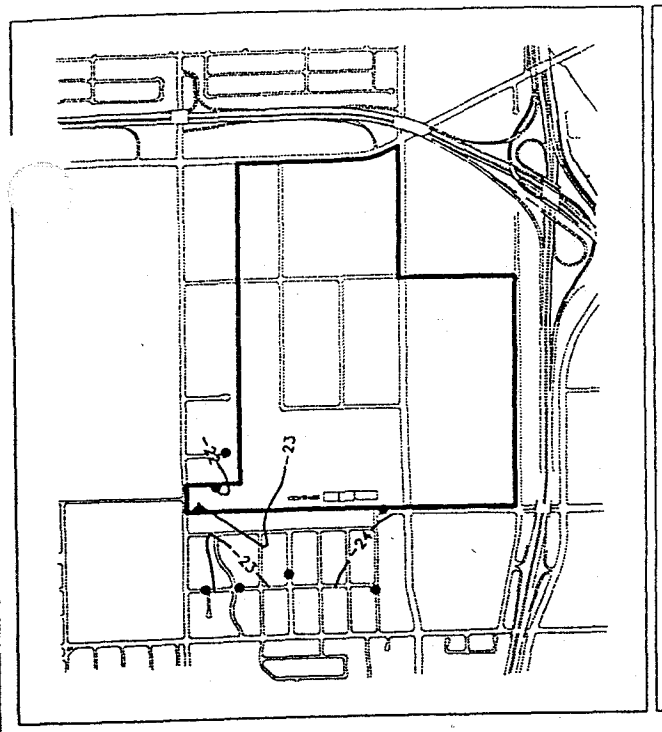
Time - Series Groundwater Contours
Middle Bellflower C Sand

Groundwater Remedial Investigation
Del Amo Study Area

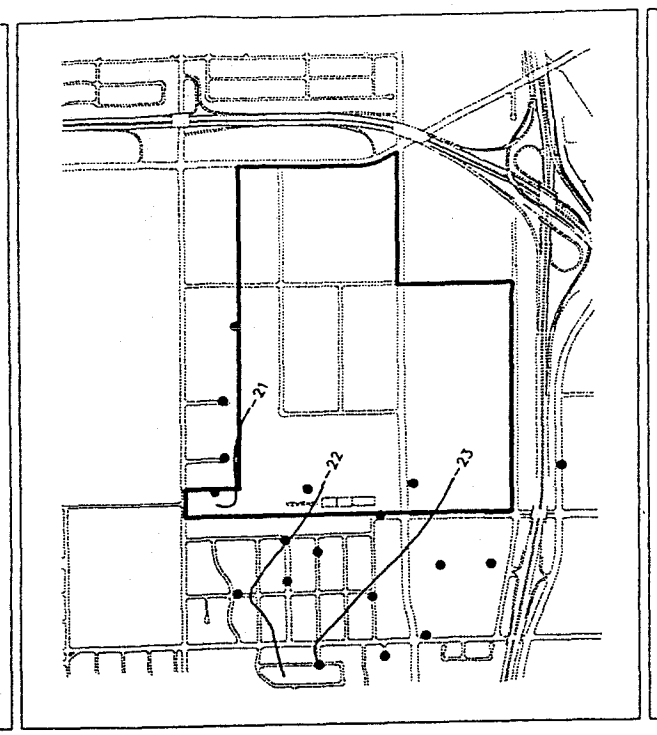
DAMES & MOORE

C:\ADWG\00216\483\CESHYPLT.DWG USING: C:\ADWG\00218\446\SHYMBCPS. 09/06/96 at 20:00

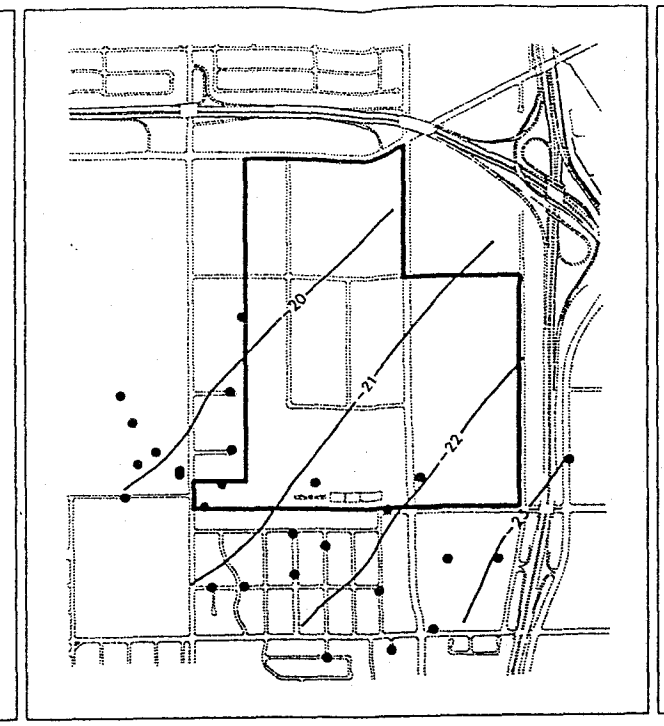
BOE-C6-0139870



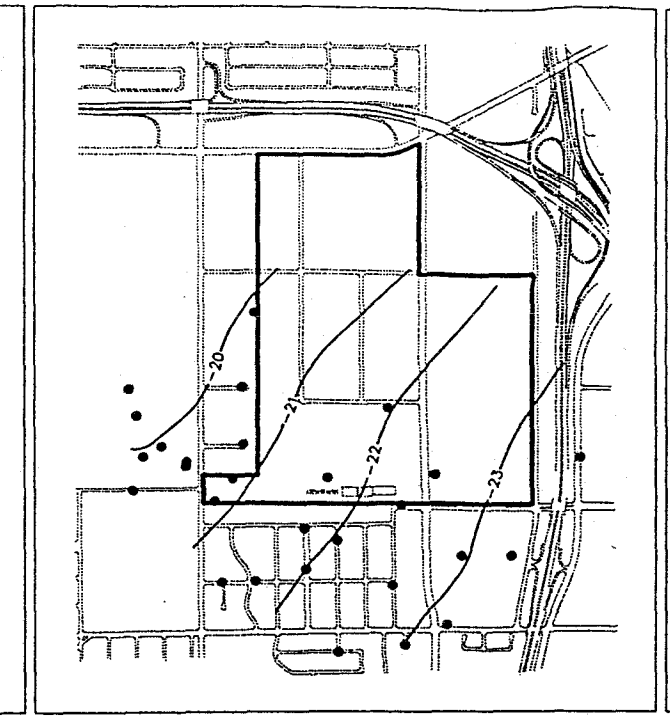
May 1993



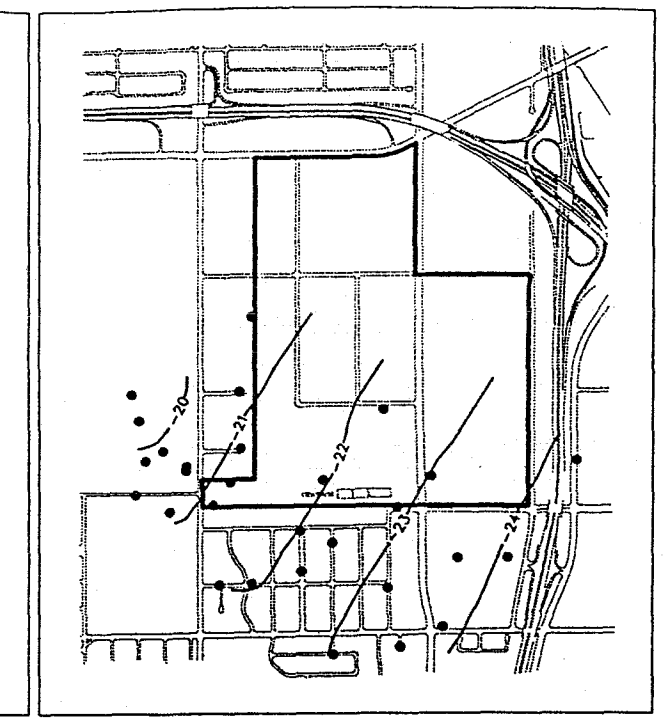
February 1994



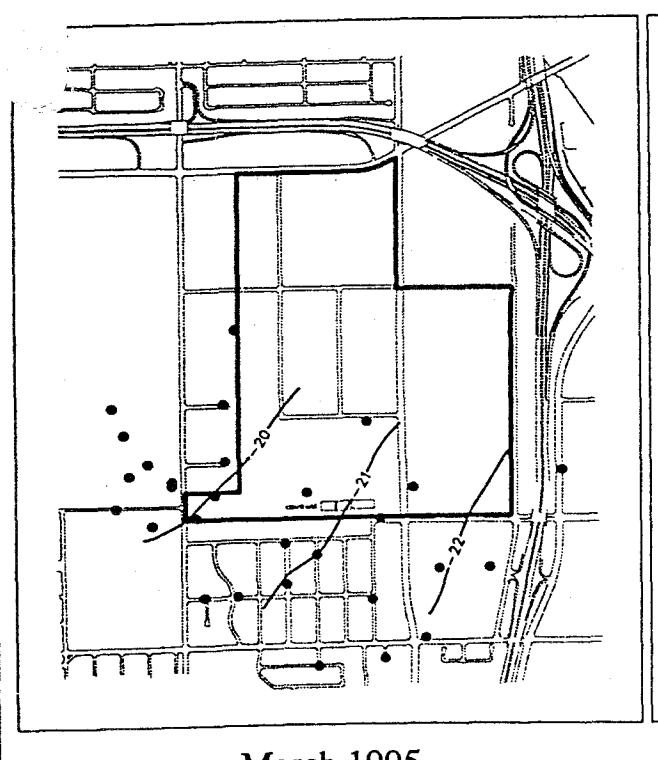
May 1994



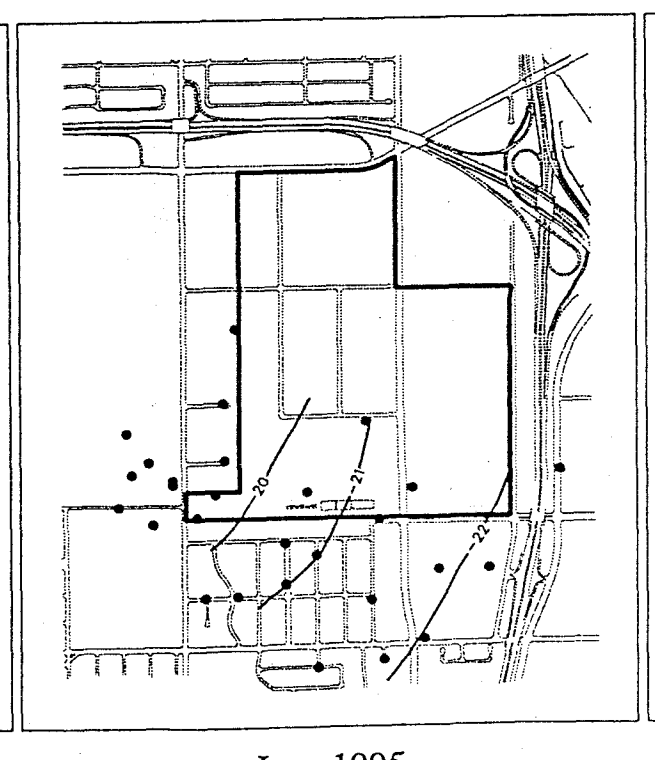
July 1994



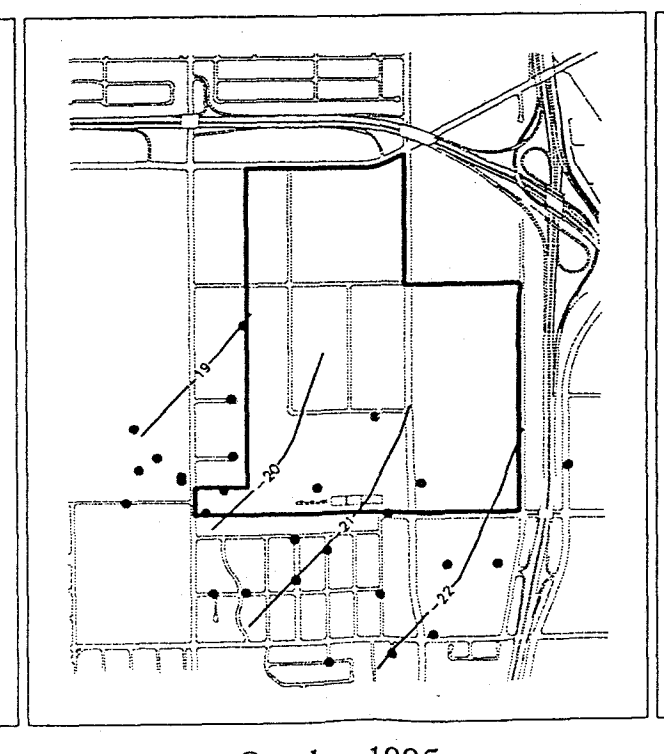
October 1994



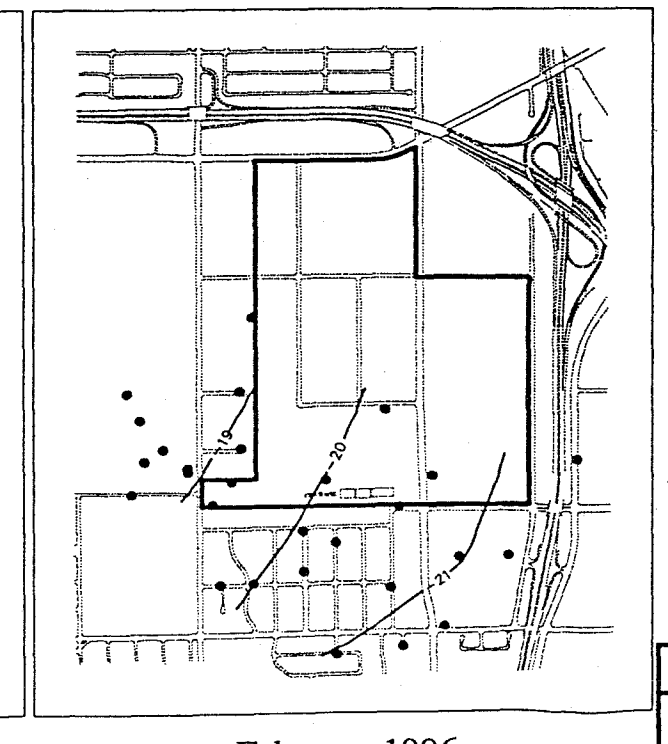
March 1995



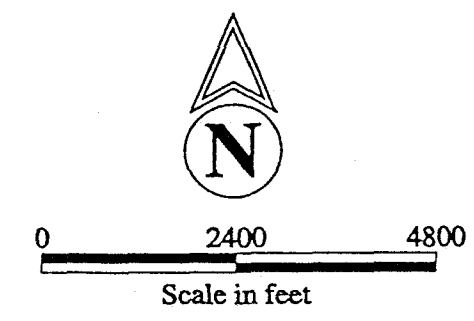
June 1995



October 1995



February 1996



EXPLANATION

- ● Gage monitoring location
- Groundwater elevation contour (ft MSL)

FIGURE 4.1-10

Time - Series Groundwater Contours
Gage Aquifer

Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

C:\ADWG\00216\483\CESHYPLT.DWG USING: C:\ADWG\00216\446\SHYGAGPS. 09/19/96 at 14:57

BOE-C6-0139871

DEL AMO STUDY AREA

Vertical Gradient Summary Table

TABLE 4.1-2
VERTICAL GRADIENTS

HSU Pair	Monitoring Location Pair	Well Screen Midpoint Elevations (ft msl)	Vertical Gradient	Average Vertical Gradient
Water Table/MBFB	PZL0016/SWL0029	-23.01 / -42.04	-0.0095	-0.0234
	SWL0016/SWL0037	-22.73 / -56.70	-0.0212	
	SWL0015/SWL0019	-26.08 / -60.15	-0.0355	
	SWL0057/SWL0056	-21.95 / -50.61	-0.1888*	
	SWL0009/SWL0010	-24.66 / -85.03	-0.1002*	
	SWL0024/SWL0023	-26.12 / -67.94	0.0273	
MBFB/MBFC	SWL0029/SWL0030	-42.04 /- 68.53	-0.0023	-0.0027
	XMW-12/XBF-05	-27.63 / -86.42	-0.0029	
	XMW-27/XBF-19	-25.76 / -89.22	-0.0071	
	SWL0037/SWL0035	-56.70 / -95.42	-0.0026	
	SWL0050/SWL0055	**-41.95 / -87.15**	**+0.0049**	
	SWL0011/SWL0013	**-66.18 / -105.69**	**+0.0005**	
	XMW-13/XBF-06	-26.60 / -77.20	-0.0059	
	XMW-14/XBF-07	-24.56 / -68.65	-0.0071	
	SWL0052/SWL0053	-62.56 / -99.86	-0.0016	
MBFC/Gage Aquifer	SWL0030/SWL0031	-68.53 / -128.75	-0.0340	-0.0304
	XBF-05/XG-04	-86.42 / -133.56	-0.0242	
	XBF-19/XG-14	-89.22 / -133.62	-0.0286	
	SWL0035/SWL0036	-95.42 / -152.79	-0.0493	
	SWL0013/SWL0022	-105.69 / -153.29	-0.0500	
	XBF-06/XG-05	-77.20 / -127.65	-0.0200	
	XBF-07/XG-06	-68.65 / -126.21	-0.0158	
	XBF-14/XG-13	-78.72 / -139.78	-0.0192	
	SWL0040/XG-11	-92.15 / -166.59	-0.0275	
	SWL0027/SWL0026	-104.14 / -144.50	-0.0349	
Gage Aquifer/Lynwood Aquifer	XLG-02/XLW-01	-149.73 / -194.49	0.2634	-0.1870
	XG-01/XLW-05	-103.62 / -192.91	0.1325	
	XG-06/XLW-04	-126.21 / -192.54	0.1652	

Groundwater elevations used in vertical gradient calculaton from third sampling period, 1995 monitoring event (Table 4.1-1). Bolded Locations have an upward (positive) vertical gradient; all others are downward.

* Gradient values at these locations may not reflect natural conditions; water table elevations are anomalously high, possibly due to recharge from leaking water pipelines, sewers, or other unknown sources. Gradient values at these locations are not used in calculation of average value.

TABLE 4.2-1
SUMMARY OF CONSTANT RATE DISCHARGE TESTS
DEL AMO AQUIFER TESTING

Well ID	Test Date(s)	Pumping Rate, Q (gpm)	Time Pump On	Time Pump Off	Total Pumping Time (minutes)
Upper Bellflower Aquitard					
SWL0005	2/29/96	0.7	13:31:20	19:14:00	341
SWL0006	3/6/96	0.35	9:21:00	21:33:00	732
SWL0009	3/5/96	0.29	9:10:00	22:30:00	800
SWL0012	3/13/96	0.86	9:45:00	15:38:00	353
SWL0016	2/20/96	0.8	9:01:00	21:35:00	754
SWL0017	3/19/96	0.4	12:25:00	0:30:00	725
SWL0021	3/22/96	0.2	8:43:00	20:43:00	720
SWL0039	1/19/96	1.8	9:39:00	21:53:00	734
SWL0042	3/20/96	1.0	9:40:00	21:51:00	731
SWL0046	1/18/96	0.9	10:34:00	22:50:30	737
SWL0057	2/21/96	0.75	9:09:00	21:26:00	737
Middle Bellflower B Sand					
SWL0011	3/15/96	10.8	10:00:00	22:20:00	740
SWL0023	4/25/96-4/26/96	9.9	09:40:00	13:00:00	1,640
SWL0037	3/23/96	4.8	8:35:00	20:36:00	721
SWL0047	3/12/96	4.6	9:47:35	21:50:00	722
SWL0049	2/28/96	5.0	10:22:00	23:00:00	758
XMW-28	3/24/96	4.0	10:40:00	21:25:00	645
Middle Bellflower C Sand					
SWL0014	4/22/96	4.8	12:00:02	17:56:00	356
Gage					
XDA-1B	5/3/96	25.0	10:33:00	21:30:00	657

TABLE 4.2-2
SUMMARY OF AQUIFER TESTING RESULTS
THEIS RECOVERY METHOD
DEL AMO AQUIFER TESTING
Page 1 of 2

Well ID	Transmissivity, T (ft^2/minute)	Aquifer Thickness, b (feet)	Hydraulic Conductivity, K (feet/day)
Upper Bellflower Aquitard			
SWL0005	0.02	17.6	1.6
SWL0006	0.025	21.6	1.7
SWL0009	0.004	24.1	0.2
SWL0012[1]	0.059	16.5	5.2
SWL0016	0.046	13.4	4.9
SWL0017	0.016	16.7	1.4
SWL0021	0.02	16	1.8
SWL0039	0.13	19.3	10
SWL0042	0.02	16.1	1.8
SWL0044[2]	0.001	13.8	0.1
SWL0046	0.023	11.4	2.9
SWL0057	0.053	16.3	4.7
Middle Bellflower B Sand			
SWL0011	0.77	63	18
SWL0023	0.96	65	21
SWL0037	0.50	61	12
SWL0047	0.35	58	9
SWL0049	0.42	12.1	50
XMW-28[3]	0.11	16.1	10

TABLE 4.2-2
Page 2 of 2

Well ID	Transmissivity, T (ft^2/minute)	Aquifer Thickness, b (feet)	Hydraulic Conductivity, K (feet/day)
Middle Bellflower C Sand			
SWL0014	1.1	58	27
XBF-5[4]	5.5	20	400
XBF-7[4]	1.3	10	190
XBF-9[4]	3.5	19.5	260
XBF-11[4]	2.8	65.1	62
XBF-13[4]	1.3	59.5	32
XBF-15[4]	5	43.5	170
Gage			
XDA-1B	0.98	62	23
XG-5[4]	1.5	61	35
XG-11[4]	1.3	52	31
XG-13[4]	0.92	36.5	36

1 Short pumping time; pumping was terminated at 353 minutes to avoid drawing water level below pump intake.

2 Results for match to head-ratio data from falling-head slug test

3 Well XMW-28 is a water table well that is screened partially in the upper Bellflower and partially in the middle Bellflower B Sand

4 Results from Hargis + Associates' reanalysis of constant discharge aquifer test data collected during Montrose RI/FS using the Theis recovery method (Hargis + Assoc., 1996b)

TABLE 4.2-3

SUMMARY OF AQUITARD VERTICAL HYDRAULIC CONDUCTIVITY RATIO METHOD TEST RESULTS

Aquifer/ Well	Aquitard/ Well	Time (minutes)	Upper-End Average K_v' (feet/day)	Lower-End Average K_v' (feet/day)
MBFB	UBF	170	4.9×10^{-1}	2.6×10^{-1}
SWL0023	SWL0024	500	2.5×10^{-1}	1.4×10^{-1}
		Average	3.7×10^{-1}	2×10^{-1}
MBFC	LBF	60	9.6×10^{-1}	3.6×10^{-1}
SWL0014	SWL0043	210	6.1×10^{-1}	2.3×10^{-1}
		Average	7.9×10^{-1}	3×10^{-1}
Gage	LBF	72	5×10^{-2}	2×10^{-2}
XDA-1B	SWL0043	312	2×10^{-2}	9×10^{-3}
		Average	3.5×10^{-2}	1×10^{-2}

K_v' = vertical hydraulic conductivity of aquitard

Appendix C

BOE-C6-0139878

Appendix C
Water Chemistry Data

INDUSTRIAL LIGHT METALS SITE

Summary of Groundwater Analytical Results – VOCs

Summary of Groundwater Analytical Results – Total Petroleum Hydrocarbons

Summary of Groundwater Analytical Results – Metals

Summary of Natural Attenuation Parameters

DEL AMO STUDY AREA

Trilinear Piper Diagrams

INDUSTRIAL LIGHT METALS SITE

Summary of Groundwater Analytical Results – VOCs

TABLE 4.6

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCs)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS[1] (in µg/L) BY EPA METHOD 8260																		
		TCE	PCE	1,1-DCA	1,1-DCE	1,1,1-TCA	Bromodi-chloro-methane	Bromoform	Chloroform	1,2- Dichloro-propane	Trans-1,2- DCE	Cis-1,2-DCE	Dibromo-chloro-methane	Toluene	Benzene	Ethyl benzene	Total Xylenes	Vinyl Chloride	1,1,2-TCA	1,2-DCA
P-1	1/24/95	22,000	38	0.53	9.7	0.74	1.3	ND(0.5)	64	ND(0.5)	2.2	NA	ND(0.5)	30	12	1.8	11	ND(0.5)	ND(0.5)	ND(0.5)
	3/17/95	23,000	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	NA	ND(600)	ND(600)	ND(600)	ND(600)	ND(1,000)	ND(100)	ND(600)	ND(600)
	12/27/95	24,000	ND(600)	ND(0.5)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(1,000)	ND(100)	ND(600)	ND(600)
	12/27/95(D)	23,000	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(600)	ND(1,000)	ND(100)	ND(600)	ND(600)
	3/19/96	22,000	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(3,000)	ND(300)	ND(2,000)	ND(2,000)
	6/26/96	24,000	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(2,000)	ND(200)	ND(900)	ND(900)
	6/26/96(D)	23,000	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(900)	ND(2,000)	ND(200)	ND(900)	ND(900)
	9/18/96	23,000	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(2,000)	ND(4,000)	ND(400)	ND(2,000)	ND(2,000)
	7/10/97	15,000	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(1,000)	ND(200)	ND(500)	ND(500)
	7/10/97(D)	15,000	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(1,000)	ND(200)	ND(500)	ND(500)
	3/4/99	8,100	83	1.7	10	ND(0.5)	ND(0.5)	ND(0.5)	13	ND(0.5)	1.2	24	ND(0.5)	ND(0.5)	1.3	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/16/99	10,000	78	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(50)	ND(50)	ND(50)
P-2	1/27/95	87	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	NA	ND(3)	100	20	7.2	60	ND(3)	ND(3)	ND(3)
	3/17/95	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	NA	ND(3)	ND(3)	ND(3)	ND(3)	24	ND(3)	ND(3)	ND(3)
	12/27/95	ND(5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	2.1	ND(0.5)	0.83	23	ND(1)	ND(0.5)	ND(0.5)
	3/19/96	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.5	ND(0.1)	ND(0.5)	ND(0.5)
	3/19/96(D)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	2.0	ND(0.1)	ND(0.5)	ND(0.5)
	6/20/96	0.52	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.2	ND(0.1)	ND(0.5)	ND(0.5)
	6/20/96(D)	0.59	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.2	ND(0.1)	ND(0.5)	ND(0.5)
	9/17/96	0.92	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	7/8/97	11	7.9	ND(0.5)	19	110	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	9.2	ND(0.5)	1.1	ND(0.5)	ND(0.5)	1.6	ND(0.2)	ND(0.5)	ND(0.5)
	3/2/99	0.70	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/13/99	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
P-3	1/24/95	140	ND(0.5)	ND(0.5)	1.6	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	3/17/95	26	ND(0.5)	ND(0.5)	1.1	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	12/20/95	50	ND(0.5)	ND(0.5)	1.8	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	3/14/96	56	ND(0.5)	ND(0.5)	2.7	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	6/19/96	52	ND(0.5)	ND(0.5)	3.0	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	9/11/96	64	ND(5)	ND(5)	3.4	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
	7/8/97	35	ND(0.5)	ND(0.5)	2.3	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.2)	ND(0.5)	ND(0.5)
	3/2/99	39	ND(0.5)	ND(0.5)	2.3	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/14/99	62	ND(2)	ND(2)	2.7	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(4)	ND(2)	ND(2)	ND(2)
P-4	1/26/95	2,500	ND(50)	ND(50)	86	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	NA	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(50)	ND(50)	ND(50)
	3/17/95	2,200	ND(60)	ND(60)	77	ND(60)	ND(60)	ND(60)	ND(60)	ND(60)	ND(60)	NA	ND(60)	ND(60)	ND(60)	ND(60)	ND(100)	ND(60)	ND(60)	ND(60)
	12/21/95	3,400	ND(100)	ND(600)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	3/18/96	3,500	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(30)	ND(30)	ND(200)	ND(200)
	9/16/96	3,500	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	7/9/97	1,500	39	ND(30)	71	54	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(10)	ND(30)	ND(30)
		WELL ABANDONED 10/97																		

BOE-C6-0139881

TABLE 4.6

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCs)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS[1] (in µg/L) BY EPA METHOD 8260																		
		TCE	PCE	1,1-DCA	1,1-DCE	1,1,1-TCA	Bromodi-chloro-methane	Bromoform	Chloroform	1,2- Dichloro-propane	Trans-1,2- DCE	Cis-1,2-DCE	Dibromo-chloro-methane	Toluene	Benzene	Ethyl benzene	Total Xylenes	Vinyl Chloride	1,1,2-TCA	1,2-DCA
P-5	1/26/95	27	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	NA	ND(3)	23	6.9	ND(3)	10	ND(3)	ND(3)	ND(3)
	3/17/95	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	NA	ND(3)	ND(3)	ND(3)	ND(3)	ND(6)	ND(3)	ND(3)	ND(3)
	12/27/95	2.5	ND(0.5)	0.62	0.87	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.81	0.51	190	ND(0.5)	ND(0.5)	3.2	ND(0.5)	2.2	ND(1)	ND(0.5)	ND(0.5)
	3/19/96	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	180	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	11	ND(5)	ND(5)
	6/25/96	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	140	ND(7)	ND(7)	ND(7)	ND(7)	ND(20)	23	ND(7)	ND(7)
	9/17/96	1.1	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.56	ND(0.5)	ND(1)	34	ND(0.5)	ND(0.5)
	9/17/96(D)	1.0	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.58	ND(0.5)	ND(1)	30	ND(0.5)	ND(0.5)
P-6	3/16/95	510	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(2)	ND(10)	ND(10)
	12/20/95	570	18	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	3/18/96	510	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(50)	ND(5)	ND(30)	ND(30)
	6/20/96	500	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(5)	ND(30)	ND(30)
	9/12/96	520	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(6)	ND(30)	ND(30)
	7/9/97	530.0	ND(10)	ND(10)	ND(10)	13.0	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(5)	ND(10)	ND(10)
	WELL ABANDONED 10/97																			
P-6B	3/3/99	280	7.4	ND(0.5)	1.2	ND(0.5)	ND(0.5)	ND(0.5)	0.94	ND(0.5)	ND(0.5)	1.7	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/14/99	420	7.8	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
P-7	3/17/95	2,500	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	NA	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	3/17/95(D)	2,400	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	NA	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	12/21/95	1,700	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(10)	ND(50)	ND(50)
	3/18/96	1,500	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(10)	ND(50)	ND(50)
	6/24/96	1,700	ND(70)	ND(200)	ND(200)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(200)	ND(200)	ND(70)	ND(70)	ND(70)	ND(200)	ND(20)	ND(200)	ND(200)
	9/16/96	1,700	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(10)	ND(50)	ND(50)
	7/9/97	3,200	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(200)	ND(30)	ND(70)	ND(70)
	3/4/99	900	13	2.2	7.8	7.2	ND(0.5)	ND(0.5)	12	ND(0.5)	3.3	75	ND(0.5)	ND(0.5)	0.61	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/15/99	1,100	9.7	ND(5)	6.8	6.4	ND(5)	ND(5)	10	ND(5)	ND(5)	85	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
P-8	3/16/95	3,100	ND(60)	ND(60)	ND(60)	ND(60)	ND(60)	ND(60)	ND(60)	ND(60)	ND(60)	NA	ND(60)	ND(60)	ND(60)	ND(60)	ND(100)	ND(10)	ND(60)	ND(60)
	WELL ABANDONED 8/96																			
P-9	3/16/95	910	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	NA	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(6)	ND(30)	ND(30)
	12/20/95	1,100	ND(5)	ND(5)	6.2	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	3/18/96	1,100	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(10)	ND(50)	ND(50)
	6/26/96	1,300	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(40)	ND(80)	ND(8)	ND(40)	ND(40)
	9/12/96	1,200	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(6)	ND(30)	ND(30)
	7/9/97	1000	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(10)	ND(30)	ND(30)
	WELL ABANDONED 10/97																			
P-9B	3/3/99	280	1.70	ND(0.5)	4.50	ND(0.5)	ND(0.5)	ND(0.5)	2.20	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/14/99	410	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
P-10	3/16/95	2.8	ND(0.5)	ND(0.5)	0.64	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	12/19/95	1.2	ND(0.5)	0.60	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	3/14/96	0.62	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	6/18/96	1.2	ND(0.5)	ND(0.5)	0.55	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	9/11/96	0.74	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
	7/8/97	3.4	1.2	ND(0.5)	2.9	13	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.0	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.2)	ND(0.5)	ND(0.5)
	3/1/99	3.7	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/13/99	3.2	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)

BOE-C6-0139882

TABLE 4.6

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCs)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS[1] (in µg/L) BY EPA METHOD 8260																		
		TCE	PCE	1,1-DCA	1,1-DCE	1,1,1-TCA	Bromodi-chloro-methane	Bromoform	Chloroform	1,2- Dichloro-propane	Trans-1,2- DCE	Cis-1,2-DCE	Dibromo-chloro-methane	Toluene	Benzene	Ethyl benzene	Total Xylenes	Vinyl Chloride	1,1,2-TCA	1,2-DCA
P-11	12/27/95	1.8	0.57	ND(0.5)	ND(0.5)	ND(0.5)	1.5	ND(0.5)	1.9	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	3/14/96	1.6	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.88	ND(0.5)	1.4	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	6/19/96	7.3	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.94	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	9/11/96	2.8	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	0.97	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(6)	ND(30)	ND(30)
	7/8/97	4.3	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.2)	ND(0.5)	ND(0.5)
	WELL ABANDONED 10/97																			
P-12	12/21/95	10,000	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(200)
	3/19/96	8,500	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(700)	ND(70)	ND(400)	ND(700)
	6/26/96	9,200	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(800)	ND(80)	ND(400)	ND(800)
	6/26/96(D)	9,400	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(800)	ND(80)	ND(400)	ND(800)
	9/18/96	5,000	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(60)	ND(300)	ND(300)
	7/10/97	3,000	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(200)	ND(30)	ND(70)	ND(200)
	3/3/99	1,500	1.5	31	29	8.9	ND(0.5)	ND(0.5)	31	2.9	ND(0.5)	2.9	ND(0.5)	ND(0.5)	6.7	ND(0.5)	ND(1)	ND(0.5)	1.6	0.54
	WELL DAMAGED 7/99																			
P-13	12/21/95	160	ND(5)	ND(5)	5.6	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	3/14/96	160	3.0	ND(0.5)	5.7	ND(0.5)	ND(0.5)	ND(0.5)	1.2	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	6/19/96	160	3.7	6.3	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.5	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	9/11/96	170	ND(5)	ND(5)	5.2	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
	7/8/97	240	ND(5)	ND(5)	6.2	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(2)	ND(5)	ND(5)
	WELL ABANDONED 10/97																			
P-14	12/21/95	6,300	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	40	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(6)	ND(30)	ND(30)
	3/19/96	5,900	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(500)	ND(50)	ND(300)	ND(300)
	6/26/96	6,700	ND(300)	ND(300)	ND(200)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(60)	ND(300)	ND(200)
	9/17/96	5,400	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(60)	ND(300)	ND(300)
	7/10/97	3,100	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(80)	ND(200)	ND(200)
	WELL ABANDONED 10/97																			
P-15	12/27/95	9,300	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(50)	ND(300)	ND(300)
	3/19/96	9,200	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(300)	ND(400)	ND(700)	ND(70)	ND(400)	ND(400)
	6/26/96	9,800	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(400)	ND(800)	ND(80)	ND(400)	ND(400)
	9/18/96	8,200	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(60)	ND(300)	ND(300)
	7/10/97	6,200	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(100)	ND(300)	ND(300)
	WELL ABANDONED 10/97																			
P-16A	12/26/95	3,100	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	3/18/96	3,500	4.3	0.95	29	1.6	ND(0.5)	ND(0.5)	14	ND(0.5)	ND(0.5)	28	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	3/18/96(D)	3,300	ND	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(200)	ND(20)	ND(70)	ND(70)
	6/25/96	3,800	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(60)	ND(300)	ND(300)
	9/16/96	4,100	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	7/9/97	3,400	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(40)	ND(100)	ND(100)
	3/4/99	370	9.5	0.62	14	1.7	ND(0.5)	ND(0.5)	3.4	ND(0.5)	0.56	8.7	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/15/99	530	7.5	ND(5)	12	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	6.2	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)

BOE-C6-0139883

TABLE 4.6

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCs)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS[1] (in µg/L) BY EPA METHOD 8260																		
		TCE	PCE	1,1-DCA	1,1-DCE	1,1,1-TCA	Bromodi-chloro-methane	Bromoform	Chloroform	1,2- Dichloro-propane	Trans-1,2- DCE	Cis-1,2-DCE	Dibromo-chloro-methane	Toluene	Benzene	Ethyl benzene	Total Xylenes	Vinyl Chloride	1,1,2-TCA	1,2-DCA
P-16B	12/19/95	48	ND(0.5)	ND(0.5)	5.3	ND(0.5)	8.0	1.5	ND(0.5)	ND(0.5)	ND(0.5)	0.94	8.4	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	0.10	ND(0.5)	ND(0.5)
	12/19/95(D)	51	ND(0.5)	ND(0.5)	5.8	ND(0.5)	7.8	1.6	6.3	ND(0.5)	ND(0.5)	1.1	8.0	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	3/18/96	49	ND(0.5)	ND(0.5)	6.6	ND(0.5)	5.7	1.1	5.8	ND(0.5)	ND(0.5)	1.0	5.8	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	0.25	ND(0.5)	ND(0.5)
	6/24/96	480	ND(1)	1.2	61	ND(1)	ND(1)	ND(1)	1.6	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(2)	ND(2)	ND(1)	ND(1)
	WELL DESTROYED 8/96																			
P-16C	9/12/96	440	ND(30)	ND(30)	56	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(6)	ND(30)	ND(30)
	7/9/97	340	ND(7)	ND(7)	40	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(7)	ND(20)	ND(3)	ND(7)	ND(7)
	3/2/99	210	0.78	0.94	43	ND(0.5)	ND(0.5)	ND(0.5)	1.7	ND(0.5)	ND(0.5)	0.65	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/14/99	440	ND(20)	ND(20)	71	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(30)	ND(20)	ND(20)	ND(20)
P-17	12/21/95	13,000	700	ND(30)	340	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(6)	ND(30)	ND(30)
	3/19/96	12,000	780	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(1000)	ND(100)	ND(500)	ND(500)
	9/18/96	9,600	1,000	ND(300)	530	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(60)	ND(300)	ND(300)
	7/10/97	6,900	1,300	ND(300)	690	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(100)	ND(300)	ND(300)
	3/4/99	1,400	270	23	140	24	ND(0.5)	ND(0.5)	6.0	ND(0.5)	0.51	4.3	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/15/99	1,600	230	14	150	14	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(30)	ND(10)	ND(10)	ND(10)
P-18	12/26/95	270	ND(6)	ND(6)	12	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(6)	ND(10)	ND(1)	ND(6)	ND(6)
	3/19/96	180	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(30)	ND(3)	ND(20)	ND(20)
	9/12/96	200	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(40)	ND(4)	ND(20)	ND(20)
	9/12/96(D)	200	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(40)	ND(4)	ND(20)	ND(20)
	7/8/97	180	ND(5)	ND(5)	5.0	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(2)	ND(5)	ND(5)
	WELL ABANDONED 10/97																			
P-19	12/26/95	4,400	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	140	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	3/19/96	4,500	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	230	ND(200)	ND(200)	ND(200)	ND(200)	ND(300)	ND(30)	ND(200)	ND(200)
	6/25/96	4,900	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	280	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	9/17/96	4,300	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	7/9/97	170	2.3	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	2.8	ND(2)	ND(2)	ND(2)	ND(2)	ND(4)	ND(1)	ND(2)	ND(2)
	WELL ABANDONED 10/97																			
P-20	12/27/95	4,200	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	3/18/96	4,400	6.0	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	12	ND(5)	ND(5)	5.1	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	6/25/96	6,800	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	9/16/96	6,400	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	7/10/97	4,800	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(80)	ND(200)	ND(200)
	3/4/99	6,900	17	0.59	8.2	ND(0.5)	0.65	ND(0.5)	24	ND(0.5)	1.7	22	ND(0.5)	ND(0.5)	2.3	ND(0.5)	ND(1)	ND(0.5)	7.5	ND(0.5)
	3/4/99(D)[2]	6,800	15	0.55	7.8	ND(0.5)	ND(0.5)	ND(0.5)	23	ND(0.5)	1.7	21	ND(0.5)	ND(0.5)	2.1	ND(0.5)	ND(1)	ND(0.5)	7.3	ND(0.5)
	7/16/99	5,400	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(50)	ND(50)	ND(50)
	7/16/99(D)[2]	5,200	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(50)	ND(50)	ND(50)
P-21	12/26/95	4,400	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	3/18/96	4,200	83	53	150	27	ND(5)	ND(5)	19	ND(5)	ND(5)	780	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	6/25/96	5,600	ND(200)	ND(200)	170	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	320	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	9/17/96	5,500	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(200)	ND(400)	ND(40)	ND(200)	ND(200)
	7/10/97	2,100	ND(100)	ND(100)	ND(100)	110	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(40)	ND(100)	ND(100)
	WELL ABANDONED 10/97																			

BOE-C6-0139884

TABLE 4.6

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCs)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS[1] (in µg/L) BY EPA METHOD 8260																		
		TCE	PCE	1,1-DCA	1,1-DCE	1,1,1-TCA	Bromodi-chloro-methane	Bromoform	Chloroform	1,2- Dichloro-propane	Trans-1,2- DCE	Cis-1,2-DCE	Dibromo-chloro-methane	Toluene	Benzene	Ethyl benzene	Total Xylenes	Vinyl Chloride	1,1,2-TCA	1,2-DCA
P-22	12/20/95	1,200	8.2	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	3/18/96	1,200	12	ND(0.5)	2.0	ND(0.5)	ND(0.5)	ND(0.5)	1.6	ND(0.5)	ND(0.5)	5.2	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	6/20/96	1,400	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(50)	ND(50)	ND(50)
	9/12/96	1,000	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(70)	ND(200)	ND(20)	ND(70)	ND(70)
	7/9/97	1,200	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(10)	ND(30)	ND(30)
	3/3/99	1,100	30	1.5	18	ND(0.5)	ND(0.5)	ND(0.5)	8.4	ND(0.5)	0.59	18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/15/99	1,300	19	ND(10)	14	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	12	ND(10)	ND(10)	ND(10)	ND(10)	ND(30)	ND(10)	ND(10)	ND(10)
P-23	12/20/95	160	0.53	3.6	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.1	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	3/14/96	100	0.57	ND(0.5)	0.60	ND(0.5)	ND(0.5)	ND(0.5)	0.83	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.1)	ND(0.5)	ND(0.5)
	6/20/96	100	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	9/11/96	96	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
	7/8/97	89	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(5)	ND(1)	ND(3)	ND(3)
	WELL ABANDONED 10/97																			
P-24	12/20/95	430	ND(5)	ND(5)	5.4	ND(5)	ND(5)	ND(5)	7.6	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(1)	ND(5)	ND(5)
	3/19/96	380	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)
	6/24/96	330	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(40)	ND(4)	ND(20)	ND(20)
	9/17/96	320	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(40)	ND(4)	ND(20)	ND(20)
	9/17/96(D)	350	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(60)	ND(6)	ND(30)	ND(30)
	7/9/97	120	ND(3)	ND(3)	15	72	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	10	ND(3)	ND(3)	ND(3)	ND(3)	ND(6)	ND(3)	ND(3)	ND(3)
	3/3/99	210	0.99	ND(0.5)	1.4	ND(0.5)	ND(0.5)	ND(0.5)	6.7	ND(0.5)	ND(0.5)	0.75	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/15/99	210	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	4.8	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(5)	ND(3)	ND(3)	ND(3)
P-25	12/26/95	14,000	6,900	500	2,000	1,300	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(200)	ND(20)	ND(100)	ND(100)
	3/19/96	15,000	4,800	ND(700)	1,800	730	ND(700)	ND(700)	ND(700)	ND(700)	ND(700)	ND(700)	ND(700)	ND(700)	ND(700)	ND(700)	ND(2,000)	ND(200)	ND(700)	ND(700)
	6/26/96	16,000	4,700	ND(500)	1,600	760	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(1,000)	ND(100)	ND(500)	ND(500)
	9/18/96	14,000	3,300	ND(500)	1,200	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(1,000)	ND(100)	ND(500)	ND(500)
	7/10/97	13,000	2,100	ND(300)	910	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)	ND(600)	ND(100)	ND(300)	ND(300)
	7/10/97(D)	12,000	1,800	ND(500)	810	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(500)	ND(1,000)	ND(200)	ND(500)	ND(500)
	WELL ABANDONED 10/97																			

99-200/Rpts/DrGrWaRcFa (11/19/99/rm)

[1] Only detected analytes are reported in table (except for three analytes detected [sec-butylbenzene, isopropylbenzene and p-isopropyltoluene] in Well P-2 since they are not considered COCs); results of all analyses are reported in laboratory reports.

[2] Duplicate sample for P-20 is identified as P-29 in laboratory reports.

[3] Duplicate sample for P-20 is identified as P-30 in laboratory reports.

µg/L	Micrograms per liter
ND( )	Analyte not detected above the practical quantitation limit (in parentheses)
(D)	Duplicate sample
TCE	Trichloroethene
PCE	Tetrachloroethene
DCA	Dichloroethane
DCE	Dichloroethene
TCA	Trichloroethane
--	Not sampled

BOE-C6-0139885

TABLE 4.7

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCs)
BRC PROPERTY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	VOLATILE ORGANIC COMPOUNDS[1] (in µg/L) BY EPA METHOD 8260																		
		TCE	PCE	1,1-DCA	1,1-DCE	1,1,1-TCA	Bromodi-chloro-methane	Bromoform	Chloroform	1,2-Dichloro-propane	Trans-1,2-DCE	Cis-1,2-DCE	Dibromo-chloro-methane	Toluene	Benzene	Ethyl benzene	Total Xylenes	Vinyl Chloride	Carbon Tetra-chloride	1,1,2-TCA
BL-1	3/4/99	6.6	ND(0.5)	1.0	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.57	ND(0.5)	ND(0.5)	15	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	3/4/99[2]	6.8	ND(0.5)	0.95	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.60	ND(0.5)	ND(0.5)	14	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/13/99	5.2	ND(0.5)	0.7	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	15	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
BL-2	3/3/99	250	0.91	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.81	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/14/99	460	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(5)	ND(5)
BL-3	3/3/99	720	73	0.72	3.8	2.1	ND(0.5)	ND(0.5)	3	ND(0.5)	ND(0.5)	0.76	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/15/99	1,200	77	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	25	ND(20)	ND(20)	ND(50)	ND(20)	ND(20)	ND(20)
BL-4	3/2/99	58	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	8.4	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	0.62	ND(0.5)
	7/14/99	49	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.68	ND(0.5)
BL-5	3/4/99	4.1	ND(0.5)	0.54	1.3	ND(0.5)	ND(0.5)	ND(0.5)	2.8	ND(0.5)	3.2	71	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/13/99	2.7	ND(0.5)	0.56	0.79	ND(0.5)	ND(0.5)	ND(0.5)	1.4	ND(0.5)	0.55	110	ND(0.5)	ND(0.5)	0.52	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
BL-6	3/1/99	6,700	2.9	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	11	ND(0.5)	0.65	15	ND(0.5)	0.60	0.84	ND(0.5)	ND(1)	ND(0.5)	1.1	0.61
	7/16/99	5,600	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(50)	ND(50)	ND(50)
	7/16/99[3]	5,600	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(100)	ND(50)	ND(50)	ND(50)
BL-7	3/2/99	32	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.67	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.2	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/14/99	23	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.60	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
BL-8	3/2/99	23	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.2	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)
	7/13/99	18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.0	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)

99-2(KI/Rpts/DrGrWaRcFa (11/15/99/dh)

[1] Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.
[2] Duplicate sample for BL-1 is identified as B-17 in laboratory reports.
[3] Duplicate sample for BL-6 is identified as B-15 in laboratory reports.

µg/L	Micrograms per liter
ND( )	Analyte not detected above the practical quantitation limit (in parentheses)
TCE	Trichloroethene
PCE	Tetrachloroethene
DCA	Dichloroethane
DCE	Dichloroethene
TCA	Trichloroethane
--	Not sampled

BOE-C6-0139886

INDUSTRIAL LIGHT METALS SITE

Summary of Groundwater Analytical Results – Total Petroleum Hydrocarbons

TABLE 4.8

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL PETROLEUM HYDROCARBONS (TPH)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH[1] (in µg/L) BY EPA METHOD 8015M			
		TPH-c/w	TPH-d	TPH-k/Jet Fuel	TPH-z
P-1	1/24/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/17/95	ND(1,000)	1,200	ND(200)	ND(1,000)
	12/27/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	12/27/95(D)	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/26/96	ND(1,000)	310	ND(200)	ND(1,000)
	6/26/96(D)	ND(1,000)	330	ND(200)	ND(1,000)
	9/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/10/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	7/10/97(D)	ND(500)	ND(200)	ND(200)	ND(1,000)
	3/4/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/16/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
P-2	1/27/95	ND(10,000)	ND(2,000)	22,000	ND(10,000)
	3/17/95	ND(22,000)	ND(4,000)	40,000	ND(20,000)
	12/27/95	ND(40,000)	ND(8,000)	60,000	ND(40,000)
	3/19/96	11,000	ND(2,000)	19,000	ND(10,000)
	3/19/96(D)	14,000	ND(2,000)	22,000	ND(10,000)
	6/20/96	7,500	ND(200)	16,000	ND(1,000)
	6/20/96(D)	6,000	ND(200)	13,000	ND(1,000)
	9/17/96	4,600	ND(1,000)	ND(1,000)	ND(2,000)
	7/8/97	ND(10,000)	ND(4,000)	20,000	ND(20,000)
	3/2/99	ND(2,000)	ND(400)	2,300	ND(2,000)
	7/13/99	1,800	490	ND(200)	ND(1,000)
P-3	1/24/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/17/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	12/20/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/14/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/19/96	ND(1,000)	310	ND(200)	ND(1,000)
	9/11/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/8/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	3/2/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/14/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
P-4	1/26/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/17/95	ND(1,000)	300	ND(200)	ND(1,000)
	12/21/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/18/96	2,600	ND(200)	ND(200)	ND(1,000)
	9/16/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	ND(500)	ND(200)	ND(200)	ND(1,000)
		WELL ABANDONED 10/97			
P-5	1/26/95	ND(10,000)	15,000	ND(2,000)	ND(10,000)
	3/17/95	ND(5,000)	10,000	ND(1,000)	ND(5,000)
	12/27/95	ND(8,000)	11,000	ND(2,000)	ND(8,000)
	3/19/96	ND(5,000)	11,000	ND(1,000)	ND(5,000)
	6/25/96	ND(5,000)	8,200	ND(1,000)	ND(5,000)
	9/17/96	ND(4,000)	5,200	ND(800)	ND(4,000)
	9/17/96(D)	ND(2,000)	5,000	ND(400)	ND(2,000)
P-6	3/16/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	12/20/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/20/96	ND(1,000)	230	ND(200)	ND(1,000)
	9/12/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	--	--	--	--
		WELL ABANDONED 10/97			
P-6B	3/3/99	1,100	ND(200)	ND(200)	ND(1,000)
	7/14/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)

TRC

TABLE 4.8

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL PETROLEUM HYDROCARBONS (TPH)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH[1] (in µg/L) BY EPA METHOD 8015M			
		TPH-c/w	TPH-d	TPH-k/Jet Fuel	TPH-z
P-7	3/17/95	ND(1,000)	220	ND(200)	ND(1,000)
	3/17/95(D)	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	12/21/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/24/96	ND(1,000)	200	ND(200)	ND(1,000)
	9/16/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	--	--	--	--
	3/4/99	ND(1,000)	270	ND(200)	ND(1,000)
	7/15/99	ND(1,000)	ND(200)	ND(200)	ND(200)
P-8	3/16/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	WELL ABANDONED 8/96				
P-9	3/16/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	12/20/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/18/96	ND(1,000)	570	ND(200)	ND(1,000)
	6/26/96	ND(1,000)	330	ND(200)	ND(1,000)
	9/12/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	--	--	--	--
	WELL ABANDONED 10/97				
P-9B	3/3/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/14/99	1,400	ND(200)	ND(200)	ND(1,000)
P-10	3/16/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	12/19/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/14/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/11/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/8/97	--	--	--	--
	3/1/99	1,500	ND(200)	ND(200)	ND(1,000)
	7/13/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
P-11	12/27/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/14/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/11/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/8/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	WELL ABANDONED 10/97				
P-12	12/21/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	280	ND(200)	ND(1,000)
	6/26/96	ND(1,000)	430	ND(200)	ND(1,000)
	6/26/96(D)	ND(1,000)	370	ND(200)	ND(1,000)
	9/18/96	ND(2,000)	ND(400)	ND(400)	ND(2,000)
	7/10/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	3/3/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	WELL DAMAGED 7/99				
P-13	12/21/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/14/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/19/96	ND(1,000)	270	ND(200)	ND(1,000)
	9/11/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/8/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	WELL ABANDONED 10/97				
P-14	12/21/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/26/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/17/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/10/97	ND(500)	220	ND(200)	ND(1,000)
	WELL ABANDONED 10/97				

TRC

TABLE 4.8

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL PETROLEUM HYDROCARBONS (TPH)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH[1] (in µg/L) BY EPA METHOD 8015M			
		TPH-c/w	TPH-d	TPH-k/Jet Fuel	TPH-z
P-15	12/27/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/26/96	ND(1,000)	250	ND(200)	ND(1,000)
	9/18/96	1,900	ND(200)	ND(200)	ND(1,000)
	7/10/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	WELL ABANDONED 10/97				
P-16A	12/26/95	ND(1,000)	350	ND(200)	ND(1,000)
	3/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/18/96(D)	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/25/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/16/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	--	--	--	--
	3/4/99	ND(1,000)	210	ND(200)	ND(1,000)
	7/15/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
P-16B	12/19/95	ND(1,000)	ND(200)	ND(200)	2,300
	3/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/24/96	ND(1,000)	430	ND(200)	ND(1,000)
	WELL ABANDONED 8/96				
P-16C	9/12/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	--	--	--	--
	3/2/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/14/99	1,200	ND(200)	ND(200)	ND(1,000)
P-17	12/21/95	ND(1,000)	750	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/10/97	--	--	--	--
	3/4/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/15/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
P-18	12/26/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/12/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/18/96(D)	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/8/97	--	--	--	--
	WELL ABANDONED 10/97				
P-19	12/26/95	ND(1,000)	330	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/25/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/17/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	--	--	--	--
	WELL ABANDONED 10/97				
P-20	12/27/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/18/96	ND(1,000)	1,600	ND(200)	ND(1,000)
	6/25/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/16/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/10/97	--	--	--	--
	3/4/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/4/99(D)[2]	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/16/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/16/99(D)[2]	ND(1,000)	ND(200)	ND(200)	ND(1,000)
P-21	12/26/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/25/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/17/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/10/97	--	--	--	--
	WELL ABANDONED 10/97				

TRC

TABLE 4.8

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL PETROLEUM HYDROCARBONS (TPH)
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH[1] (in µg/L) BY EPA METHOD 8015M			
		TPH-c/w	TPH-d	TPH-k/Jet Fuel	TPH-z
P-22	12/20/95	ND(1,000)	ND(200)	ND(200)	1,000
	3/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/20/96	ND(1,000)	390	ND(200)	ND(1,000)
	9/12/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/9/97	--	--	--	--
	3/3/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/15/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
P-23	12/20/95	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	3/14/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/20/96	ND(1,000)	230	ND(200)	ND(1,000)
	9/11/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/8/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	WELL ABANDONED 10/97				
P-24	12/20/95	ND(2,000)	6,200	ND(400)	ND(2,000)
	3/19/95	ND(5,000)	10,000	ND(1,000)	ND(5,000)
	6/24/96	ND(2,000)	4,100	ND(400)	ND(1,000)
	9/17/96	ND(2,000)	ND(200)	ND(400)	ND(2,000)
	9/17/96(D)	ND(2,000)	ND(200)	ND(400)	ND(2,000)
	7/9/97	ND(500)	ND(200)	ND(200)	ND(1,000)
	3/3/99	ND(1,000)	450	ND(200)	ND(1,000)
	7/15/99	1,600	ND(200)	ND(200)	ND(1,000)
P-25	12/26/95	ND(1,000)	1,200	ND(200)	ND(1,000)
	3/19/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	6/26/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	9/18/96	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/10/97	--	--	--	--
	7/10/97(D)	--	--	--	--
	WELL ABANDONED 10/97				

99-200\Rpts\DeGrWaRcFa (12/27/99)jh

[1] Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.

[2] Duplicate sample for P-20 is identified as P-29 in laboratory reports.

[3] Duplicate sample for P-20 is identified as P-30 in laboratory reports.

TPH-d	Total Petroleum Hydrocarbons - Diesel Range
TPH-k	Total Petroleum Hydrocarbons - Kerosene Range
TPH-z	Total Petroleum Hydrocarbons - Z-Oil
TPH-c/w	Total Petroleum Hydrocarbons - Crude Oil/Waste Oil
µg/L	Micrograms per liter
ND( )	Analyte not detected above the practical quantitation limit (in parentheses)
(D)	Duplicate sample
--	Not sampled

TRC

TABLE 4.9

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL PETROLEUM HYDROCARBONS (TPH)
BRC PROPERTY, TORRANCE, CALIFORNIA

Sample ID	Sample Date	TPH[1] (in µg/L) BY EPA METHOD 8015M			
		TPH-c/w	TPH-d	TPH-k	TPH-z
BL-1	3/4/99	ND(1,000)	560	ND(200)	ND(1,000)
	3/4/99[2]	ND(1,000)	450	ND(200)	ND(1,000)
	7/13/99	ND(1,000)	1,300	ND(200)	ND(1,000)
BL-2	3/3/99	--	--	--	ND(1,000)
	7/14/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
BL-3	3/3/99	--	--	--	--
	7/15/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
BL-4	3/2/99	--	--	--	--
	7/14/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
BL-5	3/4/99	ND(1,000)	610	ND(200)	ND(1,000)
	7/13/99	ND(1,000)	1,700	ND(200)	ND(1,000)
BL-6	3/1/99	--	--	--	--
	7/16/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
	7/16/99[3]	ND(1,000)	ND(200)	ND(200)	ND(1,000)
BL-7	3/2/99	--	--	--	--
	7/14/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)
BL-8	3/2/99	--	--	--	--
	7/13/99	ND(1,000)	ND(200)	ND(200)	ND(1,000)

99-200/Rpts/DrGrWaRcFa (11/19/99/rm)

[1] Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.
[2] Duplicate sample for BL-1 is identified as B-17 in laboratory reports.
[3] Duplicate sample for BL-6 is identified as B-15 in laboratory reports.

TPH-d	Total Petroleum Hydrocarbons - Diesel Range
TPH-k	Total Petroleum Hydrocarbons - Kerosene Range
TPH-c/w	Total Petroleum Hydrocarbons - Crude Oil/Waste Oil
TPH-z	Total Petroleum Hydrocarbons - Z-Oil
µg/L	Micrograms per liter
ND( )	Analyte not detected above the practical quantitation limit (in parentheses)
--	Not sampled

INDUSTRIAL LIGHT METALS SITE

Summary of Groundwater Analytical Results – Metals

TABLE 4.10

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
DISSOLVED METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	DISSOLVED METALS[1] (in µg/L)																		
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron[2]	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Hexavelant Chromium (EPA Method 7196)	Magnesium (EPA Method 6010)	Copper (EPA Method 6010)	Mercury (EPA Method 7470)	Vanadium (EPA Method 6010)
P-1	1/24/95	4.8	ND(2)	ND(50)	ND(100)	ND(5)	1,100	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	22	1,100	46,000	ND(10)	--	ND(10)
	3/17/95	2	2.2	604	ND(100)	ND(5)	785	ND(10)	388	ND(5)	ND(10)	21	ND(50)	ND(10)	39	780	44,000	ND(10)	--	ND(10)
	12/27/95	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	1,450	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	1,280	51,000	ND(10)	--	ND(10)
	12/27/95(D)	ND(2)	ND(2)	ND(50)	ND(100)	10	1,350	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	1,120	51,000	ND(10)	--	ND(10)
	3/19/96	ND(2)	2.0	ND(50)	ND(100)	ND(10)	1,290	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	920	54,000	ND(10)	--	ND(10)
	6/26/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	1,290	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	1,260	52,000	ND(10)	--	ND(10)
	6/26/96(D)	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	1,260	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	1,100	51,000	ND(10)	--	ND(10)
	9/18/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	1,040	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	1,040	48,000	ND(10)	--	ND(10)
	7/10/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	1,270	--	--	--	--
	7/10/97(D)	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	1,270	--	--	--	--
	3/4/99	ND(2)	4.1	ND(50)	112	ND(5)	1,370	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(10)	1,280	--	ND(10)	ND(0.2)	ND(10)
	7/16/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	1,070	ND(50)	--	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	12	1,070	--	ND(10)	ND(0.2)	ND(10)
P-2	1/27/95	12	2	ND(50)	110	ND(5)	ND(10)	ND(10)	ND(50)	ND(5)	ND(10)	280	ND(50)	ND(10)	77	ND(10)	110,000	ND(10)	--	ND(10)
	3/17/95	9.2	2.2	53	199	ND(5)	ND(10)	ND(10)	1,310	6.3	ND(10)	2,150	ND(50)	ND(10)	58	ND(10)	114,000	ND(10)	--	ND(10)
	12/27/95	3.6	ND(2)	1,830	129	ND(10)	ND(5)	ND(10)	3,360	ND(5)	ND(10)	3,620	ND(50)	ND(10)	34	ND(10)	85,000	ND(10)	--	ND(10)
	3/19/96	3.8	ND(2)	13,900	ND(100)	ND(10)	12	ND(50)	41,600	ND(5)	ND(50)	2,650	69	ND(10)	346	ND(10)	21,000	ND(10)	--	ND(10)
	3/19/96(D)	6.2	ND(2)	12,800	138	ND(10)	8.3	ND(50)	51,600	ND(5)	ND(50)	3,690	98	ND(10)	820	ND(10)	27,000	ND(10)	--	ND(10)
	6/20/96	3.6	ND(2)	296	199	ND(10)	ND(5)	ND(50)	8,150	ND(5)	ND(50)	3,360	ND(50)	ND(10)	ND(10)	ND(10)	130,000	ND(10)	--	ND(10)
	6/20/96(D)	3.6	ND(2)	503	198	ND(10)	ND(5)	ND(50)	7,840	ND(5)	ND(50)	3,210	ND(50)	ND(10)	ND(10)	ND(10)	131,000	ND(10)	--	ND(10)
	9/17/96	ND(2)	ND(2)	97	165	ND(10)	ND(5)	ND(50)	1,810	ND(5)	ND(50)	1,840	ND(50)	ND(10)	ND(10)	ND(10)	133,000	ND(10)	--	ND(10)
	7/8/97	--	--	ND(50)	--	ND(10)	--	--	--	ND(5)	--	--	--	--	--	ND(10)	--	--	--	--
	3/2/99	2.2	ND(2)	ND(50)	161	ND(5)	ND(10)	ND(50)	1,550	ND(5)	ND(50)	--	ND(50)	ND(10)	129	2.5J	--	ND(10)	ND(0.2)	ND(10)
	7/13/99	ND(2)	ND(2)	ND(50)	152	ND(10)	ND(10)	ND(50)	--	ND(5)	ND(50)	1,440	ND(50)	ND(10)	114	9.4	--	ND(10)	ND(0.2)	ND(10)
P-3	1/24/95	3.6	ND(2)	ND(50)	110	ND(5)	ND(10)	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	23	10	66,000	ND(10)	--	ND(10)
	3/17/95	2.2	2	175	113	ND(5)	ND(10)	ND(10)	187	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	142	ND(10)	60,000	ND(10)	--	ND(10)
	12/20/95	2.4	ND(2)	ND(50)	133	ND(10)	8.8	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	13	72,000	ND(10)	--	ND(10)
	3/14/96	2.2	ND(2)	ND(50)	136	ND(10)	10	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	10	76,000	ND(10)	--	ND(10)
	6/19/96	3.0	ND(2)	ND(50)	126	ND(10)	10	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(10)	76,000	ND(10)	--	ND(10)
	9/11/96	3.7	ND(2)	ND(50)	133	ND(10)	14	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	12	77,000	ND(10)	--	ND(10)
	7/8/97	--	--	ND(50)	--	ND(10)	--	--	--	ND(5)	--	--	--	--	--	11	--	--	ND(0.2)	--
	3/2/99	3.0	ND(2)	ND(50)	111	ND(5)	12	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	22	31	--	25	ND(0.2)	ND(10)
	7/14/99	2.1	ND(2)	ND(50)	115	ND(10)	10	ND(50)	--	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(50)	12	--	ND(10)	ND(0.2)	ND(10)
P-4	1/26/95	2	ND(2)	ND(50)	110	ND(5)	99	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	13	115	NA	ND(10)	--	ND(10)
	3/17/95	ND(2)	2.8	ND(50)	130	ND(5)	1,570	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	334	1,800	71,700	ND(10)	--	ND(10)
	12/21/95	ND(2)	ND(2)	ND(50)	135	13	427	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	20	480	71,000	ND(10)	--	ND(10)
	3/18/96	2.2	ND(2)	ND(50)	127	ND(10)	385	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	280	68,000	ND(10)	--	ND(10)
	9/16/96	ND(2)	ND(2)	ND(50)	147	ND(10)	280	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	280	84,000	ND(10)	--	ND(10)
	7/9/97	--	--	1,450	--	--	--	--	--	ND(5)	--	--	--	--	--	140	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																			
P-5	1/26/95	12	ND(2)	ND(100)	130	ND(5)	ND(10)	ND(10)	6,240	ND(5)	ND(10)	1,370	ND(50)	ND(10)	ND(10)	ND(10)	NA	ND(10)	--	ND(10)
	3/17/95	5.6	ND(2)	314	ND(100)	ND(5)	ND(10)	ND(10)	4,580	7.4	ND(10)	623	ND(50)	ND(10)	27	ND(10)	38,400	ND(10)	--	ND(10)
	12/27/95	ND(2)	ND(2)	ND(50)	179	ND(10)	ND(5)	ND(10)	10,000	ND(5)	ND(10)	1,310	ND(50)	ND(10)	ND(10)	ND(10)	97,000	ND(10)	--	ND(10)
	3/19/96	27	ND(2)	ND(50)	192	ND(10)	ND(5)	ND(50)	11,700	ND(5)	ND(50)	1,350	ND(50)	ND(10)	ND(10)	ND(10)	91,000	ND(10)	--	ND(10)
	6/19/96	33	ND(2)	ND(50)	163	ND(10)	ND(5)	ND(50)	14,300	ND(5)	ND(50)	1,500	ND(50)	ND(10)	12	ND(10)	87,000	ND(10)	--	ND(10)
	9/17/96	29	ND(2)	ND(50)	196	ND(10)	ND(5)	ND(50)	13,400	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(10)	101,000	ND(10)	--	ND(10)
	9/17/96(D)	31	ND(2)	ND(50)	181	ND(10)	ND(5)	ND(50)	12,700	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(10)	106,000	ND(10)	--	ND(10)
P-6	3/16/95	ND(2)	2.4	ND(50)	ND(100)	ND(5)	ND(10)	ND(10)	ND(50)	ND(5)	ND(10)	57	ND(50)	ND(10)	ND(10)	10	66,400	ND(10)	--	ND(10)
	12/20/95	ND(2)	2.2	ND(50)	176	ND(10)	14	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	14	90,000	ND(10)	--	ND(10)
	3/18/96	ND(2)	2.0	ND(50)	193	ND(10)	11	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(10)	91,000	ND(10)	--	ND(10)
	6/20/96	ND(2)	2.0	ND(50)	171	ND(10)	13	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	15	10	85,000	ND(10)	--	ND(10)
	9/12/96	ND(2)	ND(2)	ND(50)	144	ND(10)	14	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	15	69,000	ND(10)	--	ND(10)
	7/9/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	15	--	--	--	--
	WELL ABANDONED 10/97																			

BOE-C6-0139894

TABLE 4.10

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
DISSOLVED METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA
(Continued)

SAMPLE ID	SAMPLE DATE	DISSOLVED METALS[1] (in µg/L)																		
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron[2]	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Hexavelant Chromium (EPA Method 7196)	Magnesium (EPA Method 6010)	Copper (EPA Method 6010)	Mercury (EPA Method 7470)	Vanadium (EPA Method 6010)
P-6B	3/3/99	2.3	ND(2)	ND(50)	268	ND(5)	ND(10)	ND(50)	53	ND(5)	ND(50)	--	ND(50)	ND(10)	12	4.9	--	ND(10)	ND(0.2)	ND(10)
	7/14/99	ND(2)	ND(2)	ND(50)	350	ND(10)	ND(10)	ND(50)	--	ND(5)	ND(50)	806	ND(50)	ND(10)	ND(50)	6.7	--	ND(10)	ND(0.2)	ND(10)
P-7	3/17/95	2.2	ND(2)	733	ND(100)	ND(5)	ND(10)	ND(10)	806	ND(5)	ND(10)	104	ND(50)	29	20	ND(10)	41,000	ND(10)	--	ND(10)
	3/17/95(D)	ND(2)	ND(2)	154	ND(100)	ND(5)	ND(10)	ND(10)	104	ND(5)	ND(10)	126	ND(50)	ND(10)	22	ND(10)	40,000	22	--	ND(10)
	12/21/95	2.0	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(10)	ND(50)	ND(5)	ND(10)	77	ND(50)	ND(10)	14	ND(10)	34,000	ND(10)	--	ND(10)
	3/18/96	2.8	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	70	ND(50)	ND(10)	ND(10)	ND(10)	36,000	ND(10)	--	ND(10)
	6/24/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	47	ND(50)	ND(10)	ND(10)	ND(10)	36,000	ND(10)	--	ND(10)
	9/16/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(10)	37,000	ND(10)	--	ND(10)
	7/9/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(10)	--	--	--	--
	3/4/99	5.9	ND(2)	ND(50)	ND(100)	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	11	2.8	--	ND(10)	ND(0.2)	10
	7/15/99	5.0	ND(2)	ND(50)	108	ND(10)	ND(10)	ND(50)	--	ND(5)	ND(50)	268	ND(50)	ND(10)	ND(10)	2.0	--	ND(10)	ND(0.2)	11
P-8	3/16/95	ND(2)	4.1	ND(50)	ND(100)	ND(5)	56	ND(10)	ND(50)	ND(5)	ND(10)	15	ND(50)	ND(10)	ND(10)	60	34,500	ND(10)	--	ND(10)
	WELL ABANDONED 8/96																			
P-9	3/16/95	ND(2)	ND(2)	ND(50)	ND(100)	ND(5)	ND(10)	ND(10)	ND(50)	ND(5)	ND(10)	16	ND(50)	ND(10)	30	20	86,000	ND(10)	--	ND(10)
	12/20/95	2.2	ND(2)	ND(50)	ND(100)	ND(10)	12	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	17	67,000	ND(10)	--	ND(10)
	3/18/96	3.6	ND(2)	ND(50)	ND(100)	ND(10)	15	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(10)	70,000	ND(10)	--	ND(10)
	6/26/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	16	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	16	64,000	ND(10)	--	ND(10)
	9/12/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	13	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	14	68,000	ND(10)	--	ND(10)
	7/9/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	16.0	--	--	--	--
	WELL ABANDONED 10/97																			
P-9B	3/3/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(5)	12	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	15	22	--	ND(10)	ND(0.2)	ND(10)
	7/14/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	10	ND(50)	--	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(50)	18	--	ND(10)	ND(0.2)	ND(10)
P-10	3/16/95	5.8	2.6	ND(50)	ND(100)	ND(5)	28	ND(10)	ND(50)	ND(5)	ND(10)	30	ND(50)	ND(10)	24	30	58,000	ND(10)	--	ND(10)
	12/19/95	2.6	2.6	ND(50)	ND(100)	ND(10)	28	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	30	62,000	ND(10)	--	ND(10)
	3/14/96	ND(2)	2.4	ND(50)	ND(100)	ND(10)	30	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	31	66,000	ND(10)	--	ND(10)
	6/18/96	2.6	2.0	ND(50)	ND(100)	ND(10)	29	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	25	66,000	ND(10)	--	ND(10)
	9/11/96	3.3	2.1	ND(50)	ND(100)	ND(10)	28	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	30	66,000	10	--	ND(10)
	7/8/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	35	--	--	--	--
	3/1/99	ND(2)	2.6	ND(50)	ND(100)	ND(5)	30	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	24	31J	--	29	ND(0.2)	ND(10)
	7/13/99	ND(2)	2.0	ND(50)	ND(100)	ND(10)	31	ND(50)	--	ND(5)	ND(50)	13	ND(50)	ND(10)	11	33	--	ND(10)	ND(0.2)	ND(10)
P-11	12/27/95	ND(2)	ND(2)	ND(50)	101	ND(10)	13	ND(10)	ND(50)	ND(5)	ND(10)	19	ND(50)	ND(10)	ND(10)	18	139,000	ND(10)	--	ND(10)
	3/14/96	ND(2)	ND(2)	ND(50)	133	ND(10)	15	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	17	138,000	ND(10)	--	ND(10)
	6/19/96	ND(2)	2.0	ND(50)	100	ND(10)	23	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	20	118,000	ND(10)	--	ND(10)
	9/11/96	ND(2)	ND(2)	ND(50)	134	ND(10)	19	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	21	139,000	20	--	ND(10)
	7/8/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	26	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																			
P-12	12/21/95	6.2	2.0	ND(50)	112	ND(10)	18	21	ND(50)	ND(5)	ND(10)	81	ND(50)	ND(10)	12	21	63,000	ND(10)	--	ND(10)
	3/19/96	2.6	2.4	ND(50)	170	ND(10)	22	ND(50)	177	ND(5)	ND(50)	44	ND(50)	ND(10)	ND(10)	11	66,000	ND(10)	--	ND(10)
	6/26/96	2.7	2.4	ND(50)	160	ND(10)	25	ND(50)	260	9.5	ND(50)	38	ND(50)	ND(10)	ND(10)	23	60,000	ND(10)	--	ND(10)
	6/26/96(D)	2.8	2.5	ND(50)	162	ND(10)	25	ND(50)	236	ND(5)	ND(50)	35	ND(50)	ND(10)	ND(10)	25	60,000	ND(10)	--	ND(10)
	9/18/96	2.3	ND(2)	ND(50)	160	ND(10)	26	ND(10)	153	ND(5)	ND(50)	23	ND(50)	ND(10)	ND(10)	24	59,000	ND(10)	--	ND(10)
	7/10/97	--	--	ND(50)	--	20	--	--	--	ND(5)	--	--	--	--	--	17	--	--	0.20	--
	3/3/99	2.1	ND(2)	ND(50)	190	ND(5)	26	58	1,190	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(50)	36	--	ND(10)	1.90	ND(10)
	WELL DAMAGED 7/99																			
P-13	12/21/95	2.6	7.8	ND(50)	ND(100)	ND(10)	15	ND(10)	ND(50)	ND(5)	11	ND(10)	ND(50)	19	ND(10)	ND(10)	22,000	ND(10)	--	ND(10)
	3/14/96	ND(2)	8.2	ND(50)	ND(100)	ND(10)	17	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	15	22,000	ND(10)	--	ND(10)
	6/19/96	2.0	8.6	ND(50)	ND(100)	ND(10)	14	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	10	24,000	ND(10)	--	ND(10)
	9/11/96	2.5	6.6	ND(50)	ND(100)	ND(10)	13	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	12	24,000	ND(10)	--	ND(10)
	7/8/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	17	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																			

BOE-C6-0139895

TABLE 4.10

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
DISSOLVED METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA
(Continued)

SAMPLE ID	SAMPLE DATE	DISSOLVED METALS[1] (in µg/L)																		
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron[2]	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010).	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Hexavelant Chromium (EPA Method 7196)	Magnesium (EPA Method 6010)	Copper (EPA Method 6010)	Mercury (EPA Method 7470)	Vanadium (EPA Method 6010)
P-14	12/21/95	2.4	2.0	ND(50)	ND(100)	ND(10)	2,820	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	2,600	34,000	ND(10)	--	ND(10)
	3/19/96	2.8	3.2	ND(50)	ND(100)	ND(10)	2,170	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	1,240	34,000	ND(10)	--	ND(10)
	6/26/96	ND(2)	3.0	ND(50)	ND(100)	ND(10)	1,860	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	12	1,360	32,000	20	--	ND(10)
	9/17/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	1,590	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(10)	ND(10)	ND(10)	1,640	32,000	ND(10)	--	ND(10)
	7/10/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	555	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																			
P-15	12/27/95	2.8	ND(2)	ND(50)	ND(100)	ND(10)	388	ND(10)	ND(50)	ND(5)	ND(10)	ND(10)	ND(50)	ND(10)	ND(10)	370	34,000	ND(10)	--	ND(10)
	3/19/96	3.0	ND(2)	ND(50)	ND(100)	ND(10)	218	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	120	30,000	ND(10)	--	ND(10)
	6/26/96	2.7	ND(2)	ND(50)	ND(100)	ND(10)	86	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	78	27,000	ND(10)	--	ND(10)
	9/18/96	2.1	ND(2)	ND(50)	ND(100)	ND(10)	73	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	72	25,000	ND(10)	--	ND(10)
	7/10/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	277	--	--	--	--
	WELL ABANDONED 10/97																			
P-16A	12/26/95	4.8	2.6	ND(50)	ND(100)	ND(10)	26	ND(10)	ND(50)	ND(5)	ND(10)	28	ND(50)	ND(10)	11	23	59,000	ND(10)	--	ND(10)
	3/18/96	5.4	2.4	ND(50)	ND(100)	ND(10)	23	ND(50)	ND(50)	ND(5)	ND(50)	12	ND(50)	ND(10)	10	14	68,000	ND(10)	--	ND(10)
	3/18/96(D)	7.2	2.0	ND(50)	ND(100)	ND(10)	24	ND(50)	ND(50)	ND(5)	ND(50)	10	ND(50)	ND(10)	12	22	69,000	ND(10)	--	ND(10)
	6/25/96	5.4	3.6	ND(50)	ND(100)	ND(10)	60	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	15	54	52,000	ND(10)	--	ND(10)
	9/16/96	4.5	ND(2)	ND(50)	ND(100)	ND(10)	23	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	24	82,000	ND(10)	--	ND(10)
	7/9/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	21	--	--	--	--
	3/4/99	7.5	2.0	ND(50)	ND(100)	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(10)	14	--	ND(10)	ND(0.2)	--
	7/15/99	8.3	ND(2)	ND(50)	ND(100)	ND(10)	12	ND(50)	--	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(10)	15	--	ND(10)	ND(0.2)	ND(10)
P-16B	12/19/95	ND(2)	2.8	ND(50)	158	ND(10)	ND(5)	ND(10)	ND(50)	ND(5)	ND(10)	94	ND(50)	ND(10)	498	ND(10)	35,000	ND(10)	--	ND(10)
	12/19/95(D)	ND(2)	2.8	ND(50)	157	ND(10)	ND(5)	ND(10)	ND(50)	ND(5)	ND(10)	94	ND(50)	ND(10)	497	ND(10)	36,000	14	--	ND(10)
	3/18/96	ND(2)	2.4	ND(50)	168	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	72	ND(50)	ND(10)	550	ND(10)	38,000	ND(10)	--	ND(10)
	6/24/96	ND(2)	5.8	ND(50)	492	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	22	ND(50)	ND(10)	18	ND(10)	98,000	ND(10)	--	ND(10)
	WELL DESTROYED 8/96																			
P-16C	9/12/96	3.0	5.3	ND(50)	388	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	335	ND(50)	ND(10)	1,500	ND(10)	96,000	ND(10)	--	ND(10)
	7/9/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(10)	--	--	--	--
	3/2/99	ND(2)	5.1	ND(50)	424	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	37	ND(5)UJ	--	ND(10)	ND(0.2)	ND(10)
	7/14/99	ND(2)	4.1	ND(100)	484	ND(10)	ND(10)	ND(50)	--	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(50)	5.4	--	ND(10)	ND(0.2)	ND(10)
P-17	12/21/95	2.0	ND(2)	ND(50)	ND(100)	ND(10)	1,030	ND(10)	ND(50)	ND(5)	ND(10)	53	ND(50)	ND(10)	13	902	62,000	ND(10)	--	ND(10)
	3/19/96	ND(2)	2.6	ND(50)	ND(100)	ND(10)	967	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	640	62,000	ND(10)	--	ND(10)
	9/18/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	1,060	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	1,140	55,000	ND(10)	--	ND(10)
	7/10/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	1,330	--	--	--	--
	3/4/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(5)	30	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(10)	40	--	ND(10)	ND(0.2)	ND(10)
	7/15/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	23	ND(50)	--	ND(5)	ND(50)	12	ND(50)	ND(10)	10	24	--	ND(10)	ND(0.2)	ND(10)
P-18	12/26/95	3.4	4.2	926	ND(100)	ND(10)	19	ND(10)	268	ND(5)	ND(10)	77	ND(50)	ND(10)	32	10	63,000	ND(10)	--	ND(10)
	3/19/96	3.0	2.2	472	ND(100)	ND(10)	14	ND(50)	108	ND(5)	ND(50)	30	ND(50)	ND(10)	19	11	52,000	ND(10)	--	ND(10)
	9/12/96	2.9	3.3	ND(50)	ND(100)	ND(10)	10	ND(50)	ND(50)	ND(5)	ND(50)	40	ND(50)	ND(10)	ND(10)	ND(10)	54,000	ND(10)	--	ND(10)
	9/12/96(D)	3.3	3.3	ND(50)	ND(100)	18	10	ND(50)	ND(50)	ND(5)	ND(50)	38	ND(50)	ND(10)	ND(10)	ND(10)	54,000	ND(10)	--	ND(10)
	7/8/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	19	--	--	--	--
	WELL ABANDONED 10/97																			
P-19	12/26/95	2.6	4.0	ND(50)	ND(100)	ND(10)	8.8	ND(10)	ND(50)	6.3	ND(10)	42	ND(50)	ND(10)	ND(10)	10	56,000	ND(10)	--	ND(10)
	3/19/96	ND(2)	3.8	ND(50)	ND(100)	ND(10)	13	ND(50)	ND(50)	ND(5)	ND(50)	13	ND(50)	ND(10)	ND(10)	ND(10)	57,000	ND(10)	--	ND(10)
	6/25/96	ND(2)	4.2	ND(50)	ND(100)	ND(10)	18	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	17	56,000	ND(10)	--	ND(10)
	9/17/96	ND(2)	2.0	ND(50)	ND(100)	ND(10)	16	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	16	55,000	ND(10)	--	ND(10)
	7/9/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	31	--	--	--	--
	WELL ABANDONED 10/97																			

BOE-C6-0139896

TABLE 4.10

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
DISSOLVED METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA
(Continued)

SAMPLE ID	SAMPLE DATE	DISSOLVED METALS[1] (in µg/L)																		
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron[2]	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Hexavelant Chromium (EPA Method 7196)	Magnesium (EPA Method 6010)	Copper (EPA Method 6010)	Mercury (EPA Method 7470)	Vanadium (EPA Method 6010)
P-20	12/27/95	2.6	ND(2)	ND(50)	ND(100)	ND(10)	26	ND(10)	ND(50)	ND(5)	ND(10)	14	ND(50)	ND(10)	ND(10)	26	76,000	ND(10)	--	ND(10)
	3/18/96	2.2	ND(2)	ND(50)	ND(100)	ND(10)	23	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	13	73,000	ND(10)	--	ND(10)
	6/25/96	2.4	ND(2)	ND(50)	ND(100)	ND(10)	27	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	18	23	50,000	ND(50)	--	ND(10)
	9/16/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	18	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	17	67,000	ND(10)	--	ND(10)
	7/10/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	19	--	--	--	--
	3/4/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(5)	27	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(10)	35	--	ND(10)	ND(0.2)	ND(10)
	3/4/99(D)[3]	ND(2)	ND(2)	ND(50)	ND(100)	ND(5)	28	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(10)	33	--	ND(10)	ND(0.2)	ND(10)
	7/16/99	ND(2)	ND(2)	ND(100)	ND(100)	ND(10)	21	ND(50)	--	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	25	--	ND(10)	ND(0.2)	ND(10)
	7/16/99(D)[4]	ND(2)	ND(2)	ND(100)	ND(100)	ND(10)	22	ND(50)	--	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	27	--	ND(10)	ND(0.2)	ND(10)
P-21	12/26/95	2.4	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(10)	ND(50)	ND(5)	ND(50)	41	ND(50)	ND(10)	19	ND(10)	52,000	ND(10)	--	ND(10)
	3/18/96	4.6	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	100	ND(50)	ND(10)	ND(10)	ND(10)	52,000	ND(10)	--	ND(10)
	6/25/96	2.4	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	22	ND(50)	ND(10)	11	ND(10)	46,000	ND(10)	--	ND(10)
	9/17/96	2.3	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	25	ND(50)	ND(10)	ND(10)	ND(10)	49,000	ND(10)	--	ND(10)
	7/10/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	ND(10)	--	--	--	--
	WELL ABANDONED 10/97																			
P-22	12/20/95	14	6.0	ND(50)	ND(100)	ND(10)	8.5	ND(10)	ND(50)	ND(5)	ND(10)	22	ND(50)	ND(10)	43	11	24,000	ND(10)	--	ND(10)
	3/18/96	7.6	6.0	ND(50)	ND(100)	ND(10)	11	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	11	25,000	ND(10)	--	ND(10)
	6/20/96	5.2	6.4	ND(50)	ND(100)	ND(10)	14	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	10	24,000	ND(10)	--	ND(10)
	9/12/96	4.5	5.8	ND(50)	ND(100)	ND(10)	12	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	12	27,000	ND(10)	--	ND(10)
	7/9/97	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	12	--	--	--	--
	3/3/99	3.8	2.3	ND(50)	178	ND(5)	10	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	ND(10)	18	--	ND(10)	ND(0.2)	ND(10)
	7/15/99	3.3	2.1	ND(50)	190	ND(10)	10	ND(50)	--	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	16	17	--	ND(10)	ND(0.2)	ND(10)
P-23	12/20/95	2.8	ND(2)	ND(50)	ND(100)	ND(10)	11	ND(10)	ND(50)	ND(5)	ND(10)	13	ND(50)	ND(10)	24	16	93,000	ND(10)	--	ND(10)
	3/14/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	14	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	12	13	96,000	ND(10)	--	ND(10)
	6/20/96	2.6	ND(2)	ND(50)	ND(100)	ND(10)	14	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	10	97,000	ND(10)	--	ND(10)
	9/11/96	3.0	ND(2)	ND(50)	ND(100)	ND(10)	14	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	14	89,000	ND(10)	--	ND(10)
	7/8/97	--	--	ND(50)	--	ND(10)	--	--	--	ND(5)	--	--	--	--	--	14	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																			
P-24	12/20/95	2.0	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(10)	ND(50)	ND(5)	ND(10)	875	ND(50)	ND(10)	11	ND(10)	77,000	ND(10)	--	ND(10)
	3/19/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	1,080	ND(50)	ND(10)	ND(10)	ND(10)	85,000	ND(10)	--	ND(10)
	6/24/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	509	ND(50)	ND(10)	ND(10)	ND(10)	82,000	ND(10)	--	ND(10)
	9/17/96	2.3	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	922	ND(50)	ND(10)	ND(10)	ND(10)	81,000	ND(10)	--	ND(10)
	9/17/96(D)	2.3	ND(2)	ND(50)	ND(100)	ND(10)	ND(5)	ND(50)	ND(50)	ND(5)	ND(50)	844	ND(50)	ND(10)	ND(10)	ND(10)	89,000	ND(10)	--	ND(10)
	7/9/97	--	--	3,240	--	ND(10)	--	--	--	ND(5)	--	--	--	--	--	60	--	--	ND(0.2)	--
	3/3/99	3.6	ND(2)	ND(50)	120	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	ND(50)	--	ND(50)	ND(10)	16	5.6	--	ND(10)	ND(0.2)	ND(10)
	7/15/99	4.0	ND(2)	ND(50)	133	ND(10)	ND(10)	ND(50)	--	ND(5)	ND(50)	114	ND(50)	ND(10)	ND(10)	ND(2)	--	ND(10)	ND(0.2)	ND(10)
P-25	12/26/95	2.4	ND(2)	ND(50)	ND(100)	ND(10)	518	ND(10)	ND(50)	ND(5)	ND(10)	28	ND(50)	ND(10)	ND(10)	480	58,000	ND(10)	--	ND(10)
	3/19/96	2.4	ND(2)	ND(50)	ND(100)	ND(10)	329	ND(50)	ND(50)	ND(5)	ND(50)	12	ND(50)	ND(10)	ND(10)	22	58,000	ND(10)	--	ND(10)
	6/26/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	464	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	480	58,000	ND(10)	--	ND(10)
	9/18/96	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	478	ND(50)	ND(50)	ND(5)	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	480	55,000	ND(10)	--	ND(10)
	7/10/97	--	--	218	--	--	--	--	--	ND(5)	--	--	--	--	--	281	--	--	--	--
	7/10/97(D)	--	--	ND(50)	--	--	--	--	--	ND(5)	--	--	--	--	--	323	--	--	--	--
	WELL ABANDONED 10/97																			

99-2000/Rpts/DrGrWaRcFa (12/27/99/jb)

(1) Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.
(2) Dissolved iron analyzed in the field using Hach Field Test Kit.
(3) Duplicate sample for P-20 is identified as P-29 in laboratory reports.
(4) Duplicate sample for P-20 is identified as P-30 in laboratory reports.

µg/L Micrograms per liter
ND( ) Analytes not detected above the particle quantitation limit (in parentheses)
(D) Duplicate sample
-- Not sampled

BOE-C6-0139897

TABLE 4.11

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
DISSOLVED METALS, BRC PROPERTY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	DISSOLVED METALS[1] (in µg/L)																
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron[3]	Lead (EPA Method 7421)	Manganese (EPA Method 6010)	Molybdenum (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Hexavelant Chromium (EPA Method 7196)	Copper (EPA Method 6010)	Mercury (EPA Method 7470)
BL-1	3/4/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(10)	4.1	ND(10)	ND(0.2)
	3/4/99[2]	ND(2)	ND(2)	ND(50)	ND(100)	ND(5)	ND(10)	ND(50)	50	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(10)	4.8	ND(10)	ND(0.2)
	7/13/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	ND(10)	ND(50)	–	ND(5)	16	ND(50)	ND(50)	ND(10)	ND(50)	ND(2)	ND(10)	ND(0.2)
BL-2	3/3/99	3.9	ND(2)	ND(50)	ND(100)	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(50)	15	ND(10)	ND(0.2)
	7/14/99	2.5	ND(2)	ND(50)	ND(100)	ND(10)	ND(10)	ND(50)	–	ND(5)	ND(10)	ND(50)	ND(50)	ND(10)	ND(50)	14	ND(10)	ND(0.2)
BL-3	3/3/99	ND(2)	ND(2)	ND(50)	270	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(50)	11	ND(10)	ND(0.2)
	7/15/99	ND(2)	ND(2)	ND(50)	397	ND(10)	10	ND(50)	–	ND(5)	13.0	ND(50)	ND(50)	ND(10)	ND(50)	12	ND(20)	ND(0.2)
BL-4	3/2/99	2.1	ND(2)	ND(50)	ND(100)	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(10)	4.3	ND(10)	ND(0.2)
	7/14/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	ND(10)	ND(50)	–	ND(5)	ND(10)	ND(50)	ND(50)	ND(10)	ND(50)	10	ND(10)	ND(0.2)
BL-5	3/4/99	ND(2)	2.6	ND(50)	ND(100)	ND(5)	ND(10)	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	16	5.5	ND(10)	ND(0.2)
	7/13/99	ND(2)	ND(2)	ND(50)	ND(100)	ND(10)	ND(10)	ND(50)	–	ND(5)	38	ND(50)	ND(50)	ND(10)	ND(50)	ND(2)	ND(10)	ND(0.2)
BL-6	3/1/99	2.1	2.0	ND(50)	32	ND(5)	213	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(50)	167	12U	ND(0.2)
	7/16/99	60R	ND(2)	ND(50)	ND(100)	ND(10)	203	ND(50)	–	ND(5)	ND(10)	ND(50)	ND(50)	ND(10)	ND(50)	214	ND(10)	ND(0.2)
	7/16/99(D)[3]	10R	ND(2)	ND(50)	ND(100)	ND(10)	210	ND(50)	–	ND(5)	ND(10)	ND(50)	ND(50)	ND(10)	ND(50)	214	ND(10)	ND(0.2)
BL-7	3/2/99	4.8	ND(2)	ND(50)	ND(100)	ND(5)	16	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(10)	16	ND(10)	ND(0.2)
	7/14/99	2.6	ND(2)	ND(50)	ND(100)	ND(10)	24	ND(50)	–	ND(5)	ND(10)	ND(50)	ND(50)	ND(10)	ND(50)	26	ND(10)	ND(0.2)
BL-8	3/2/99	2.4	ND(2)	ND(50)	122	ND(5)	11	ND(50)	ND(50)	ND(5)	–	ND(50)	ND(50)	ND(10)	ND(10)	14	22U	ND(0.2)
	7/13/99	ND(2)	ND(2)	ND(50)	285	ND(10)	15	ND(50)	–	ND(5)	ND(10)	ND(50)	ND(50)	ND(10)	ND(50)	ND(2)	ND(10)	ND(0.2)

99-2(KVRpts/DrGrWaRcFa (11/15/99/dh)

(1) Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.
(2) Duplicate sample for BL-1 is identified as BL-17 in laboratory reports.
(3) Dissolved iron analyzed in the field using Hach Field Test Kit.
(4) Duplicate sample for BL-6 is identified as BL-15 in laboratory reports.

µg/L Micrograms per liter
ND( ) Analytes not detected above the particle quantitation limit (in parentheses)
(D) Duplicate sample
– Not sampled

Data Validation Qualifiers (for more information, see Data Validation Report).
U Not detected
R Unusable/rejected based on field duplicate evaluation

BOE-C6-0139898

TABLE 4.12

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL METALS[1] (in µg/L)																	
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron (EPA Method 6010)	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Copper (EPA Method 6010)	Vanadium (EPA Method 6010)	Mercury (EPA Method 7470)	Thallium (EPA Method 7841)
P-1	1/24/95	2.2	ND(2)	6,170	ND(100)	ND(5)	690	ND(10)	8,490	ND(5)	ND(10)	100	ND(50)	450	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/17/95	ND(2)	2.0	3,400	ND(100)	ND(5)	676	ND(10)	4,720	ND(5)	ND(10)	59	ND(50)	257	110	10.0	ND(50)	ND(0.2)	ND(5)
	12/27/95	2.0	ND(2)	310	ND(100)	ND(10)	1,420	ND(10)	384	ND(5)	ND(10)	11	ND(50)	14	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/27/95(D)	2.2	ND(2)	1,980	ND(100)	ND(10)	1,250	ND(10)	2,490	ND(5)	ND(10)	35	ND(50)	361	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/19/96	2.6	ND(2)	2,790	ND(100)	ND(10)	1,180	ND(50)	4,370	ND(5)	ND(50)	64	ND(50)	213	138	ND(10)	ND(10)	ND(0.2)	ND(1)
	6/26/96	6.7	ND(2)	11,400	118	ND(10)	1,060	ND(50)	17,200	13	ND(50)	252	ND(50)	906	162	23	32	ND(0.2)	ND(1)
	6/26/96(D)	4.1	ND(2)	6,240	101	ND(10)	998	ND(50)	9,320	6.8	ND(50)	132	ND(50)	515	250	15	17	ND(0.2)	ND(1)
	9/18/96	3.7	ND(2)	4,400	ND(100)	ND(10)	1,050	ND(50)	6,380	ND(5)	ND(50)	95	ND(50)	339	87	ND(10)	11	0.7	ND(1)
	7/10/97	--	--	1,620	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	7/10/97(D)	--	--	4,160	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	3/4/99	4.0	3.9	8,270	164	ND(5)	1,280	ND(10)	10,600	12	ND(10)	--	ND(50)	559	53	ND(10)	21	5.3	ND(5)
	7/15/99	ND(2)	ND(2)	1,520	99	ND(5)	999	ND(10)	2,280	ND(5)	ND(10)	35	ND(50)	110	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(5)
P-2	1/27/95	ND(2)	ND(2)	16,800	180	ND(5)	55	10	23,200	ND(5)	ND(10)	430	ND(50)	1,130	190	17	ND(50)	ND(0.2)	ND(5)
	3/17/95	9.0	2.2	1,620	121	ND(5)	10	ND(10)	3,380	ND(5)	ND(10)	1,920	ND(50)	80	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/27/95	6.8	ND(2)	5,810	179	172	14	ND(10)	7,900	38	14	3,590	ND(50)	153	1,470	143	ND(50)	ND(0.2)	ND(5)
	3/19/96	29	2.6	220,000	2,200	2,150	1,280	142	281,000	4,610	169	4,880	434	13,100	27,400	5,090	500	5.0	ND(1)
	3/19/96(D)	78	2.4	208,000	1,810	1,770	1,030	142	276,000	3,840	141	6,110	434	10,400	23,600	3,860	478	5.3	ND(1)
	6/20/96	6.8	ND(2)	5,220	212	68	25	ND(50)	12,900	245	ND(50)	2,800	ND(50)	211	2,030	75	16	0.42	ND(1)
	6/20/96(D)	8.8	ND(2)	7,170	223	76	34	ND(50)	14,600	153	ND(50)	2,670	ND(50)	293	2,610	94	21	0.64	ND(1)
	9/17/96	5.8	ND(2)	9,060	219	110	42	ND(50)	12,200	18	ND(50)	1,810	ND(50)	566	1,900	200	25	0.28	ND(1)
	7/8/97	--	--	2,360	--	32	--	--	--	103	--	--	--	--	--	--	--	--	--
	3/2/99	3.2	ND(2)	1,440	166	24	11	ND(10)	3,210	38	14	--	ND(50)	73U	388	29	ND(10)	ND(0.2)	ND(5)
	7/13/99	3.8	ND(2)	2,420J	165	30.0	ND(10)	ND(10)	4,620	76	14	1,370	ND(50)	138	562	63	ND(10)	ND(0.2)	ND(5)
P-3	1/24/95	9.2	ND(2)	11,400	160	ND(5)	32	ND(10)	14,400	5.3	ND(10)	130	ND(50)	710	81	14	ND(50)	0.36	ND(5)
	3/17/95	3.0	ND(2)	2,680	116	ND(5)	21	ND(10)	3,270	ND(5)	ND(10)	32	ND(50)	160	176	ND(10)	ND(50)	0.21	ND(5)
	12/20/95	11	ND(2)	3,000	131	ND(10)	17	ND(10)	3,140	ND(5)	ND(10)	75	ND(50)	118	52	ND(10)	ND(50)	3.0	ND(5)
	3/14/96	10	ND(2)	12,700	201	ND(10)	48	ND(50)	18,700	ND(5)	ND(50)	212	ND(50)	834	98	18	36	3.0	ND(5)
	6/19/96	5.8	ND(2)	1,960	141	ND(10)	16	ND(50)	1,930	ND(5)	ND(50)	108	ND(50)	78	ND(50)	ND(10)	ND(10)	2.0	1.1
	9/11/96	3.9	ND(2)	2,650	145	ND(10)	19	ND(50)	3,450	ND(5)	ND(50)	34	ND(50)	93	ND(50)	ND(10)	ND(10)	0.58	ND(1)
	7/8/97	--	--	1,770	--	ND(10)	--	--	--	ND(5)	--	--	--	--	--	--	--	0.31	--
	3/2/99	4.1	ND(2)	2,630	123	ND(5)	16	ND(10)	3,240	ND(5)	ND(10)	--	ND(50)	176	ND(50)	43	ND(10)	0.25	ND(5)
	7/14/99	2.5	ND(2)	501	118	ND(5)	ND(10)	ND(10)	819	ND(5)	ND(10)	17	ND(50)	37	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(5)
P-4	1/26/95	7.4	ND(2)	11,500	160	ND(5)	110	ND(10)	14,900	8.8	ND(10)	160	ND(50)	730	84	16	ND(50)	ND(0.2)	ND(5)
	3/17/95	ND(2)	2.4	530	122	ND(5)	731	ND(10)	777	ND(5)	ND(10)	ND(10)	ND(50)	11	73	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/21/95	10	ND(2)	18,800	207	ND(10)	440	11	24,800	5.4	ND(10)	308	ND(50)	1,360	126	19	65	ND(0.2)	ND(5)
	3/18/96	25	ND(2)	24,000	258	ND(10)	383	ND(50)	34,800	33	ND(50)	520	ND(50)	1,620	179	42	68	0.36	ND(5)
	9/16/96	11	ND(2)	26,800	258	ND(10)	304	ND(50)	32,400	21	ND(50)	510	ND(50)	1,530	134	37	66	0.21	ND(1)
	7/9/97	--	--	317,000	--	--	--	--	--	311	--	--	--	--	--	--	--	1.5	--
	WELL ABANDONED 10/97																		
P-5	1/26/95	38	4.6	67,200	400	ND(5)	110	39	91,400	24	ND(10)	2,260	71	3,680	310	86	210	ND(0.2)	ND(5)
	3/17/95	7.2	ND(2)	7,160	115	ND(5)	14	ND(10)	14,700	ND(5)	ND(10)	724	ND(50)	444	66	12	ND(50)	ND(0.2)	ND(5)
	12/27/95	37	ND(2)	18,000	270	ND(10)	22	10	32,700	9.1	ND(10)	1,560	ND(50)	1,240	87	21	77	ND(0.2)	ND(5)
	3/19/96	46	4.4	22,200	177	ND(10)	41	ND(50)	36,600	36	ND(10)	952	ND(50)	279	136	49	62	0.23	ND(1)
	6/25/96	38	ND(2)	11,500	182	ND(10)	25	ND(50)	27,500	8.6	ND(50)	1,370	ND(50)	687	94	35	36	ND(0.2)	ND(1)
	9/17/96	29	ND(2)	10,800	219	ND(10)	19	ND(50)	27,000	7.3	ND(50)	1,660	ND(50)	618	103	21	32	ND(0.2)	ND(1)
	9/17/96(D)	34	ND(2)	12,800	238	ND(10)	22	ND(50)	28,100	7.9	ND(50)	1,720	ND(50)	697	63	22	34	0.37	ND(1)
P-6	3/16/95	3.4	2.2	3,000	ND(100)	ND(5)	21	ND(10)	4,670	ND(5)	ND(10)	108	ND(50)	243	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/20/95	12	ND(2)	18,900	257	ND(10)	59	17	26,800	ND(5)	ND(10)	494	ND(50)	1,520	110	21	67	ND(0.2)	ND(5)
	3/18/96	8.8	ND(2)	13,000	258	ND(10)	52	ND(50)	20,800	7.8	ND(50)	386	ND(50)	1,120	98	21	40	ND(0.2)	ND(5)
	6/20/96	4.6	2.2	11,200	215	ND(10)	45	ND(50)	17,500	10	ND(50)	423	ND(50)	919	166	21	35	ND(0.2)	1.6
	9/12/96	4.7	2.1	6,630	153	ND(10)	34	ND(50)	9,990	ND(5)	ND(50)	164	ND(50)	566	ND(50)	10	21	ND(0.2)	ND(1)
	7/9/97	--	--	4,850	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	WELL ABANDONED 10/97																		

BOE-C6-0139899

TABLE 4.12

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA
(Continued)

SAMPLE ID	SAMPLE DATE	TOTAL METALS[1] (in µg/L)																	
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron (EPA Method 6010)	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Copper (EPA Method 6010)	Vanadium (EPA Method 6010)	Mercury (EPA Method 7470)	Thallium (EPA Method 7841)
P-6B	3/3/99	12	ND(2)	38,500	556	ND(5)	66	19	44,600	26	ND(10)	--	50	1,970	156	53	131	ND(0.2)	ND(5)
	7/14/99	8.5	ND(2)	23,200	514	ND(5)	39	13	30,600	17	ND(10)	1,310	ND(50)	1,340	116	24U	78	ND(0.2)	ND(5)
P-7	3/17/95	2.2	ND(2)	5,820	ND(100)	ND(5)	18	ND(10)	8,160	ND(5)	ND(10)	150	ND(50)	364	64	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/17/95(D)	ND(2)	ND(2)	2,590	ND(100)	ND(5)	13	ND(10)	3,700	ND(5)	ND(10)	126	ND(50)	160	57	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/21/95	7.0	ND(2)	10,400	ND(100)	ND(10)	28	ND(10)	14,300	ND(5)	ND(10)	246	ND(50)	656	106	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/18/96	6.4	ND(2)	5,080	ND(100)	ND(10)	16	ND(50)	7,380	6.8	ND(50)	168	ND(50)	326	100	10	20	ND(0.2)	ND(5)
	6/24/96	2.6	ND(2)	2,800	ND(100)	ND(10)	10	ND(50)	4,450	ND(5)	ND(50)	90	ND(50)	197	ND(50)	ND(10)	14	ND(0.2)	ND(1)
	9/16/96	2.4	ND(2)	1,630	ND(100)	ND(10)	7	ND(50)	2,300	ND(5)	ND(50)	77	ND(50)	101	ND(50)	ND(10)	11	ND(0.2)	ND(1)
	7/9/97	--	--	5,920	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	--
	3/4/99	9.0	ND(2)	13,800	166	ND(5)	20	ND(10)	15,300	14	11	--	ND(50)	727	60	31	37	ND(0.2)	ND(5)
	7/15/99	9.2	ND(2)	14,000	184	ND(5)	22	ND(10)	16,500	9.8	ND(10)	452	ND(50)	762	66	27U	38	ND(0.2)	ND(5)
P-8	3/16/95	2.4	3.8	1,700	ND(100)	ND(5)	53	ND(10)	2,670	ND(5)	ND(10)	38	ND(50)	91	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	WELL ABANDONED 8/96																		
P-9	3/16/95	ND(2)	ND(2)	308	ND(100)	ND(5)	12	ND(10)	482	482	ND(10)	21	ND(50)	ND(10)	57	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/20/95	8.4	ND(2)	3,580	ND(100)	ND(10)	19	ND(10)	3,570	ND(5)	ND(10)	114	ND(50)	136	52	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/18/96	12	ND(2)	15,800	131	ND(10)	58	ND(50)	23,900	8.1	ND(50)	256	ND(50)	1,080	110	16	48	ND(0.2)	ND(5)
	6/26/96	2.6	ND(2)	4,140	ND(100)	ND(10)	24	ND(50)	5,930	ND(5)	ND(50)	57	ND(50)	287	80	11	15	ND(0.2)	ND(1)
	9/12/96	16	ND(2)	20,400	202	ND(10)	56	ND(50)	25,800	29	ND(50)	450	ND(50)	1,250	186	38	59	0.30	1.2
	7/9/97	--	--	3,570	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	WELL ABANDONED 10/96																		
P-9B	3/3/99	2.3	ND(2)	4,600	100	ND(5)	32	ND(10)	6,530	ND(5)	ND(10)	--	ND(50)	295J	ND(50)	ND(10)	15	ND(0.2)	ND(5)
	7/14/99	ND(2)	ND(2)	1,240	91	ND(5)	ND(10)	ND(10)	1,990	ND(5)	ND(10)	20	ND(50)	80	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(5)
P-10	3/16/95	6.4	2.8	2,600	ND(100)	ND(5)	27	ND(10)	2,390	ND(5)	ND(10)	47	ND(50)	105	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/19/95	9.4	2.8	1,120	ND(100)	ND(10)	26	ND(10)	1,000	ND(5)	ND(10)	153	ND(50)	ND(10)	51	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/14/96	3.6	2.0	3,750	ND(100)	ND(10)	32	ND(50)	4,680	ND(5)	ND(50)	80	ND(50)	192	62	ND(10)	13	ND(0.2)	ND(5)
	6/18/96	5.2	2.0	1,520	ND(100)	ND(10)	27	ND(50)	1,830	ND(5)	ND(50)	64	ND(50)	71	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(1)
	9/11/96	3.8	2.1	2,100	ND(100)	ND(10)	29	ND(50)	2,580	ND(5)	ND(50)	44	ND(50)	77	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(1)
	7/8/97	--	--	1,690	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	--
	3/1/99	ND(2)	2.8	196	76	ND(5)	26	ND(10)	190	ND(5)	ND(10)	--	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(5)
	7/13/99	2.4	ND(2)	1,180J	74	ND(5)	26	ND(10)	1,730	ND(5)	ND(10)	29	ND(50)	69	ND(50)	10	ND(10)	ND(0.2)	ND(5)
P-11	12/27/95	6.8	ND(2)	16,200	170	ND(10)	62	ND(10)	18,600	5.9	ND(10)	199	ND(50)	1,090	57	11	85	ND(0.2)	ND(5)
	3/14/96	4.6	ND(2)	2,850	124	ND(10)	21	ND(50)	4,190	ND(5)	ND(50)	51	ND(50)	188	52	ND(10)	12	ND(0.2)	ND(5)
	6/19/96	4.0	2.0	1,690	ND(100)	ND(10)	21	ND(50)	1,490	ND(5)	ND(50)	60	ND(50)	54	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(1)
	9/11/96	4.1	ND(2)	8,550	146	ND(10)	35	ND(50)	10,900	ND(5)	ND(50)	105	ND(50)	535	ND(50)	15	22	ND(0.2)	ND(1)
	7/8/97	--	--	2,180	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																		
P-12	12/21/95	17	2.2	47,200	323	ND(10)	109	42	59,600	7.1	ND(10)	626	ND(10)	2,480	230	38	159	0.31	ND(5)
	3/19/96	8.8	3.2	31,000	308	ND(10)	91	57	45,500	16	ND(50)	547	ND(50)	2,740	300	41	95	1.2	ND(1)
	6/26/96	5.9	2.3	14,300	208	ND(10)	54	ND(50)	21,100	10	ND(50)	249	ND(50)	950	78	21	46	1.5	ND(1)
	6/26/96(D)	6.3	2.1	18,800	237	ND(10)	63	ND(50)	26,800	10	ND(50)	312	ND(50)	1,220	98	25	54	1.6	ND(1)
	9/18/96	4.0	ND(2)	4,410	191	ND(10)	29	ND(50)	6,090	ND(5)	ND(50)	92	ND(50)	312	ND(50)	ND(10)	16	0.7	ND(1)
	7/10/97	--	--	852	--	ND(10)	--	--	--	ND(5)	--	--	--	--	--	--	--	0.53	--
	3/3/99	3.2	ND(2)	3,100	190	ND(5)	32	53	5,100	ND(5)	ND(10)	--	ND(50)	19	ND(50)	16	11	0.5	ND(5)
	WELL DAMAGED 7/99																		
P-13	12/21/95	6.8	7.4	1,510	ND(100)	ND(10)	15	ND(10)	1,060	5.2	ND(10)	87	ND(50)	19	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/14/96	3.2	6.6	6,330	ND(100)	ND(10)	29	ND(50)	8,780	5.4	ND(50)	113	ND(50)	381	87	12	22	ND(0.2)	ND(5)
	6/19/96	3.0	7.8	2,140	ND(100)	ND(10)	18	ND(50)	2,890	ND(5)	ND(50)	53	ND(50)	125	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(1)
	9/11/96	3.0	7.2	3,340	ND(100)	ND(10)	20	ND(50)	4,040	ND(5)	ND(50)	53	ND(50)	138	ND(50)	ND(10)	11	0.34	ND(1)
	7/8/97	--	--	6,660	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																		

BOE-C6-0139900

TABLE 4.12

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA
(Continued)

SAMPLE ID	SAMPLE DATE	TOTAL METALS[1] (in µg/L)																	
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron (EPA Method 6010)	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Copper (EPA Method 6010)	Vanadium (EPA Method 6010)	Mercury (EPA Method 7470)	Thallium (EPA Method 7841)
P-14	12/21/95	33	3.4	5,170	ND(100)	ND(10)	2,400	ND(10)	5,520	5.2	ND(10)	285	ND(50)	216	58	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/19/96	24	4.0	21,000	114	ND(10)	1,800	ND(50)	34,000	17	ND(50)	649	ND(50)	2,250	193	41	74	ND(0.2)	ND(1)
	6/26/96	11	3.4	9,060	ND(100)	ND(10)	1,520	ND(50)	12,900	9.1	ND(50)	245	ND(50)	564	108	19	28	ND(0.2)	ND(1)
	9/17/96	11	2.5	8,600	ND(100)	ND(10)	1,500	ND(50)	12,400	7.5	ND(50)	241	ND(50)	553	54	17	29	ND(0.2)	ND(1)
	7/10/97	--	--	1,700	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																		
P-15	12/27/95	5.6	ND(2)	3,820	ND(100)	ND(10)	372	ND(10)	5,290	ND(5)	ND(10)	72	ND(50)	279	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/19/96	5.4	2.0	5,780	ND(100)	ND(10)	223	ND(50)	7,490	ND(5)	ND(50)	109	ND(50)	1,580	175	ND(10)	21	ND(0.2)	ND(1)
	6/26/96	5.9	ND(2)	6,270	ND(100)	ND(10)	88	ND(50)	8,710	10	ND(50)	144	ND(50)	399	ND(50)	19	21	ND(0.2)	ND(1)
	9/18/96	4.9	ND(2)	4,070	ND(100)	ND(10)	73	ND(50)	4,980	10	ND(50)	107	ND(50)	257	66	ND(10)	13	ND(0.2)	ND(1)
	7/10/97	--	--	448	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	--
	WELL ABANDONED 10/97																		
P-16A	12/26/95	12	2.4	17,700	ND(100)	ND(10)	70	ND(10)	24,100	7.1	ND(10)	240	ND(50)	979	89	13	72	ND(0.2)	ND(5)
	3/18/96	7.0	2.4	15,600	ND(100)	ND(10)	70	ND(50)	22,800	8.4	ND(50)	278	ND(50)	820	140	19	49	ND(0.2)	ND(5)
	3/18/96(D)	14	2.0	6,840	ND(100)	ND(10)	45	ND(50)	10,400	10	ND(50)	219	ND(50)	358	133	11	25	ND(0.2)	ND(5)
	6/25/96	7.0	3.0	12,600	ND(100)	ND(10)	90	ND(50)	19,800	6.1	ND(50)	254	ND(50)	659	93	16	ND(10)	ND(0.2)	ND(1)
	9/16/96	7.2	ND(2)	4,740	ND(100)	ND(10)	36	ND(50)	6,530	ND(5)	ND(50)	88	ND(50)	246	ND(50)	ND(10)	17	ND(0.2)	ND(1)
	7/9/97	--	--	1,580	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	3/4/99	9.3	ND(2)	8,380	156	ND(5)	21	ND(10)	8,350	9.2	ND(10)	--	ND(50)	438	ND(50)	ND(10)	22	ND(0.2)	ND(5)
	7/15/99	9.2	ND(2)	4,530	104	ND(5)	21	ND(10)	5,240	ND(5)	ND(10)	102	ND(50)	247	ND(50)	53U	16	ND(0.2)	ND(5)
P-16B	12/19/95	ND(2)	3.0	87	144	ND(10)	ND(5)	ND(10)	147	ND(5)	11	87	ND(50)	ND(10)	504	ND(10)	ND(50)	ND(0.2)	ND(5)
	12/19/95(D)	2.0	2.8	85	143	ND(10)	ND(5)	ND(10)	165	ND(5)	ND(10)	86	ND(50)	ND(10)	510	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/18/96	ND(2)	3.2	300	170	ND(10)	ND(5)	ND(50)	280	ND(5)	ND(50)	88	ND(50)	14	561	ND(10)	ND(10)	ND(0.2)	ND(5)
	6/24/96	ND(2)	5.8	126	446	ND(10)	ND(5)	ND(50)	233	ND(5)	ND(50)	23	ND(50)	ND(10)	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(1)
	WELL DESTROYED 8/96																		
P-16C	9/12/96	3.2	5.6	381	391	ND(10)	ND(5)	ND(50)	405	ND(5)	ND(50)	332	ND(50)	19	1,370	ND(10)	ND(10)	ND(0.2)	ND(1)
	7/9/97	--	--	256	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	3/2/99	2.6	4.3	3,680	451	ND(5)	ND(10)	ND(10)	4,000	ND(5)	ND(10)	--	ND(50)	209J	61	ND(10)	ND(10)	ND(0.2)	ND(5)
	7/14/99	2.0	3.5	3,440	502	ND(5)	ND(10)	ND(10)	4,100	ND(5)	ND(10)	89	ND(50)	186	81	ND(10)	ND(10)	ND(0.2)	ND(5)
P-17	12/21/95	21	ND(2)	2,700	ND(100)	ND(10)	881	ND(10)	949	ND(5)	ND(10)	249	ND(50)	ND(10)	78	ND(10)	ND(50)	0.22	ND(5)
	3/19/96	10	2.0	18,300	116	ND(10)	770	ND(50)	28,600	12	ND(50)	388	ND(50)	382	138	24	58	ND(0.2)	ND(1)
	9/18/96	11	ND(2)	19,400	210	ND(10)	1,080	ND(50)	23,400	35	ND(50)	447	ND(50)	1,200	282	102	49	ND(0.2)	21
	7/10/97	--	--	340	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	3/4/99	2.5	ND(2)	2,580	69	ND(5)	40	ND(10)	3,370	7.4	ND(10)	--	ND(50)	165	ND(50)	21	ND(10)	ND(0.2)	ND(5)
	7/15/99	2.6	ND(2)	2,950	86	ND(5)	34	ND(10)	3,890	7.2	ND(10)	70	ND(50)	185	173	ND(10)	ND(10)	ND(0.2)	ND(5)
P-18	12/26/95	10	3.6	18,400	ND(100)	ND(10)	52	ND(10)	26,700	6.7	ND(10)	256	ND(50)	1,080	74	11	68	ND(0.2)	ND(5)
	3/19/96	12	2.0	10,800	ND(100)	ND(10)	50	ND(50)	17,700	11	ND(50)	209	ND(50)	612	75	16	33	ND(0.2)	ND(1)
	9/12/96	20	3.3	25,400	223	ND(10)	69	ND(50)	34,100	32	ND(50)	567	ND(50)	1,390	164	47	86	ND(0.2)	1.1
	9/12/96(D)	18	3.4	24,700	220	ND(10)	68	ND(50)	33,500	31	ND(50)	557	ND(50)	1,390	165	47	84	ND(0.2)	ND(1)
	7/8/97	--	--	4,550	--	--	--	--	--	7.6	--	--	--	--	--	--	--	--	ND(1)
	WELL ABANDONED 10/97																		
P-19	12/26/95	15	3.8	25,300	111	ND(10)	72	11	36,500	8.9	ND(10)	347	ND(50)	1,540	87	14	91	ND(0.2)	ND(5)
	3/19/96	11	3.0	17,300	ND(100)	ND(10)	66	ND(50)	26,400	9.0	ND(50)	281	ND(50)	1,040	124	18	53	ND(0.2)	1.3
	6/25/96	29	3.0	7,860	ND(100)	ND(10)	35	ND(50)	12,100	ND(5)	ND(50)	147	ND(50)	467	85	10	27	ND(0.2)	ND(1)
	9/17/96	4.9	3.0	5,670	ND(100)	ND(10)	34	ND(50)	8,250	ND(5)	ND(50)	105	ND(50)	328	ND(50)	ND(10)	19	ND(0.2)	ND(1)
	7/9/97	--	--	1,220	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	--
	WELL ABANDONED 10/97																		

BOE-C6-0139901

TABLE 4.12

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL METALS, FORMER ILM FACILITY, TORRANCE, CALIFORNIA
(Continued)

SAMPLE ID	SAMPLE DATE	TOTAL METALS[1] (in µg/L)																	
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron (EPA Method 6010)	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Manganese (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Copper (EPA Method 6010)	Vanadium (EPA Method 6010)	Mercury (EPA Method 7470)	Thallium (EPA Method 7841)
P-20	12/27/95	6.2	ND(2)	4,110	ND(100)	ND(10)	42	ND(10)	5,120	ND(5)	ND(10)	104	ND(50)	290	ND(50)	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/18/96	4.6	ND(2)	5,830	ND(100)	ND(10)	36	ND(50)	8,700	6.6	ND(50)	170	ND(50)	416	65	10	22	ND(0.2)	ND(5)
	6/25/96	7.4	ND(2)	5,840	ND(100)	ND(10)	34	ND(50)	8,830	ND(5)	ND(50)	168	250	392	59	ND(10)	21	ND(0.2)	ND(1)
	9/16/96	5.7	ND(2)	3,990	ND(100)	ND(10)	25	ND(50)	5,360	ND(5)	ND(50)	124	ND(50)	262	ND(50)	ND(10)	13	ND(0.2)	ND(1)
	7/10/97	--	--	245	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	--
	3/4/99	4.4	ND(2)	4,060	102	ND(5)	39	19	5,700	5.2	ND(10)	--	ND(50)	290	ND(50)	23	12	ND(0.2)	ND(5)
	3/4/99(D)[1]	4.5	ND(2)	4,690	106	ND(5)	43	22	6,360	6.0	ND(10)	--	ND(50)	329	ND(50)	12	15	ND(0.2)	ND(5)
	7/16/99	ND(2)	ND(2)	1,640	109	ND(5)	26	14	2,350	ND(5)	ND(10)	53	ND(50)	112	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(5)
	7/16/99(D)[3]	ND(2)	ND(2)	1,430	109	ND(5)	26	13	2,140	ND(5)	ND(10)	49	ND(50)	99	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(5)
P-21	12/26/95	8.4	ND(2)	12,500	125	ND(10)	36	ND(10)	16,300	13	ND(10)	188	ND(50)	857	79	ND(10)	60	ND(0.2)	ND(5)
	3/18/96	5.8	ND(2)	2,350	ND(100)	ND(10)	11	ND(50)	3,650	10	ND(50)	166	ND(50)	151	54	ND(10)	12	ND(0.2)	ND(5)
	6/25/96	ND(2)	ND(2)	5,540	ND(100)	ND(10)	24	ND(50)	8,610	ND(5)	ND(50)	393	ND(50)	352	60	11	22	ND(0.2)	ND(1)
	9/17/96	4.2	ND(2)	3,230	ND(100)	ND(10)	14	ND(50)	4,580	ND(5)	ND(50)	120	ND(50)	192	ND(50)	ND(10)	13	ND(0.2)	ND(1)
	7/10/97	--	--	281	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	--
	WELL ABANDONED 10/97																		
P-22	12/20/95	19	6.4	3,120	ND(100)	ND(10)	11	ND(10)	2,520	5.2	ND(10)	228	ND(50)	64	171	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/18/96	5.0	5.2	7,810	ND(100)	ND(10)	23	ND(50)	7,970	10	ND(50)	460	ND(50)	349	103	ND(10)	24	ND(0.2)	ND(5)
	6/20/96	6.2	7.4	3,950	ND(100)	ND(10)	17	ND(50)	4,250	10	ND(50)	241	ND(50)	163	84	ND(10)	14	ND(0.2)	ND(1)
	9/12/96	6.0	6.3	5,370	ND(100)	ND(10)	21	ND(50)	5,440	ND(5)	ND(50)	184	ND(50)	236	ND(50)	ND(10)	14	ND(0.2)	ND(1)
	7/9/97	--	--	260	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	--
	3/3/99	4.2	2.3	2,200	184	ND(5)	25	ND(10)	2,420	ND(5)	ND(10)	--	ND(50)	139J	ND(50)	ND(10)	12	ND(0.2)	ND(5)
	7/15/99	4.0	2.1	473	187	ND(5)	16	ND(10)	690	ND(5)	ND(10)	27	ND(50)	22J	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(5)
P-23	12/20/95	4.4	ND(2)	824	ND(100)	ND(10)	13	ND(10)	1,090	ND(5)	ND(10)	32	ND(50)	44	70	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/14/96	2.8	ND(2)	1,080	ND(100)	ND(10)	16	ND(50)	1,250	ND(5)	ND(50)	29	ND(50)	55	54	ND(10)	ND(10)	ND(0.2)	ND(5)
	6/20/96	3.4	ND(2)	1,220	ND(100)	ND(10)	16	ND(50)	1,820	ND(5)	ND(50)	39	ND(50)	82	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(1)
	9/11/96	3.9	ND(2)	856	ND(100)	ND(10)	14	ND(50)	1,140	ND(5)	ND(50)	16	ND(50)	50	ND(50)	ND(10)	ND(10)	ND(0.2)	ND(1)
	7/8/97	--	--	583	--	ND(10)	--	--	--	ND(5)	--	--	--	--	--	--	--	ND(0.2)	--
	WELL ABANDONED 10/97																		
P-24	12/20/95	9.6	ND(2)	9,720	ND(100)	ND(10)	38	11	14,400	ND(5)	ND(10)	995	ND(50)	621	106	ND(10)	ND(50)	ND(0.2)	ND(5)
	3/19/96	14	ND(2)	20,200	130	ND(10)	65	ND(50)	31,800	14	ND(50)	1,480	ND(50)	1,370	180	28	63	ND(0.2)	ND(1)
	6/24/96	5.6	ND(2)	6,610	ND(100)	ND(10)	18	ND(50)	10,700	ND(5)	ND(50)	771	ND(50)	416	ND(50)	ND(10)	21	ND(0.2)	ND(1)
	9/17/96	7.4	ND(2)	14,200	131	ND(10)	29	ND(50)	19,000	8.3	ND(50)	1,020	ND(50)	914	86	16	41	8.4	ND(1)
	9/17/96(D)	6.2	ND(2)	9,010	100	ND(10)	25	ND(50)	12,000	6.1	ND(50)	890	ND(50)	576	61	13	25	5.8	ND(1)
	7/9/97	--	--	898,000	--	109	--	--	--	143	--	--	--	--	--	--	--	20	--
	3/3/99	4.9	ND(2)	5,250	144	ND(5)	13	ND(10)	5,760	ND(5)	ND(10)	--	ND(50)	274J	ND(50)	ND(10)	15	ND(0.2)	ND(5)
	7/15/99	5.9	ND(2)	4,150	147	ND(5)	12	ND(10)	5,180	ND(5)	ND(10)	181	ND(50)	197	ND(50)	23U	14	ND(0.2)	ND(5)
P-25	12/26/95	13	ND(2)	22,400	119	ND(10)	490	12	30,600	12	ND(10)	360	ND(50)	1,680	98	17	78	ND(0.2)	ND(5)
	3/19/96	11	ND(2)	15,600	ND(100)	ND(10)	308	ND(50)	24,800	7.1	ND(50)	322	ND(50)	1,180	117	20	46	ND(0.2)	ND(1)
	6/26/96	8.6	ND(2)	12,100	ND(100)	ND(10)	453	ND(50)	18,300	10	ND(50)	230	ND(50)	810	119	27	32	ND(0.2)	ND(1)
	9/18/96	5.1	ND(2)	5,030	ND(100	ND(10)	488	ND(50)	7,530	ND(5)	ND(50)	101	ND(50)	373	ND(50)	ND(10)	15	ND(0.2)	ND(1)
	7/10/97	--	--	937	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	7/10/97(D)	--	--	2,940	--	--	--	--	--	ND(5)	--	--	--	--	--	--	--	--	ND(1)
	WELL ABANDONED 10/97																		

99-200/Rpts/DrGrWaFcFa (11/19/99Alb)

(1) Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.
(2) Duplicate sample for P-20 is identified as P-29 in laboratory reports.
(3) Duplicate sample for P-20 is identified as P-30 in laboratory reports.

µg/L Micrograms per liter
ND( ) Analytes not detected above the particle quantitation limit (in parentheses)
(D) Duplicate sample
-- Not sampled

Data Validation Qualifiers (for more information, see Data Validation Report, Appendix G).
U Not detected
J Estimated, detected

BOE-C6-0139902

TABLE 4.13

SUMMARY OF GROUND WATER ANALYTICAL RESULTS
TOTAL METALS, BRC PROPERTY, TORRANCE, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TOTAL METALS[1] (in µg/L)																
		Arsenic (SM 3114B)	Selenium (SM 3114B)	Aluminum (EPA Method 6010)	Barium (EPA Method 6010)	Cadmium (EPA Method 6010)	Chromium (EPA Method 6010)	Cobalt (EPA Method 6010)	Iron (EPA Method 6010)	Lead (EPA Method 7421)	Molybdenum (EPA Method 6010)	Nickel (EPA Method 6010)	Titanium (EPA Method 6010)	Zinc (EPA Method 6010)	Copper (EPA Method 6010)	Vanadium (EPA Method 6010)	Mercury (EPA Method 7470)	Thallium (EPA Method 7841)
BL-1	3/4/99	110J	2.4	97,800J	367J	ND(5)	195J	73J	154,000J	55J	12	123	4,920J	394J	110J	317J	0.29	ND(5)
	3/4/99[2]	166J	3.5	131,000J	508J	ND(5)	280J	111J	229,000J	87J	17	182	7,510	654J	146J	459J	0.46	ND(5)
	7/13/99	157	ND(2)	122,000J	589	ND(5)	258	109	217,000	74	15	180	7,000	568	182	428	0.71	ND(5)
BL-2	3/3/99	59	ND(2)	41,500	200	ND(5)	119	24	63,400	13	ND(10)	51	2,870	146	39	126	ND(0.2)	ND(5)
	7/14/99	146	ND(2)	90,300J	448	ND(5)	280	58	155,000	38	ND(10)	130	6,150	371	53	286	ND(0.2)	ND(5)
BL-3	3/3/99	20	ND(2)	24,400	328	ND(5)	92	10	37,400	8.9	ND(10)	ND(50)	1,360	86	ND(10)	75	ND(0.2)	ND(5)
	7/15/99	60	ND(2)	62,900	722	ND(5)	243	32	100,000	27	ND(10)	83	3,410	232	ND(10)	189	0.22U	ND(5)
BL-4	3/2/99	12	ND(2)	36,600	168	ND(5)	114	17	49,300	15	ND(10)	54	2,240	119	33	118	ND(0.2)	ND(5)
	7/14/99	13	ND(2)	38,600J	191	ND(5)	117	20	54,000	17	ND(10)	52	2,360	131	36	125	ND(0.2)	ND(5)
BL-5	3/4/99	12	3.4	18,000	110	ND(5)	84	ND(10)	28,900	10	ND(10)	ND(50)	946	122	30	55	ND(0.2)	ND(5)
	7/13/99	17	ND(2)	28,000J	220	ND(5)	122	12	47,200	15	ND(10)	ND(50)	1,440	128	20	88	ND(0.2)	ND(5)
BL-6	3/1/99	109	2.2	89,300	453	ND(5)	450	39	120,000	20	14	108	4,140	279	ND(10)	202	0.27	ND(5)
	7/16/99	275	ND(2)	284,000	1,720	7.9	1,160	158	431,000	111	28	375	10,800	1,070	ND(10)	729	ND(0.2)	ND(5)
	7/16/99[3]	338	2.1	244,000	1,530	5.3	1,040	137	375,000	100	24	324	9,150	939	ND(10)	639	0.74	ND(5)
BL-7	3/2/99	86	ND(2)	62,300	203	ND(5)	255	31	106,000	23	11	99	3,740	256	29	188	ND(0.2)	ND(5)
	7/14/99	99	ND(2)	66,100J	258	ND(5)	285	36	116,000	32	11	109	3,830	262	64	210	ND(0.2)	ND(5)
BL-8	3/2/99	25	ND(2)	22,100	188	ND(5)	95	ND(10)	32,900	8	ND(10)	ND(50)	1,420	74	ND(10)	62	ND(0.2)	ND(5)
	7/13/99	106	ND(2)	86,500J	663	ND(5)	330	42	142,000	36	ND(10)	118	5,190	315	70	250	0.22	ND(5)

99-200/Rpts/DrGrWaRcFa (11/19/99/dh)

(1) Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.
(2) Duplicate sample for BL-1 is identified as B-17 in laboratory reports.
(3) Duplicate sample for BL-6 is identified as B-15 in laboratory reports.

µg/L Micrograms per liter
ND( ) Analytes not detected above the particle quantitation limit (in parentheses)
– Not sampled

Data Validation Qualifiers (for more information, see Data Validation Report, Appendix G).
U Not detected
J Estimated, detected

BOE-C6-0139903

INDUSTRIAL LIGHT METALS SITE

Summary of Natural Attenuation Parameters

TABLE 4.14

SUMMARY OF NATURAL ATTENUATION PARAMETERS ANALYTICAL RESULTS
JULY 1999 GROUND WATER MONITORING
FORMER ILM FACILITY, TORRANCE, CALIFORNIA

METHOD	PARAMETER	UNITS	SAMPLE LOCATION													
			P-1	P-2	P-3	P-6B	P-7	P-9B	P-10	P-16A	P-16C	P-17	P-20	P-20(D)	P-22	P-24
Ground Water Quality Parameters																
EPA 310.1	Alkalinity	mg/L	447	511	654	376	253	380	356	240	213	280	358	353	314	414
EPA 350.1	Ammonia Nitrogen	mg/L	ND(0.02)	0.46	ND(0.02)	0.11	0.22	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	ND(0.02)	0.05	0.02	ND(0.02)	0.07
Field	Specific Conductivity	µmhos/cm	1,570	4,010	2,260	1,750	1,393	2,493	1,883	2,433	3,310	1,887	2,430	2,430	2,396	1,503
EPA 415.1	D.O.C.	mg/L	8.1	6.7	7.0	2.9	7.2	6.9	5.3	2.0	6.0	5.0	8.1J	4.4J	4.9	6.1
EPA 365.1	ortho-Phosphate	mg/L	0.12	ND(0.05)	0.09	0.15	1.9	0.08	0.95	4.7	0.11	0.10	0.17	0.17	2.2	2.3
Field	Redox Potential	mV	348.73	-10.27	299.97	190.53	118.93	290.27	247.13	230.73	267.3	289.67	299.03	299.03	277.3	259.60
Field	pH	pH Units	7.39	7.13	7.28	7.62	7.47	7.25	7.51	7.29	7.30	7.37	7.26	7.26	7.09	7.57
Field	Temperature	°C	24.2	23.5	23.3	23.6	24.5	23.0	24.1	23.5	22.9	23.4	23.4	23.4	23.7	22.8
Terminal Electron Acceptor Parameters																
AM19GAX	D.O.	mg/L	5.62	0.78	2.44	2.5	0.82	5.63	7.24	6.44	3.29	6.89	5.36	4.98	4.74	2.7
Field	D.O.	%	69.5	3.0	18.5	19.7	9.8	61.3	82.0	61.9	31.9	80.8	53.5	53.5	52.1	17.1
EPA 353.2	Nitrite/Nitrate	mg/L	14	5.5	12	10	7.5	13	11	9.6	70	7.0	15	15	5.1	1.9
EPA 6010	Iron (total)	µg/L	2,280	4,620	819	30,600	16,500	1,990	1,730	5,240	4,100	3,890	2,350	2,140	690	5,180
Field	Iron (dissolved)	µg/L	0	1.0	0	0	0	0	0	0	0	0	0	0	0	0
EPA 6010	Manganese (total)	µg/L	35	1,370	17	1,310	452	20	29	102	89	70	53	49	27	181
EPA 6010	Manganese (dissolved)	µg/L	ND(10)	1,440	ND(10)	806	268	ND(10)	13	ND(10)	ND(10)	12	ND(10)	ND(10)	ND(10)	114
EPA 300	Sulfate	mg/L	313	427	297	130	77	389	166	97	88	28	95	105	11	64
Field	Hydrogen Sulfide	mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM19GAX	Carbon Dioxide	mg/L	44.45	64.55	85.86	25.68	20.69	71.23	29.90	28.12	19.68	24.92	51.57	51.72	67.36	27.84
AM19GAX	Methane	µg/L	0.603	0.12	0.76	4.377	0.086	1.167	0.621	0.536	2.355	0.266	3.302	3.293	0.487	82.54
Degradation Products																
EPA 300	Chloride	mg/L	200	896	409	436	361	374	367	626	980	394	667	675	881	387
AM19GAX	Ethane	ng/L	60	417	ND(5)	26	ND(5)	ND(5)	ND(5)	18	ND(5)	30	25	23	52	110
AM19GAX	Ethene	ng/L	16	76	ND(5)	82	ND(5)	17	11	ND(5)	51	ND(5)	10	15	ND(5)	104
Technical Quality Control Data																
AM19GAX	Nitrogen	mg/L	13.74	15.09	16.16	19.58	16.46	15.54	14.93	16.79	20.65	13.85	16.71	15.60	16.48	16.65
AM19GAX	Propane/Propene	ng/L	142	502	ND(10)	50	48	ND(10)	ND(10)	130	ND(10)	184	149	147	153	256

99-2RI/Rpts/DrGrWaRcFa (11/19/99/dh)

(D) = Field Duplicate
mg/L = Milligrams per liter
µg/L = Micrograms per liter
ng/L = Nanograms per liter
ND( ) = Not detected above method detection limit. Number in parentheses is the detection or practical quantitation limit.
D.O.C. = Dissolved Organic Carbon
D.O. = Dissolved Oxygen
mV = milliVolts
°C = Degrees Centigrade
% = percent saturation

Specific conductivity, pH, redox potential, temperature and D.O. (Field) result is an average of the last three measurements collected in the field.

BOE-C6-0139905

TABLE 4.15

SUMMARY OF NATURAL ATTENUATION PARAMETERS ANALYTICAL RESULTS
JULY 1999 GROUND WATER MONITORING
BRC PROPERTY TORRANCE, CALIFORNIA

METHOD	PARAMETER	UNITS	SAMPLE LOCATION								
			BL-1	BL-2	BL-3	BL-4	BL-5	BL-6	BL-6(D)	BL-7	BL-8
Ground Water Quality Parameters											
EPA 310.1	Alkalinity	mg/L	544	340	323	257	445	369	373	350	242
EPA 350.1	Ammonia Nitrogen	mg/L	0.04	ND(0.02)	ND(0.02)	ND(0.02)	0.02	ND(0.02)	ND(0.02)	ND(0.02)	0.02
Field	Specific Conductivity	µmhos/cm	1,797	1,017	4,060	596	1,900	1,530	1,530	950	2,450
EPA 415.1	D.O.C.	mg/L	15	5.2	5.0	4.0	8.5	4.6	1.4	7.5	4.3
EPA 365.1	ortho-Phosphate	mg/L	0.07	0.16	0.13	0.21	0.11	0.17	0.17	0.16	0.11
Field	Redox Potential	mV	192.6	267.73	253.57	275.80	127.17	255.87	255.87	272.90	247.0
Field	pH	pH Units	6.92	7.40	7.04	7.66	7.06	7.36	7.36	7.48	7.44
Field	Temperature	°C	23.9	22.7	23.4	23.0	23.9	22.2	22.2	22.9	23.8
Terminal Electron Acceptor Parameters											
AM19GAX	D.O.	mg/L	0.52	6.13	5.52	6.38	2.97	6.28	7.35	7.47	7.36
Field	D.O.	%	6.8	68.4	58.6	71.0	24.7	75.2	75.2	89.8	86.8
EPA 353.2	Nitrite/Nitrate	mg/L	28	8.2	11.0	3.3	3.7	7.7	7.7	3.8	6.1
EPA 6010	Iron (total)	µg/L	217,000	155,000	100,000	54,000	47,200	431,000	375,000	116,000	142,000
Field	Iron (dissolved)	µg/L	0	0	0	0	0	0	0	0	0
EPA 6010	Manganese (total)	µg/L	3,320	2,680	1,090	945	642	7,490	6,520	1,080	1,280
EPA 6010	Manganese (dissolved)	µg/L	16	ND(10)	13	ND(10)	38	ND(10)	ND(10)	ND(10)	ND(10)
EPA 300	Sulfate	mg/L	151	59	65	94	7.7	72	78	59	29
Field	Hydrogen Sulfide	mg/L	0	0	0	0	0	0	0	0	0
AM19GAX	Carbon Dioxide	mg/L	150.61	36.81	66.26	15.35	98.63	44.34	44.98	25.94	21.28
AM19GAX	Methane	µg/L	3.96	0.614	0.566	1.038	9.815	0.463	0.461	1.154	2.683
Degradation Products											
EPA 300	Chloride	mg/L	251	95	1,140	44	485	331	332	103	770
AM19GAX	Ethane	ng/L	ND(5)	ND(5)	14	ND(5)	16	11	11	ND(5)	ND(5)
AM19GAX	Ethene	ng/L	70	29	29	18	76	37	36	11	22
Technical Quality Control Data											
AM19GAX	Nitrogen	mg/L	13.26	15.91	16.19	16.38	17.30	16.97	19.57	15.33	15.43
AM19GAX	Propane/Propene	ng/L	102	ND(10)	51	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)

99-2000Rpts/DrGrWaRcFc (12/20/99/rm)

(D) = Field Duplicate
mg/L = Milligrams per liter
µg/L = Micrograms per liter
ng/L = Nanograms per liter
ND( ) = Not detected above method detection limit. Number in parentheses is the detection or practical quantitation limit.
D.O.C. = Dissolved Organic Carbon
D.O. = Dissolved Oxygen
mV = milliVolts
° C = Degrees Centigrade
% = Percent saturation

Specific conductivity, pH, redox potential, temperature and D.O. (Field) result is an average of the last three measurements collected in the field.

BOE-C6-0139906

TABLE 5.1

METAL CONCENTRATIONS IN GROUND WATER
FORMER ILM FACILITY
TORRANCE, CALIFORNIA

METAL	RANGE OF SITE DISSOLVED METAL CONCENTRATIONS IN GROUND WATER	SITE MEAN METAL CONCENTRATIONS IN GROUND WATER (Detects Only)	TYPICAL RANGE OF NATURAL CONCENTRATIONS OF METALS IN GROUND WATER(1)
Arsenic	<2.0 to 33	4.8	<1.0 to 30
Barium	<100 to 492	178.39	10 to 500
Chromium	<5.0 to 2,820	275.94	<1.0 to 5.0
Chromium (hexavalent)	<2.0 to 2,600	230.47	Not Listed
Manganese	<10 to 3,690	536.46	<1.0 to 1,000
Selenium	<2.0 to 8.6	3.24	<1.0 to 10
Vanadium	<10 to 11	10.50	<1.0 to 10
Zinc	<10 to 1,500	106.80	<10 to 2,000

99-200/Rpts/GrWaRcFalnRe (12/28/99/jb)

Note: All values in μg/L or ppb.

(1) Dragun, 1988.

TRC

TABLE 5.2

LABORATORY-DERIVED REACTION PATHWAY, REACTION HALF-LIFE AND REACTION PRODUCTS

CHLORINATED HYDROCARBON		PATHWAY	REACTION HALF-LIFE	REACTION/ DEGRADATION PRODUCTS
Ethenes	PCE	Microbial Degradation (A/M/m) (A/M)	<2 days	TCE c-1,2-DCE t-1,2-DCE Vinyl chloride
		Hydrolysis	0.73 yr.	Alcohols Acids
	TCE	Microbial Degradation (A/M/m) (A/M) (A/S)	0.3 yr. at high concentration; minimal at lower concentration	c-1,2-DCE t-1,2-DCE Vinyl chloride
		Hydrolysis	0.9 yr.	Alcohols Acids
	DCEs (cis and trans)	Microbial Degradation (A/M/m) (A/S) (A/M)	8 to 10 weeks with methanogenic aquifer material (cis) 0.5 year under anoxic conditions (trans)	Vinyl Chloride Chloroethane
	Vinyl Chloride	Hydrolysis	<10 yr./slow	Alcohols Acids
		Microbial Degradation (A/M/m) (O/P/mb)	Resistant to biodegradation in aerobic systems. 5 to 6 weeks in sand by methanogenic microorganisms under anaerobic conditions.	CO_2
Ethanes	1,1,2,2-Tetrachloroethane	Microbial Degradation (A/M/m) (A/M)	4 weeks to 6 months, aerobic 1 to 4 weeks, anaerobic	1,1,2-TCA
		Dehydrohalogenation	--	TCE
	1,1,1-TCA	Hydrolysis	0.5 to 2.5 yrs	1,1-DCA Acetic Acid
		Dehydrohalogenation	--	1,1-DCE
		Microbial Degradation (A/S) (A/M/m) (A/M)	< 2 days to 2.5 yrs 20 to 39 weeks, aerobic 80 to 156 weeks, anaerobic	1,1-DCA 1,1-DCE c-1,2,-DCE t-1,2-DCE Chloroethane Vinyl Chloride

TRC

TABLE 5.2

LABORATORY-DERIVED REACTION PATHWAY, REACTION HALF-LIFE AND REACTION PRODUCTS (Continued)

CHLORINATED HYDROCARBON		PATHWAY	REACTION HALF-LIFE	REACTION/ DEGRADATION PRODUCTS
Ethanes (Cont'd)	1,1,2-TCA	Dehydrohalogenation	170 yrs	1,1-DCE
	1,1-DCA	Microbial Degradation (A/M/m)	5 to 22 weeks, aerobic 18 to 88 weeks, anaerobic	Vinyl Chloride Chloroethane
	1,2-DCA	Microbial Degradation (O/P/p) (O/P/x) (A/M/m)	Acclimated anaerobic system reports no degradation. Activated sludge system reports 99% removal due to stripping, 1% due to sorption and 0% due to biodegradation in 6 days.	CO_2 Alcohols
	Chloroethane	Hydrolysis	5 - 6 weeks	Ethanol

99-200/Rpts/DrGrWaRcFa (12/28/99/rm)

Sources: Smith & Dragun, 1984
Vogel, Criddle & McCarthy, 1987
Howard, 1991
Howard, Boethling, Jarvis, Meylan and Michalenko, 1991

Notes:
A - Anaerobic
M - Mixed Culture
m - Methanogenic Culture
S - Soil/Aquifer Biological Seed
P - Pure Culture
mb - Mycobacterium
O - Aerobic
X - Xanthobacter
-- - No Data Available

TRC

TABLE 5.3

WELL COMPARISON OF CHLORINATED HYDROCARBON AND NATURAL ATTENUATION PARAMETERS

METHOD	PARAMETER	UNITS	IMPACTED WELLS			BACKGROUND WELLS(1)			
			P-1	BL-6	P-20	P-2	BL-5	P-10	BL-8
Chlorinated Hydrocarbon Parameters									
EPA 8260	TCE	µg/L	10,000	5,600	5,400	ND (0.5)	2.7	3.2	18
	PCE	µg/L	78	ND (50)	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1-DCE	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	0.79	ND (0.5)	ND (0.5)
	t-1,2-DCE	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	0.55	ND (0.5)	ND (0.5)
	c-1,2-DCE	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	110	ND (0.5)	ND (0.5)
	Vinyl Chloride	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1,1-TCA	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1,2-TCA	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1-DCA	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	0.56	ND (0.5)	ND (0.5)
	1,2-DCA	µg/L	ND (50)	ND (50)	ND (50)	ND (0.5)	ND (50)	ND (0.5)	ND (0.5)
Ground Water Quality Parameters									
EPA 310.1	Alkalinity	mg/L	447	369	358	511	445	356	242
EPA 350.1	Ammonia Nitrogen	mg/L	ND (0.02)	ND (0.02)	0.05	0.46	0.02	ND (0.02)	0.02
Field	Specific Conductivity(2)	µmhos/cm	1,570	1,530	2,430	4,010	1,900	1,883	2,450
EPA 415.1	D.O.C.	mg/L	8.1	4.6	8.1	6.7	8.5	5.3	4.3
EPA 365.1	ortho-Phosphate	mg/L	0.12	0.17	0.17	ND (0.05)	0.11	0.95	0.11
Field	Redox Potential(2)	mV	348.73	255.87	299.03	-10.27	127.17	247.13	247.0
Field	pH(2)	pH Units	7.39	7.36	7.26	7.13	7.06	7.51	7.44
Field	Temperature(2)	° C	24.2	22.2	23.4	23.5	23.9	24.1	23.8
Terminal Electron Acceptor Parameters									
AM19GAX	D.O.	mg/L	5.62	6.28	5.36	0.78	2.97	7.24	7.36
Field	D.O.(2)	% Saturation	69.5	75.2	53.5	3.0	24.7	82.0	68.6
EPA 353.2	Nitrite/Nitrate	mg/L	14	7.7	15	5.5	3.7	11	6.1
EPA 6010	Iron (total)	µg/L	2,280	431,000	2,350	4,620	47,200	1,730	142,000
Field	Iron (dissolved)	µg/L	0	0	0	1.0	0	0	0

TRC

BOE-C6-0139910

TABLE 5.3

WELL COMPARISON OF CHLORINATED HYDROCARBON AND NATURAL ATTENUATION PARAMETERS
(Continued)

METHOD	PARAMETER	UNITS	IMPACTED WELLS			BACKGROUND WELLS(1)			
			P-1	BL-6	P-20	P-2	BL-5	P-10	BL-8
Terminal Electron Acceptor Parameters (Cont'd)									
EPA 6010	Manganese (total)	µg/L	35	7,490	53	1,370	642	29	1,280
EPA 6010	Manganese (dissolved)	µg/L	ND (10)	ND (10)	ND (10)	1,440	38	13	ND (10)
EPA 300.0	Sulfate	mg/L	313	72	95	427	7.7	166	29
Field	Hydrogen Sulfide	mg/L	0	0	0	0	0	0	0
AM19GAX	Carbon Dioxide	mg/L	44.45	44.34	51.57	64.55	98.63	29.90	21.28
AM19GAX	Methane	µg/L	0.603	0.463	3.302	0.12	9.815	0.621	2.683
Degradation Products									
EPA 300.0	Chloride	mg/L	200	331	667	896	485	367	770
AM19GAX	Ethane	ng/L	60	11	25	417	16	ND (5.0)	ND (5.0)
AM19GAX	Ethene	ng/L	16	37	10	76	76	11	22
Technical Quality Control Data									
AM19GAX	Nitrogen	mg/L	13.74	16.97	16.71	15.09	17.30	14.93	15.43
AM19GAX	Propane/Propene	ng/L	142	ND (10)	149	502	ND (10)	ND (10)	ND (10)

99-200/Rpts/DrGrWaRcFa (12/28/99/rm)

(1) Wells upgradient, sidegradient and downgradient at nondetect or at low historical levels of chlorinated hydrocarbons for the site.
(2) Specific conductivity, pH, redox potential, temperature and D.O. (field) results are averages of the last three measurements collected in the field, if more than three measurements were collected during the sampling/measurement event.

µg/L = Micrograms per liter
mg/L = Milligrams per liter
ng/L = Nanograms per liter
ND = Not detected above method detection limit. Number in parentheses is the detection or practical quantitation limit.
D.O.C. = Dissolved Organic Carbon
D.O. = Dissolved Oxygen
mV = milliVolts

PCE = Tetrachloroethene
DCE = Dichloroethene
TCA = Trichloroethane
DCA = Dichloroethane
TCE = Trichloroethene
°C = degrees Centigrade
% = percent saturation

TRC

BOE-C6-0139911

DEL AMO STUDY AREA

Trilinear Piper Diagrams

FINAL GROUNDWATER REMEDIAL INVESTIGATION REPORT

DEL AMO STUDY AREA
LOS ANGELES, CALIFORNIA

Volume I
Text, Tables & Figures

FOR

SHELL OIL COMPANY

AND

THE DOW CHEMICAL COMPANY

PREPARED BY:

DAMES & MOORE

MAY 15, 1998

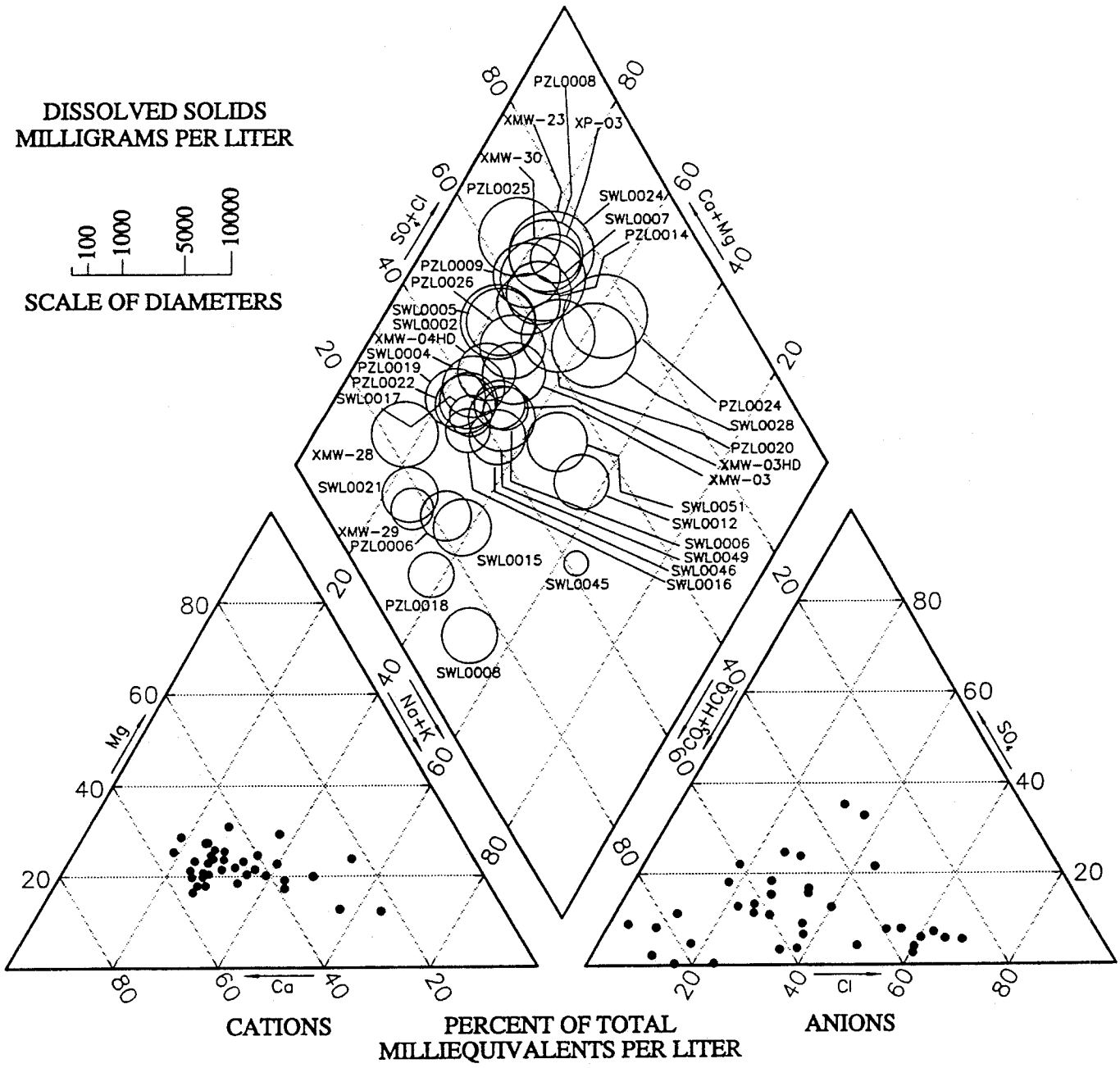


FIGURE 4.3-1

Trilinear Piper Diagram
Water Table

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC4\tlp-w, 05/08/97 at 16:18

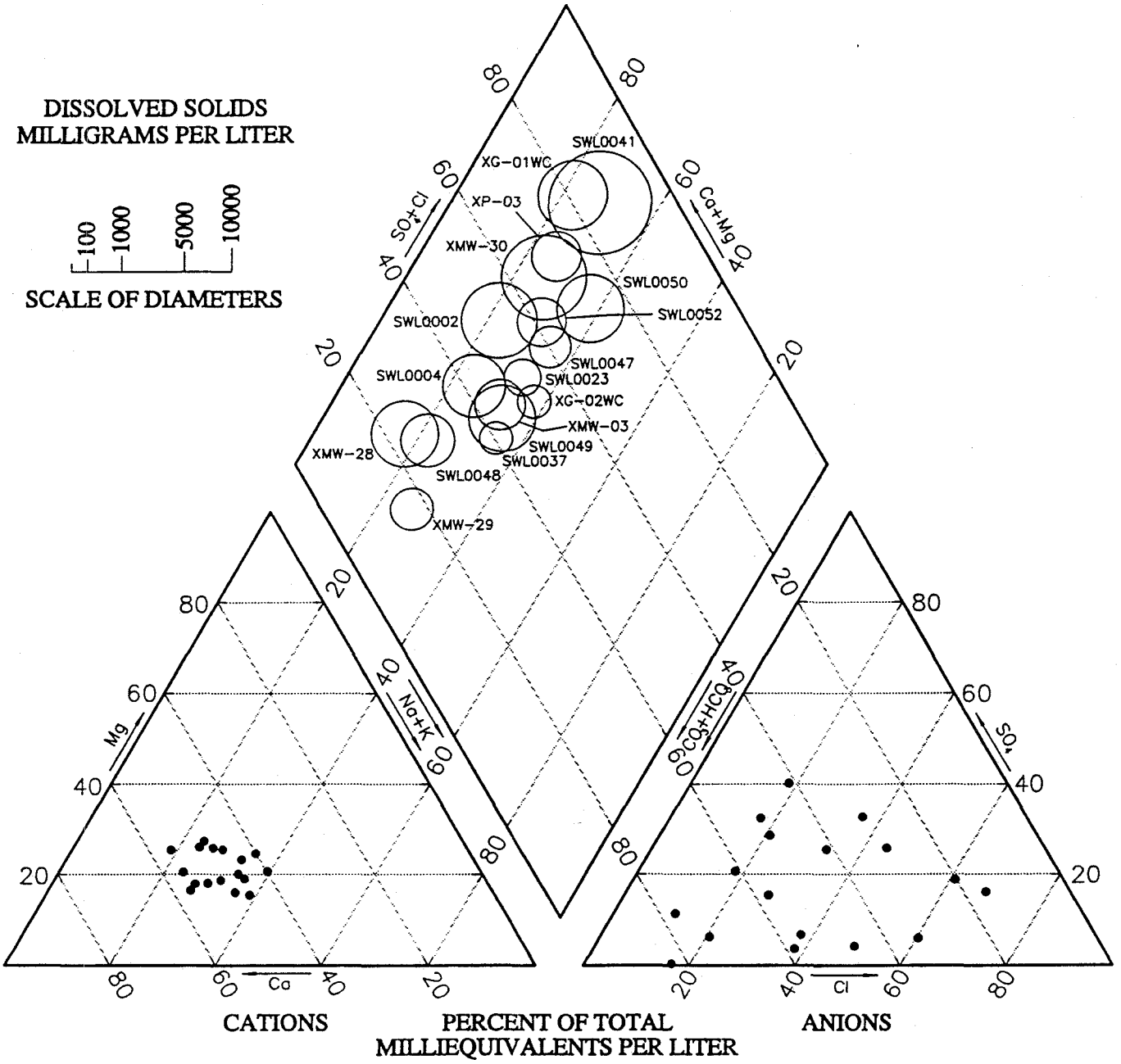


FIGURE 4.3-3

Trilinear Piper Diagram
Middle Bellflower B Sand

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

D:\DJO\RI\SEC4\tlp-b, 05/08/97 at 16:18

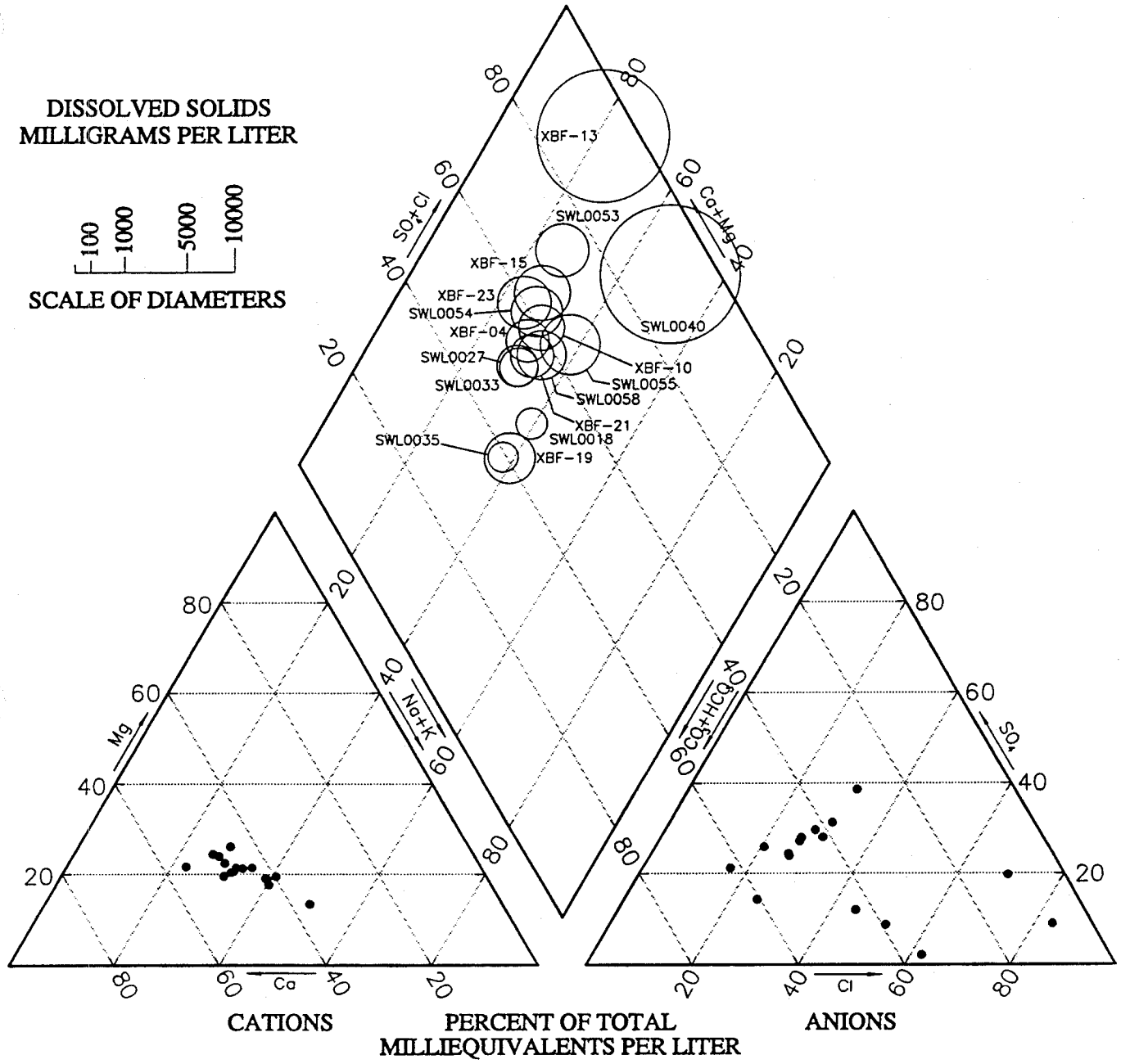


FIGURE 4.3-5

Trilinear Piper Diagram
Middle Bellflower C Sand

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC4\tlp-c, 05/08/97 at 16:19

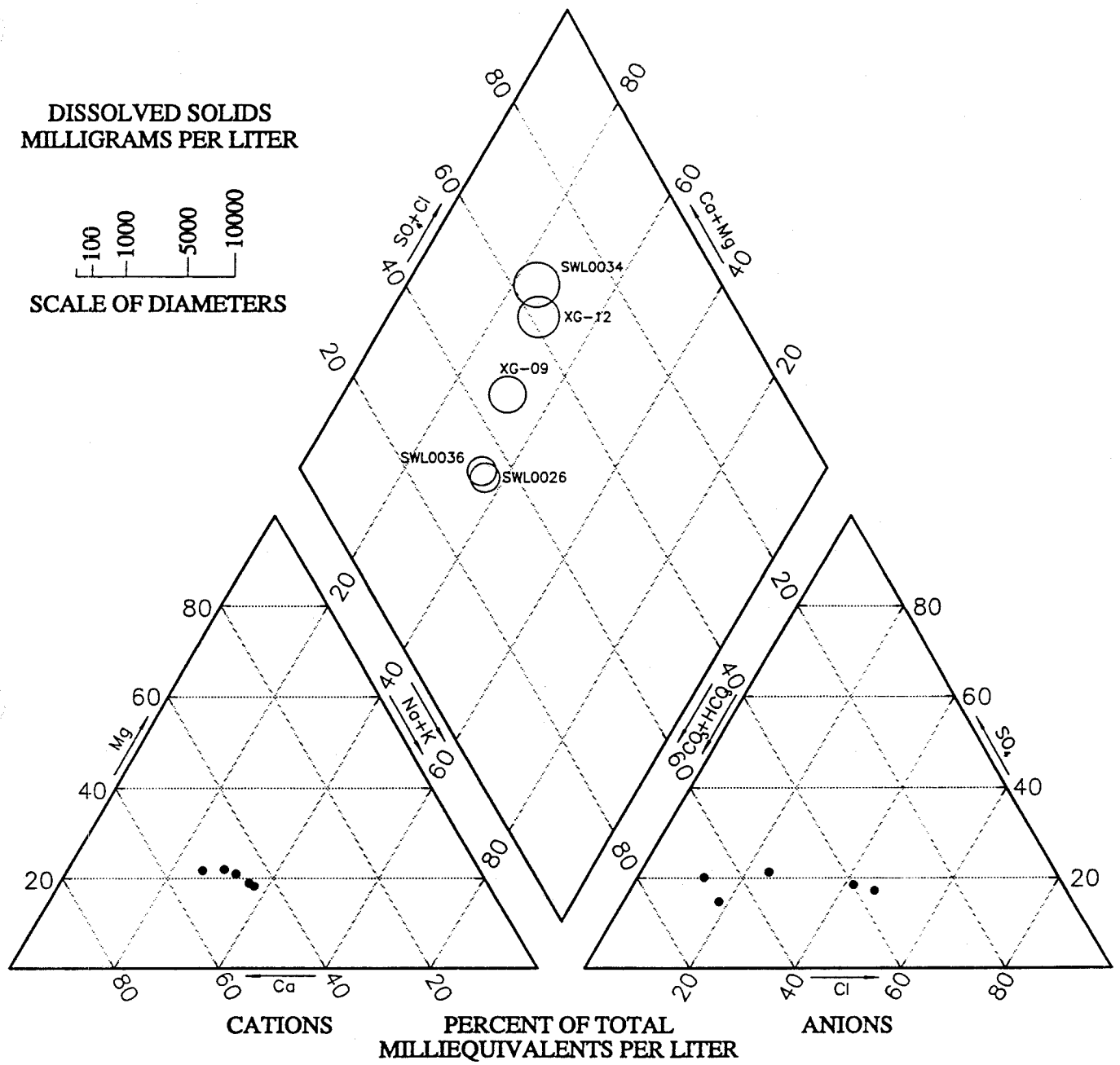


FIGURE 4.3-7

Trilinear Piper Diagram
Gage Aquifer

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

D:\DJD\RI\SEC4\tlp-g, 05/08/97 at 16:19

Appendix D

BOE-C6-0139918

Appendix D
Aquifer Test Data

FORMER C-6 FACILITY

Aquifer Testing and Analysis

DEL AMO STUDY AREA

Summaries of Aquifer Test Results

Map showing Aquifer Test Well Locations

FORMER C-6 FACILITY

Aquifer Testing and Analysis

RETURN TO C6 - ENVIRONM

Woodward-Clyde Consultants

DOUGLAS AIRCRAFT COMPANY
TORRANCE (C6) FACILITY
PHASE III GROUNDWATER AND SOIL
INVESTIGATION REPORT

Prepared for:

Douglas Aircraft Company
19503 South Normandie
Los Angeles, California 90502

Prepared by:

Woodward-Clyde Consultants
203 North Golden Circle Drive
Santa Ana, California 92705

Project No. 8941863J
March 1990

(2L-ABC/C6GW3-R)

TABLE 1
SLUG TEST DATA REDUCTION
DOUGLAS AIRCRAFT C6 FACILITY, TORRANCE CALIFORNIA

Where:
K = Hydraulic Conductivity
Rc = Radius of well casing in feet
Re = Effective Radius of influence (ft)
Yo = Initial drawdown at time t =0 (sec)
H = Distance from base of well to SWL (ft)
A = Constant Based on L/Rw
Yt = Drawdown at time t (sec)
Dw = Depth of well (ft)
Depth to water(ft) – Measured 19 July, 30 August, and 4 October 1989.

Rw = Radius of Boring in feet
L = Length of screen of saturated thickness if entire screen is not saturated in feet
t = Selected time/drawdown semi-log plot (sec)
D = Thickness of aquifer in feet (Bottom of aquifer approx. 150 feet)
B = Constant based on L/Rw

Parameter	WCC-4S		WCC-5S		WCC-7S		WCC-8S	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Rc	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Rw	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Dw	90	90	90	90	90	90	90	90
DTW	69.35	69.35	69.69	69.69	68.41	68.41	70.01	70.01
L = (Dw-DTW)*	20.65	20.65	20.31	20.31	21.59	21.59	19.99	19.99
D = (150-DTW)	80.65	80.65	80.31	80.31	81.59	81.59	79.99	79.99
H = (Dw-DTW)	20.65	20.65	20.31	20.31	21.59	21.59	19.99	19.99
A	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
B	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
L/Rw	49.17	49.17	48.36	48.36	51.40	51.40	47.60	47.60
Yo	0.87	1.5	0.65	2.05	0.84	1.5	0.94	1.5
Yt	0.28	0.33	0.16	0.61	0.38	0.7	0.62	1
t	20	20	11	10	20	20	20	20
Ln Re/Rw =	2.52584	2.52584	2.50616	2.50616	2.57881	2.57881	2.48737	2.48737
K (ft/sec) =	1.00E-04	1.34E-04	2.27E-04	2.16E-04	6.85E-05	6.58E-05	3.74E-05	3.65E-05
AVG K (ft/sec)	1.17E-04		2.22E-04		6.71E-05		3.69E-05	
AVG K (CM/SEC)	3.57E-03		6.76E-03		2.05E-03		1.13E-03	
AVG K (Gal/day/ft2)	7.56E+01		1.43E+02		4.34E+01		2.39E+01	

TABLE 1 (Continued)

Parameter	WCC-9S		WCC-10S		WCC-1D		WCC-3D	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Rc	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Rw	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Dw	90	90	90	90	140	140	140	140
DTW	67.17	67.17	69.51	69.51	70.09	70.09	70.62	70.62
L = (Dw-DTW)*	22.83	22.83	20.49	20.49	20	20	20	20
D = (150-DTW)	82.83	82.83	80.49	80.49	79.91	79.91	79.38	79.38
H = (Dw-DTW)	22.83	22.83	20.49	20.49	69.91	69.91	69.38	69.38
A	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
B	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
L/Rw	54.36	54.36	48.79	48.79	47.62	47.62	47.62	47.62
Yo	0.91	1.9	0.96	1.5	2.25	2.4	1.68	1.7
Yt	0.16	0.21	0.56	0.83	0.39	0.52	1.23	1.36
t	71	77	20	20	117	117	60	60
Ln Re/Rw =	2.64567	2.64567	2.51661	2.51661	3.19028	3.19028	3.18702	3.18702
K (ft/sec) =	4.10E-05	4.79E-05	4.78E-05	5.25E-05	3.45E-05	3.01E-05	1.20E-05	8.56E-06
AVG K (ft/sec)	4.44E-05		5.02E-05		3.23E-05		1.03E-05	
AVG K (CM/SEC)	1.36E-03		1.53E-03		9.86E-04		3.13E-04	
AVG K (Gal/day/ft2)	2.87E+01		3.24E+01		2.09E+01		6.63E+00	

TABLE 2

SUMMARY OF AQUIFER HYDRAULICS TESTING

Well No.	Hydraulic Conductivity (gpd/ft^2)			Coefficient of Storativity (S) (from pump test)
	Slug Test[a]	Pump Test	Pump Test[b] Analysis Method	
1S	--	460	Cooper Jacob	0.014
2S	NT	NM	--	--
3S	NT	ND	--	--
4S	76	470	residual drawdown	--
5S	140	NM	--	--
6S	NT	970	Cooper Jacob	0.004
7S	43	970	Cooper Jacob	0.013
8S	24	560	Cooper Jacob	0.009
9S	29	NR	--	--
10S	32	NM	--	--
1D	NT	NR	--	--
3D	6.6	NM	--	--
1S, 6S, 7S, 8S	--	860	Distance drawdown (500 minutes)	0.007

a Slug test values included for reference, generally not directly comparable to pump test values.

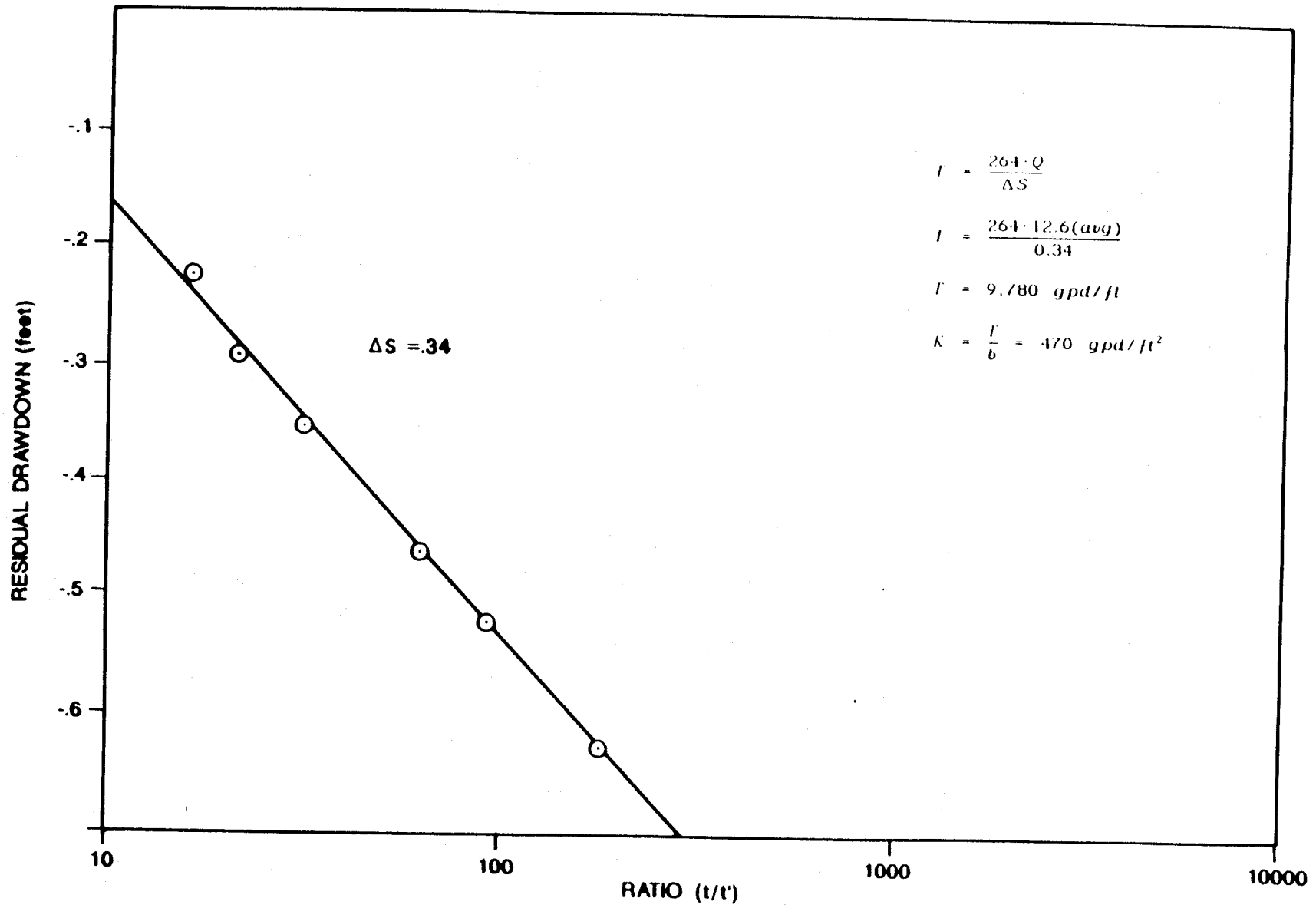
b WCC-4S was pumping well.

NT Not tested.

NR Not responsive.

NM Not monitored.

(2L-ABC/C8GW3-T1)



$$T = \frac{264 \cdot Q}{\Delta S}$$

$$T = \frac{264 \cdot 12.6(avg)}{0.34}$$

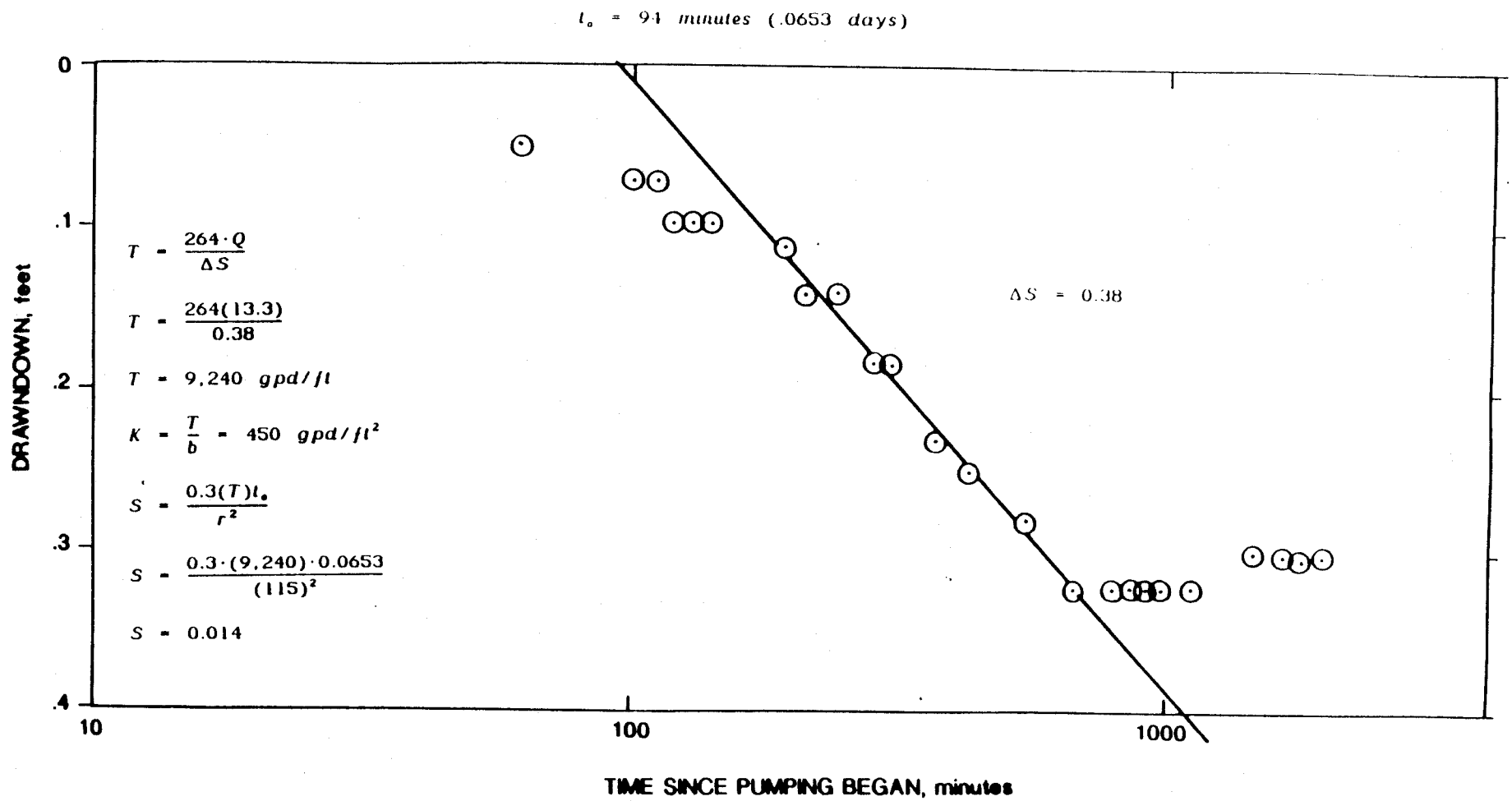
$$T = 9,780 \ gpd/ft$$

$$K = \frac{T}{b} = 470 \ gpd/ft^2$$

PUMPING WELL (WCC-4S) - RESIDUAL DRAWDOWN PLOT

Project No.: 8941863J	Date: FEB. 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-23

Woodward-Clyde Consultants

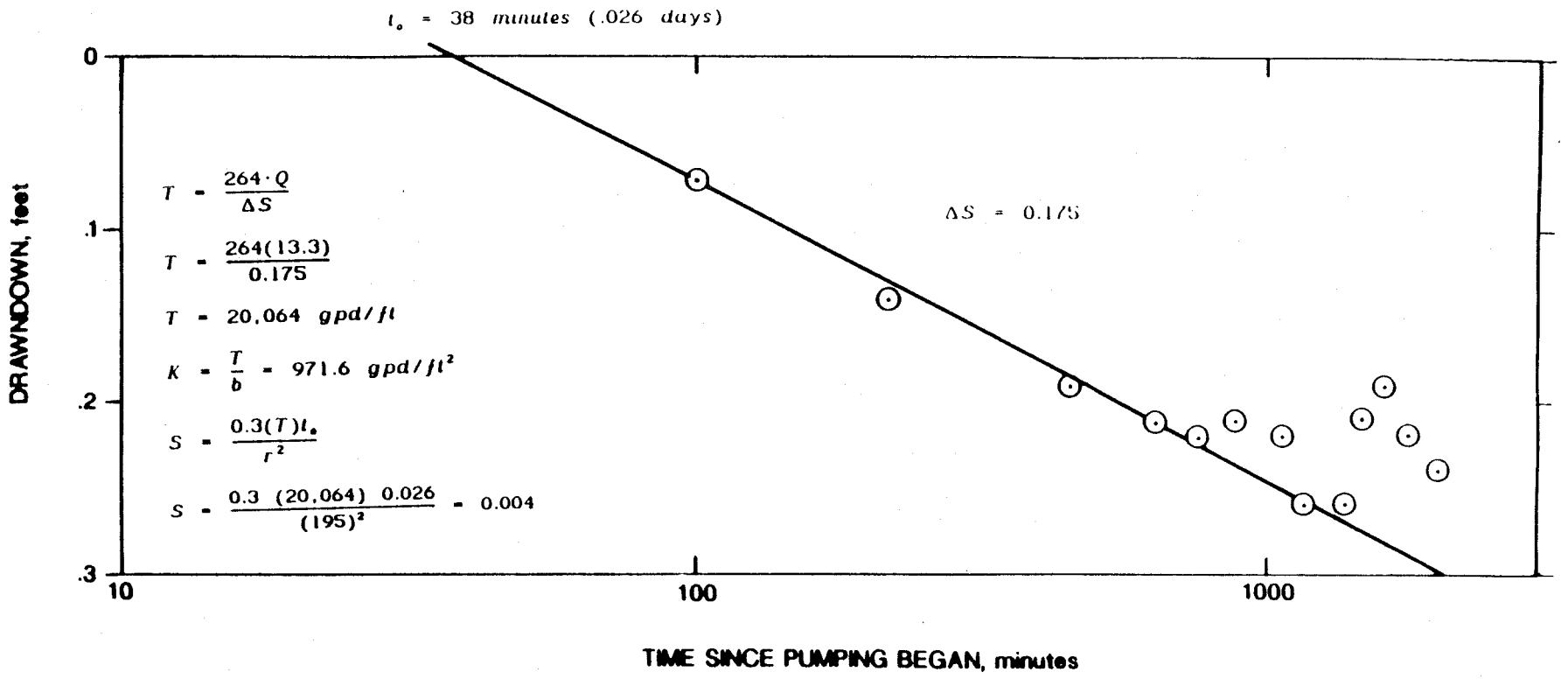


WCC-1S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-24

Woodward-Clyde Consultants

BOE-C6-0139926

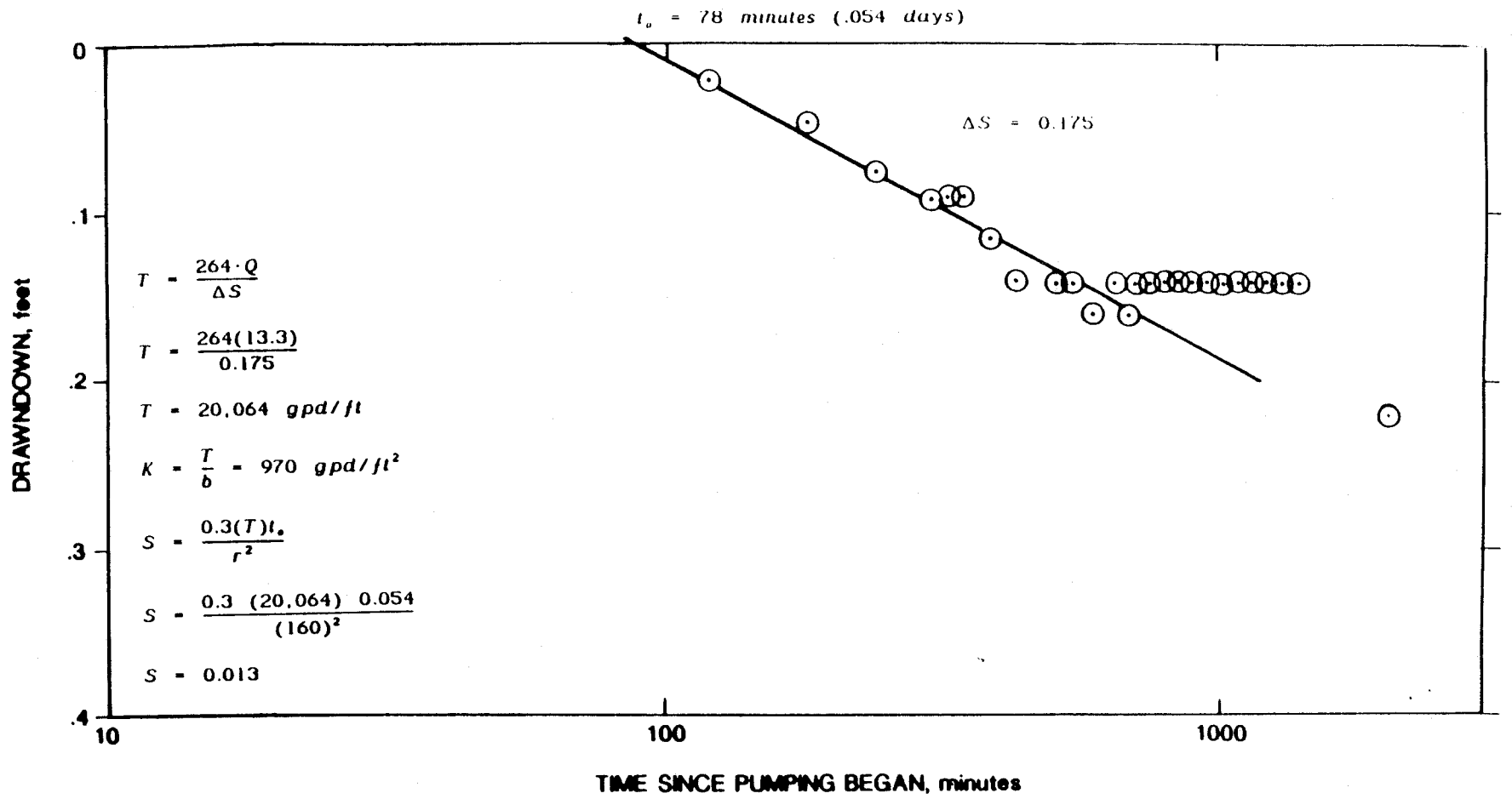


WCC-6S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-25

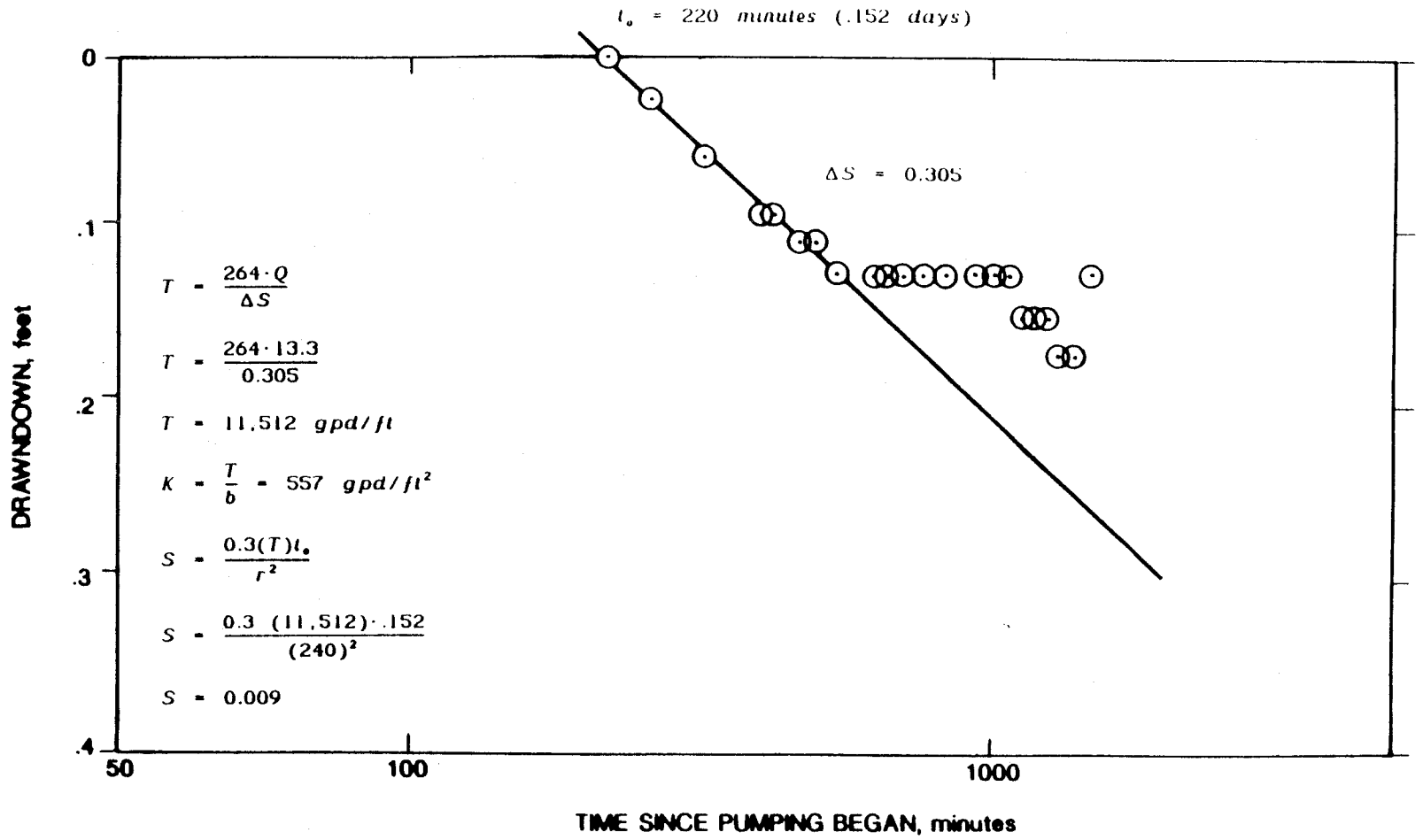
Woodward-Clyde Consultants

BOE-C6-0139927



WCC-7S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-26

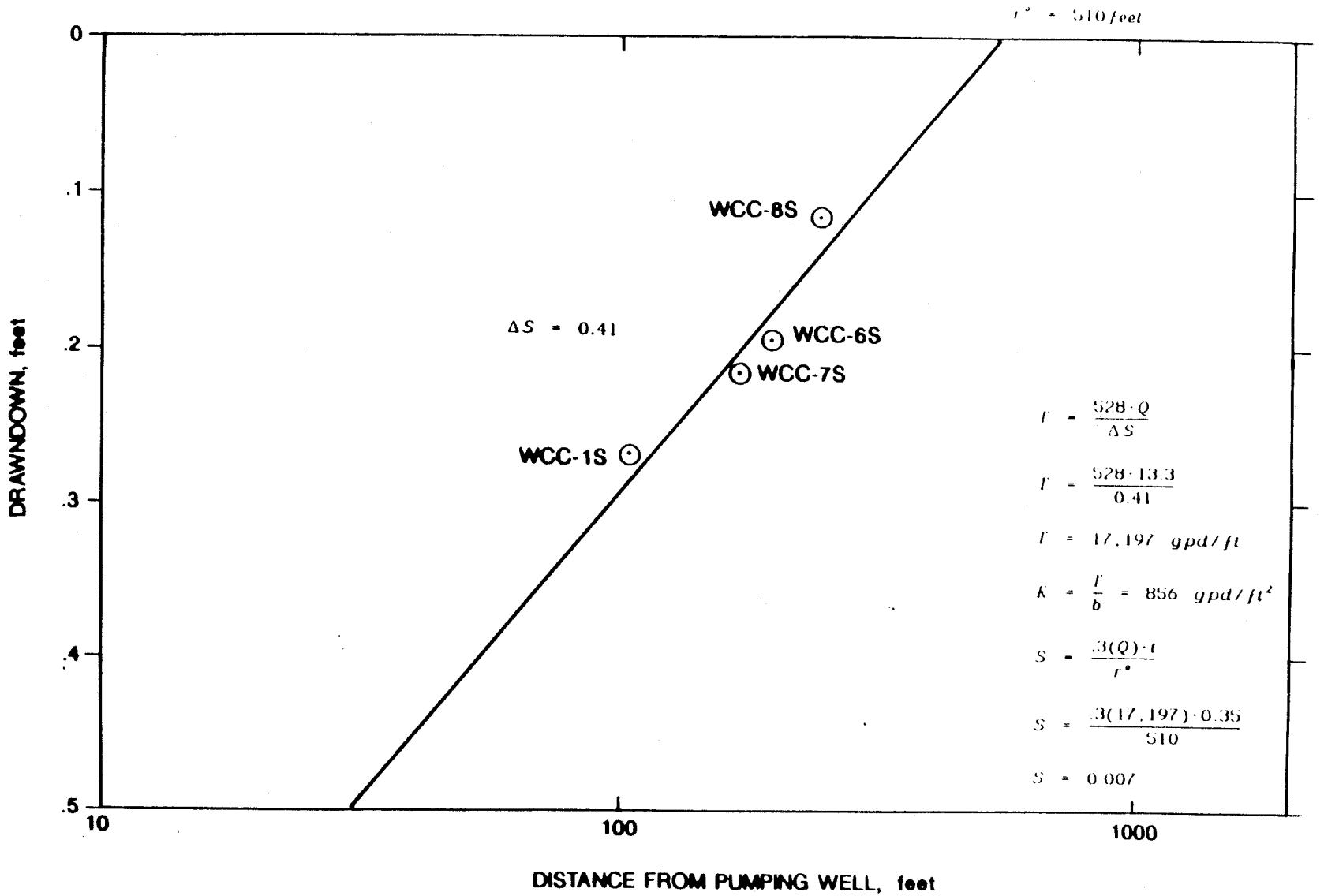


WCC-8S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-27

Woodward-Clyde Consultants

BOE-C6-0139929



DISTANCE/DRAWDOWN PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO	Fig A-28

Woodward-Clyde Consultants

BOE-C6-0139930

APPENDIX A

FIELD PROCEDURES
AND
AQUIFER TESTING DATA ANALYSIS

(2L-ABC/C6GW3-AA)

APPENDIX A

FIELD PROCEDURES AND AQUIFER TESTING DATA ANALYSIS

A.1 GENERAL INFORMATION

Drilling was performed by two companies: A&R Drilling, Inc. of Carson; and Beylik Drilling, Inc. of La Habra California. Drilling began on 5 June 1989 and was completed on 30 June 1989. Soil sample borings and shallow observation well borings were drilled using a CME-75 drill rig equipped with 6-1/2 inch O.D. hollow stem augers for soil sampling and 11-inch O.D. hollow stem augers for well installation. The deep observation well borings were completed by mud rotary drilling using an Ingersoll-Rand drill rig equipped with a 10-inch tri-cone drill bit.

A.1.1 Shallow Observation Well Installation

Observation Wells WCC-7S, 8S, and 10S were constructed of threaded 4-inch diameter, Schedule 40 PVC casing and screen and set to a depth of approximately 90 feet. The observation wells were installed by first drilling a sampling borehole with the 6-1/2-inch outside diameter (O.D.) hollow stem augers. In general, soil samples were collected at near-surface, 5 feet and then at approximately 5 foot intervals. Next, these augers were removed from the boring and the 11-inch O.D. hollow stem augers with a wooden plug placed in the bottom were used to ream out the boring to its total depth of 90 feet. Upon reaching total depth the inside of the augers were quickly filled with tap water and the wooden plug was knocked out of the bottom auger. The water was used to form hydrostatic pressure in the augers to help hold out the surging sands which would otherwise fill up the inside of the bottom augers and prevent a proper well installation. After knocking out the wooden plug, the 4-inch diameter wells were installed by

inserting the casing into the hollow stem auger and allowing the well casing to rest on the bottom of the boring. Filter pack material (Lone Star No. 0/30) was poured from the surface into the annulus between the casing and hollow stem auger. As filter pack material was introduced into the borehole, the hollow stem augers were slowly withdrawn from the hole to allow the filter pack to fall in place between the well casing and native soil. The same procedure was followed in placing the bentonite plug and the volclay grout backfilling.

A.1.2 Deep Observation Well Installation

Observation Wells WCC-1D and WCC-3D were also constructed of threaded 4-inch diameter, Schedule 40 PVC casing and screen and set to a depth of approximately 140 feet. The wells were installed by first completing a sampling borehole using a wire line coring system which was used to attempt continuous coring from 120 to 140 feet. This sampling system worked satisfactorily on WCC-3D, but had little success in WCC-1D. After completing the sampling borehole, the geologic formation was electrically logged (E-logged) by Geo-Hydro-Data, Inc. of Tehachapi, California. Next, the boring was reamed out to the total depth with a 10-inch diameter drill bit.

Once the boring was completed for the casing installation, the drilling mud was thinned to help break down the mud cake formed on the sidewalls of the boring. In both WCC-1D and WCC-3D the mud was thinned too much on the first attempt, and the boring sidewalls caved in and had to be redrilled. The well casing was placed down the 10-inch boring with centralizers installed at five locations along its length to keep it centered in the boring and not laying against the sidewalls. Filter pack sand was placed outside the screened interval of the casing using 1-1/2 inch diameter tremie pipe

and washing it down with tap water. A bentonite plug was set in the boring on top of the filter pack by pouring 1/4-inch bentonite pellets directly into the boring.

After allowing the bentonite pellets to settle into place the remainder of the annulus was backfilled by tremie pipe with volclay grout up to 8 feet below the surface. The top 8 feet of the annulus was backfilled with concrete.

A.1.3 Well Construction

The observation wells were constructed of 4-inch O.D. Schedule 40 PVC flush-threaded blank pipe, and screened with 0.010-inch slotted PVC screen. Adhesives were not used. The shallow wells were installed with 70 feet of blank casing and 30 feet of screen. The deep wells were installed with 120 feet of blank casing and 20 feet of screen. The well screen was filter packed by pouring or treming the filter material into the borehole from the surface. A filter pack material of Lone Star No. 0/30 sand was selected based on a field sieve analysis. Filter pack analysis and design procedures are discussed in Section C.4. The filter pack was placed from the well bottom to about 5 feet above the top of the well screen.

An approximately 5-foot thick bentonite pellet plug was placed on top of the filter pack, to minimize movement of fluids through the annular space. In addition, volclay bentonite grout was placed in the annulus from the top of the bentonite plug to approximately 8 feet below ground surface. A concrete plug was placed from the top of the volclay to the surface, to minimize seepage of surface fluids into the well and to provide strength to the backfill. The top of the well casings were completed 3 to 6 inches below grade with a waterproof locking well cap and protected with a moisture resistant steel traffic-rated

Christy box. Figure A.0 is a schematic of the general observation well design. Appendix D presents the boring logs and graphic well construction details.

A.1.4 Soil Borings

Four soil borings, B-6 through B-9, to collect soil samples for chemical analysis and lithologic logging, were completed in the vicinity of the underground tank cluster, 15T through 18T. Each boring was completed to a depth of 65 feet.

Soil sampling as described in Section A.2 was completed in each boring just below the surface, and at 5-foot intervals to the total depth of each boring.

A.1.5 Soil Boring Backfill

Soil borings B-6 through B-9 were backfilled with silica sand and bentonite powder, at a ratio of 4 to 1. The top 1 to 2 feet of the borings were backfilled with asphalt.

A.2 SOIL SAMPLING

Soil samples were collected at 5-foot intervals in the soil borings and the shallow well borings to make observations regarding subsurface stratigraphic conditions and the presence of contamination, to perform field headspace tests, and to conduct laboratory analyses. Soil samples were collected using a modified California sampler that contained four brass tubes. The brass tubes were filled by driving the sampler 18 inches into undisturbed soil with the drop hammer. The number of blows required to drive the sampler 12 inches was recorded on the boring log and used to evaluate the density or consistency of the soil.

Additional soil sampling was completed for logging purposes only in the deep well borings beginning at 120 foot depth

and continuing to 140 feet. This sampling was performed using a wire line coring system which had a 2-inch diameter by 5-foot long split barrel sampler.

A.2.1 OVA Headspace Measurements

In general, one brass tube from each sample was extruded and placed into a sealable plastic bag. The bag was sealed and after approximately 5 to 10 minutes, an organic vapor analyzer (OVA) probe was inserted into the bag, and the vapor concentration in the headspace was measured and recorded on the boring log.

A.2.2 Soil Sample Preparation

One to two tubes from the soil sampler were prepared for laboratory analysis. The ends of the tubes were covered with aluminum foil, plastic end caps, and sealed with electrical tape. Soil samples were labeled with the following information:

- Project number
- Project name
- Boring number
- Sample number
- Soil depth
- Date
- Sampler's initials

The soil samples were then sealed in Ziploc plastic bags and placed on ice in an ice chest. All of the soil samples were delivered to West Coast Analytical Service, Inc. in Santa Fe Springs, California for analysis. Chain-of-custody procedures, including the use of sample identification

labels and chain-of-custody forms were used for tracking the collection and shipment of soil samples. Copies of the chain-of-custody forms are presented in Appendix C.

A.2.3 Drilling Residuals

Drill cuttings from the soil borings and the shallow well borings were placed in Department of Transportation (DOT) Class 17H 55-gallon drums, and the contents of the drums were labeled using a permanent ink marker and a spray-painted inventory number corresponding to an inventory list compiled by the field engineer. The drums were sealed and stored inside the facility hazardous waste storage area. Drilling mud and soil cuttings produced during installation of the two deep observation wells were pumped into separate roll-off bins next to the wells. Douglas Aircraft was advised of the locations and contents of the drums, and the need for proper management of the drill cuttings.

A.3 FIELD OBSERVATIONS

Observations by Woodward-Clyde Consultants' personnel during the drilling, sampling, and well installation operations were recorded on boring logs, as presented in Appendix B. These observations related to visual soil classifications, geologic and stratigraphic sample descriptions, observation well construction details, sampling efforts, OVA measurements, and other pertinent information.

A.4 FILTER PACK ANALYSIS

The selection of the proper filter pack material and well screen slot size is essential in collecting a sediment-free or low sediment content water sample. In all observation wells, soil samples were collected for sieve analysis. Filter pack design calculations were made based on the grain size distribution of these finest grained soil samples

collected within the designed screen interval and below the ground water table. For observation Wells WCC-1D, 3D, 7S, 8S, and 10S the depths of the samples analyzed were 123, 122, 75, 75, and 80 feet, respectively.

Soil sieve analyses for selection of well screen slot and filter pack size were conducted in the field. Each soil sample was heated with a portable propane stove to evaporate water from the soil. When the sample was dry, it was weighed on a scale to the nearest gram. The soil sample was then poured into the top of an eight sieve stack and shaken for approximately 5 minutes. The sieve sizes used in the analysis are shown in Figure A-1. The soil retained in each sieve was weighed and the cumulative percent retained was calculated for each sieve. The gradation analyses for the wells are illustrated in Figures A-1 through A-5.

A well design using a Lonestar No. 30 sand filter pack and a screen slot width of 0.01 inches (10 slot) was used for the five wells based on the gradation analyses. An ideal gradation of filter pack and screen slot width are plotted on Figures A-1 through A-5 along with the actual material sizes used. These ideal sizes were calculated using the well design formulas presented in "Ground Water and Wells" by Driscoll, 1986." A commercially blended filter pack material was then selected that best matched the calculated filter pack curve, since custom made filter pack materials were not readily available. The grain size analysis curves for Wells -1D, -3D, -7S, -8S, and -10S were similar, and the soils were classified as silty sands to sandy silts. This lithologic classification also correlated with the field descriptions of WCC--1D, -3D, -1S, -2S, -3S, and -4S.

A.5 WELL DEVELOPMENT

Observation Wells WCC-7S, -8S, -10S, -1D, and -3D were developed by Howard Pumps, Inc. of Barstow, California. Development occurred on 5 through 7 July 1989. During this development WCC-1D was damaged by breaking the bottom plug out of the well while bailing. Due to the formation conditions, sand surged up about 8 feet into the casing. This damage was repaired on 20 July 1989 by filling the well casing with drilling mud and then bailing the sand out of the bottom. Then a 2-foot plug of bentonite clay was set in the bottom of the well by pouring dehydrated bentonite pellets down the well and allowing them to hydrate. Once the pellets had hydrated, and formed a new bottom plug, the well was redeveloped.

All of the wells were developed, first by bailing and surging, to remove the maximum amount of sediment possible. Next the wells were pumped by submersible pump to remove a large volume of water and assure the ground water around the well was formation water which had not been affected by the well installation. The two deep observation wells, WCC-1D and -3D, required a greater effort in their development because they were installed using mud rotary drilling. In Table A-1 the development times, and the ground water volumes removed during development are presented. The water removed from each well was observed to become clearer during development and was completely clear upon completion of development. Water removed from the wells during development was stored in one large, steel, temporary "Baker" storage tank on site near Building No. 41, prior to treatment and discharge.

A.6 GROUND WATER SAMPLING

Two rounds of ground water sampling were completed from all ten of the observation wells. On 11, 12, 24, and 25 July 1989 the first round of sampling occurred (the two deep observation wells were sampled on the later two dates due to the damage of WCC-1D), and on 21 through 23 August 1989 the second round of sampling was completed.

Prior to beginning sampling procedures the static ground water level was measured in each well to the nearest one hundredth of a foot using an electronic well sounder. Then each well was purged, to remove possible stagnant water, by evacuating a minimum of three casing volumes of ground water. This was accomplished by bailing the well with a 3-1/2-inch-diamter PVC bailer attached to new polypropylene rope. The exception to this was the purging of WCA-1D and -3D on the first round of sampling only. These wells were purged by setting a submersible pump in the well and pumping a large volume of water for a final effort in development.

Throughout purging, and just prior to sampling the wells, pH, electrical conductivity or total dissolved solids, and temperature were measured and recorded for the evacuated ground water (Table A-2). These measurements were made to confirm that the wells were purged sufficiently. Sampling was done with a 1-1/2-inch-diameter Teflon bailer suspended from a monofilament line. Water samples were collected from each well in two 40 ml VOA vials.

In addition to water samples, bailer rinse samples were also collected in two 40 ml VOA vials for each well prior to collecting the water samples. The rinse samples were collected for possible analysis to confirm the sampling equipment was satisfactorily decontaminated.

The water samples, rinse samples, and two 40 ml VOA trip blanks for each sampling round, were packed on ice in a portable chest immediately after collection. Samples were delivered on the day following collection to West Coast Analytical Services. Chain-of-custody procedures, including the use of sample identification labels and chain-of-custody form, were used for tracking the collection and delivery of the samples. The chain-of-custody form is presented in Appendix C.

A.7 EQUIPMENT DECONTAMINATION PROCEDURES

Soil and ground water sampling equipment was decontaminated between sampling events using the following procedure:

1. Brush-assisted water rinse to remove soil and mud (soil sampling only)
2. Water wash with Liquinox
3. Deionized water rinse to remove Liquinox
4. Second rinse with deionized water
5. Dry with paper towels (soil sampling only).

Prior to use at the site, the brass tubes used in the modified California sampler were cleaned in WCC's laboratory by washing sequentially in dilute sulfuric acid, Liquinox and water, and deionized water. The tubes were then air dried, and stored in sealable plastic bags prior to use at the site. New end caps were carried to the site in sealable plastic bags.

Drill augers or pipes, pumps, bailers, surge blocks, and cables were all steam cleaned prior to working on each boring or well. Steam cleaning was performed by the drilling companies on the facilities steam cleaning pad.

A.8 SLUG TESTING

Slug tests were conducted on observation Wells WCC-4S, -5S, -7S, -8S, -9S, -10S, -1D, and -3D on 19 July, 30 August, and 4 October 1989. Slug testing is a relatively quick and cost-effective method of measuring actual field hydraulic conductivity (K) values. Slug test derived hydraulic conductivity (K) values are not as accurate as aquifer pump test derived values, however, they are useful in preliminary calculations and in identifying large anomalies in hydraulic conductivity (K) values.

Slug tests only measure the average horizontal hydraulic conductivity (K) in the immediate vicinity of the well. In comparison a pump test stresses the aquifer at a greater radial distance, and as a result, a more representative hydraulic conductivity value (K) is obtained.

The slug tests were performed using the following equipment:

- DL-120-MCP Envirolabs data logger with a 25 psi pressure transducer
- One 3.25-inch diameter x 39-inch-long sand weighted mandrel with a 1.4 gallon volume
- Steel tripod and polyethylene rope

The weighted mandrel was used with the tripod and rope to simulate a slug of water being inserted and withdrawn from the well. The pressure transducer and data logger recorded the subsequent drawdown and recovery water level measurements of the well. One cycle of drawdown and recovery was performed on each observation well.

Data from the slug tests were evaluated using the Bouwer-Rice method (June 1976) for calculating hydraulic conductivity (K). Bouwer and Rice developed a procedure

that considers the effects from partially penetrating wells, the radius of the gravel pack, and the effective radius of influence of the test.

The Bouwer and Rice method entails solving the following equation:

$$K = \frac{r_c^2 \ \ln(R_e/R_w)}{2Lt} \ \ln \ (Y_o/Y_t)$$

Where:

K = hydraulic conductivity

r_c = radius of well casing

R_e = effective radius of influence

r_w = radius of the well boring

L = length of screened interval or saturated thickness if entire screen is not saturated

t = arbitrarily selected time from drawdown/time semi-log plot

Y_o = initial drawdown at time t = 0, from drawdown/ time semi-log plot

Y_t = drawdown (distance between water level in well and static water level) at selected time (t) from drawdown/time semi-log plot

The term R_e/r_w, which is a function of the radius over which the drawdown in the well is dissipated, was solved using the following equation:

$$\ln(R_e/r_w) = \left[\frac{1.1}{\ln(H/r_w)} + \frac{A + B\ln[(D-H)/r_w]}{L/r_w}\right]^{-1}$$

Where:

H = distance from base of well to Static Water Level (SWL)

L = length of screen (or saturated thickness if entire screen is not saturated)

D = thickness of aquifer

A = constant based on value of L/r_w

(see Figure A-22)

B = constant based on value of L/r_w

(see Figure A-22)

The test data were plotted on a semi-log diagram of drawdown (Y_t) versus time (t), drawdown being logarithmic (see Figures A-6 through A-21). The data should generate a straight line, although a flat "tail" is frequently observed. A drawdown (Y_t) is recorded for a selected time (t) within the straight line segment of the plot. Y_t and t are used in solving the equation for K.

The Bouwer and Rice method makes the following assumptions:

1. The aquifer is of constant thickness.
2. The soil is homogeneous and isotropic.
3. Flow is horizontal in the aquifer.

These assumptions are judged to be generally reasonable, recognizing that variations in aquifer thickness and anisotropic conditions will have an influence on calculated results.

A.9 PUMP TEST

The pumping well, WCC-4S, was selected because it is centrally located to the surrounding observation wells. In addition information collected during slug testing indicated the well would have a relatively high yield. Wells WCC-1S, -4S, -6S, -7S, -8S, -9S, and -1D served as observation wells.

Details of the well design for the existing ten shallow observation wells and the two deep observation wells are summarized in Table A-3. Depth of groundwater and distance to the pumping well is also included. Figure 2 shows the locations of the wells.

A 1-1/2 horsepower submersible pump was used to pump water from WCC-4S. The pump was switched on at 12:00 p.m. on 20 December 1989 and allowed to pump at 13.3 gpm for 16 hours and 30 minutes. At this rate the water level was nearly stable at a drawdown of approximately 6 feet.

The evacuated groundwater was stored in two 21,000-gallon transportable steel storage tanks. Storage requirements were estimated based on well development activities which indicated a maximum pumping rate of 4 to 5 gallons per minute. Assuming a pumping rate of up to 10 gallons per minute, Woodward-Clyde initially ordered one storage tank and figured if and when a second storage tank was required, it would be more than 24 hours after the pumping began. Because the pumping rate was greater than 10 gpm the second storage tank would have been needed before the tank rental company could respond to our request, if the 13.3 gpm pumping rate was sustained. Therefore, the flow rate was reduced to 8.5 gpm for 4-1/2 hours. After the second tank was delivered to the site, the flow rate of 13.3 was resumed and maintained for the remainder of 30 total hours of "pumping". The overall time weighted pumping rate was

approximately 12.6 gal/min. The pump was switched off at 6:00 p.m. on 21 December 1989. Measurements in the pumping well and all the monitoring wells continued until WCC-4S had recovered 99 percent of its maximum drawdown, two hours after the pump was shut off.

Water was pumped to the surface and approximately 400 feet horizontally to the storage tanks. The volume of water pumped out of WCC-4S was measured by an in-line totalizer. A total of approximately 28,000 gallons of groundwater was evacuated.

Five of the monitoring wells WCC-4S, -1S, -7S, -8S, and -1D had pressure transducers installed and connected to one of three Terra 8 data loggers to automatically measure and record the depth to groundwater. In addition, Woodward-Clyde measured the depth to groundwater on regular intervals in all of the observation wells except WCC-1S, -4S, and -1D. This task was performed using a Solonist electric well sounder. In addition barometric pressure readings were collected at regular intervals throughout the pump test using a Swift, Model 477 barometer.

The data from each well showing a discernable reaction were analyzed using one or more of the following techniques: Recovery (Residual Drawdown) plot, Cooper-Jacob Time-Drawdown plot, and/or Distance/Drawdown plot. A summary of the results is previously presented in Table 2. Slug test values obtained earlier are included for reference.

The nearly instantaneous initial drawdown and the subsequent constant drawdown with time, precluded any valid analyses of the pumping stage drawdown in the pumping well WCC-4S.

Nevertheless the recovery data for the pumping well which did appear valid was analyzed using a residual drawdown plotting technique.

This technique utilizes a semi-log plot of the residual drawdown (in feet) vs. the ratio of t/t′ (see Figure A-23) where:

t = time since pumping started

t′ = time since pumping stopped

The differential change in water level (Δs) is thus obtained from the plot and used in the equation:

$$K = \frac{264Q}{\Delta s \cdot b} \qquad (1)$$

where:

K = Hydraulic conductivity in gpd/ft^2

Q = Pumping rate, in gpm

Δs = Differential change in water level during one log cycle of time, in feet

b = The aquifer thickness (20.65 feet at WCC-4S)

Data for the observation wells WCC-1S, -6S, -7S, and -8S were analyzed using the Cooper-Jacob Time-Drawdown technique as shown on Figures A-24 to A-27. A calculation of μ (from the well function, Driscoll 1986) showed the technique would be appropriate in general. A Distance/Drawdown plot shows the change in drawdown as a function of distance from the pumping well. The equations used and the calculations are shown with the plot. Analytical methods used are discussed

in the literature (Driscoll, 1986; Walton, 1987). The fundamental equation for hydraulic conductivity is identical to Equation (1) above. Other equations include:

$$T = Kb \tag{2}$$

and

$$S = \frac{0.3Tt_o}{r^2} \tag{3}$$

where:

T = Coefficient of transmissivity, in gpd/ft

K = Hydraulic conductivity in gpd/ft^2 (Equation [1])

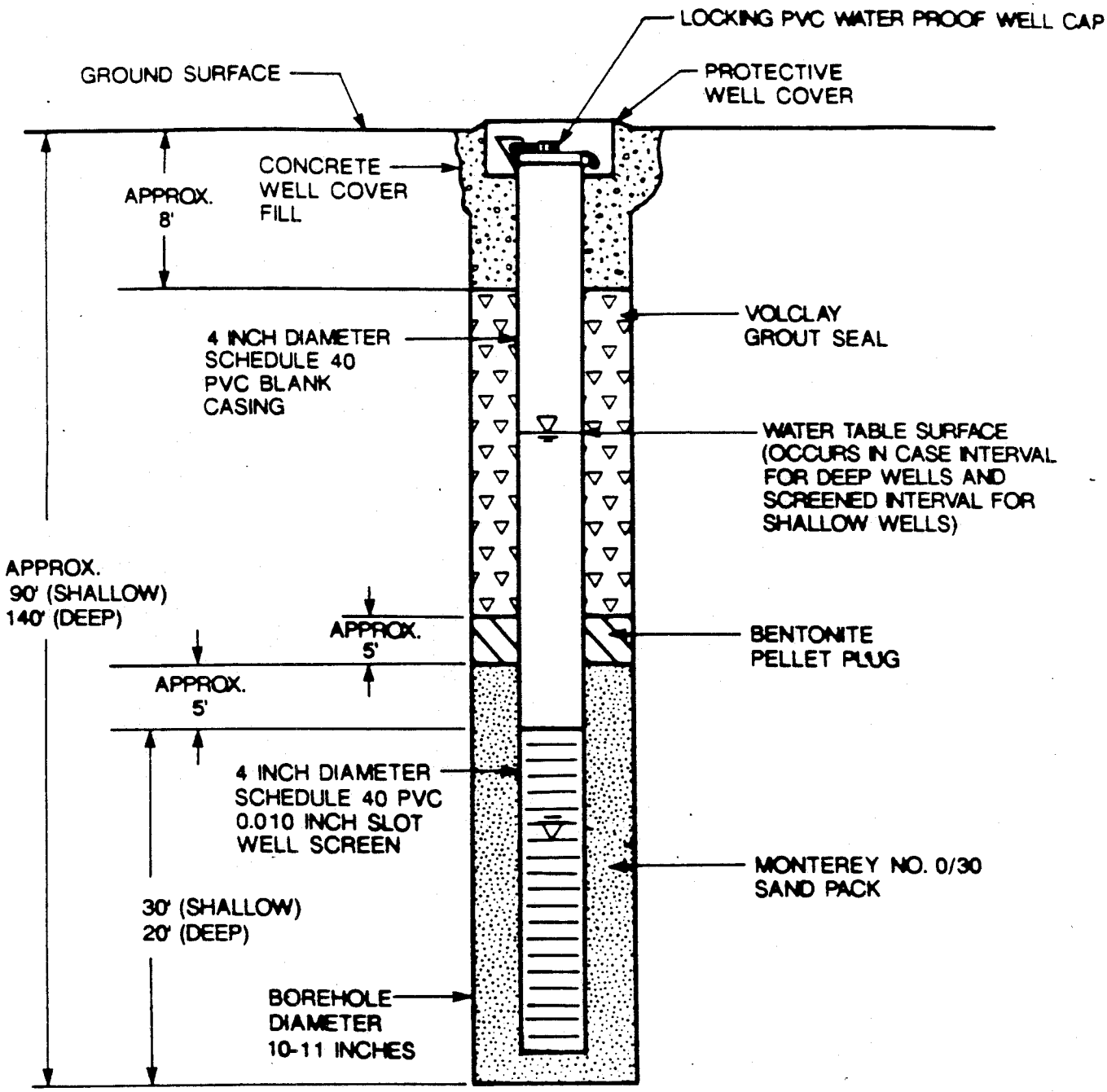
b = Saturated thickness of the aquifer tested in feet

s = Storage coefficient (dimensionless)

t_o = Time, in days, of the intercept of the extrapolated drawdown curve at zero drawdown

r = Distance, in feet, from pumped well to the observation well where drawdown measurements were made

These plots allowed the calculation of both hydraulic conductivity, and storage coefficient according to Equations (1) and (3). The method of plotting and the calculation are shown on Figure A-28.



NOT TO SCALE

SHALLOW WELL DEPTH 90 FEET
DEEP WELL DEPTH 140 FEET

DESIGN APPLIES TO
WCC-7s, -8s, -10s, -1D, AND -3D

GENERAL OBSERVATION WELL DESIGN

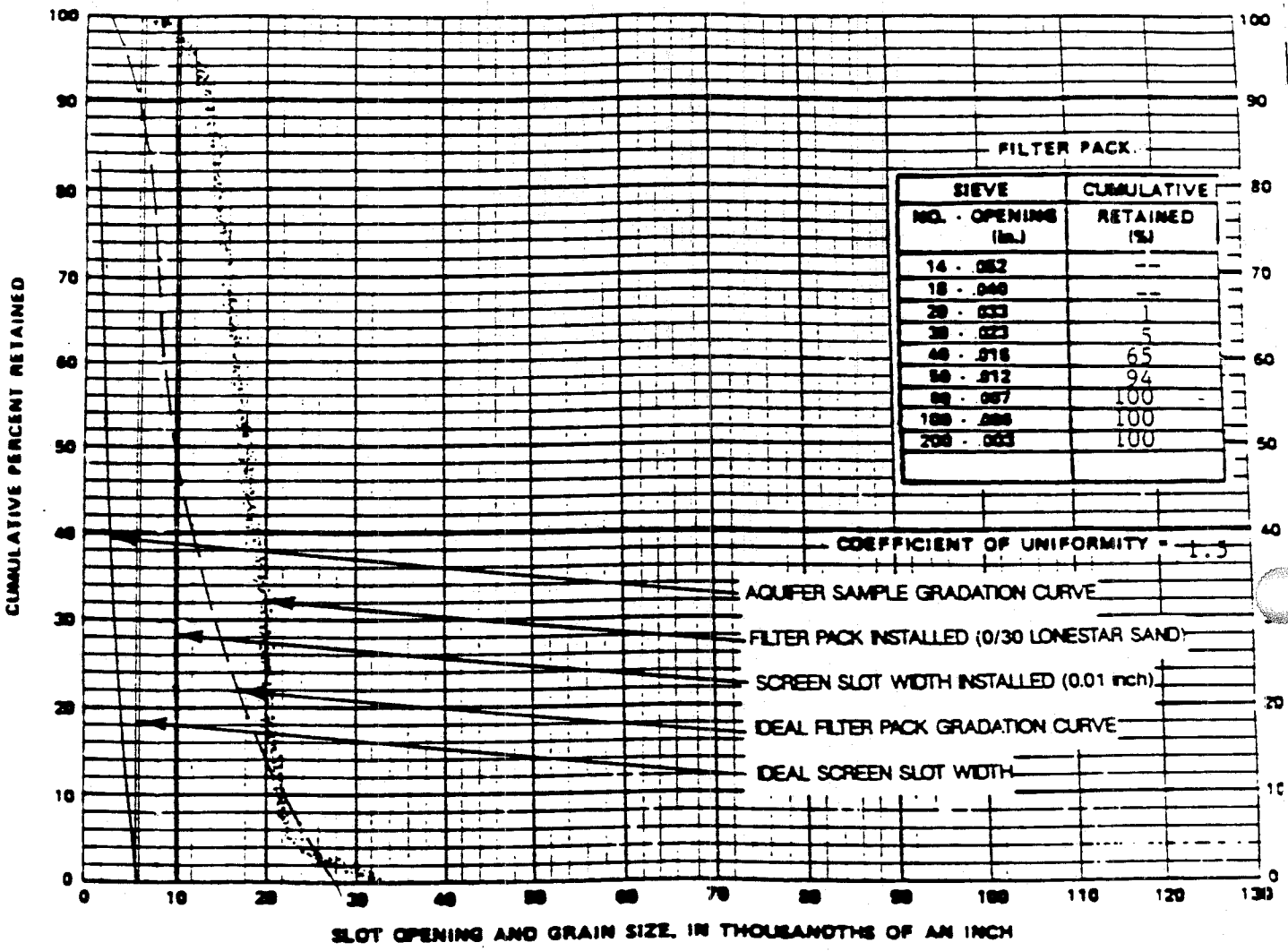
Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT-C6 FACILITY	Fig. A.0

Well Name: WCC-7s Date: 8 June 1989

Well Location: 160 ft. South of WCC-4s

Sample Depth: 75 ft. Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .007	100
100 - .006	100
200 - .003	100

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .0086	--	--	
80 - .007	--	--	
100 - .006	5	2.0	
200 - .003	124	46.0	
Bottom Pan	270	100.0	

Notes: WET WT. of sample: 350 gm
DRY WT. of sample: 270 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

GRAIN SIZE ANALYSIS WCC-7S

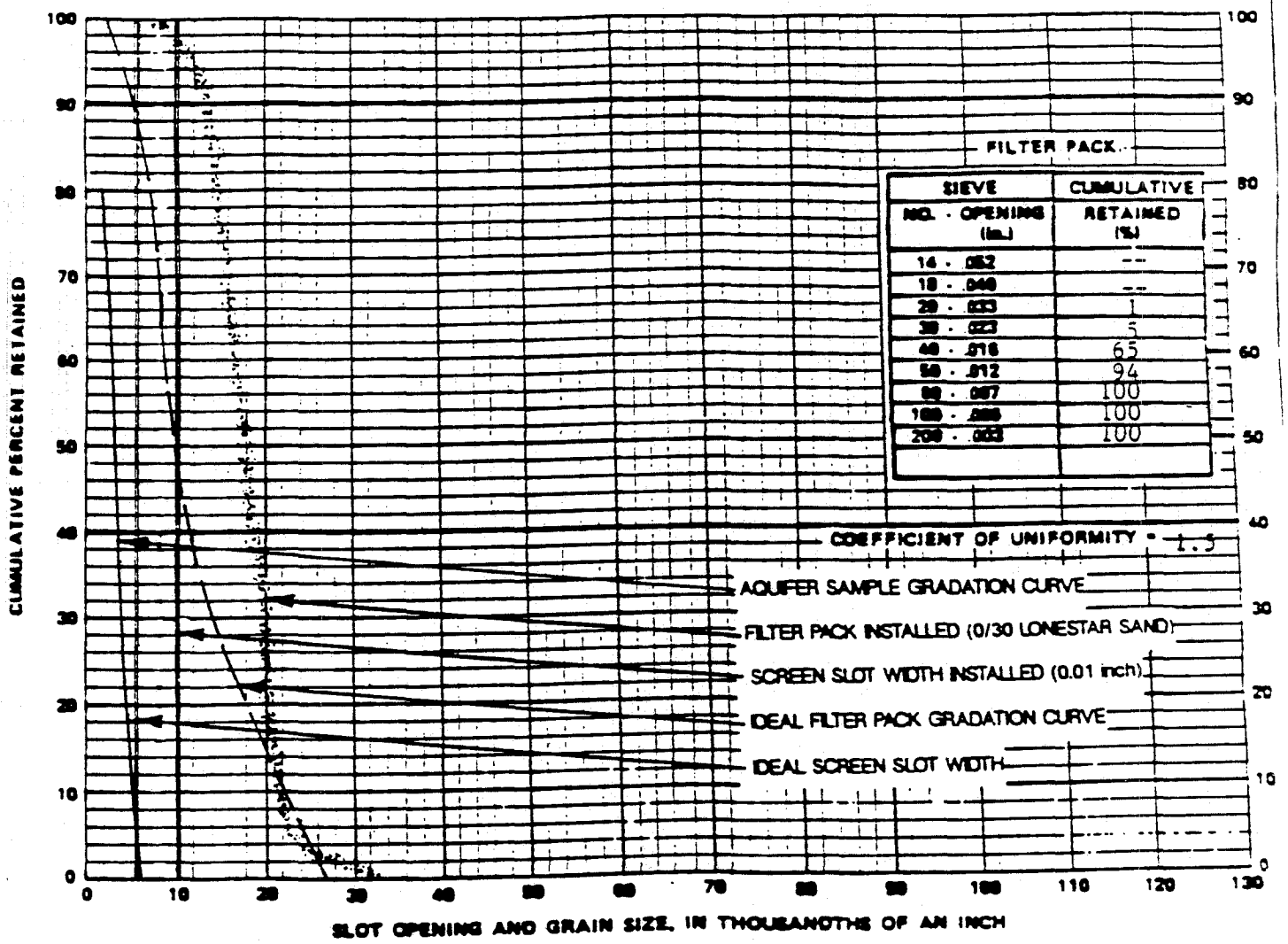
Fig. A.1

Well Name: WCC-8s **Date:** 12 June 1989

Well Location: N125 ft. North of WCC-1s

Sample Depth: 75 ft. **Performed By:** P.GLAESMAN/H. REYES

Comments:



SIEVE NO. · OPENING (in.)	CUMULATIVE RETAINED (%)
14 · .052	--
18 · .040	--
20 · .033	1
30 · .023	5
40 · .016	65
50 · .012	94
60 · .007	100
100 · .006	100
200 · .003	100

SIEVE NO. · OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 · 040	--	--	
20 · 033	--	--	
30 · 023	--	--	
40 · 016	--	--	
50 · 012	--	--	
60 · 0086	--	--	
80 · 007	--	--	
100 · 006	3	1.0	
200 · 003	123	52.0	
Bottom Pan	235	100.0	

Notes: WET WT. of sample: 300 gm
DRY WT. of sample: 235 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

GRAIN SIZE ANALYSIS WCC-8S

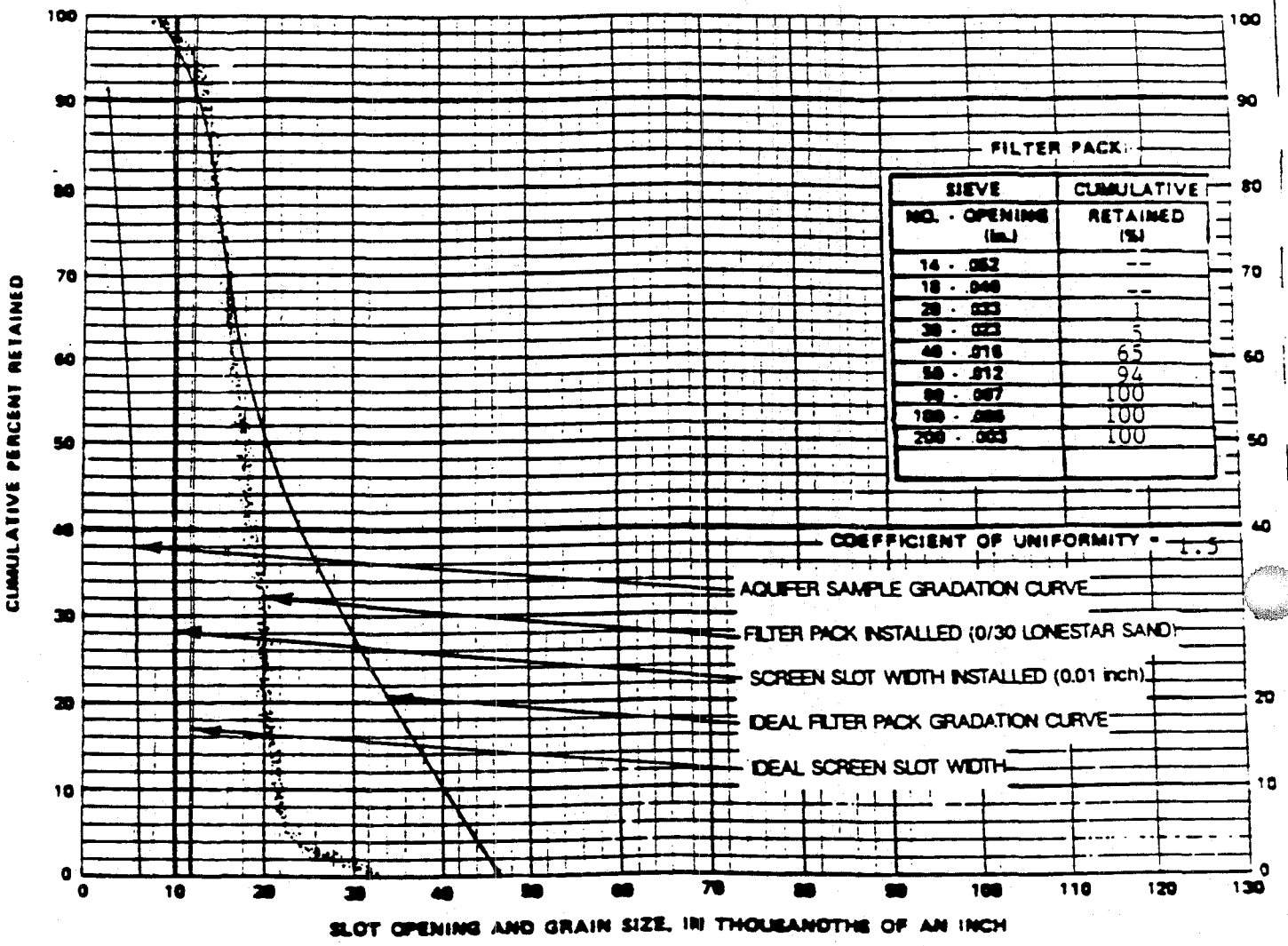
Fig. A.2

Well Name: WCC-10S Date: 6 June 1989

Well Location: Northwest corner of property

Sample Depth: 80 ft. Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .009	100
80 - .007	100
100 - .006	100
200 - .003	

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .009	--	--	
80 - .007	--	--	
100 - .006	157	35.0	
200 - .003	395	88.0	
Bottom Pan	450	100.0	

Notes: WET WT. of sample: 528 gm
DRY WT. of sample: 450 gm

Recommended Slot Opening:

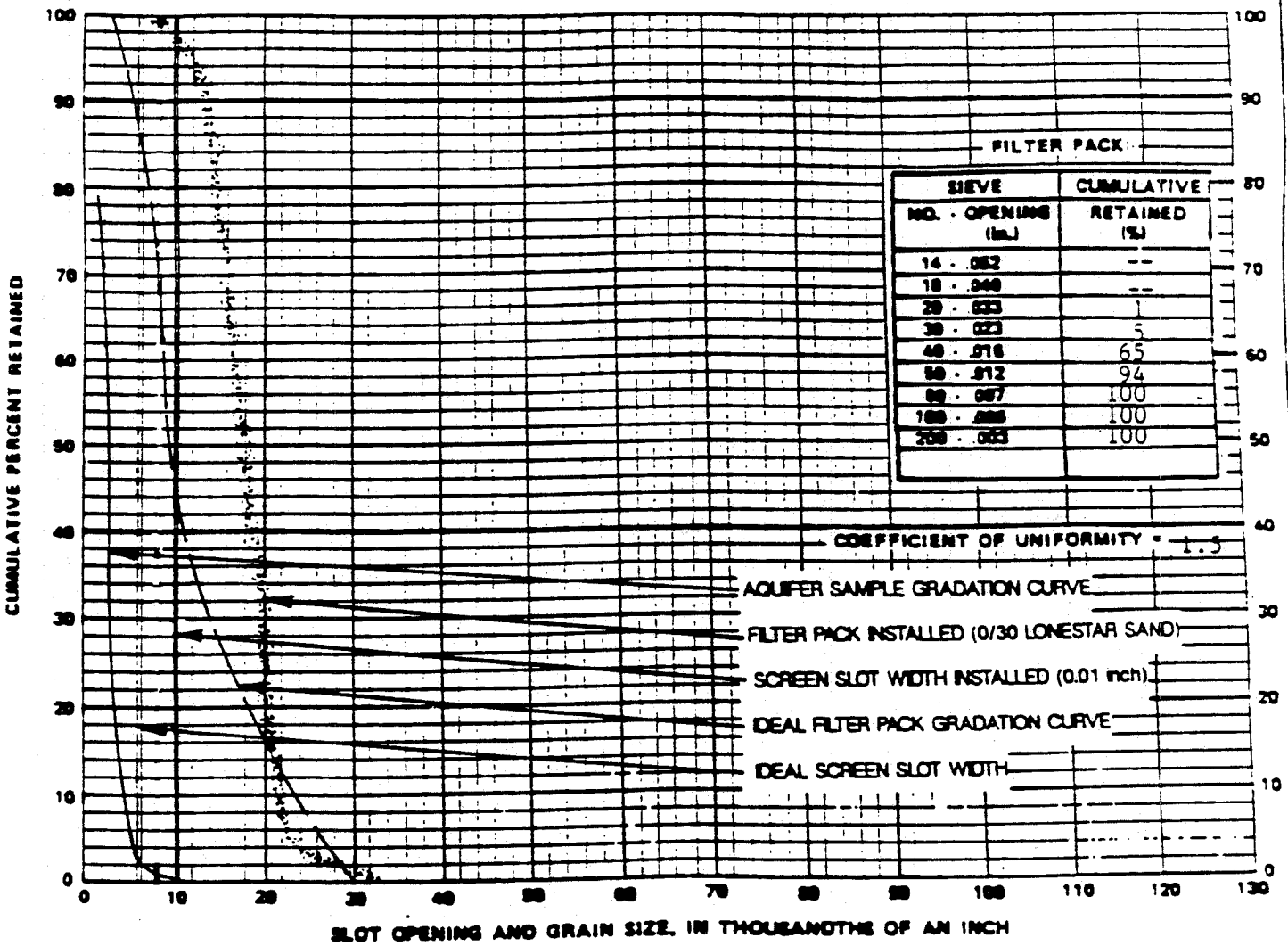
Project DOUGLAS AIRCRAFT CO. - TORRANCE Project No. 8941863J	GRAIN SIZE ANALYSIS WCC-10S	Fig. A.3

Well Name: WCC-1D Date: 6-29-89

Well Location: 10 feet south of WCC-1S

Sample Depth: 123 feet Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .007	100
100 - .006	100
200 - .003	100

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	2	0.8	
60 - .0098	2	0.8	
80 - .007	2	0.8	
100 - .006	8	3.1	
200 - .003	100	39.4	
Bottom Pan	254	100.0	

Notes: WET WT. of sample: 300 gm
DRY WT. of sample: 254 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

GRAIN SIZE ANALYSIS WCC-1D

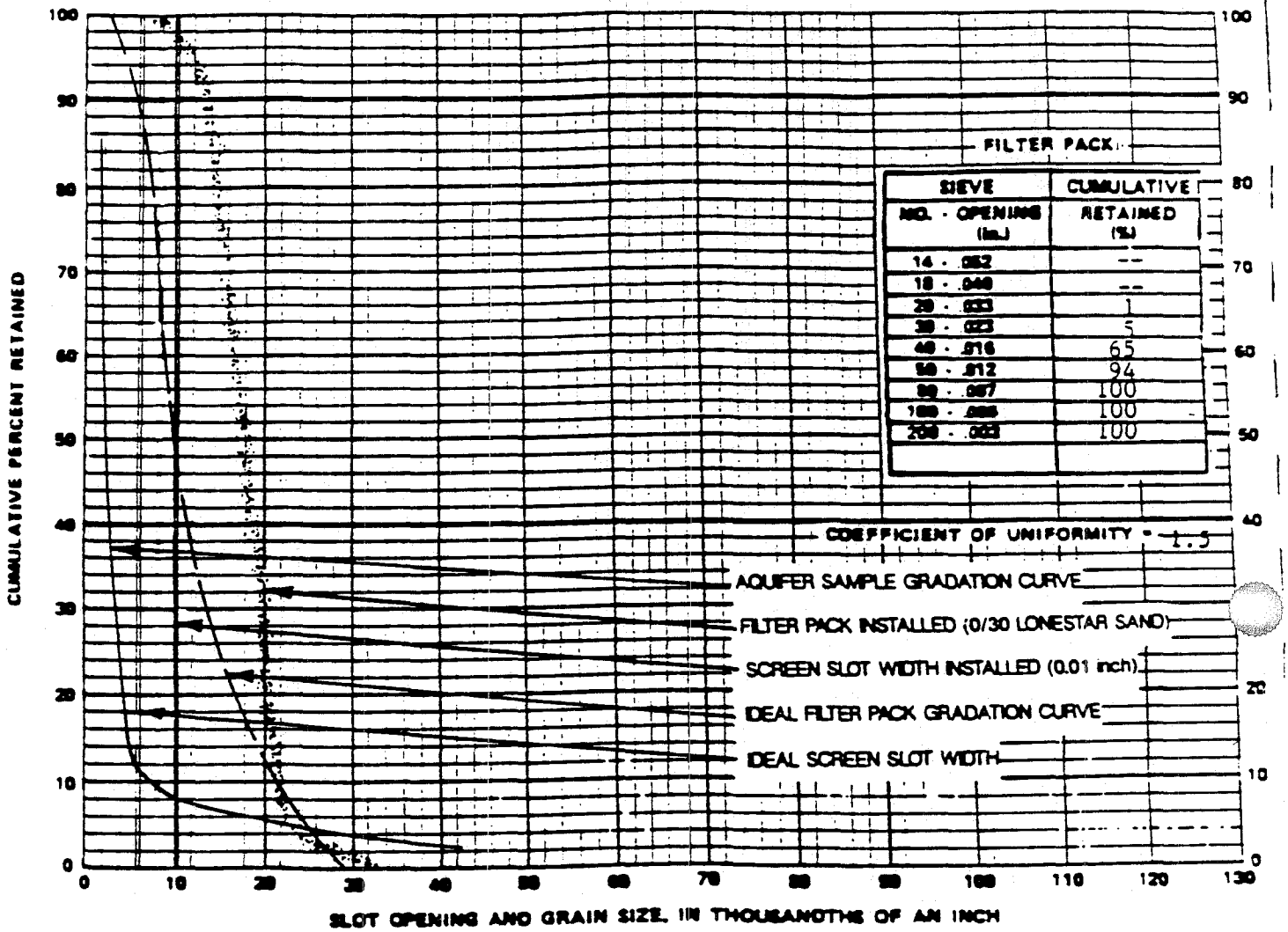
Fig. A.4

Well Name: WCC-3D Date: 6-27-89

Well Location: 35 feet northwest of WCC-3S

Sample Depth: 122 feet Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .007	100
100 - .006	100
200 - .003	100

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	9	3.6	
30 - .023	10	4.0	
40 - .016	12	4.8	
50 - .012	19	7.6	
60 - .0098	20	8.0	
80 - .007	22	8.8	
100 - .006	25	10.0	
200 - .003	122	48.8	
Bottom Pan	250	100.0	

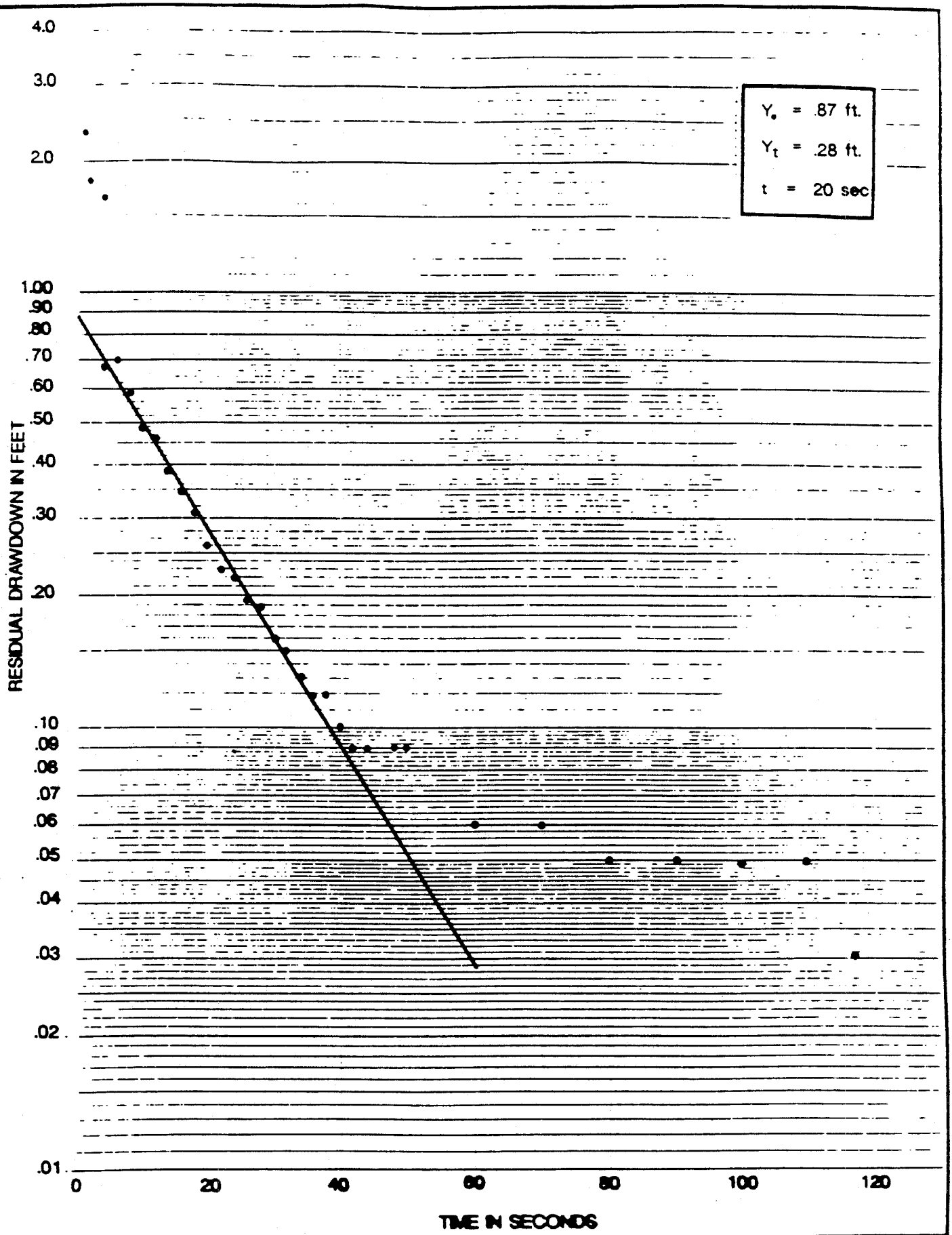
Notes: WET WT. of sample: 300 gm
DRY WT. of sample: 250 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

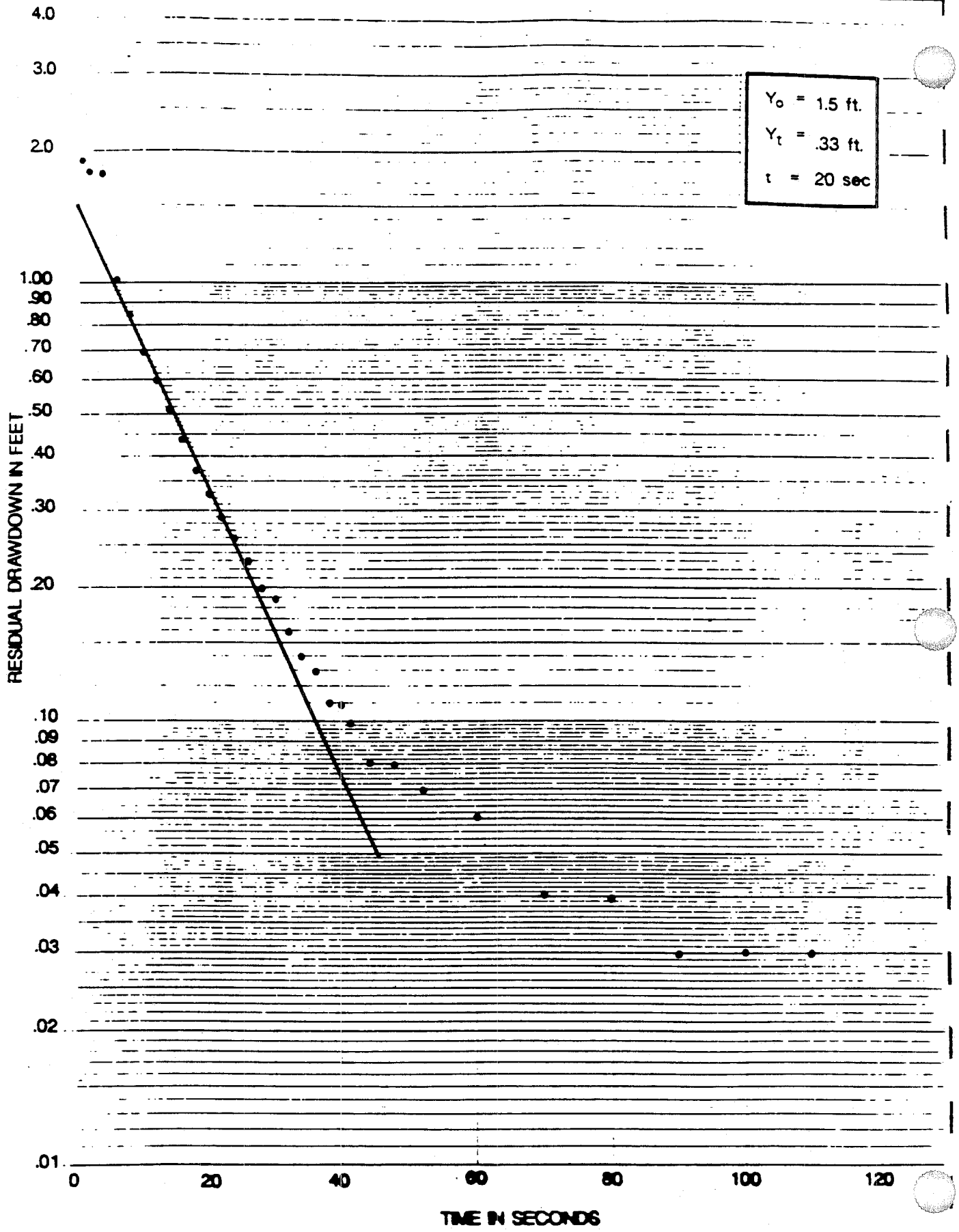
GRAIN SIZE ANALYSIS WCC-3D

Fig. A.5



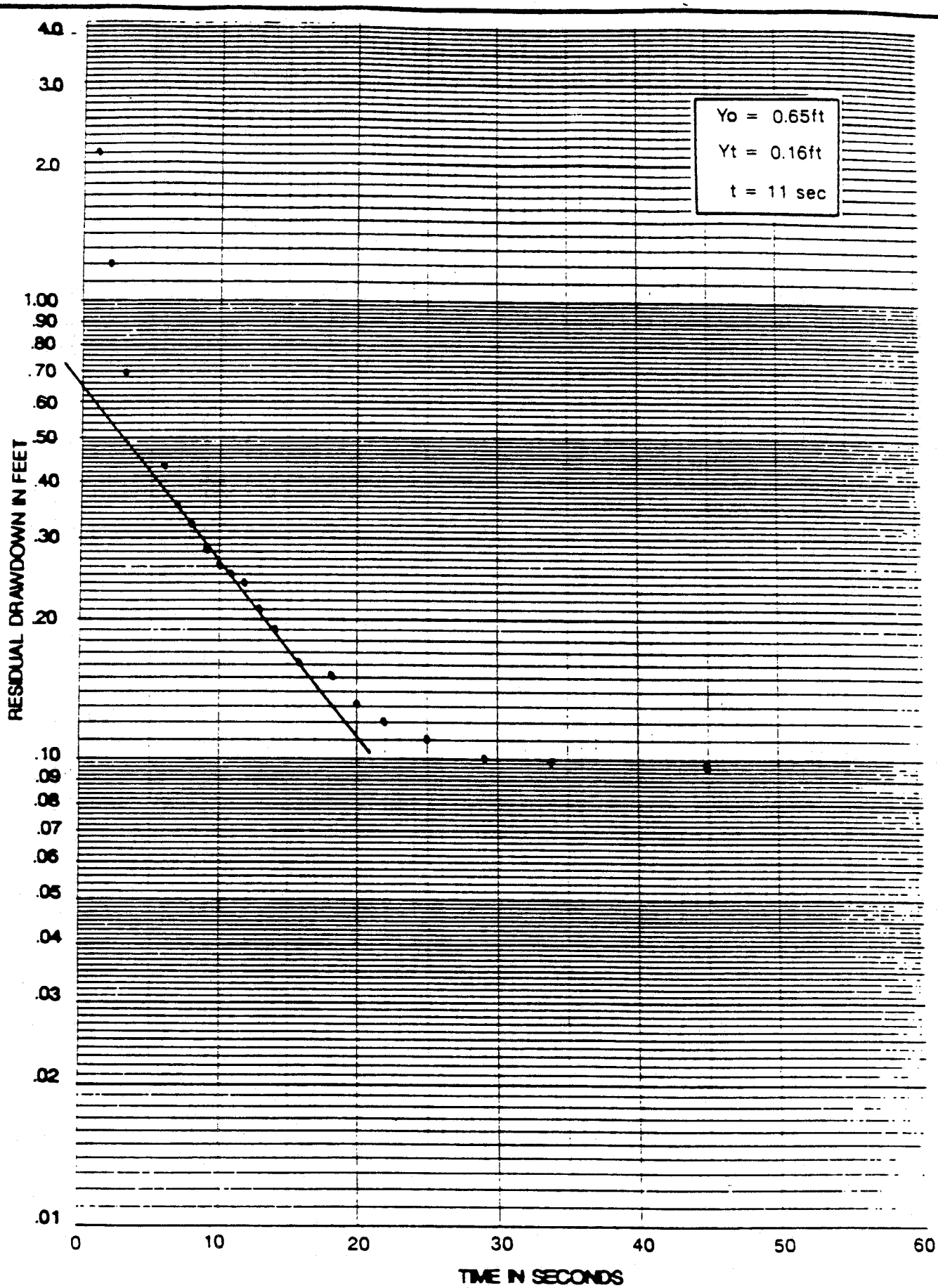
WCC-4S SLUG TEST INSERT

Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.6



WCC-4S SLUG TEST WITHDRAWAL

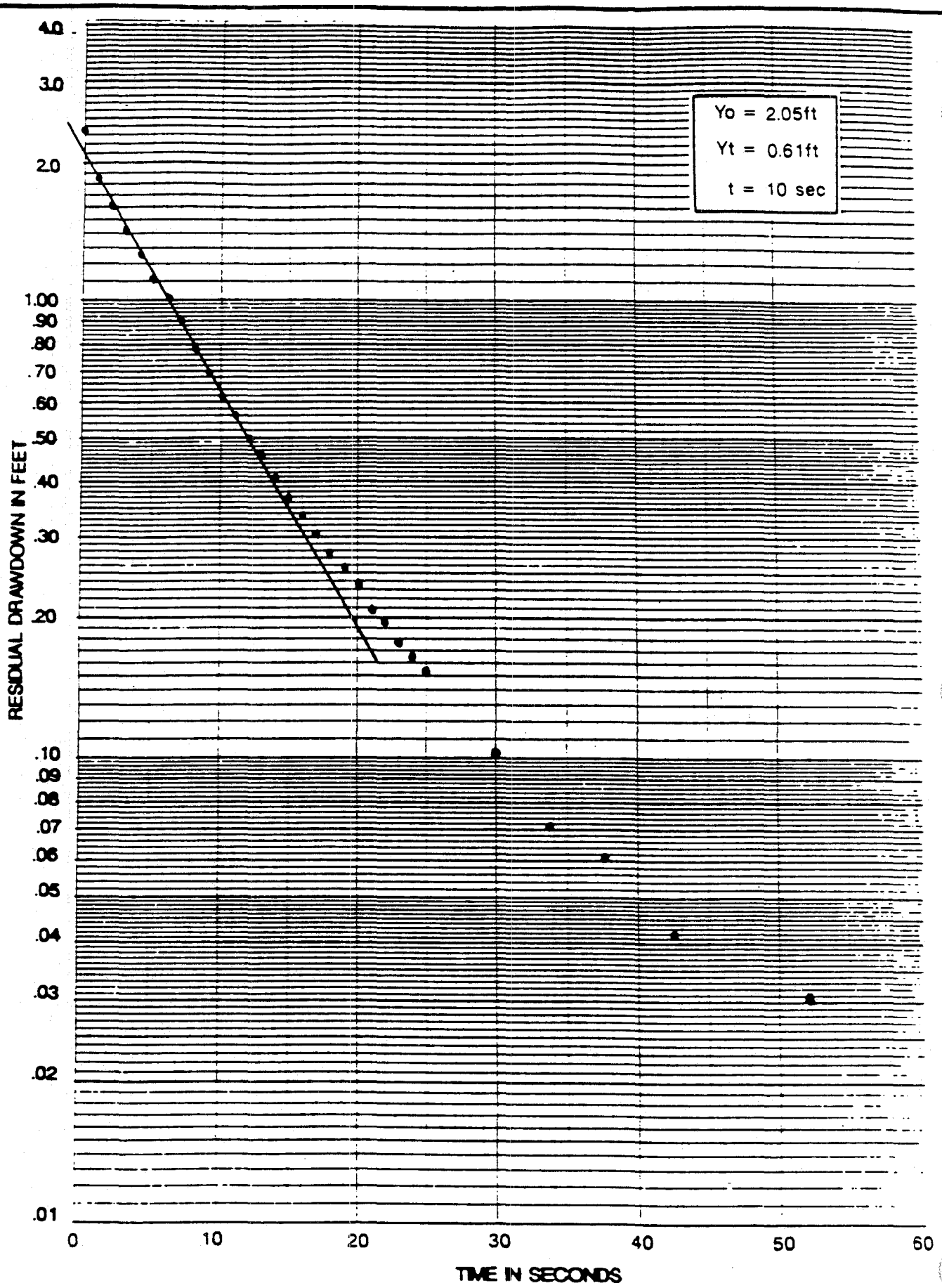
Project No.: [redacted]	Date: AUGUST [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.7



WCC-5S SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.8

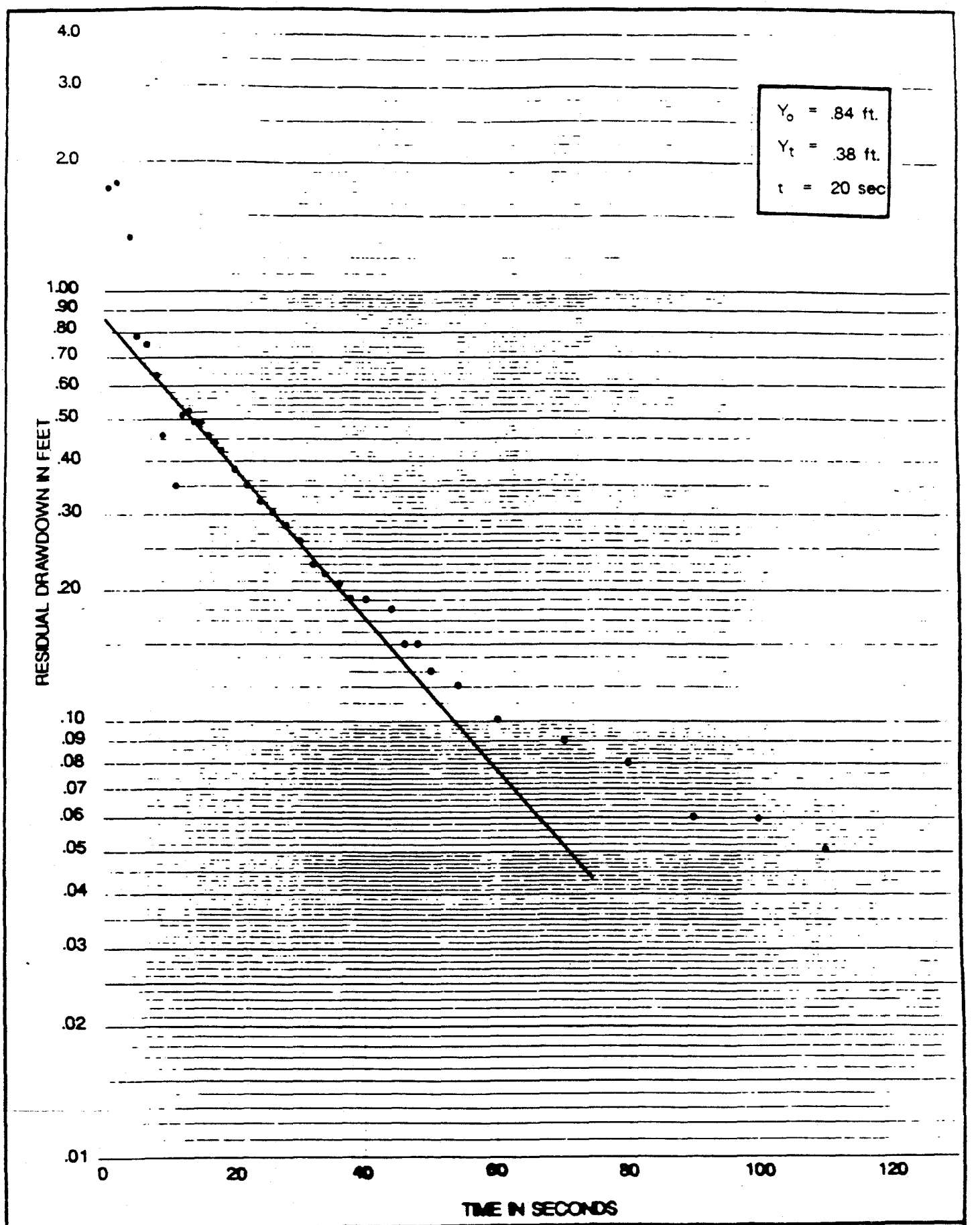
Woodward-Clyde Consultants



WCC-5S SLUG TEST WITHDRAWAL

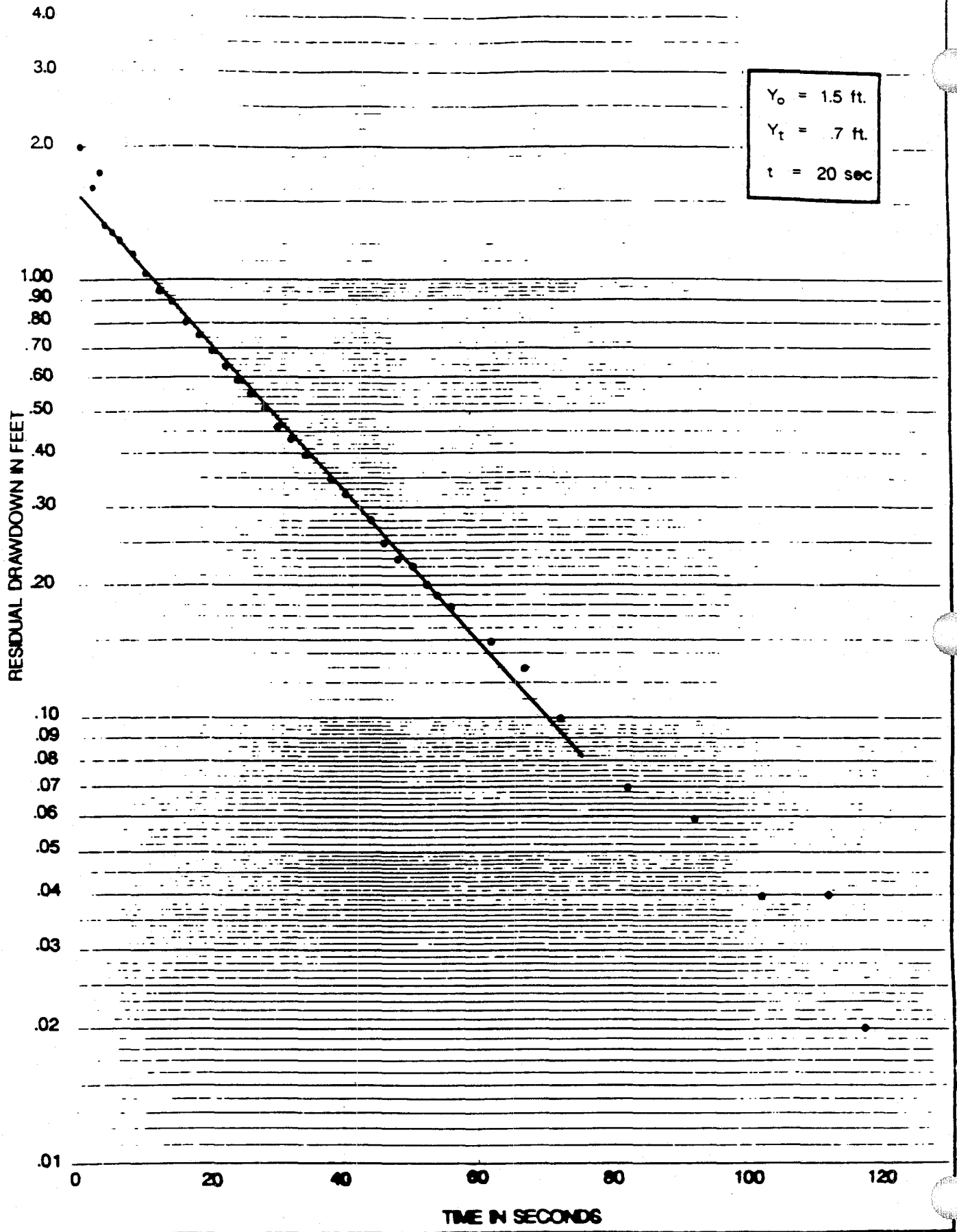
Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.9

Woodward-Clyde Consultants



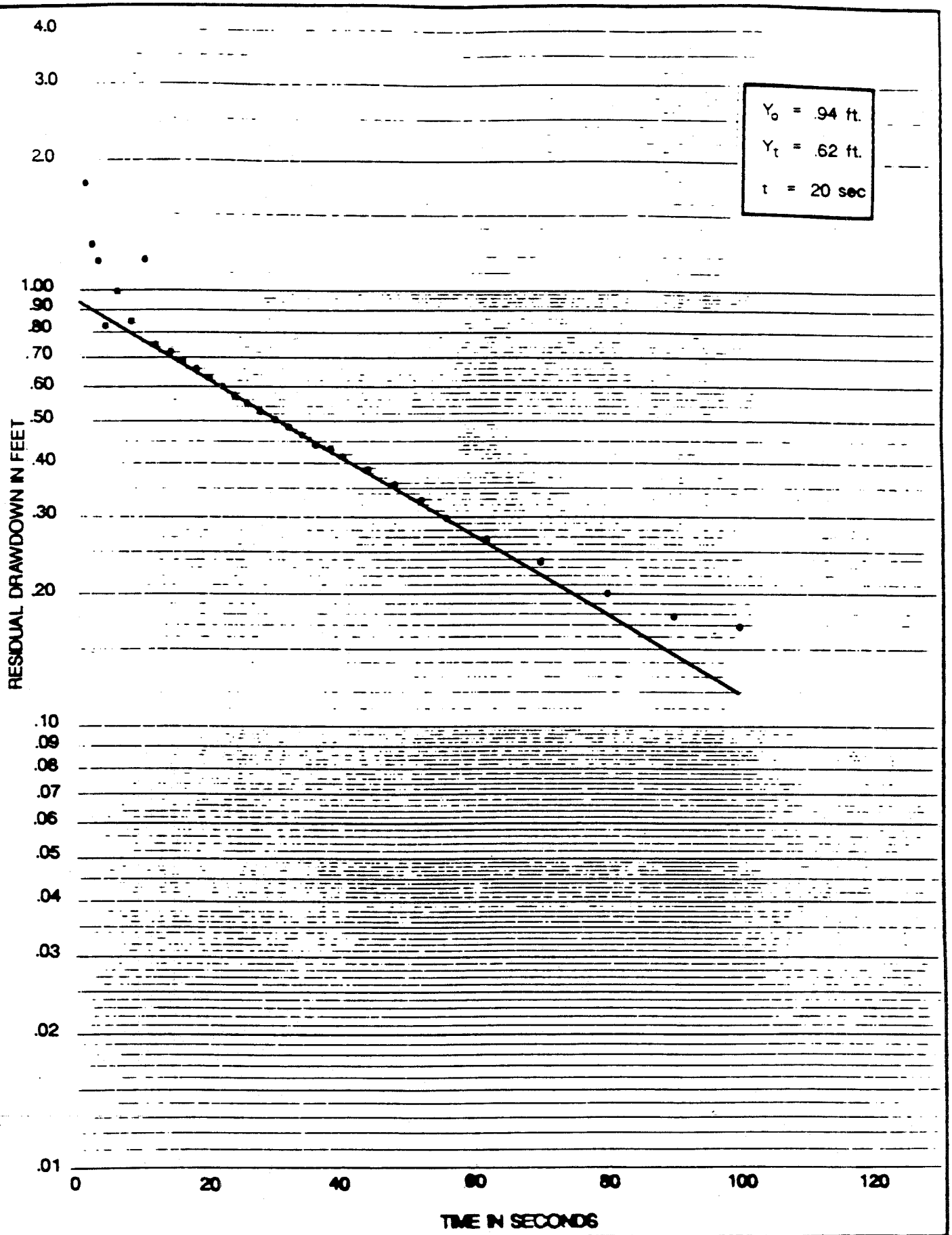
WCC-7S SLUG TEST INSERT

Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.10



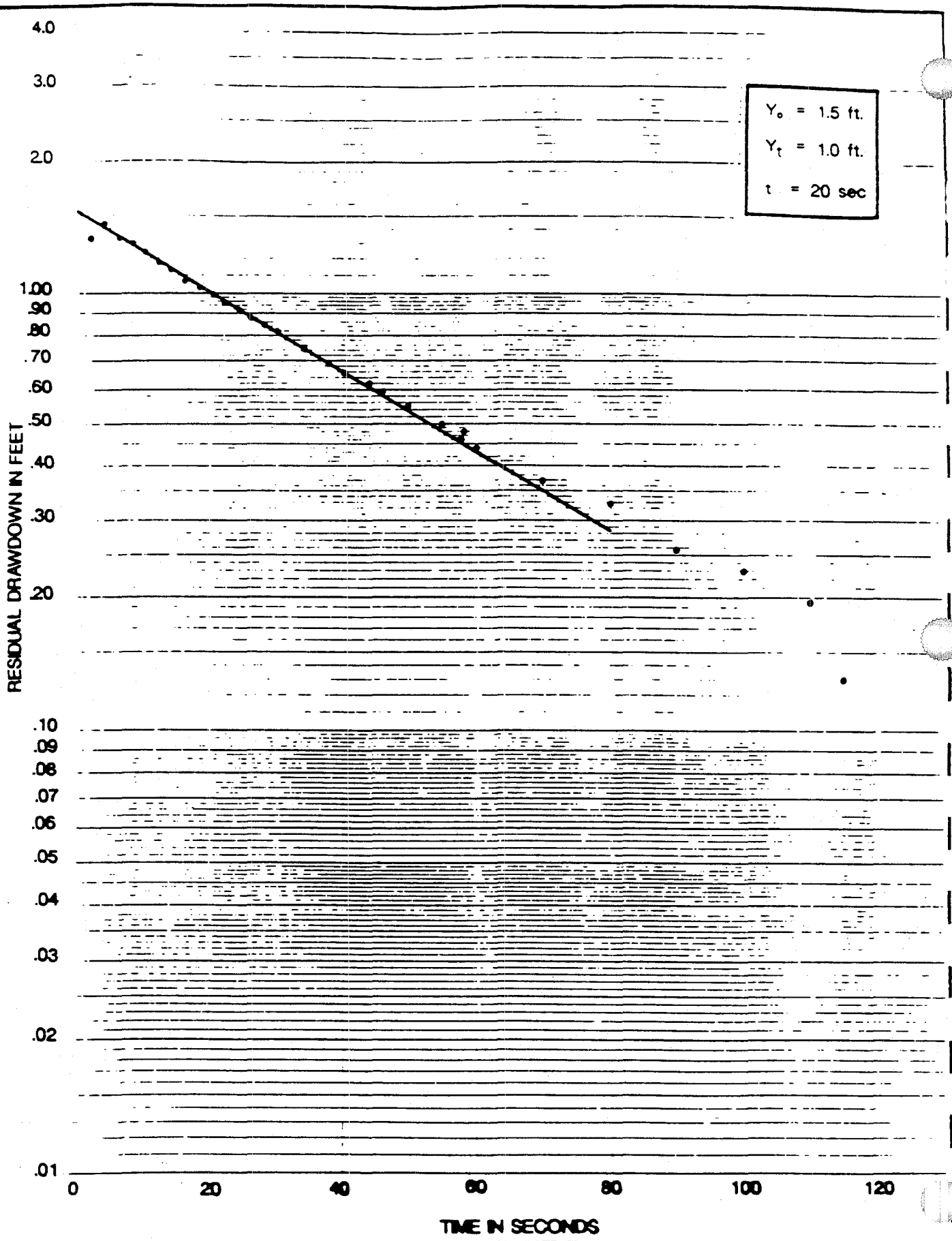
WCC-7S SLUG TEST WITHDRAWAL

Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.11



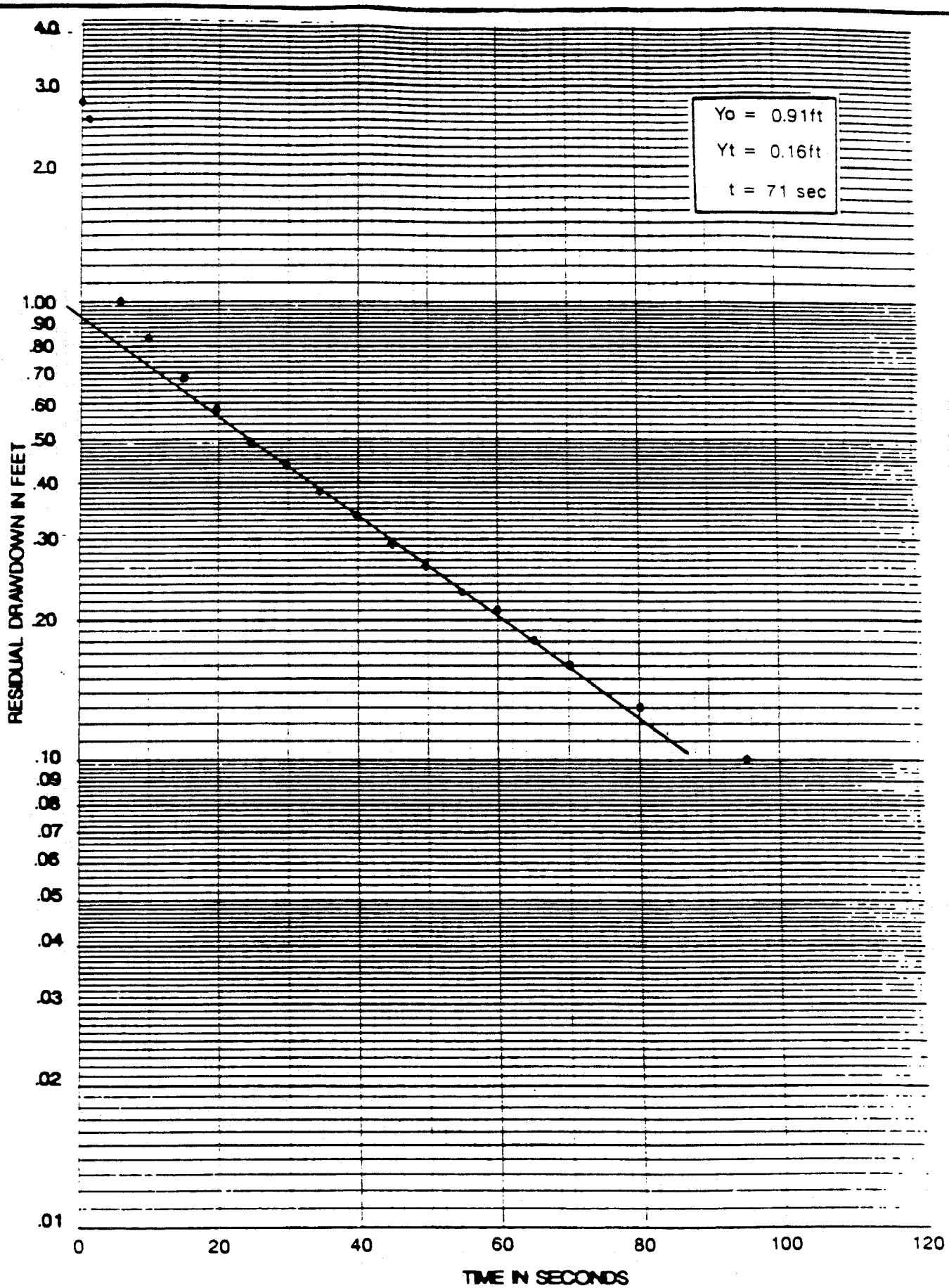
WCC-8S SLUG TEST INSERT

Project No.: [redacted]	Date: AUGUST [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.12



WCC-8S SLUG TEST WITHDRAWAL

Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.13

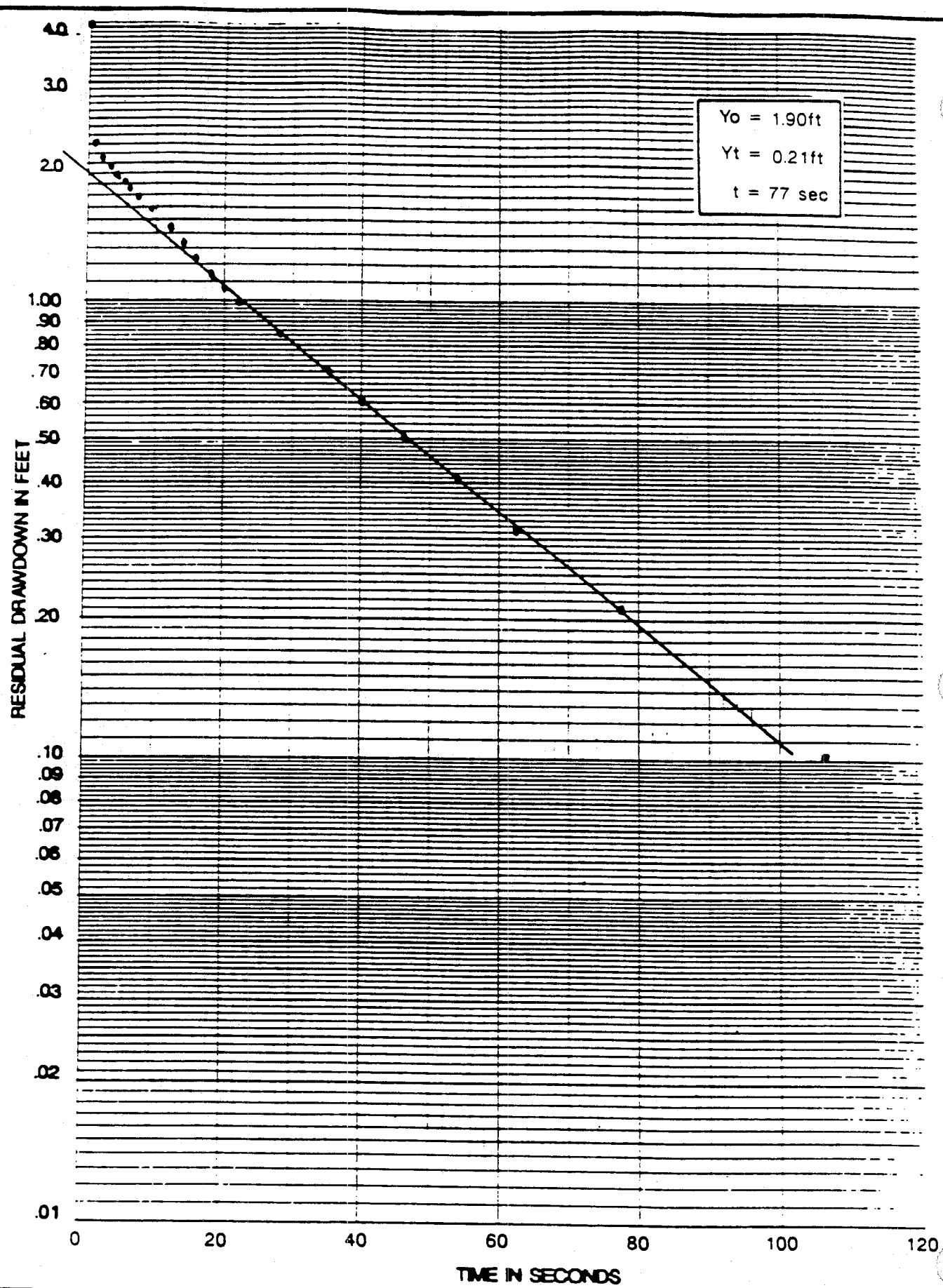


WCC-9S SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.14

Woodward-Clyde Consultants

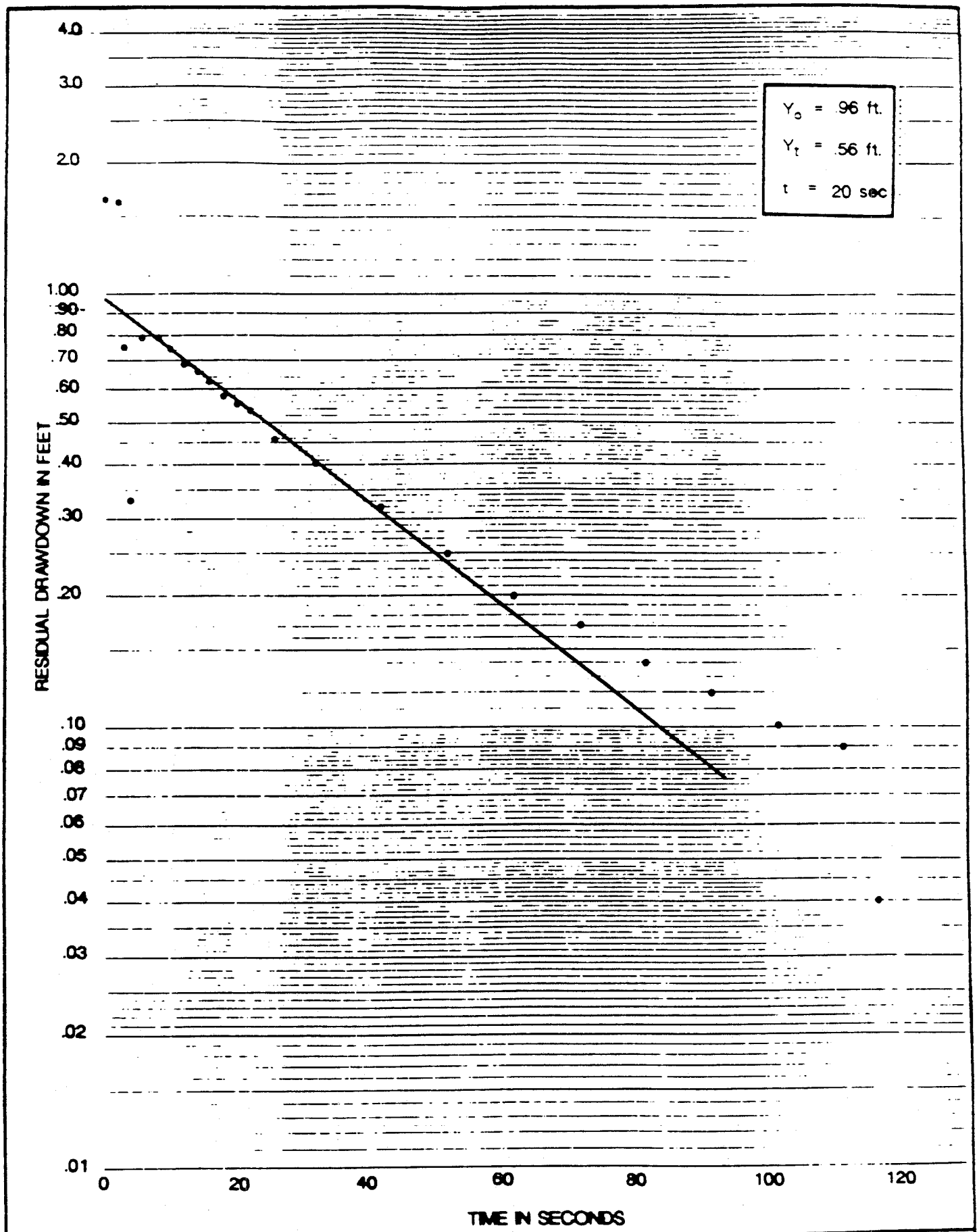
BOE-C6-0139963



WCC-9S SLUG TEST WITHDRAWAL

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.15

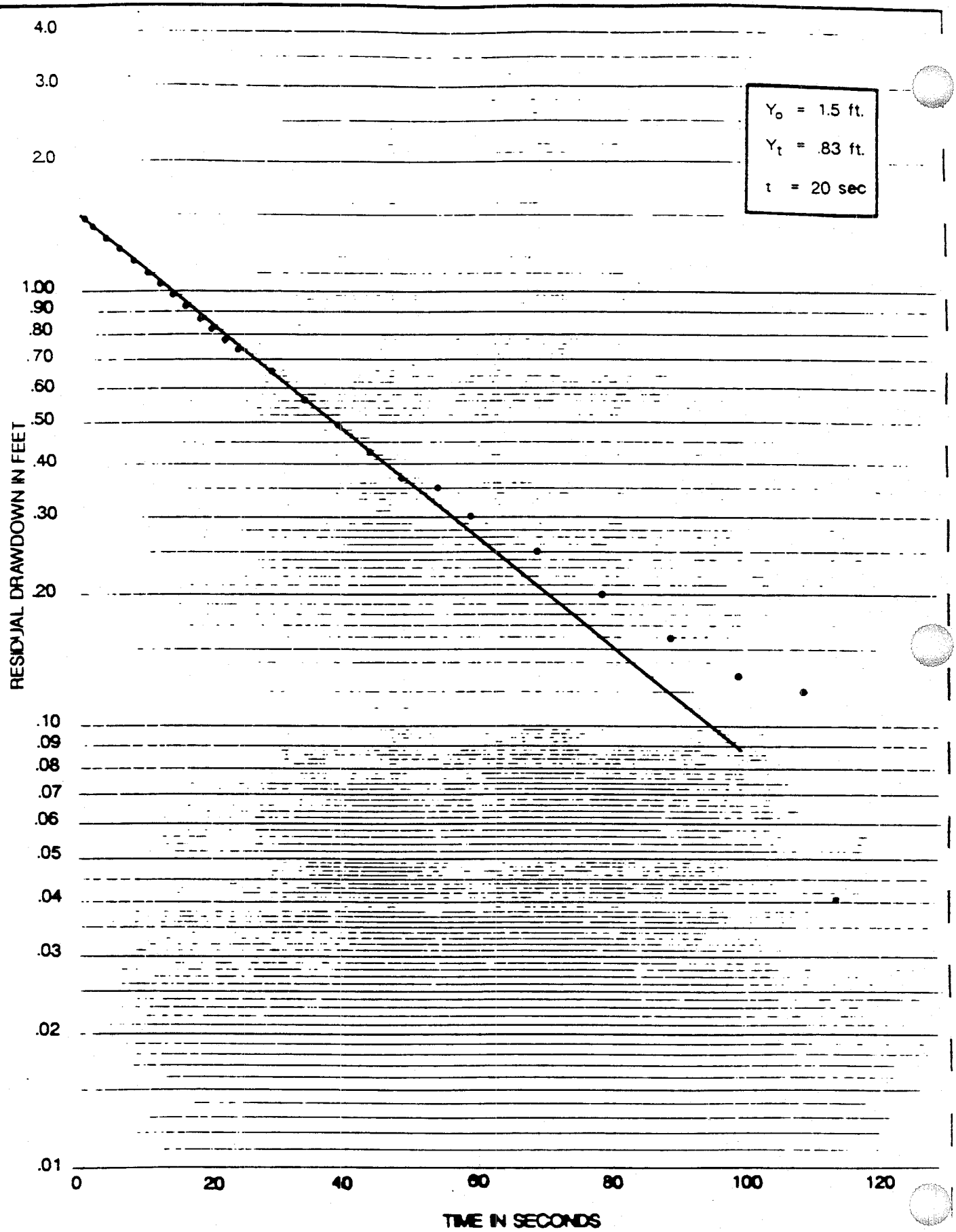
Woodward-Clyde Consultants



WCC-10S SLUG TEST INSERT

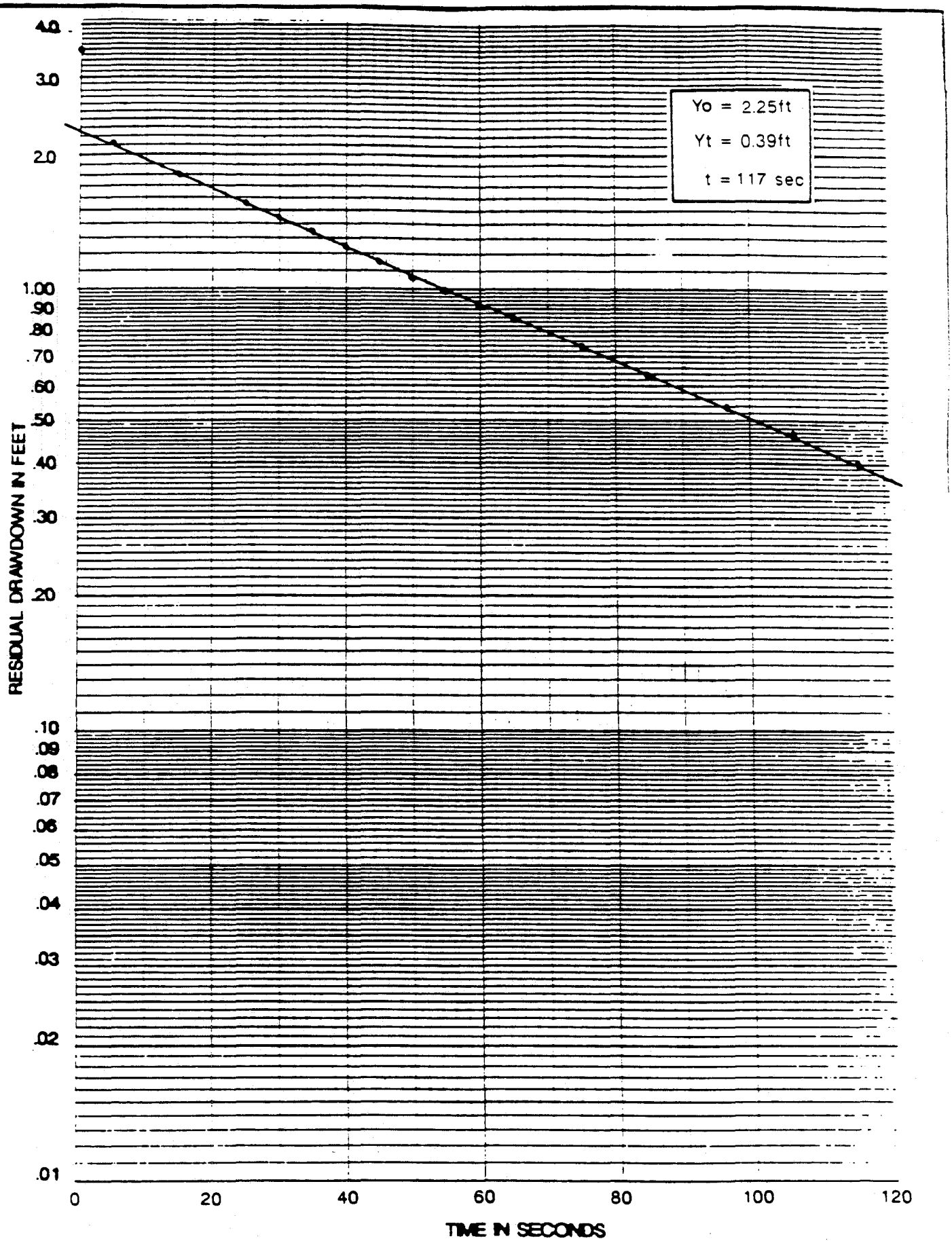
Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.16

Woodward-Clyde Consultants



WCC-10S SLUG TEST WITHDRAWAL

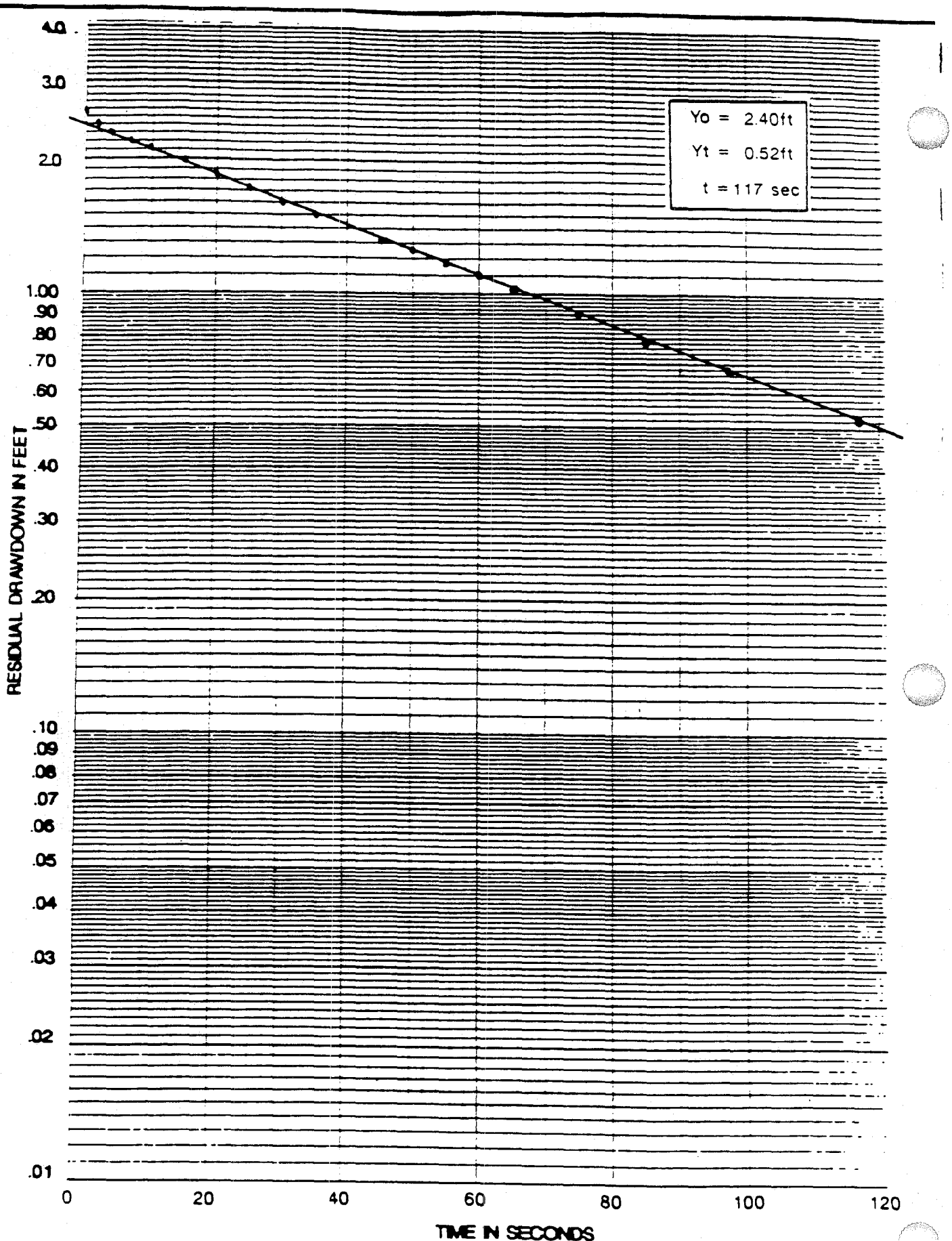
Project No.: 894 1863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.17



WCC-1D SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.18

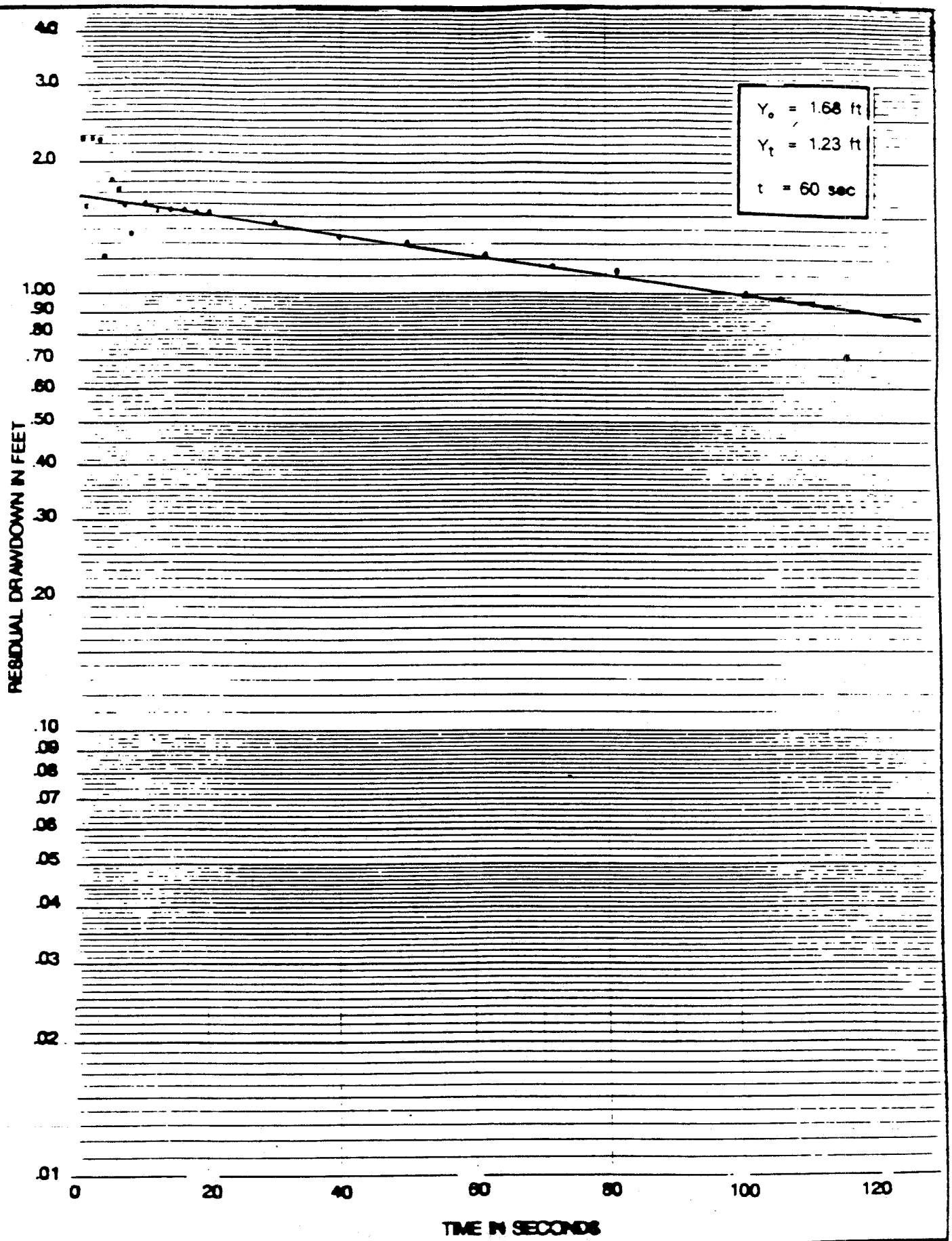
Woodward-Clyde Consultants



WCC-1D SLUG TEST WITHDRAWAL

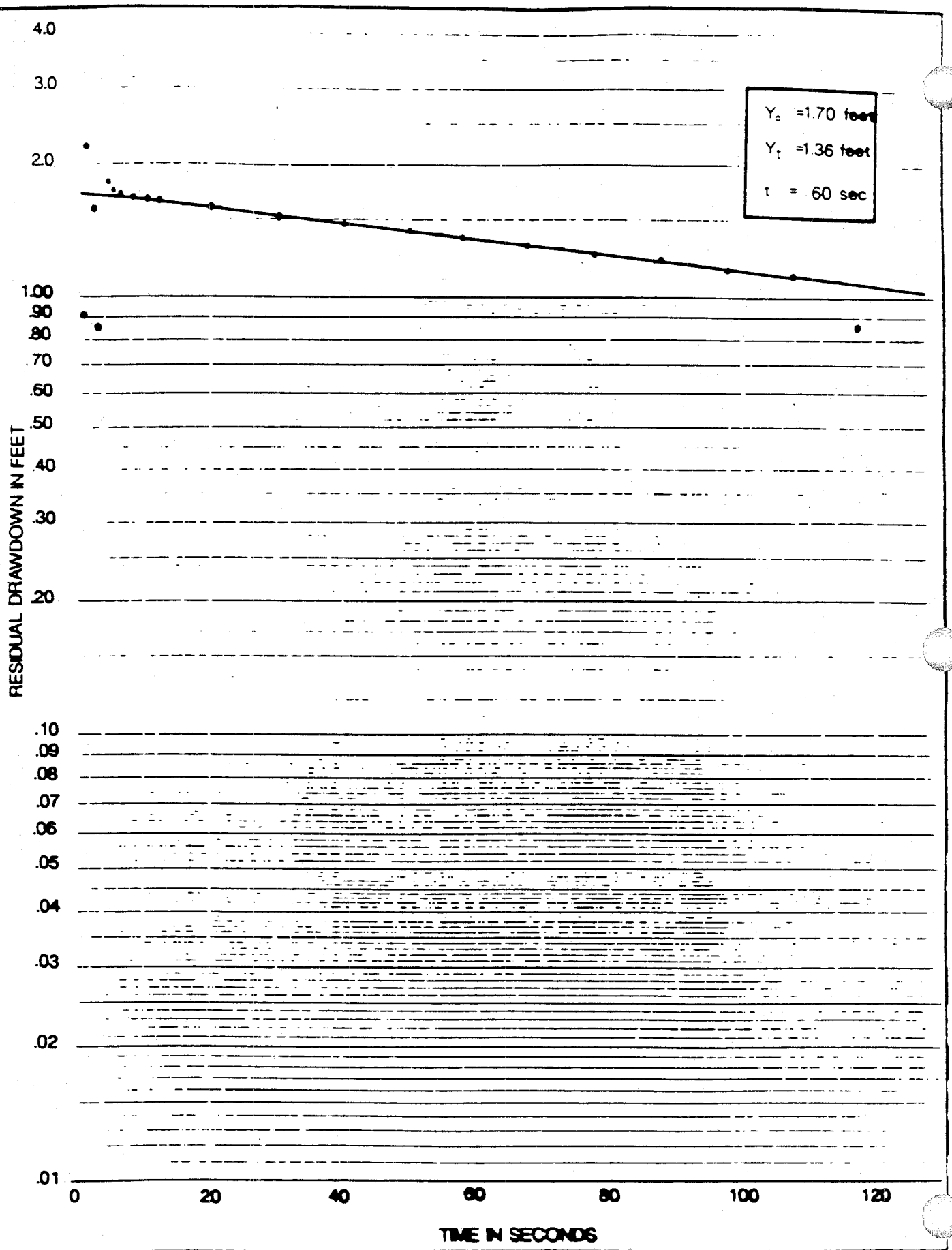
Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.19

Woodward-Clyde Consultants



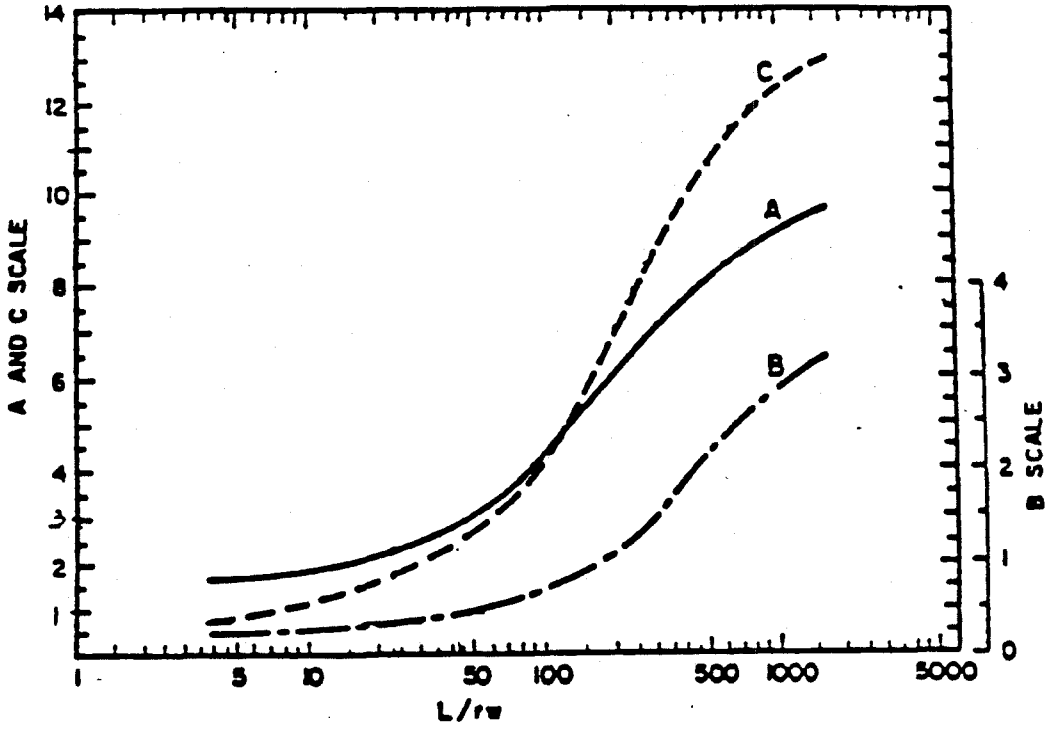
WCC-3D SLUG TEST INSERT

Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.20



WCC-3D SLUG TEST WITHDRAWAL

Project No.: [redacted]	Date: AUGUST [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.21



Bouwer and Rice A, B and C Coefficient Curves

Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT COMPANY	Fig. A.22

Woodward-Clyde Consultants

BOE-C6-0139971

BOE-C6-0139972

DEL AMO STUDY AREA

Summaries of Aquifer Test Results

TABLE 4.2-1
SUMMARY OF CONSTANT RATE DISCHARGE TESTS
DEL AMO AQUIFER TESTING

Well ID	Test Date(s)	Pumping Rate, Q (gpm)	Time Pump On	Time Pump Off	Total Pumping Time (minutes)
Upper Bellflower Aquitard					
SWL0005	2/29/96	0.7	13:31:20	19:14:00	341
SWL0006	3/6/96	0.35	9:21:00	21:33:00	732
SWL0009	3/5/96	0.29	9:10:00	22:30:00	800
SWL0012	3/13/96	0.86	9:45:00	15:38:00	353
SWL0016	2/20/96	0.8	9:01:00	21:35:00	754
SWL0017	3/19/96	0.4	12:25:00	0:30:00	725
SWL0021	3/22/96	0.2	8:43:00	20:43:00	720
SWL0039	1/19/96	1.8	9:39:00	21:53:00	734
SWL0042	3/20/96	1.0	9:40:00	21:51:00	731
SWL0046	1/18/96	0.9	10:34:00	22:50:30	737
SWL0057	2/21/96	0.75	9:09:00	21:26:00	737
Middle Bellflower B Sand					
SWL0011	3/15/96	10.8	10:00:00	22:20:00	740
SWL0023	4/25/96-4/26/96	9.9	09:40:00	13:00:00	1,640
SWL0037	3/23/96	4.8	8:35:00	20:36:00	721
SWL0047	3/12/96	4.6	9:47:35	21:50:00	722
SWL0049	2/28/96	5.0	10:22:00	23:00:00	758
XMW-28	3/24/96	4.0	10:40:00	21:25:00	645
Middle Bellflower C Sand					
SWL0014	4/22/96	4.8	12:00:02	17:56:00	356
Gage					
XDA-1B	5/3/96	25.0	10:33:00	21:30:00	657

TABLE 4.2-2
SUMMARY OF AQUIFER TESTING RESULTS
THEIS RECOVERY METHOD
DEL AMO AQUIFER TESTING

Well ID	Transmissivity, T (ft^2/minute)	Aquifer Thickness, b (feet)	Hydraulic Conductivity, K (feet/day)
Upper Bellflower Aquitard			
SWL0005	0.02	17.6	1.6
SWL0006	0.025	21.6	1.7
SWL0009	0.004	24.1	0.2
SWL0012[1]	0.059	16.5	5.2
SWL0016	0.046	13.4	4.9
SWL0017	0.016	16.7	1.4
SWL0021	0.02	16	1.8
SWL0039	0.13	19.3	10
SWL0042	0.02	16.1	1.8
SWL0044[2]	0.001	13.8	0.1
SWL0046	0.023	11.4	2.9
SWL0057	0.053	16.3	4.7
Middle Bellflower B Sand			
SWL0011	0.77	63	18
SWL0023	0.96	65	21
SWL0037	0.50	61	12
SWL0047	0.35	58	9
SWL0049	0.42	12.1	50
XMW-28[3]	0.11	16.1	10

TABLE 4.2-2
Page 2 of 2

Well ID	Transmissivity, T (ft^2/minute)	Aquifer Thickness, b (feet)	Hydraulic Conductivity, K (feet/day)
Middle Bellflower C Sand			
SWL0014	1.1	58	27
XBF-5[4]	5.5	20	400
XBF-7[4]	1.3	10	190
XBF-9[4]	3.5	19.5	260
XBF-11[4]	2.8	65.1	62
XBF-13[4]	1.3	59.5	32
XBF-15[4]	5	43.5	170
Gage			
XDA-1B	0.98	62	23
XG-5[4]	1.5	61	35
XG-11[4]	1.3	52	31
XG-13[4]	0.92	36.5	36

1 Short pumping time; pumping was terminated at 353 minutes to avoid drawing water level below pump intake.

2 Results for match to head-ratio data from falling-head slug test

3 Well XMW-28 is a water table well that is screened partially in the upper Bellflower and partially in the middle Bellflower B Sand

4 Results from Hargis + Associates' reanalysis of constant discharge aquifer test data collected during Montrose RI/FS using the Theis recovery method (Hargis + Assoc., 1996b)

TABLE 4.2-3

SUMMARY OF AQUITARD VERTICAL HYDRAULIC CONDUCTIVITY RATIO METHOD TEST RESULTS

Aquifer/ Well	Aquitard/ Well	Time (minutes)	Upper-End Average K_v' (feet/day)	Lower-End Average K_v' (feet/day)
MBFB	UBF	170	4.9×10^{-1}	2.6×10^{-1}
SWL0023	SWL0024	500	2.5×10^{-1}	1.4×10^{-1}
		Average	3.7×10^{-1}	2×10^{-1}
MBFC	LBF	60	9.6×10^{-1}	3.6×10^{-1}
SWL0014	SWL0043	210	6.1×10^{-1}	2.3×10^{-1}
		Average	7.9×10^{-1}	3×10^{-1}
Gage	LBF	72	5×10^{-2}	2×10^{-2}
XDA-1B	SWL0043	312	2×10^{-2}	9×10^{-3}
		Average	3.5×10^{-2}	1×10^{-2}

K_v' = vertical hydraulic conductivity of aquitard

DEL AMO STUDY AREA

Map showing Aquifer Test Well Locations

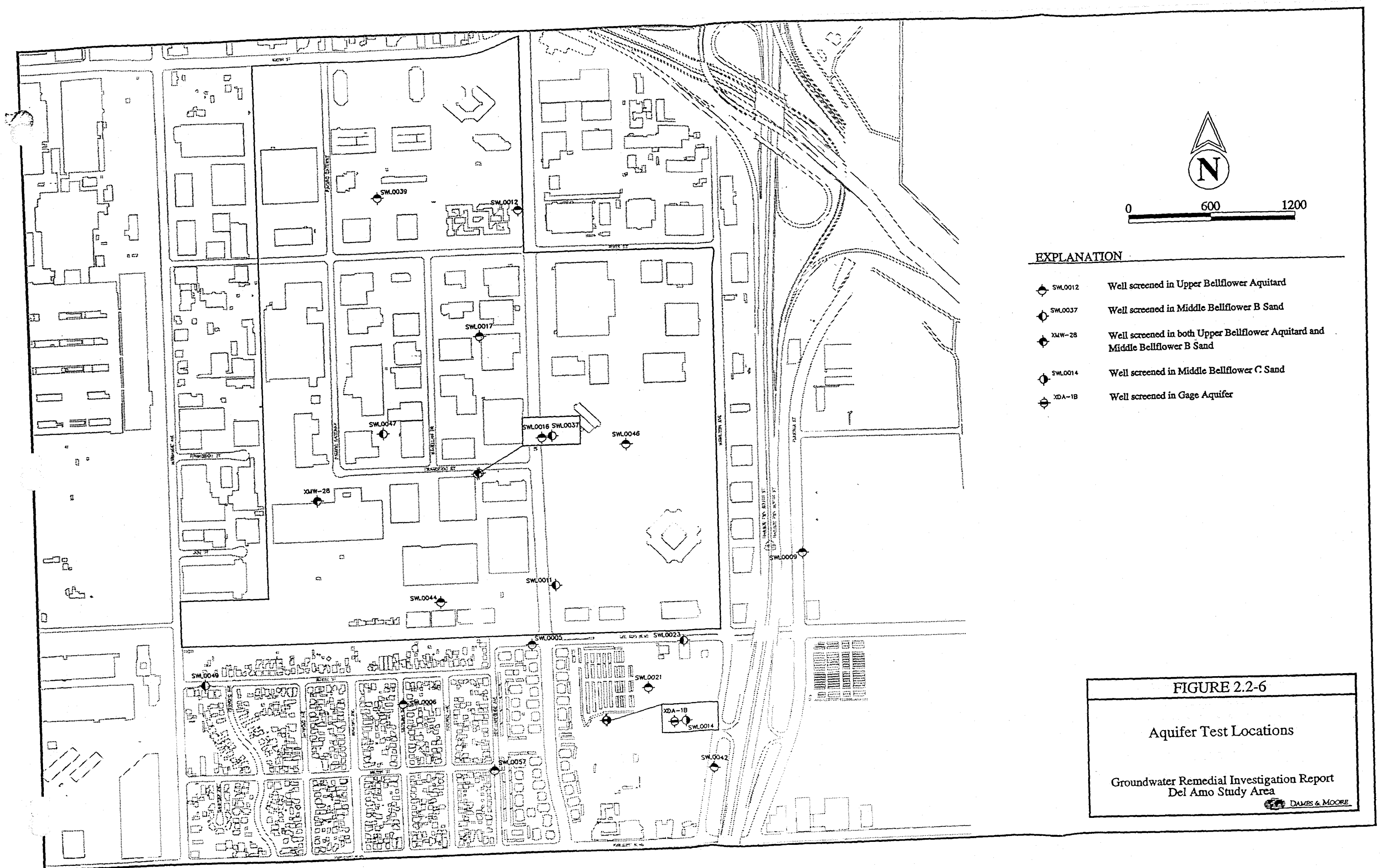


FIGURE 2.2-6

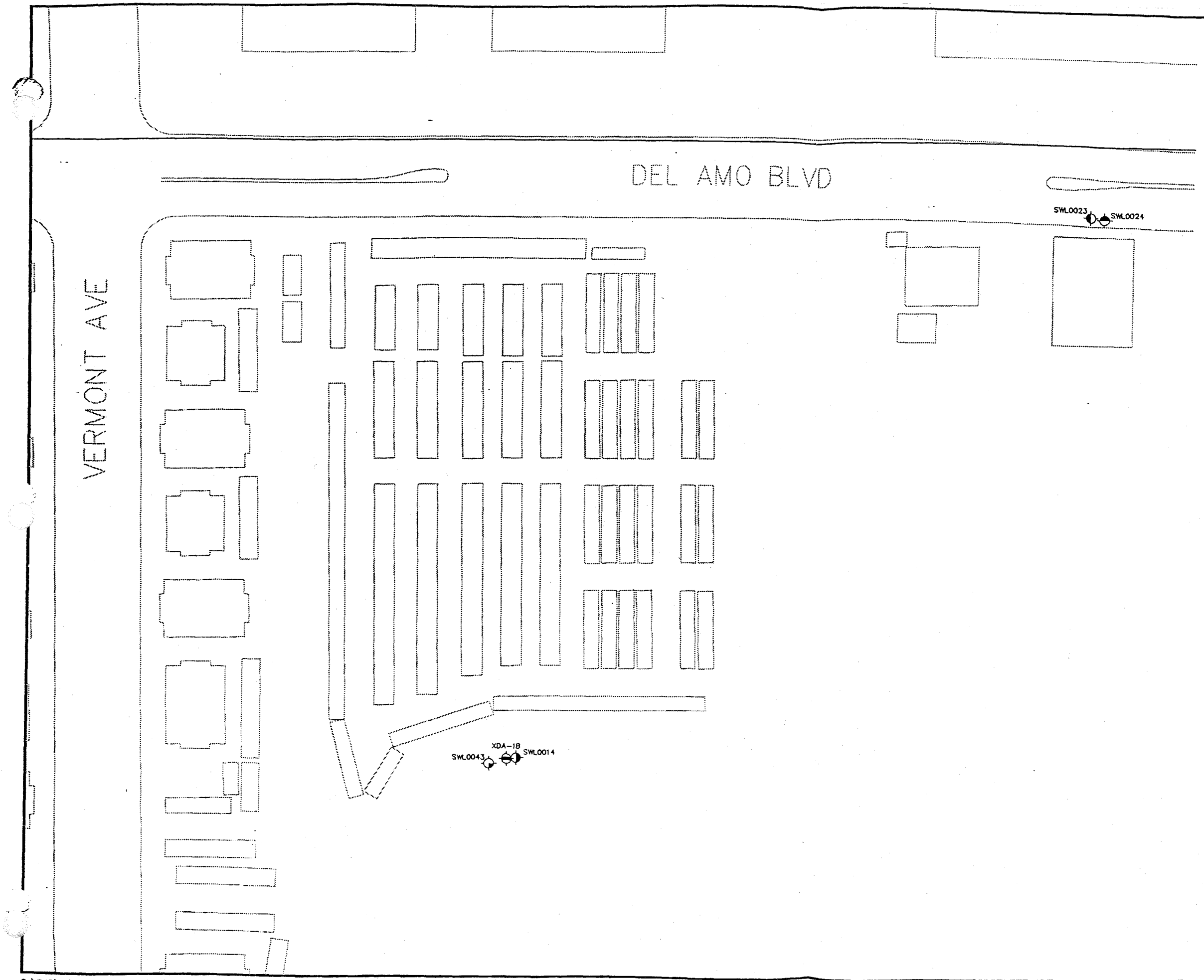
Aquifer Test Locations

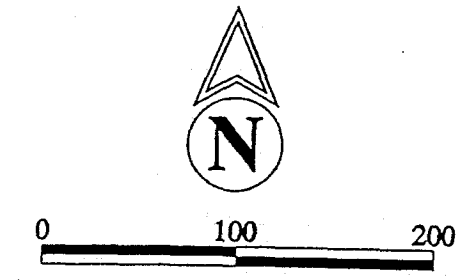
Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

C:\DJD\RI\SEC4\421, 08/30/96 at 15:25

BOE-C6-0139979





EXPLANATION

SWL0024	Well screened in Upper Bellflower Aquitard
SWL0023	Well screened in Middle Bellflower B Sand
SWL0014	Well screened in Middle Bellflower C Sand
SWL0043	Well screened in Lower Bellflower Aquitard
XDA-18	Well screened in Gage Aquifer

FIGURE 2.2-7

Ratio Test Method Locations

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

C:\DJO\RI\SEC4\422, 09/09/96 at 10:19

BOE-C6-0139980

Appendix E

BOE-C6-0139981

Appendix E
Water Supply Wells in Site Vicinity

INDUSTRIAL LIGHT METALS SITE

Summary Table of Offsite Ground Water Extraction Wells within 0.5 Miles of Former ILM Site

Map Showing Offsite Ground Water Extraction Wells within 0.5 Miles of Former ILM Site

DEL AMO STUDY AREA

Wells of Record Within 2-Mile Radius of Study Area – US EPA

INDUSTRIAL LIGHT METALS SITE

Summary Table of Offsite Ground Water Extraction Wells Within 0.5 Miles of Former ILM Site

TABLE A.1

OFFSITE GROUND WATER EXTRACTION WELLS WITHIN 0.5 MILES OF FORMER ILM FACILITY LOCKHEED MARTIN CORPORATION

MAP NUMBER	WELL ID[1]	STATE WELL NAME	OWNER	WELL USE	DIRECTION RELATIVE TO SITE	DEPTH (ft bgs)	DEPTH TO TOP OF SCREEN (ft bgs)	DEPTH TO BOTTOM OF SCREEN (ft bgs)	DATE INSTALLED	LAST USED	FATE
1[2]	783S	NA	T. H. Wright	NA	NW	NA	NA	NA	NA	12/21/61	Covered, Not Destroyed
2[2]	784	NA	General Petroleum Co.	NA	W	NA	NA	NA	1909	1912	Not Used Since
3	793	3S/14W-36E01	Ms. Francis A. Corwin	Domestic	N	163	NA	NA	1903	1930	Not Used Since
4[2]	793A	NA	Jack and Betty Ordway	NA	NE	NA	NA	NA	1910	NA	NA
5	793D	3S/14W-35J01	Hugh Cameron	NA	NW	NA	NA	NA	1904	NA	NA
6	793F	3S/14W-36L01	H. T. Jorgensen	NA	NE	270	NA	NA	NA	01/47	Not Used Since
7	793G	3S/14W-36L02	F. A. Conover	Irrigation	NE	NA	NA	NA	1905	NA	NA
8[2]	793K	NA	H. W. Douglas	NA	N	45	NA	NA	1921	1929	Not Used Since
9	794A	4S/14W-01F01	Aluminum Co. of Amer.	NA	E	600	473	514	10/42	NA	Abandoned
10	794B	4S/14W-01F02	Douglas Aircraft	Industrial Supply	E	600	477-535	506-540	10/42	Active	Abandoned
11	794C	4S/14W-01F03	Aluminum Co. of Amer.	Industrial Supply	E	600	427-538	433-550	08/42	Active	Abandoned
12	794D	3S/14W-36N02	John Zurlite	NA	NE	NA	NA	NA	NA	1947	Abandoned
13	803B	3S/14W-36K03	Barnett Ranch	NA	NE	234	NA	NA	1900	NA	Abandoned
14[2]	803M	NA	O. C. Miller	NA	NE	NA	NA	NA	NA	1947	Not Used Since
15[2]	803N	NA	E. J. Wait	NA	NE	NA	NA	NA	NA	1947	Not Used Since
16[2]	803Q	NA	F. C. Irvine	NA	NE	572	471, 505	479, 528	03/49	NA	NA
17	804B	3S/14W-36Q02	M. E. Woods	NA	NE	702	NA	NA	NA	NA	NA
18[2]	UBE-01	NA	Montrose	NA	SE	NA	NA	NA	NA	NA	NA
19[2]	UBT-01	NA	Montrose	NA	SE	98.8	NA	NA	9/22/89	NA	NA
20[2]	UBT-02	NA	Montrose	NA	SE	99.3	NA	NA	9/16/89	NA	NA
21[2]	UBT-03	NA	Montrose	NA	SE	97.3	NA	NA	9/12/89	NA	NA
22[2]	PW-01	16	Allied Signal	NA	S-SW	NA	NA	NA	Appr. 6/13/95	NA	NA
23[2]	PW-02	17	Allied Signal	NA	S-SW	NA	NA	NA	Appr. 6/13/95	NA	NA
24[2]	200' Cathode	NA	Mobil	NA	SW	200	145	200	Appr. 9/12/79	In Service	In Service
25[2]	EW-02	NA	Mobil	Dewatering GW Table	W-SW	170	80, 160	150, 165	5/14/90	NA	NA
26[2]	EW-03	NA	Mobil	Dewatering GW Table	W-SW	160	74, 150	145, 155	5/17/90	NA	NA
27[2]	EW-04	NA	Mobil	Dewatering GW Table	W-SW	155	65, 145	140, 150	6/1/90	NA	NA
28[2]	EW-05	NA	Mobil	Dewatering GW Table	W	160	65, 150	145, 155	5/20/90	NA	NA
29[2]	EW-06	NA	Mobil	Dewatering GW Table	SW	159	74, 149	144, 154	5/25/90	NA	NA
30[3]	EW-9	NA	Mobil	Dewatering GW Table	NA	560	290	550	7/1/87	NA	NA
31[2]	EW-10	NA	Mobil	Dewatering GW Table	W	650	260, 545	380, 640	7/18/87	NA	NA

99-206\Rpts\GrWaRcEx 01/29/99/mo

(1) Obtained from Draft 1996 DAR.
(2) Mapped from Figure C-2, Draft 1996 DAR.
(3) Not able to map. Location information not provided.
NA = Not Available

Sources: Geraghty & Miller, Inc. 1996. Draft Groundwater Data Assessment Report (DAR) RCRA Facility Investigation Lockheed Martin Corporation International Light Metals Facility, Torrance, California, Volume I, May 1996. Well Survey updated in 1998 by Geraghty & Miller and in 1999 by TRC.
ARCADIS Geraghty & Miller, Inc., 1999. Exposure Pathway Assessment and Human Health Risk Assessment Scope of Work, Former ILM Facility.

TRC

BOE-C6-0139984

TABLE A.2

ACTIVE GROUND WATER EXTRACTION WELLS WITHIN 2 MILES OF FORMER ILM FACILITY LOCKHEED MARTIN CORPORATION

STATE WELL NAME	OWNER	WELL USE	DIRECTION RELATIVE TO SITE	DEPTH (ft bgs)	DEPTH TO TOP OF SCREEN (ft bgs)	DEPTH TO BOTTOM OF SCREEN (ft bgs)	DATE INSTALLED	ACTIVE
3S/14W-34N04	SCE	NA	NW	236	168, 194	184, 200	12/18/53	Y (1995)
4S/14W-10D02	Dominguez Water Corp.	Municipal (Public Supply)	SW	800	300	800	NA	N (1994) Y (1995)
4S/14W-10D03	Dominguez Water Corp.	Domestic	SW	560	285-531(1)	296-542(1)	7/3/68	Y (1995)
3S/14W-34C02	City of Torrance	Municipal (Public Supply)	NW	810	200	786	1965	Y (1995)
3S/14W-34B02	SCE	Industrial Supply	NW	485	196	337	1929	Y (1995)
4S/14W-03L04	Mobil	NA	W	454	124	448	06/42	Y (1995)
4S/14W-10K02	City of Torrance	Municipal (Public Supply)	SW	812	180	812	1965	Y (1995)
4S/14W-10K03	City of Torrance	Municipal (Public Supply)	SW	816	210	786	NA	Y (1995)
3S/14W-35M07	Garrett Corp.	Irrigation	NW	324	292	321	5/15/64	Y (1995)
3S/14W-25N02	A. D. Seaback	Irrigation	N	205	NA	NA	07/36	N (1994) Y (1995)
3S/14W-25P04	So. Cal. Water Co.	Municipal (Public Supply)	N	751	544-699(1)	555-734(1)	3/25/48	Y (1995)
4S/13W-19B01	General Petroleum Co.	NA	SE	251	212	245	1922	Y (1995)
3S/13W-29E03	H. W. Abernathy	Domestic	NE	72	NA	NA	NA	Y (1995)
3S/13W-30J01	Hansen Enterprises	NA	NE	743	355-658(1)	365-707(1)	10/95	(1994) Y (1995)(2)
3S/13W-30J05	C. F. Johnson	Domestic and Irrigation	NE	156	135	142	3/15/37	Y (1995)
3S/14W-26J01	Mrs. E. V. Kuapa	Domestic	NW	231	NA	NA	4/10/05	Y (1995)(3)
4S/14W-10D04	Dominguez Water Corp.	Municipal (Public Supply)	SW	600	312, 462	353, 556	1969	Y (1995)
4S/14W-03L02	Mobil	Industrial Supply	W	450	130	450	04/38	Y (1995)
4S/14W-03L03	Mobil	Industrial Supply	W	450	130	450	04/40	Y (1995)
4S/14W-10J01	City of Torrance	Municipal (Public Supply)	SW	623	170, 360	320, 520	12/14/35	Y (1994) N (1995)
4S/14W-3M01	Mobil	Industrial Supply	W	NA	NA	NA	NA	Y (1994) N (1995)
3S/14W-25K06	Mayflower Nursery	Municipal (Public Supply)	N	120	112	120	1947	Y (1994) N (1995)
4S/13W-17D01	Dominguez Water Corp.	Not used since 12/18/63	SE	1,701	504-635(1)	511-660(1)	6/26/16	Y (1994) N (1995)
3S/13W-31M01	Maxwell Ziegler	Domestic and Irrigation	NE	664	550, 638	574, 644	01/49	Y (1994) N (1995)
3S/13W-31B07	Clark and Grace Day	NA	NE	384	365	370	8/28/48	Y (1994) N (1995)

99-200/Rpts/GrWaRCFa (12/29/99/tm)

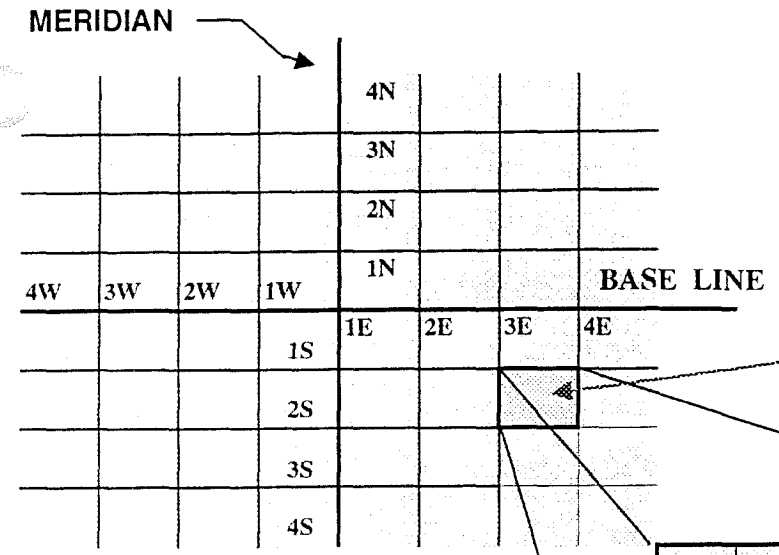
NA = Not Available
Y = yes N = No

(1) There are numerous unique perforation upper and lower limits. Shown is the range of upper perforation and lower perforation.
(2) Abandoned.
(3) Monitored.

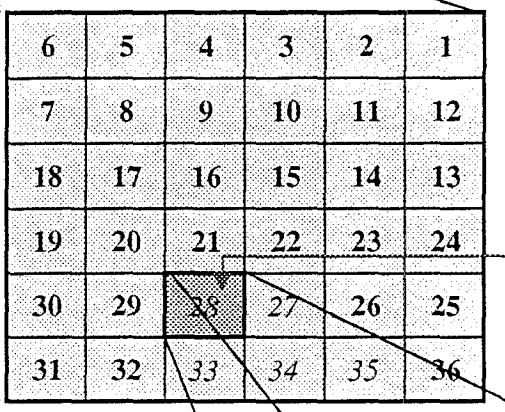
Source: Geraghty & Miller, Inc. 1996. Draft Groundwater Data Assessment Report (DAR) RCRA Facility Investigation Lockheed Martin Corporation International Light Metals Facility, Torrance, California, Volume I, May 1996.
Well Survey updated in 1998 by Geraghty & Miller, and in 1999 by TRC.

TRC

BOE-C6-0139985



Township 2 South
Range 3 East

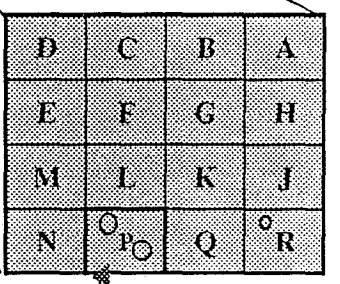


Section 28

o A Township is approximately 6 miles x 6 miles and has 36 Sections.

o A Section is approimately 1 square mile and is divided into 16 Tracts.

o A Tract is approximately 1/4 mile x 1/4 mile and has about 40 acres.



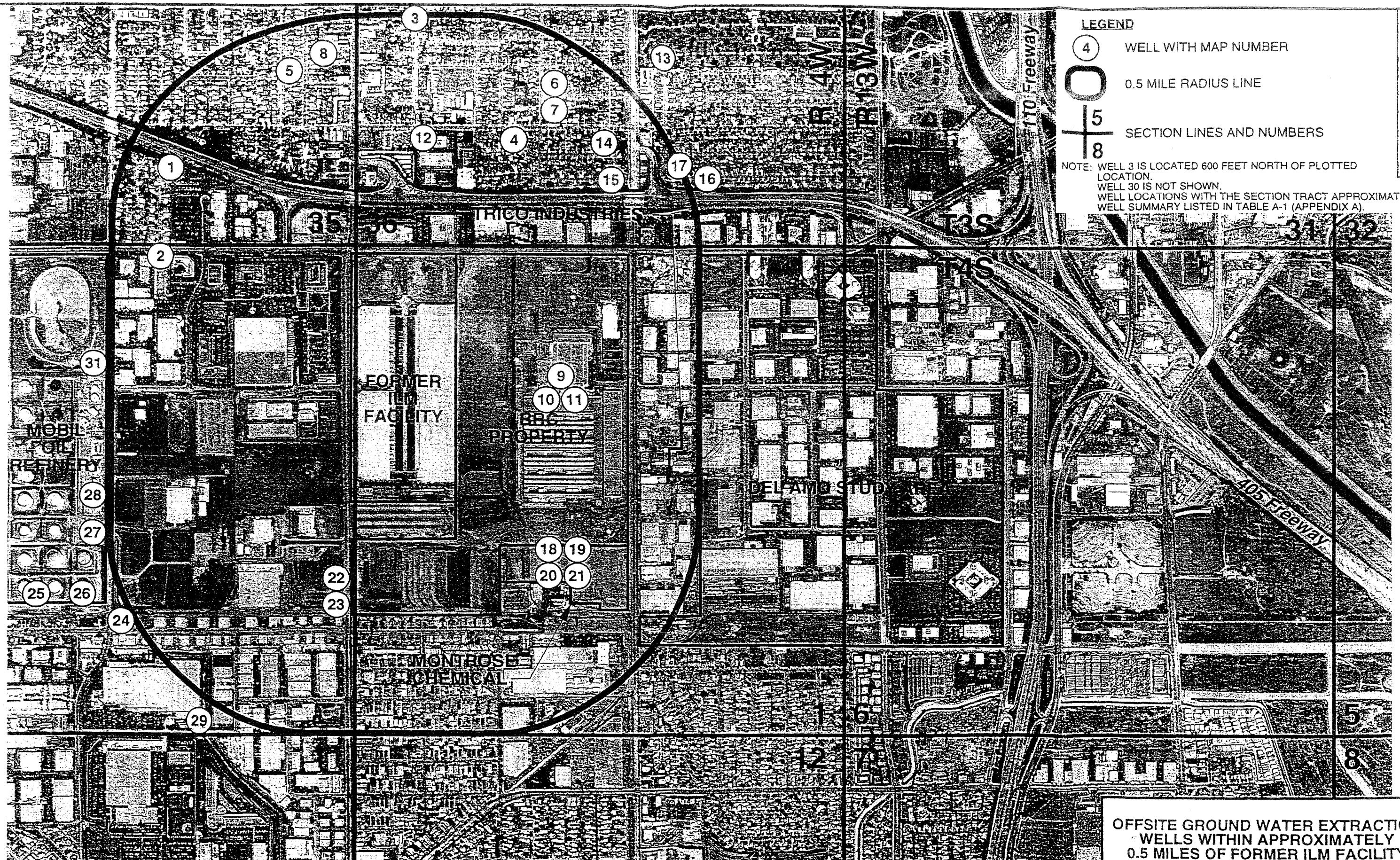
In this example, if there are two wells in Tract P.

The State Well Number for the second well would be:	02S	03E	28	P	OO2	S
Township						
Range						
Section						
Tract						
Sequence number of well within the tract						
Base and Meridian (S for San Bernardino and M for Mount Diablo)						

INDUSTRIAL LIGHT METALS SITE

Map Showing Offsite Ground Water Extraction Wells Within 0.5 Miles of Former ILM Site

99-200GW-03 REV. 12/30/99



0 1,000 2,000 FEET
APPROXIMATE SCALE

REFERENCE: AERIAL PHOTOGRAPH BY CONTINENTAL AERIAL PHOTO INC. 2/23/99.

OFFSITE GROUND WATER EXTRACTION WELLS WITHIN APPROXIMATELY 0.5 MILES OF FORMER ILM FACILITY

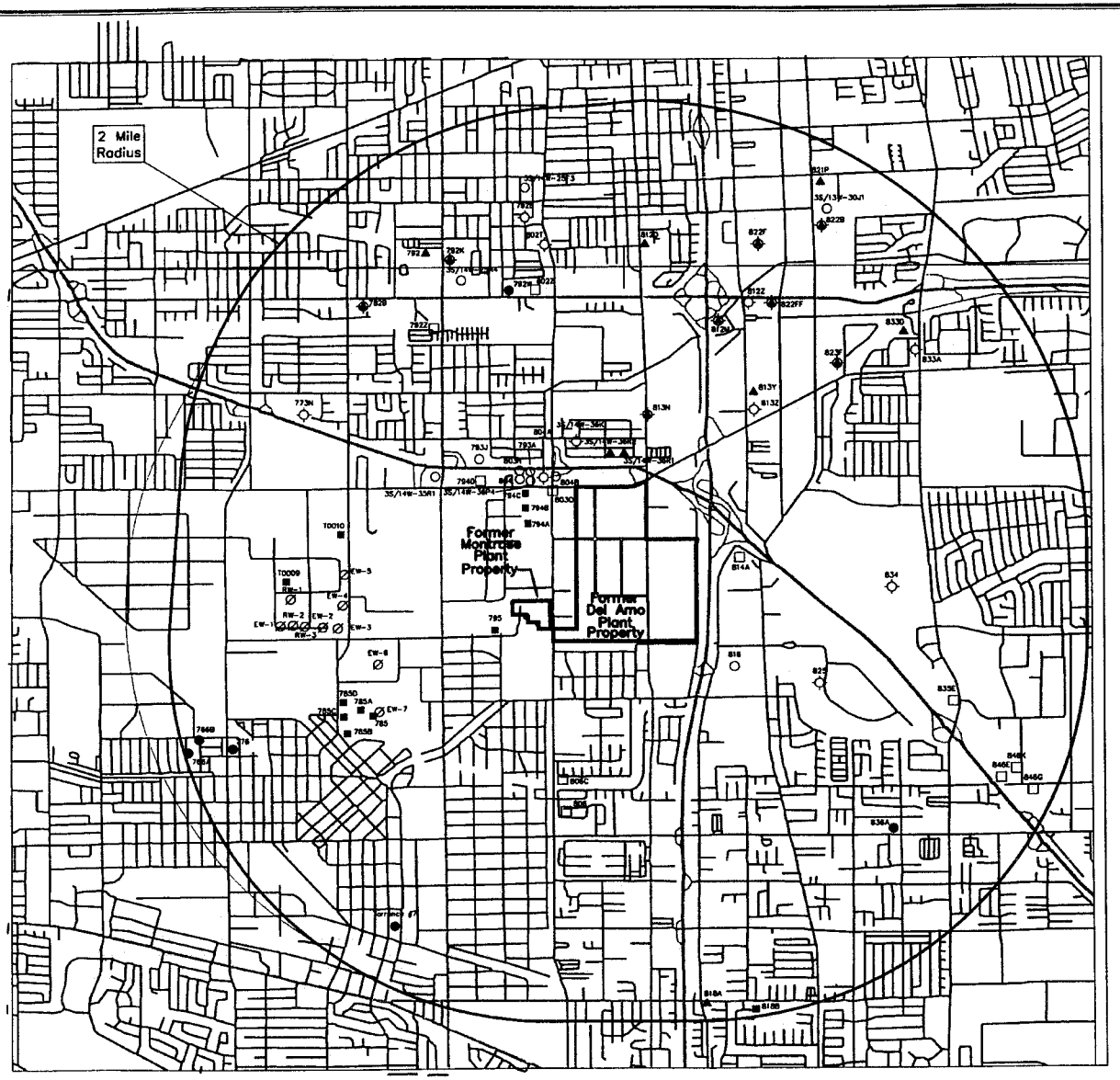
FORMER INTERNATIONAL LIGHT METALS FACILITY
TORRANCE, CALIFORNIA

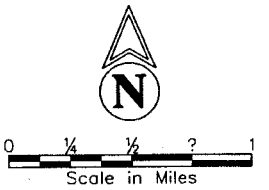
TRC | FIGURE A.1

BOE-C6-0139988

DEL AMO STUDY AREA

Wells of Record Within 2-Mile Radius of Del AmoStudy Area – US EPA.





EXPLANATION

- Municipal supply well
- Domestic supply well
- Irrigation supply well
- Domestic/Irrigation supply well
- Industrial supply well
- Remediation/cleanup well
- Observation well
- Well of unknown use

FIGURE 7-8

Wells of Record Within 2-Mile Radius of Study Area

Record of Decision
Dual Site Groundwater Operable Unit
Montrose and Del Amo Superfund Sites

US EPA Region IX

BOE-C6-0139990

Appendix F

BOE-C6-0139991

Appendix F
Selected Sections of the Del Amo Record of Decision (Sections 1 through 6)

I. DECLARATION

Statutory Preference for Treatment as a Principal Element is Met and Five Year Reviews Are Required

1. Site Name and Location

This Record of Decision (ROD) applies to *both* the Montrose Chemical Superfund Site and the Del Amo Superfund Site, in Los Angeles County, California. Portions of these sites lie within the City of Los Angeles, and adjacent to the City of Torrance, California.

2. Statement of Basis and Purpose

This ROD presents the selected remedial action for (1) groundwater contamination, and (2) isolation and containment of non-aqueous phase liquids (NAPL) at the Montrose Chemical and Del Amo Superfund Sites. EPA has selected this remedy in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, P.L. 99-499, 100 Stat. 1613 (1986) (CERCLA) and with the relevant provisions of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300 (NCP). This decision is based on consideration of the administrative record, including public comments and the detailed analysis of the alternatives which are discussed and summarized in the Decision Summary.

This ROD establishes a *dual-site operable unit remedy*. This operable unit remedy is anticipated to be consistent with any other operable unit remedies, and the final remedies, for both the Montrose Chemical Superfund Site and the Del Amo Superfund Site. Such other remedies may apply to one or the other site individually, in contrast to the dual-site nature of this remedy.

This document identifies applicable or relevant and appropriate requirements (ARARs) and other criteria and requirements which shall be met in implementing this remedy. During investigations of the Montrose Chemical and Del Amo Superfund Sites, data has been collected in accordance with approved sampling and quality assurance management plans. EPA considers site data to be of adequate quality to support the remedy presented in this ROD. Remedial designs, actions, and operation and maintenance undertaken in the course of implementing this remedy shall comply with all standards, requirements and specifications in this ROD.

The State of California, acting by and through its Department of Toxic Substances Control, concurs with the remedy selected in this document.

BOE-C6-0139993

The authority to select CERCLA remedial actions has been delegated to the U.S. EPA Region IX Superfund Division Director *(See* U.S. EPA CERCLA Delegations Manual, Delegation 14.5 (April 15, 1994) and redelegated by EPA Region IX Delegation Order, Selection of Remedial Actions (September 29, 1997)).

3. Assessment of the Site

Releases of hazardous substances, pollutants or contaminants from the former DDT pesticide manufacturing plant operated by Montrose Chemical Corporation, including but not limited to chlorobenzene, DDT, and parachlorobenzene sulfonic acid, have resulted in hazardous substances contamination in the groundwater. Releases of hazardous substances from the former Del Amo Synthetic Rubber Manufacturing plant, including but not limited to benzene, ethylbenzene, and naphthalene have resulted in hazardous substances contamination in the groundwater. Releases of hazardous substances including but not limited to benzene, trichloroethylene (TCE), perchloroethylene (PCE), and dichloroethylene (DCE) have occurred potentially as a result of the operations at both the former Montrose Chemical and Del Amo plant properties and otherwise as a result of the operations of additional facilities in the immediately surrounding area. These releases have also resulted in groundwater contamination. Some of the hazardous substances discussed above are present below the ground surface in the form of non-aqueous phase liquids (NAPL) as well as dissolved in water and adsorbed to soils.

Contamination in groundwater from the two sites has partially commingled, or merged. Remedial actions selected for the contamination originating from either site individually would affect the contamination, execution, and implications of remedial actions selected for the contamination originating from the other site. The groundwater contamination from both sites is being addressed by EPA as a single technical problem with a unified remedial strategy which has been developed in part by considering the interrelationships of the various areas of groundwater at the Montrose Chemical and Del Amo Superfund Sites.

The groundwater contamination at and from the former Montrose and Del Amo plant properties; and the contamination from additional sources that is commingled, or within the area that might be subject to significant hydraulic influences from this remedy; are collectively referred to by EPA as "the Joint Site." This term is being used only with respect to this selected groundwater remedy. Additional description and caveats pertaining to the use of this term are provided in the Decision Summary of this ROD. Unless otherwise noted, where used in this ROD the term "both sites," shall refer to the Montrose Chemical Superfund Site and the Del Amo Superfund Site.

Actual or threatened releases of hazardous substances from both the Montrose Chemical Superfund Site and the Del Amo Superfund Site, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public

BOE-C6-0139994

health, welfare, or the environment.

4. Description of the Remedy

The implementation of the remedial actions selected by this ROD shall meet the description and all specifications and requirements as provided in this section, and the accompanying Decision Summary. The Decision Summary contains more detail on remedy description.

The primary principal threat at both of these sites related to groundwater is the NAPL which continues to dissolve into the groundwater. The dissolved contamination in the groundwater poses an unacceptable potential human health risk over the long term.. This selected remedial action is the first of two phases of remedial decisionmaking for the groundwater operable unit of the Montrose Chemical and Del Amo Superfund Sites. This ROD selects remedial actions that will:

- Contain the principal threat by containing the dissolved-phase groundwater contamination that surrounds the NAPL, thereby isolating the NAPL;
- Reduce the concentrations of dissolved contaminants in groundwater, outside the area of groundwater being contained, to levels that no longer pose an unacceptable health risk; and
- Prevent human exposure to groundwater contamination at these Superfund sites.

The containment of the principal threat shall be accomplished by (1) hydraulic extraction and treatment (with aquifer injection), and (2) reliance on intrinsic biodegradation, a form of natural attenuation. The manner in which each of these shall be applied is specified in the Decision Summary.

The reduction of concentrations of dissolved contaminants outside the area of groundwater being contained shall be accomplished by hydraulic extraction, treatment, and aquifer injection. This reduction shall occur at rates and meet time- and efficiency-based performance requirements specified in the Decision Summary. Some treated water may under this remedial action also may be discharged under permit to surface water channels. Provisions for institutional controls, monitoring, additional data acquisition, acceptable forms of groundwater treatment, and waivers of certain ARARs based on technical impracticability, shall also apply to this remedial action as specified in the Decision Summary.

EPA has determined that the remedial action selected in this ROD is protective of human health and the environment. However, the remedial action selected by this ROD does not remove

BOE-C6-0139995

- Dissolved phase contamination in a specifically-bounded, monitored zone of groundwater, as defined in the Decision Summary, shall be contained and isolated indefinitely such that the contamination cannot escape the zone. This zone is referred to by this ROD as the ***containment zone.***[1] By containing the dissolved phase contamination surrounding the NAPL, this action isolates the NAPL from the remainder of groundwater.

- Specific ARARs shall be waived due to technical impracticability ("TI waiver"). The waived ARARs are identified in Appendix A of the ROD. The TI waiver of these ARARs shall apply solely to a zone of groundwater that is defined in the Decision Summary of this ROD and is referred to as the ***TI waiver zone.*** The TI waiver zone and the containment zone are congruent and refer to the same physical space.

- Contaminants within the containment zone shall be contained by two methods: (1) groundwater extraction and treatment, and (2) monitored intrinsic biodegradation. The method which shall apply shall differ for various portions of groundwater, as specified and in accordance with all requirements and provisions in the Decision Summary.

- The concentrations of dissolved phase contaminants in all groundwater at the Joint Site that lies *outside* the containment zone shall be reduced to concentrations at or below standards identified and discussed in the Decision Summary of this ROD in a reasonable time frame. These standards are referred to by this ROD as ***in-situ groundwater standards,*** or ***ISGS***. This reduction shall be accomplished by extraction and treatment of groundwater. This requirement does not apply to the chemical pCBSA. Special actions for pCBSA are discussed in the Decision Summary.

- The reduction of the volume of water outside the containment zone that is contaminated at concentrations above ISGS levels shall be achieved at the groundwater extraction rates and in accordance with the performance standards, requirements, and provisions in the Decision Summary.

- The remedial action shall, while still meeting all other requirements and objectives of the remedial action as specified by this ROD, limit inducing adverse migration of NAPL (residual phase) contaminants. Additional definitions and exceptions with respect to this requirement are provided in the Decision Summary.

---

[1]The use of the term "containment zone" is this ROD does not reflect a formal establishment of a containment zone as that term is used in, and per the requirements of, California State Water Resources Control Board Resolution No. 92-49(III)(H).

BOE-C6-0139996

- The remedial action shall, while still meeting all other requirements and objectives of this remedial action as specified by this ROD, limit the migration of existing contamination where such migration would be of a nature that would lengthen the remedial action, result in a greater potential health risk, or result in spreading of the contamination. Additional definitions and exceptions with respect to this requirement are provided in the Decision Summary.

- Any of several technologies (or combinations of those technologies), identified in the Decision Summary shall be considered acceptable for treatment as determined in the remedial design phase. This remedy shall attain all ARARs identified by this ROD that pertain to any of the technologies that are actually implemented.

- For the chlorobenzene and TCE plumes, groundwater shall be injected back into the aquifers after treatment to standards selected in this ROD. Additional specifications are provided in the Decision Summary.

- For the benzene plume, after treatment groundwater shall be discharged after treatment in one of the following ways as determined in the remedial design phase: (1) discharge to the storm sewer, (2) discharge to the sanitary sewer, or (3) aquifer injection. The discharge shall meet all ARARs identified in this ROD and any independently applicable standards for such discharges.

- Contingent actions, as put forth in the Decision Summary, shall be implemented in the event that the remedial action does not contain groundwater contamination within the containment zone.

- The hydraulics of the affected groundwater aquifers, the nature, extent, fate, and transport of contamination, and compliance with the requirements of this ROD, shall be continually monitored in accordance with the objectives, requirements and provisions presented in the Decision Summary.

- Existing drinking water production wells in the vicinity of the Joint Site shall be routinely monitored for the contaminants from the Joint Site and actions shall be taken to ensure that contamination from the Joint Site does not enter the potable water supply, as provided in the Decision Summary.

- Additional field data shall be acquired during the remedial design phase, including monitoring well data from new and existing monitoring wells, well surveys, aquifer tests, and other data as required and as specified in the Decision Summary.

- Institutional controls are identified in Sections 11 and 13 of the Decision Summary to

BOE-C6-0139997

reduce the potential for groundwater use in the area of contaminated groundwater presently and during the course of the remedial action and to limit the potential for the spreading of existing contamination during the course of the remedial action.

5. Statutory Determinations

The selected remedy is protective of human health and the environment. In addition, as required by the terms of this ROD, EPA will conduct a second phase of remedial decisionmaking for this operable unit to address unresolved uncertainty regarding whether certain remedial actions selected in this ROD will continue to remain protective of human health and the environment over the long term. This second phase of remedial decisionmaking will address whether and to what degree NAPL recovery and/or NAPL immobilization shall occur at the Montrose Chemical and Del Amo Superfund Sites.

The selected remedy complies with Federal and State requirements that are legally applicable or relevant and appropriate (ARARs) to the remedial action, except where such ARARs have been waived. The waiver of certain ARARs, which are identified in Appendix B and explained in the Decision Summary of the ROD, is justified due to technical impracticability. This waiver applies to a specific zone of groundwater identified by the Decision Summary.

The selected remedy is cost effective and utilizes permanent solutions and alternative treatment technology to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces the mobility, toxicity, or volume as a principal element.

BOE-C6-0139998

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of the remedial action, and again every five years subsequently for as long as hazardous substances remain on-site, to ensure that the remedy continues to provide adequate protection of public health or welfare or the environment. As part of these reviews, EPA shall evaluate toxicological studies which may have been performed since the issuance of this ROD to determine whether remedial actions selected in this ROD to address the groundwater contaminant pCBSA remain protective of human health and the environment. This discussed in detail in the Decision Summary of this ROD.

Keith Takata, Director Date
Superfund Division
United States Environmental Protection Agency, Region IX

BOE-C6-0139999

II. DECISION SUMMARY

1. Site Names and Location

This record of decision (ROD) documents and establishes the dual-site operable unit remedy for groundwater at the Montrose Chemical and Del Amo Superfund Sites[1] (Figures 1-1 and 1-2) in Los Angeles, California (near the Cities of Torrance and Carson)(See Section 4 of this ROD for the context of this selected remedial action). The EPA CERCLIS identification numbers for these sites are CAD008242711 and CAD029544731, respectively. These separate, but adjacent Superfund sites have commingled groundwater contamination. Groundwater contamination at these two sites originated primarily from (1) the former Montrose Chemical plant and property, which manufactured the pesticide DDT between 1947 and 1982, and (2) the former Del Amo Synthetic Rubber plant and property, which operated between 1942 and 1972. There are other sources of groundwater contamination which are discussed in later sections of this ROD and in the remedial investigation reports. More details are provided in the Section 2 of this ROD, in the Remedial Investigation Reports, and Section 2 of the Joint Groundwater Feasibility Study.

The "Harbor Gateway" is a half-mile-wide strip of the City of Los Angeles that extends south from Los Angeles proper and provides the City a contiguous jurisdiction to Los Angeles Harbor. The former Montrose Chemical and Del Amo plants were located in the Harbor Gateway between the Cities of Torrance and Carson. The former Montrose plant property is at 20201 Normandie Avenue, lying on the west side of Normandie Avenue between Del Amo Boulevard on the south and Francisco Street (extended) on the north. The former Del Amo plant property lies in an area *roughly* bounded by Normandie Avenue on the west, Interstate 110 on the east, 190th Street on the north, and Del Amo boulevard on the south. The actual former plant property boundaries can be seen on Figure 1-2. The area surrounding the former plants contains portions of the cities of Carson, Gardena, and Torrance. A strip of land immediately east of the former Del Amo plant, and the residential area directly south of the former Del Amo plant, are part of unincorporated Los Angeles County. Overall, groundwater contamination associated with these

[1]On February 19, 1999, the United States Court of Appeals for the District of Columbia Circuit overturned EPA's final rule by which EPA had added the Del Amo Superfund Site to the Superfund National Priorities List. [Harbor Gateway Commercial Property Owners' Association, et al., v. U.S. EPA, 1999 U.S. App. LEXIS 2504 (D.C. Cir. 1999] Regardless of the NPL status of the Del Amo Site, it is appropriate to continue to refer to the Del Amo Site as the "Del Amo Superfund Site" because EPA, as the lead agency under the NCP, is continuing to undertake Superfund response actions at and with respect to that site, due to substantial actual or threatened releases of hazardous substances which pose an imminent and substantial endangerment to human health and the environment, and consistent with EPA's delegated CERCLA authority and the NCP [e.g., see 42 U.S.C. §9604(a-b); 40 C.F.R. §300.425(b)(4)].

BOE-C6-0140000

two sites has come to be located over an area extending more than 1.3 miles in length, but its extent differs widely with the depth of the water-bearing unit as well as the lateral location being considered (see Section 7 of this ROD, Summary of Site Characteristics, for discussion of distribution of contamination and land use characteristics).

BOE-C6-0140001

2. Site History and Enforcement Activities

Figures 2-1, 2-2 and 2-3 show many of the features discussed in this text. Most major sources of contamination at the former Montrose and Del Amo plant properties, as well as minor sources between these major sources, are shown on Figure 2-3a. Areas of known or highly suspected non aqueous phase liquids (NAPL) are shown on Figure 2-3b. Section 2 of the JGWFS (1988), the Montrose Remedial Investigation Report (1988), and the Del Amo Groundwater Remedial Investigation Report (1988) each contain more detail on contaminant sources. See Section 7 of this ROD, Summary of Site Characteristics, for more details and conclusions about contaminant distributions.

2.1 Former Montrose Chemical Corporation Plant

Montrose Chemical Corporation operated a technical grade dichloro-diphenyltrichloroethane (DDT) pesticide manufacturing plant at 20201 S. Normandie Avenue in Los Angeles, California from 1947 to 1982. The 13-acre former plant property lies just outside the City of Torrance, in the Harbor Gateway (See Section 1 and Figures 1-1 and 1-2). Historical documents from the time of the plant's operations refer to the plant as "the Torrance plant," and the former plant property has a Torrance mailing address, despite the fact that it was not formally located within the boundaries of the City of Torrance. The layout of the former Montrose plant property is depicted in Figure 2-1.

DDT was one of the most-widely used pesticides in the world until 1972, when the use of DDT was banned in the United States for most purposes. After 1972, Montrose continued producing DDT at the former plant to be sold in other countries. In 1982-1983, the plant ceased operations, was dismantled, and all buildings were razed. Since 1985 there is a temporary asphalt covering over the former plant property, which is otherwise fenced and vacant.

During its 35 years of operation, the Montrose plant released hazardous substances, pollutants or contaminants, into the surrounding environment, including surface soils, surface drainage and storm water pathways, sanitary sewers, the Pacific Ocean, and groundwater. The primary raw materials Montrose used for making the pesticide DDT were ***monochlorobenzene*** (hereafter, "chlorobenzene") and ***trichloroacetaldehyde***, known as "chloral." Montrose placed these in batch reactors in the presence of a powerful sulfuric acid catalyst called oleum. The resulting chemical reaction produced DDT. Chlorobenzene and DDT are two of the primary contaminants found in the environment at the Montrose Chemical Site today. DDT does not significantly dissolve in water but will readily dissolve in chlorobenzene. When in its pure form, chlorobenzene is a dense non-aqueous phase liquid (DNAPL).

BOE-C6-0140002

An unwanted by-product of DDT manufacture at the Montrose chemical plant was the highly water-soluble compound ***para-chlorobenzene sulfonic acid***, or pCBSA. This compound was created when chlorobenzene was directly sulfonated by sulfuric acid in Montrose's operations. To EPA's knowledge, pCBSA occurs in industry only in connection with DDT manufacture. There are no chronic toxicity data, and virtually no acute toxicity data for this compound. There are no promulgated health standards for pCBSA, which is found extensively in groundwater at the Montrose and Del Amo Superfund Sites. Additional information about pCBSA is provided in later sections of this ROD, including Section 8, Summary of Groundwater-Related Risks, and Section 12, Summary of Comparative Analysis of Alternatives and Rationale for Selected Alternative.

Montrose operations included a series of trenches used to convey wastes and a waste disposal pond (impoundment) which received wastewaters, DDT, and chlorobenzene. This pond also received caustic liquors and acid tars. Activities at the plant caused discharges of chemicals to the ground surface and to the waste pond. The soils under the Central Processing Area of the former Montrose plant contain large quantities of chlorobenzene in DNAPL form, as well as chlorobenzene dissolved in groundwater. The DNAPL occurs both above and below the water table. Data collected during the remedial investigation suggest that this DNAPL is a primary continuing source of groundwater contamination.

There were also periodic discharges of contamination from the Montrose plant into the storm water pathway leading from the Montrose plant. The evolution of this pathway and the discharges of wastes into it are described in detail in Chapter 1 of the *Remedial Investigation Report for the Montrose Superfund Site* (Montrose Site RI Report) (EPA, 1998). Some of these discharges may have resulted in standing contaminated water of significant quantity and over sufficient time that groundwater could have become newly or additionally contaminated by recharge from the ground surface.

Chapter 1 of the final Montrose Site RI Report gives additional details on the Montrose operating history. Section 7 of this ROD provides a more-detailed discussion of contaminant distribution; the most detailed description of contaminant distribution can be found in the Montrose Site RI Report, the Del Amo Groundwater RI Report (Dames & Moore, 1988), and the Joint Groundwater Feasibility Study (JGWFS), Section 2 (EPA, 1998). References for these documents are provided in Section 5 of this ROD.

BOE-C6-0140003

2.2 Enforcement Activities Related to the Montrose Superfund Site

In 1982, EPA conducted an inspection of the Montrose property and determined that DDT was present in surface drainages leading from the Montrose property. In 1983, EPA and the California Regional Water Quality Control Board issued a enforcement orders to Montrose, requiring them to cease and desist their discharge of hazardous wastes to the storm drain and surface water drainages. On October 15, 1984, the Montrose Superfund Site was proposed for the National Priorities List, or NPL. The Site was listed final on the NPL on October 4, 1989. EPA began a remedial investigation of the Montrose Chemical Site under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA). Montrose demolished the former plant and graded the site in 1984 and 1985 without the prior approval of EPA. Montrose covered the entire property, except for an area in the southeastern corner, with an asphalt cap. On February 19, 1988, EPA issued a unilateral administrative order to Montrose requiring Montrose to cover the uncovered portion of the southeastern portion of the site with asphalt (EPA Docket No. 88-10). Montrose ultimately complied with this request.

On October 28, 1985, Montrose and EPA entered into an Administrative Order on Consent (AOC) (EPA Docket No. 85-04) which obligated Montrose to perform a remedial investigation and feasibility study (RI/FS) of the entire Montrose Chemical site. This AOC was subsequently amended twice, once in 1987 and again in 1989. The AOC required that Montrose evaluate the nature and extent of contamination at Montrose under EPA oversight and subject to EPA approval, including surface and deep soils at and surrounding the former plant site, surface soils in neighborhoods, groundwater, sanitary sewers, and surface water pathways. It also required that Montrose perform a feasibility study, subject to EPA oversight and approval, of alternatives for addressing the contaminants in all of these areas.

Montrose installed groundwater monitoring wells in four separate hydrostratigraphic units, installed onsite NAPL wells, drilled and sampled from soil borings on and near the former plant property, and performed a number of other investigation-related tasks. Montrose generated drafts of the remedial investigation report as well as several drafts of feasibility studies related to screening and evaluating alternatives for soils and groundwater. However, Montrose did not modify any of these drafts adequately, nor did Montrose address EPA's comments on these documents sufficiently, such that EPA could approve and finalize the RI or FS documents. In January 1998, pursuant to the provisions of the AOC, EPA took back from Montrose the work to complete the RI Report and EPA completed it using EPA staff and contractor resources.

See discussion below about the JGWFS for further information about enforcement activities after the initiation of the joint remedial effort for groundwater.

BOE-C6-0140004

2.3 The Former Del Amo Synthetic Rubber Plant

The United States War Assets Administration (this former federal agency was succeeded by the U.S. General Services Administration [GSA]), owned a synthetic rubber manufacturing facility in Harbor Gateway, between the cities of Torrance and Carson, beginning in 1942. The War Assets Administration entered into operating agreements with Shell Oil Company (Shell), Dow Chemical Company, and several other companies, to operate the plant and to produce synthetic rubber for the United States during World War II. In 1955, Shell purchased the facility and began operating it directly. Shell operated the facility until 1972, at which time operations ceased, the plant was dismantled, and the plant buildings were razed. The plant property has been entirely redeveloped with light industrial and commercial enterprises, with the exception of the area at the south-central border of the former plant property, which is owned by Shell and is the location of the "Del Amo Waste Pits" (see below). The site did not take on the name "Del Amo" until later. The former Del Amo synthetic rubber plant property covered 270 acres, roughly 21 times the size of the neighboring Montrose plant property.

The layout of the former Del Amo plant property is depicted in Figure 2-2. The Del Amo plant had three sub-plants within it, commonly called "plancors." The styrene and butadiene plancors produced styrene and butadiene, respectively, and the rubber plancor chemically combined styrene and butadiene to make synthetic rubber. Of the three plancors, it has been shown that the majority of the contamination (there are exceptions) is found in the area of the former styrene plancor, in which large quantities of liquid benzene and ethylbenzene were stored and used. Over the years of its operation, the Del Amo plant released hazardous substances, pollutants, or contaminants into the surrounding environment. There are, at a minimum, eleven areas at the former Del Amo plant, nine of which are in the styrene plancor, which are under investigation as sources of benzene NAPL to the subsurface (See Figure 2-3a, Item Nos.2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12; and also Figure 2-3b). In some of these areas, the evidence of NAPL is conclusive because NAPL has been directly encountered. In the other areas, the evidence of NAPL presence is very strong, but based on deduction from indirect indicators. These areas remain under further investigation by Shell Oil Company and Dow Chemical Company under the oversight of EPA.

All of these NAPL sources lie within or close to the distribution, or "footprint", of the observed groundwater contamination. The "MW-20 area," so-named because it is near monitoring well MW-20, lies near a former benzene storage tank of at least a half-million gallons capacity (Item No.3 on Figure 2-3a; also shown on Figure 2-3b). South of MW-20 is a tank farm which stored benzene and ethylbenzene (Item No. 6 on Figure 2-3a; also shown on Figure 2-3b).

At the southern boundary of the former Del Amo plant property are the unlined "waste pits," in which both tarry and aqueous wastes were discharged, including wastes containing benzene, ethylbenzene, and naphthalene (Item No.10 on Figure 2-3a; also shown on Figure 2-3b). The

BOE-C6-0140005

waste pits also received surfactants which may account for unusual contaminant migration patterns under the pits. While the pits have a thick soil cover, there is still 55,000 cubic yards of viscous waste remaining in the pits underground. In September 1997, EPA signed a ROD for an operable unit remedy for the waste pits. Pursuant to that selected remedy, an engineered impervious cap complying with requirements of the Resource, Conservation and Recovery Act (RCRA) will be constructed over the waste, which will be left in place. In addition, soil vapor extraction (SVE) will be performed on the soils under the waste. This remedial action is currently in the remedial design phase.

On the eastern end of the former rubber plant lies another area with extensive benzene contamination in soils and groundwater (Item No.12 on Figure 2-3a; also shown on Figure 2-3b). Plant history indicates the presence of laboratories, above-ground pipelines, chemical storage and processing areas, and wastewater treatment areas. All of these have been the subject of the Superfund remedial investigation effort, and some remain under investigation. Enough information is known, however, to select the remedial actions set out in the ROD for groundwater.

In the southeastern area of the former Del Amo plant site, directly east of the waste pits, is another area with confirmed benzene NAPL contamination (Item No.11 on Figure 2-3a; also shown on Figure 2-3b). The source of this benzene is not immediately apparent, though there was a major pipeline in this area while the plant was in operation.

2.4 Enforcement Activities Related to the Del Amo Superfund Site

On May 7, 1992, EPA, Shell Oil Company (Shell), and Dow Chemical Corporation (Dow) entered into an Administrative Order on Consent (AOC) (EPA Docket No. 92-13) which required Shell and Dow, acting as "the Del Amo Respondents," to perform a remedial investigation and feasibility study for the Del Amo site, including the entire 270-acre former plant site. Among the requirements of this AOC was that the Del Amo Respondents perform a 2-phase remedial investigation, a feasibility study, and several focused investigations, including the NAPL near well MW-20, as well as a focused investigation/feasibility study for the Del Amo Waste Pits. To date the Del Amo Respondents have produced a draft Phase I remedial investigation report, a final groundwater remedial investigation report (see below), a final focused feasibility study for the waste pits area, a series of reports and documents related to its investigation of the NAPL at MW-20 and a pilot NAPL hydraulic extraction test (treatability study) for that area, a report on NAPL near monitoring well P-1 and the transmission pipelines, and numerous other satellite documents. The Phase 1 RI report was never finalized by the Respondents, with the agreement that EPA's comments on that document would be addressed in the final RI and that the draft Phase I RI would not be referenced. Phase II work is now in progress.

BOE-C6-0140006

When the joint groundwater work was initiated, EPA acknowledged that a separate remedial investigation report would be needed for the Del Amo Site which addressed groundwater only, while all remaining aspects of the remedial investigation would need to be documented in a separate report which would be issued later. The Del Amo Respondents voluntarily agreed to produce a "Del Amo Groundwater Remedial Investigation Report," which was completed to EPA's satisfaction in May of 1998.

2.5 Enforcement History Related to the Joint Groundwater Remedial Effort

Because the investigation of the Montrose Chemical Site had begun earlier than that for the Del Amo Site, originally there had been insufficient data to determine (1) the degree to which groundwater contamination from the Montrose and Del Amo Sites were commingled, and (2) the degree to which contamination from the Montrose Chemical Site might be affected by remedial actions that were being considered in feasibility studies for groundwater at the Montrose Chemical Site. The Montrose remedial investigation had identified the existence of extensive Del Amo-related groundwater contamination, but initially the remedial investigation at the Del Amo Site had not progressed to the point that this contamination was adequately defined. Accordingly, EPA considered selecting limited interim groundwater remedies for the Montrose Chemical Site until these factors could be resolved.

However, by late 1995, sufficient data had been obtained from the Del Amo groundwater investigation to determine that (1) the groundwater contamination from the two sites was commingled, and (2) the evaluation of remedial alternatives related to groundwater contamination at one site was inseparable from the same evaluation at the other site. Groundwater contamination at both sites had to be considered together in order to properly evaluate and select groundwater alternatives for the two sites (See Section 4, Context, Scope and Role of the Remedial action, in this ROD).

In late 1995 and early 1996, EPA informed and opened a dialogue with Montrose Chemical and the Del Amo Respondents (Shell Oil Company and Dow Chemical Company) that EPA intended to unite the remedial selection processes with respect to groundwater, thereby leading to a single feasibility study and a dual-site groundwater ROD. EPA initiated a process to generate a single feasibility study, called a Joint Groundwater Feasibility Study (JGWFS) to provide analysis for this ROD. While the separate AOC documents did not directly discuss a JGWFS, the parties agreed to proceed with the joint work as envisioned by EPA on a voluntary basis.

In March of 1996, a joint groundwater modeling effort was initiated. This technical effort was intensely overseen by EPA and was carried out by technical consultants to both parties. A series of meetings occurred from one to three times per month for six months in which a sophisticated

BOE-C6-0140007

groundwater flow and contaminant transport model was developed. The model was run and results compiled in late 1996. Summary details, results, and limitations of this model are discussed in a later section of this document. Those wishing technical or complete detail are referred to the Joint Groundwater Feasibility Study (EPA, 1998).

While the draft JGWFS was due on March 10, 1997, the joint parties did not submit the draft document to EPA until May 20, 1997. Upon reviewing this document, EPA found it highly deficient and misleading in numerous respects (*See* A.R. No. 4742; EPA DCN 0639-03730). EPA formally took over the work to complete the JGWFS on August 14, 1997. EPA found that while the modeling effort was technically sound and usable, the draft JGWFS report required wholesale revision. EPA took over the work and rewrote the JGWFS, and released the public comment draft on June 26, 1998. The JGWFS is considered final with the issuance of this ROD.

In January, 1998, EPA took over the effort to complete the Montrose Site RI Report after Montrose did not produce an acceptable draft after almost a decade of multiple iterations of Montrose drafts and comments by EPA. EPA completed its revision to this draft document on June 26, 1998. This was referred to as the "Public Comment Draft."

The Del Amo Respondents completed the Groundwater Remedial Investigation Report pertaining to the Del Amo Site on May 18, 1998, in accordance with EPA's comments and EPA has approved that document.

Both Montrose Chemical and the Del Amo Respondents completed the *Joint Groundwater Risk Assessment* in accordance with EPA comments in February, 1998. This document was approved by EPA as amended by EPA's *Supplement to Joint Groundwater Risk Assessment* (EPA, 1988).

2.6 Contaminant Sources Other Than the Montrose Chemical and Del Amo Plants

Within the Joint Site (See Section 6 for formal definition of Joint Site), there are several actual or potential sources of benzene and chlorinated solvents in addition to the former Montrose Chemical plant and former Del Amo plant. Montrose Chemical is the only known source of chlorobenzene, DDT, and pCBSA to groundwater at the Joint Site. As part of the Joint Site, these sources are by definition either entirely within the current area of groundwater contamination from the Montrose Chemical and Del Amo Sites, partly within it, or sufficiently close that contamination will have to be addressed as part of the remedial action selected in this ROD (See Section 6 of this ROD for definition of the term, "Joint Site."). *This section is intended for the purposes of providing background and does not necessarily identify all such sources.* The sources are listed below with the likely primary contributing contaminant in parentheses (). Other contaminants may also be present in each case, as identified by Section 7

BOE-C6-0140008

of this ROD and the remedial investigation reports for this remedial action, as referenced in Section 5 of this ROD.

- **Petroleum transmission pipelines (benzene).** A series of petroleum transmission pipelines, unrelated to the former Montrose and Del Amo plants, have been and still are used to transfer petroleum products from the port to the refineries in the area (Figure 2-3a, Items "K," "M," and "N"). There are several locations directly under these pipelines where groundwater concentrations are indicative of the likely presence of benzene NAPL and which may be related to these pipelines. The pipelines occur in separate bundles. Most of these bundles run in an east-west direction just south of both the former Montrose Chemical and Del Amo plant properties. One suspect location along this pipeline is south of Montrose along the pipeline, and east of the Jones Chemicals facility (See below for discussion of Jones). Another bundle is a feeder line that runs in a north-south direction into the east-west transmission line, parallel to Berendo Avenue south of the former Del Amo plant. Petroleum NAPL containing benzene has been directly observed along this feeder line near historical groundwater monitoring well P-1.

- **Stauffer Chemical (benzene).** A potential source of benzene in groundwater near the former Montrose plant is Stauffer Chemical, which historically operated a chemical plant on the Montrose property that manufactured benzene hexachloride (BHC), another pesticide. BHC manufacture requires benzene as a feedstock. In the process, benzene is chlorinated to form BHC. The gamma isomer of BHC is known as lindane.

- **Montrose (benzene).** A potential source of benzene in groundwater near the former Montrose plant is the benzene that occurred in raw chlorobenzene, most likely at a rate of less than 1%. Because of the copious quantities of chlorobenzene released, this could account for some of the benzene contamination in groundwater.

- **The Jones Chemicals, Inc. plant (TCE, PCE, DCE, and benzene).** This plant manufactures bleach and sells other chemical products in bulk and has been in operation immediately south of the former Montrose plant since the mid-1950s (Items "J" and "L" on Figure 2-3a). Based on investigations by EPA and the State of California, Jones Chemicals, Inc. is known to have discharged chlorinated solvents to a dry well on their property. Likewise, there are fuel tanks which may have leaked petroleum products into the subsurface. Jones also stored PCE on its property in bulk, packaged PCE in drums, and sold PCE for a number of years. Jones also operated a drum washing facility which was also a likely source of chlorinated aliphatic solvents released to the subsurface.

- **Solvent-handling Facilities (TCE, PCE)** There are facilities near 196th Street at the western border of the former Del Amo plant which have handled chlorinated solvents and

BOE-C6-0140009

have soils with significant concentrations of these solvents (Item No. 2 on Figure 2-3a; also shown on Figure 2-3b). The operations at these facilities occurred or continue to occur subsequent to the closure of the Del Amo plant.

BOE-C6-0140010

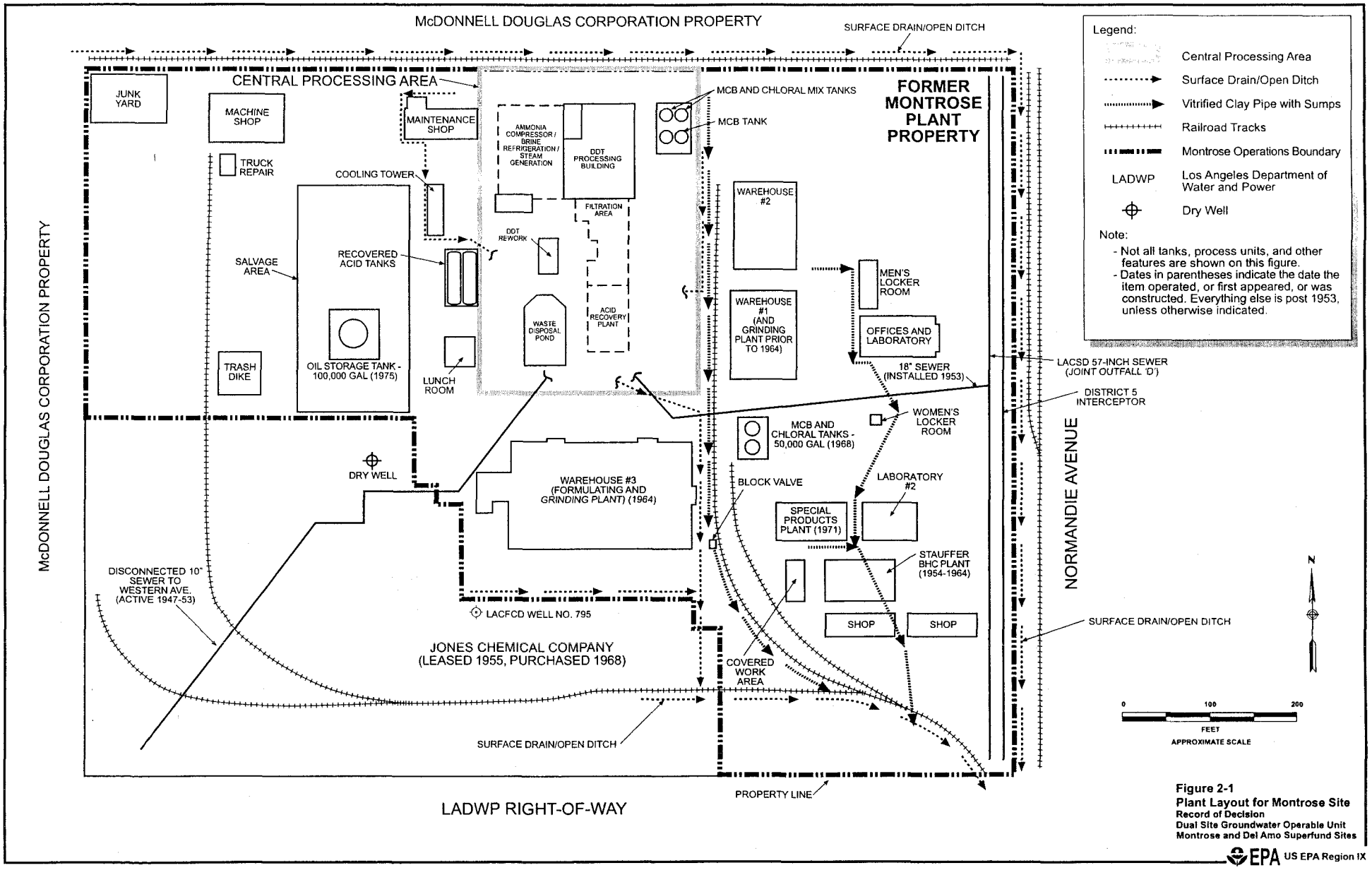


Figure 2-1
Plant Layout for Montrose Site
Record of Decision
Dual Site Groundwater Operable Unit
Montrose and Del Amo Superfund Sites

EPA US EPA Region IX

BOE-C6-0140011

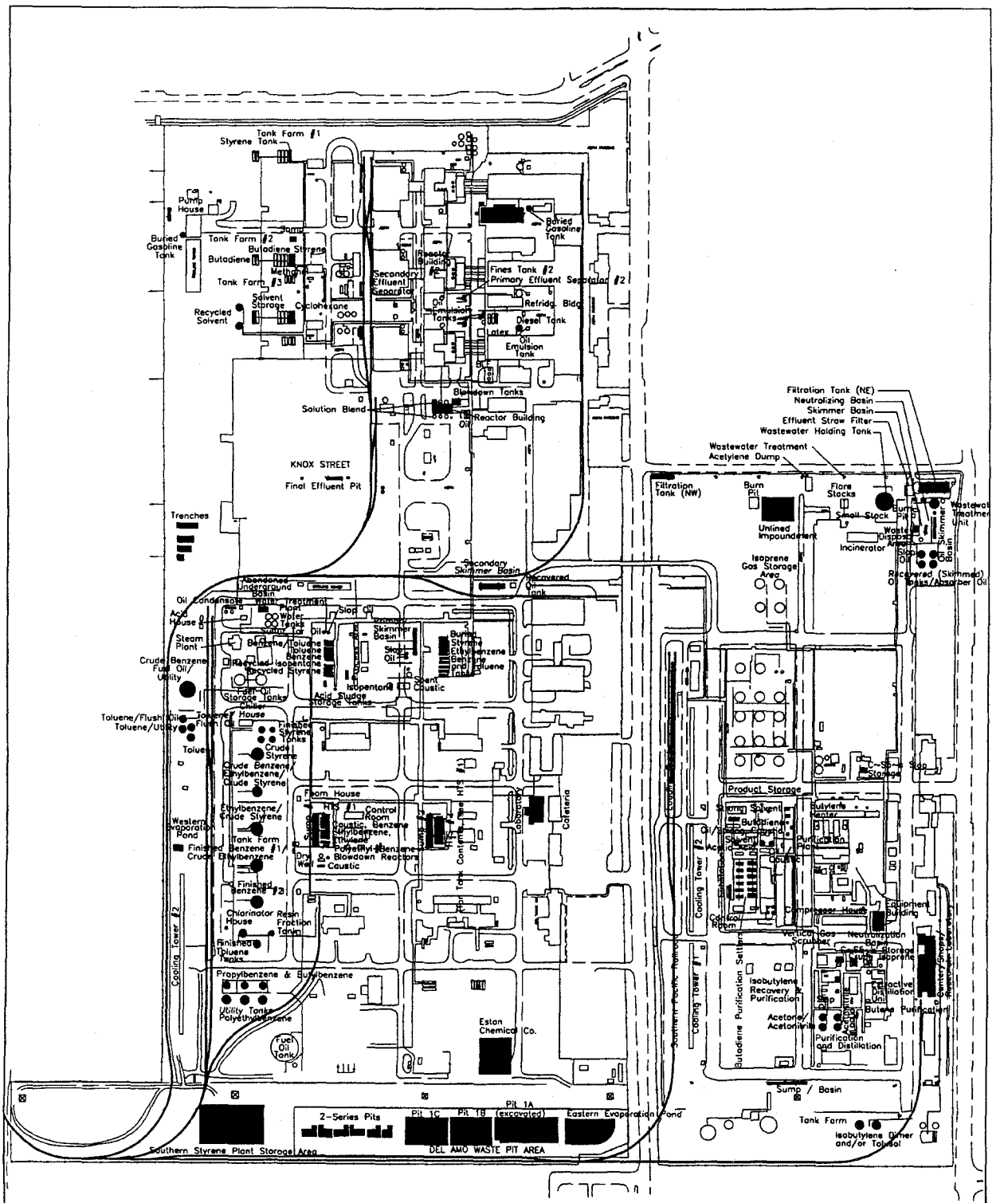
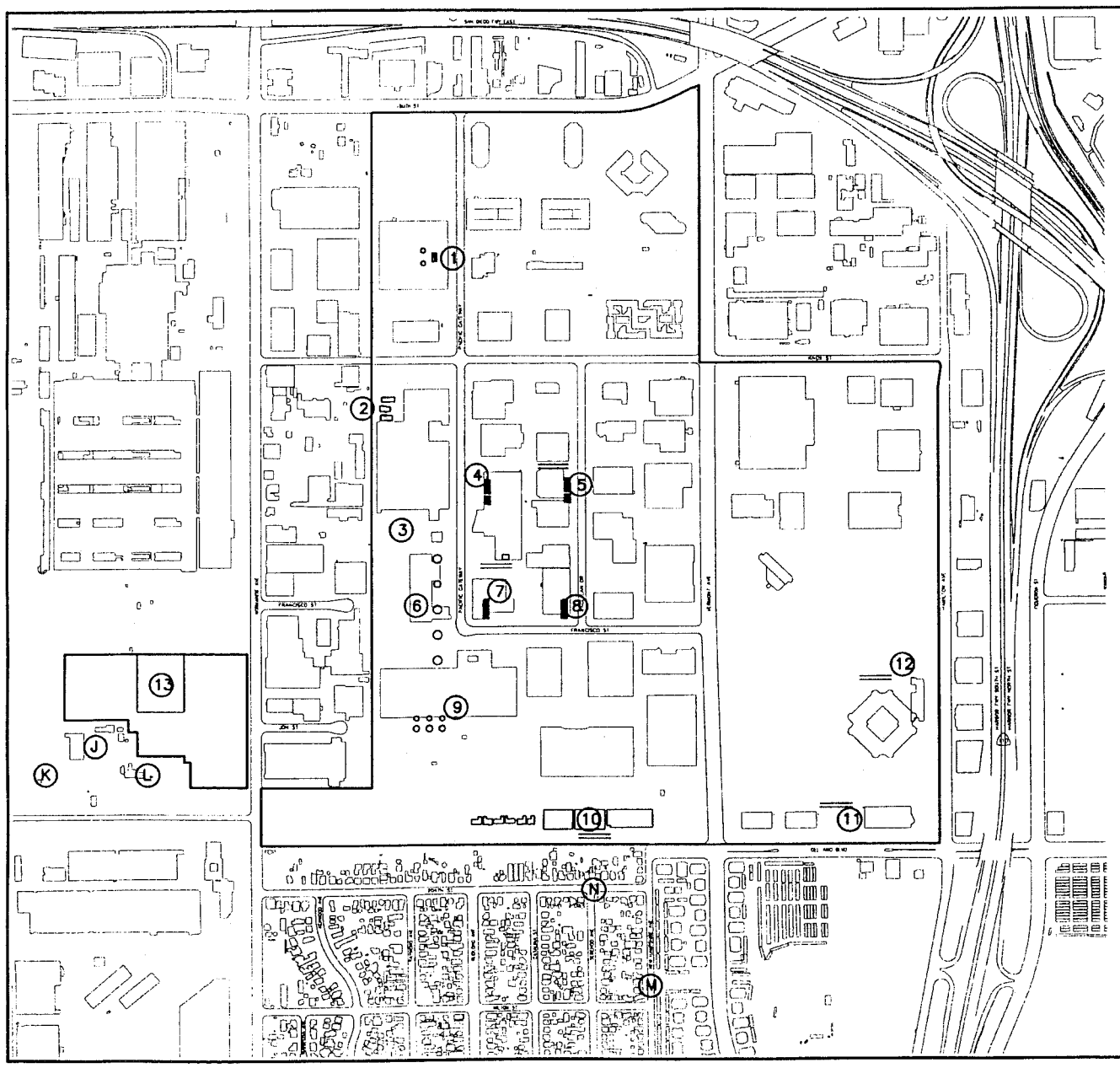


Figure 2-2

Historical Facilities
for Former Del Amo Plant Property
Record of Decision
Dual Site Groundwater Operable Unit
Montrose and Del Amo Superfund Sites

US EPA Region IX



N

0 600 1200

EXPLANATION

(9) Approximate location of groundwater contamination source areas

Source Area Number	Suspected Former Source Facility	VOCs with Elevated Concentrations in Groundwater
1	Former Del Amo Plant Property cyclohexane tanks	cyclohexane
2	Former Del Amo Plant Property pits and trenches and/or solvent facility	TCE PCE chloroform
3	Former Del Amo Plant Property XMW-20 LNAPL (benzene tank and/or pipeline)	benzene (LNAPL) toluene ethylbenzene
4	Former Del Amo Plant Property VOC tanks in styrene finishing/benzene purification unit	benzene ethylbenzene cyclohexane
5	Former Del Amo Plant Property VOC tanks and/or underground pipelines in styrene finishing unit	BTEX styrene naphthalene
6	Former Del Amo Plant Property tank farm (VOC storage)	benzene ethylbenzene
7	Former Del Amo Plant Property VOC storage tanks at ethylbenzene production unit #1	benzene ethylbenzene
8	Former Del Amo Plant Property VOC storage tanks at ethylbenzene production unit #2	benzene ethylbenzene phenol
9	Former Del Amo Plant Property "utility tanks"	benzene toluene
10	Former Del Amo Plant Property Waste Pit Area and underground petroleum product pipelines	BTEX naphthalene phenol
11	Former Del Amo Plant Property underground benzene pipeline	benzene phenol(?)
12	Former Del Amo Plant Property laboratory, underground pipelines (?)	BTEX styrene cyclohexane naphthalene
13	Former Montrose Plant Properly (DNAPL) central process area	chlorobenzene (DNAPL) benzene
N	Pipelines	benzene naphthalene
K	Pipelines	BTEX 1,1-DCA
J, L	Jones Chemical	TCE, PCE, 1,1-DCE, 1,1-DCA, benzene
M	SBL102 LNAPL	petroleum hydrocarbons

FIGURE 2-3a

Former Montrose and Del Amo Plant Properties Groundwater Contamination Source Areas

Record of Decision
Dual Site Groundwater Operable Unit
Montrose and Del Amo Superfund Sites

US EPA Region IX

BOE-C6-0140013

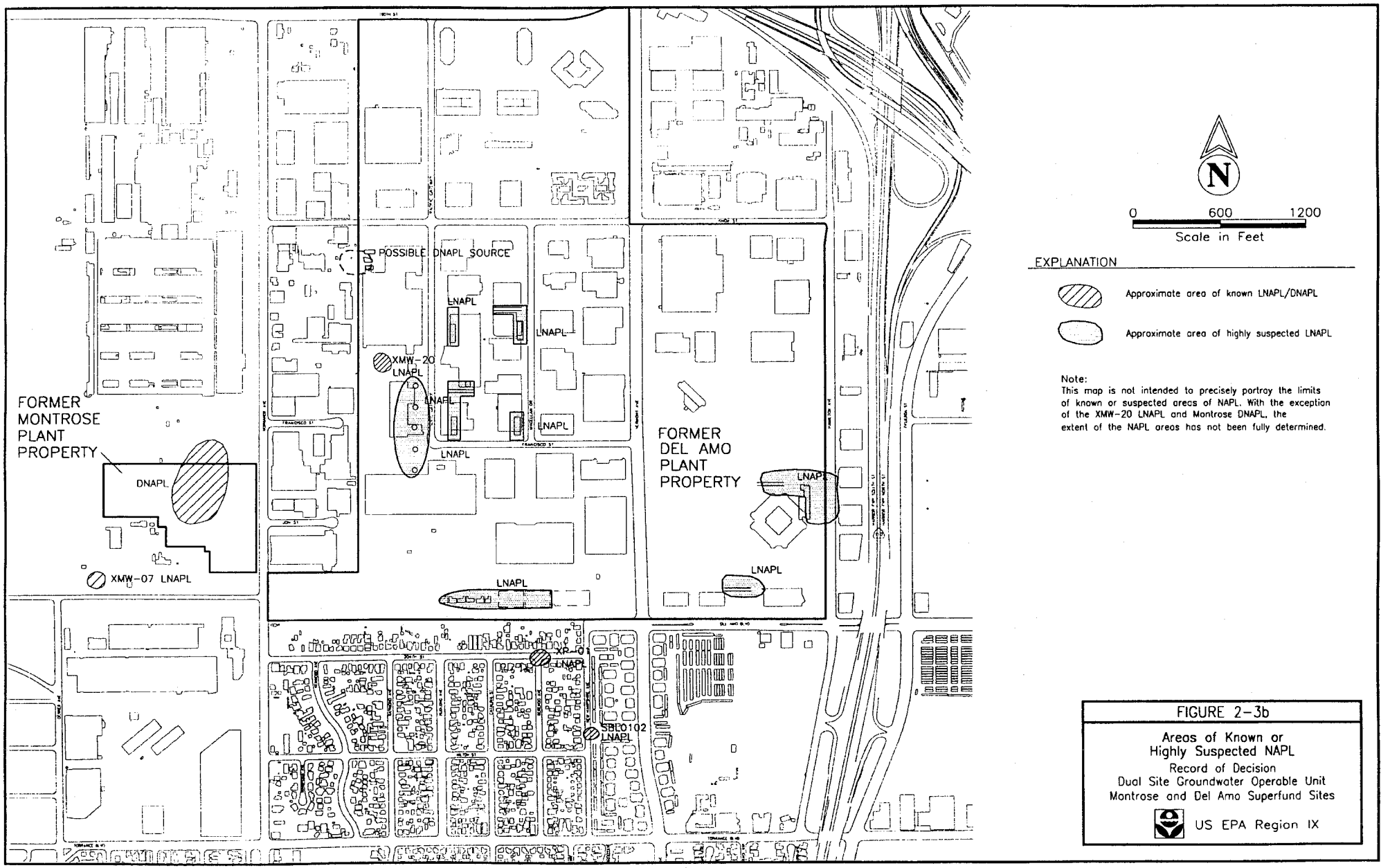


FIGURE 2-3b

Areas of Known or Highly Suspected NAPL
Record of Decision
Dual Site Groundwater Operable Unit
Montrose and Del Amo Superfund Sites

US EPA Region IX

BOE-C6-0140014

3. Highlights of Community Involvement Activities

3.1 Communities and General Community Involvement

A community relations plan was developed and issued by EPA in July of 1985 (EPA DCN 0639-00482). EPA issued an updated community relations plan in November of 1996 (EPA DCN 0639-02277). These plans were issued in accordance with EPA guidance to facilitate the Community involvement with respect to all Superfund actions for the Montrose Chemical and Del Amo Sites. This plan has been followed by EPA with respect to general community involvement as work at the two sites has proceeded over more than a decade.

EPA has maintained a mailing list database, which is updated on a continuous basis, and has issued fact sheets to persons and business entities on this mailing list throughout the Superfund project, which began for the Montrose Chemical Superfund site in 1983 and for the Del Amo Superfund site in 1991. As discussed earlier in this ROD, there are many aspects of the Montrose Chemical and Del Amo Superfund sites which are undergoing separate investigation and cleanup actions; groundwater is one of these actions and is being addressed in a dual-site manner. Beginning in 1983 and onward, EPA issued fact sheets to the mailing list and to any parties interested in the Superfund sites, addressing either some or all of the various actions and investigations underway. Groundwater was among these actions and investigations. These fact sheets provided the public with historical and up-to-date data and information about the sites and EPA's approach to the sites. They also encouraged the public to approach EPA with any concerns and comments they may have, and gave an opportunity to add or remove names from the mailing list.

During the period 1983 to 1993, community interest in these sites was modest. In 1993, fill material contaminated with DDT was found in residential yards along 204th Street, which were immediately adjacent to the former Del Amo waste pits. A community group, the Del Amo Action Committee, was formed at that time. Over time, this group took up the broader issues of health concerns and possible contamination throughout the wider neighborhood. Other groups and individuals with other interests and positions also existed in the community near the Montrose Chemical and Del Amo sites. Beginning in 1994, to address issues associated with the temporary relocation of some neighborhood residents and other concerns in the neighborhood, EPA substantially increased its community relations effort, including meetings and workshops monthly and as often as weekly, numerous fact sheets, special hot-lines, and media relations.

Although a majority of community involvement since 1994 has been focused on actions related to neighborhoods and neighborhood soils, EPA often "piggybacked" on these efforts (meetings,

BOE-C6-0140015

fact sheets, etc.) to provide the community with reports on progress, data, and changes in approach with respect to the groundwater investigation and feasibility study.

In 1997, members of the community, the Del Amo Action Committee, the EPA, agencies of the State of California, and many local agencies, formed a group called the Montrose and Del Amo Neighborhood Partners, which now meets regularly. EPA provides information to this group on groundwater and has received feedback on concerns related to groundwater.

3.2 Information Repository

EPA has maintained an information repository at the Torrance and Carson public libraries with hard copies of selected critical documents related to the investigation and response actions for the Montrose Chemical Superfund site and the Del Amo Superfund site. This repository contains the administrative record for the remedial action selected by this ROD.

3.3 Community Involvement Activities Specific to the Proposed Plan for the Groundwater Remedial Action Selected by this ROD

On April 17, 1997, EPA held an informational workshop about groundwater geared to the segment of the community without substantial scientific background. EPA advertised the meeting via a flyer sent out on our mailing list. The EPA remedial project manager (RPM) and community involvement coordinator (CIC) used a computer-generated slide show, various demonstration aids, and a groundwater model as visual aids to explain: (1) the nature and operational history of the sites, (2) what groundwater is and how water moves in aquifers and aquitards, (3) the extent of contamination in each aquifer at the Joint Site[1], (4) what non-aqueous phase liquids are and how they behave, (5) why some of the groundwater cannot be cleaned up fully, (6) the approach of using a NAPL isolation zone and restoring groundwater outside that zone, (7) the concept of intrinsic biodegradation, (8) the concept of groundwater pumping for containment or for full cleanup, and (9) some possible types of generalized actions EPA might take to address the groundwater. This meeting took place prior to the release of the Joint Groundwater Feasibility Study and was designed to be a primer to help people understand the proposed plan when it was issued. Approximately 50 people attended. EPA answered questions of the community during this workshop and fielded concerns to take back into the remedy development process.

[1]See Section 6 for formal definition of Joint Site.

BOE-C6-0140016

In May 1998, the CIC approached both the Del Amo & Montrose Partnership as well as the Del Amo Land Use Community Advisory Panel and offered to provide them with additional workshops or briefings on EPA's proposed groundwater remedy prior to the Dual Site Proposed Plan Public Meeting. Neither group accepted our offer, preferring to participate at the public meeting instead.

On June 26, 1998, EPA released two versions of the *Proposed Plan; Dual Site Groundwater Operable Unit, Montrose and Del Amo Superfund Sites.* Both versions of the plan were made available in English and Spanish. One version, the general fact sheet version, was less technical and was targeted primarily at the average person. The technical and expanded version was more technical in its terminology and analysis, was much longer, and was aimed primarily at the technical community. Each version was written to serve as a stand-alone document. Any person could receive either or both versions, in either language, upon request. The following activities accompanied this release:

- The general fact sheet version was sent to the mailing list of approximately 1900 individuals, and informed them about how to receive a copy of the technical and expanded version of the proposed plan if desired;
- The general fact sheet version was made available to anyone else who requested a copy;
- The general fact sheet version was posted on the Del Amo/Montrose web site; (URL: http://www.epa.gov/region09/waste)
- The technical and expanded version was sent to the Montrose/Del Amo Neighborhood Partners, potentially responsible parties, their attorneys and representatives, and anyone who requested a copy;
- The availability of the fact sheet and the administrative record file, and the commencement date and duration of the public comment period, were published in a local newspaper announcement; and
- A press release was issued announcing EPA's proposal, the availability of the proposed plan and administrative record file, and the commencement and duration of the public comment period.

On July 1, 1998, the administrative record file for the Dual Site Groundwater Operable Unit was made available in the Torrance and Carson public libraries, on microfilm. Selected critical documents, including the remedial investigation reports, the Joint Groundwater Feasibility Study

BOE-C6-0140017

(JGWFS), the Joint Groundwater Risk Assessment, and EPA's supplement to the risk assessment were made available in hard copy in the libraries.

On July 2, 1998, EPA opened a formal public comment period on the proposed plan and administrative record file. The original notice provided that the comment period would have a duration of 30 days and close on July 31, 1998. Subsequently, in response to requests by members of the public, EPA extended the public comment period by an additional 30 days, to August 30, 1998. An announcement of this change was placed in the same local newspaper which carried the original announcement. The public comment period spanned a total of 60 days. Because August 30 fell on a Sunday, EPA considered comments that were received or postmarked on or before Monday, August 31, 1998.

A formal public meeting on EPA's proposed plan and administrative record file was held during the afternoon on Saturday, July 25, 1998 at the Torrance Holiday Inn on Vermont Street. EPA presented an in-depth presentation about groundwater and EPA's proposal, using computer graphics and slides, and a highly sophisticated model with dye representing contaminants under the ground. EPA summarized the problems posed by the two sites. The information provided in the April 17, 1997 workshop was largely repeated and expanded upon. EPA answered the public's questions during and after this presentation. The EPA presentation was followed by a formal comment period. Both EPA's presentation, the questions and answers, and the formal comment period were transcribed by a court reporter. Approximately 35 people attended, including representatives of Del Amo Action Committee, the Del Amo Land Community Advisory Panel, local businesses, and other members of the general public. Comments read into the record during the formal comment portion of the public meeting were addressed by EPA prior to issuance of this ROD. EPA's responses can be found in the response summary.

BOE-C6-0140018

4. Context, Scope and Role of the Remedial Action

This operable unit remedy addresses cleanup of contaminated groundwater and the containment of dissolved phase contamination surrounding non-aqueous phase liquids (NAPL), with respect to *both* the Montrose Chemical and the Del Amo Superfund Sites.[1] EPA refers to this action as a ***dual-site operable unit remedy***. The term "dual site" refers to its application to two Superfund sites within a single ROD. As an operable unit remedy, this remedy addresses only a specific portion of all contamination at the Montrose Chemical and Del Amo Superfund Sites. Overall site remedies will, and other operable unit remedies may, be selected for each of the sites. Subsequent amendments to this ROD may be on either a dual-site or site-specific basis, as determined appropriate by EPA.

This ROD establishes remedial actions and standards that differ among various areas of groundwater within the Montrose and Del Amo Sites. The ROD defines these areas both laterally and with depth (i.e. 3-dimensionally) within the system of hydrostratigraphic units present at the Joint Site[2]. This is because (1) the nature and extent of NAPL contamination has made it necessary to address contaminated groundwater that is near NAPL differently than contaminated groundwater at a greater distance from NAPL, and (2) there are physical differences among the various areas of dissolved phase contamination within the overall contaminant distribution that justify differing goals and actions. The details of these distinctions are summarized later in this ROD.

This ROD contains multiple specialized issues and approaches which require substantial discussion. As just mentioned, the ROD utilizes a dual-site approach, and selects differing actions for multiple areas of groundwater. In addition, this ROD 1) reflects only the first of two phases of remedy decisionmaking with respect to this operable unit, 2) includes a waiver of certain applicable or relevant and appropriate requirements based on technical impracticability for a defined area of groundwater, and 3) relies on more than one general response action (both intrinsic biodegradation, a form of natural attenuation, as well as hydraulic extraction and treatment) to meet remedial objectives. This section places these factors and the remedial approach being used into context so as to define the scope of the remedial action clearly and provide a contextual backdrop for the other sections of this document.

---

[1]Groundwater at the Montrose Chemical and Del Amo Sites is contaminated by hazardous substances and other pollutants or contaminants as defined by Section 101 of CERCLA, 42 U.S.C. §9601, and/or listed by EPA as CERCLA hazardous substances in 40 C.F.R. Table 302.4. *See also* 40 C.F.R. §302.4.

[2]See Section 6 for formal definition of the term "Joint Site."

BOE-C6-0140019

4.1 Dual-Site Basis and Approach

The groundwater contamination from the Montrose Chemical and Del Amo Superfund Sites has partially commingled, or merged. Originally, EPA oversaw separate remedial investigations and feasibility studies for groundwater at the two sites. However, EPA has found that factors and considerations related to evaluation of remedial alternatives and implementation of remedial actions for groundwater at these sites is inextricably related. Remedial actions taken for groundwater at one site will, to some extent, affect remedial actions taken at the other site, either by affecting the type of action taken or the manner in which the action is implemented, or both.

The groundwater contamination at these two sites presents as one interrelated technical problem. This is not to say that there are not technical distinctions worth identifying and considering between the Montrose and Del Amo Sites with respect to groundwater contamination and these have been considered by EPA, as appropriate. However, it is appropriate to frame a single remedy selection process for groundwater at the two sites. The nature and extent of contamination and the nature of the EPA Superfund remedy selection process lead to the following conclusions:

1. The implications of possible remedial actions for one site must be viewed in the context of those being considered for the other site;

2. The remedial actions for both sites must be mutually consistent; and

3. The nine remedy selection criteria in the National Contingency Plan (NCP) must not be evaluated in terms of either site alone, but in relation to the groundwater contamination from both sites as a whole.

As an example, a principal goal of the JGWFS was to evaluate the degree to which groundwater contamination at either site may be adversely moved by remedial actions being considered for the groundwater contamination at the other site. Likewise, consideration was given to whether taking certain actions for one site might affect the range or latitude of options for, or the efficacy of, addressing the other site. Such factors had to be considered together, both in time and within a single vehicle.

As another example, objectives strongly valued at one site, such as cleaning up more quickly and/or keeping existing contamination contained, bring about consideration of actions at the other site, or make some results at the other site more acceptable than they would otherwise be when considered alone. A balancing among the "site-specific" objectives is required.

BOE-C6-0140020

Attempts to separate evaluations of remedial alternatives independently "by site" would have become artificial and awkward. The likely result of such an effort would have been two largely redundant and duplicative remedy selection processes, each with a set of reports straining to confine its evaluation of criteria within the sphere relating to one site, when the considerations needed cross site boundaries and pertain to the interrelated dual site. Such an approach also would have presented the formidable administrative risk of being either technically or administratively inconsistent and making the remedy selection process muddled or incomprehensible to the public.

Accordingly, EPA has employed a unified process of evaluation, public comment, and remedy selection to apply to this groundwater operable unit at both sites. Using a unified approach has: (1) provided for technical consistency and completeness, (2) minimized and simplified the administrative process of remedy selection, and (3) facilitated public understanding and the ability of the public to comment on the remedy when it was proposed to the public.

4.2 Site-Wide Context of This Operable Unit

Table 4-1 shows the contaminated media affected by each of the Superfund sites. The operable unit remedy selected in this ROD addresses only groundwater and NAPL, the first two items under each site in Table 4-1. EPA is conducting separate investigations and planning separate remedy selection processes for the other affected media at these sites, as shown in Table 4-1. The other affected media, and the activities being undertaken to address them, are not covered by this document or this remedy. The interim provisions of an operable unit ROD for the Del Amo Waste Pits, issued September 5, 1997, are finalized by this ROD.

4.3 The Problem Posed by NAPL at the Joint Site

The presence of NAPL contamination at both the Montrose and Del Amo sites strongly influences (1) the nature and scope of this remedy, (2) the remedial approach used in all remedial alternatives considered, and (3) the evaluation of alternatives. While more information is provided on NAPL and its distribution in later sections, a discussion is provided here to establish how NAPL relates to these contextual aspects.

At most sites where it occurs, contamination in groundwater is present in one of three forms: (1) dissolved in the water, called *the dissolved phase*; (2) adsorbed to soil particles, called *the sorbed phase*; and (3) as non aqueous phase liquid, called the *residual phase* or *NAPL phase*. Contaminant mass can be transferred among these three phases as subsurface conditions change. Generally speaking, NAPL is the presence of the pure, undissolved form of a chemical which is a liquid at standard temperature and pressure and which has a low enough water solubility that it is significantly immiscible with water and can exist as a separate phase when present in water. The

BOE-C6-0140021

term "NAPL" does not refer to the chemical content of a substance but rather to its form. Many chemicals and mixtures of chemicals display NAPL properties but their chemical composition can only be resolved with site-specific sampling and analysis.

NAPL is usually associated with one or more of the following characteristics: (1) high interfacial tension with the water phase; (2) a density difference with the water phase; (3) movement that is dominated more by the relative saturations of NAPL/water/air, buoyancy forces, gravity and capillary pressures, rather than by hydraulic gradients, and (4) heightened viscosity. However, it is important to note that there are many chemicals for which the NAPL form is not highly viscous. An example of this is chlorinated aliphatic solvents. NAPL that has density less than the density of water is called "light non-aqueous phase liquid," or "LNAPL," and NAPL with density greater than that of water is called "dense non-aqueous phase liquid," or "DNAPL."

EPA's experience at Superfund sites is that NAPL often creates serious challenges for remedial efforts. This is because, on the one hand, it dissolves into groundwater and causes high concentrations of contaminants (up to the solubility limit) in groundwater; yet, on the other hand, complete dissolution of NAPL takes a very long period of time, and it cannot be easily flushed and removed from the aquifer. It can be exceedingly difficult to determine with a significant or reasonable degree of certainty: (1) the location of NAPL at a site, (2) the distribution of NAPL, (3) the total NAPL mass, and (4) the lowest elevation in the subsurface at which NAPL occurs ("bottom of the NAPL-contaminated zone"). NAPL can remain in the soils indefinitely, either above or below the water table, where it continually dissolves, either directly into groundwater, or into soil moisture which percolates into groundwater. In this way, NAPL represents a continuing and often recalcitrant source of dissolved phase contaminants into groundwater. Once in groundwater, the movement of the dissolved contaminants is controlled by the processes of advection, dispersion, retardation, and degradation. Figure 4-1 provides a simple depiction of this process. In order to clean groundwater when a NAPL source is present, the NAPL must either be removed, destroyed, or isolated; otherwise, continuing dissolution from the NAPL will re-contaminate groundwater which has been cleaned.

NAPL is present in many areas in the subsurface at the Montrose and Del Amo Sites, surrounded by larger areas of dissolved-phase contamination in groundwater. At these sites, NAPL is present under conditions such that it is technically impracticable with existing technologies to remove enough NAPL to reduce groundwater concentrations to health-based standards at all points in the groundwater plume. Attaining groundwater standards in the midst of the NAPL-impacted areas would require virtually complete elimination of the NAPL from the ground, which EPA has determined to be technically impracticable. This is further discussed and supported in Section 10 of this ROD.

BOE-C6-0140022

4.4 Use of a Containment Zone for NAPL

This operable unit remedy isolates the NAPL within a ***containment zone.***[3] The containment zone includes both NAPL and some dissolved phase contamination surrounding the NAPL. Dissolved phase contaminants within the containment zone will be prevented from escaping the containment zone by the remedial actions selected by this ROD. These actions thereby isolate the NAPL and the dissolved phase contamination *inside* the containment zone, from the dissolved phase contamination and clean groundwater *outside* the containment zone. The size of the containment zone is limited in size based on technical principles (discussed in Section 10 of this ROD and Appendix E of the JGWFS).

NAPL dissolution continues to occur within the containment zone, therefore, concentrations of contaminants within the containment zone cannot be appreciably reduced; the containment zone must be contained indefinitely. However, once the containment zone is established, the dissolved phase contamination *outside* the containment zone can be cleaned up to health-based standards because NAPL dissolution no longer effects the groundwater outside the containment zone. All alternatives that EPA considered prior to selecting this remedy (except for the No Action Alternative) assumed that NAPL was isolated within a containment zone in this way. This concept is depicted in Figure 4-2.

Two means are utilized within this ROD for achieving containment of dissolved phase contaminants within the containment zone: (1) hydraulic extraction and treatment, and (2) reliance on intrinsic biodegradation. The application of these means vary depending on the area of groundwater being addressed. This is further discussed in Sections 11 and 12 of this ROD with Sections 7, 9 and 10 providing significant supporting information.

4.5 Two Phases of Remedy Selection to Address Groundwater and NAPL

This operable unit remedy represents the first of *two* phases of remedy selection that will address groundwater and NAPL at these sites. This first phase establishes a containment zone and addresses dissolved phase contamination. More specifically, this phase:

[3]The use of the term "containment zone" in this ROD does not reflect a formal establishment of a containment zone as that term is used in, and per the requirements of, California State Water Resources Control Board Resolution No. 92-49(III)(H).

BOE-C6-0140023

(1) ***Contains dissolved phase contaminants in groundwater surrounding the NAPL*** in a containment zone, thereby isolating the NAPL principal threat and the contaminated groundwater immediately surrounding it from the groundwater outside the containment zone; and

(2) Outside the containment zone, ***reduces dissolved phase concentrations*** of contaminants in groundwater to health-based standards and in accordance with the specifications in this ROD.

The second phase of remedial selection for this operable unit will address whether and to what degree ***NAPL Recovery*** and/or ***NAPL immobilization*** shall occur at the Montrose and Del Amo Sites. This distinction between the two phases is further described as follows.

It is important to make certain distinctions between the dissolved phase and the NAPL phase in order to put the two phases of remedial selection into context. While it addresses NAPL by isolating it within an area of groundwater, this first phase remedial action does *not* address ***NAPL recovery***, which refers to removing the NAPL itself from the ground. The action selected by this ROD, therefore, does not significantly affect the mass of NAPL remaining in the ground.

Also, the actions selected in this ROD prevent the migration of dissolved phase contaminants *in the water surrounding the NAPL,* but do not prevent the migration of the NAPL phase itself. While this ROD requires that the remedial action be designed to prevent or limit *inducing* the movement of NAPL, a certain degree of NAPL movement may occur naturally. EPA has determined that this remedy is protective of human health and the environment. However, the potential for movement of the NAPL phase itself in the future, as well as the lingering mass of NAPL, creates uncertainty with respect to the long-term effectiveness of the remedial actions selected in this ROD, and the ability of those actions to maintain protectiveness of human health and the environment over the long term. To address these uncertainties, EPA is performing a second phase of remedial decisionmaking for this groundwater operable unit.

Some degree of NAPL recovery and/or immobilization of NAPL would likely enhance the long-term effectiveness and certainty of long-term protectiveness of the first phase remedial actions selected by this ROD. When NAPL is recovered from the ground, its mass and saturation are reduced. In principle, this can (1) reduce the amount of time that the containment zone must be maintained, (2) reduce the potential for NAPL to move naturally either vertically or laterally, and (3) increase the long-term certainty that the remedial action will be protective of human health and remain effective. In addition to technologies which physically remove NAPL, there are other technologies which, while not removing NAPL from the ground, may reduce its mobility in place, thereby immobilizing it. Evaluations of the potential for NAPL recovery or immobilization to be effective are underway but have not been completed specifically with respect to the Montrose Chemical and Del Amo Sites.

BOE-C6-0140024

Whether and to what degree NAPL recovery and/or NAPL immobilization should occur at the Montrose Chemical and Del Amo Superfund sites will be determined in a separate but related second-phase remedial selection process. As of the date of this ROD, EPA is presently overseeing separate feasibility studies (one for the Montrose Chemical Site, and another for the Del Amo Site) that are examining the feasibility of various NAPL recovery and immobilization alternatives. If EPA determines that an additional remedial action is necessary, EPA will select the second phase remedial actions in an *amendment* to this ROD. EPA may issue such an amendment, if any, as a stand-alone document or within the framework of another ROD for the Montrose and Del Amo Site, including final site-wide ROD(s) which may be issued.

Performance of the second phase remedial selection process for this operable unit is authorized by and consistent with the NCP provision at 40 C.F.R. 300.430(f)(5)(iii)(D) which provides that the ROD shall:

> ...When appropriate, provide a commitment for further analysis and selection of long-term response measures within an appropriate time frame.

The second phase is also in accordance with the *Guidance for Evaluating the Technical Impracticability of Groundwater Restoration* [EPA OSWER Directive 9234.2-25, October 1993], which directs that when waivers of applicable or relevant and appropriate requirements (ARARS) are issued based on technical impracticability in groundwater remedies, EPA should demonstrate:

> ...that contamination sources [in the case of the Joint Site, the NAPL sources] have been identified and have been, or will be, removed and contained to the extent practicable [Section 4.3].

This ROD makes no determination or specification as to NAPL recovery or immobilization, or the feasibility of these actions at these sites, other than to determine that enough NAPL cannot be recovered with existing technologies to reduce contaminant concentrations to drinking water standards at all points in the contaminant distribution (this is further discussed in Section 10 of this ROD).

Both the remedial actions selected in this ROD, and any remedial actions for NAPL recovery or immobilization that may be selected by EPA in ROD amendments subsequently, may be necessary to fully address the principal groundwater-related threat. However, because it will be technically impracticable to recover enough NAPL to reduce groundwater concentrations to drinking water standards in the containment zone, the remedial actions selected in this ROD to isolate the NAPL will be necessary *regardless* of the degree of NAPL recovery or immobilization ultimately selected in the second phase. Because of this, and because the process of evaluating alternatives for NAPL recovery or immobilization is not yet completed, EPA is proceeding with

BOE-C6-0140025

the selection of this remedial action in advance of the completion of the remedy selection process where NAPL recovery and/or immobilization will be addressed.

4.6 Finalization of Del Amo Waste Pits ROD

This ROD finalizes the provisions of the Del Amo Waste Pit remedy that EPA had designated as interim when it issued its ROD for that remedy in 1997. Specifications and details related to this are discussed in Sections 12 and 13 of this ROD.

BOE-C6-0140026

Table 4-1
Affected Media at the Montrose Chemical and Del Amo Superfund Sites
Record of Decision for Dual Site Groundwater Operable Unit
Montrose Chemical and Del Amo Superfund Sites

MONTROSE CHEMICAL SUPERFUND SITE	DEL AMO SUPERFUND SITE
Groundwater	Groundwater
NAPL	NAPL
Surface soils on and near the original plant property	Surface Soils on the original plant property
Sediments in existing storm water pathways	Indoor air in businesses
Sediments and soils in neighborhoods contaminated by DDT due to historical surface water pathways and/or aerial dispersion	Del Amo Waste Pits area (separate interim ROD finalized by this ROD)
Sediments in the sanitary sewer system	
DDT-contaminated fill in a neighborhood	
DDT-contaminated sediments on the Pacific Ocean floor	

5. Major Documents

The documents that EPA considered in selecting this remedy appear in EPA's administrative record for this remedy which contains more than 6000 documents and is available at the Torrance and Carson public libraries and at EPA's Region IX Offices in San Francisco. Various documents are also available at the State Department of Toxic Substances Control in Cypress. The following seven documents are required by the NCP and are of particular importance to the remedy selected by this ROD:

1. *Final Remedial Investigation Report for the Montrose Site; Los Angeles, California*; May 18, 1998; originally prepared by Montrose Chemical Corporation of California and Revised by U.S. Environmental Protection Agency, Region IX. 2 volumes.

2. *Final Groundwater Remedial Investigation Report; Del Amo Study Area;* May 15, 1998; prepared by Dames & Moore for the Shell Oil Company and The Dow Chemical Company. 3 volumes.

3. *Final Joint Groundwater Feasibility Study for the Montrose and Del Amo Sites; Los Angeles, California;* May 19, 1998; prepared by CH2M Hill for the U.S. Environmental Protection Agency, Region IX. 1 volume.

4. *Joint Groundwater Risk Assessment; Montrose and Del Amo Sites; Los Angeles County, California*; February 1998; prepared by McLaren Hart for the Montrose Chemical Corporation, and Dames & Moore for the Shell Oil Company and The Dow Chemical Company. 1 volume.

5. *Supplement to the Joint Groundwater Risk Assessment for the Montrose and Del Amo Sites; Los Angeles, California*; May 18, 1998; prepared by CH2M Hill for the U.S. Environmental Protection Agency, Region IX. 1 volume.

6. *Fact Sheet: Montrose and Del Amo Superfund Sites: EPA Proposes Groundwater Cleanup Plan; (General Fact Sheet Version)*; June 1998 by the United States Environmental Protection Agency Region IX. 14 pages.

7. *Remedy Proposed Plan for Dual Site Groundwater Operable Unit, Montrose and Del Amo Superfund Sites; Technical and Expanded Version;* June 1998 by the United States Environmental Protection Agency Region IX. 47 pages plus graphics.

All of these documents appear in EPA's administrative record for this remedy.

BOE-C6-0140028

6. Definition of the Term "Joint Site"

The National Contingency Plan (NCP), the regulation governing the Superfund Program, defines "on site" at 40 C.F.R. §300.5 as:

> *"...the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action."*

The boundary of a Superfund site occurs at the limits of the areal extent to which contamination has come to be located. Knowledge of this boundary changes as remedial investigations reveal additional areal extent that is contaminated, or as the contamination spreads. It usually is not possible to know with complete certainty all places where contamination has come to be located, even at the conclusion of the remedial investigation, and so in turn the site boundary cannot be known with complete certainty. What is considered the boundary of a site is not static but changes as the knowledge about the extent of contamination changes.

This ROD does not make formal determinations as to the boundaries of the Montrose Chemical Superfund Site nor the Del Amo Superfund Site. Again in accordance with the above definition, each "site" is neither congruent with nor confined by the boundaries of any specific property with which the former Montrose Chemical plant or the former Del Amo plant were associated.

In the case of this remedy, several factors gave rise to the need for EPA to define a term to refer, in concept and by convention, to the area to which the remedy selected by this ROD is assumed to apply:

- As discussed, this ROD is addressing the contamination from the two sites as a single technical problem.
- For convenience and simplicity a shorthand term was needed to encompass the lengthy and awkward reference to groundwater at "the Montrose Chemical and Del Amo Superfund Sites."
- The Montrose and Del Amo Sites lie in an industrial area where other sources of groundwater contamination exist. Some of these other sources will be directly affected by this proposed remedial action, others will not. There needed to be a conceptual (as opposed to absolute) basis for determining how the remedial action selected by this ROD applies to some of these areas and not to others.

BOE-C6-0140029

- This ROD defines several areas of contaminated groundwater within the Montrose Chemical and Del Amo Superfund sites, to which differing requirements shall apply (e.g. ARAR waivers, containment only, full cleanup, etc.). All such areas occur by definition within the union of the two Superfund sites, and a conceptual basis for this region was needed.

Because of these factors, this ROD does not refer to either site individually unless specifically mentioned. Rather, the ROD uses the term ***Joint Site*** to refer to the area within which the selected remedial action will apply. The area within the Joint Site is based on: 1) the extent of the contamination and 2) the nature and likely effects of the remedial actions selected by this ROD. The latter consideration is included because the remedial action may have a hydraulic influence on certain overlying and surrounding contamination sources that must be considered part of the Joint Site due to their proximity to the remedial action. These hydraulic influences on the sources have been identified with the assistance of the groundwater model (see Section 1.2.3, Section 2, and Appendix B of the Joint Groundwater Feasibility Study (JGWFS), EPA 1988). Specifically, the term "Joint Site" in this ROD refers to:

- The former Montrose Chemical and Del Amo plant properties;

- The areal extent of groundwater affected by the contamination originating or emanating from the former Montrose Chemical and Del Amo plant properties;

- Any areas of groundwater contamination originating or emanating from sources in the vicinity of the former Montrose and Del Amo plant properties that is wholly contained within the areas described in the preceding bullet items;

- Any areas of groundwater contamination that are partially overlapping, or distinct, but in proximity to the areas of groundwater described in the preceding bullet items ***and*** that likely would be significantly affected by the remedial action selected in this ROD.

There are sources of groundwater contamination farther afield surrounding the former Montrose and Del Amo plant properties that are not likely to be affected by this remedy. These sources are not considered to be part of the Joint Site. Most of these are subject to cleanup investigation and/or other cleanup actions directed or overseen by the State of California. While EPA has made no such determination at present, it is possible that in the future such sources would be shown to have an influence on the Joint Site that cannot be avoided. By definition, these sources would then be part of the Joint Site.

BOE-C6-0140030

The use of the term Joint Site does not imply that a formal Joint Site boundary exists that can be depicted on a map. Rather, EPA intends to give conceptual guidelines as to the area being addressed by the remedial action.

It is further noted that *Joint Site* refers not only to the existing known extent of contamination as described by the above bullet items, but to the *actual* extent of contamination so-described, whether known or not known, both presently and in the future.

BOE-C6-0140031

Appendix G

BOE-C6-0140032

Appendix G
Reference Lists

FORMER C-6 FACILITY

INTERNATIONAL LIGHT METALS SITE

DEL AMO STUDY AREA

FORMER C-6 FACILITY

SELECTED GROUNDWATER REFERENCES
BOEING REALTY CORPORATION
FORMER C-6 FACILITY AND VICINITY

Dames & Moore, 1997, Groundwater Monitoring Report, Third Sampling Period 1996 and First Sampling Period 1997. Del Amo Study Area, Los Angeles, California. Dated August 22, 1997. Prepared for Shell Oil Company and The Dow Chemical Company.

Dames & Moore, 1998, Final Groundwater Investigation Report, Del Amo Study Area, Los Angeles, California. . Dated May 25, 1998. Prepared for Shell Oil Company and The Dow Chemical Company.

Harding Lawson Associates, 2000, Groundwater Sampling and Well Abandonment, Wells BL-5 through BL-8. Letter report dated April 21, 2000. Prepared for International Light Metals (ILM)/ Lockheed Martin Corporation Facility, Boeing Realty Corporation (BRC)/Lockheed Martin Corporation Joint Investigation, Los Angeles, California.

Harding Lawson Associates, 2000a, Groundwater Sampling and Well Destruction, Well TMW-17. Letter report dated May 4, 2000. Prepared for Boeing Realty Corporation Long Beach, California.

Hargis+Associates, 1992, Final Draft Remedial Investigation Montrose Site, Volumes I-IV. A primary reference for data used on maps in Dames & Moore 1998.

James M. Montgomery Consulting Engineers, Inc., 1992, Final Report on the West Coast Basin Plume Mitigation Study. Volume 1 – Text. Dated August 1992. Prepared for Metropolitan Water District of Southern California, Los Angeles County Department of Public Works, Water Replenishment District.

Kennedy/Jenks Consultants, 1999, Installation of Temporary Monitoring Wells Area Buildings 1 and 2, Boeing Realty Corporation's C-6 Facility, Los Angeles. Dated October 1999. Prepared for Boeing Realty Corporation, Long Beach, CA.

Kennedy/Jenks Consultants, 2000, Installation of Temporary Monitoring Wells TMW-10 through TMW-16 and 2nd Quarter (March/April) Groundwater Monitoring Results, Boeing Realty Corporation's C-6 Facility, Los Angeles. Dated April 2000. Prepared for Boeing Realty Corporation, Long Beach, CA.

Kennedy/Jenks Consultants, 2000a, Groundwater Monitoring Report 2nd Quarter 2000, Boeing Realty Corporation's C-6 Facility, Los Angeles. Dated July 2000. Prepared for Boeing Realty Corporation, Long Beach, CA.

Poland, J. F., Garrentt, A. A., and Sinnott, A., 1959, Geology, Hydrology, and Chemical Characteristics of the Ground Waters in the Torrance-Santa Monica Area, California, USGS Water Supply Paper 1461.

Richard C. Slade & Associates, 1998, Summary of Operations, Destruction of Two Water-Supply Wells, Boeing Realty Corporation C-6 Facility, Los Angeles, California. Dated September 1998. Prepared for Integrated Environmental Services, Inc.

State of California, Department of Water Resources, 1961, Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County. Appendix A Ground Water Geology.

TRC, 1999, Groundwater RCRA Facility Investigation Report, Former International Light Metals Facility, Torrance, California, Volumes I and II. Dated December 1999. Prepared for Lockheed Martin Corporation, Burbank, California.

Watermaster Services in the West Coast Basin of Los Angeles County, July 1, 1998 June 30, 1999. September 1999. State of California Department of Water Resources, Southern District.

Woodward Clyde Consultants, 1990, Douglas Aircraft Company, Torrance (C6) Facility Phase III Groundwater and Soil Investigation Report. Dated March 1990. Prepared for Douglas Aircraft Company, Los Angeles, California.

Woodward Clyde Consultants, 1992, Report on the Installation of Observation Wells WCC-11 and WCC12 at Douglas Aircraft Company's Facility in Torrance California. Prepared for Douglas Aircraft Company, Los Angeles, California.

USEPA 1999, Record of Decision for Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites, Volume I and II. Dated March 1999.

FORMER INTERNATIONAL LIGHT METALS SITE

7.0 REFERENCES

ARCADIS Geraghty & Miller, Inc., *Current Conditions Report*, Lockheed Martin Corporation, Former International Light Metals, Torrance, California, April 2, 1999. (ARCADIS G&M, 1999a)

ARCADIS Geraghty & Miller, Inc., *March 1999 Ground Water Monitoring and Offsite Well Installation Report*, May 19, 1999. (ARCADIS G&M, 1999b)

ARCADIS Geraghty & Miller, Inc., *Exposure Pathway Assessment and Human Health Risk Assessment Scope of Work*, Former ILM Facility, August 12, 1999. (ARCADIS G&M 1999c)

ARCADIS Geraghty & Miller, Inc., *Groundwater RFI Workplan*, Former International Light Metals Facility, Torrance, California, Docket HWCA: P1-98/99-002. March 15, 1999. [Including attachments: Project Management Plan (updated), Health and Safety Plan (updated), Quality Assurance Project Plan (selected paged, updated)]. March 15, 1999. (ARCADIS G&M, 1999d)

ARCADIS Geraghty & Miller, Inc., *RFI Workplan Addendum for the July Groundwater Monitoring and Sampling Program*, June 21, 1999. (ARCADIS G&M 1999e)

Department of Toxic Substances Control, *Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Site and Permitted Facilities*. Office of the Science Advisor, July 1992. (DTSC, 1992)

Department of Toxic Substances Control, *Corrective Action Administrative Agreement on Consent (Consent Agreement)*, International Light Metals Division, Martin Marietta Technologies, Inc. March 21, 1995. (DTSC, 1995a)

Department of Toxic Substances Control, *Consent Agreement Approval*, Martin Marietta Technologies, International Light Metals Facility, 19200 Western Avenue, Torrance, California, March 31, 1995. (DTSC, 1995b)

Dragun, James, Ph.D., *The Soil Chemistry of Hazardous Materials*, The Hazardous Materials Control Research Institute, 1988. (Dragun, 1988)

Geraghty & Miller, Inc., *Piezometer Installation Program*, International Light Metals Division Facility, 19200 S. Western Avenue, Torrance, California, December 15, 1994. (Geraghty & Miller, 1994)

Geraghty & Miller, Inc., *Baseline Risk Assessment Workplan*, Martin Marietta Technologies, Inc., International Light Metals Facility, Torrance, California, January 19, 1995. (Geraghty & Miller, 1995)

Geraghty & Miller, Inc., *RCRA Facility Investigation Report*, Martin Marietta Technologies, Inc., International Light Metals Facility, Torrance, California, February 26, 1996. (Geraghty & Miller, 1996a)

Geraghty & Miller, Inc., *Baseline Risk Assessment*, Lockheed Martin Corporation, International Light Metals Facility dated March 22, 1996. (Geraghty & Miller, 1996b)

Geraghty & Miller, Inc., *Groundwater RCRA Facility Investigation Workplan*, Martin Marietta Technologies, Inc., International Light Metals Division, Torrance, California: Consultant report dated January 1996. (Geraghty & Miller, 1996c)

Geraghty & Miller, Inc., *Second Quarterly Groundwater Monitoring Report (First Quarter 1996) RCRA Facility Investigation*, Lockheed Martin Corporation, International Light Metals Facility, Torrance, California, August 30, 1996. (Geraghty & Miller, 1996d)

Geraghty & Miller, Inc., *Third Quarterly Groundwater Monitoring Report (Second Quarter 1996) RCRA Facility Investigation*, Lockheed Martin Corporation, International Light Metals Facility, Torrance, California, October 2, 1996. (Geraghty & Miller, 1996e)

Geraghty & Miller, Inc., *Draft Groundwater Data Assessment Report*, Lockheed Martin Corporation, International Light Metals Facility, Torrance, California. 1996. (Geraghty & Miller, 1996f)

Geraghty & Miller, Inc., *Fourth Quarterly Groundwater Monitoring Report (Third Quarter 1996) RCRA Facility Investigation*, Lockheed Martin Corporation, International Light Metals Facility, Torrance, California, December 24, 1996. (Geraghty & Miller, 1996g)

Geraghty & Miller, Inc., *Ground Water Monitoring Report*, Former International Light Metals Facility, October 24, 1997. (Geraghty & Miller, 1997a)

Geraghty & Miller, Inc., *Completion Report for Site Construction Activities*, Lockheed Martin Corporation, International Light Metals Facility, Torrance, California, May 12, 1997. (Geraghty & Miller, 1997b)

Integrated Environmental Services, Inc., *Offsite Groundwater Characterization Workplan*, prepared for Lockheed Martin Corporation and Boeing Realty Corporation, December 1998. (IES, 1998)

Kennedy/Jenks Consultants, *Ground Water Monitoring Data Summary Report First Quarter 1997*, June 1997. (Kennedy/Jenks, 1997)

Smith, Leverett R. & Dragun, James, *Degradation of Volatile Chlorinated Aliphatic Priority Pollutants in Ground Water*, September 15, 1984, Environmental International, Vol. 10, pp. 291-298. (Smith & Dragun, 1984)

State of California Department of Water Resources (DWR), *Bulletin 104: Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County*, Appendix A - Groundwater Geology. 1961. (DWR 1961)

United States Environmental Protection Agency, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water*, September 1998. (EPA, 1998)

United States Environmental Protection Agency, *Exposure Factors Handbook*. Office of Research and Development. EPA 600/c-99/001, 1999. (USEPA, 1999)

United States Environmental Protection Agency, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*, September 1998. (USEPA, 1998)

United States Environmental Protection Agency, *Interim Final RCRA Facility Investigation Guidance*, May 1989. (USEPA 1989a)

United States Environmental Protection Agency, *Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Parts A, B, and C)*. Office of Emergency and Remedial Response. EPA 540/1-89-002, 1989. (USEPA 1989b)

Vogel, T.M., C.S. Criddle, and P.L. McCarty, *Transformations of Halogenated Aliphatic Compounds*, ES&T Critical Review, Vol. 21, No. 8, 1987. (Vogel, Criddle, McCarty, 1987)

4.0 REFERENCES

Dames & Moore, 1993. Remedial Investigation/Feasibility Study Work Plan, Del Amo Site. February 25, 1993.

Dames & Moore, 1994. Groundwater Monitoring Program, Del Amo Study Area, for Shell Oil Company and the Dow Chemical Company. February 11, 1994.

Dames & Moore, 1996. Draft Groundwater Remedial Investigation Report, Del Amo Study Area, for Shell Oil Company and the Dow Chemical Company. October 22, 1996.

EPA, 1996. Letter to Del Amo Respondents, EPA Response to Request by Del Amo Respondents for Modifications to Groundwater Monitoring Program; Del Amo Superfund Area, Los Angeles, California. April 10, 1996.

Freeze, Allen R. and John A. Cherry, 1979. Groundwater. Prentiss Hall, Inc., New Jersey.

Shell Oil Company (on behalf of Del Amo Respondents), 1996a. Letter to EPA, Proposed Modification to Groundwater Monitoring Program, Del Amo Study Area. March 14, 1996.

Shell Oil Company (on behalf of Del Amo Respondents), 1996b. Letter to EPA, Response to EPA Proposed Revised Groundwater Monitoring Program, Del Amo Study Area. May 3, 1996.

DEL AMO STUDY AREA

5. Major Documents

The documents that EPA considered in selecting this remedy appear in EPA's administrative record for this remedy which contains more than 6000 documents and is available at the Torrance and Carson public libraries and at EPA's Region IX Offices in San Francisco. Various documents are also available at the State Department of Toxic Substances Control in Cypress. The following seven documents are required by the NCP and are of particular importance to the remedy selected by this ROD:

1. *Final Remedial Investigation Report for the Montrose Site; Los Angeles, California*; May 18, 1998; originally prepared by Montrose Chemical Corporation of California and Revised by U.S. Environmental Protection Agency, Region IX. 2 volumes.

2. *Final Groundwater Remedial Investigation Report; Del Amo Study Area;* May 15, 1998; prepared by Dames & Moore for the Shell Oil Company and The Dow Chemical Company. 3 volumes.

3. *Final Joint Groundwater Feasibility Study for the Montrose and Del Amo Sites; Los Angeles, California;* May 19, 1998; prepared by CH2M Hill for the U.S. Environmental Protection Agency, Region IX. 1 volume.

4. *Joint Groundwater Risk Assessment; Montrose and Del Amo Sites; Los Angeles County, California*; February 1998; prepared by McLaren Hart for the Montrose Chemical Corporation, and Dames & Moore for the Shell Oil Company and The Dow Chemical Company. 1 volume.

5. *Supplement to the Joint Groundwater Risk Assessment for the Montrose and Del Amo Sites; Los Angeles, California*; May 18, 1998; prepared by CH2M Hill for the U.S. Environmental Protection Agency, Region IX. 1 volume.

6. *Fact Sheet: Montrose and Del Amo Superfund Sites: EPA Proposes Groundwater Cleanup Plan; (General Fact Sheet Version)*; June 1998 by the United States Environmental Protection Agency Region IX. 14 pages.

7. *Remedy Proposed Plan for Dual Site Groundwater Operable Unit, Montrose and Del Amo Superfund Sites; Technical and Expanded Version;* June 1998 by the United States Environmental Protection Agency Region IX. 47 pages plus graphics.

All of these documents appear in EPA's administrative record for this remedy.

BOE-C6-0140043

TABLE 1.3-1
SIGNIFICANT DOCUMENTS PERTAINING TO PRIOR GROUNDWATER INVESTIGATIONS COMPLETED WITHIN DEL AMO STUDY AREA[1]

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1983	Ecology & Environment, Inc.	Hydrogeological Assessment, Del Amo Site, Torrance, CA	11/11/83	Del Amo study area and vicinity	Consolidation and assessment of existing information regarding the hydrogeology and groundwater quality of the study area.
1984	Dames & Moore	Interim Summary of Findings, Del Amo Site Investigation, Los Angeles, CA, for Irell & Manella	6/15/84	Del Amo Waste Pit Area	Presents findings of an investigation of waste, soil, and groundwater conditions in the Waste Pit area performed in February and March, 1984 by Dames & Moore and Radian
1985	Woodward-Clyde Consultants	Del Amo Hazardous Waste Site Remedial Investigation/Feasibility Study—Description of Existing Site Conditions for the DOH	8/20/85	Del Amo Waste Pit Area	Provides a general site history and chronology, characterizes the site in terms of the nature of wastes, extent of soil and groundwater contamination, contribution to atmospheric levels of contaminants, hydrogeology and environmental setting, characterization of hazardous wastes known to be present in terms of chemical and physical properties, toxicology and safety hazards, and assesses impacts of the site on the environmental and on the public health and welfare.
1986	Metcalf & Eddy	Draft Preliminary Report RI/Part 1, Montrose Facility	3/86	Montrose Plant Property	Assess conditions, summarizing soil and groundwater sampling investigations that were performed.

BOE-C6-0140044

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1987	Metcalf & Eddy	Technical Oversight & Feasibility Study, Montrose Chemicals—May 1987, Revised August 1987 (Preliminary Evaluation of Part 2—Onsite Soils & Groundwater)	8/87	Montrose Plant Property	Evaluation of field and analytical data from the Remedial Investigation, Part 2—Phase 1 onsite groundwater and soils investigation.
1987	Woodward-Clyde Consultants	Task 2 Final Report, Additional Data Acquisition and Interpretation, Del Amo Hazardous Waste Site—Los Angeles, CA—Volume 1 and 2	10/2/87	Del Amo Waste Pit Area	Evaluates the spatial distribution of soil contamination adjacent to the pits and presents findings of shallow groundwater investigations.
1987	Applied Geosciences	Toxic Hazard Assessment of the Cadillac Fairview Company's Pacific Gateway Center, prepared for Hazard Management Consulting, Inc.	10/15/87	Cadillac Fairview Property, Pacific Gateway Center	Results of a toxic hazard assessment and preliminary field investigation for the Cadillac Fairview Property, Pacific Gateway Center.
1988	Dames & Moore	Project Summary Report #1, for G.P. Holdings	6/9/88	Del Amo Waste Pit Area	Addressed actions taken to date during the reporting period, actions expected to be taken during the following two months; and summary reports of sample analyses, tests and other data generated or received.
1989	Reidel Environmental	Environmental investigation for 20221 Hamilton Avenue, for Andrex Development Company	3/22/89	Hamilton Dutch Investors 20221 Hamilton Avenue, Torrance, Ca.	Presents results of environmental investigation conducted on subject site

BOE-C6-0140045

TABLE 1.3-1

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1989	Emcon Associates	Assessment of Potential Soil Contamination, 20221 Hamilton Avenue, Los Angeles, Ca. for Wheeler, Augustini and Dorman	3/10/89	20221 Hamilton Avenue, Torrance, Ca.	Presents results of soil investigations conducted at the subject site and discusses implications of these data have regarding potential for groundwater contamination at the site
1989	Ecology & Environment, Inc.	CERCLA Expanded Site Inspection—Del Amo, Del Amo Blvd./Torrance Blvd., Torrance, CA—Los Angeles County for U.S. EPA	5/30/89	Del Amo Waste Pit Area	Site inspection to evaluate the groundwater exposure pathway from the Del Amo Waste Pit Area.
1989	Ecology & Environment, Inc.	CERCLA Expanded Site Inspection, for Del Amo Field Investigation Team Zone II	6/30/89	Del Amo study area	Expanded site inspection of the Del Amo study area (formerly known as Cadillac-Fairview), conducted to evaluate the contaminant exposure pathways from the Del Amo site, determine if an observed release to the drinking water aquifer occurred, to determine the impact of upgradient sites on local groundwater chemistry, and to determine if continuity exists between the uppermost contaminated aquifer near the Del Amo site (Gage aquifer) and the local drinking water aquifer (Lynwood aquifer) within 2 miles of the site.

BOE-C6-0140046

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1990	CKY Environmental	Laboratory Report for Samples received on 1/15/90, for Riedel Environmental	1/17/90	Hamilton Dutch Investors 20221 Hamilton Ave. Torrance, CA 90502	Laboratory data for groundwater and soil samples received on 1/15/90.
1990	Dames & Moore	Remedial Investigation Report, Del Amo Site, Los Angeles. CA, for GP Holdings, Dow Chemical Co., and Shell Oil	4/4/90	Del Amo Waste Pit Area	Consolidates existing data and presents conclusions regarding physical and chemical character of soil, waste, and groundwater in proximity to Del Amo Waste Pit Area.
1990	Hargis + Assoc.	Field Data Submittal—Part 2—Remedial Investigative Work—Phase 2B—Montrose Site, Torrance. August 1989 - April 1990	5/4/90	Montrose Plant Property	Summarizes field activities and presents geologic logs associated with exploratory drilling and monitoring well installation program.
1990	Hargis + Assoc.	Field Data Submittal—Part 2—Remedial Investigative Work—Phase 2B—Montrose Site, Torrance. April 1990 Groundwater Sampling	5/21/90	Montrose Plant Property	Summarizes field tasks completed during April 1990 groundwater sampling event for the Montrose RI.
1990	Hargis + Assoc.	Regional Hydrogeologic Assessment Report, Task 15—Volumes I (Text, Tables, Illustrations) and II (Appendices A - F)	5/29/90	Montrose Plant Property	Volume I: Presents data regarding the hydrogeologic environment in the vicinity of the Montrose property and identification of known and potential sources of groundwater contamination.

BOE-C6-0140047

TABLE 1.3-1

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1990	Engineering Enterprises	Report of Additional Subsurface Assessment and Groundwater Sampling Amoco Chemical Facility, Torrance	5/29/90	Amoco Chemical Company 1225 West 196th Street Torrance, CA	Evaluation of the vertical extent of styrene in soil and volatile organic compounds in groundwater samples collected from existing onsite monitoring wells.
1990	IT Corporation	Phase II Environmental Assessment Report, IT Corporation, for Pacific Bell	10/5/90	Pacific Bell 19310 Pacific Gateway Drive Los Angeles, CA	Presents findings of visual inspection of the site and surrounding area, results of laboratory analyses on soil and groundwater samples collected from the site and information obtained from aerial photographs and file review.
1990	Hargis + Assoc.	Results of Regional Well Sampling—Montrose Site, Torrance, CA Task 15	11/1/90	Montrose Plant Property	Results of regional well sampling within a 1-mile radius of the Montrose property, Torrance, CA.
1990	Levine-Fricke	Preliminary Subsurface Investigation—Harbor Technology	12/21/90	Harbor Technology Center 20280, 20300 Vermont Ave. Torrance, CA	Evaluation of soil and groundwater conditions in the northeast corner of the property, in the vicinity of previously reported occurrences of hydrocarbons in soils.
1991	Simon Environmental Engineering	Report of Groundwater Sampling and Analysis, Amoco Chemical Company, Torrance	1/21/91	Amoco Chemical Facility 1225 West 196th Street Torrance, CA	Presents findings of volatile and semi-volatile organic compounds detected in groundwater samples collected from onsite monitoring wells.

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1991	Hydro-Search Inc.	Site Characterization Report, Torrance, CA. Volumes I (Text through Appendix F) and II (Appendices G & H)	2/20/91	Hamilton Dutch Investors Harbor Gateway Center 20221 Hamilton Ave. Torrance, CA 1991	Volume I: Assessed the distribution of regulated hydrocarbon compounds in soil near the northwest corner of Lot 62, presents an evaluation of local geology & hydrology, assesses the distribution of hydrocarbon compounds in shallow groundwater and identifies potential sources of benzene and other hydrocarbon compounds.
1991	McLaren/Hart	Site Investigation Part A at HDI Lot 62 Harbor City, CA. for Augustini and Wheeler	3/7/91	Hamilton Dutch Investors 20221 Hamilton Ave. Harbor City, CA	Presents results of site investigation to assess the extent of benzene contamination in the soil and groundwater at Lot 62.
1991	Dames & Moore	Feasibility Study Report, Del Amo Site	5/5/91	Del Amo Waste Pit Area	Identifies remedial action alternatives for the Del Amo Waste Pit Area.
1991	Simon Environmental Engineering	Report of Groundwater Sampling and Analysis, Amoco Chemical Company.	6/91	Amoco Chemical Facility 1225 West 196th Street Torrance, CA	Evaluated the concentration of volatile and semi-volatile organic compounds in groundwater samples collected from six onsite monitoring wells.
1991	Kennedy Jenks Chilton	Report of Technical Documents Review and Groundwater Sampling, McDonnell Douglas Co.	6/12/91	Douglas Aircraft Co. C6 Facility Torrance, CA (directly north of the Montrose Property)	Evaluated industrial operations and environmental conditions at or near the subject property that could have resulted in the presence of chloroform in shallow groundwater.

BOE-C6-0140049

TABLE 1.3-1

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1992	Simon Hydrosearch	Groundwater Sampling and Analysis Report Amoco Chemical Co., Torrance	1/92	Amoco Chemical Company 1225 West 196th Street, Torrance, CA	Evaluated the concentration of volatile and semi-volatile organic compounds in groundwater samples collected from six on-site monitoring wells.
1992	Dames & Moore	Analytical Results for NAPL from Monitoring Well P-1, Adjacent to the Del Amo Site, Los Angeles, CA for U.S. Environmental Protection Agency	1/23/92	Monitoring Well P-1, located approximately 350 feet south of the Del Amo Waste Pit Area.	Presents results of chemical analyses conducted on samples of petroleum hydrocarbon NAPL collected from Monitoring Well P-1.
1992	Dames & Moore	Focused Investigation of Non-Aqueous Phase Liquid (NAPL) Monitoring Well P-1, Torrance, California, for the Del Amo Participants	10/23/92	Monitoring Well P-1, located approximately 350 feet south of the Del Amo Waste Pit Area.	Summary of results of focused investigation to evaluate the source and chemical nature of the petroleum hydrocarbon NAPL present in Monitoring Well P-1 and surrounding soil
1992	Hargis + Assoc.	Final Draft Remedial Investigation Montrose Site, Volumes I - IV	10/29/92	Montrose Plant Property	Presents results of the Remedial Investigation conducted at the Montrose Property and vicinity.
1993	Dames & Moore	Focused Investigation, Nature and Extent of Non-Aqueous Phase Liquid (NAPL) Monitoring Well MW-20	3/5/93	Monitoring Well MW-20, former styrene plant, Del Amo study area.	Presents findings of investigations to characterize the MW-20 NAPL accumulation and provide data to assist in possible NAPL recovery.
1993	Hargis + Assoc.	Field and Raw Analytical Data Submittal, Groundwater Sampling, January 1993—Montrose Site	3/11/93	Montrose Plant Property	Presents findings and analytical results of recent groundwater sampling event

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1993	Dames & Moore	P-1 NAPL Source Area Analysis / Del Amo study area	5/15/93	Monitoring Well P-1, located approximately 350 feet south of the Del Amo Waste Pit Area.	Presents chemical evidence that NAPL in monitoring well P-1 originated from an oil pipeline leak unrelated to the former synthetic rubber manufacturing plant.
1993	Dames & Moore	Phase I Remedial Investigation Report, Del Amo Study Area, Volumes I - V	10/29/93	Del Amo study area	Reports findings of Phase I site characterization investigations throughout Del Amo study area, including analytical results for soil, soil gas and groundwater
1994	Dames & Moore	Groundwater Monitoring Plan, Del Amo Study Area	2/11/94	Del Amo study area	Outlines scope of periodic groundwater monitoring program to be implemented at Del Amo study area
1994	Dames & Moore	Draft Phase II Remedial Investigation Work Plan, Del Amo Study Area	2/18/94	Del Amo study area	Outlines proposed scope for Phase II site characterization investigations in selected portions of the Del Amo study area. Presents recent analytical results for new soil gas locations and new groundwater monitoring wells.
1994	Dames & Moore	Quarterly Report—Groundwater Monitoring Program, First Quarterly Sampling Event, Del Amo Study Area	7/22/94	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event
1994	Dames & Moore	Quarterly Report Groundwater Monitoring Program Second Quarter Sampling Event 1994, Del Amo Study Area	12/15/94	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event

TABLE 1.3-1

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1995	Dames & Moore	Quarterly Report, Groundwater Monitoring Program, Third Quarter Sampling Event 1994, Del Amo Study Area	2/9/95	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event
1995	Dames & Moore	Technical Memorandum, Interpretation of Montrose and Del Amo Pump and Slug Test Data	5/5/95	Del Amo study area	Presents results of recent pump tests and slug tests conducted by Dames & Moore, and offers a re-analysis of earlier pump test data previously presented by Hargis + Assoc. for the Montrose Plant Property
1995	Dames & Moore	Technical Memorandum, Assessment of Arsenic in Groundwater, Del Amo Study Area	5/19/95	Del Amo study area	Evaluates available data for arsenic in groundwater within the study area and offers hypotheses regarding the origin of elevated arsenic concentrations in the vicinity.
1995	Dames & Moore	Interim Plan, Phase II Groundwater Investigations, Del Amo Study Area	8/1/95	Del Amo study area	Outlines scope of Phase II monitoring well installation and groundwater characterization efforts.
1995	Dames & Moore	Groundwater Monitoring Report, Fourth Quarter 1994, Del Amo Study Area	5/23/95	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event

BOE-C6-0140052

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1995	Dames & Moore	Draft Report and Work Plan, Laboratory Data and Analysis and Hydraulic Extraction Work Plan, MW-20 Pilot Program, Del Amo Study Area	9/29/95	Del Amo study area—monitoring well MW-20 area	Presents laboratory results of fluid saturations and physical testing conducted on NAPL-containing soil samples and outlines proposed scope of work in support of pilot hydraulic extraction system to be constructed and operated at the monitoring well MW-20 area
1995	Dames & Moore	Groundwater Monitoring Report, First Quarter 1995, Del Amo Study Area	11/6/95	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event
1995	Dames & Moore	Groundwater Monitoring Report, Fourth Quarter 1994, Del Amo Study Area (revision of May 23, 1995 report)	11/17/95	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event; text revised at the request of EPA to eliminate conclusions
1995	Dames & Moore	Phase II Remedial Investigation Groundwater Contamination Source Areas, Data Summary and Proposed Target Areas, Del Amo Study Area	11/17/95	Del Amo study area	Presents summary of available data used to identify nature and location of potential groundwater contamination source areas within the Del Amo study area. Also indicates proposed locations for Phase II investigations
1995	Dames & Moore	Information Package Addressing Evaluation of NAPL Dissolution, MW-20 NAPL Area	12/1/95	Del Amo study area—monitoring well MW-20 area	Summarizes available data regarding NAPL dissolution mechanisms for the monitoring well MW-20 area

BOE-C6-0140053

TABLE 1.3-1

YEAR	AUTHOR	REPORT TITLE	REPORT DATE	LOCATION	PURPOSE/TOPIC OF REPORT
1995	Dames & Moore	Groundwater Monitoring Report, Second Quarter 1995, Del Amo Study Area	12/22/95	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event
1996	Dames & Moore	Response to Comments: Draft Report And Work Plan, Laboratory Data and Analysis and Hydraulic Extraction Work Plan, MW-20 Pilot Program, Del Amo Study Area	1/12/96	Del Amo study area—monitoring well MW-20 area	Presents response to agency comments on 9/29/95 MW-20 NAPL area work plan
1996	Hargis + Assoc.	Groundwater Sampling Data Submittal, October through December 1995, Montrose Site	1/17/96	Montrose Plant Property	Presents findings and analytical results of recent groundwater sampling event
1996	Dames & Moore	Groundwater Monitoring Report, Third Sampling Period 1995, Del Amo Study Area	2/23/96	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event
1996	Dames & Moore	Technical Memorandum, Analysis of Groundwater Flow and Mass Transport, Del Amo Study Area	2/28/96	Del Amo study area—monitoring well MW-20 area	Summarizes results of focused groundwater flow and contaminant transport model for the monitoring well MW-20 area
1996	Dames & Moore	Groundwater Monitoring Report, First Sampling Period 1996, Del Amo Study Area	6/17/96	Del Amo study area	Presents findings and analytical results of periodic groundwater sampling event

[1] Partial listing only—limited primarily to documents presenting groundwater data/findings

BOE-C6-0140054