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

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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

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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)

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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

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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

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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	–

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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

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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

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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

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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

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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	–

99-200/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

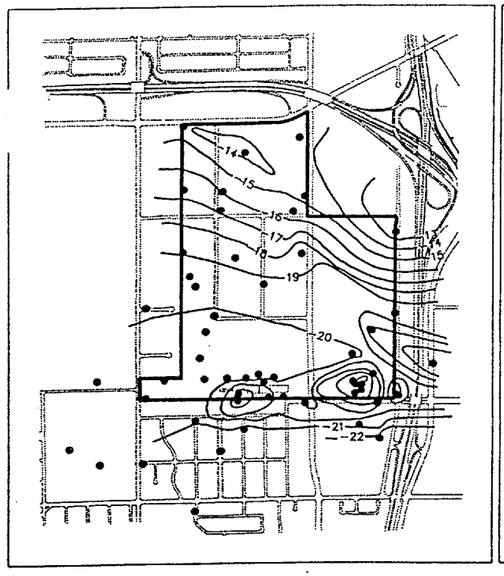
99-2100 (11/3/99/mc)

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



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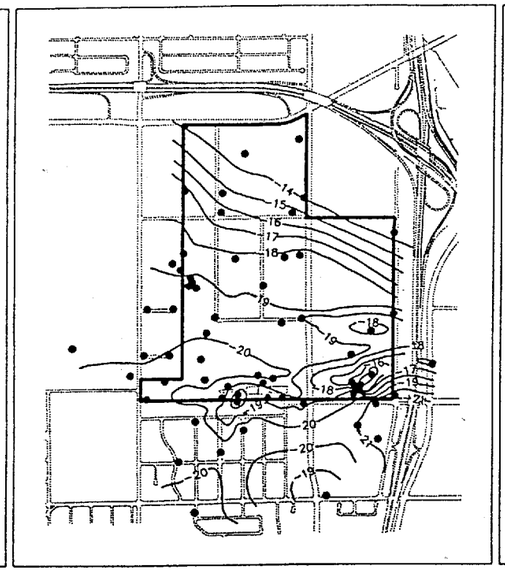
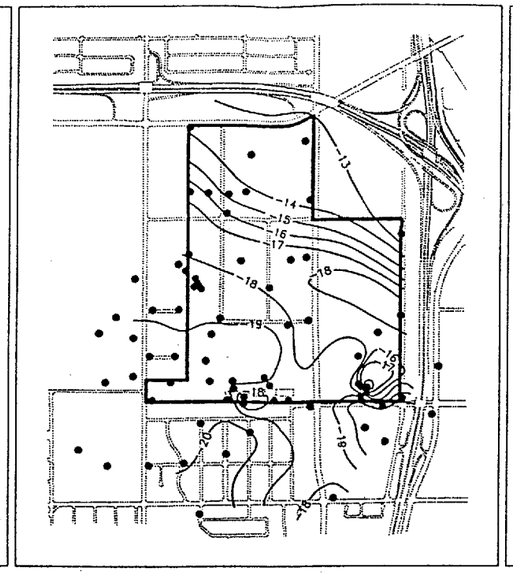
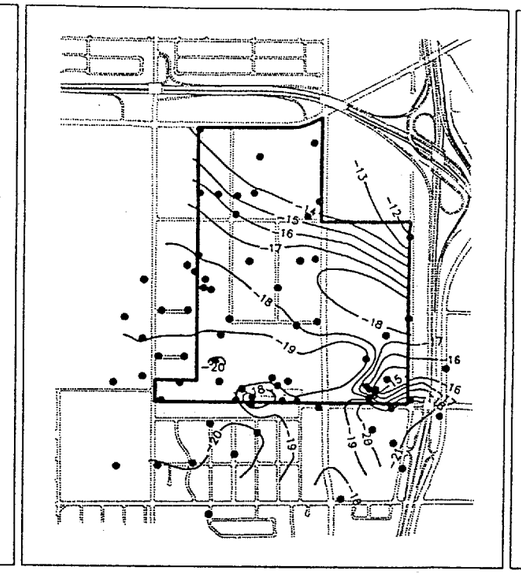


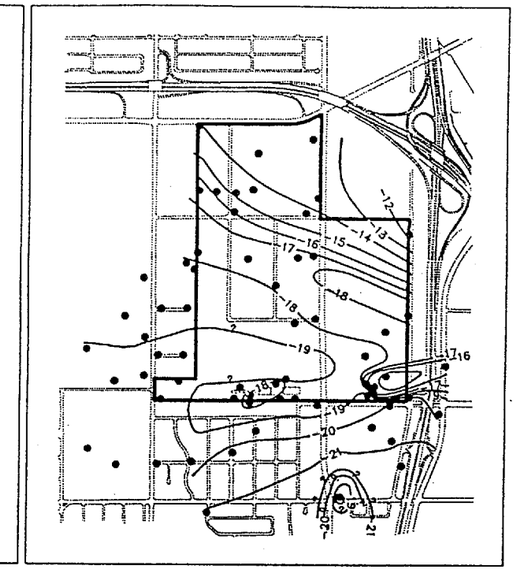
February 1994



May 1994



July 1994



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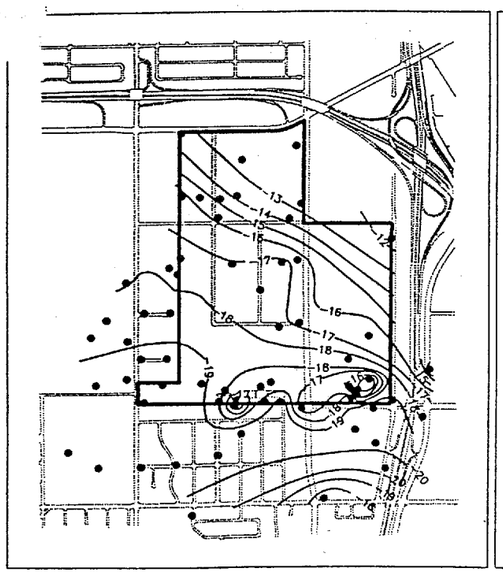

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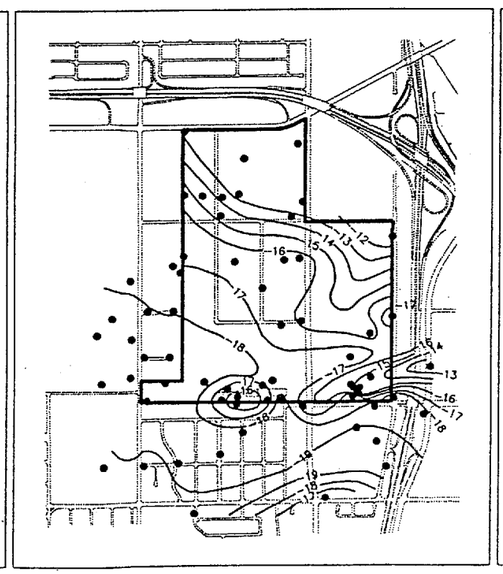
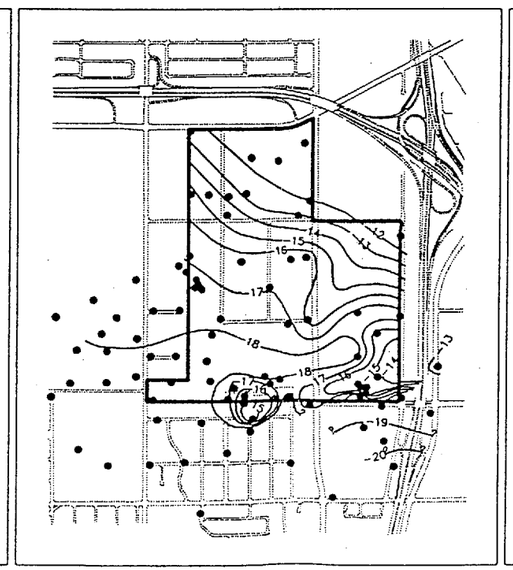


June 1995



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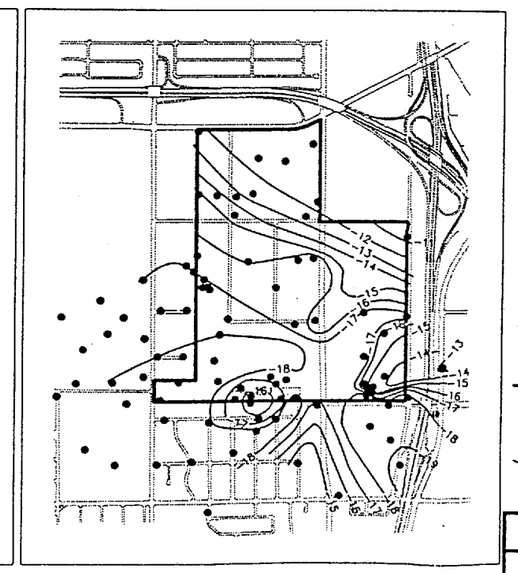

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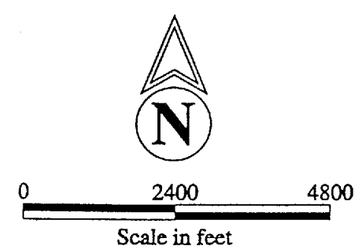


EXPLANATION

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

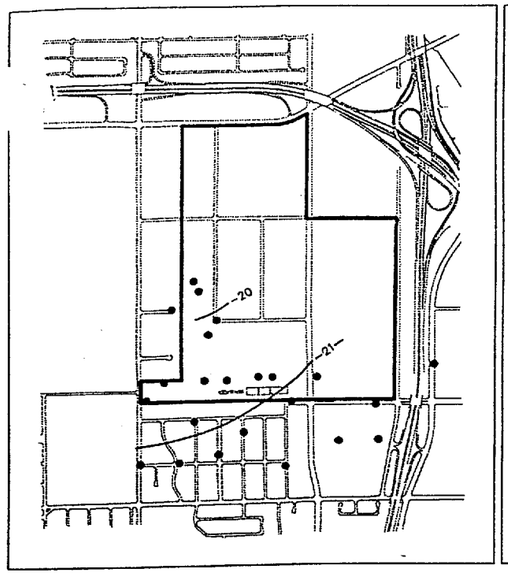
FIGURE 4.1-4

Time - Series Groundwater Contours
Water Table Zone

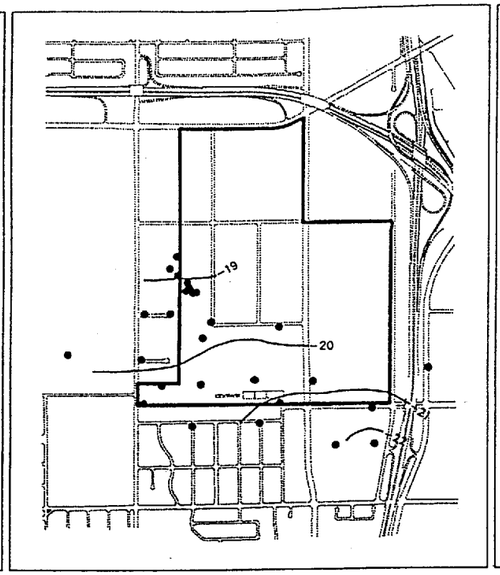
Groundwater Remedial Investigation
Del Amo Study Area

DAMES & MOORE

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



July 1993



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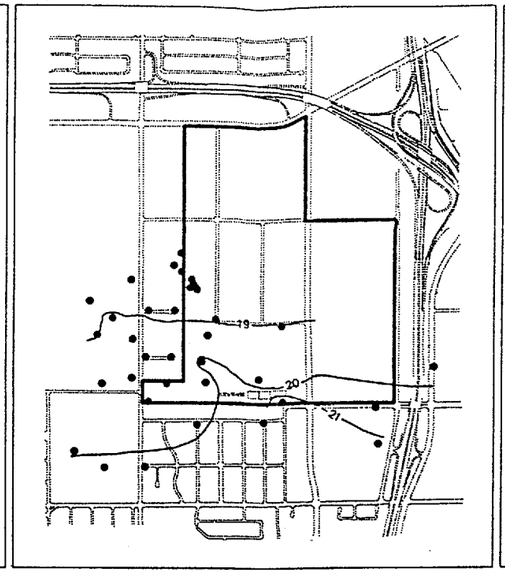
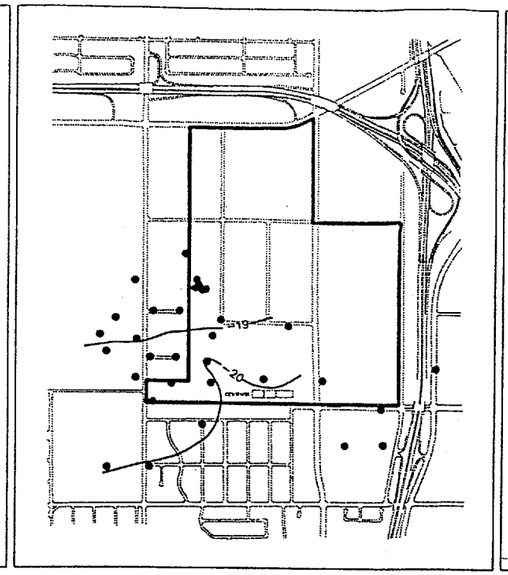


May 1994



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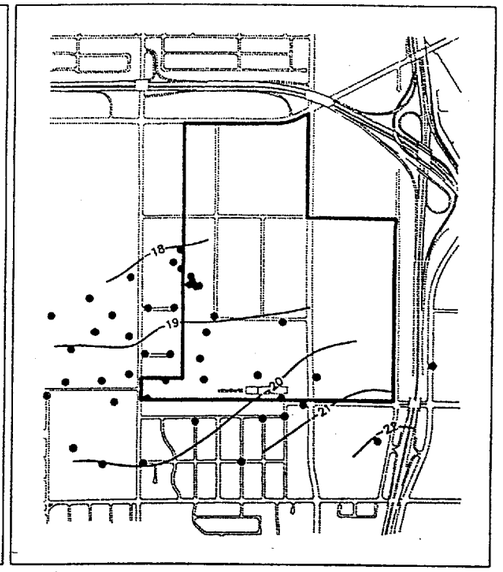

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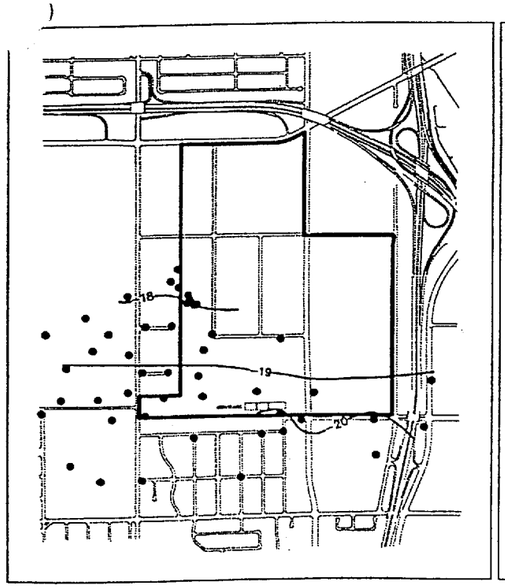

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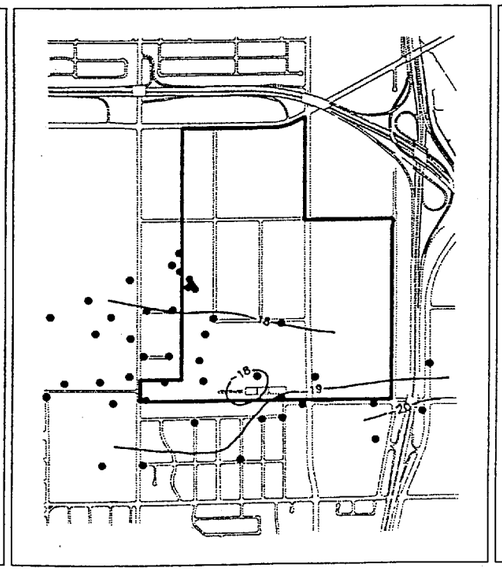

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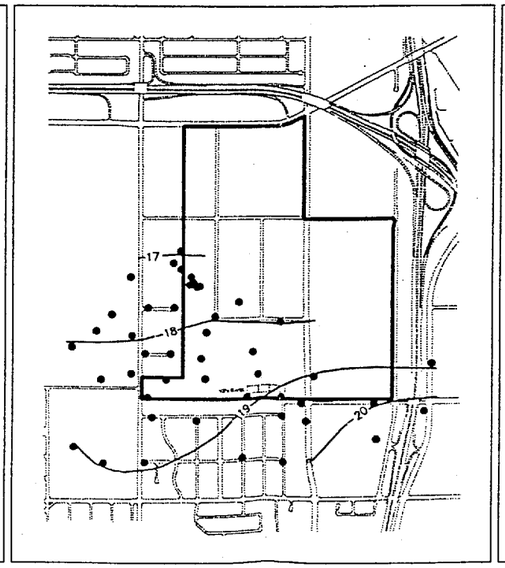

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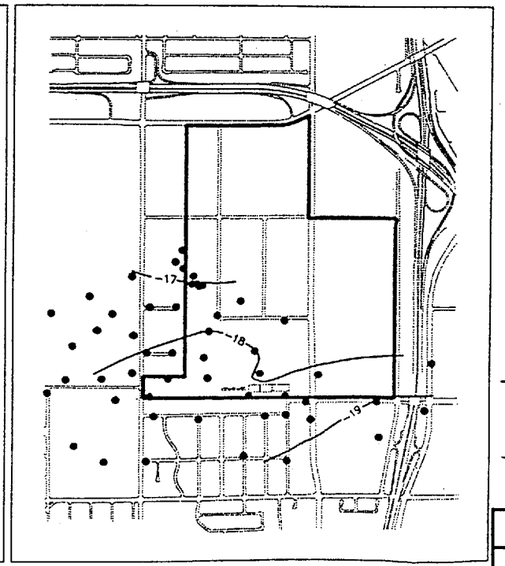
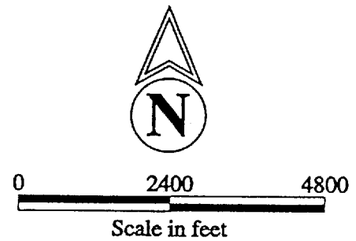


February 1996



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

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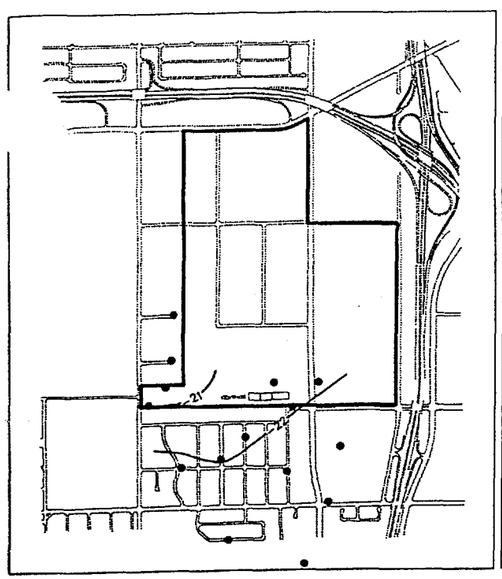

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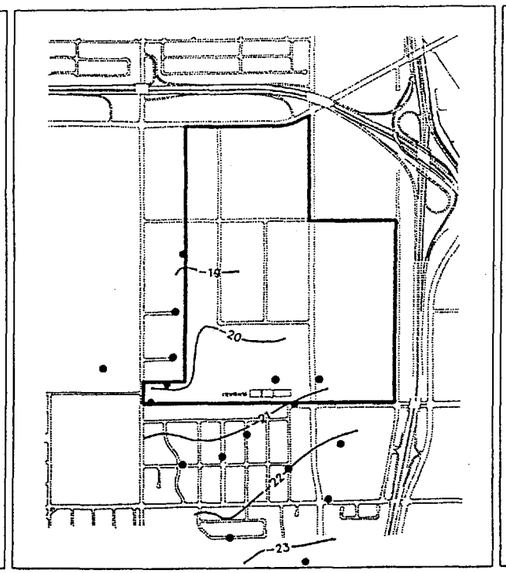

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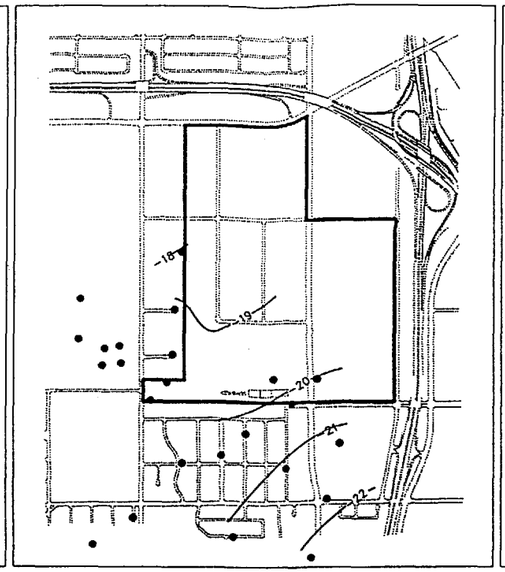
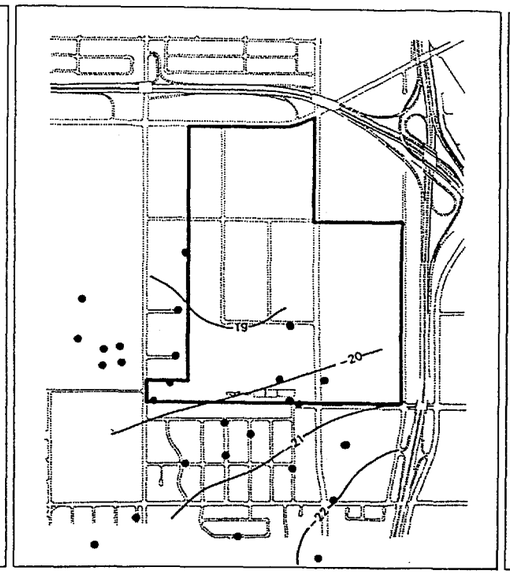


May 1994



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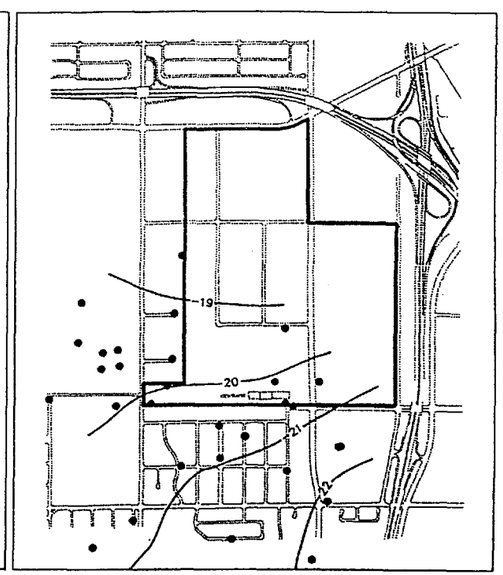

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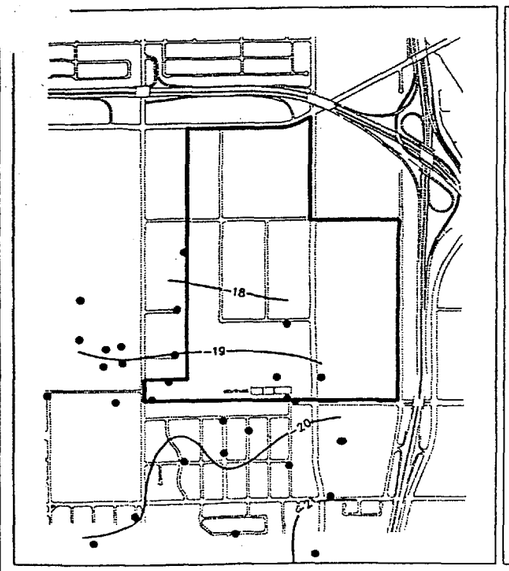
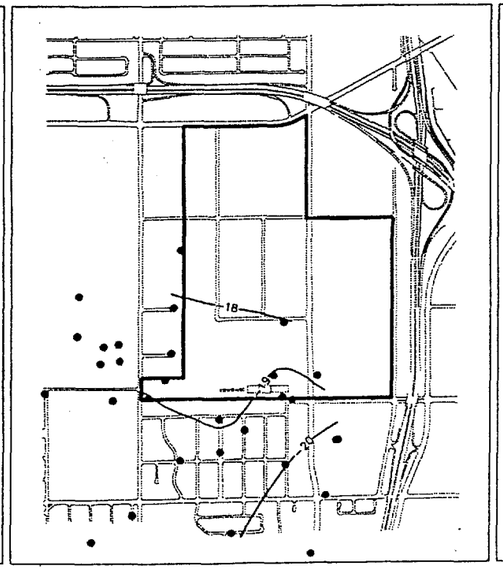


March 1995



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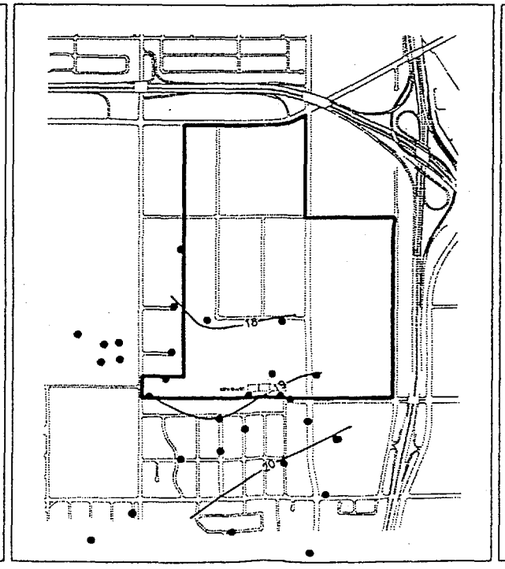

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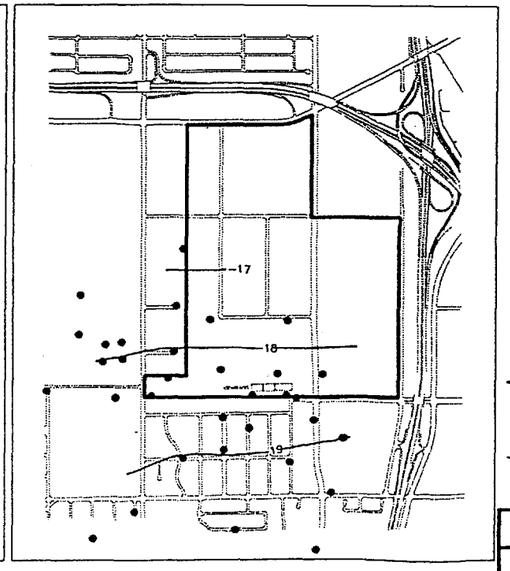


February 1996

N

0 2400 4800

Scale in feet

EXPLANATION

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

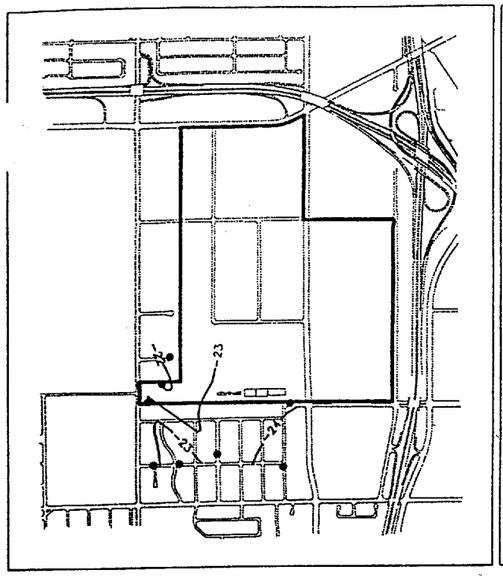
FIGURE 4.1-8

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\00216\446\SHYMBCPS. 09/06/96 at 20:00



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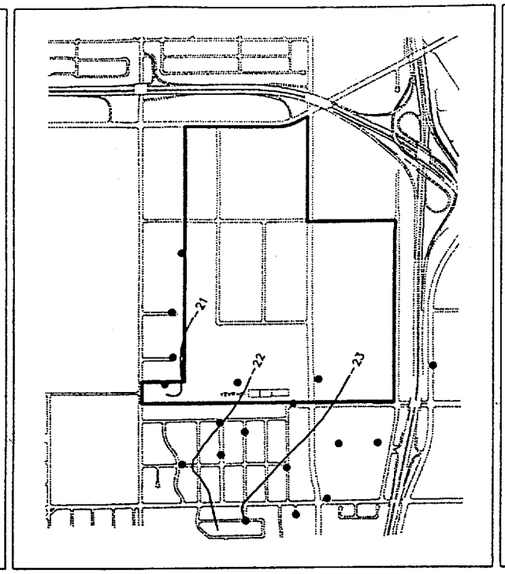

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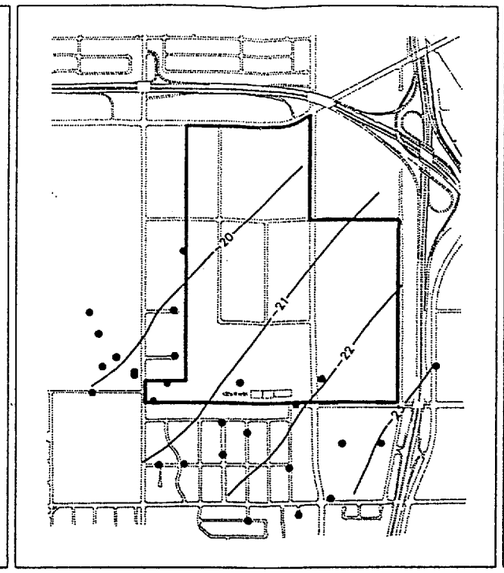

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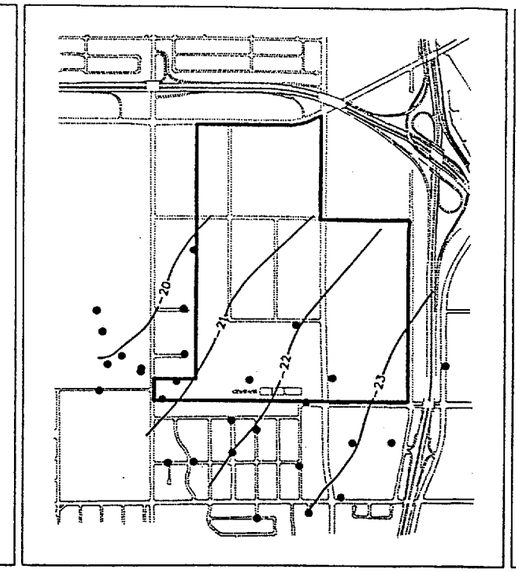

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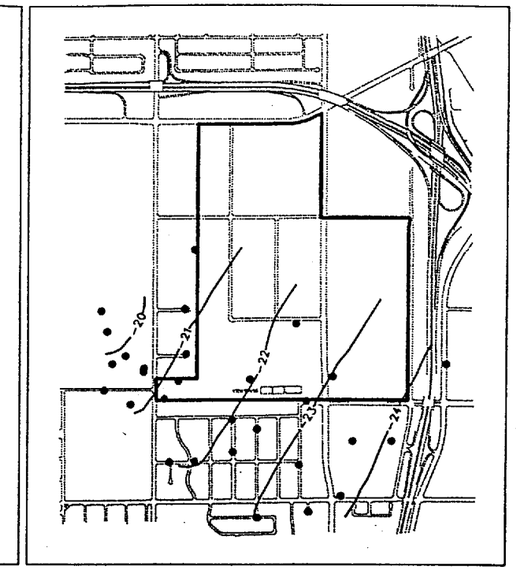
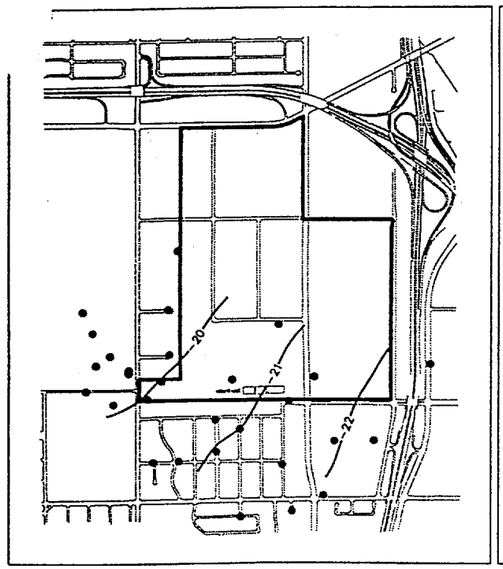


October 1994



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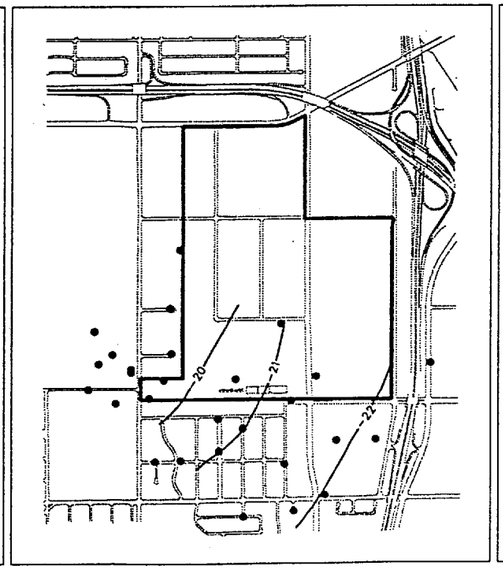
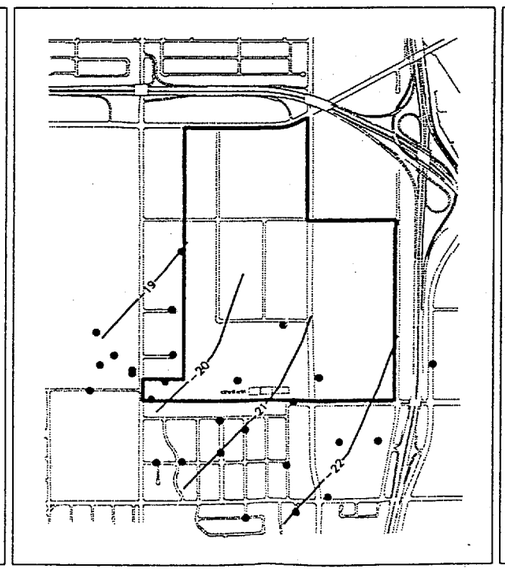


June 1995



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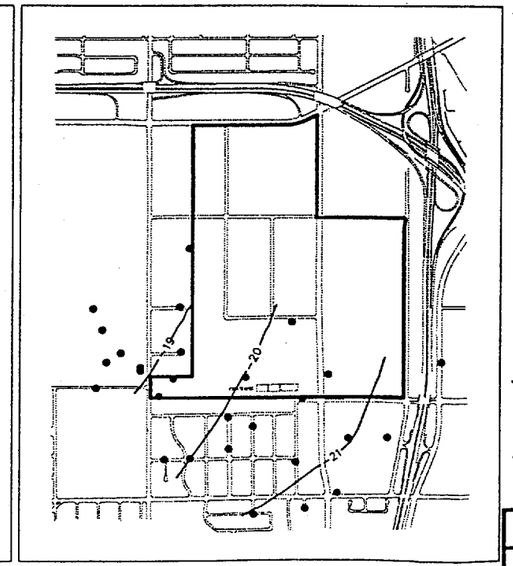
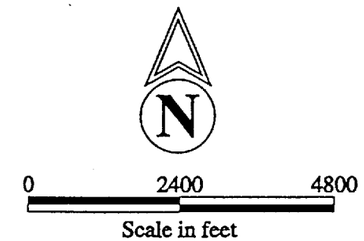


February 1996



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\SHYCADPS, 09/19/96 at 14:57

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

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
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																			

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)

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[a] (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)

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																			

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/DrGrWsRcFa (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

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)

99-200/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

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[a] (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[a] (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				

99-2nVRpts/DrGrWatRcFa (12/27/99)b)

[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)

Only detected analytes are reported in table; results of all analyses are reported in laboratory reports.
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																			

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																			

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																			

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																			

99-2IM/Rpts/DrGrWatlcFa (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

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(K)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 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

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																		

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																		

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																		

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 (11/19/99Alh)

(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

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)

99-2100/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

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

99-2181/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.

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)

99-2UU/Rpts/DrGrWaRcFc (12/28/99/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.

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/GrWaReFaluRe (12/28/99/jb)

Note: All values in μg/L or ppb.

(1) Dragun, 1988.

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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

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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

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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-C6-0013180

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

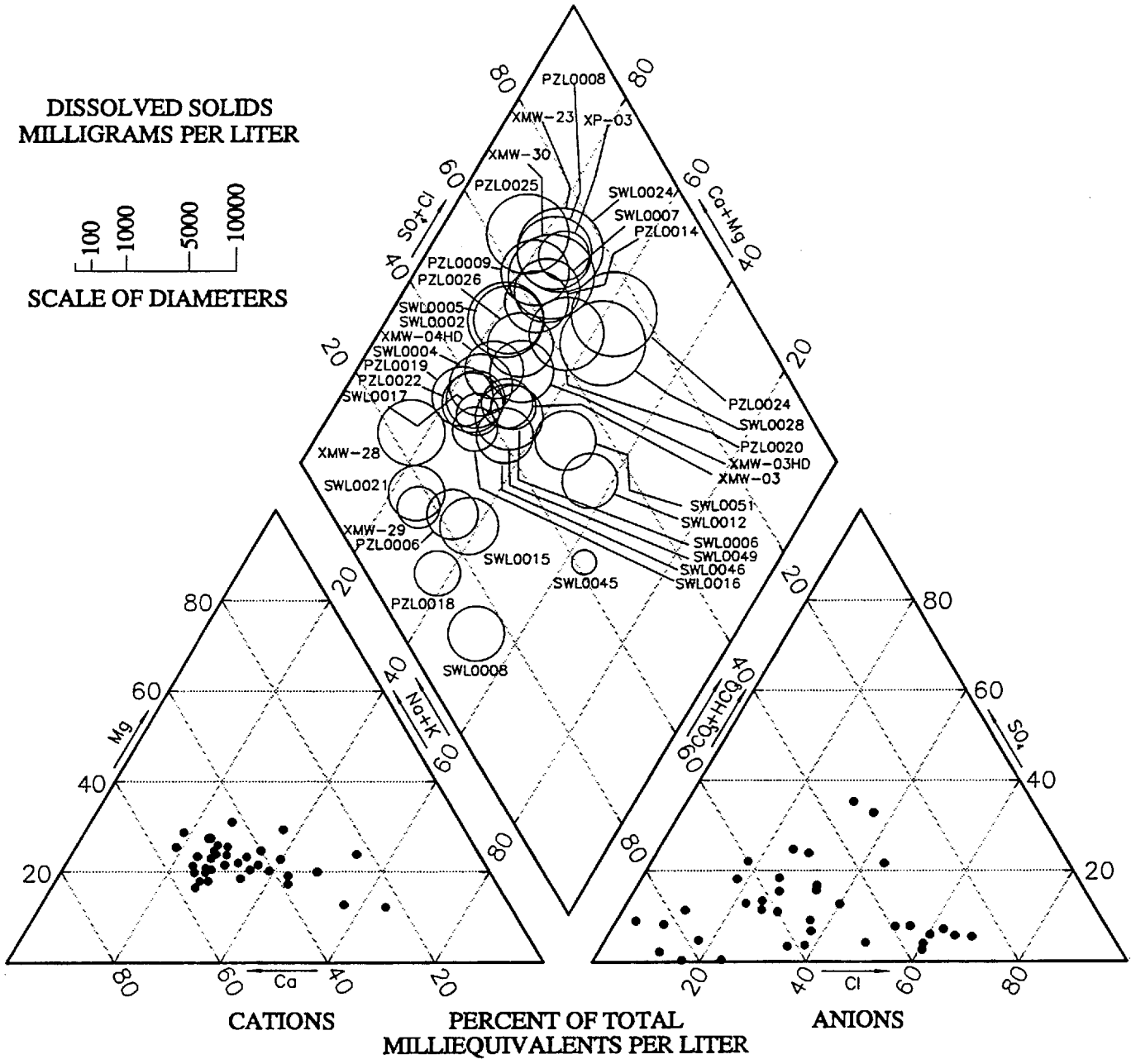

FIGURE 4.3-1

Trilinear Piper Diagram
Water Table

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

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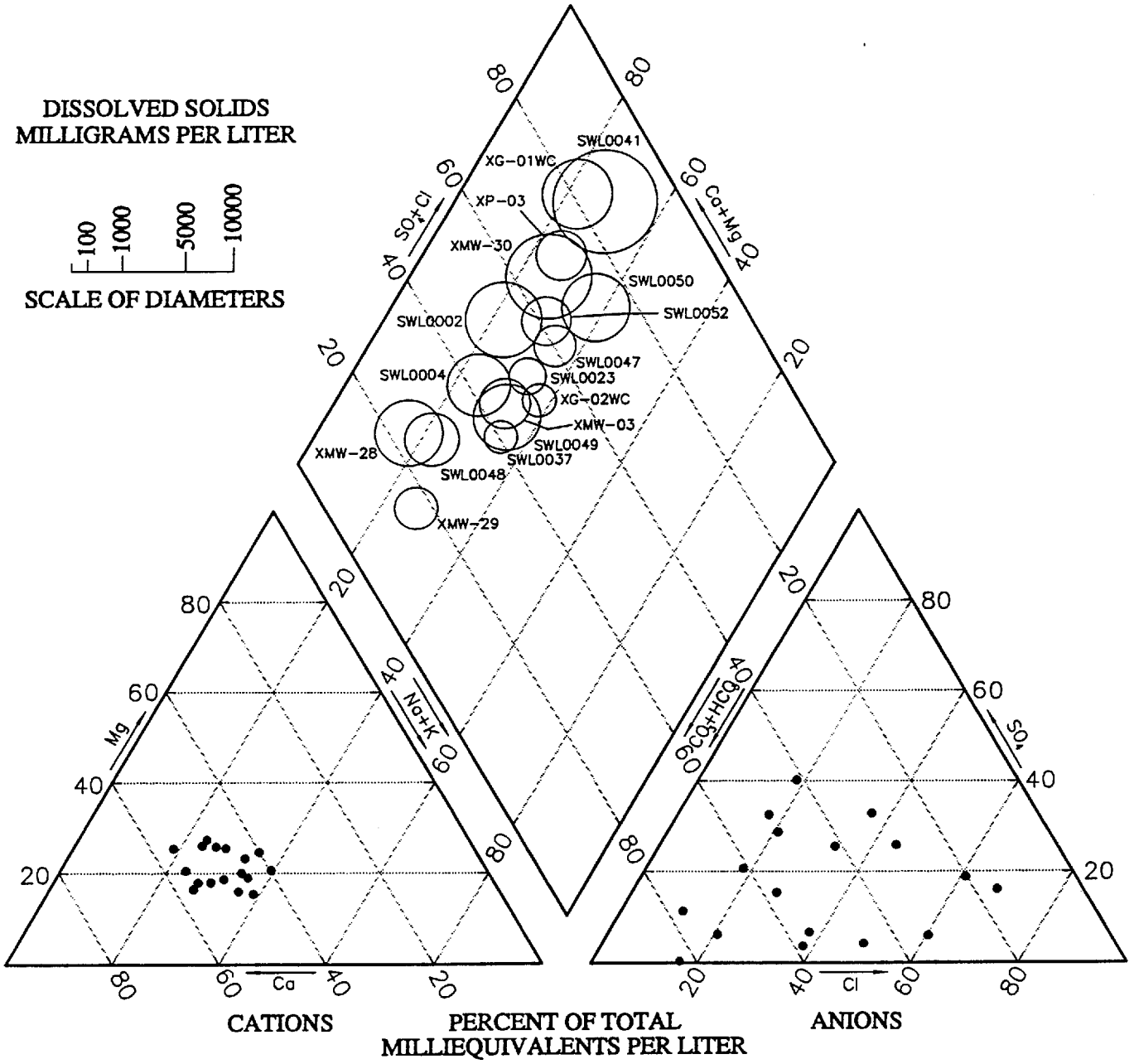

FIGURE 4.3-3

Trilinear Piper Diagram
Middle Bellflower B Sand

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

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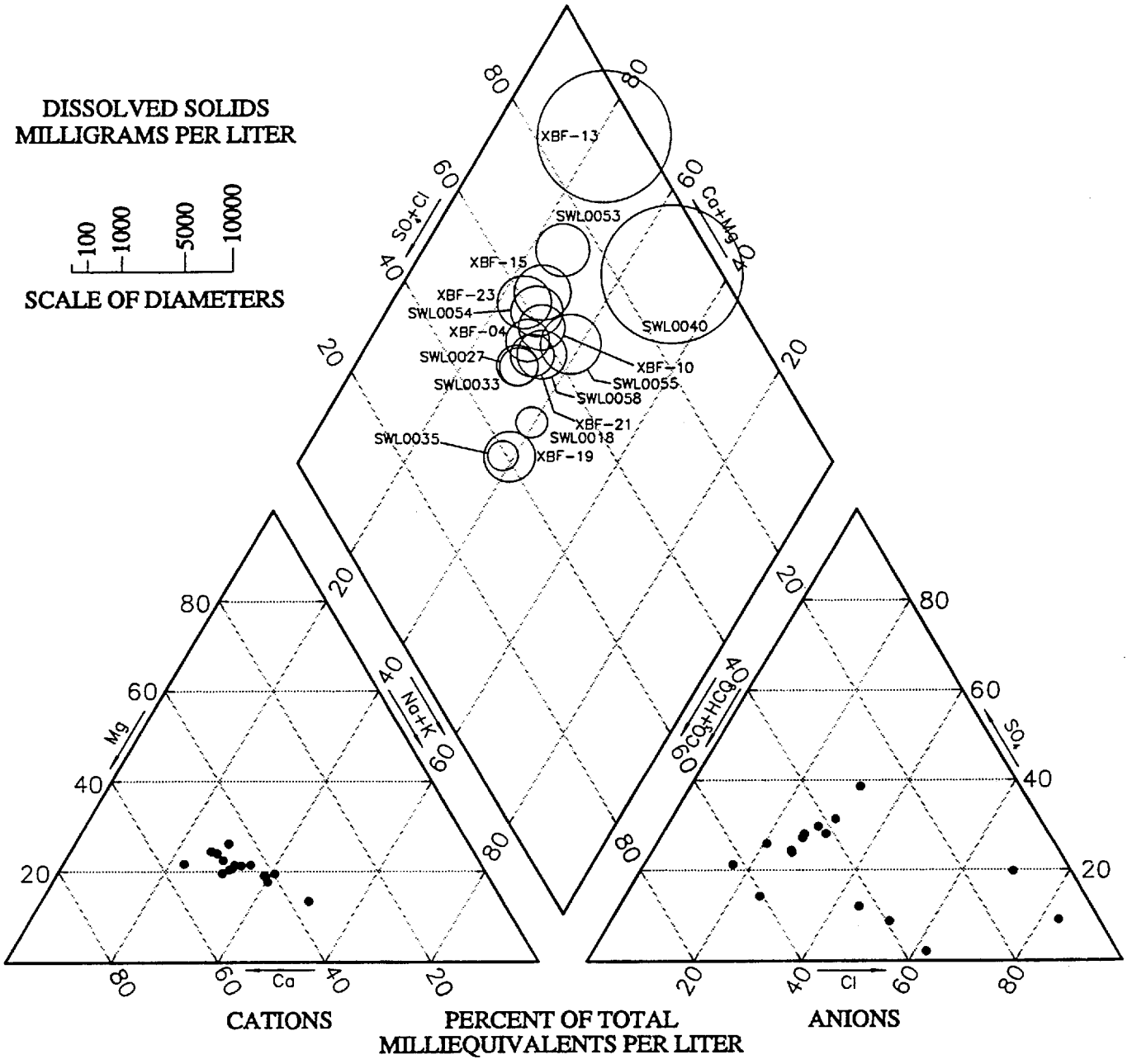

FIGURE 4.3-5

Trilinear Piper Diagram
Middle Bellflower C Sand

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

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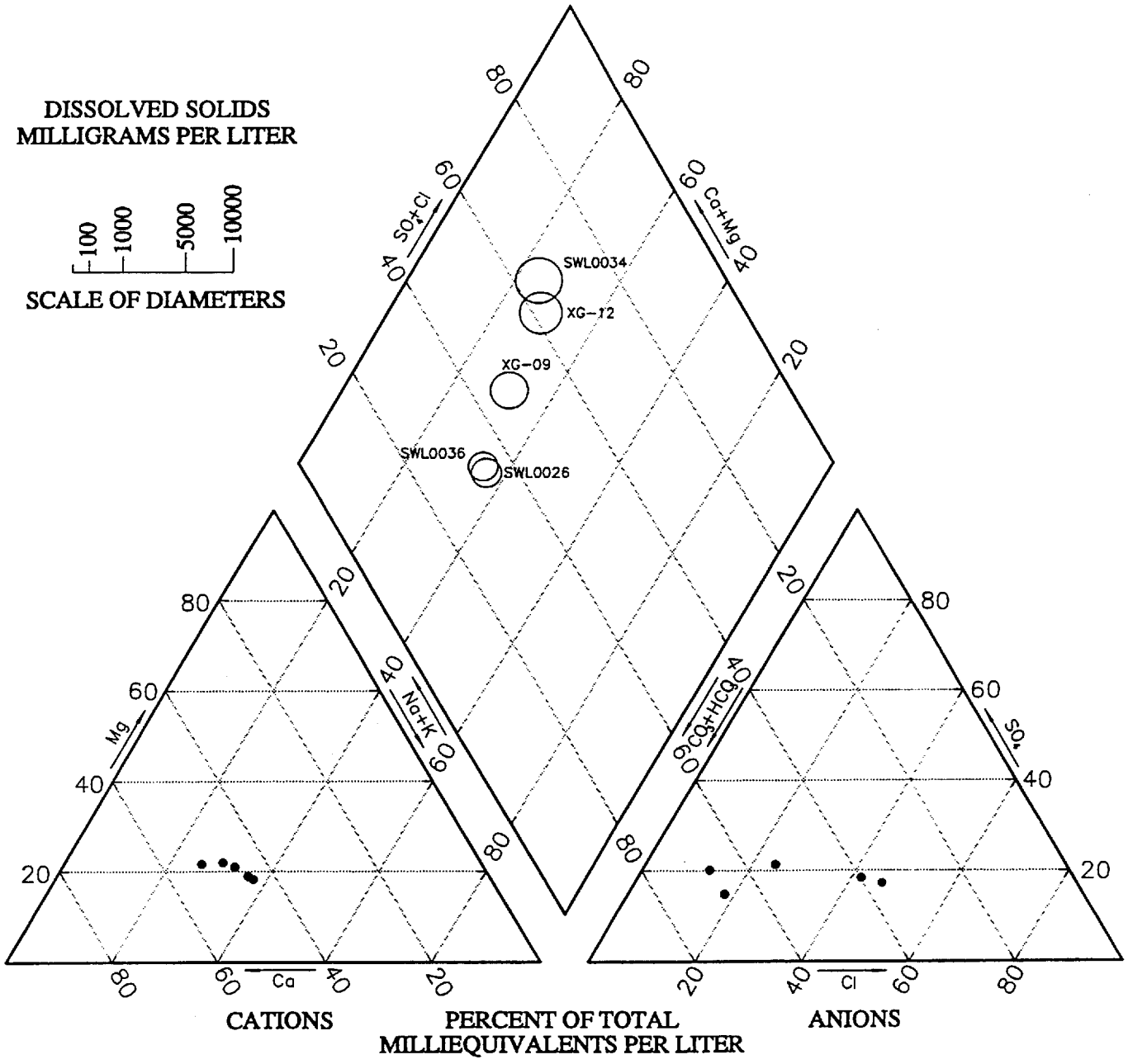

FIGURE 4.3-7

Trilinear Piper Diagram
Gage Aquifer

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

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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	
K ft/day	8.64	11.6	19.6	18.7	5.9	5.7	3.2	3.15

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	
K (ft/day)	3.5	4.1	4.1	4.5	2.98	2.6	1.04	0.74

Storage Coeff. .004 - 0.014

BOE-C6-0013191

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.

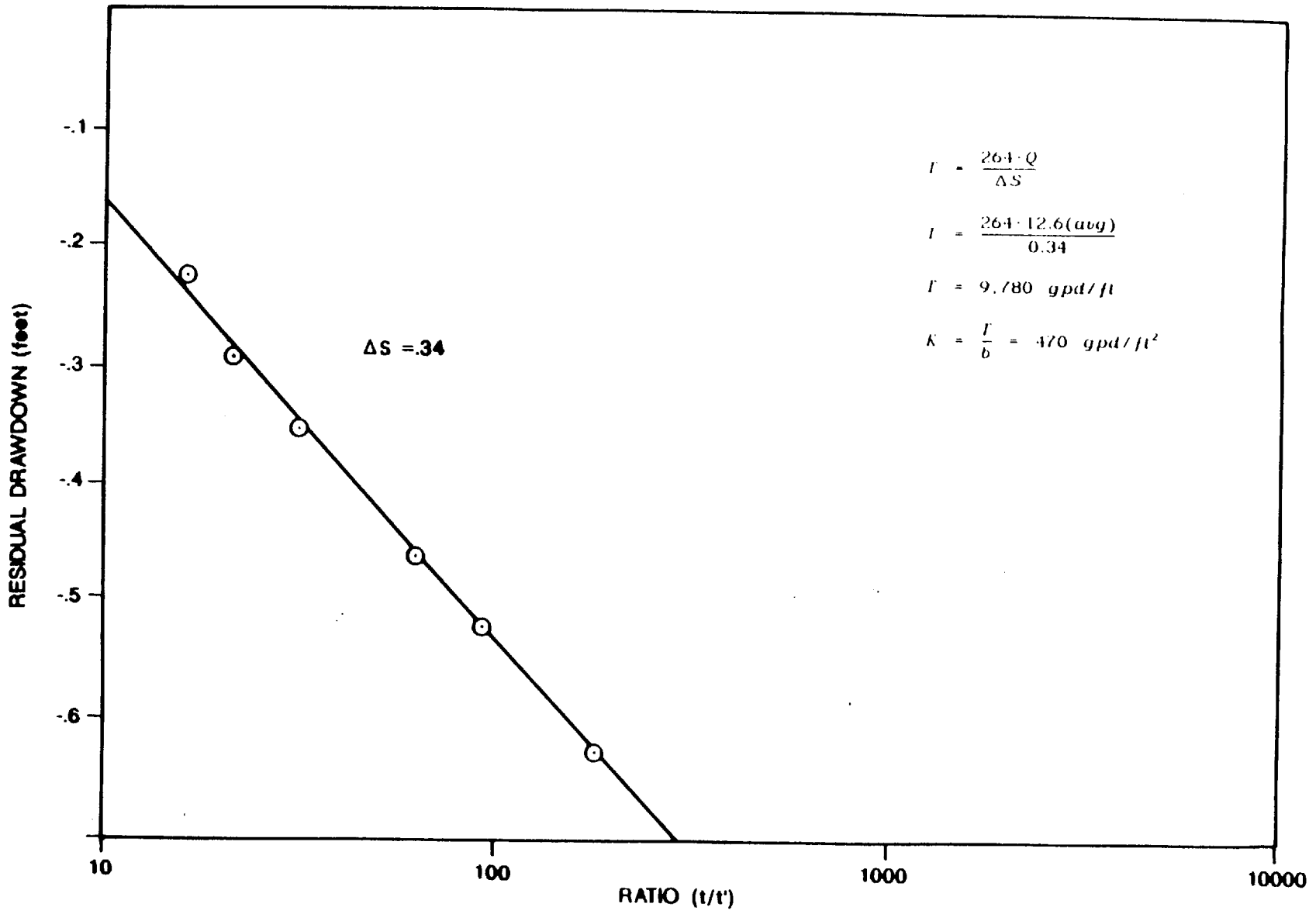
b WCC-4S was pumping well.

NT Not tested.

NR Not responsive.

NM Not monitored.

(2L-ABC/C6GW3-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

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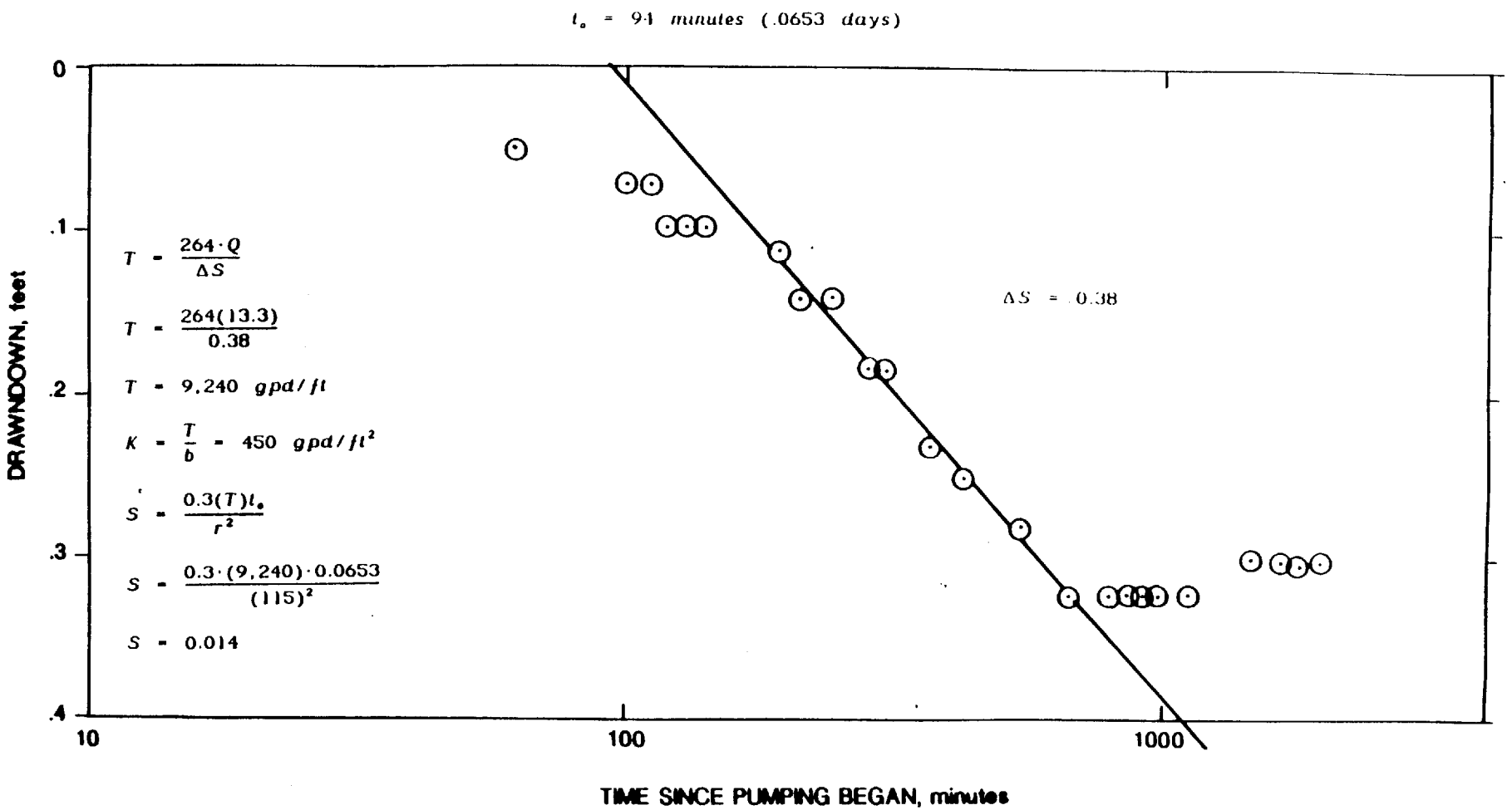

WCC-1S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-24

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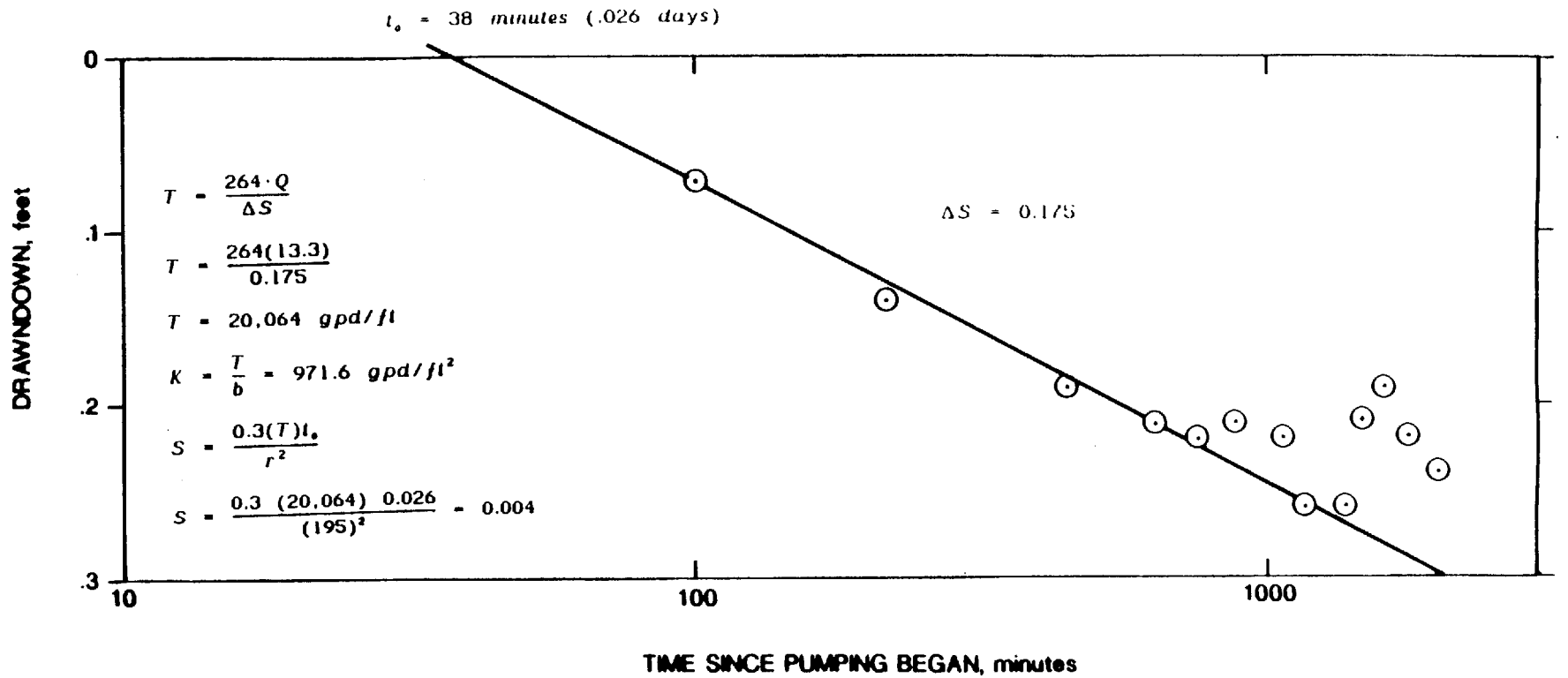
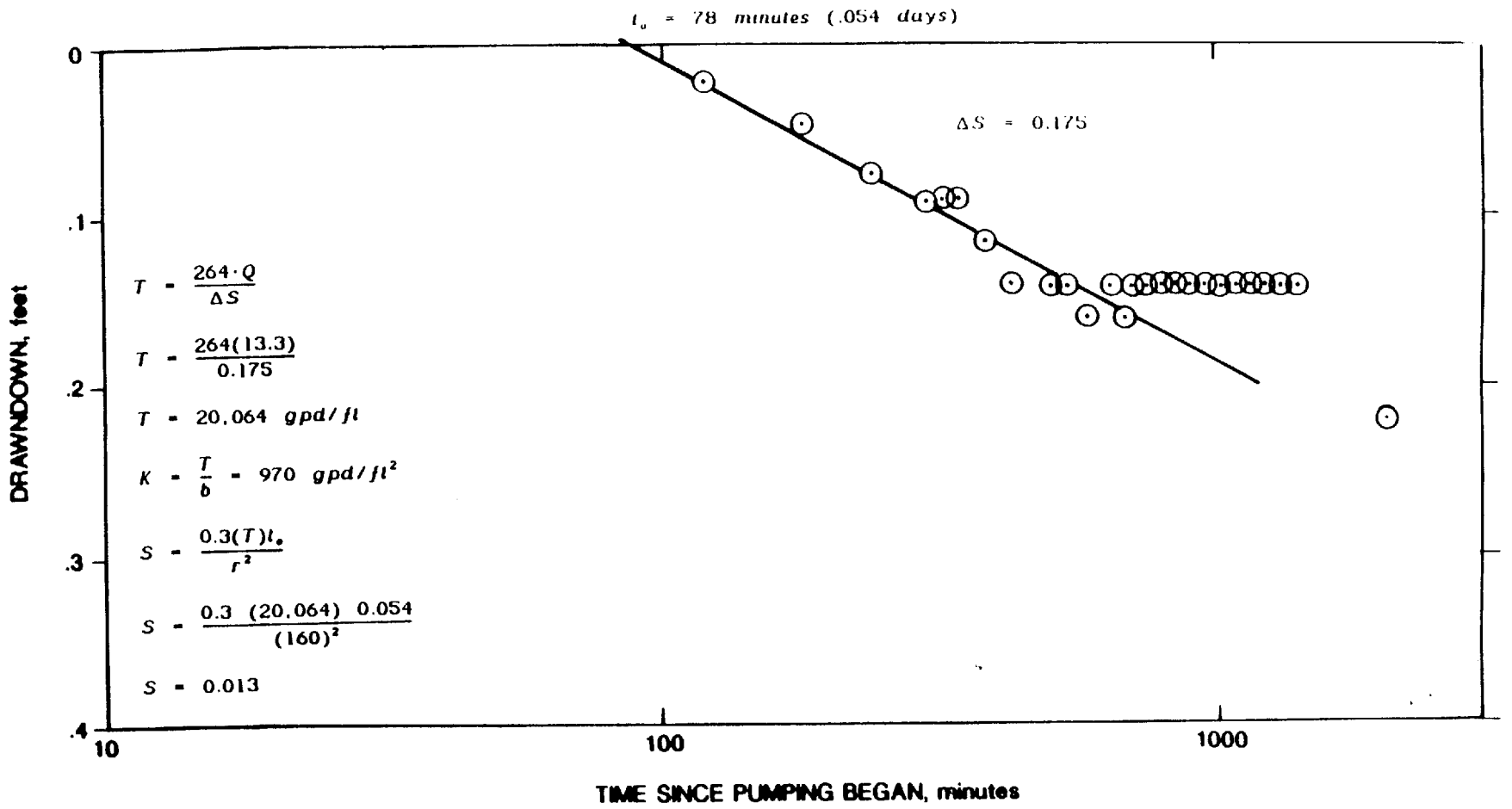
BOE-C6-0013194



WCC-6S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-25

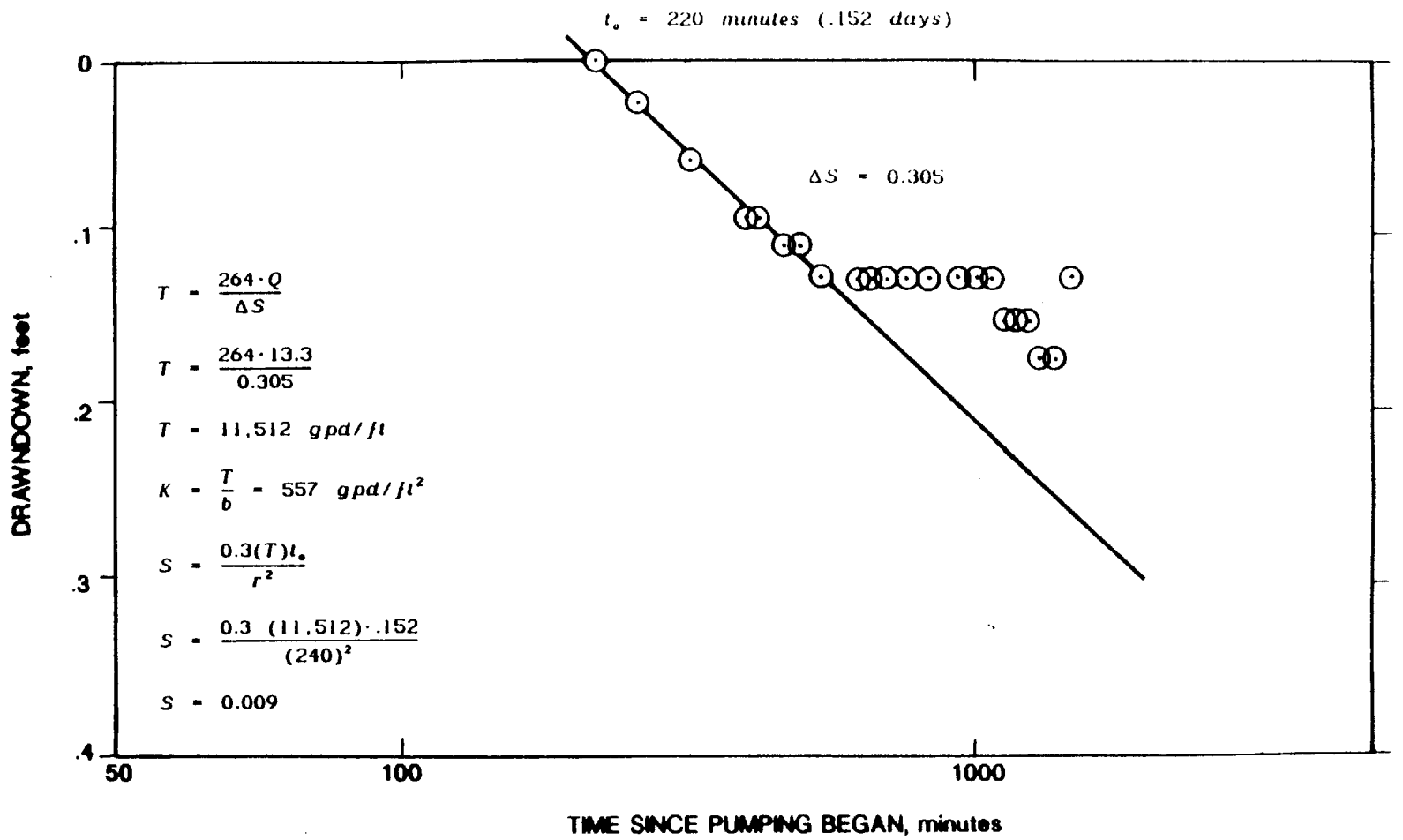
Woodward-Clyde Consultants



WCC-7S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-26

BOE-C6-0013196



WCC-8S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig A-27

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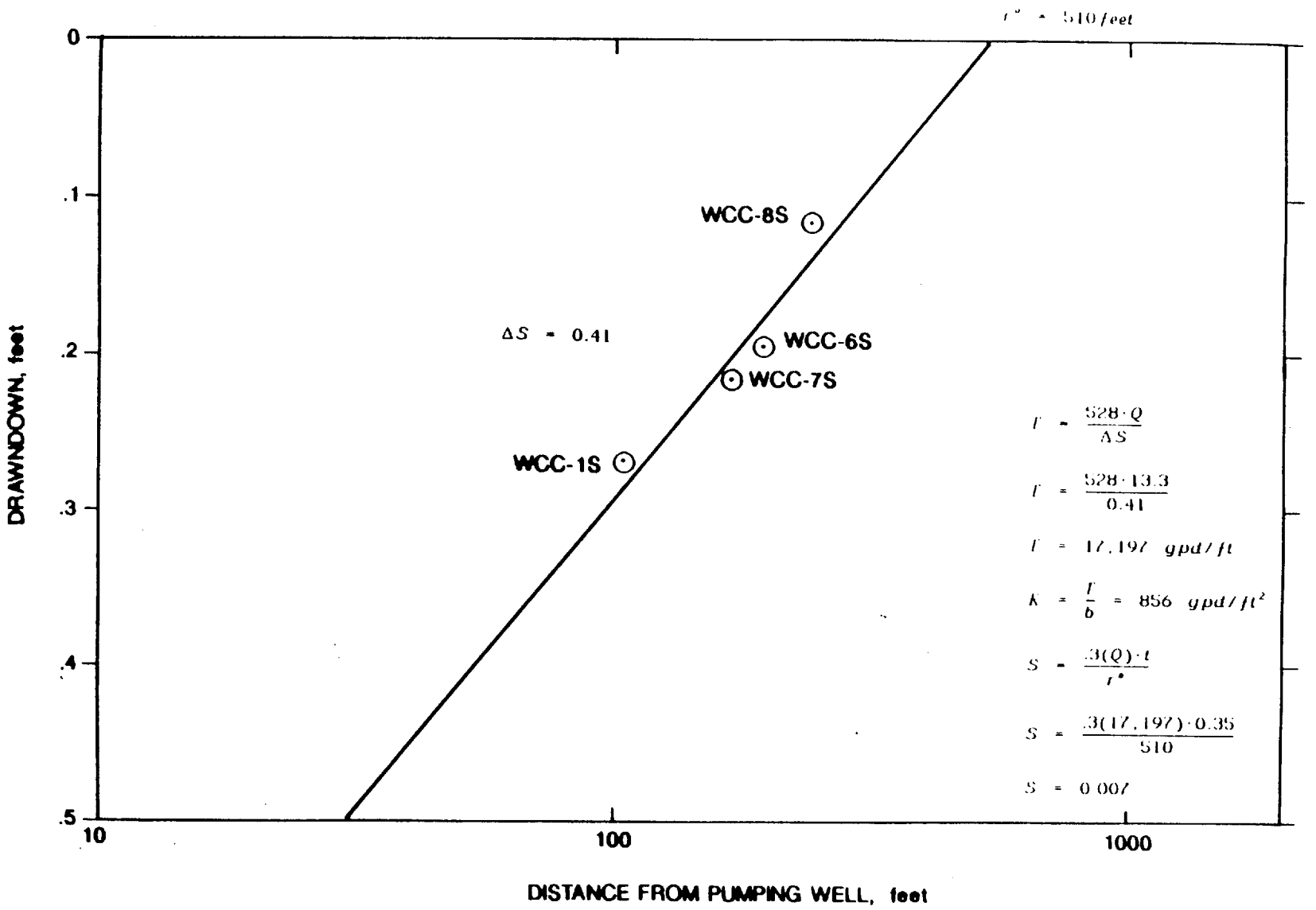

DISTANCE/DRAWDOWN PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO	Fig A-28

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BOE-C6-0013198

APPENDIX A

FIELD PROCEDURES
AND
AQUIFER TESTING DATA ANALYSIS

(2L-ABC/C6GW3-AA)

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

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

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

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.

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.

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:

$$\ln(R_e/r_w) = \left[\frac{1.1}{\ln(H/r_w)} + \frac{A + B\ln[(D-H)/r_w]}{L/r_w}\right]^{-1}$$

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

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:

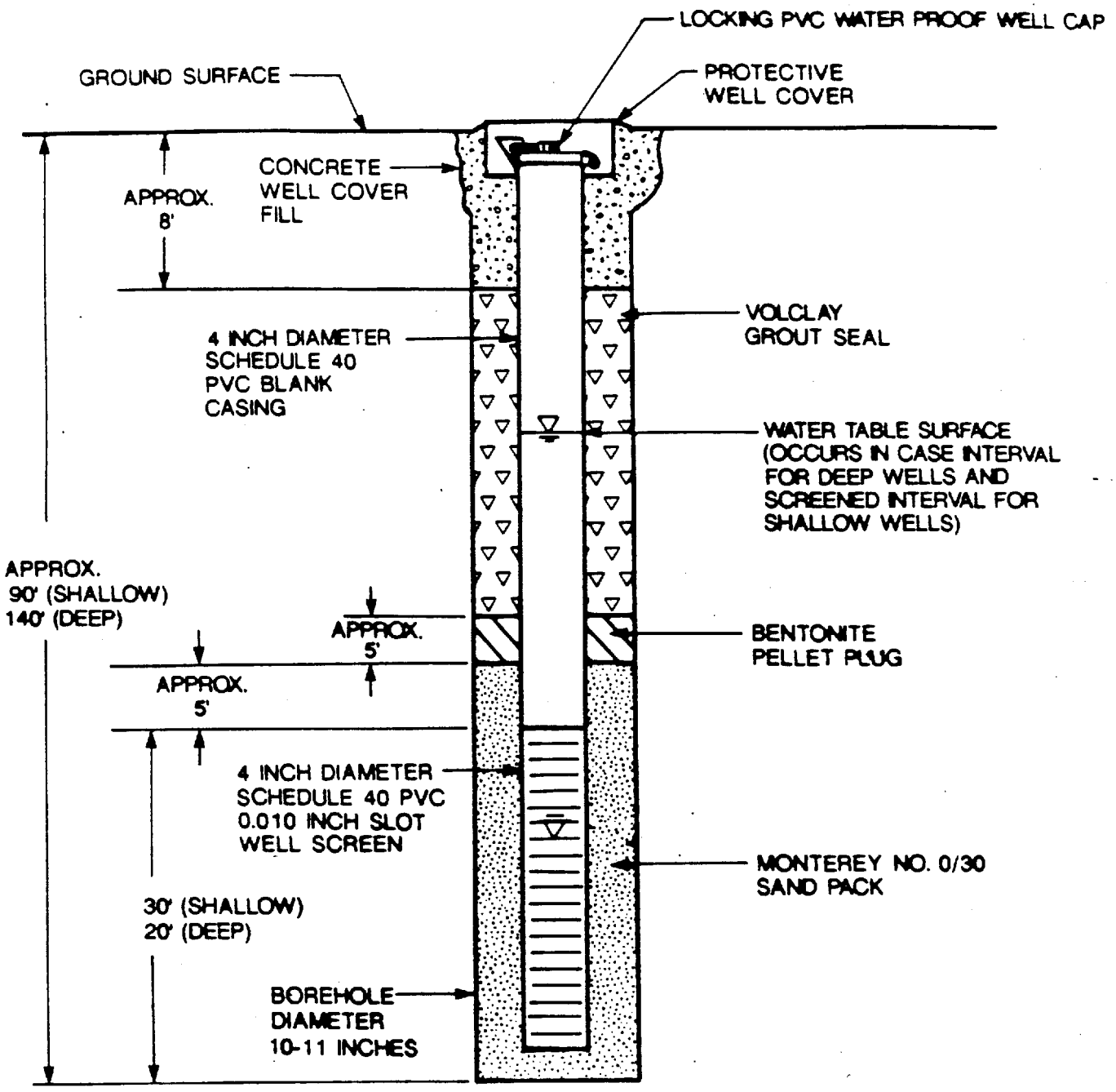
K = Hydraulic conductivity in gpd/ft^2

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



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

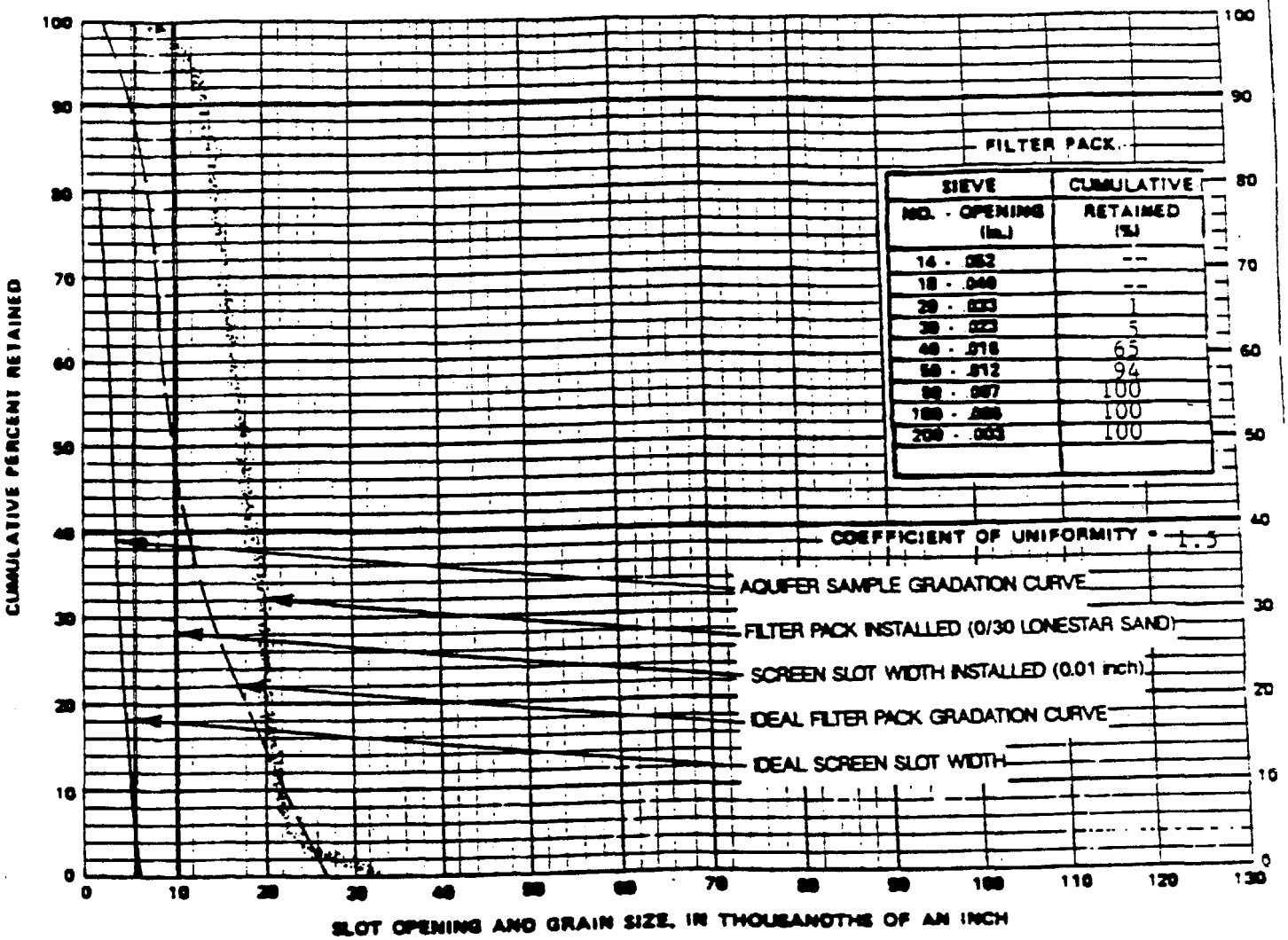
Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT-C6 FACILITY	Fig. A.0

Well Name: WCC-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 - .0098	100
80 - .007	100
100 - .005	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 - .0098	--	--	
80 - .007	--	--	
100 - .005	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

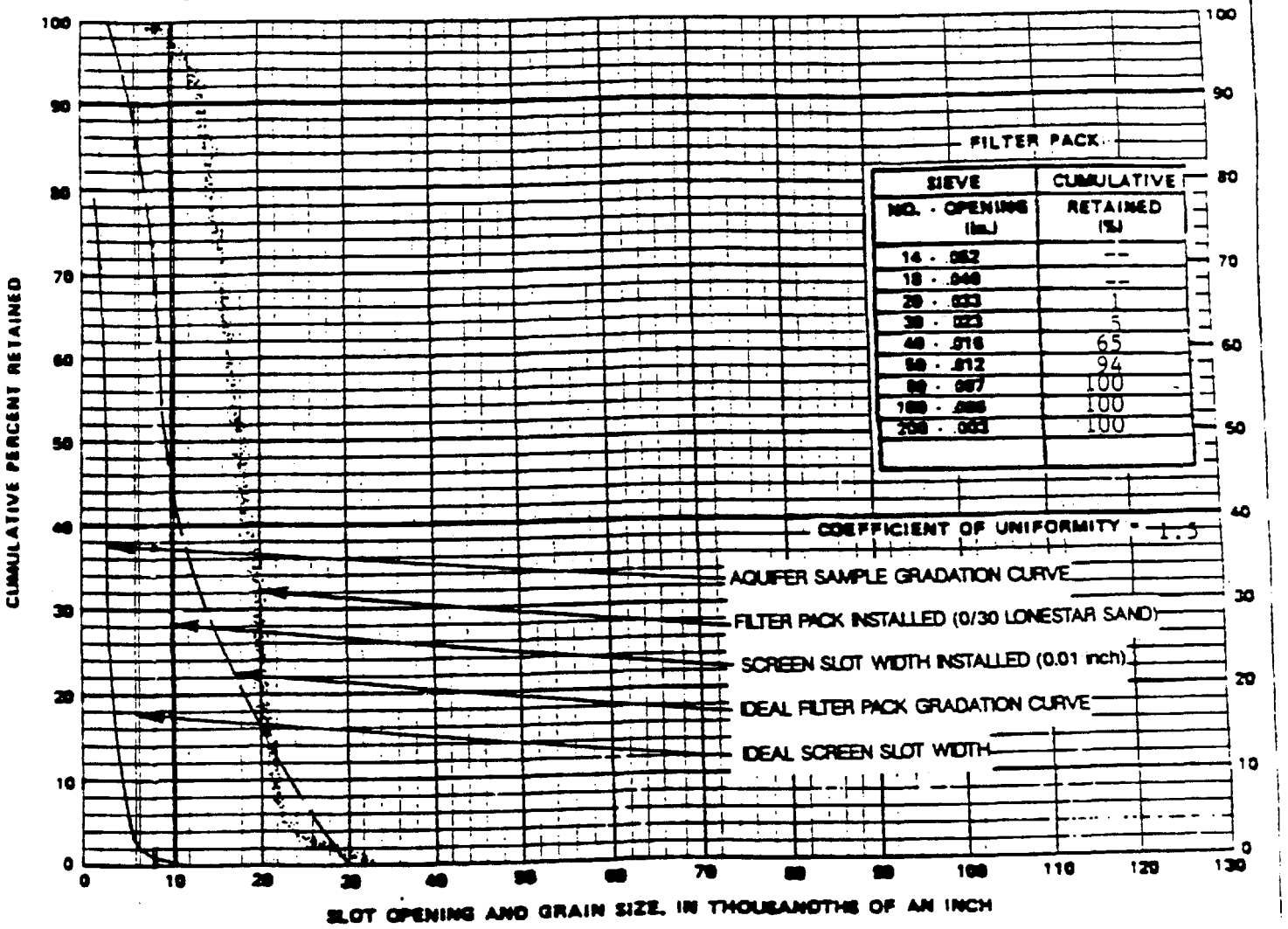
Fig. A.2

Well Name: WCC-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

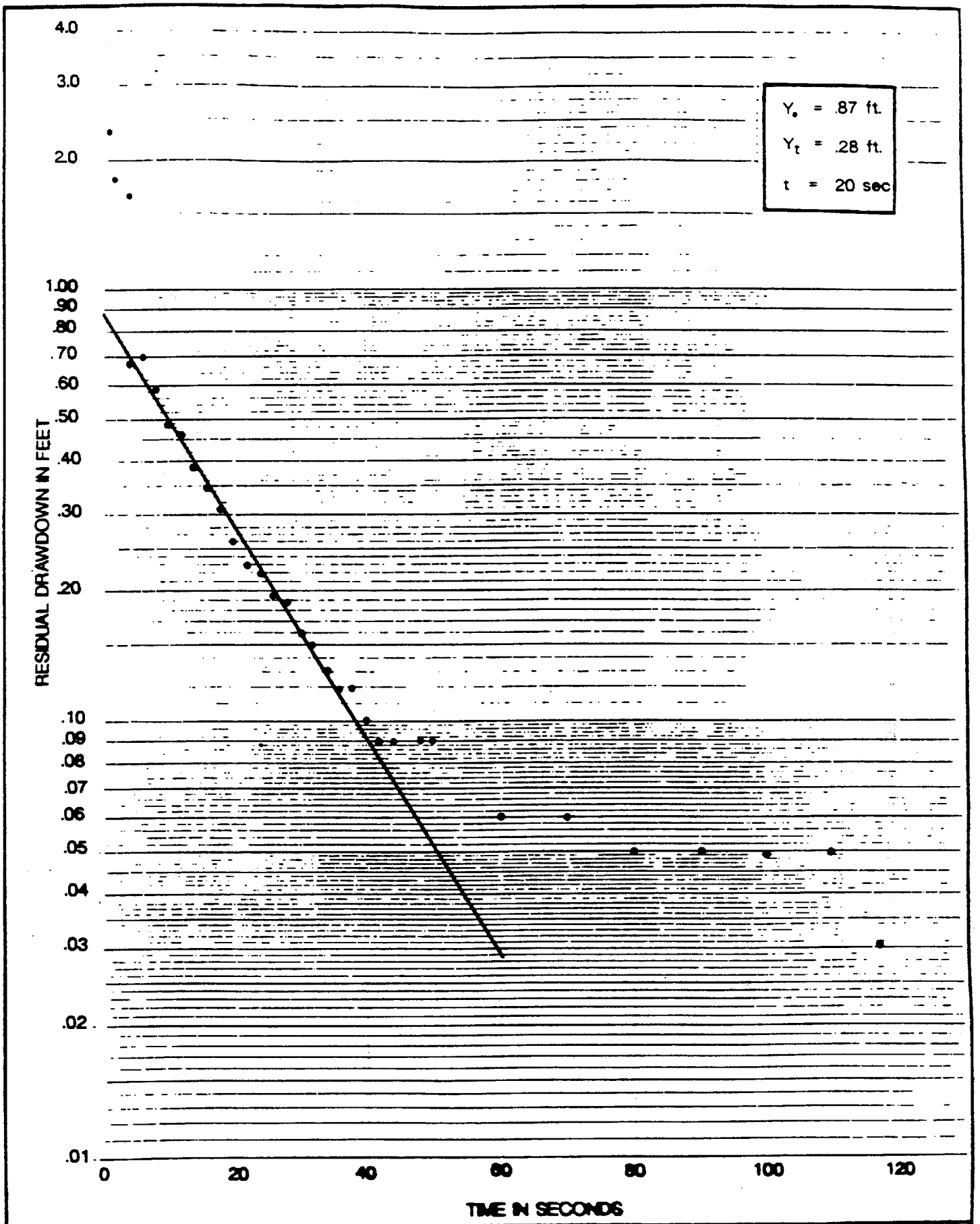
Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

GRAIN SIZE ANALYSIS WCC-1D

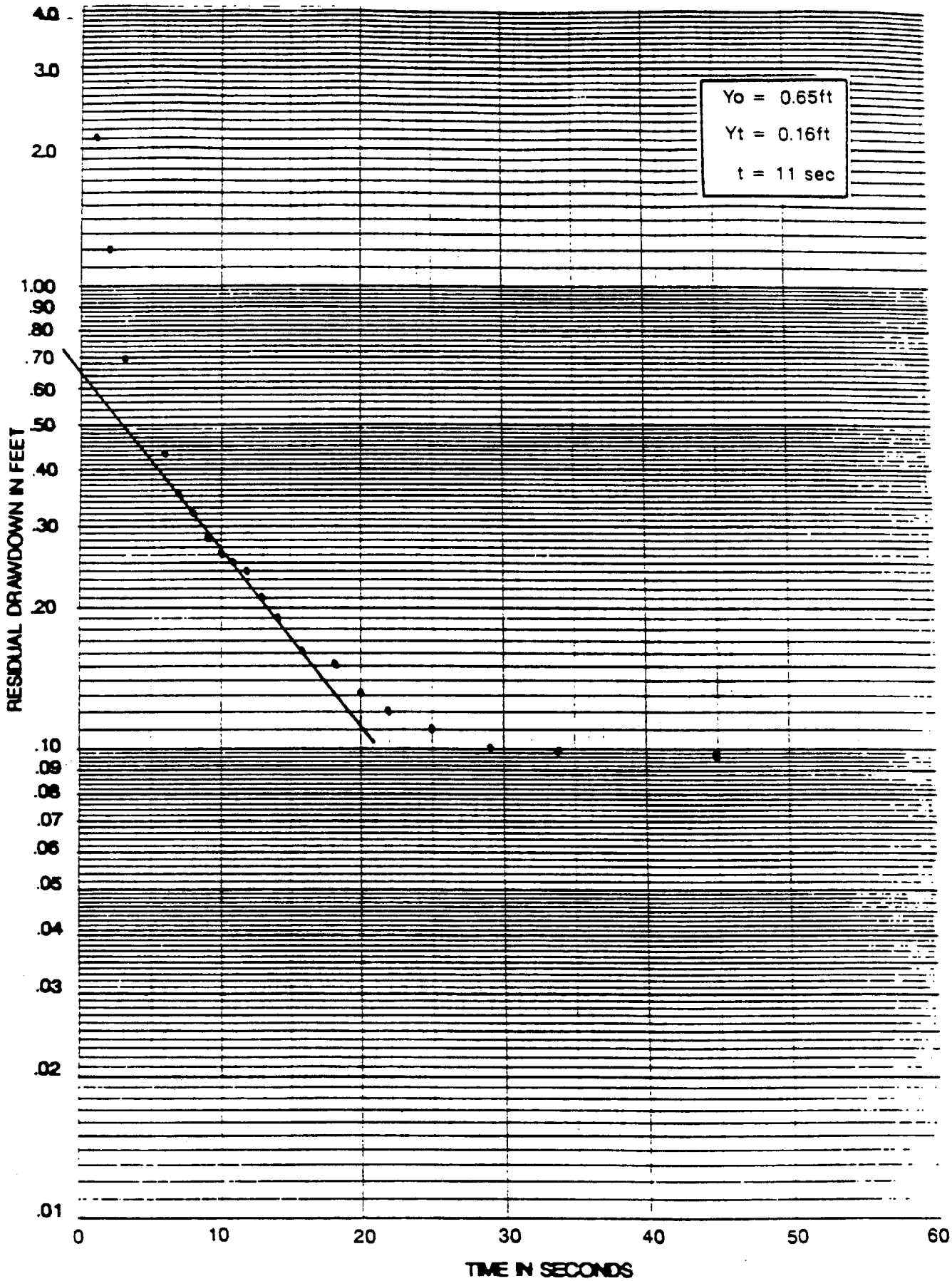
Fig. A.4

BOE-C6-0013210



WCC-4S SLUG TEST INSERT

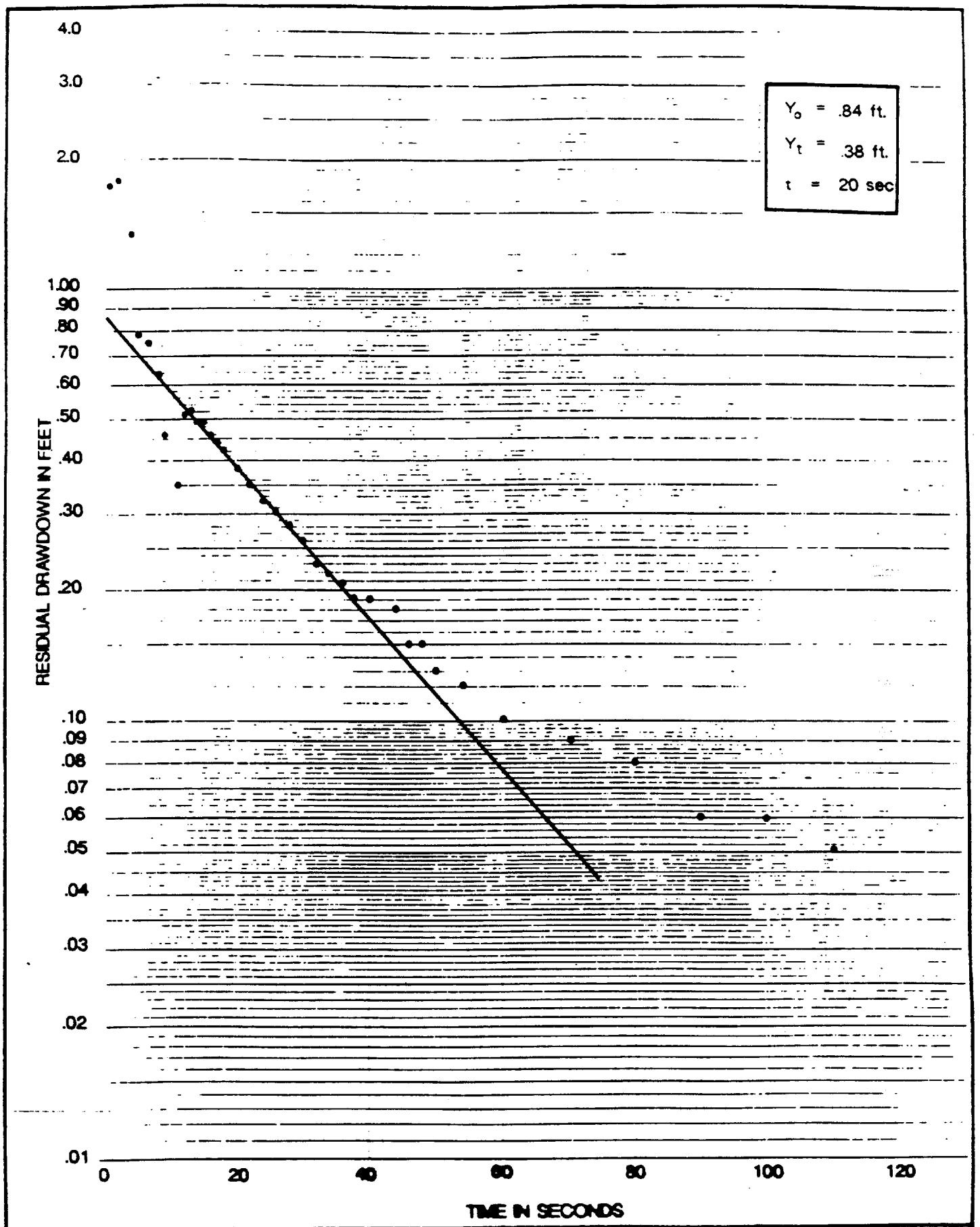
Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.6



WCC-5S SLUG TEST INSERT

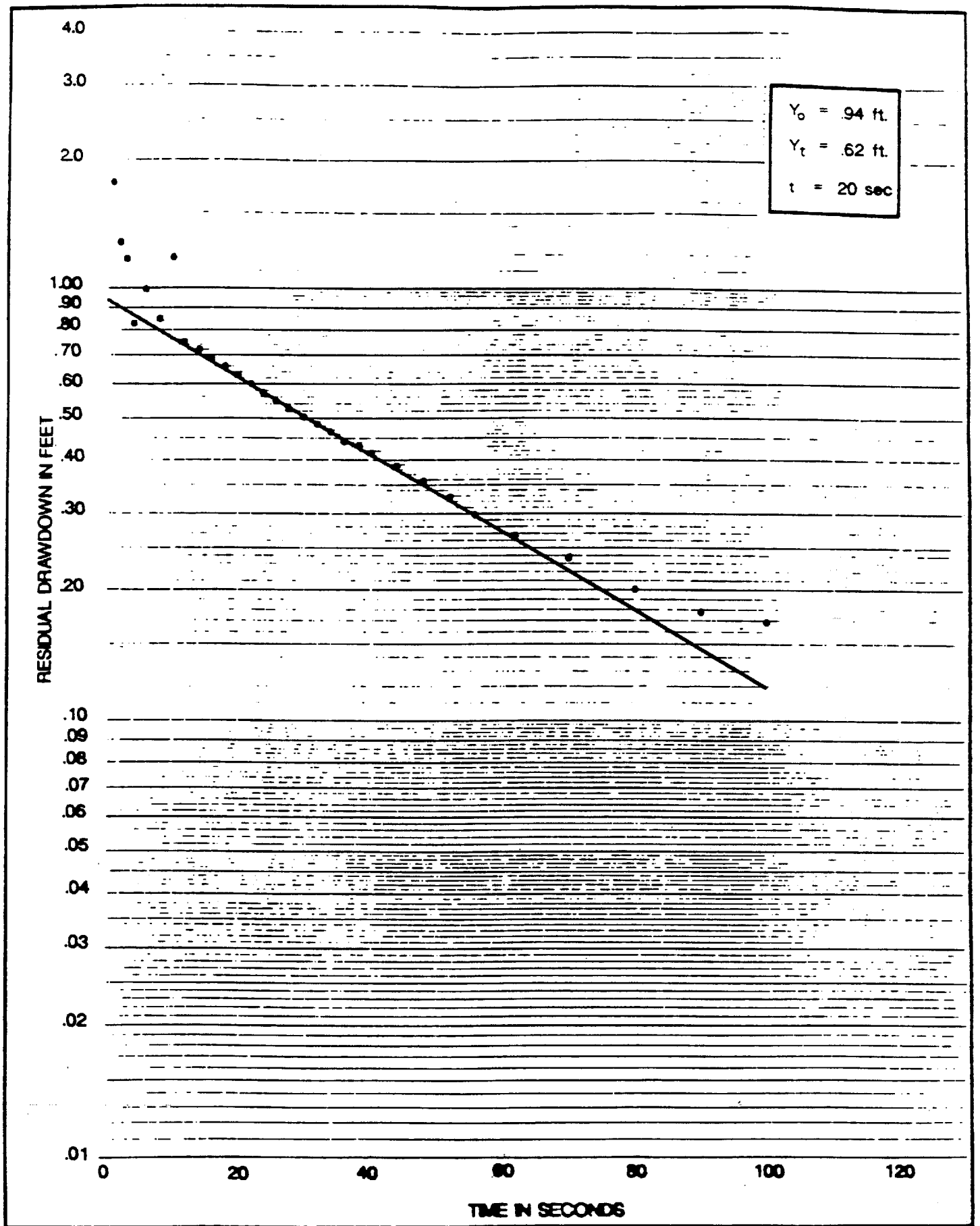
Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.8

Woodward-Clyde Consultants



WCC-7S SLUG TEST INSERT

Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.10



WCC-8S SLUG TEST INSERT

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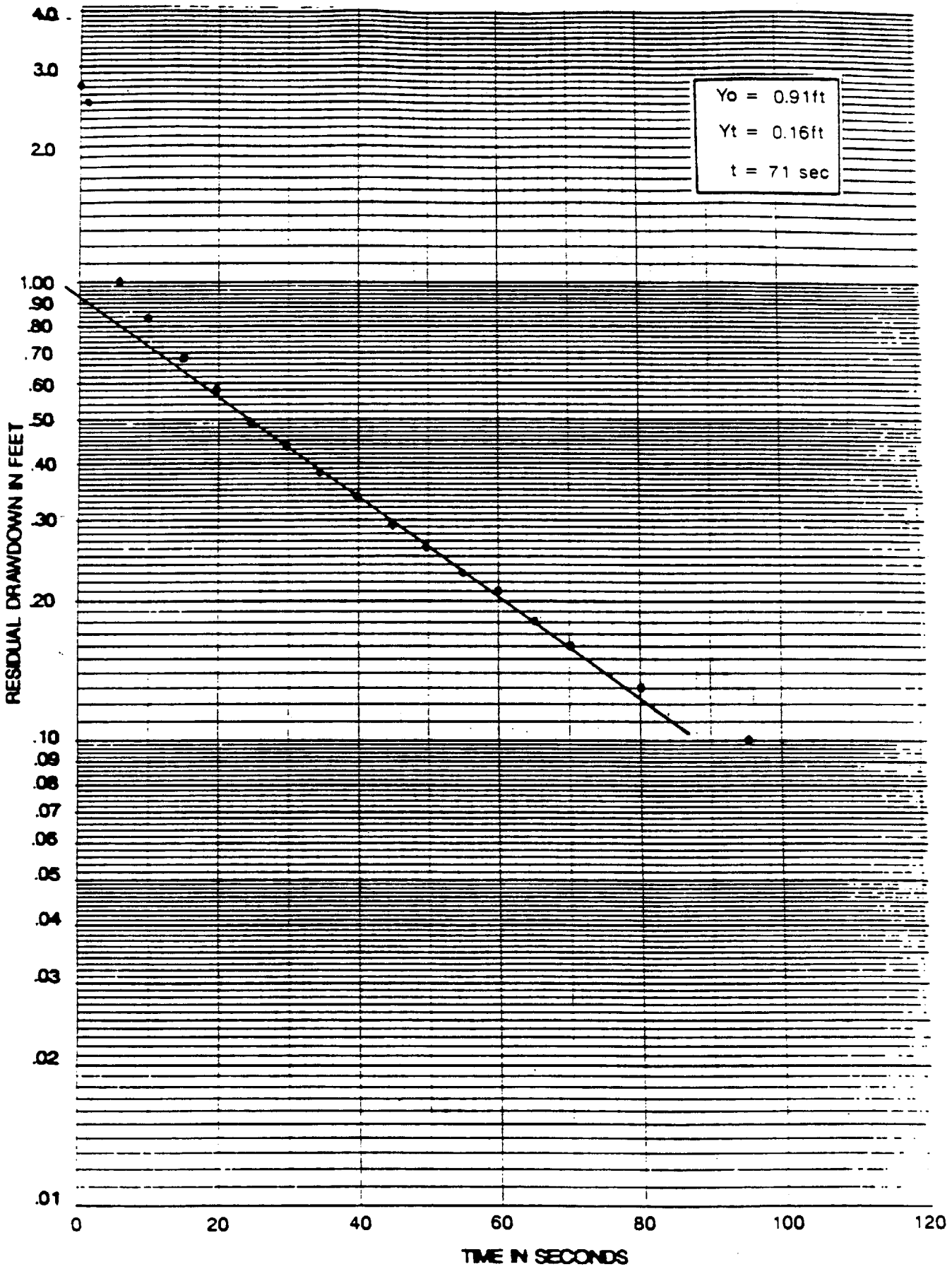
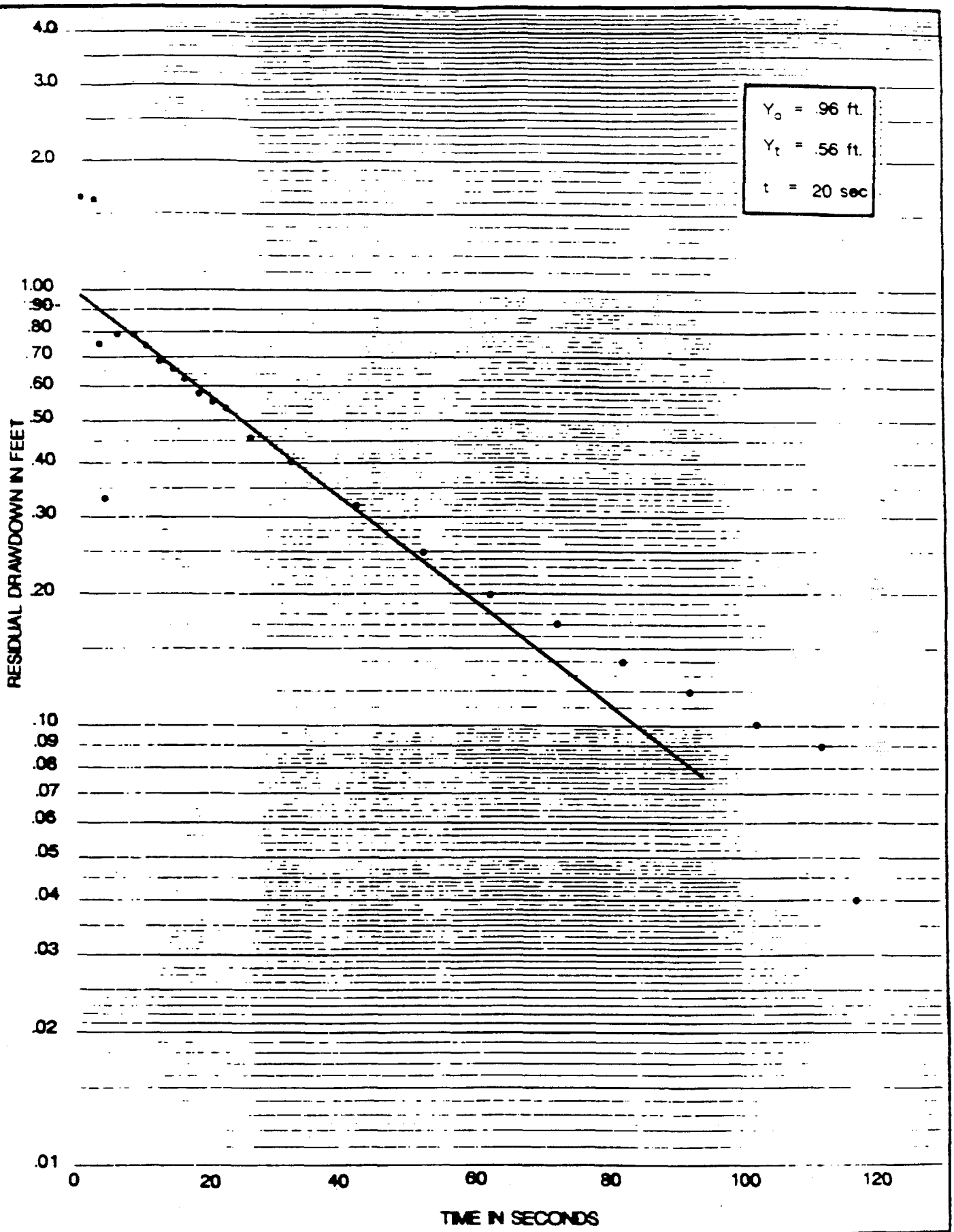


WCC-9S SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.14

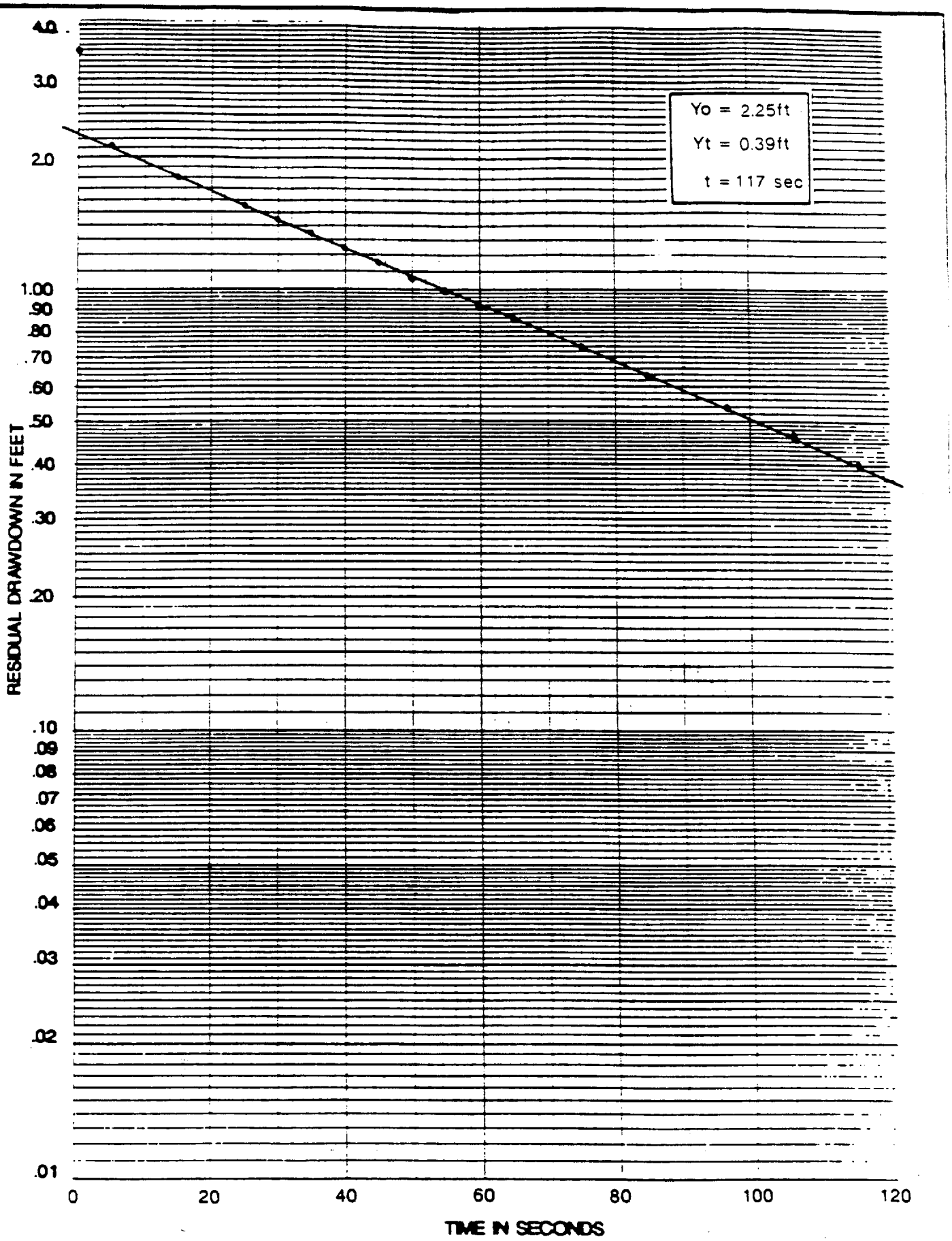
Woodward-Clyde Consultants



WCC-10S SLUG TEST INSERT

Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.16

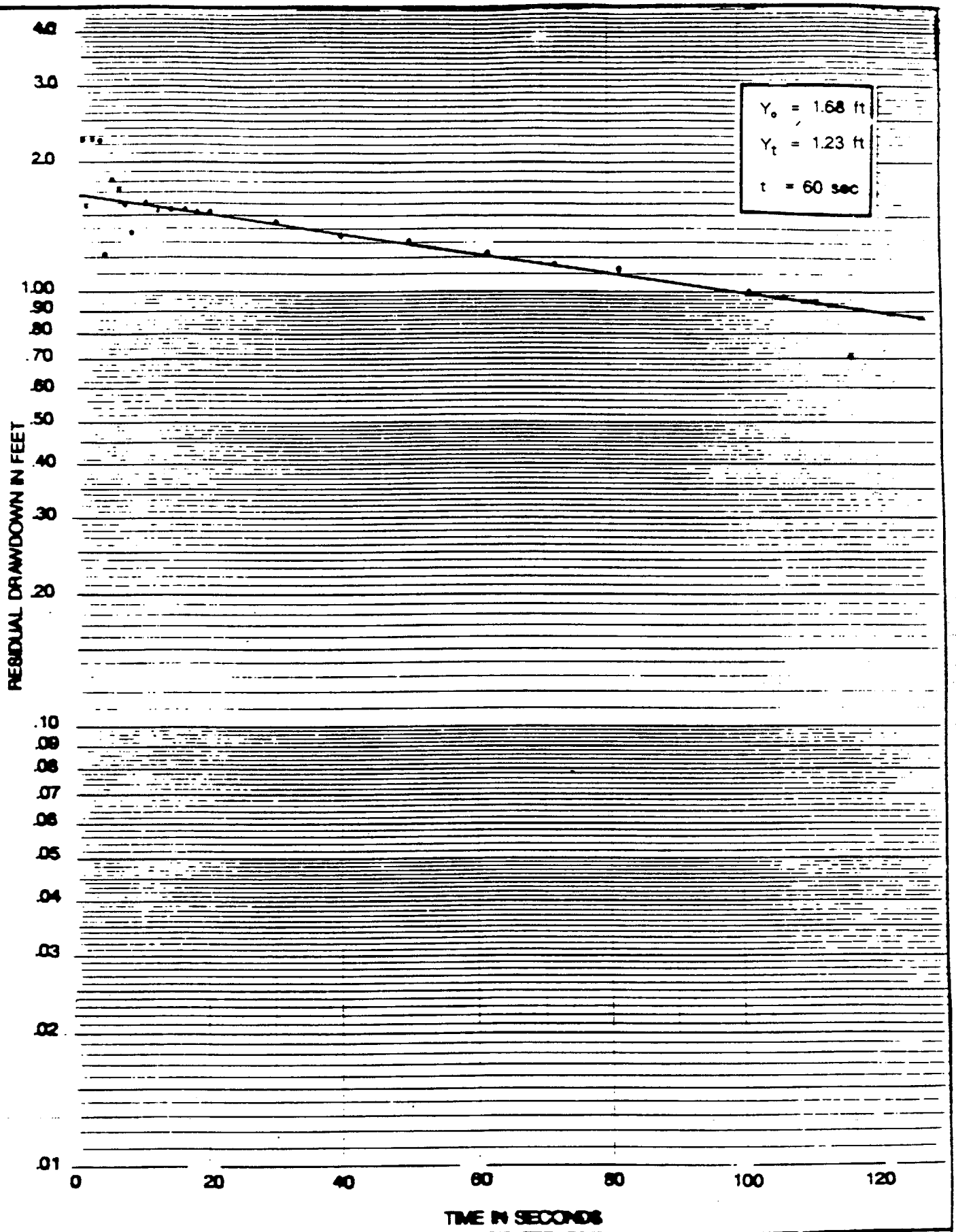
Woodward-Clyde Consultants



WCC-1D SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.18

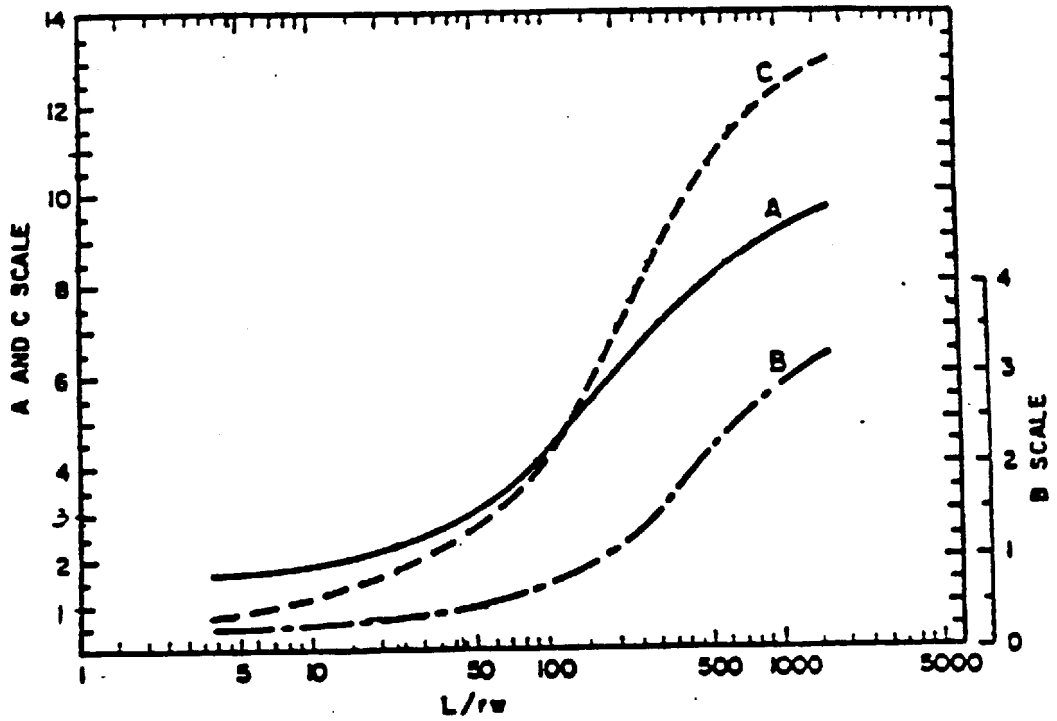
Woodward-Clyde Consultants



WCC-3D SLUG TEST INSERT

Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.20

Woodward-Clyde Consultants



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-C6-0013220

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

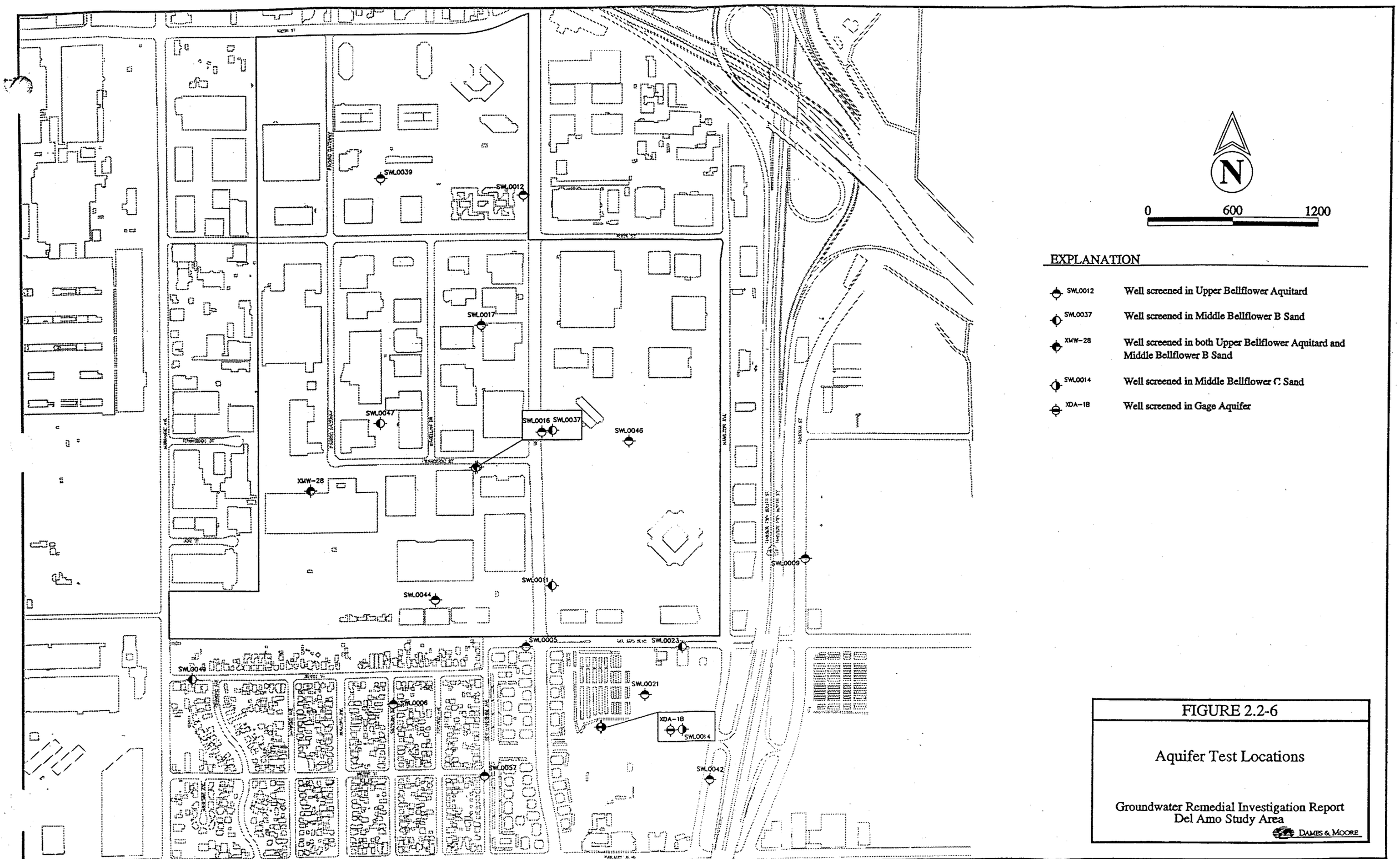


FIGURE 2.2-6

Aquifer Test Locations

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

C:\DJD\RI\SEC4\421, 08/30/96 at 15:25

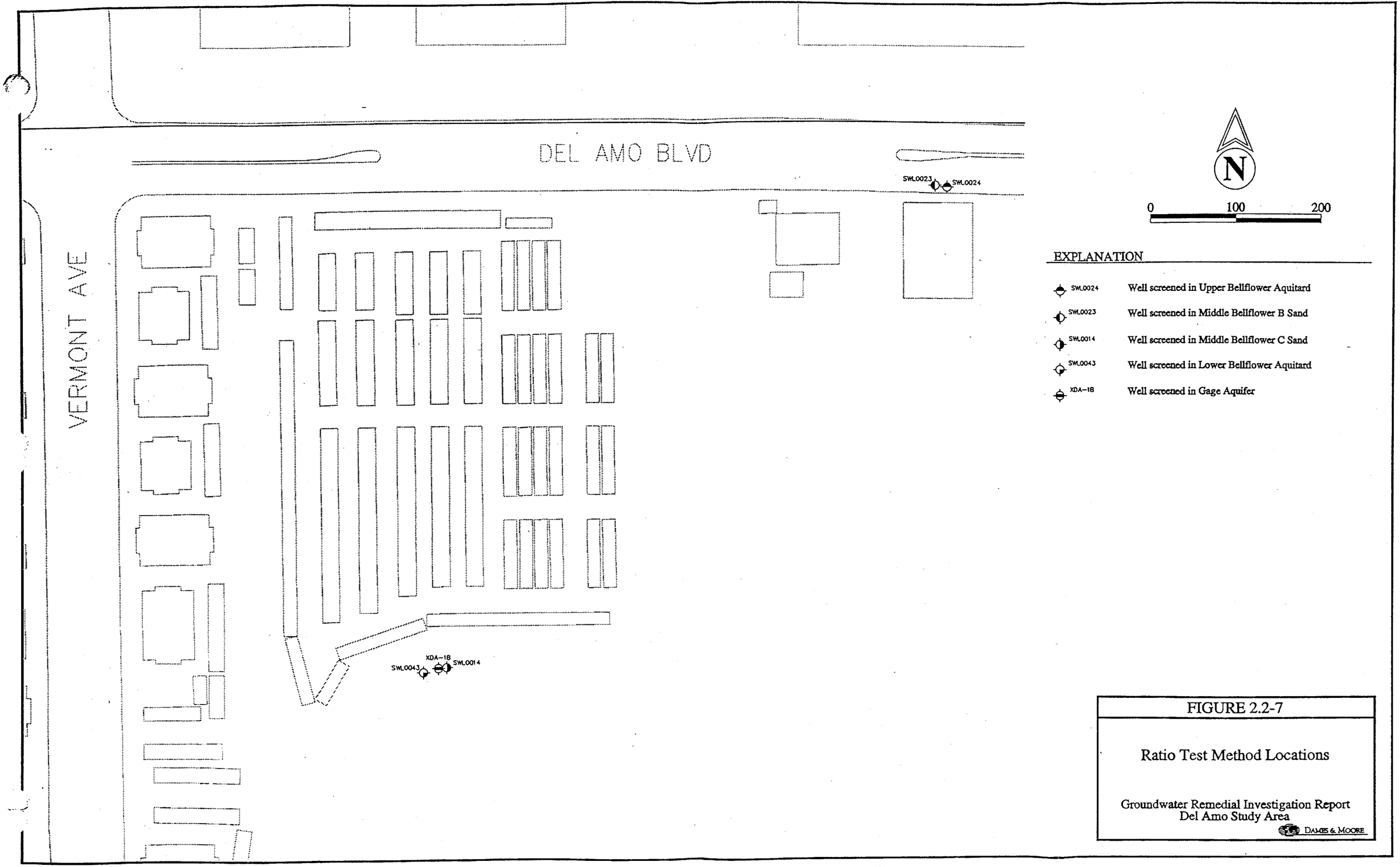


FIGURE 2.2-7

Ratio Test Method Locations

Groundwater Remedial Investigation Report
Del Amo Study Area

DAMES & MOORE

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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

(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

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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/rm)

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 1, May 1996.
Well Survey updated in 1998 by Geraghty & Miller, and in 1999 by TRC.

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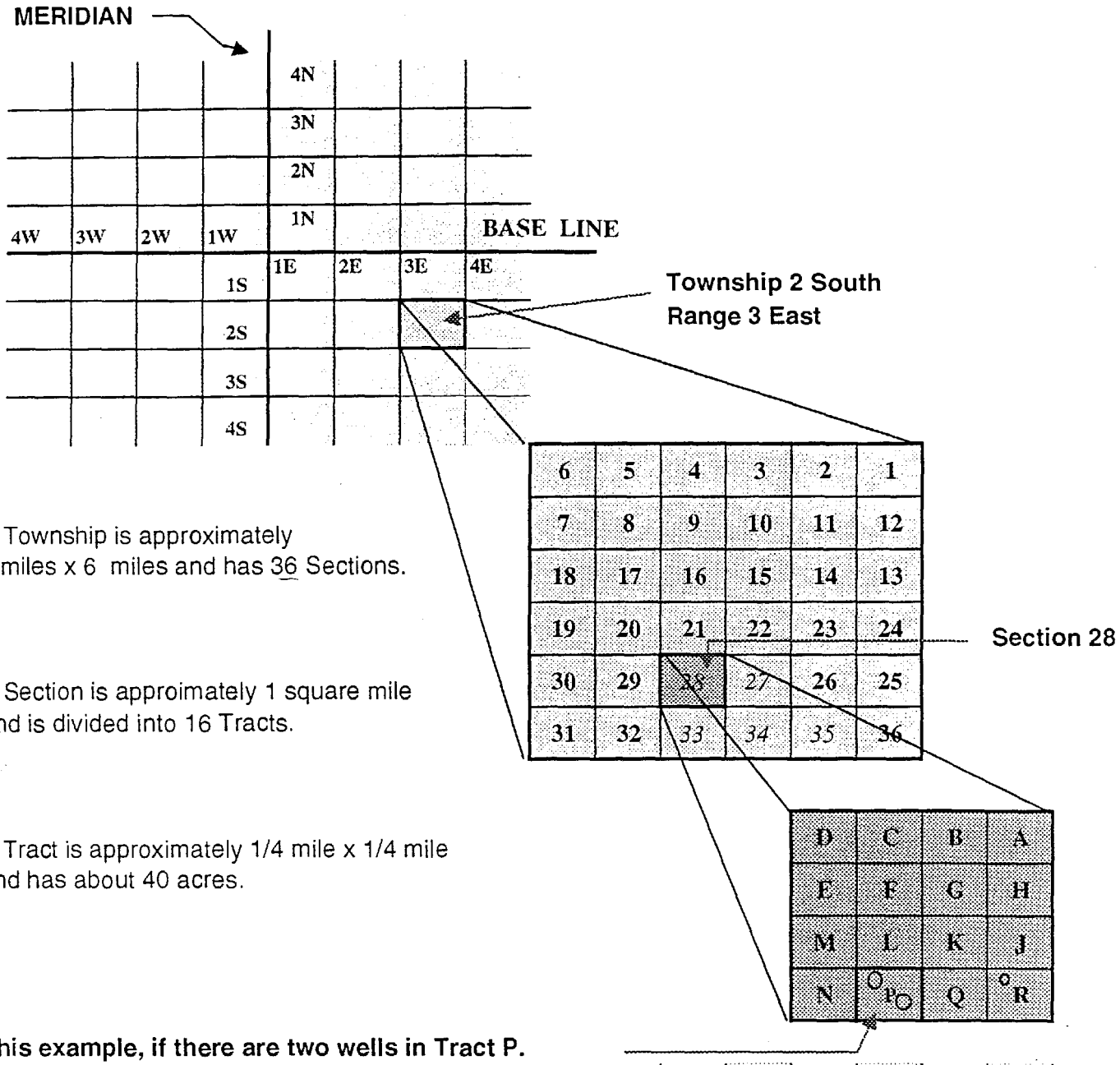


- o A Township is approximately 6 miles x 6 miles and has 36 Sections.
- o A Section is approimately 1 square mile and is divided into 16 Tracts.
- o A Tract is approximately 1/4 mile x 1/4 mile and has about 40 acres.

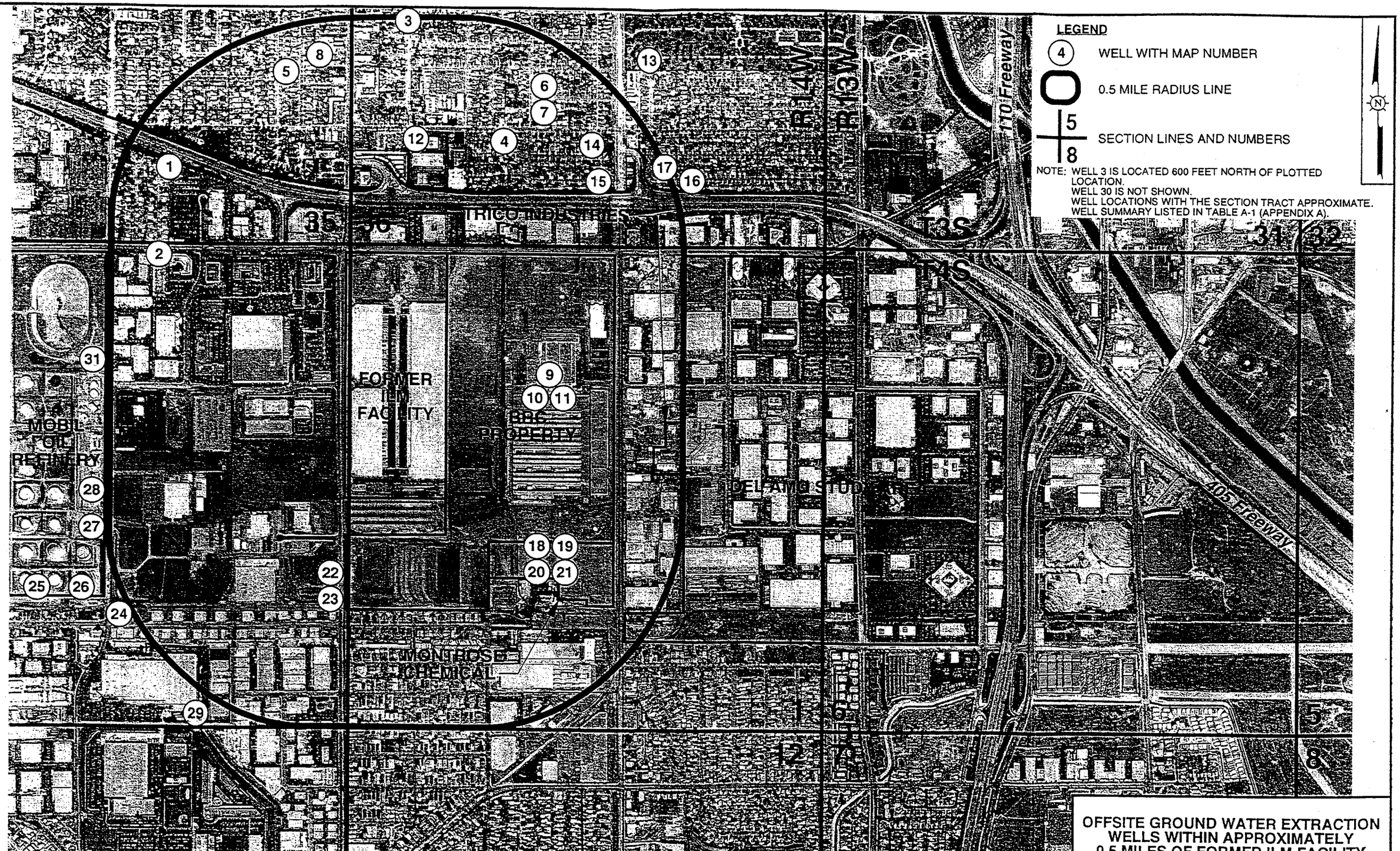
In this example, if there are two wells in Tract P.

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.

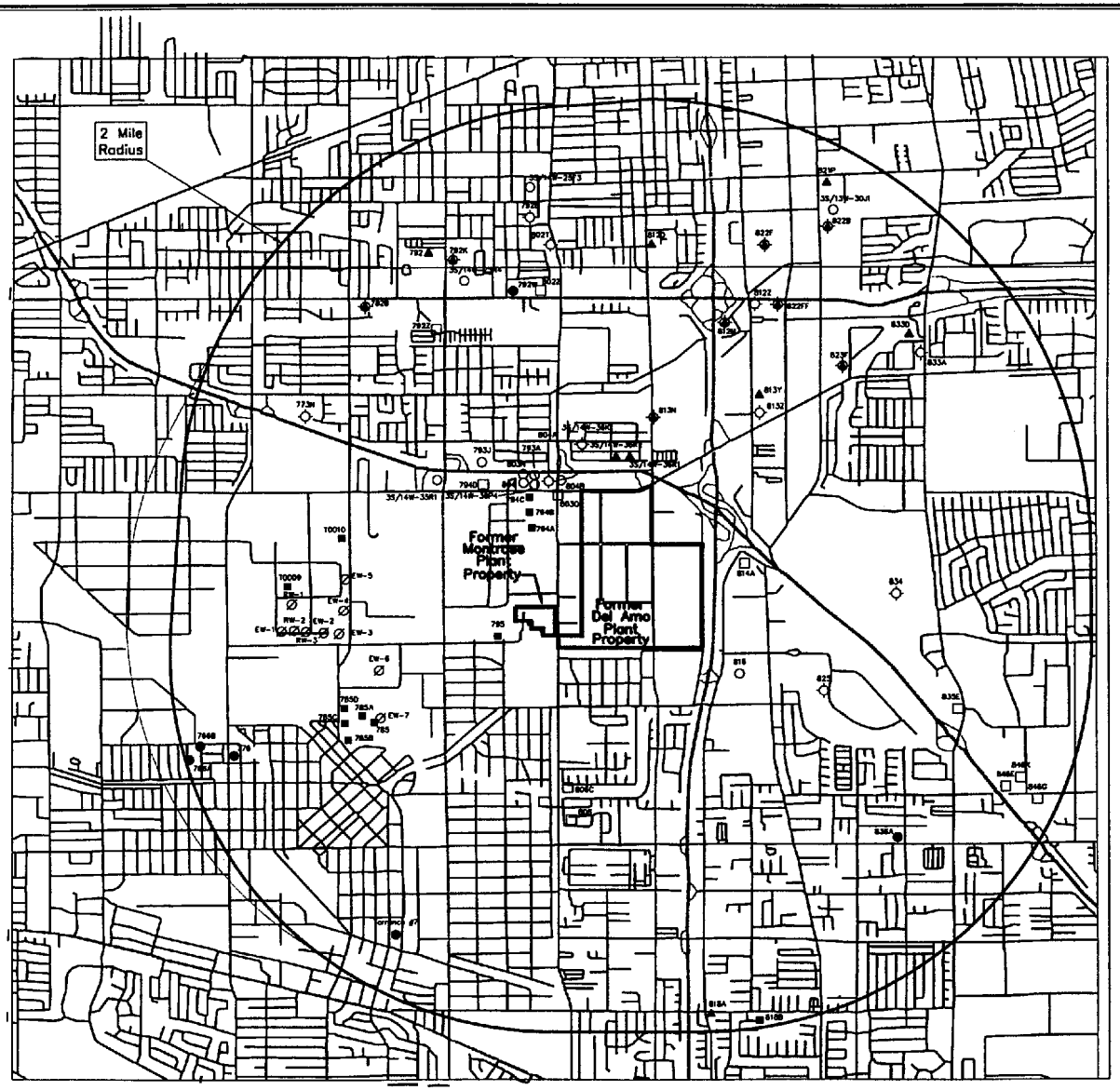
OFFSITE GROUND WATER EXTRACTION WELLS WITHIN APPROXIMATELY 0.5 MILES OF FORMER ILM FACILITY

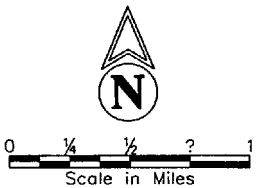
FORMER INTERNATIONAL LIGHT METALS FACILITY
TORRANCE, CALIFORNIA

TRC | FIGURE A.1

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

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.

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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

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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

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NAPL from the ground nor immobilize it. As extensively discussed in the Decision Summary, the remedial action selected by this ROD will remain in place over an extended time frame. The existing mass of NAPL and the potential for NAPL migration create significant uncertainties that the remedial action selected in this ROD will continue to remain protective of human health and the environment over the long term. To address such uncertainties, EPA will undertake a second phase of remedial decisionmaking for this groundwater operable unit, which will address whether and to what degree NAPL shall be recovered (removed) from the ground and/or immobilized at each of the two sites. Recovery and/or immobilization of the NAPL may enhance the long-term effectiveness of the remedial action selected in this ROD and may reduce these long-term uncertainties. If, as a result of such evaluations, EPA determines that additional remedial actions are required, 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 of remedial selection 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 may:

> ...When appropriate, provide a commitment for further analysis and selection of long-term response measures within an appropriate time frame.

This operable unit ROD finalizes the interim provisions of the operable unit ROD that EPA issued for the Del Amo Waste Pits on September 5, 1997, as specified and described in detail in the Decision Summary. These provisions were designed to control the Waste Pits as a source of continuing contamination to groundwater.

Remedial Actions

Three areas of groundwater at the Joint Site are defined by convention in the Decision Summary of this ROD, as the ***chlorobenzene plume***, the ***benzene plume***, and the ***TCE plume***. This ROD establishes differing remedial requirements and objectives for each of these plumes, within the context of the overall remedial action, as discussed in the Decision Summary. The Decision Summary provides numerous details and additional specifications related to each of the following elements which are incorporated in this Declaration by reference. In addition, the Decision summary includes specifications for the monitoring and evaluation of the performance of the remedial action, for the chemical pCBSA, for actions to be taken during the course of the remedial action, and other specifications.

The remedy shall consist of the following actions and meet the following requirements, as further discussed and developed later in this ROD:

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- 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.

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[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).

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- 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

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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.

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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-C6-0013246

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)].

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).

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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).

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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.

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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.

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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

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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.

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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

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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

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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

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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.

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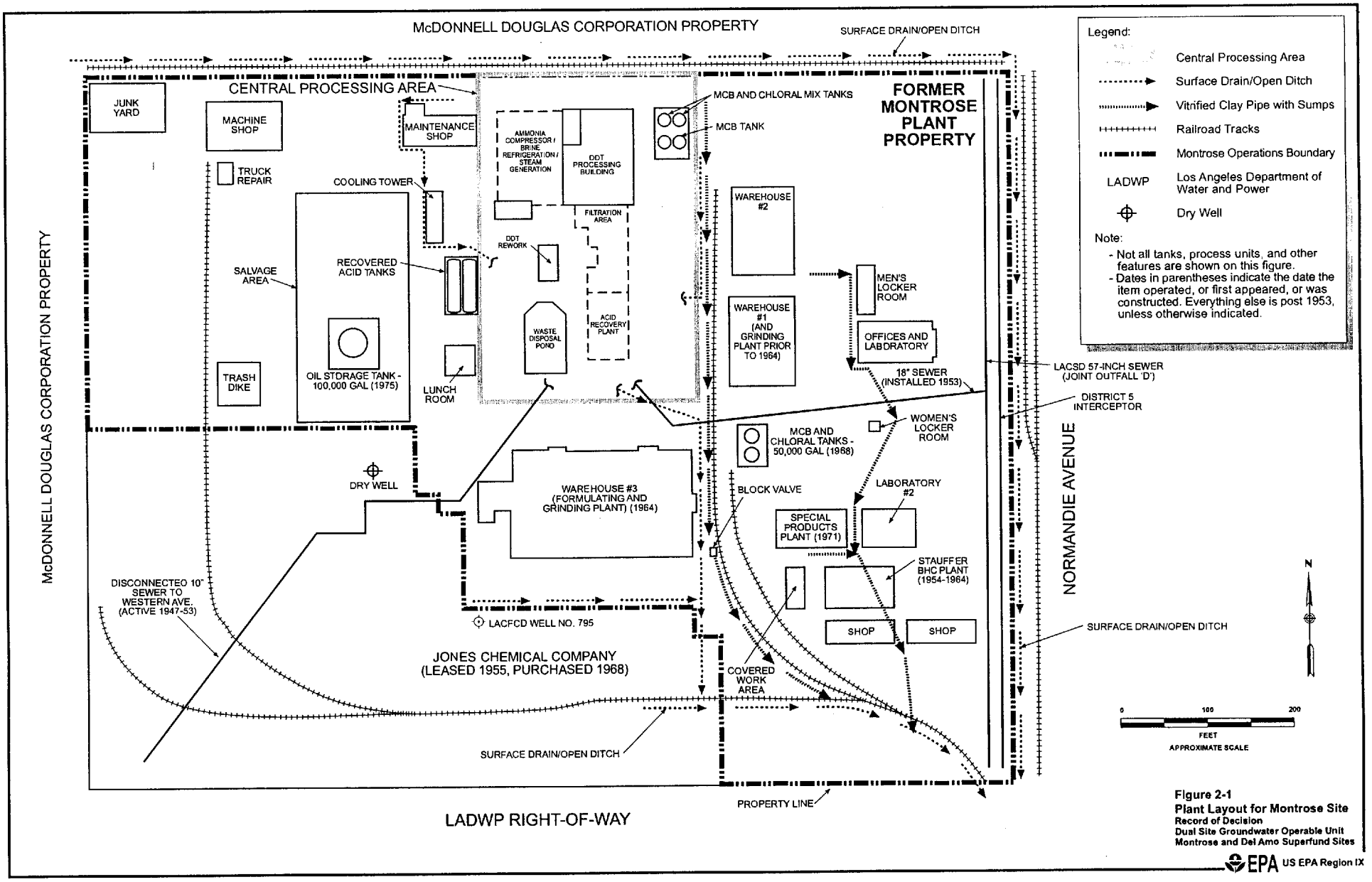

Figure 2-1
Plant Layout for Montrose Site
Record of Decision
Dual Site Groundwater Operable Unit
Montrose and Del Amo Superfund Sites

EPA US EPA Region IX

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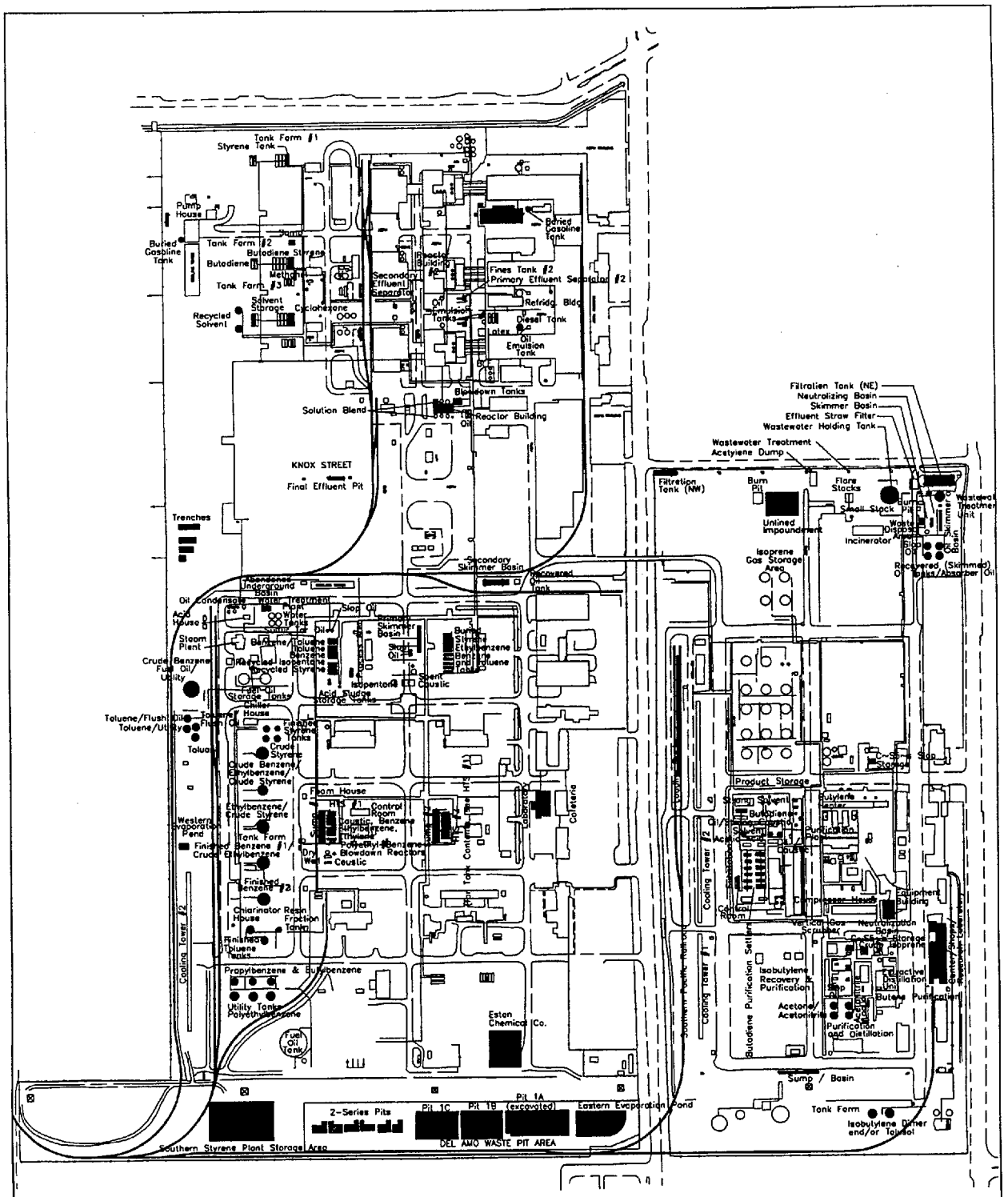
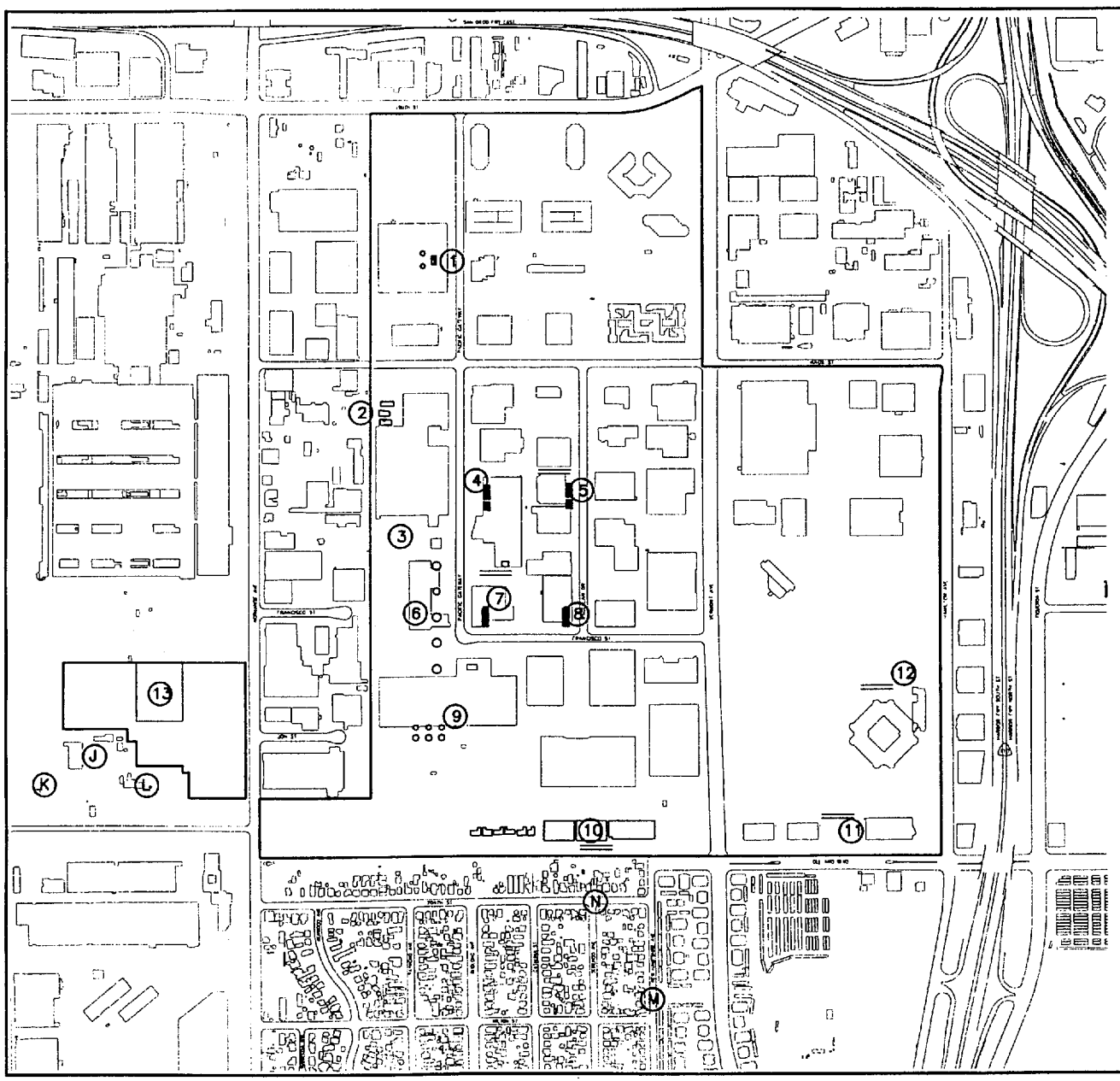


Figure 2-2

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



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 Property (DNAPL) central process area	chlorobenzene (DNAPL) benzene
N	Pipelines	benzene naphthalene
K	Pipelines	BTEX 1,1-DCA
J, L	Janes 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

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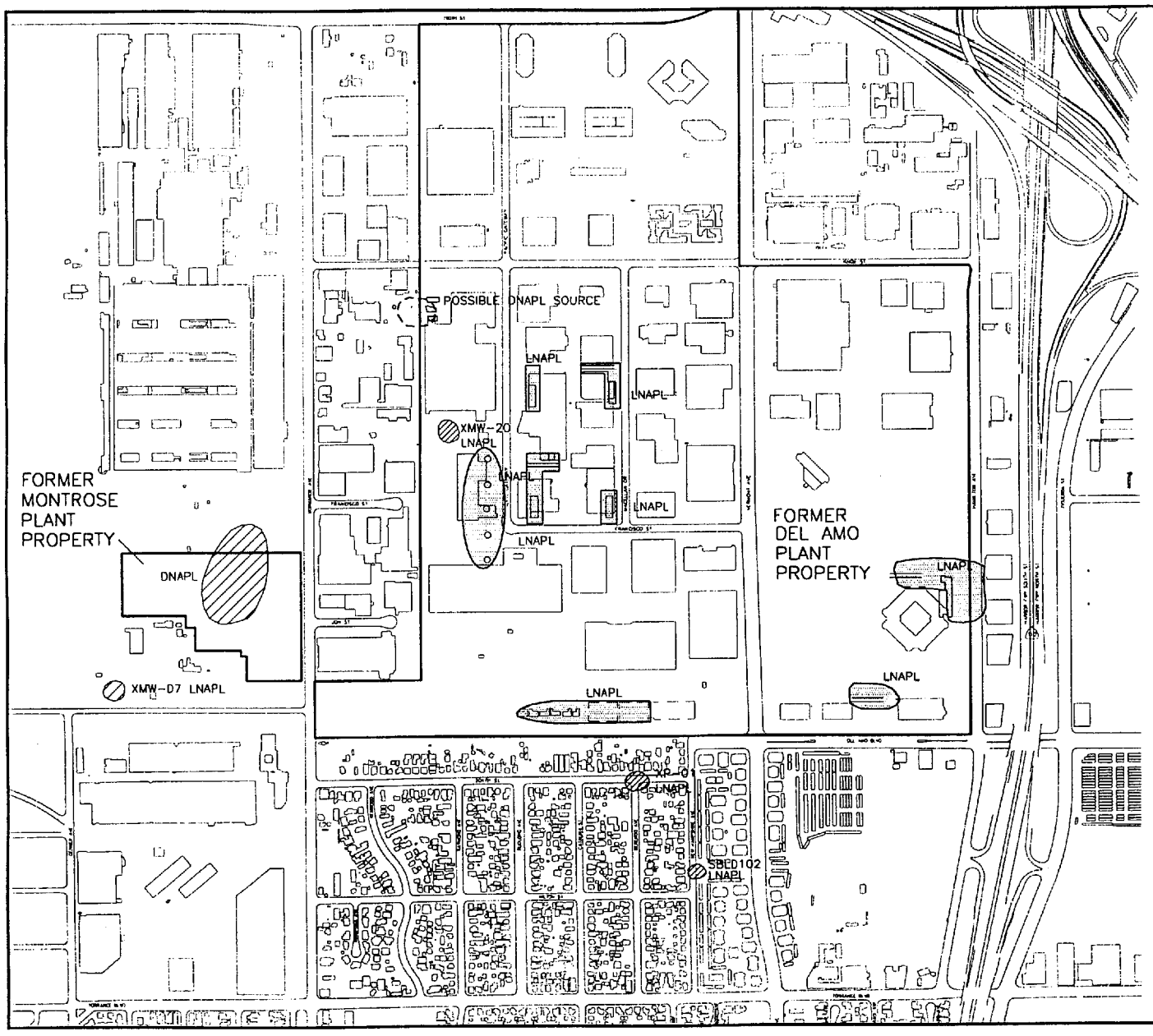

N

0 600 1200

Scale in Feet

EXPLANATION

Approximate area of known LNAPL/DNAPL

Approximate area of highly suspected LNAPL

Note:
This map is not intended to precisely portray the limits of known or suspected areas of NAPL. With the exception of the XMW-20 LNAPL and Montrose DNAPL, the extent of the NAPL areas has not been fully determined.

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

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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,

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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.

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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

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(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.

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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.

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[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."

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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.

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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

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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.

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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).

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(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.

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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

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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.

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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.

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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.

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- 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.

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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.

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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
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FORMER INTERNATIONAL LIGHT METALS SITE

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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:

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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.

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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.

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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 I 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

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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.

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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.

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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.

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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

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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

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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

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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

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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