Tables

TABLE 1

Construction of New Groundwater Monitoring Wells and Piezometers

Halaco Site Remedial Investigation, Oxnard, California

						Year and Date Installed			Survey Information				Well Log Construction					Well Screen Elevation	
Loca-tion	Well	Aquifer	Relative Depth	Surface Comp-letion (A/F)	Drilling Method	2009 (Oct/Nov)	2010 (May)	Date Installed	Outer TOC Elevation (feet, 1988 NAVD)	Inner TOC Elevation (feet, 1988 NAVD)	Ground Surface Elevation (feet, 1988 NAVD)	Stickup (feet ags)	Total Diameter (feet, bgs)	Total Depth (feet, bgs)	Top of Screen (feet, bgs)	Bottom of Screen (feet, bgs)	Screen Length (feet)	Calculated Top of Screen Elevation (feet, 1988 NAVD)	Calculated Bottom of Screen Elevation (feet, 1988 NAVD)
Monitoring Wells																			
2	MW-2C	Semiperched	Medium	A	Sonic	X		10/24/09	30.03	29.63	27.57	2.07	2	85.0	74.6	84.6	10	-47.03	-57.03
	MW-2D	Oxnard	Deep	A	Sonic	X		10/21/09	30.23	29.67	27.46	2.21	2	152.4	142.0	152.0	10	-114.54	-124.54
3	MW-3C	Semiperched	Medium	A	Sonic	X		10/24/09	27.42	27.10	24.77	2.33	2	85.0	74.6	84.6	10	-49.83	-59.83
	MW-3D	Oxnard	Deep	A	Sonic	X		10/20/09	27.69	27.35	25.13	2.23	2	150.4	140.0	150.0	10	-114.87	-124.87
6	MW-6C	Semiperched	Medium	A	Sonic	X		10/27/09	21.85	21.17	19.70	1.46	2	82.0	71.6	81.6	10	-51.90	-61.90
	MW-6D	Oxnard	Deep	A	Sonic	X		10/26/09	22.02	21.71	19.92	1.79	2	150.0	139.6	149.6	10	-119.68	-129.68
12	MW-12C	Semiperched	Medium	A	HSA		X	5/12/10	17.60	17.29	14.86	2.43	2	70.3	60.0	70.0	10	-45.14	-55.14
13	MW-13C	Semiperched	Medium	F	HSA		X	5/11/10	9.72	9.37	9.79	-0.42	2	66.3	56.0	66.0	10	-46.21	-56.21
19	MW-19C	Semiperched	Medium	A	Sonic	X		10/23/09	20.46	19.85	17.99	1.86	2	74.5	64.1	74.1	10	-46.11	-56.11
	MW-19D	Oxnard	Deep	A	Sonic	X		10/23/09	20.43	19.86	18.00	1.86	2	142.4	132.0	142.0	10	-114.00	-124.00
20	MW-20	Semiperched	Shallow	F	HSA	X		11/6/09	13.37	12.99	13.37	-0.38	2	30.0	19.6	29.6	10	-6.23	-16.23
21	MW-21	Semiperched	Shallow	F	HSA	X		11/6/09	9.10	8.60	9.10	-0.50	2	25.0	14.6	24.6	10	-5.50	-15.50
	MW-21C	Semiperched	Medium	F	HSA		X	5/10/10	9.03	8.65	9.10	-0.44	2	65.3	55.0	65.0	10	-45.90	-55.90
22	MW-22	Semiperched	Shallow	F	HSA	X		11/6/09	8.55	8.18	8.44	-0.26	2	24.5	14.1	24.1	10	-5.66	-15.66
23	MW-23B	Semiperched	Shallow	A	HSA		X	5/18/10	11.99	11.91	9.39	2.53	2	30.3	20.0	30.0	10	-10.61	-20.61
	MW-23C	Semiperched	Medium	A	HSA		X	5/18/10	11.81	11.48	9.02	2.46	2	65.3	55.0	65.0	10	-45.98	-55.98
24	MW-24	Semiperched	Shallow	A	HSA	X		11/9/09	17.68	16.87	14.74	2.12	2	32.4	22.0	32.0	10	-7.26	-17.26
	MW-24C	Semiperched	Medium	A	HSA		X	5/17/10	18.12	17.92	14.95	2.97	2	66.8	56.5	66.5	10	-41.55	-51.55
25	MW-25B	Semiperched	Shallow	A	HSA		X	5/13/10	12.31	12.06	9.56	2.50	2	30.3	20.0	30.0	10	-10.44	-20.44
	MW-25C	Semiperched	Medium	A	HSA		X	5/13/10	12.42	12.21	9.60	2.62	2	65.3	55.0	65.0	10	-45.40	-55.40
27	MW-27B	Semiperched	Shallow	A	HSA		X	5/14/10	11.70	11.54	8.90	2.64	2	30.3	20.0	30.0	10	-11.10	-21.10
	MW-27C	Semiperched	Medium	A	HSA		X	5/14/10	11.73	11.44	8.86	2.58	2	65.3	55.0	65.0	10	-46.14	-56.14
Piezometers																			
1	PZ-1A	Semiperched	Shallow	F	DP	X		11/3/09	8.67	8.55	8.66	-0.11	0.75	10.5	9.5	10.5	1	-0.84	-1.84
	PZ-1B	Semiperched	Medium	F	DP	X		11/3/09	8.65	8.34	8.64	-0.29	0.75	20.5	19.5	20.5	1	-10.86	-11.86
	PZ-1C	Semiperched	Deep	F	HSA	X		11/5/09	8.65	8.39	8.64	-0.25	0.75	32.5	31.5	32.5	1	-22.86	-23.86
2	PZ-2A	Semiperched	Shallow	F	DP	X		11/3/09	9.31	9.13	9.30	-0.17	0.75	10.5	9.5	10.5	1	-0.20	-1.20
	PZ-2B	Semiperched	Medium	F	DP	X		11/3/09	9.35	9.19	9.34	-0.16	0.75	20.5	19.5	20.5	1	-10.16	-11.16
	PZ-2C	Semiperched	Deep	F	HSA	X		11/5/09	9.22	9.00	9.21	-0.22	0.75	32.5	31.5	32.5	1	-22.29	-23.29
3	PZ-3A	Semiperched	Shallow	A	HSA	X		11/10/09	17.12	17.00	15.24	1.76	0.75	10.5	9.5	10.5	1	5.74	4.74
	PZ-3B	Semiperched	Medium	A	HSA	X		11/10/09	17.31	17.08	15.22	1.86	0.75	20.5	19.5	20.5	1	-4.28	-5.28
	PZ-3C	Semiperched	Deep	A	HSA	X		11/9/09	17.29	17.11	15.28	1.83	0.75	32.5	31.5	32.5	1	-16.22	-17.22
4	PZ-4A	Semiperched	Shallow	A	HSA	X		11/9/09	15.41	15.07	13.36	1.71	0.75	10.5	9.5	10.5	1	3.86	2.86
	PZ-4B	Semiperched	Medium	A	HSA	X		11/9/09	15.38	15.07	13.25	1.82	0.75	20.5	19.5	20.5	1	-6.25	-7.25
	PZ-4C	Semiperched	Deep	A	HSA	X		11/6/09	15.18	15.02	13.12	1.90	0.75	32.5	31.5	32.5	1	-18.38	-19.38

Notes:

A = Above ground (monument)
F = Flush with ground (vault)

ags = Above ground surface
bgs = below ground surface

HSA = Hollow Stem Auger
DP = Direct Push

TABLE 2

Construction of Existing Groundwater Monitoring Wells

Halaco Site Remedial Investigation, Oxnard, California

		Well Log Construction Information							Survey Information: 2007 SAGE Survey (1988 NAVD)						Revised Well Construction Information (based on total depth measurement on 3-6-08)					
Location	Well	Date Installed	Surface Comp-letion (S/F)	Total Depth (feet, BTOC)	Total Depth (feet, bgs)	Top of Screen (feet, bgs)	Screen Length (feet)	Well Diameter (inches)	Inner TOC Elevation (feet, 1988 NAVD)	Outer TOC Elevation (feet, 1988 NAVD)	Ground Surface Elevation (feet, 1988 NAVD)	Calcu-lated Inner TOC Stickup (feet, ags)	2003 Padre Associates Survey TOC Elevation (feet, NGVD 1929)	Difference in TOC between 2003 and 2007 Surveys (feeet)	Field Measured Total Depth (feet, BTOC)	Calculated Total Depth (feet, bgs)	Calculated Top of Screen Elevation (feet, 1988 NAVD)	Calculated Bottom of Screen Elevation (feet, 1988 NAVD)	Calculated Total Depth minus Well Log Total Depth (feet)	Comment
Wells Installed by Padre Associates (2003)																				
1	MW-1R	11/6/03	S	19.94	17.5	12.5	5	2	10.46	10.93	8.16	2.30	7.87	2.59	20.00	17.70	-4.34	-9.34	0.20	-
2	MW-2RA	11/6/03	S	11.79	9	4	5	2	10.01	10.56	7.91	2.10	7.44	2.57	11.92	9.82	3.91	-1.09	0.82	-
	MW-2RB	11/6/03	S	29.87	27	17	10	2	9.81	10.64	7.91	1.90	7.25	2.56	30.00	28.10	-9.09	-19.09	1.10	-
3	MW-3RA	11/5/03	S	10.11	8	3	5	2	9.93	10.95	8.22	1.71	7.34	2.59	11.19	9.48	5.22	0.22	1.48	-
	MW-3RB	11/5/03	S	21.79	20	15	5	2	10.00	10.84	8.09	1.91	7.4	2.60	22.41	20.50	-6.91	-11.91	0.50	-
4	MW-4RA	2/20/03	S	19.75	18.5	3.5	15	2	10.51	11.76	9.56	0.95	8.75	1.76	20.22	19.27	6.06	-8.94	0.77	-
	MW-4RB	2/20/03	S	31.27	30	20	10	2	11.29	11.29	9.52	1.77	9.23	2.06	31.32	29.55	-10.48	-20.48	-0.45	-
5	MW-5	2/20/03	S	22.07	20	10	10	2	20.20	20.43	18.76	1.44	17.8	2.40	22.23	20.79	8.76	-1.24	0.79	-
6	MW-6	2/20/03	S	20.02	18.5	3.5	15	2	16.14	16.32	14.87	1.27	13.54	2.60	19.72	18.45	11.37	-3.63	-0.05	-
Wells Installed by Weston Solutions (2007)																				
11	MW-11	6/19/06	F	n/a	12	2	10	1	13.57	13.82	13.69	-0.12	n/a	n/a	7.32	7.44	11.69	1.69	-4.56	Potential material in well
12	MW-12	6/19/06	S	n/a	13	3	10	1	14.81	16.33	14.15	0.66	n/a	n/a	12.72	12.06	12.09	2.09	-0.94	-
13	MW-13	6/19/06	F	n/a	13	3	10	1	9.85	10.06	9.86	-0.01	n/a	n/a	10.53	10.54	6.86	-3.14	-2.46	Potential material in well
14	MW-14	6/21/06	F	n/a	12	2	10	1	7.91	8.17	7.86	0.05	n/a	n/a	10.84	10.79	5.86	-4.14	-1.21	-
15	MW-15	6/21/06	F	n/a	16	6	10	1	8.25	8.42	8.39	-0.14	n/a	n/a	15.63	15.77	2.39	-7.61	-0.23	-
16	MW-16	6/20/06	F	n/a	17	4	13	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Wellhead submerged
17	MW-17	6/22/06	S	n/a	26	16	10	1	45.82	47.00	42.49	3.33	n/a	n/a	45.74	42.41	10.08	0.08	16.41	Wellheads raised (+) or
18	MW-18	6/26/06	S	n/a	33	23	10	1	45.83	45.87	41.81	4.02	n/a	n/a	48.91	44.89	6.92	-3.08	11.89	lowered (-) during EPA
19	MW-19	6/21/06	F	n/a	25	15	10	1	17.37	17.73	17.64	-0.27	n/a	n/a	17.65	17.92	9.72	-0.28	-7.08	wastepile regrading

Notes:

n/a = Not available
ags = Above ground surface
bgs = Below ground surface
S = Stickup well completion (above ground monument)
F = Flush mount well completion (below ground vault)
TOC = Top of casing
BTOC = Below top of casing

TABLE 3

Groundwater Monitoring Well and Piezometer Survey Data

Halaco Site Remedial Investigation, Oxnard, California

		Year and Date Installed					Survey Data (SAGE)								
							Vertical Elevaetions *					Horizontal Coordiantes			
Loca-tion	Well	2003 (Padre)	2006 (Weston)	2009 (CH2M HILL)	2010 (CH2M HILL)	Date Installed	Surface Comp-letion (A/F)	Outer TOC Elevation (feet, 1988 NAVD)	Inner TOC Elevation (feet, 1988 NAVD)	Ground Surface Elevation (feet, 1988 NAVD)	Stickup (feet above ground surface)	North Latitude **	West Longitude **	(Y) Northing ***	(X) Easting ***
Monitoring Wells															
1	MW-1R	X				11/6/03	A	10.93	10.46	8.16	2.30	34-08-07.26433	119-10-46.32652	1873733.3773	6204734.2083
2	MW-2RA	X				11/6/03	A	10.56	10.01	7.91	2.10	34-08-13.85882	119-10-45.54947	1874399.1506	6204807.3427
	MW-2RB	X				11/6/03	A	10.64	9.81	7.91	1.90	34-08-13.83923	119-10-45.55851	1874397.1802	6204806.5590
	MW-2C			X		10/24/09	A	30.03	29.63	27.57	2.07	34-08-13.67557	119-10-46.44658	1874381.5485	6204732.0733
	MW-2D			X		10/21/09	A	30.23	29.67	27.46	2.21	34-08-13.79673	119-10-46.43842	1874393.7882	6204732.9031
3	MW-3RA	X				11/5/03	A	10.95	9.93	8.22	1.71	34-08-08.45219	119-10-48.75659	1873855.8051	6204531.3631
	MW-3RB	X				11/5/03	A	10.84	10.00	8.09	1.91	34-08-08.44117	119-10-48.72962	1873854.6647	6204533.6177
	MW-3C			X		10/24/09	A	27.42	27.10	24.77	2.33	34-08-09.85207	119-10-49.10103	1873997.6837	6204504.4235
	MW-3D			X		10/20/09	A	27.69	27.35	25.13	2.23	34-08-09.81535	119-10-49.02910	1873993.9006	6204510.4254
4	MW-4RA	X				2/20/03	A	11.76	10.51	9.56	0.95	34-08-24.05361	119-10-49.45559	1875433.5094	6204491.1312
	MW-4RB	X				2/20/03	A	11.29	11.29	9.52	1.77	24-08-24.06008	119-10-49.48660	1875434.1935	6204488.5323
5	MW-5	X				2/20/03	A	20.43	20.20	18.76	1.44	34-08-13.34168	119-10-54.09709	1874355.3155	6204088.2910
6	MW-6	X				2/20/03	A	16.32	16.14	14.87	1.27	34-08-17.05670	119-10-53.91087	1874730.6516	6204108.3578
	MW-6C			X		10/27/09	A	21.85	21.17	19.70	1.46	34-08-15.46151	119-10-53.76754	1874569.3010	6204118.8608
	MW-6D			X		10/26/09	A	22.02	21.71	19.92	1.79	34-08-15.33293	119-10-53.76887	1874556.3052	6204118.5960
11	MW-11		X			6/19/06	F	13.82	13.57	13.69	-0.12	34-08-18-57610	119-10-59.99224	1874890.2477	6203599.0265
12	MW-12		X			6/19/06	A	16.33	14.81	14.15	0.66	34-08-16.54480	119-10-56.57039	1874681.5367	6203884.2164
	MW-12C				X	5/12/10	A	17.60	17.29	14.86	2.43	34-08-16.63955	119-10-56.51753	1874691.0558	6203888.7722
13	MW-13		X			6/19/06	F	10.06	9.85	9.86	-0.01	34-08-23.22963	119-10-57.81228	1875358.4770	6203787.7860
	MW-13C				X	5/11/10	F	9.72	9.37	9.79	-0.42	34-08-23.26095	119-10-57.81198	1875361.6362	6203787.8483
14	MW-14		X			6/21/06	F	8.17	7.91	7.86	0.05	34-08-19.24504	119-11-02.80982	1874960.6547	6203363.0064
15	MW-15		X			6/21/06	F	8.42	8.25	8.39	-0.14	34-08-24.40882	119-11-01.50506	1875481.3220	6203479.0701
16	MW-16		X			6/20/06	F	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17	MW-17		X			6/22/06	A	47.00	45.82	42.49	3.33	34-08-14.71563	119-10-50.75890	1874490.8996	6204370.5019
18	MW-18		X			6/26/06	A	45.87	45.83	41.81	4.02	34-08-16.91210	119-10-48.83814	1874711.0259	6204534.5503
19	MW-19		X			6/21/06	F	17.73	17.37	17.64	-0.27	34-08-19.02335	119-10-49.02560	1874924.6188	6204521.3005
	MW-19C			X		10/23/09	A	20.46	19.85	17.99	1.86	34-08-18.99854	119-10-48.94008	1874922.0621	6204528.8116
	MW-19D			X		10/23/09	A	20.43	19.86	18.00	1.86	34-08-18.99660	119-10-48.98592	1874921.9116	6204524.9571
20	MW-20			X		11/6/09	F	13.37	12.99	13.37	-0.38	34-08-20.25587	119-10-58.53427	1875058.6337	6203723.9199
21	MW-21			X		11/6/09	F	9.10	8.60	9.10	-0.50	34-08-19.88501	119-11-01.24339	1875023.8277	6203485.7781
	MW-21C				X	5/10/10	F	9.03	8.65	9.10	-0.44	34-08-19.94239	119-11-01.23851	1875029.5812	6203495.9038
22	MW-22			X		11/6/09	F	8.55	8.18	8.44	-0.26	34-08-22.56769	119-11-01.56806	1875295.3172	6203471.6845
23	MW-23B				X	5/18/10	A	11.99	11.91	9.39	2.53	34-08-25.66515	119-11-07.71368	1875614.4603	6202958.4931
	MW-23C				X	5/18/10	A	11.81	11.48	9.02	2.46	34-08-25.66507	119-11-07.65143	1875614.3909	6202963.7248
24	MW-24			X		11/9/09	A	17.68	16.87	14.74	2.12	34-08-18.99660	119-10-48.98592	1875351.1106	6204486.0764
	MW-24C				X	5/17/10	A	18.12	17.92	14.95	2.97	34-08-23.23656	119-10-49.64984	1875351.1058	6204473.8350
25	MW-25B				X	5/13/10	A	12.31	12.06	9.56	2.50	34-08-24.02964	119-10-40.22484	1875421.9786	6205266.9303
	MW-25C				X	5/13/10	A	12.42	12.21	9.60	2.62	34-08-24.03023	119-10-40.28074	1875422.0935	6205262.2331
27	MW-27B				X	5/14/10	A	11.70	11.54	8.90	2.64	34-08-14.93769	119-10-32.23112	1874495.0852	6205928.0392
	MW-27C				X	5/14/10	A	11.73	11.44	8.86	2.58	34-08-14.98209	119-10-32.22595	1874499.5680	6205928.5264
Piezometers															
1	PZ-1A			X		11/3/09	F	8.67	8.55	8.66	-0.11	34-08-24.42817	119-11-00.45275	1875482.2739	6203567.6402
	PZ-1B			X		11/3/09	F	8.65	8.34	8.64	-0.29	34-08-24.42322	119-11-00.53463	1875481.8545	6203560.7525
	PZ-1C			X		11/5/09	F	8.65	8.39	8.64	-0.25	34-08-24.42721	119-11-00.58040	1875482.3033	6203556.9102
2	PZ-2A			X		11/3/09	F	9.31	9.13	9.30	-0.17	34-08-24.41167	119-10-57.66602	1875477.8494	6203801.8400
	PZ-2B			X		11/3/09	F	9.35	9.19	9.34	-0.16	34-08-24.41386	119-10-57.73587	1875478.1398	6203795.9720
	PZ-2C			X		11/5/09	F	9.22	9.00	9.21	-0.22	34-08-24.42190	119-10-57.79015	1875479.0058	6203791.4192
3	PZ-3A			X		11/10/09	A	17.12	17.00	15.24	1.76	34-08-23.46007	119-10-52.38485	1875376.4406	6204244.5818
	PZ-3B			X		11/10/09	A	17.31	17.08	15.22	1.86	34-08-23.46399	119-10-52.33225	1875376.7856	6204249.0078
	PZ-3C			X		11/9/09	A	17.29	17.11	15.28	1.83	34-08-23.46149	119-10-52.27638	1875376.4777	6204253.7002
4	PZ-4A			X		11/9/09	A	15.41	15.07	13.36	1.71	34-08-23.41592	119-10-48.33490	1875367.9800	6204584.9214
	PZ-4B			X		11/9/09	A	15.38	15.07	13.25	1.82	34-08-23.42272	119-10-48.28289	1875368.6157	6204589.3013
	PZ-4C			X		11/6/09	A	15.18	15.02	13.12	1.90	34-08-23.43159	119-10-48.23133	1875369.4617	6204593.6447

Notes n/a = Not available; ags = Above ground surface; A = Above ground (monument); F = Flush with ground (vault); * MSL elevation, survey feet (NAVD 1988); ** degrees, minutes, seconds (NAD 1983) (CORPSCON6); *** CA State Plane Coordinates System Zone 5, Survey feet

TABLE 4

CPT Locations and Depths

Halaco Site Remedial Investigation, Oxnard, California

CPT	Date	Co-located Well or Soil Boring	Relative Location	CPT Probe (feet, bgs)	CPT-SMRT Probe (feet, bgs)	EC-HPT Probe (feet, bgs)
Smelter parcel						
SCP-1	10/14/09	MW-12C	Southeast Area	157	-	135
SCP-2	10/14/09	SPS-14	Process Area	25	-	-
SCP-3	10/24/09	MW-13C	North Area	-	127	-
Waste Management Area						
WCP-1	10/12/09	WGT-1	Top of WMU	-	52	-
WCP-2	10/12/19	WGT-2	Top of WMU	-	50	-
WCP-3	10/13/09	MW-19C and MW-19D	North of WMU	-	141	-
WCP-4	10/13/09	MW-3C and MW-3D	South of WMU	-	148	-
WCP-5	10/24/09	MW-24C	North of WDA	-	139	-

Notes

CPT = Cone Penetrometer Test
SMRT = Soil Moisture Resistivity Temperature
EC = Electrical Conductivity
HPT = Hydraulic Profile Test

TABLE 5

Surface Water and Groundwater Samples Analyzed

Halaco Site Remedial Investigaiton, Oxnard, California

Area	Sample Location	Sample No. 1 November 2009 (Event 1)	Sample No. 1 June 2010 (Event 3)	Sample No. 2 February 2010 (Event 2)	Sample No. 2 October 2010 (Event 4)	Screen May 2010	Total Sample Locations	Total Total Samples	Comments
SURFACE WATER									
Seawater	OCE-1, OCE-2	■	-	■	-	-	2	4	
Other Drains	JSD-1, HUD-1	■	-	■	-	-	2	4	
OID	OID-1 --> OID-8	■	-	■	-	-	8	16	
Lagoon	LAG-1, LAG-2	■	-	■	-	-	2	4	
WMU Ditch	WMU-1, WMU-2	■	-	-	-	-	2	2	Dry during February 2010
NCL-East	NCE-1 --> NCE-3	-	■	-	-	-	3	3	
Total							19	33	
GROUNDWATER									
Monitoring Wells									
1	MW-1R	■	-	■	-	-	1	2	
2	MW-2RA	■	-	■	-	-	1	2	
	MW-2RB	■	-	■	-	-	1	2	
	MW-2C	■	-	■	-	-	1	2	
	MW-2D	■	-	■	-	-	1	2	
3	MW-3RA	■	-	■	-	-	1	2	
	MW-3RB	■	-	■	-	-	1	2	
	MW-3C	■	-	■	-	-	1	2	
	MW-3D	■	-	■	-	-	1	2	
4	MW-4RA	■	-	■	-	-	1	2	
	MW-4RB	■	-	■	-	-	1	2	
5	MW-5	■	-	■	-	-	1	2	
6	MW-6	■	-	■	-	-	1	2	
	MW-6C	■	-	■	-	-	1	2	
	MW-6D	■	-	■	-	-	1	2	
11	MW-11	■	-	■	-	-	1	2	
12	MW-12	■	-	■	-	-	1	2	
	MW-12C	-	■	-	■	-	1	2	
13	MW-13	■	-	■	-	-	1	2	
	MW-13C	-	■	-	■	■	1	3	
14	MW-14	■	-	■	-	-	1	2	
15	MW-15	■	-	■	-	-	1	2	
16	MW-16	-	-	-	-	-	1	2	Not sampled, underwater
17	MW-17	-	-	-	-	-	1	2	Not sampled, very turbid
18	MW-18	■	-	■	-	-	1	2	
19	MW-19	■	-	■	-	-	1	2	
	MW-19C	■	-	■	-	-	1	2	
	MW-19D	■	-	■	-	-	1	2	
20	MW-20	■	-	■	-	-	1	2	
21	MW-21	■	-	■	-	-	1	2	
	MW-21C	-	■	-	■	■	1	3	
22	MW-22	■	-	■	-	-	1	2	
23	MW-23B	-	■	-	■	-	1	2	
	MW-23C	-	■	-	■	-	1	2	
24	MW-24	■	-	■	-	-	1	2	
	MW-24C	-	■	-	■	-	1	2	
25	MW-25B	-	■	-	■	-	1	2	
	MW-25C	-	■	-	■	-	1	2	
27	MW-27B	-	■	-	■	-	1	2	
	MW-27C	-	■	-	■	-	1	2	
Total							40	82	
AWPF Piezometers									
AWPF	P-1	-	■	-	■	-	1	2	Radionucides not analyzed
	P-3	-	■	-	■	-	1	2	Radionucides not analyzed
	P-4	-	■	-	■	-	1	2	Radionucides not analyzed
Total							3	6	

Notes: Sample Analysis

Groundwater
- Sample No. 1: Metals (total and dissolved), radionuclides, general chemistry, VOCs, SVOCs, and TPH
- Sample No. 2: Metals (total and dissolved), radionuclides, and general chemistry
- Screen Sample: General chemistry

Surface Water
- Sample No. 1: Metals, radionuclides, and general chemistry. Select samples for TOC and pH.
- Sample No. 2: Metals, radionuclides, and general chemistry. Select samples for TOC and pH.

TABLE 6

Hydrogeologic Zones of Monitoring Well and Piezometer Screened Intervals

Halaco Site Remedial Investigation, Oxnard, California

		Surface Wellhead Elevations (from SAGE survey)		Subsurface Well Construction (from well logs)				Hydrogeologic Zone of Screened Interval					
Location	Well	Surface Completion (A/F)	Ground Surface Elevation (feet, 1988 NAVD)	Depth to Top of Screen (feet, bgs)	Depth to Bottom of Screen (feet, bgs)	Screen Length (feet)	Well Diameter (inch)	"A" Water Table	"B" Shallow Sands	"C" Medium Sands	"D" Oxnard Aquifer	Native or Fill	Description of Materials within Screened Interval
Monitoring Wells													
1	MW-1R	A	8.16	17.5	12.5	5	2		X			Native	Fine sand
2	MW-2RA	A	7.91	9.0	4.0	5	2	X				Native	Silty sand, silt, and clay
	MW-2RB	A	7.91	27.0	17.0	10	2		X			Native	Fine sand
	MW-2C	A	27.57	74.6	84.6	10	2			X		Native	Fine sand
	MW-2D	A	27.46	142.0	152.0	10	2				X	Native	Fine to medium sand with some gravel
3	MW-3RA	A	8.22	8.0	3.0	5	2	X				Native	Fine to coarse sand
	MW-3RB	A	8.09	20.0	15.0	5	2		X			Native	Fine sand
	MW-3C	A	24.77	74.6	84.6	10	2			X		Native	Fine sand
	MW-3D	A	25.13	140.0	150.0	10	2				X	Native	Medium to coarse sand with gravel
4	MW-4RA	A	9.56	18.5	3.5	15	2	X				Native	Sand and silt
	MW-4RB	A	9.52	30.0	20.0	10	2		X			Native	Fine to medium sand with some gravel
5	MW-5	A	18.76	20.0	10.0	10	2	X				Fill overlying native	Sand and clay
6	MW-6	A	14.87	18.5	3.5	15	2	X				Fill overlying native	Sand, silt, and clay
	MW-6C	A	19.70	71.6	81.6	10	2			X		Native	Fine to medium sand
	MW-6D	A	19.92	139.6	149.6	10	2				X	Native	Fine to coarse sand with some gravel
11	MW-11	F	13.69	12.0	2.0	10	1	X				Fill overlying native	Burn dump waste overlying silt/clay
12	MW-12	A	14.15	13.0	3.0	10	1	X				Fill overlying native	Process waste overlying silt/clay
	MW-12C	A	14.86	60.0	70.0	10	2			X		Native	Fine to medium sand with trace gravel
13	MW-13	F	9.86	13.0	3.0	10	1	X				Fill overlying native	Burn dump waste overlying silt/clay
	MW-13C	F	9.79	56.0	66.0	10	2			X		Native	Fine to coarse sand with some gravel
14	MW-14	F	7.86	12.0	2.0	10	1	X				Fill overlying native	General fill overlying sand/silt/clay
15	MW-15	F	8.39	16.0	6.0	10	1	X				Fill overlying native	General fill overlying silt/clay
17	MW-17	A	42.49	26.0	16.0	10	1	X				Fill overlying native	Process waste overlying silt/clay
18	MW-18	A	41.81	33.0	23.0	10	1	X				Fill overlying native	Process waste overlying silt/clay
19	MW-19	F	17.64	25.0	15.0	10	1	X				Fill overlying native	Process waste overlying silt/clay
	MW-19C	A	17.99	64.1	74.1	10	2			X		Native	Find sand
	MW-19D	A	18.00	132.0	142.0	10	2				X	Native	Fine to coarse sand with gravel
20	MW-20	F	13.37	19.6	29.6	10	2		X			Native	Fine to medium sand
21	MW-21	F	9.10	14.6	24.6	10	2		X			Native	Fine to medium sand
	MW-21C	F	9.10	55.0	65.0	10	2			X		Native	Fine to medium sand
22	MW-22	F	8.44	14.1	24.1	10	2		X			Native	Fine to medium sand
23	MW-23B	A	9.39	20.0	30.0	10	2		X			Native	Medium to coarse sand
	MW-23C	A	9.02	55.0	65.0	10	2			X		Native	Fine sand
24	MW-24	A	14.74	22.0	32.0	10	2		X			Native	Fine to medium sand
	MW-24C	A	14.95	56.5	66.5	10	2			X		Native	Fine to medium sand with trace gravel
25	MW-25B	A	9.56	20.0	30.0	10	2		X			Native	Fine to medium sand
	MW-25C	A	9.60	55.0	65.0	10	2			X		Native	Fine sand with some gravel
27	MW-27B	A	8.90	20.0	30.0	10	2		X			Native	Fine to medium sand
	MW-27C	A	8.86	55.0	65.0	10	2			X		Native	Fine sand
Piezometers													
1	PZ-1A	F	8.66	9.5	10.5	1	0.75	X				Native	Fine sand
	PZ-1B	F	8.64	19.5	20.5	1	0.75	X				Native	Fine sand
	PZ-1C	F	8.64	31.5	32.5	1	0.75		X			Native	Medium sand
2	PZ-2A	F	9.30	9.5	10.5	1	0.75	X				Native	Fine sand
	PZ-2B	F	9.34	19.5	20.5	1	0.75	X				Native	Fine to medium sand
	PZ-2C	F	9.21	31.5	32.5	1	0.75		X			Native	Medium sand
3	PZ-3A	A	15.24	9.5	10.5	1	0.75	X				Fill	Sand and silt
	PZ-3B	A	15.22	19.5	20.5	1	0.75	X				Native	Fine to medium sand
	PZ-3C	A	15.28	31.5	32.5	1	0.75		X			Native	Fine to medium sand
4	PZ-4A	A	13.36	9.5	10.5	1	0.75	X				Fill	Silt and clay
	PZ-4B	A	13.25	19.5	20.5	1	0.75	X				Native	Fine sand
	PZ-4C	A	13.12	31.5	32.5	1	0.75		X			Native	Fine sand

Notes:

bgs = Below ground surface

A = Stickup well completion (above ground monument)

F = Flush mount well completion (below ground vault)

TABLE 7
Surface Water Elevations
Halaco Site Remedial Investigation, Oxnard, California

Year	Berm Breached	Date	OID Staff Gauge Reading (feet)	OID Elevation (feet)	NCL-E Elevation (feet)	NCL-N Elevation (feet)	Comment
2007	No	10/15/07	7.05	8.57	nm	nm	
		12/3/07	6.65	8.17	7.88	7.89	
2008	Yes	1/3/08	4.03	5.55	7.50	Dry	
		1/31/08	3.58	5.10	7.62	Dry	
		3/6/08	4.52	6.04	7.38	Dry	
		4/1/08	5.66	7.18	6.80	Dry	
	No	5/2/08	6.39	7.91	7.25	7.80	
		6/2/08	6.50	8.02	7.59	7.89	
		7/3/08	7.75	9.27	8.60	8.82	
		8/4/08	7.78	9.30	8.65	8.24	
		9/2/08	6.37	7.89	7.75	7.85	
		9/2/08	6.37	7.89	7.75	7.85	
		10/4/08	6.40	7.92	7.76	7.87	
		10/30/08	7.20	8.72	8.10	8.46	
	Yes	11/26/08	4.90	6.42	7.50	7.20	
		12/31/08	Dry	Dry	7.40	Dry	
2009		2/4/09	5.60	7.12	6.10	6.50	
		2/28/09	Dry	Dry	6.40	Dry	
		4/5/09	5.80	7.32	6.40	6.60	
	No	4/15/09	6.40	7.92	Dry	Dry	High wind event
		5/1/09	6.60	8.12	7.40	7.80	
		5/29/09	6.60	8.12	7.90	8.10	
		6/28/09	6.40	7.92	7.62	7.72	
		7/29/09	5.70	7.22	6.95	7.18	
		8/29/09	5.80	7.32	Dry	6.80	
		10/12/09	6.40	7.92	Dry	7.20	
		10/20/09	7.30	8.82	8.20	8.78	
		11/16/09	6.60	8.12	7.95	8.10	Water sampling Event #1
		12/4/09	6.50	8.02	7.80	8.00	
2010		1/4/10	6.50	8.02	7.70	7.90	
		1/17/10	Flooded	12.50	nm	nm	Site flooded, estimate from VCWPD
	Yes	1/25/10	Dry	Dry	7.70	Dry	
		2/22/10	3.75	5.27	7.60	Dry	Water sampling Event #2
		2/24/10	4.80	6.32	6.40	Dry	
	No	3/26/10	6.30	7.82	6.80	7.70	
	Yes	4/11/10	3.90	5.42	7.70	Dry	
	No	5/9/10	6.40	7.92	7.00	7.60	
		5/23/10	6.60	8.12	7.50	7.50	
		6/1/10	7.00	8.52	8.00	8.48	Water sampling Event #3
		6/6/10	6.90	8.42	8.00	8.30	
		6/14/10	6.90	8.42	8.00	8.40	
		7/3/10	6.90	8.42	8.00	8.29	
		8/6/10	6.50	8.02	7.80	7.90	
		8/31/10	6.60	8.12	7.60	6.80	
		9/24/10	6.50	8.02	7.60	6.70	
		10/7/10	7.80	9.32	8.20	9.30	
		10/14/10	7.30	8.82	8.30	8.80	
		10/20/10	7.70	9.22	8.40	9.20	
		10/25/10	7.25	8.77	8.40	8.30	Water sampling Event #4
		11/5/10	4.00	5.52	7.70	Dry	
	Yes	11/18/10	5.00	6.52	7.50	Dry	
		11/26/10	2.20	3.72	7.50	Dry	
		12/23/10	Dry	Dry	8.00	Dry	
		12/27/10	3.50	5.02	7.98	Dry	Groundwater levels measured
2011		1/28/11	Dry	Dry	7.50	Dry	
		3/4/11	Dry	Dry	7.20	Dry	
	No	4/15/11	5.20	6.72	7.10	nm	
		5/21/11	7.20	8.72	7.30	nm	
		6/20/11	7.00	8.52	8.20	nm	
		8/12/11	6.70	8.22	7.80	nm	
		9/23/11	6.60	8.12	7.80	nm	

Notes: Elevation datum is NAVD 1988
Add 1.52 feet to OID staff gauge to obtain surface watwer elevation
NCL East and NCL North staff gauges are set to read elevation directly.
nm = not measured

TABLE 8
Groundwater Elevations
Halaco Site Remedial Investigation, Oxnard, California

Loca-tion	Well	Hydrogeologic Zone: "A" Water Table	"B" Shallow Sands	"C" Medium Sands	"D" Oxnard Aquifer	Well Construction: Surface Comp-letion (A/F)	Outer TOC Elevation (feet, 1988 NAVD)	Inner TOC Elevation (feet, 1988 NAVD)	Ground Surface Elevation (feet, 1988 NAVD)	Stickup (feet above ground surface)	Well Diameter (inch)	November 16, 2009: Measured Total Well Depth (feet, BTOC)	Measured Depth to Water (feet, BTOC)	Calculated Depth to Water (feet, BGS)	Calculated Water Level Elevation (feet, 1988 NAVD)	February 22, 2010: Measured Total Well Depth (feet, BTOC)	Measured Depth to Water (feet, BTOC)	Calculated Depth to Water (feet, BGS)	Calculated Water Level Elevation (feet, 1988 NAVD)	June 1, 2010: Measured Total Well Depth (feet, BTOC)	Measured Depth to Water (feet, BTOC)	Calculated Depth to Water (feet, BGS)	Calculated Water Level Elevation (feet, 1988 NAVD)	October 25, 2010: Measured Total Well Depth (feet, BTOC)	Measured Depth to Water (feet, BTOC)	Calculated Depth to Water (feet, BGS)	Calculated Water Level Elevation (feet, 1988 NAVD)	December 27, 2010: Measured Depth to Water (feet, BTOC)	Calculated Depth to Water (feet, BGS)	Calculated Water Level Elevation (feet, 1988 NAVD)
Monitoring Wells																														
1	MW-1R		X			A	10.93	10.46	8.16	2.30	2	20.09	2.98	0.68	7.48	20.18	5.08	2.78	5.38	20.10	3.10	0.80	7.36	20.06	2.13	-0.17	8.33	4.16	1.86	6.30
2	MW-2RA	X				A	10.56	10.01	7.91	2.10	2	11.98	2.50	0.40	7.51	12.00	2.81	0.71	7.20	11.93	2.36	0.26	7.65	11.92	1.87	-0.23	8.14	2.12	0.02	7.89
	MW-2RB		X			A	10.64	9.81	7.91	1.90	2	30.09	3.81	1.91	6.00	30.19	5.67	3.77	4.14	30.16	3.38	1.48	6.43	30.10	2.73	0.83	7.08	4.46	2.56	5.35
	MW-2C			X		A	30.03	29.63	27.57	2.07	2	87.85	22.26	20.19	7.37	87.64	24.12	22.05	5.51	87.80	22.68	20.61	6.95	87.75	21.75	19.68	7.88	23.30	21.23	6.33
	MW-2D				X	A	30.23	29.67	27.46	2.21	2	154.82	27.74	25.53	1.93	154.80	23.38	21.17	6.29	154.81	20.70	18.49	8.97	155.05	23.10	20.89	6.57	20.82	18.61	8.85
3	MW-3RA	X				A	10.95	9.93	8.22	1.71	2	10.26	1.85	0.14	8.08	10.24	3.68	1.97	6.25	10.24	1.54	-0.17	8.39	10.26	1.20	-0.51	8.73	2.75	1.04	7.18
	MW-3RB		X			A	10.84	10.00	8.09	1.91	2	22.25	2.29	0.38	7.71	22.34	4.53	2.62	5.47	22.31	2.02	0.11	7.98	22.31	1.53	-0.38	8.47	3.76	1.85	6.24
	MW-3C			X		A	27.42	27.10	24.77	2.33	2	86.35	19.04	16.71	8.06	86.32	21.24	18.91	5.86	86.04	18.94	16.61	8.16	86.30	18.35	16.02	8.75	20.56	18.23	6.54
	MW-3D				X	A	27.69	27.35	25.13	2.23	2	152.92	25.77	23.54	1.58	153.00	21.28	19.05	6.07	152.74	18.43	16.20	8.92	152.80	21.50	19.27	5.85	18.72	16.49	8.63
4	MW-4RA	X				A	11.76	10.51	9.56	0.95	2	20.29	4.18	3.23	6.33	20.25	8.99	8.04	1.52	20.18	2.60	1.65	7.91	20.25	2.23	1.28	8.28	4.56	3.61	5.95
	MW-4RB		X			A	11.29	11.29	9.52	1.77	2	31.42	6.60	4.83	4.69	31.45	9.90	8.13	1.39	31.48	5.53	3.76	5.76	31.34	4.71	2.94	6.58	5.64	3.87	5.65
5	MW-5	X				A	20.43	20.20	18.76	1.44	2	22.28	12.43	10.99	7.77	22.24	15.30	13.86	4.90	22.31	11.73	10.29	8.47	22.44	11.30	9.86	8.90	15.72	14.28	4.48
6	MW-6	X				A	16.32	16.14	14.87	1.27	2	19.63	9.26	7.99	6.88	19.56	10.98	9.71	5.16	19.65	9.00	7.73	7.14	19.63	8.35	7.08	7.79	9.41	8.14	6.73
	MW-6C			X		A	21.85	21.17	19.70	1.46	2	84.34	13.60	12.14	7.57	89.75	15.99	14.53	5.18	84.22	13.33	11.87	7.84	84.27	12.75	11.29	8.42	15.28	13.82	5.89
	MW-6D				X	A	22.02	21.71	19.92	1.79	2	153.00	19.44	17.65	2.27	152.74	15.20	13.41	6.51	152.60	12.37	10.58	9.34	152.86	15.55	13.76	6.16	12.69	10.90	9.02
11	MW-11	X				F	13.82	13.57	13.69	-0.12	1	7.51	6.23	6.35	7.34	7.51	6.98	7.10	6.59	7.52	6.25	6.37	7.32	7.55	5.72	5.84	7.85	6.16	6.28	7.41
12	MW-12	X				A	16.33	14.81	14.15	0.66	1	11.77	7.59	6.93	7.22	11.77	8.48	7.82	6.33	12.67	8.06	7.40	6.75	12.74	7.10	6.44	7.71	6.84	6.18	7.97
	MW-12C			X		A	17.60	17.29	14.86	2.43	2									71.87	10.76	8.33	6.53	71.86	10.26	7.83	7.03	12.92	10.49	4.37
y	MW-13	X				F	10.06	9.85	9.86	-0.01	1	10.37	3.30	3.31	6.55	10.30	3.54	3.55	6.31	10.30	3.73	3.74	6.12	10.33	2.70	2.71	7.15	2.42	2.43	7.43
	MW-13C			X		F	9.72	9.37	9.79	-0.42	2									66.86	8.00	8.42	1.37	66.73	7.06	7.48	2.31	7.34	7.76	2.03
14	MW-14	X				F	8.17	7.91	7.86	0.05	1	10.81	1.01	0.96	6.90	11.17	4.54	4.49	3.37	11.29	1.84	1.79	6.07	11.38	1.08	1.03	6.83	3.60	3.55	4.31
15	MW-15	X				F	8.42	8.25	8.39	-0.14	1	15.17	8.46	8.60	-0.21	15.25	9.89	10.03	-1.64	15.18	8.87	9.01	-0.62	15.20	8.34	8.48	-0.09	8.30	8.44	-0.05
17	MW-17	X				A	47.00	45.82	42.49	3.33	1	45.32	39.09	35.76	6.73	46.17	40.62	37.29	5.20	46.17	39.32	35.99	6.50	46.21	38.63	35.30	7.19	40.74	37.41	5.08
18	MW-18	X				A	45.87	45.83	41.81	4.02	1	48.38	40.15	36.13	5.68	49.04	41.50	37.48	4.33	48.57	40.02	36.00	5.81	48.66	39.62	35.60	6.21	41.84	37.82	3.99
19	MW-19	X				F	17.73	17.37	17.64	-0.27	1	17.64	12.10	12.37	5.27	17.94	13.46	13.73	3.91	17.95	12.26	12.53	5.11	18.00	11.57	11.84	5.80	12.93	13.20	4.44
	MW-19C			X		A	20.46	19.85	17.99	1.86	2	74.38	14.26	12.40	5.59	74.25	16.54	14.68	3.31	74.03	13.80	11.94	6.05	74.29	13.00	11.14	6.85	14.53	12.67	5.32
	MW-19D				X	A	20.43	19.86	18.00	1.86	2	145.02	17.74	15.88	2.12	15.75	13.48	11.62	6.38	144.96	10.82	8.96	9.04	145.12	13.80	11.94	6.06	10.83	8.97	9.03
20	MW-20		X			F	13.37	12.99	13.37	-0.38	2	30.48	7.32	7.70	5.67	30.48	9.63	10.01	3.36	30.55	7.25	7.63	5.74	30.54	6.73	7.11	6.26	8.56	8.94	4.43
21	MW-21		X			F	9.10	8.60	9.10	-0.50	2	25.21	2.22	2.72	6.38	25.21	4.88	5.38	3.72	25.35	1.98	2.48	6.62	25.20	1.49	1.99	7.11	3.94	4.44	4.66
	MW-21C			X		F	9.03	8.65	9.10	-0.44	2									65.19	2.65	3.09	6.00	65.20	2.02	2.46	6.63	4.41	4.85	4.24
22	MW-22		X			F	8.55	8.18	8.44	-0.26	2	24.52	3.13	3.39	5.05	24.66	5.38	5.64	2.80	24.56	3.18	3.44	5.00	24.58	2.55	2.81	5.63	3.82	4.08	4.36
23	MW-23B		X			A	11.99	11.91	9.39	2.53	2									32.45	6.48	3.95	5.43	32.39	6.15	3.62	5.76	7.34	4.81	4.57
	MW-23C			X		A	11.81	11.48	9.02	2.46	2									67.20	6.45	3.99	5.03	67.07	6.36	3.90	5.12	7.46	5.00	4.02
24	MW-24		X			A	17.68	16.87	14.74	2.12	2	34.87	12.45	10.33	4.42	34.84	15.66	13.54	1.21	34.88	11.80	9.68	5.07	34.83	10.83	8.71	6.04	11.83	9.71	5.04
	MW-24C			X		A	18.12	17.92	14.95	2.97	2									40.56	14.23	11.26	3.69	67.61	12.25	9.28	5.67	13.52	10.55	4.40
25	MW-25B		X			A	12.31	12.06	9.56	2.50	2									32.60	6.52	4.02	5.54	32.60	5.34	2.84	6.72	4.94	2.44	7.12
	MW-25C			X		A	12.42	12.21	9.60	2.62	2									64.31	6.91	4.29	5.30	64.26	5.79	3.17	6.42	4.76	2.14	7.45
27	MW-27B		X			A	11.70	11.54	8.90	2.64	2									31.95	5.88	3.24	5.66	32.00	4.93	2.29	6.61	4.08	1.44	7.46
	MW-27C			X		A	11.73	11.44	8.86	2.58	2									66.42	5.45	2.88	5.99	66.43	5.00	2.43	6.44	3.83	1.26	7.61
Piezometers																														
1	PZ-1A	X				F	8.67	8.55	8.66	-0.11	0.75	nm	9.48	9.59	-0.93	10.28	Dry	Dry	Dry	10.20	9.92	10.03	-1.37	10.20	9.28	9.39	-0.73	9.40	9.51	-0.85
	PZ-1B		X			F	8.65	8.34	8.64	-0.29	0.75	nm	9.19	9.48	-0.85	20.00	10.75	11.04	-2.41	15.18	8.87	9.16	-0.53	19.11	9.21	9.50	-0.87	9.28	9.57	-0.94
	PZ-1C			X		F	8.65	8.39	8.64	-0.25	0.75	nm	8.62	8.87	-0.23	32.49	10.07	10.32	-1.68	19.91	9.51	9.76	-1.12	32.36	8.45	8.70	-0.06	8.69	8.94	-0.30
2	PZ-2A	X				F	9.31	9.13	9.30	-0.17	0.75	nm	9.60	9.77	-0.47	10.20	Dry	Dry	Dry	10.14	Dry	Dry	Dry	10.18	9.97	10.14	-0.84	6.98	7.15	2.15
	PZ-2B		X			F	9.35	9.19	9.34	-0.16	0.75	nm	11.04	11.20	-1.85	19.92	12.48	12.64	-3.29	19.54	11.34	11.50	-2.15	19.89	10.70	10.86	-1.51	11.14	11.30	-1.95
	PZ-2C			X		F	9.22	9.00	9.21	-0.22	0.75	nm	11.01	11.23	-2.01	32.60	12.24	12.46	-3.24	32.42	11.61	11.83	-2.61	32.53	10.66	10.88	-1.66	11.04	11.26	-2.04
3	PZ-3A	X				A	17.12	17.00	15.24	1.76	0.75	nm	14.52	12.76	2.48	18.68	16.75	14.99	0.25	18.61	14.11	12.35	2.89	18.60	13.12	11.36	3.88	15.08	13.32	1.92
	PZ-3B		X			A	17.31	17.08	15.22	1.86	0.75	nm	14.49	12.63	2.59	28.95	17.40	15.54	-0.32	28.60	14.60	12.74	2.48	28.88	13.00	11.14	4.08	15.21	13.35	1.87
	PZ-3C			X		A	17.29	17.11	15.28	1.83	0.75	nm	14.31	12.48	2.80	40.54	17.71	15.88	-0.60	40.56	14.23	12.40	2.88	40.40	13.28	11.45	3.83	15.14	13.31	1.97
4	PZ-4A	X				A	15.41	15.07	13.36	1.71	0.75	nm	10.55	8.84	4.52	15.34	11.84	10.13	3.23	15.32	10.02	8.31	5.05	15.32	8.91	7.20	6.16	10.02	8.31	5.05
	PZ-4B		X			A	15.38	15.07	13.25	1.82	0.75	nm	10.05	8.23	5.02	25.04	13.73	11.91	1.34	24.62	9.58	7.76	5.49	24.95	8.69	6.87	6.38	9.53	7.71	5.54
	PZ-4C			X		A	15.18	15.02	13.12	1.90	0.75	nm	10.45	8.55	4.57	37.69	14.04	12.14	0.98	37.76	9.93	8.03	5.09	37.60	8.96	7.06	6.06	9.83	7.93	5.19

Notes:

n/a = Not available
ags = Above ground surface
bgs = Below ground surface

A = Stickup well completion (above ground monument)
F = Flush mount well completion (below ground vault)

TOC = Top of casing
BTOC = Below top of casing

nm = Not measured
Well not yet installed

MW-16 was submerged and inaccessible. No data available.

TABLE 9

General Chemistry Analytical Results, Surface Water and Groundwater

Halaco Site Remedial Investigation, Oxnard, California

								General						Alkalinity								Anions								Nitrogen Species								TOC	
Matrix	Location	Location ID	Sample	Sample ID	Dup	Date	Time	Total Dissolved Solids Result	Q	Specific Conductance (EC) Result	Q	pH Result	Q	Total Alkalinity Result	Q	Hydroxide Alkalinity Result	Q	Bi-carbonate Alkalinity Result	Q	Carbonate Alkalinity Result	Q	Chloride Result	Q	Sulfate Result	Q	Bromide Result	Q	Fluoride Result	Q	Ammonia as N Result	Q	Nitrate as N Result	Q	Nitrite as N Result	Q	Nitrogen, Total Kjeldahl Result	Q	Total Organic Carbon Result	Q
Surface Water	Ocean	OCE-1	1	SW-OCE-001-1109		11/16/09	10:15	33000		49000		8.1		120		10	U	120		10	U	21000		2600		66		10	U	0.03	U	10	U	100	U	0.05	J	0.5	U
			2	SW-OCE-001-0210		2/23/10	11:15	34000		48000		8.1		120		10	U	120		10	U	10000		2600		57		0.76		0.03	U	1	U	50	U	0.1	U		
		OCE-2	1	SW-OCE-002-1109		11/16/09	9:50	33000		49000		8.1		120		10	U	120		10	U	19000		2600		70		10	U	0.03	U	10	U	100	U	0.1	U	0.5	U
			2	SW-OCE-002-0210		2/23/10	10:45	36000		49000		8.1		110		10	U	110		10	U	11000		2700		61		0.84		0.03	U	1	U	50	U	0.1	U		
	Other Drains	HUD-1	1	SW-HUD-001-1109		11/16/09	9:38	5600		8900		7.7		370		10	U	370		10	U	2500		900		8.9		0.79		0.68		0.15		10	U	1.4		2.3	
			2	SW-HUD-001-0210		2/26/10	8:45	2800		4300		7.6		330		10	U	330		10	U	970		650		3.3		0.71		0.24		0.42		10	U	1		5.8	
		JSD-1	1	SW-JSD-001-1109		11/16/09	10:10	4300		6800		8.2		270		10	U	270		10	U	1800		910		7.1		0.63		0.11		0.83		5	U	2.6		6	
			2	SW-JSD-001-0210		2/25/10	12:15	16000		24		8		240		10	U	240		10	U	9000		1400		34		0.43		0.15		0.29		50	U	0.87		2	
	Lagoon	LAG-1	1	SW-LAG-001-1109		11/16/09	8:25	2700		4000		8.1		220		10	U	220		10	U	740		900		4.8		0.58		0.056		4.8		2	U	2		7.8	
			2	SW-LAG-001-0210		2/25/10	13:30	8100		13000		8.2		170		10	U	170		10	U	4000		990		16		0.42		0.088		4.5		10	U	0.87		5.9	
		LAG-2	1	SW-LAG-002-1109		11/16/09	11:05	2900		4300		8.3		210		10	U	210		10	U	890		880		4.9		0.59		0.03	U	3.2		2	U	1.9		8.9	
			2	SW-LAG-002-0210		2/24/10	13:35	9100		14000		8.3		220		10	U	220		10	U	4100		1500		17		0.65		0.03	U	8.7		10	U	0.52		2.9	
	Oxnard Industrial Drain	OID-1	1	SW-OID-001-1109		11/16/09	11:40	2600		3800		8.2		220		10	U	220		10	U	670		920		4.8		0.6		0.057		5.8		2	U	2		8.6	
				SW-OID-101-1109	Dup	11/16/09	11:40	2600		3700		8.2		220		10	U	220		10	U	630		900		4.8		0.6		0.064		6		2	U	1.9		8.2	
			2	SW-OID-001-0210		2/24/10	12:40	6800		12000		8.3		250		10	U	250		10	U	3300		1500		13		0.57		0.03	U	9.5		10	U	0.49			
				SW-OID-101-0210	Dup	2/24/10	12:40	4300		12000		8.3		250		10	U	250		10	U	3400		1500		14		0.63		0.037		10		10	U	0.55			
		OID-2	1	SW-OID-002-1109		11/16/09	13:05	2400		3300		8.1		220		10	U	220		10	U	460		970		4.7		0.6		0.09		8.4		2	U	1.6		8	
			2	SW-OID-002-0210		2/24/10	13:40	7200		11000		8.2		260		10	U	260		10	U	3100		1500		12		0.59		0.023		9.5		10	U	1.3		2.7	
		OID-3	1	SW-OID-003-1109		11/16/09	13:30	2400		3300		8.1		220		10	U	220		10	U	450		970		4.6		0.6		0.094		8.6		2	U	1.8		7.5	
			2	SW-OID-003-0210		2/25/10	12:45	3300		5300		7.8		160		10	U	160		10	U	1300		660		5.8		0.34		0.2		5.3		10	U	1.4			
		OID-4	1	SW-OID-004-1109		11/16/09	13:05	2400		3200		8.1		220		10	U	220		10	U	420		980		4.6		0.6		0.094		9		0.1	U	1.9		7.7	
				SW-OID-104-1109	Dup	11/16/09	13:05																							0.099						1.8		8.6	
			2	SW-OID-004-0210		2/24/10	12:15	6900		11000		8.2		260		10	U	260		10	U	3000		1500		13		0.66		0.036		11		10	U	0.62			
				SW-OID-104-0210	Dup	2/24/10	12:15	7200		11000		8.1		260		10	U	260		10	U	2900		1500		13		0.69		0.054		11		10	U	0.59			
		OID-5	1	SW-OID-005-1109		11/16/09	12:15	2300		3100		8.1		220		10	U	220		10	U	340		960		4.6		0.6		0.12		10		0.07	J	1.5		7.1	
			2	SW-OID-005-0210		2/24/10	13:45	5900		9300		8.1		270		10	U	270		10	U	2300		1500		11		0.71		0.094		13		10	U	0.71			
		OID-6	1	SW-OID-006-1109		11/16/09	11:55	2300		3000		8.1		220		10	U	220		10	U	320		950		4.6		0.61		0.13		11		0.07	J	1.3		7.2	
			2	SW-OID-006-0210		2/24/10	13:00	5200		7900		8.1		290		10	U	290		10	U	1800		1500		9.2		0.74		0.043		15		10	U	0.62		3.6	
		OID-7	1	SW-OID-007-1109		11/16/09	11:15	2100		2600		8.2		220		10	U	220		10	U	120		1100		4.6		0.59		0.14		15		0.12		1.1		6.4	
			2	SW-OID-007-0210		2/24/10	12:40	4200		6100		8.2		280		10	U	280		10	U	1100		1500		8		0.68		0.054		18		10	U	0.7			
		OID-8	1	SW-OID-008-1109		11/16/09	8:50	1500		2000		8.5		300		10	U	290		18		97		690		2.3		0.63		0.03	U	0.1	U	2	U	0.92		9.9	
			2	SW-OID-008-0210		2/24/10	12:15	2600		3100		8.3		220		10	U	220		10	U	130		1400		5.7		0.67		0.03	U	20		1	U	0.1	U	4.8	
	WMU Ditch	WMU-1	1	SW-WMU-001-1109		11/16/09	8:45	2700		4000		8		210		10	U	210		10	U	740		870		4.8		0.61		0.12		4.4		2	U	2		8.4	
		WMU-2	1	SW-WMU-002-1109		11/16/09	9:10	2700		3900		7.8		220		10	U	220		10	U	700		870		4.8		0.61		0.19		4.4		2	U	1.8		8.5	
	NCE-East	NCE-1	1	SW-NCE-001-0610		6/2/10	7:45	6900						150		10	U	150		10	U	3100		1400		12		0.6		0.06		0.09		10	U	2.3		14	
				SW-NCE-101-0610	Dup	6/2/10	7:45	6800						160		10	U	160		10	U	3100		1400		13		0.6		0.099		0.12		10	U	2.3		17	
		NCE-2	1	SW-NCE-002-0610		6/3/10	7:30	7100						160		10	U	160		10	U	3000		1400		13		0.56		0.036		0.1	U	10	U	2.6			
		NCE-3	1	SW-NCE-003-0610		6/3/10	8:00	6600						150		10	U	150		10	U	3200		1500		13		0.57		0.022		0.1	U	10	U	2.3			
Ground-water	1	MW-1R	1	GW-MW-1R-1109		11/19/09	11:50	7700		13000		6.3		190		10	U	190		10	U	3600		820		10		3		46		0.1	U	10	U	40			
			2	GW-MW-1R-0210		2/25/10	10:20	10000		16000		7.5		280		10	U	280		10	U	4800		1000		14		2.8		63		0.06		10	U	52			
	2	MW-2RA	1	GW-MW-2RA-1109		11/18/09	7:10	15000		22000		8		260		10	U	260		10	U	7800		2000		24		3.9		29		2.1		20	U	25			
			2	GW-MW-2RA-0210		2/23/10	7:50	17000		2400		8		270		10	U	270		10	U	4300		2000		13		4.5		39		0.59		20	U	36			
				GW-MW-102RA-0210	Dup	2/23/10	7:50	18000		27000		7.9		260		10	U	260		10	U	5000		1900		19		4.3		37		0.98		50	U	35			
		MW-2RB	1	GW-MW-2RB-1109		11/17/09	14:45	40000		69000		7.1		85		10	U	85		10	U	28000		550		49		5	U	500		5	U	100	U	460			
			`	GW-MW-102RB-1109	Dup	11/17/09	14:45	48000		69000		7.1		87		10	U	87		10	U	27000		520		48		5	U	520		5	U	100	U	450			
			2	GW-MW-2RB-0210		2/23/10	9:30	53000		72000		7.2		92		10	U	92		10	U	31000		780		44		0.79		49		1	U	100	U	420			
		MW-2C	1	GW-MW-2C-1109		11/17/09	14:30	83000		110000		6.7		120		10	U	120		10	U	46000		930		96		5	U	810		5	U	100	U	730			
			2	GW-MW-2C-0210		2/23/10	10:30	75000		100000		6.8		120		10	U	120		10	U	45000		900		87		1	U	74		1	U	100	U	680			
		MW-2D	1	GW-MW-2D-1109		11/17/09	12:10	870		1300		7.6		230		10	U	230		10	U	96		330		0.42		0.61		120		0.1	U	1	U	1			
			2	GW-MW-2D-0210		2/23/10	11:40	890		1500		7.9		220		10	U	220		10	U	89		360		0.42		0.57		0.32		0.1	U	1	U	0.66			
	3	MW-3RA	1	GW-MW-3RA-1109		11/19/09	10:30	4000		5800		7.2		230		10	U	230		10	U	1100		1400		5.2		1.5		0.41		0.1	U	5	U	1			
			2	GW-MW-3RA-0210		2/25/10	8:20	2500		4100		7.8		230		10	U	230		10	U	990		440		4.3		1.1		1.1		2.3		10	U	1.6			
		MW-3RB	1	GW-MW-3RB-1109		11/19/09	9:25	4100		6800		7.4		260		10	U	260		10	U	1500		1100		6.7		2.2		15		0.1	U	5	U	14			
			2	GW-MW-3RB-0210		2/25/10	9:15	6800		11000		7.9		280		10	U	280		10	U	3200		950		10		2		27		0.1	U	10	U	24			
		MW-3C	1	GW-MW-3C-1109		11/18/09	8:20	67000		88000		7.3		170		10	U	170		10	U	38000		1400		120		2.8	J	480		5	U	100	U	440			
			2	GW-MW-3C-0210		2/23/10	12:00	73000		94000		6.8		140		10	U	140		10	U	42000		1400		120		1	U	52		1	U	100	U	460			
		MW-3D	1	GW-MW-3D-1109		11/18/09	7:10	940		1400		7.9		230		10	U	230		10	U	110		350		0.44		0.58		0.29		0.1	U	1	U	0.52			
			2	GW-MW-3D-0210		2/23/10	14:30	960		1600		7.9		240		10	U	240		10	U	110		370		0.47		0.62		0.35		0.1	U	1	U	0.6			
	4	MW-4RA	1	GW-MW-4RA-1109		11/20/09	6:40	2200		3600		7.6		330		10	U	330		10	U	720		560		3.5		2.7		0.03	U	0.1	U	2	U	0.34			
			2	GW-MW-4RA-0210		2/24/10	10:05	5200		8300		7.4		370		10	U	370		10	U	2200		1000		9.2		3.7		0.12		1	U	10	U	0.63			
		MW-4RB	1	GW-MW-4RB-1109		11/20/09	7:10	6000		9400		6.3		470		10	U	470		10	U	2500		1200		11		1.1		0.48		0.1	U	5	U	1.1			
			2	GW-MW-4RB-0210		2/24/10	10:35	6500		10000		7.3		500		10	U	500		10	U	2700		1300		12		0.96		0.25		1	U	10	U	0.79			
	5	MW-5	1	GW-MW-5-1109		11/18/09	10:00	12000		19000		7.7		200		10	U	200		10	U	6700		1300		27		4.2		33		30		20	U	24			
			2	GW-MW-5-0210		2/24/10	8:45	21000		34000		7.5		190		10	U	190		10	U	13000		730		32		5.5		73		12		50	U	51			
	6	MW-6	1	GW-MW-6-1109		11/20/09	8:15	33000		52000		8.1		130		10	U	130		10	U	19000		670		37		1.2		680		1	U	100	U	580			
			2	GW-MW-6-0210		2/24/10	8:45	24000		36000		8.1		62		10	U	58		10	U	13000		170		25		2.6		200		180		50	U	100			
		MW-6C	1	GW-MW-6C-1109		11/18/09	11:05	70000		98000		8.2		320		10	U	320		10	U	41000		780		110		2	U	1200		2	U	100	U	1200			
			2	GW-MW-6C-0210		2/24/10	7:25	64000		97000		8.2		310		10	U	260		46		41000		710		84		1	U	1500		1	U	100	U	1000			

TABLE 9

General Chemistry Analytical Results, Surface Water and Groundwater

Halaco Site Remedial Investigation, Oxnard, California

								General						Alkalinity								Anions								Nitrogen Species								TOC	
Matrix	Location	Location ID	Sample	Sample ID	Dup	Date	Time	Total Dissolved Solids		Specific Conductance (EC)		pH		Total Alkalinity		Hydroxide Alkalinity		Bi-carbonate Alkalinity		Carbonate Alkalinity		Chloride		Sulfate		Bromide		Fluoride		Ammonia as N		Nitrate as N		Nitrite as N		Nitrogen, Total Kjeldahl		Total Organic Carbon	
								Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
		MW-6D	1	GW-MW-6D-1109		11/18/09	9:55	1200		1800		7.7		200		10	U	200		10	U	290		350		1.1		0.58		0.75		0.18		2	U	1			
			2	GW-MW-6D-0210		2/24/10	7:25	1100		1700		7.6		210		10	U	210		10	U	200		350		0.69		0.65		0.54		1	U	10	U	0.91			
	11	MW-11	1	GW-MW-11-1109		11/19/09	9:05	4600		7200		7.2		520		10	U	520		10	U	1600		1000		6.6		1.2		1.5		0.46		5	U	2.5			
			2	GW-MW-11-0210		2/25/10	15:20	4700		6900		7.4		270		10	U	270		10	U	1800		660		3.2		1.3		0.12		7.1		10	U	1			
	12	MW-12	1	GW-MW-12-1109		11/20/09	9:55	120000		130000		9.3		790		530		10	U	260		60000		5	U	100		2.9		870		1	U	200	U	680			
				GW-MW-112-1109	Dup	11/20/09	9:55	120000		130000		9.2		740		450		10	U	290		61000		5	U	100		2.9		850		1	U	200	U	710			
			2	GW-MW-12-0210		2/25/10	11:30	180000		140000		9.1		930		230		10	U	710		73000		2.5	U	140		4.2		830		3.5		500	U	640			
				GW-MW-112-0210	Dup	2/25/10	11:30	140000		140000		9.1		790		190		10	U	610		70000		2.5	U	140		3.6		820		3.8		500	U	640			
		MW-12C	1	GW-MW-12C-0610		6/3/10	9:15	53000						440		10	U	330		110		30000		1200		98		2.3		1200		0.5	U	100	U	940			
			2	GW-MW-12C-1010		10/26/10	13:08	53000		70000		7.6		230		10	U	230		10	U	30000		1400		100		10	U	810		10	U	100	U	740			
	13	MW-13	1	GW-MW-13-1109		11/19/09	7:10	10000		17000		7.5		430		10	U	430		10	U	5400		890		18		0.1	U	31		0.1	U	20	U	27			
			2	GW-MW-13-0210		2/25/10	10:10	10000		16000		7.6		440		10	U	440		10	U	5600		940		20		0.1	U	27		0.1	U	20	U	25			
		MW-13C	1	GW-MW-13C-0610		6/3/10	10:30	48000						400		10	U	400		10	U	30000		3200		120		0.47		460		0.5	U	100	U	420			
				GW-MW-113C-0610	Dup	6/3/10	10:30	47000						400		10	U	400		10	U	30000		3200		120		0.48		480		0.5	U	100	U	410			
			2	GW-MW-13C-1010		10/27/10	7:46	50000		60000		7.1		440		10	U	440		10	U	30000		3000		120		0.1	U	520		23		100	U	480			
				GW-MW-113C-1010	Dup	10/27/10	7:46	51000		70000		7		440		10	U	440		10	U	30000		3000		150		0.1	U	510		23		100	U	440			
	14	MW-14	1	GW-MW-14-1109		11/18/09	14:20	5600		9600		7.4		450		10	U	450		10	U	2800		1200		11		1.2		1.5		0.1	U	10	U	2.6			
			2	GW-MW-14-0210		2/24/10	15:30	5600		8800		7.3		450		10	U	450		10	U	2400		990		10		1.3		1.6		1	U	10	U	2.3			
	15	MW-15	1	GW-MW-15-1109		11/18/09	12:00	5400		8100		7.2		290		10	U	290		10	U	2100		1400		8.7		1		4.1		0.05	J	10	U	2			
			2	GW-MW-15-0210		2/25/10	8:35	5500		8300		7.3		300		10	U	300		10	U	2000		1500		8.9		0.88		1.4		0.38		10	U	2			
	18	MW-18	1	GW-MW-18-1109		11/20/09	10:30	52000		75000		8.5		180		10	U	47		130		30000		230		47		4		720		1	U	100	U	670			
			2	GW-MW-18-0210		2/23/10	8:35	61000		75000		8.3		450		10	U	320		130		31000		260		54		3.8		670		1	U	100	U	590			
	19	MW-19	1	GW-MW-19-1109		11/17/09	8:30	55000		82000		8.4		220		10	U	43		170		34000		170		80		5	U	890		5	U	100	U	880			
			2	GW-MW-19-0210		2/22/10	15:15	62000		84000		8.4		280		10	U	200		77		34000		210		87		1.5		890		1	U	100	U	810			
		MW-19C	1	GW-MW-19C-1109		11/17/09	8:10	81000		100000		9.5		1300		950		10	U	320		45000		820		110		5	U	870		5	U	100	U	830			
				GW-MW-119C-1109	Dup	11/17/09	8:10	81000		100000		9.5		1300		940		10	U	310		44000		810		110		5	U	860		5	U	100	U	810			
			2	GW-MW-19C-0210		2/22/10	14:15	82000		110000		9.2		750		340		10	U	410		50000		1000		120		10	U	890		10	U	100	U	790			
				GW-MW-119C-0210	Dup	2/22/10	14:15	88000		110000		9.2		760		400		10	U	360		47000		990		120		10	U	890		10	U	100	U	810			
		MW-19D	1	GW-MW-19D-1109		11/17/09	10:15	1000		1500		7.8		210		10	U	210		10	U	170		340		0.67		0.53		5.8		0.1	U	1	U	0.61			
			2	GW-MW-19D-0210		2/22/10	11:15	1000		1600		7.8		210		10	U	210		10	U	170		370		0.71		0.59		0.38		0.1	U	1	U	0.61			
	20	MW-20	1	GW-MW-20-1109		11/18/09	14:20	8200		13000		7.7		310		10	U	310		10	U	3900		1400		16		1.9		4		0.12		10	U	4.1			
				GW-MW-120-1109	Dup	11/18/09	14:20	8200		13000		7.7		310		10	U	310		10	U	4000		1500		16		1.8		3.7		0.15		10	U	4.1			
			2	GW-MW-20-0210		2/26/10	7:45	8500		13000		7.5		330		10	U	330		10	U	4000		1500		14		1.9		5.4		0.1	U	10	U	5.5			
				GW-MW-120-0210	Dup	2/26/10	7:45	8600		13000		7.6		330		10	U	330		10	U	4000		1400		16		1.6		5.6		0.1	U	10	U	7.6			
	21	MW-21	1	GW-MW-21-1109		11/19/09	12:15	7800		13000		7.4		280		10	U	280		10	U	3800		1300		15		0.7		0.33		0.05	J	10	U	0.87			
			2	GW-MW-21-0210		2/23/10	14:20	8600		12000		7.7		330		10	U	330		10	U	3300		1400		14		0.74		0.35		0.1	U	10	U	0.89			
		MW-21C	1	GW-MW-21C-0610		6/3/10	12:00	23000						280		10	U	280		10	U	11000		2300		39		0.8		2.8		0.5	U	50	U	2.8			
			2	GW-MW-21C-1010		10/26/10	14:02	22000		32000		7.3		310		10	U	310		10	U	12000		2600		43		0.34		2.5		0.1	U	50	U	2.7			
	22	MW-22	1	GW-MW-22-1109		11/19/09	7:10	7900		13000		7.5		370		10	U	370		10	U	3600		1300		14		0.69		0.44		0.1	U	10	U	0.9			
			2	GW-MW-22-0210		2/24/10	15:15	8300		12000		7.5		370		10	U	370		10	U	3600		1400		14		0.8		0.42		1	U	10	U	0.95			
	23	MW-23B	1	GW-MW-23B-0610		6/3/10	14:45	11000						400		10	U	400		10	U	5400		1500		20		1		0.93		0.1	U	20	U	1.2			
			2	GW-MW-23B-1010		10/26/10	11:04	9300		14000		7.6		220		10	U	220		10	U	4900		1500		17		0.8		0.7		0.1	U	20	U	1			
		MW-23C	1	GW-MW-23C-0610		6/3/10	13:30	18000						280		10	U	280		10	U	8700		2400		33		0.57		2.7		0.1	U	50	U	2.7			
			2	GW-MW-23C-1010		10/26/10	11:39	16000		23000		7.4		350		10	U	350		10	U	9000		1900		31		0.41		1.9		0.1	U	20	U	2.6			
	24	MW-24	1	GW-MW-24-1109		11/17/09	11:20	10000		16000		7.2		420		10	U	420		10	U	4700		1700		21		0.19		72		0.1	U	100	U	65			
			2	GW-MW-24-0210		2/22/10	15:45	13000		21000		7.5		370		10	U	370		10	U	6800		1900		25		10	U	58		10	U	20	U	53			
		MW-24C	1	GW-MW-24C-0610		6/2/10	14:45	57000						190		10	U	190		10	U	33000		1800		110		0.1	U	700		0.5	U	100	U	600			
			2	GW-MW-24C-1010		10/26/10	8:14	56000		80000		6.9		230		10	U	230		10	U	34000		2600		120		10	U	770		10	U	100	U	680			
	25	MW-25B	1	GW-MW-25B-0610		6/2/10	11:30	8700						320		10	U	320		10	U	2600		2800		8.3		0.18		3.9		0.1	U	10	U	4.3			
			2	GW-MW-25B-1010		10/26/10	9:22	9500		12000		7.4		530		10	U	530		10	U	3100		3600		11		0.2		3.8		0.1	U	10	U	4			
		MW-25C	1	GW-MW-25C-0610		6/2/10	12:45	20000						310		10	U	310		10	U	9100		2800		35		0.1	U	8.3		0.1	U	100	U	7.6			
			2	GW-MW-25C-1010		10/26/10	10:07	18000		26000		7.3		330		10	U	330		10	U	9600		2900		37		0.06		7.8		0.1	U	20	U	8			
	27	MW-27B	1	GW-MW-27B-0610		6/2/10	9:00	9600						310		10	U	310		10	U	4600		2400		18		0.24		3.9		0.1	U	10	U	3.7			
			2	GW-MW-27B-1010		10/27/10	11:48	11000		16000		7.1		340		10	U	340		10	U	4400		3300		16		0.33		3		0.1	U	10	U	3			
		MW-27C	1	GW-MW-27C-0610		6/2/10	10:10	3000						220		10	U	220		10	U	750		1100		2.4		0.43		1.8		0.1	U	2	U	2.1			
			2	GW-MW-27C-1010		10/27/10	12:23	2700		3600		7.5		280		10	U	280		10	U	650		990		2		0.37		1.4		0.1	U	2	U	1.8			
	AWPF Piezometers	P-1	1	GW-P-1-0610		6/4/10	9:00	4700						430		10	U	430		10	U	400		2500		2.3		0.51		1.8		0.56		1	U	2.6			
			2	GW-P-1-1010		10/27/10	9:22	5700		6600		7.2		430		10	U	430		10	U	850		2800		3.7		0.44		3.5		0.1	U	5	U	4			
		P-3	1	GW-P-3-0610		6/4/10	10:45	5100						460		10	U	460		10	U	320		2900		2.7		0.59		2.6		0.1	U	1	U	2.8			
			2	GW-P-3-1010		10/27/10	10:09	3800		5700		7.2		450		10	U	450		10	U	460		2700		2.7		0.58		1.8		0.1	U	1	U	3.2			
		P-4	1	GW-P-4-0610		6/4/10	10:00	4200						380		10	U	380		10	U	490		2100		1.9		0.38		2.3		0.1	U	5	U	2.4			
			2	GW-P-4-1010		10/27/10	10:44	4400		4800		7.2		370		10	U	370		10	U	760		940		2.8		0.72		1.6		0.1	U	2	U	2.3			

Notes:

Units are in mg/L. except for EC and pH. EC is in umhos/cm. pH is in pH units.

Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

TABLE 10
Total Metals Analytical Results, Surface Water and Groundwater
Halaco Site Remedial Investigation, Oxnard, California

							Analyzed by ICP AES																																							
							Aluminum		Calcium		Chromium		Iron		Magnesium		Manganese		Mercury		Potassium		Selenium		Sodium		Zinc		Antimony		Arsenic		Barium		Beryllium		Cadmium		Cobalt		Copper		Lead		Nickel		Silver		Thallium		Vanadium	
Matrix	Location ID	Sample	Sample ID	Dup	CLP ID	Date	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Surface Water (total)	OCE-1	1	SW-OCE-001-1109		MY5H73	11/16/09	71.4	J	297000		10	U	34.6	J	1280000		1.6	J	0.2	U	439000	J	35	U	1.06E+07		60	U	4	U	35		6.1	J	1.3	U	1	U	0.81	J	1.6	UJ	2	U	5.4		0.72	U	2	U	2.9	
		2	SW-OCE-001-0210		MY5ZC6	2/23/10	70.6	UJ	324000		10	U	146		1240000		6.1	UJ	0.2	U	498000		35	U	9590000		3.2	J	0.6	UJ	39.9	J	9.1	UJ	3.3	UJ	2.5	U	1.1	UJ	3.3	J	0.19	J	7.9		1.8	U	5	U	5.6	
	OCE-2	1	SW-OCE-002-1109		MY5H74	11/16/09	98.4	J	290000		10	U	81.5	J	1270000		2.7	J	0.2	U	433000	J	35	U	1.04E+07		60	U	2	U	11.2		6.9	J	1.3	U	0.5	U	1		1.6	UJ	2	U	5		0.36	U	2	U	2	
		2	SW-OCE-002-0210		MY5ZC8	2/23/10	110	UJ	332000		10	U	158		1260000		4.6	UJ	0.2	U	444000		35	U	9690000		4.7	J	0.49	UJ	41.3	J	9	UJ	3.3	UJ	2.5	U	1.2	UJ	4	J	5	U	8.2		1.8	U	5	U	6.3	
	HUD-1	1	SW-HUD-001-1109		MY5H71	11/16/09	167	J	250000		10	U	1810		219000		527		0.2	U	65500	J	35	U	1570000		10.1	J	2	U	7.2		68.8	J	0.66	U	0.5	U	0.7	J	2.2		1.3		5.3		0.36	U	1	U	1.8	
		2	SW-HUD-001-0210		MY5ZC2	2/26/10	85	U	207000		10	U	798		111000		416		0.048	UJ	24500		4	J	610000		6.4	UJ	0.38	UJ	3.2	J	54.2	J	0.66	U	0.5	U	0.54	UJ	1.8	J	0.25	UJ	4.8		0.36	U	1	U	0.83	UJ
	JSD-1	1	SW-JSD-001-1109		MY5H72	11/16/09	85	U	221000		10	U	123		172000		159		0.2	U	47800	J	35	U	1090000		60	U	0.29		5.6		51.4	J	0.66	U	0.5	U	0.56	J	1.6	UJ	0.065	J	5.8		0.36	U	1	U	1.2	
		2	SW-JSD-001-0210		MY5ZC4	2/25/10	85	U	265000		10	U	530		535000		243		0.049	UJ	173000		4.3	J	4410000		9.7	UJ	0.44	UJ	11.2	J	40.8	J	2.6	U	1	U	0.62	UJ	3.9	UJ	0.34	UJ	5.1		0.72	U	2	U	1.2	UJ
	LAG-1	1	SW-LAG-001-1109		MY5H67	11/16/09	82.1	J	225000		10	U	187		116000		142		0.2	U	22800	J	35	U	503000		5.9	UJ	0.44	J	5.8		46	J	0.66	U	0.5	U	0.67	J	3.1		0.26	J	7		0.36	U	1	U	2.1	
		2	SW-LAG-001-0210		MY5ZA8	2/25/10	161	J	203000		0.59	UJ	468		294000		206		0.052	UJ	89300		4.8	J	2280000		21.7	UJ	0.94	UJ	8.2	J	26	J	0.66	U	0.5	U	0.78	UJ	6.3	J	1.2	J	6.9		0.36	U	0.035	UJ	3.2	
	LAG-2	1	SW-LAG-002-1109		MY5H68	11/16/09	78.1	J	212000		10	U	202		120000		116		0.2	U	26200	J	3	J	576000		4.8	UJ	0.43	J	5.2		44.4	J	0.66	U	0.5	U	0.61	J	2.8		0.31	J	6.6		0.36	U	1	U	2	
		2	SW-LAG-002-0210		MY5ZB0	2/24/10	43.6	J	320000		10	U	211		380000		325		0.038	UJ	101000	J	35	U	2310000		7.1	J	0.49	UJ	13.4		24.5	J	0.66	U	0.5	U	1.1		3.7	J	0.33	J	9.6		0.36	U	0.046	UJ	1.8	
	OID-1	1	SW-OID-001-1109		MY5H56	11/16/09	111	UJ	230000		10	U	61	J	113000		33.3		0.2	U	19100	J	35	U	461000		9	UJ	0.54	J	4.8		43.4	J	0.045		0.5	U	0.65	UJ	3.7		0.34	UJ	7		0.36	U	0.075	J	2	
			SW-OID-101-1109		MY5H57	11/16/09	112	UJ	236000		10	U	220		115000		171		0.2	U	20100	J	2.3	J	468000		6.8	UJ	0.53	J	4.9		45.9	J	0.66	U	0.5	U	0.71	UJ	3.1		0.46	UJ	7		0.36	U	1	U	2.2	
		2	SW-OID-001-0210		MY5Z87	2/24/10	53.6	UJ	343000		10	U	291		309000		378		0.043	UJ	72500	J	2.4	J	1730000		9	J	0.49	UJ	9.6		22.6	J	0.66	U	0.5	U	1.3		4.3	J	0.39	J	10.6		0.027	UJ	0.16	UJ	1.9	
			SW-OID-101-0210	Dup	MY5Z89	2/24/10	69.2	UJ	318000		10	U	289		358000		335		0.041	UJ	95200	J	35	U	2190000		9.4	J	0.51	UJ	12.2		34.7	J	0.66	U	0.5	U	1.3		4.4	J	0.52	J	10.3		0.025	UJ	0.12	UJ	2.2	
	OID-2	1	SW-OID-002-1109		MY5H58	11/16/09	78.5	UJ	249000		10	U	230		108000		226		0.2	U	15900	J	35	U	372000		60	U	0.53	J	4.7		43.7	J	0.66	U	0.062	UJ	0.8	UJ	2.6		0.42	UJ	7.3		0.36	U	1	U	2.2	
		2	SW-OID-002-0210		MY5Z94	2/24/10	59.1	UJ	338000		10	U	292		301000		366		0.041	UJ	70900	J	35	U	1690000		8.1	J	0.42	UJ	10.1		22.2	J	0.66	U	0.5	U	1.3		4.1	J	0.34	J	10.8		0.36	U	0.089	UJ	1.7	
	OID-3	1	SW-OID-003-1109		MY5H60	11/16/09	63	UJ	244000		10	U	206		106000		191		0.2	U	16200	J	35	U	372000		5	UJ	0.51	J	4.9		42.6	J	0.66	U	0.042	UJ	0.8	UJ	2.8		0.46	UJ	7.6		0.36	U	1	U	2.4	
		2	SW-OID-003-0210		MY5Z95	2/25/10	214		168000		1.1	UJ	696		131000		245		0.048	UJ	33600		5.2	J	842000		32.2	UJ	1.1	UJ	4.5	J	36.3	J	0.036	UJ	0.5	U	0.73	UJ	8.3	J	1.5	J	7		0.36	U	0.045	UJ	3.6	
	OID-4	1	SW-OID-004-1109		MY5H61	11/16/09	80.2	UJ	253000		10	U	235		107000		240		0.2	U	15400	J	2	J	376000		60	U	0.49	J	5.7		43.3	J	0.66	U	0.5	U	0.81	UJ	2.7		0.41	UJ	7.5		0.36	U	1	U	2.4	
			SW-OID-104-1109		MY5H62	11/16/09	84.1	J	255000		10	U	246		108000		246		0.2	U	15900	J	35	U	366000		6.7	UJ	0.53	J	5.5		44.3	J	0.66	U	0.5	U	0.82	UJ	2.8		0.43	UJ	7.7		0.36	U	1	U	2.1	
		2	SW-OID-004-0210		MY5Z97	2/24/10	85	U	346000		10	U	306		308000		378		0.034	UJ	71000	J	35	U	1690000		7.9	J	0.44	UJ	9.8		24.2	J	0.66	U	0.5	U	1.2		4	J	0.36	J	10.4		0.36	U	0.074	UJ	1.6	
			SW-OID-104-0210	Dup	MY5Z99	2/24/10	36.7	J	341000		10	U	309		296000		375		0.04	UJ	66000	J	35	U	1570000		8.1	J	0.42	UJ	10.6		26.3	J	0.66	U	0.5	U	1.2		4.3	J	0.36	J	11		0.36	U	0.066	UJ	1.7	
	OID-5	1	SW-OID-005-1109		MY5H63	11/16/09	88.5	J	260000		10	U	262		106000		199		0.2	U	14100	J	35	U	327000		60	U	0.54	J	5.3		45.5	J	0.66	U	0.5	U	0.86	UJ	2.8		0.46	UJ	8		0.36	U	1	U	2.2	
			SW-OID-005-1109-1		MY5HE4	11/20/09	85	U	254000		10	U	171		98100		169		0.2	U	13100		35	U	273000		60	U	0.44	UJ	3.1		37.6	J	0.66	U	0.5	U	0.57	J	3.8	J	0.3	J	6.7		0.36	U	1	U	2.1	
		2	SW-OID-005-0210		MY5ZA1	2/24/10	90.9	J	361000		10	U	411		270000		375		0.037	UJ	54200	J	1.6	J	1340000		10.2	J	0.45	UJ	8.8		28.2	J	0.66	U	0.5	U	1.2		4.5	J	0.63	J	10.9		0.36	U	0.058	UJ	1.9	
	OID-6	1	SW-OID-006-1109		MY5H64	11/16/09	82.8	J	260000		10	U	271		105000		222		0.2	U	13500	J	35	U	321000		60	U	0.51	J	5.1		48.7	J	0.66	U	0.5	U	0.87	UJ	2.8		0.49	UJ	7.9		0.36	U	1	U	2.4	
		2	SW-OID-006-0210		MY5ZA2	2/24/10	85	U	369000		10	U	277		233000		303		0.034	UJ	43100	J	3.2	J	1100000		7.9	J	0.35	UJ	8.3		30.1	J	0.66	U	0.5	U	1.2		4.4	J	0.18	J	11.9		0.36	U	0.051	UJ	1.6	
	OID-7	1	SW-OID-007-1109		MY5H65	11/16/09	65.8	J	292000		10	U	180		102000		126		0.2	U	9030	J	35	U	233000		60	U	0.39	J	4.8		33.5	J	0.66	U	0.032	UJ	0.83	UJ	3.4		0.21	UJ	8.7		0.36	U	1	U	2.2	
		2	SW-OID-007-0210		MY5ZA4	2/24/10	34.9	J	374000		10	U	385		190000		300		0.039	UJ	27600	J	1.4	J	752000		8.2	J	0.29	UJ	6.3		34.5	J	0.66	U	0.5	U	1.2		4.5	J	0.29	J	12		0.36	U	0.052	UJ	1.7	
	OID-8	1	SW-OID-008-1109		MY5H66	11/16/09	132	J	206000		10	U	240		83300		77.9		0.2	U	9260	J	3.9	J	185000		25.1	UJ	0.45	J	3.2		26.7	J	0.66	U	0.13	UJ	0.68	UJ	10.8		0.81	UJ	6.3		0.36	U	1	U	2.1	
		2	SW-OID-008-0210		MY5ZA6	2/24/10	85	U	384000		10	U	284		133000		179		0.038	UJ	5300	J	2.2	J	241000		7	J	0.21	UJ	6		25.7	J	0.66	U	0.097	UJ	1.1		4.2	J	0.26	J	13		0.36	U	0.044	UJ	1.5	
	WMU-1	1	SW-WMU-001-1109		MY5H69	11/16/09	107	J	224000		10	U	149		117000		162		0.2	U	23500	J	35	U	522000		8.2	J	0.44	J	5.1		46.2	J	0.66	U	0.5	U	0.63	J	3.4		0.28	J	7.1		0.36	U	1	U	1.9	
	WMU-2	1	SW-WMU-002-1109		MY5H70	11/16/09	82.8	J	223000		10	U	128		114000		188		0.2	U	22800	J	35	U	516000		6.6	J	0.42	J	4.6		46.2	J	0.66	U	0.5	U	0.62	J	4.1		0.36	J	6.8		0.36	U	1	U	1.6	
	NCE-1	1	SW-NCE-001-0610		MY6Q67	6/2/10	559		219000		0.59	UJ	461		247000		163		0.2	U	81300		35	U	1700000		17.1	J	0.86	UJ	9.9		83.8	J	0.046	J	0.5	U	0.95	J	18.2		2.7	J	9.2		0.03	J	0.035	UJ	2.9	
		2	SW-NCE-101-0610		MY6Q69	6/2/10	512		209000		0.49	UJ	396		238000		155		0.2	U	81400		35	U	1710000		29.8	J	0.91	UJ	9.9		83.2	J	0.052	J	0.5	U	0.93	J	18.4		2.7	J	9.1		0.36	UJ	0.026	UJ	2.8	
	NCE-2	1	SW-NCE-002-0610		MY6Q71	6/3/10	496		244000		10	U	465		267000		210		0.2	U	87500	J	35	U	1780000		14.3	J	0.84	UJ	6.5		79.9	J-	0.063	J	0.5	U	0.68	UJ	12.6		2.2		6.9		0.36	UJ	0.031	UJ	2.4	
	NCE-3	1	SW-NCE-003-0610		MY6Q73	6/3/10	74.1	UJ	232000		10	U	131		257000		162		0.2	U	83900	J	35	U	1760000		4.8	J	0.73	UJ	5.9		68.1	J-	0.66	U	0.5	U	0.5	UJ	5.9		0.31	J	6.4		0.36	UJ	1	U	1.2	
Ground-water (total)	MW-1R	1	GW-MW-1R-1109		MY5H76	11/19/09	99.7	J	120000		10	U	6200		149000		438		0.2	U	1280000		35	U	1590000		60	U	2	U	5.8		55	J	0.66	UR	0.5	U	0.32	J	2.3	J	0.29	J	2.9		0.36	U	1	U	1.3	
		2	GW-MW-1R-0210		MY5ZD0	2/25/10	264		168000		10	U	6530		211000		686		0.045	UJ	1830000		2.7	J	2140000		3.8	UJ	0.14	UJ	9.3	J	78.2	J	0.66	UR	0.5	U	0.58	UJ	2.1	J	0.32	UJ	4.4		0.36	U	0.033	UJ	1.5	
	MW-2A	1	GW-MW-2RA-1109		MY5H78	11/18/09	85	U	329000		10	U	100	U	641000		942		0.2	U	1310000		25.6	J	3180000		6.8	UJ	1.6	UJ	17.7	J	78		0.66	U	0.59	UJ	1.5		3.8		2	U	9.8		0.048	UJ	0.072	J	2.8	
		2	GW-MW-2RA-0210		MY5ZD2	2/23/10	40.2	UJ	311000		10	U	37.7	UJ	663000		1200		0.2	U	1500000		3.5	J	3330000		7	J	1.4	UJ	17.3	J	70.8		1.3	UJ	0.41	UJ	1.7	UJ	5.2		2	U	10.6		0.72	U	2	U	3.1	
			GW-MW-102RA-0210	Dup	MY5ZD4	2/23/10	44	UJ	309000		10	U	30.5	UJ	648000		1180		0.2	U	1470000		2.5	J	3300000		6.9	J	1.4	UJ	18.1	J	71.3		1.3	UJ	0.4	UJ	1.6	UJ	4.9		2	U	10.5		0.72	U	2	U	2.8	
	MW-2B	1	GW-MW-2RB-1109		MY5H80	11/17/09	76.3	UJ	795000		10	U	7550		926000		2840		0.035	UJ	7750000		35	U	9130000		60	U	20	U	15.6	J	894		6.6	U	5	U	2.8	UJ	6.1	UJ	10	U	18.7		3.6	U	10	U	4.5	UJ
			GW-MW-102RB-1109		MY5H79	11/17/09	86.9	UJ	791000		10	U	7350		920000		2790		0.03	UJ	7580000		35	U	9170000		60	U	20	U	17.4	J	898		6.6	U	5	U	2.7	UJ	6	UJ	10	U	19.1		3.6	U	10	U	3.5	UJ
		2	GW-MW-2RB-0210		MY5ZD6	2/23/10	426	J+	873000		10	U	11900		975000		3320		0.2	U	7710000		35	U	9330000		9	J	1.3	UJ	15.1	J	872		3.3	UR	2.5	U	2.8	J	7.5	J	1.3	J	16.6		0.47	UJ	5	U	2.6	UJ
	MW-2C	1	GW-MW-2C-1109		MY5H81	11/17/09	540		1220000		10	U	36400		404000		8670		0.2	U	1.43E+07		35	U	1.58E+07		7.3	UJ	20	U	23.6	J	653		13.2	U	5	U	7.6	UJ	9.2	UJ	0.68	UJ	29.9		3.6	U	10	UR	5	UJ
		2	GW-MW-2C-0210		MY5ZD8	2/23/10	429	J+	1250000		10	U	38800		398000		8400		0.2	U	1.39E+07		35	U	1.47E+07		10.1	J	20	U	25.9	J	578		6.6	UJ	5	U	5.3	UJ	13.4	J	1	J	24.7		0.3	UJ	10	U	50	U
	MW-2D	1	GW-MW-2D-1109		MY5H82	11/17/09	3510		113000		6.2	J	5370		35900		386		0.2	U	6810		35	U	107000		17.9	UJ	0.38	UJ	2.6	J	87.6		0.21	J	0.4	UJ	3		8.5		3.6		9.2		0.033	UJ	0.063	J	14.1	
		2	GW-MW-2D-0210		MY5ZE0	2/23/10	422	J+	118000		0.78	J	571		37200		402		0.2	U	5820		35	U	105000		6.5	J	0.18	UJ	2.4	J	63.3		0.057	J-	0.092	UJ	0.82	UJ	5.1		0.98	J	3.4		0.03	UJ	1	U	2.3	
	MW-3A	1	GW-MW-3RA-1109		MY5H83	11/19/09	85	U	254000		10	U	4820		198000		900		0.2	U	39500		35	U	778000		60	U	2	U	10.9		19.7	J	0.66	U	0.5	U	0.32	J	2	UJ	0.21	J	5.1		0.36	U	1	U	0.8	J
		2	GW-MW-3RA-0210		MY5ZE2	2/25/10	85	U	130000		10	U	1690		119000		244		0.041	UJ	38000		3.1	J	572000		2.3	UJ	0.24	UJ	9.8	J	15.5	J	0.66	U	0.5	U	0.32	UJ	1.6	J	0.14	UJ	3.3		0.36	U	1	U	0.35	UJ
	MW-3B	1	GW-MW-3RB-1109		MY5H84	11/19/09	96.3	J	89200		10	U	798		114000		225		0.2	U	519000		35	U	892000		60	U	2	U	10.1		61	J	0.66	U	0.17	J	0.28	J	1.7	UJ	0.29	J	3.5		0.36	U	1	U	1.4	
		2	GW-MW-3RB-0210		MY5ZE4	2/25/10	103	J	200000		0.45	UJ	1530		264000		467		0.042	UJ	852000		35	U	1440000		3.8	UJ	2	U	10.5	J	152	J	0.66	U	0.5	U	0.54	UJ	1.7	J	0.3	UJ	4.9		0.36	U	1	U	0.95	UJ
	MW-3C	1	GW-MW-3C-1109		MY5H85	11/18/09	872		1070000		10	U	10700		819000		3550		0.2	U	8740000		35	U	1.45E+07		14.4	UJ	20	U	24.4	J	360		6.6	U	5	U	5	UJ	11.2	UJ	1.2	UJ	24.9		3.6	U	10	UR	4.3	UJ
		2	GW-MW-3C-0210		MY5ZE6	2/23/10	3630	J+	1160000		5.8	J	40900		835000		4650		0.2	U	9510000		35	U	1.45E+07		86.4	J	1.5	UJ	35.8	J	554		0.45	J-	5	U	5.5	UJ	25.1		5.1	J	26.9		0.66	UJ	10	U	11.9	
	MW-3D	1	GW-MW-3D-1109		MY5H86	11/18/09	903		122000		2.5	J	1480		45200		424		0.2	U	6560		35	U	108000		12.5	UJ	0.28		1.6	J	89.2		0.15	J	0.16	UJ	1.1		8.2		1.7		4.6		0.037	UJ	1	U	3.3	
		2	GW-MW-3D-0210		MY5ZE8	2/23/10	5050	J+	132000		10.1		2260		49900		754		0.2	U	6010		1.5	J	103000		118	J	1.4	UJ	2.7	J	712		3.2	J-	0.58	UJ	1.9		90.6		13.9		9.8		0.23	UJ	1	U	8.1	
	MW-4A	1	GW-MW-4RA-1109		MY5H87	11/20/09	68.4	J	97100		10	U	231		109000		417		0.2	U	36400		35	U	495000		60	U	2	U	3.6		58.4	J	0.66	U	0.5	U	0.81	J	4.9	J	0.34	J	5		0.11	UJ	1	U	1.1	
		2	GW-MW-4RA-0210		MY5ZF0	2/24/10	117	J	201000		10	U	244		325000		1120		0.039	UJ	83900	J	35	U	1170000		8.8	J	0.49	UJ	8.6		135	J	0.66	U	0.12	UJ	3.6		3.8	J	0.44	J	9.6		0.069	UJ	0.058	UJ	3.5	
	MW-4B	1	GW-MW-4RB-1109		MY5H88	11/20/09	293		246000		10	U	9020		225000		1180		0.2	U	76600		35	U	1390000		5.4	J	2	U	9.6		76.6	J	0.66	U	0.45	J	0.99	J	4.2	J	1.4	J	6		0.36	U	1	U	6.2	
		2	GW-MW-4RB-0210		MY5ZF2	2/24/10	596		300000		0.77	J	10300		275000		1340		0.036	UJ	87800	J	35	U	1570000		8.4	J	0.2	UJ	13.9		78.6	J	0.66	U	0.071	UJ	1.1		3.6	J	0.95	UJ	8.3		0.36	U	0.054	UJ	3.7	
	MW-5	1	GW-MW-5-1109		MY5H90	11/18/09	42.7	J	225000		2.3	J	1140		345000		863		0.2	U	1290000		3.9	J	2650000		60	U	1.1	UJ	22	J	55.3		0.66	U	0.64	UJ	0.72	UJ	10.7		0.08	UJ	6.1		0.16	UJ	0.068	J	2.1	
		2	GW-MW-5-0210		MY5ZF4	2/24/10	47.4	J	271000		10	U	227		557000		645		0.048	UJ	3300000	J	35	U	4180000		4.5	J	0.93	UJ	26		147	J	1.3	U	1.6	UJ	0.77	J	8	J	0.3	UJ	6.2		1.1	UJ	0.18	UJ	0.88	UJ
	MW-6	1	GW-MW-6-1109		MY5H89	11/20/09	148	J	339000		10	U	199		210000		443		0.2	U	5400000		35	U	6920000		6.3	J	20	U	24		1430	J	6.6	U	5	U	10	U	12.3	UJ	10	UJ	4.6	J	3.6	U	10	U	50	U
		2	GW-MW-6-0210		MY5ZF6	2/24/10	344		750000		0.53	J	318		353000		648		0.043	UJ	3620000	J	1.7	J	4160000		10.5	J	1.2	UJ	11.1		2010	J	1.3	U	1	U	2.3		17.5	J	1.2	J	25		0.28	UJ	0.12	UJ	2.2	
	MW-6C	1	GW-MW-6C-1109		MY5H91	11/18/09	647		308000		10	U	803		10500		174		0.2	U	1.21E+07		35	U	1.55E+07		5.7	UJ	20	U	75	J	574		6.6	U	5	U	1.6	UJ	5.1	UJ	20	U	8.3	J	3.6	U	20	U	5.3	UJ
		2	GW-MW-6C-0210		MY5ZF8	2/24/10	85	U	366000		10	U	183		8850		106		0.047	UJ	1.18E+07	J	35	U	1.52E+07		3	J	0.46	UJ	22.7		525	J	5.3	U	2	U	1.1	J	3.4	J	8	UJ	8.4		0.11	UJ	0.26	UJ	20	U
	MW-6D	1	GW-MW-6D-1109		MY5H92	11/18/09	629		161000		1.9	J	899		57800		555		0.2	U	14900		35	U	139000		19.1	UJ	0.31	UJ	2.3	J	81.8		0.15	J	0.08	UJ	1.3		9.9		1.4		6.5		0.36	U	1	U	2.6	
		2	GW-MW-6D-0210		MY5ZG0	2/24/10	69.6	J	151000		10	U	141		45700		636		0.038	UJ	11100	J	35	U	119000		2.8	J	0.1	UJ	3.9		52.6	J	0.66	U	0.5	U	0.71	J	2.1	J	0.16	UJ	3.7		0.36	U	1	U	0.49	UJ
	MW-11	1	GW-MW-11-1109		MY5H93	11/19/09	85	U	230000		10	U	9480		195000		828		0.2	U	240000		35	U	997000		286		1.4	UJ	6.3		30.9	J	0.66	U	0.52	J	1.7		9.6	J	5.4	J	26.4		0.36	U	1	U	0.61	J
		2	GW-MW-11-0210		MY5ZG2	2/25/10	85	U	471000		1.2	UJ	98.7	J	152000		329		0.047	UJ	833000		7.8	J	278000		313		5.6		2.8	J	74	J	0.66	U	2.2		2.1		27.6	J	4.4	J	23.1		0.03	UJ	0.11	UJ	0.87	UJ

TABLE 10
Total Metals Analytical Results, Surface Water and Groundwater
Halaco Site Remedial Investigation, Oxnard, California

							Analyzed by ICP AES																																					
							Aluminum		Calcium		Chromium		Iron		Magnesium		Manganese		Mercury		Potassium		Selenium		Sodium		Zinc		Antimony		Arsenic		Barium		Beryllium		Cadmium		Cobalt		Copper		Lead		Nickel		Silver		Thallium		Vanadium	
Matrix	Location ID	Sample	Sample ID	Dup	CLP ID	Date	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
	MW-12	1	GW-MW-12-1109		MY5H95	11/20/09	437		5020000		10	U	189		2610000		877		0.2	U	1.98E+07		35	U	1.21E+07		27.7	J	40	U	13.4	J	2380000	J	13.2	U	9.8	J	6.3	J	308	J	1.5	J	43.2		1.5	UJ	20	U	100	U
			GW-MW-112-1109		MY5H94	11/20/09	1830		4970000		8.2	J	685		2590000		1050		0.2	U	1.97E+07		35	U	1.20E+07		73.9		40	U	20.1		2360000	J	1.2		9.9	J	6.2	J	312	J	5.6	J	49.1		1.7	UJ	20	U	100	U
		2	GW-MW-12-0210		MY5ZG4	2/25/10	10200		6650000		41.7		4670		3330000		1780		0.066	UJ	2.36E+07		29.1	J	1.43E+07		392		5.1	UJ	28.6	J	2430000	J	9.8	UJ	15.2		13.2		439	J	45.9	J	93.1		7.7	UJ	0.92	UJ	4.3	UJ
			GW-MW-112-0210	Dup	MY5ZG6	2/25/10	15300		6580000		63.6		7170		3420000		2500		0.075	UJ	2.35E+07		24.5	J	1.43E+07		589		5.6	UJ	35	J	2450000	J	16.3	J	14.1		14.7		498	J	73.2	J	101		10.3		0.8	UJ	9.1	UJ
	MW-12C	1	GW-MW-12C-0610		MY6Q44	6/3/10	856		732000		0.76	J	1820		685000		561		0.2	U	7430000	J	35	U	1.04E+07		11.9	J	1.9	UJ	13.1		411	J-	0.28		5	U	1.8	UJ	4.9	J	10	U	13.2		3.60	UJ	1.1	UJ	4	UJ
		2	GW-MW-12C-1010		MY7BS9	10/26/10	188	J	985000		10	U	2430		769000		1860		0.2	U	6870000		35	U	1.02E+07		4.3	J	2.7	UJ	25.9		421	J-	6.6	U	5	U	2.3	J	64.1		3.5	UJ	14.2		3.6	UJ	10	U	50	UJ
	MW-13	1	GW-MW-13-1109		MY5H96	11/19/09	81.8	J	251000		10	U	4270		479000		719		0.2	U	1430000		35	U	2030000		65.4		0.81	UJ	8.9		147	J	0.66	UR	0.97	J	1.2		17.9	J	31.8	J	10		0.052	UJ	1	U	0.9	UJ
		2	GW-MW-13-0210		MY5ZG8	2/25/10	719		288000		1.7	UJ	4470		479000		1090		0.043	UJ	1380000		2.9	J	2050000		238		2	U	11.4	J	102	J	0.66	U	2.3		2.4		62	J	86.7	J	19.3		0.4	UJ	0.038	UJ	1.2	
	MW-13C	1	GW-MW-13C-0610		MY6Q49	6/3/10	2450		523000		3.3	J	13400		1480000		824		0.2	U	1990000	J	35	U	1.44E+07		20.7	J	20	U	44.5		110	J-	6.6	U	5	U	2.7	UJ	10.4	J	6.1	J	12.6		3.60	UJ	0.4	UJ	9.3	UJ
			GW-MW-113C-0610		MY6Q47	6/3/10	1440		549000		1.3	J	11800		1500000		821		0.2	U	2010000	J	35	U	1.43E+07		13.2	J	20	U	38.2		93.2	J-	6.6	U	5	U	2	UJ	5.8	J	2.1	J	10.9		3.60	UJ	0.51	UJ	5.2	UJ
		2	GW-MW-13C-1010		MY7BT3	10/27/10	576		518000		0.62	J	11100		1380000		723		0.2	U	2140000		35	U	1.45E+07		9.8	J	1.6	UJ	19.9		80.5	J-	6.6	U	5	U	1.3	J	75.1		3.9	UJ	9	J	3.6	UJ	10	U	7.5	UJ
			GW-MW-113C-1010	Dup	MY7BT1	10/27/10	513		520000		1	J	11200		1440000		731		0.2	U	2200000		35	U	1.49E+07		11.6	J	20	U	51.3		80	J-	6.6	U	5	U	1.3	J	103		4	UJ	9.2	J	3.6	UJ	10	U	5.7	UJ
	MW-14	1	GW-MW-14-1109		MY5H97	11/18/09	2760		257000		5	J	13800		243000		1710		0.2	U	112000		35	U	1440000		140		0.4	UJ	16.6	J	191		0.25	J	2.4		3.8		28.4		13		16.8		0.1	UJ	0.1	J	19.8	
		2	GW-MW-14-0210		MY5ZH0	2/24/10	2180		275000		6.5	J	11100		247000		1690		0.048	UJ	109000	J	35	U	1310000		105		0.29	UJ	11		136	J	0.13	J	1.4		2.2		16.7	J	8	J	13.7		0.04	UJ	0.074	UJ	9.9	
	MW-15	1	GW-MW-15-1109		MY5H98	11/18/09	133	J	228000		10	U	6320		193000		1040		0.2	U	104000		35	U	1250000		60	U	2	U	8.1	J	83.3		0.66	U	0.5	U	0.78	UJ	1.7	UJ	0.17	UJ	6.1		0.36	U	1	U	1.6	
		2	GW-MW-15-0210		MY5ZH2	2/25/10	701		254000		3.2	UJ	7430		195000		984		0.041	UJ	106000		3.6	J	1450000		15.6	UJ	0.098	UJ	5.4	J	104	J	0.055	UJ	0.5	U	1.3		3.3	J	1.4	J	7.4		0.031	UJ	0.041	UJ	4.3	
	MW-18	1	GW-MW-18-1109		MY5HA1	11/20/09	18100		1190000		42.6		2540		396000		2480		0.2	U	7970000		35	U	1.06E+07		232		40	U	8.6	J	2120	J	3.4	J	10	U	5.8	J	274	J	33.4	J	54.6		0.67	UJ	20	U	36	
		2	GW-MW-18-0210		MY5ZH8	2/23/10	67500	J+	1220000		426		69200		407000		3190		0.24		7900000		35	U	1.02E+07		403	J	1.4	UJ	45.8	J	3030		6.1	J-	6		50.6		365		96.9		335		1.5	UJ	0.85	J	235	
	MW-19	1	GW-MW-19-1109		MY5HA2	11/17/09	171	UJ	782000		10	U	275		610000		1960		0.2	U	9430000		35	U	1.11E+07		5.3	UJ	20	U	15.9	J	5490		6.6	U	5	U	3	UJ	6.7	UJ	10	U	20.2		3.6	U	10	U	50	U
		2	GW-MW-19-0210		MY5ZJ0	2/22/10	214	J+	805000		10	U	338		741000		2000		0.042	UJ	1.03E+07		35	U	1.14E+07		6.7	J	1.4	UJ	39.7	J	4800		3.3	UR	2.5	U	2.3	UJ	7.2	J	0.27	J	15.8		0.21	UJ	5	U	1.7	UJ
	MW-19C	1	GW-MW-19C-1109		MY5HA4	11/17/09	1210		1310000		2	J	1410		55400		170		0.2	U	1.30E+07		35	U	1.65E+07		5.7	UJ	20	U	22.4	J	1330		6.6	U	5	U	6.1	UJ	10.3	UJ	1.2	UJ	37.2		3.6	U	20	U	15	
			GW-MW-119C-1109		MY5HA3	11/17/09	1830		1310000		3	J	2150		54200		170		0.2	U	1.27E+07		35	U	1.64E+07		7.6	UJ	20	U	31.9	J	1340		6.6	U	5	U	5.9	UJ	10.2	UJ	1.2	UJ	38.5		3.6	U	20	U	14.3	
		2	GW-MW-19C-0210		MY5ZJ2	2/22/10	2950	J+	1590000		7.4	UJ	3540		81000		133		0.021	UJ	1.39E+07		35	U	1.77E+07		13	J	0.95	UJ	27.2	J	1020		6.6	UJ	5	U	5.3	UJ	12.2	J	2	J	31.5		3.6	U	10	U	17.4	
			GW-MW-119C-0210	Dup	MY5ZJ4	2/22/10	3210	J+	1590000		8.1	UJ	3930		80600		134		0.2	U	1.40E+07		35	U	1.76E+07		13.5	J	1.1	UJ	38.1	J	1020		6.6	UJ	5	U	5.4	UJ	14.6	J	2	J	60.2		0.79	UJ	10	U	19.7	
	MW-19D	1	GW-MW-19D-1109		MY5HA5	11/17/09	1500		140000		4.3	J	2770		44500		582		0.2	U	7460		35	U	108000		11	UJ	2	U	2.5	J	78.3		0.094		0.14	UJ	2.5		3.7		1.2		8		0.36	U	0.042	J	6.9	
		2	GW-MW-19D-0210		MY5ZJ6	2/22/10	971	J+	150000		2.4	J	472		44900		645		0.2	U	5620		35	U	104000		25.7	J	2	U	0.14	J	0.19	UJ	0.66	UJ	0.5	U	0.063	J	2	U	1	U	0.11	J	0.36	U	1	U	5	U
	MW-20	1	GW-MW-20-1109		MY5HA7	11/18/09	85	U	179000		10	U	2140		306000		646		0.2	U	192000		35	U	2210000		60	U	2	U	6.3		41.6	J	0.66	U	0.5	U	0.29	J	1.5	UJ	1.3	J	3.5		0.36	U	1	U	1.2	
			GW-MW-120-1109		MY5HA6	11/18/09	125	J	171000		10	U	2280		306000		659		0.2	U	193000		35	U	2180000		7	UJ	2	U	11.4	J	40.8		0.66	U	0.5	U	0.6	UJ	2.3		2.6		5.1		0.36	U	1	U	1.7	
		2	GW-MW-20-0210		MY5ZJ8	2/26/10	85	U	199000		10	U	1990		336000		663		0.039	UJ	217000		2.4	J	2480000		3.8	UJ	2	U	8.6	J	47.2	J	0.66	U	0.5	U	0.47	UJ	3.1	J	1.3	J	4.5		0.36	U	1	U	0.91	UJ
			GW-MW-120-0210	Dup	MY5ZK0	2/26/10	85	U	198000		10	U	2040		327000		651		0.046	UJ	222000		35	U	2460000		3.8	UJ	2	U	7.7	J	48.1	J	0.66	U	0.5	U	0.45	UJ	2.1	J	1.6	J	4.4		0.36	U	1	U	0.75	UJ
	MW-21	1	GW-MW-21-1109		MY5HA8	11/19/09	85	U	307000		10	U	3590		373000		661		0.2	U	105000		35	U	2080000		60	U	2	U	7.3		49.3	J	0.66	U	0.5	U	0.76	J	1.6	UJ	0.099	J	4.9		0.36	U	1	U	1.2	
		2	GW-MW-21-0210		MY5ZK2	2/23/10	534		275000		1.1	UJ	5150		308000		639		0.053	UJ	89400		5.7	J	1960000		8.7	UJ	0.15	UJ	8.8	J	46.7	J	0.036	UJ	0.5	U	1	U	2.5	J	0.91	UJ	6.5		0.043	UJ	0.12	UJ	3	
	MW-21C	1	GW-MW-21C-0610		MY6Q51	6/2/10	369		285000		10	U	6360		824000		650		0.2	U	289000	J	35	U	6510000		6	J	6	U	18.5		61.8	J-	2	U	1.5	U	1.8	UJ	2.6	J	3	U	5.8		1.10	UJ	0.089	UJ	2.3	UJ
		2	GW-MW-21C-1010		MY7BT5	10/26/10	52.8	J	259000		10	U	6840		689000		518		0.2	U	230000		2.4	UJ	5610000		2.7	J	0.65	UJ	20.2		37.5	J-	3.3	U	2.5	U	0.69	J	30.8		1.2	UJ	5.1		1.8	UJ	5	U	2.4	UJ
	MW-22	1	GW-MW-22-1109		MY5HB0	11/19/09	61.8	J	270000		10	U	3620		345000		452		0.2	U	127000		35	U	2080000		60	U	2	U	8.4		40.2	J	0.66	U	0.5	U	0.61	UJ	12.2	J	0.23	J	4.1		0.36	U	0.078	J	2.4	
		2	GW-MW-22-0210		MY5ZK4	2/24/10	1090		292000		1.9	J	5780		360000		466		0.044	UJ	122000	J	35	U	1970000		16.1	J	0.13	UJ	12.6		56.2	J	0.027		0.5	U	1.6		4.4	J	2	J	8.8		0.36	U	0.057	UJ	6.7	
	MW-23B	1	GW-MW-23B-0610		MY6Q53	6/2/10	303		261000		10	U	3360		434000		744		0.2	U	158000	J	35	U	2980000		4	J	0.22	UJ	9.3		75.2	J-	1.3	U	1	U	1.2	UJ	2.1	J	2	U	5.5		0.72	UJ	2	U	1.6	UJ
		2	GW-MW-23B-1010		MY7BT7	10/26/10	151	J	213000		0.29	J	3500		308000		433		0.2	U	121000		35	U	2460000		4.4	J	0.43	UJ	10.5		42.6	J-	1.3	U	1	U	0.58	J	14.7		0.79	UJ	5.4		0.72	UJ	2	U	3.2	J
	MW-23C	1	GW-MW-23C-0610		MY6Q55	6/2/10	1190		352000		1.6	J	2660		488000		956		0.2	U	167000	J	35	U	5130000		14.6	J	20	U	17		167	J-	6.6	U	5	U	3.1	UJ	7.9	J	10	U	10.2		3.60	UJ	0.36	UJ	7	UJ
		2	GW-MW-23C-1010		MY7BT9	10/26/10	81.9	J	292000		10	U	3400		532000		874		0.2	U	163000		35	U	4660000		2.8	J	10	U	26		65.7	J-	3.3	U	2.5	U	0.93	J	20.8		0.7	UJ	5.7		1.8	UJ	5	U	2.4	UJ
	MW-24	1	GW-MW-24-1109		MY5HB1	11/17/09	4990		322000		8.5	J	15700		324000		1760		0.2	U	543000		35	U	2560000		36.6	UJ	0.32	UJ	24.6	J	140		0.3	J	0.25	UJ	5.2		14.5		6.3		15.9		0.081	UJ	0.13	J	23.3	
		2	GW-MW-24-0210		MY5ZK8	2/22/10	240	J+	426000		10	U	16000		441000		3300		0.2	U	866000		35	U	2880000		4.2	J	4	U	30.4	J	87.3		1.3	UJ	1	U	1.8	UJ	2.8	J	0.24	J	8.8		0.72	U	2	U	2.3	
	MW-24C	1	GW-MW-24C-0610		MY6Q57	6/2/10	48.2	J	1130000		10	U	16700		895000		3260		0.2	U	4810000		35	U	1.37E+07		123		2	UJ	22.9		357	J	6.6	U	5	U	10.3		54.6		10.8	J	27.3		0.89	J	1.6	UJ	50	U
		2	GW-MW-24C-1010		MY7BW1	10/26/10	32.5	J	1040000		10	U	9710		499000		2560		0.2	U	7720000		35	U	1.35E+07		2	J	2.5	UJ	50.5		246	J-	6.6	U	5	U	2	J	154		2.4	UJ	15.8		3.6	UJ	10	U	50	UJ
	MW-25B	1	GW-MW-25B-0610		MY6Q59	6/2/10	158	J	281000		0.49	UJ	3480		342000		1700		0.2	U	49600		35	U	1890000		4.4	J	0.22	UJ	12.5		72.9	J	0.66	U	0.5	U	2.1		7.5		0.8	UJ	7.2		0.36	UJ	0.097	UJ	1.5	
		2	GW-MW-25B-1010		MY7BW3	10/26/10	138	J	366000		10	U	7860		403000		2140		0.2	U	58500		35	U	2190000		2.3	J	0.21	UJ	14.8		54	J-	1.3	U	1	U	1	J	12.9		0.51	UJ	6.6		0.72	UJ	2	U	1.6	UJ
	MW-25C	1	GW-MW-25C-0610		MY6Q61	6/4/10	664		525000		1.4	UJ	8720		872000		4190		0.2	U	78100		35	U	4840000		9.1	J	0.44	UJ	25.9		119	J	1.3	U	1	U	3.8		19		2.7	J	16.1		0.72	UJ	0.12	UJ	5.3	
		2	GW-MW-25C-1010		MY7BW5	10/26/10	103	J	678000		10	U	10100		865000		3720		0.2	U	77300		35	U	4530000		3	J	10	U	22.2		78.5	J-	3.3	U	2.5	U	2.1	J	20		0.61	UJ	11		1.8	UJ	5	U	2.6	UJ
	MW-27B	1	GW-MW-27B-0610		MY6Q63	6/4/10	46.2	J	575000		10	U	8260		528000		3220		0.2	U	60300		35	U	2260000		5.4	J	0.17	UJ	24.6		71.3	J	0.66	U	0.5	U	4.1		7.3		0.59	UJ	13.9		0.36	UJ	0.038	UJ	0.66	UJ
		2	GW-MW-27B-1010		MY7BW7	10/27/10	58.8	J	489000		10	U	12600		573000		3220		0.2	U	63500		35	U	2510000		2.3	J	4	U	25.4		47.3	J-	1.3	U	1	U	1.3	J	12.4		0.27	UJ	7.8		0.72	UJ	2	U	1.5	UJ
	MW-27C	1	GW-MW-27C-0610		MY6Q65	6/4/10	308		293000		1	UJ	898		126000		434		0.2	U	32900		35	U	398000		17.9	J	0.95	UJ	3.9		66.9	J	0.052	J	0.5	U	1.5		10		1.9	J	9.3		0.36	UJ	0.051	UJ	5.7	
		2	GW-MW-27C-1010		MY7BW9	10/27/10	86.7	J	312000		10	U	1250		116000		722		0.2	U	27000		1.6	UJ	359000		3.9	J	0.18	UJ	3.7		37.9	J-	0.66	U	0.5	U	0.64	J	2.1		0.24	UJ	4.3		0.36	UJ	1	U	1.1	J
	P-1	1	GW-P-1-0610		MY6Q80	6/3/10	117	UJ	387000		10	U	4110		269000		1840		0.2	U	18200	J	2.9	J+	617000		7.9	J	0.18	UJ	2.4		31.9	J-	0.66	U	0.15	J	1.4		3.9		1	U	8.5		0.36	UJ	0.033	UJ	0.91	J
		2	GW-P-1-1010		MY7BX1	10/27/10	64.3	J	444000		10	U	3660		243000		2430		0.2	U	24400		35	U	847000		2.3	J	2	U	4.4		27.8	J-	0.66	U	0.14	UJ	1.4		3.8		0.15	UJ	8.3		0.36	UJ	1	U	1.1	J
	P-3	1	GW-P-3-0610		MY6Q81	6/3/10	403		423000		10	U	15800		317000		2670		0.2	U	18100	J	35	U	721000		1.9	J	2	U	3.9		37.1	J-	0.032		0.19	J	0.78	UJ	1.9	J	0.31	J	6.7		0.36	UJ	0.029	UJ	1.9	
		2	GW-P-3-1010		MY7BX5	10/27/10	466		385000		0.3	J	17200		265000		2500		0.2	U	17400		3.6	UJ	676000		4.9	J	0.11	UJ	5.1		37.4	J-	0.08	UJ	0.5	U	0.89	J	4.5		1	U	6.1		0.36	UJ	1	U	3.2	J
	P-4	1	GW-P-4-0610		MY6Q82	6/3/10	501		334000		0.37	J	13700		284000		2690		0.2	U	16000	J	35	U	621000		1.9	J	2	U	4.1		28	J-	0.039	J	0.11	J	0.78	UJ	2.4		0.45	J	5.1		0.36	UJ	0.031	UJ	2.3	
		2	GW-P-4-1010		MY7BX7	10/27/10	439		380000		0.27	J	9190		222000		2120		0.2	U	15700		2	UJ	548000		3.4	J	2	U	4		29	J-	0.025	J	0.5	U	0.92	J	3.1		0.68	UJ	5.9		0.36	UJ	1	U	2.5	J

Notes:
Units are in µg/L

Data Qualifiers (Q):
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit listed in the table.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+ = The result is an estimated quantity that may be biased high.
J- = The result is an estimated quantity that may be biased low.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R = The data did not meet quality control criteria and are rejected as unusable. The analyte may or may not be present in the sample.

Analytical Method
ICP AES = Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP MS = Inductively Coupled Plasma Mass Spectrometer
*Mercury analyzed by cold vapor atomic adsorption

TABLE 11

Dissolved Metals Analytical Results, Surface Water and Groundwater

Halaco Site Remedial Investigation, Oxnard, California

							Analyzed by ICP AES																						Analyzed by ICP MS																							
							Aluminum		Calcium		Chromium		Iron		Magnesium		Manganese		Mercury*		Potassium		Selenium		Sodium		Zinc		Antimony		Arsenic		Barium		Beryllium	Q	Cadmium		Cobalt		Copper		Lead		Nickel		Silver		Thallium		Vanadium	
Matrix	Location ID	Sample	Sample ID	Dup	CLP ID	Date	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Surface water (dissolved)	OCE-1	1	SW-OCE-001-1109		MY5LT3	11/16/09	34.3	J	348000		10	U	100	U	1260000		15	U	0.2	U	470000		35	U	1.03E+07		60	U	4	U	35.8		6.1	UJ	1.3	U	1	U	0.85	UJ	3.1	UJ	0.18	UJ	5.1		0.1	UJ	2	U	1.5	UJ
		2	SW-OCE-001-0210-FF		MY5ZC7	2/23/10	85	U	334000		10	U	100	U	1250000		2.9	J	0.047	UJ	462000		35	U	9930000		4.5	UJ	10	U	33.6	J-	7.6	J	3.3	UJ	2.5	U	0.87	J	4	J	5	U	7.4		1.8	U	5	U	3.1	J
	OCE-2	1	SW-OCE-002-1109		MY5LT4	11/16/09	41.2	J	346000		10	U	100	U	1220000		1.2	J	0.2	U	463000		35	U	1.05E+07		60	U	4	U	37.9		7.1	UJ	1.3	U	1	U	0.93	UJ	3.4	UJ	0.2	UJ	6.7		0.72	U	2	U	2	U
		2	SW-OCE-002-0210-FF		MY5ZC9	2/23/10	85	U	340000		10	U	100	U	1310000		1.2	J	0.056	UJ	497000		35	U	1.03E+07		4	UJ	10	U	39.5	J-	7.4	J	3.3	UJ	2.5	U	0.91	J	3.7	J	5	U	7.7		1.8	U	5	U	2.3	J
	HUD-1	1	SW-HUD-001-1109		MY5LT1	11/16/09	85	U	255000		10	U	246		233000		515		0.2	U	62600		35	U	1580000		60	U	2	U	7.4		60.7		0.66	U	0.5	U	0.71	UJ	1.2	J	0.16	UJ	5.6		0.36	U	1	U	1.2	
		2	SW-HUD-001-0210-FF		MY5ZC3	2/26/10	85	U	196000		0.39	UJ	97.8	J	104000		391		0.027	UJ	23200		35	U	573000		4.2	UJ	0.4	UJ	2.9		51.5		0.66	U	0.5	U	0.76	UJ	2		1	U	7.6		0.36	U	0.026	UJ	0.99	J
	JSD-1	1	SW-JSD-001-1109		MY5LT2	11/16/09	82.8	J	215000		10	U	655		171000		215		0.2	U	42700		35	U	1050000		7	UJ	0.46	J	6.8		52.9		0.66	U	0.5	U	0.78	UJ	2		0.52	UJ	6.2		0.36	U	1	U	1.9	
		2	SW-JSD-001-0210-FF		MY5ZC5	2/25/10	85	U	271000		0.79	UJ	54.6	J	633000		205		0.036	UJ	210000		35	U	5470000		5.7	UJ	0.43	UJ	16.9		36.3		1.3	U	1	U	0.79	UJ	3.9	J	2	U	7.4		0.72	U	0.07	UJ	1	UJ
	LAG-1	1	SW-LAG-001-1109		MY5LS7	11/16/09	85	U	219000		10	U	100	U	115000		16.9		0.2	U	21300		1.9	J	490000		60	U	0.52	J	5.1		37.3		0.66	U	0.5	U	0.73	J	2.4		0.11	J	8.5		0.36	U	1	U	1.9	
		2	SW-LAG-001-0210-FF		MY5ZA9	2/25/10	99.9667	J	206000		1.1	UJ	220		291000		211		0.03	UJ	85400		2.2	J	2080000		18.5	UJ	0.96	UJ	10.9		21.8		0.66	U	0.5	U	0.9	UJ	6.7		0.62	UJ	9		0.36	U	0.034	UJ	2.9	
	LAG-2	1	SW-LAG-002-1109		MY5LS8	11/16/09	85	U	218000		10	U	50.6	J	126000		26.2		0.2	U	25300		35	U	589000		60	U	0.58	J	5.5		38.4		0.66	U	0.5	U	0.75	UJ	2		0.17	UJ	7.3		0.36	U	1	U	2	
		2	SW-LAG-002-0210-FF		MY5ZB1	2/24/10	37.6	J	308000		10	U	187		360000		326		0.2	U	105000		1.7	J	2330000		20.2	UJ	0.44	UJ	13.2		24.5	J	0.66	U	0.5	U	1	U	4.5		0.62	J	10.7		0.36	U	1	U	1.4	
	OID-1	1	SW-OID-001-1109		MY5LR6	11/16/09	87.8	J	228000		10	U	192		115000		165		0.2	U	20100		2.6	J	461000		7.8	UJ	0.63	J	5.4		45.4		0.043		0.5	U	0.83	J	4.1		0.53	J	8.2		0.36	U	0.18	UJ	2.3	
			SW-OID-101-1109		MY5LR7	11/16/09	35.1	J	221000		10	U	15.6	J	112000		25.3		0.2	U	19600		35	U	471000		60	U	0.54	J	4.5		36.4		0.66	U	0.5	U	0.73	J	2.2		0.2	J	7.4		0.36	U	0.052	UJ	1.9	
		2	SW-OID-001-0210-FF		MY5Z88	2/24/10	29.5	J	344000		10	U	239		309000		381		0.2	U	77800		35	U	1850000		25.3	UJ	0.45	UJ	12.2		23	J	0.66	U	0.5	U	1.1		5.1		0.7	J	11.2		0.36	U	0.11	UJ	1.3	
			SW-OID-101-0210-FF	Dup	MY5Z90	2/24/10	85	U	342000		10	U	143		316000		372		0.2	U	79700		2.5	J	1860000		8.8	UJ	0.45	UJ	12.3		18.6	J	0.66	U	0.5	U	1	U	3.8		0.2	J	10.6		0.36	U	0.047	UJ	1.3	
	OID-2	1	SW-OID-002-1109		MY5LR8	11/16/09	85	U	235000		10	U	36.7	J	105000		39.3		0.2	U	14800		35	U	357000		60	U	0.52	J	4.8		38.1		0.66	U	0.5	U	0.82	J	2.3		0.15	J	8		0.36	U	1	U	2	
		2	SW-OID-002-0210-FF		MY5Z93	2/24/10	24.8	J	352000		10	U	220		315000		392		0.2	U	78100		35	U	1820000		22	UJ	0.4	UJ	11.2		20.2	J	0.66	U	0.5	U	1	U	5.5		0.42	J	11		0.36	U	0.037	UJ	1.2	
	OID-3	1	SW-OID-003-1109		MY5LS0	11/16/09	85	U	240000		10	U	42.8	J	107000		41.6		0.2	U	15500		2.2	J	369000		5.2	UJ	0.53	J	5.1		36.4		0.66	U	0.5	U	0.82	J	2.8		0.31	J	8.6		0.36	U	1	U	2.1	
		2	SW-OID-003-0210-FF		MY5Z96	2/25/10	122	J	165000		1.2	UJ	291		137000		233		0.028	UJ	36600		3.6	J	888000		24.2	UJ	1.1	UJ	6.7		27.4		0.66	U	0.5	U	0.84	UJ	7.5		0.66	UJ	8.6		0.36	U	0.035	UJ	3	
	OID-4	1	SW-OID-004-1109		MY5LS1	11/16/09	85	U	238000		10	U	41.2	J	104000		35.8		0.2	U	14500		35	U	345000		60	U	0.5	J	5.1		36.5		0.66	U	0.5	U	0.86	J	2.4		0.22	J	8.5		0.36	U	1	U	2	
		2	SW-OID-004-0210-FF		MY5Z98	2/24/10	85	U	356000		10	U	159		307000		395		0.2	U	75800		35	U	1760000		8.5	UJ	0.38	UJ	10.8		20.1	J	0.66	U	0.5	U	1	U	3.5		0.14	J	10.4		0.36	U	0.042	UJ	0.79	J
			SW-OID-104-0210-FF	Dup	MY5ZA0	2/24/10	85	U	348000		10	U	149		300000		384		0.2	U	73000		35	U	1700000		7.8	UJ	0.41	UJ	11.4		21.8	J	0.66	U	0.5	U	1.1		3.5		0.15	J	10.7		0.36	U	0.03	UJ	1.1	
	OID-5	1	SW-OID-005-1109		MY5LS3	11/16/09	85	U	257000		10	U	61.2	J	107000		59.8		0.2	U	13700		35	U	326000		60	U	0.54	J	4.9		37.4		0.66	U	0.5	U	0.92	J	2.5		0.23	J	8.8		0.045	J	1	U	2	
			SW-OID-005-1109-1-FF		MY5HE5	11/20/09	85	U	263000		10	U	58	J	102000		38		0.2	U	11900	J	2	J	288000		60	U	0.45	UJ	2.8		34	J	0.66	U	0.5	U	0.41	UJ	2.9		0.16	J	6.2		0.36	U	1	U	1.9	
		2	SW-OID-005-0210-FF		MY5ZM2	2/24/10	85	U	362000		10	U	140		255000		358		0.2	U	58100		35	U	1300000		7.3	UJ	0.31	UJ	8.9		24.8	J	0.66	U	0.5	U	1.1		3.9		0.084	J	11.2		0.36	U	1	U	1.3	
	OID-6	1	SW-OID-006-1109		MY5LS4	11/16/09	85	U	262000		10	U	55.1	J	107000		57.9		0.2	U	12900		35	U	310000		60	U	0.53	J	4.9		35.9		0.66	U	0.5	U	0.9	J	2.5		0.15	J	8.9		0.36	U	1	U	2	
		2	SW-OID-006-0210-FF		MY5ZA3	2/24/10	85	U	367000		10	U	123		249000		316		0.2	U	53500		35	U	1290000		6.6	UJ	0.37	UJ	8.4		25.9	J	0.66	U	0.5	U	1	U	3.7		0.08	J	11.2		0.36	U	0.03	UJ	1.1	
	OID-7	1	SW-OID-007-1109		MY5LS5	11/16/09	85	U	273000		10	U	62.2	J	97300		76.6		0.2	U	8350		35	U	209000		60	U	0.39	J	4.7		31.7		0.66	U	0.5	U	0.99	J	3.4		0.18	J	10		0.36	U	1	U	2.1	
		2	SW-OID-007-0210-FF		MY5ZA5	2/24/10	85	U	366000		10	U	138		176000		270		0.2	U	26600		35	U	696000		5.7	UJ	0.26	UJ	6.7		30.7	J	0.66	U	0.5	U	1	U	3.6		0.039	J	12.2		0.36	U	1	U	1.2	
	OID-8	1	SW-OID-008-1109		MY5LS6	11/16/09	85	U	193000		10	U	52.5	J	85300		54.8		0.2	U	9330		3.9	J	184000		21.8	UJ	0.54	J	3		21.4		0.66	U	0.099	J	0.74	J	10.7		0.43	J	7.2		0.038	J	1	U	1.8	
		2	SW-OID-008-0210-FF		MY5ZA7	2/24/10	27.2	J	377000		10	U	184		129000		164		0.2	U	6790		2	J	245000		13.3	UJ	0.19	UJ	6.2		24.7	J	0.66	U	0.039	UJ	0.96	UJ	3.5		0.089	J	12.9		0.36	U	0.027	UJ	1	U
	WNU-1	1	SW-WMU-001-1109		MY5LS9	11/16/09	85	U	224000		10	U	100	U	121000		68.9		0.2	U	22800		35	U	534000		5.8	UJ	0.56	J	5		37.7		0.66	U	0.5	U	0.71	UJ	2.2		0.1	UJ	8		0.36	U	1	U	1.8	
	WNU-2	1	SW-WMU-002-1109		MY5LT0	11/16/09	85	U	219000		10	U	18.7	J	116000		122		0.2	U	21600		35	U	508000		60	U	0.55	J	4.8		39.2		0.66	U	0.5	U	0.72	UJ	2.6		0.19	UJ	7.4		0.36	U	1	U	1.9	
	NCE-1	1	SW-NCE-001-0610-FF		MY6Q68	6/2/10	96.8	J	223000		10	U	63	UJ	248000		110		0.2	U	80900		35	U	1710000		3.8	J	0.84	UJ	9.8		57.8	J	0.66	U	0.5	U	0.75	J	12.2		1	U	8.4		0.36	UJ	1	U	1.7	
			SW-NCE-101-0610-FF		MY6Q70	6/2/10	81.1	J	220000		10	U	66.9	UJ	244000		94.1		0.017	J	83700		35	U	1730000		12.9	J	0.84	UJ	9.4		53.7	J	0.66	U	0.5	U	0.7	UJ	12.5		1	U	8.7		0.36	UJ	1	U	1.6	
	NCE-2	1	SW-NCE-002-0610-FF		MY6Q72	6/3/10	63.7	J	227000		10	U	57.9	J	247000		171		0.2	UJ	80400	J	35	U	1750000		5.8	UJ	0.83	UJ	9.3		55.5		0.66	U	0.5	U	0.67	J	10.8		0.77	UJ	8.8		0.36	UJ	0.034	UJ	1.5	J
	NCE-3	1	SW-NCE-003-0610-FF		MY6Q74	6/3/10	85	U	233000		10	U	364		254000		138		0.2	UJ	85300	J	35	U	1840000		3.9	UJ	0.58	UJ	9.6		63.9		0.66	U	0.5	U	0.72	J	8.8		0.43	UJ	8.5		0.36	UJ	0.026	UJ	0.75	UJ
Ground-water (dissolved)	MW-1R	1	GW-MW-1R-1109-FF		MY5HD3	11/19/09	85	U	124000		10	U	2640		154000		435		0.2	U	1330000	J	35	U	1600000		60	U	2	U	4.9		50.9	J	0.66	UR	0.5	U	0.14	J	1	UJ	0.069	J	2.6		0.36	U	1	U	1.1	
		2	GW-MW-1R-0210-FF		MY5ZD1	2/25/10	204		159000		0.73	UJ	6080		201000		656		0.027	UJ	1680000		2.4	J	2040000		12.4	UJ	0.2	UJ	12.6		73.7		0.66	UR	0.5	U	0.7	UJ	2.5		0.33	UJ	6		0.36	U	0.03	UJ	1.3	
	MW-2A	1	GW-MW-2RA-1109-FF		MY5HB7	11/18/09	84.4	J	348000		10	U	14.4	J	601000		1020		0.042	UJ	1330000		24.9	J	3180000		5.4	UJ	1.4	J	11.6	R	82.9		0.66	UJ	0.43	U	0.93	J	3.7	J-	0.22	J	7.3	J-	0.36	UR	1	U	2	
		2	GW-MW-2RA-0210-FF		MY5ZD3	2/23/10	32.6	J	356000		10	U	100	U	677000		1430		0.055	UJ	1850000		5.1	J	3730000		7.8	UJ	1.2	UJ	16.2	J-	70.9		1.3	UJ	0.56	UJ	1.6	J	4.5		2	U	9.9		0.72	U	0.051	J	2.9	
			GW-MW-102RA-0210-FF	Dup	MY5ZD5	2/23/10	85	U	384000		10	U	100	U	695000		1650		0.06	UJ	2140000		2.6	J	3980000		9.3	UJ	1.2	UJ	17.7	J-	75.9		1.3	UJ	0.83	UJ	1.9	J	5.4		0.11	UJ	11.6		0.72	U	0.072	J	2.4	
	MW-2B	1	GW-MW-2RB-1109		MY5LQ7	11/17/09	85	U	769000		10	U	6300		864000		2660		0.25		7460000		35	U	8810000		60	U	0.51	J	17.2	UJ	960		1.3	UR	0.5	UJ	0.81	J	2.2	J-	2	U	5.8	J-	0.59	UJ	2	U	5	U
			GW-MW-102RB-1109		MY5LQ6	11/17/09	85	U	785000		10	U	6320		884000		2680		0.38		7450000		35	U	8810000		60	U	0.55		0.5	U	952		0.66	UR	0.5	UJ	0.8		2.5	J-	2	U	5.9	J-	0.36	UR	2	U	5	U
		2	GW-MW-2RB-0210-FF		MY5ZD7	2/23/10	22.9	J	903000		10	U	8780		1020000		3760		0.049	UJ	8210000		35	U	1.02E+07		4	UJ	0.7	UJ	12.9	J-	807		3.3	UJ	2.5	U	2	J	4.5	J	0.2	UJ	14		0.16	UJ	0.28	J	25	U
	MW-2C	1	GW-MW-2C-1109		MY5LQ8	11/17/09	62.6	J	1200000		10	U	37900		419000		8990		0.19	UJ	1.44E+07		35	U	1.67E+07		5.6	UJ	2	U	10	U	682		0.66	UR	0.5	UJ	2.8		2	U	0.16	J	8.3	J-	7.2	U	1	UR	5	U
		2	GW-MW-2C-0210-FF		MY5ZD9	2/23/10	34.1	J	1220000		10	U	40900		422000		8900		0.051	UJ	1.43E+07		35	U	1.51E+07		6.2	UJ	20	U	5	J-	552		6.6	UJ	5	U	5	J	8.2	J	10	U	24.2		3.6	U	10	U	3.2	J
	MW-2D	1	GW-MW-2D-1109		MY5LQ9	11/17/09	85	U	118000		10	U	190		37200		314		0.03	UJ	6140		35	U	110000		60	U	0.3	J	1.6	R	43.5		0.66	UJ	0.5	UJ	0.39	J	0.76	U	0.16	J	2.3	J-	0.36	UR	1	U	0.36	J
		2	GW-MW-2D-0210-FF		MY5ZE1	2/23/10	85	U	123000		0.37	J	78	UJ	39300		410		0.048	UJ	6930		35	U	113000		60	UJ	2	U	2.4	J-	40.6		0.66	UJ	0.5	U	0.51	J	0.66	J	1	U	3		0.36	U	1	U	0.35	J
	MW-3A	1	GW-MW-3RA-1109-FF		MY5HD4	11/19/09	85	U	270000		10	U	4110		209000		920		0.2	U	38100	J	35	U	788000		60	U	2	U	9.8		19.9	J	0.66	U	0.5	U	0.27	UJ	1.6	UJ	0.12	J	5		0.36	U	1	U	0.78	J
		2	GW-MW-3RA-0210-FF		MY5ZE3	2/25/10	85	U	132000		0.5	UJ	1660		123000		250		0.032	UJ	37700		35	U	541000		2.2	UJ	0.27	UJ	11.3		14.6		0.66	U	0.5	U	0.46	UJ	1.7	J	0.15	UJ	4.9		0.36	U	1	U	0.76	UJ
	MW-3B	1	GW-MW-3RB-1109-FF		MY5HD2	11/19/09	85	U	92000		10	U	462		117000		222		0.2	U	542000	J	35	U	892000		60	U	2	U	8.9		54	J	0.66	U	0.5	U	0.12	UJ	0.86	UJ	0.07	J	3.3		0.36	U	0.081	J	0.54	J
		2	GW-MW-3RB-0210-FF		MY5ZE5	2/25/10	89.2	J	201000		0.66	UJ	1370		263000		468		0.029	UJ	853000		35	U	1390000		2.6	UJ	0.1	UJ	12.3		141		0.66	UR	0.5	U	0.76	UJ	2		0.24	UJ	7.4		0.36	U	1	U	1	U
	MW-3C	1	GW-MW-3C-1109-FF		MY5HB9	11/18/09	37.9	J	1030000		10	U	9950		754000		3570		0.028	UJ	8620000		35	U	1.49E+07		6.3	UJ	0.61	UJ	13.9	UJ	353		0.66	UR	0.5	UJ	2.1		2.9	U	0.094	UJ	12.3	J-	7.2	U	1	UR	10	U
		2	GW-MW-3C-0210-FF		MY5ZE7	2/23/10	85	U	1180000		10	U	40200		876000		5100		0.053	UJ	1.02E+07		35	U	1.57E+07		36.8	UJ	1.1	UJ	42.8	J-	295		6.6	UJ	5	U	3.4	UJ	6.8	J	10	U	21.3		3.6	U	10	U	50	U
	MW-3D	1	GW-MW-3D-1109-FF		MY5HC0	11/18/09	85	U	123000		10	U	489		40500		367		0.2	U	6120		35	U	105000		60	U	2	U	1.6	R	43.9		0.66	UJ	0.5	UJ	0.45	J	0.68	U	1	U	2	J-	0.36	UR	1	U	5	U
		2	GW-MW-3D-0210-FF		MY5ZE9	2/23/10	85	U	131000		0.39	J	198		42300		534		0.045	UJ	6540		35	U	103000		1.4	J	2	U	1.8	J-	43.5		0.66	UJ	0.5	U	0.7	J	0.84	J	1	U	3		0.36	U	1	U	5	U
	MW-4A	1	GW-MW-4RA-1109-FF		MY5HD8	11/20/09	85	U	99800		10	U	159		112000		405		0.2	U	36300	J	35	U	501000		60	U	2	U	3.4		58.9	J	0.66	U	0.5	U	0.72	UJ	2.2		0.1	J	4.9		0.038	UJ	1	U	0.96	J
		2	GW-MW-4RA-0210-FF		MY5ZF1	2/24/10	85	U	200000		10	U	96.7	UJ	321000		1130		0.2	U	91800		35	U	1190000		8	UJ	0.45	UJ	8.3		134	J	0.66	U	0.5	U	3.5		2.3		0.14	J	9.3		0.36	U	0.034	UJ	2.6	
	MW-4B	1	GW-MW-4RB-1109-FF		MY5HD9	11/20/09	60.9	J	260000		10	U	8640		241000		1170		0.2	U	79500	J	35	U	1480000		60	U	2	U	8.2		61.3	J	0.66	U	0.5	U	0.22	J	1.2	UJ	0.1	J	3.6		0.36	U	1	U	0.9	UJ
		2	GW-MW-4RB-0210-FF		MY5ZF3	2/24/10	39.1	J	296000		10	U	8500		264000		1300		0.2	U	92900		35	U	1580000		3.9	UJ	2	U	13.3		70.2	J	0.66	U	0.5	U	0.69	UJ	1.6	J	1	UJ	8.3		0.36	U	1	U	0.45	UJ
	MW-5	1	GW-MW-5-1109-FF		MY5HC1	11/18/09	50.3	J	233000		2.1	J	1020		364000		827		0.2	U	1300000		3	J	2610000		60	U	1.1	J	17.1	R	57.3		0.66	UJ	0.57	U	0.27	J	9.7	J-	0.056	J	4.8	J-	0.073	R	1	U	1.1	
		2	GW-MW-5-0210-FF		MY5ZF5	2/24/10	85	U	274000		10	U	293		549000		721		0.2	U	3520000		35	U	4420000		5	UJ	0.85	UJ	30.4		147	J	0.66	U	1.3		0.78	UJ	7.6		0.15	J	6.6		0.93	UJ	0.12	UJ	0.53	UJ
	MW-6	1	GW-MW-6-1109-FF		MY5HE3	11/20/09	34.8	J	344000		10	U	154		215000		429		0.2	U	5840000	J	35	U	7320000		60	U	20	U	20.3		1460	J	6.6	U	5	U	0.4	J	4	UJ	10	UJ	5.4	J	3.6	U	10	U	50	U
		2	GW-MW-6-0210-FF		MY5ZF7	2/24/10	36.7	J	804000		10	U	20.6	UJ	358000		648		0.2	U	3660000		35	U	4140000		4.9	UJ	1.2	UJ	15.7		2070	J	1.3	U	0.5	U	2.1		7		0.088	J	16.3		0.14	UJ	0.088	UJ	0.75	UJ
	MW-6C	1	GW-MW-6C-1109-FF		MY5HC2	11/18/09	44.7	J	314000		10	U	149		11200		166		0.026	UJ	1.16E+07		35	U	1.38E+07		60	U	4	U	52.3	J	622		0.66	UR	1	UJ	0.61	UJ	1.6	U	1	UR	4.3	J-	7.2	U	1	UR	10	U
		2	GW-MW-6C-0210-FF		MY5ZF9	2/24/10	813		366000		2.1	J	1130		9040		128		0.2	U	1.18E+07		35	U	1.50E+07		9.8	UJ	8	U	13.2		555	J	5.3	U	2	U	1.7	UJ	8.5		1.2	J	10		1.4	U	4	UR	2.5	UJ
	MW-6D	1	GW-MW-6D-1109-FF		MY5HC8	11/18/09	85	U	160000		10	U	168		50900		470		0.2	U	15400		35	U	138000		60	U	2	U	1.7	R	57.2		0.66	UJ	0.037	U	0.67	J	0.85	U	0.071	J	2.9	J-	0.36	UR	1	U	0.56	J
		2	GW-MW-6D-0210-FF		MY5ZG1	2/24/10	85	U	154000		10	U	118		46000		680		0.2	U	11300		35	U	122000		60	U	2	U	4		49.4	J	0.66	U	0.5	U	0.71	UJ	2.1		1	UJ	5		0.36	U	1	U	0.53	UJ
	MW-11	1	GW-MW-11-1109-FF		MY5HD5	11/19/09	85	U	241000		10	U	9310		203000		843		0.2	U	233000	J	35	U	1020000		293		1.3	UJ	5.5		28.3	J	0.66	U	0.54	UJ	1.7		7.4		0.51	J	25.4		0.36	U	1	U	0.71	UJ
		2	GW-MW-11-0210-FF		MY5ZG3	2/25/10	85	U	454000		1	UJ	34.6	J	155000		420		0.032	UJ	812000		35	U	315000		337		5		3.6		64.5		0.66	U	2.2		2.8		26.1		1.6		29.5		0.36	U	0.082	UJ	1.4	

TABLE 11

Dissolved Metals Analytical Results, Surface Water and Groundwater

Halaco Site Remedial Investigation, Oxnard, California

Matrix	Location ID	Sample	Sample ID	Dup	CLP ID	Date	Analyzed by ICP AES																						Analyzed by ICP MS																							
							Aluminum		Calcium		Chromium		Iron		Magnesium		Manganese		Mercury*		Potassium		Selenium		Sodium		Zinc		Antimony		Arsenic		Barium		Beryllium		Cadmium		Cobalt		Copper		Lead		Nickel		Silver		Thallium		Vanadium	
							Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
	MW-12	1	GW-MW-12-1109-FF		MY5HE7	11/20/09	85	U	5190000		10	U	12.7	J	2720000		806		0.2	U	2.10E+07	J	35	U	1.24E+07		15.1	J	40	U	21.8		2380000	J	13.2	U	10.4	UJ	6.4	UJ	294		20	UJ	43.8		1.2	UJ	20	U	100	U
			GW-MW-112-1109-FF		MY5HE0	11/20/09	93.5	J	5400000		10	U	23	J	2800000		819		0.2	U	2.12E+07	J	35	U	1.15E+07		15.8	J	40	U	36.1		2410000	J	13.2	U	10.1	UJ	4.4	UJ	230		0.81	J	32.9		1.3	UJ	20	U	7.6	J
		2	GW-MW-12-0210-FF		MY5ZG5	2/25/10	85	U	6410000		0.94	UJ	100	U	3330000		286		0.034	UJ	2.30E+07		14.7	J	1.46E+07		19.8	UJ	3.3	UJ	2.2	J	2470000		3.3	UR	16.7		13.2		339		1.8	UJ	94.2		3.8	UJ	0.72	UJ	25	U
			GW-MW-112-0210-FF	Dup	MY5ZG7	2/25/10	180	J	6450000		2.1	UJ	170		3270000		378		0.03	UJ	2.17E+07		14.1	J	1.40E+07		31	UJ	3.9	UJ	2.5	UR	2160000		0.23	UJ	16.8		12.6	J	323	J	3.1	UJ	88.9	J	3.8	UJ	0.78	UJ	25	UR
	MW-12C	1	GW-MW-12C-0610-FF		MY6Q45	6/3/10	85	U	552000		10	U	194		594000		534		0.2	UJ	7300000	J	35	U	1.10E+07		9.7	J	2.5	UJ	40.3		321		6.6	U	5	U	2	J	64.3		4.2	UJ	16.8		3.60	UJ	1.5	UJ	50	UJ
		2	GW-MW-12C-1010-FF		MY7BT0	10/26/10	85	U	1080000		10	U	2300		837000		1840		0.2	U	6480000		5.6	J	1.03E+07		1.3	UJ	2.1	UJ	37.1		376	J-	6.6	U	5	U	2.8	J	29.9		0.5	J	17.3		3.6	UJ	10	U	3.8	UJ
	MW-13	1	GW-MW-13-1109-FF		MY5HD6	11/19/09	85	U	252000		10	U	3510		478000		689		0.2	U	1440000	J	35	U	1980000		7.8	J	0.29		6.6		112	J	0.66	UR	0.5	U	0.82	J	2.9		0.23	J	7.6		0.36	U	1	U	1.1	
		2	GW-MW-13-0210-FF		MY5ZG9	2/25/10	37	J	303000		0.87	UJ	2370		485000		1080		0.028	UJ	1380000		35	U	2040000		85		0.59	UJ	16.1		74.3		0.66	U	0.5	U	2.2		14		1.3	UJ	20.3		0.052	UJ	0.081	UJ	0.96	UJ
	MW-13C	1	GW-MW-13C-0610-FF		MY6Q50	6/3/10	85	U	408000		10	U	9790		1280000		809		0.2	UJ	2120000	J	35	U	1.40E+07		7.5	J	20	U	17.5		86.8	J	6.6	U	5	U	1.7	J	48.4		3.8	UJ	13.7		3.60	UJ	0.76	UJ	50	UJ
			GW-MW-113C-0610-FF		MY6Q48	6/3/10	85	U	405000		10	U	9430		1270000		818		0.2	UJ	2170000	J	35	U	1.44E+07		4.8	J	0.91	UJ	38.6		84.2	J	6.6	U	5	U	1.7	J	53.5		3.7	UJ	12.9		3.60	UJ	0.94	UJ	50	UJ
		2	GW-MW-13C-1010-FF		MY7BT4	10/27/10	55.4	UJ	538000		10	U	10400		1460000		708		0.2	U	2020000		3.8	J	1.45E+07		1.7	UJ	20	U	34.2		69.3	J-	6.6	U	5	U	1.2	J	63.7		10	U	10.6		3.6	UJ	10	U	7.1	UJ
			GW-MW-113C-1010-FF	Dup	MY7BT2	10/27/10	42.4	UJ	534000		10	U	10400		1460000		703		0.2	U	1990000		9.5	J	1.44E+07		1.5	UJ	20	U	51.9		70	J-	6.6	U	5	U	1.3	J	56.7		10	U	11.2		3.6	UJ	10	U	6.5	UJ
	MW-14	1	GW-MW-14-1109-FF		MY5HC3	11/18/09	43.3	J	263000		10	U	6570		236000		1530		0.2	U	113000		35	U	1470000		6.6	UJ	2	U	8.2	R	89.4		0.66	UJ	0.5	UJ	0.33	J	2.5	J-	0.29	J	4.9	J-	0.36	UR	1	U	0.58	J
		2	GW-MW-14-0210-FF		MY5ZH1	2/24/10	31.1	J	274000		10	U	5990		244000		1690		0.2	U	116000		35	U	1350000		11.4	UJ	2	U	9.8		89.8	J	0.66	U	0.5	U	0.81	UJ	1.7	J	1	UJ	8.2		0.36	U	1	U	1.1	
	MW-15	1	GW-MW-15-1109-FF		MY5HC4	11/18/09	85	U	247000		10	U	5890		194000		1030		0.2	U	108000		35	U	1290000		60	U	2	U	5.5	R	83.6		0.66	UJ	0.5	UJ	0.3	J	1	U	1	U	5.1	J-	0.36	UR	1	U	0.33	J
		2	GW-MW-15-0210-FF		MY5ZH3	2/25/10	85	U	263000		0.85	UJ	5710		197000		949		0.029	UJ	111000		35	U	1450000		2.6	UJ	2	U	8		83.3		0.66	U	0.5	U	0.86	UJ	2.3		0.061	UJ	8.6		0.36	U	1	U	1.1	
	MW-18	1	GW-MW-18-1109-FF		MY5HE2	11/20/09	109	J	1210000		10	U	25.4	J	370000		1770		0.2	U	8230000	J	35	U	1.07E+07		5.7	J	40	U	16.9	UJ	1400	J	13.2	UR	10	U	3.2	J	15.2	UJ	20	UJ	47.6		7.2	U	20	U	100	U
		2	GW-MW-18-0210-FF		MY5ZH9	2/23/10	674		1250000		3.8	UJ	943		382000		1380		0.035	UJ	8430000		35	U	1.10E+07		6	UJ	2.7	UJ	20.4		875		3.3	U	2.5	U	3.7	UJ	12.3		0.42	UJ	42.8		1.8	U	0.33	UJ	3.4	UJ
	MW-19	1	GW-MW-19-1109		MY5LR0	11/17/09	37	J	757000		10	U	114		568000		1990		0.23		9230000		35	U	1.10E+07		60	U	1	J	47.5	J	6120		1.3	UR	0.5	UJ	0.79	J	1.8	U	2	U	6.9	J-	7.2	U	2	U	5	U
		2	GW-MW-19-0210-FF		MY5ZJ1	2/22/10	85	U	741000		10	U	21	J	746000		1990		0.073	UJ	1.05E+07		35	U	1.16E+07		3.8	UJ	1.4	UJ	40.6	J-	4680		3.3	UR	2.5	U	1.7	UJ	6.5	J	5	U	13.8		1.8	U	5	U	25	U
	MW-19C	1	GW-MW-19C-1109		MY5LR2	11/17/09	84.4	J	1190000		10	U	241		78000		311		0.073	UJ	1.35E+07		35	U	1.81E+07		60	U	0.34	J	14.6	UJ	1130		0.66	UR	0.5	UJ	1.5	J	2.1	U	1	UR	12.4	J-	7.2	U	1	UR	10	U
			GW-MW-119C-1109		MY5LR1	11/17/09	103	J	1150000		10	U	299		74700		293		0.12	UJ	1.28E+07		35	U	1.68E+07		60	U	0.43	J	32.2	J	1140		0.66	UR	0.5	UJ	1.1		1.6	U	0.046	J	9.2	J-	7.2	U	1	UR	5	U
		2	GW-MW-19C-0210-FF		MY5ZJ3	2/22/10	85	U	1580000		10	U	100	U	72500		30.5		0.062	UJ	1.39E+07		35	U	1.86E+07		4	UJ	20	U	49.5	J-	978		6.6	UJ	5	U	3.9	UJ	6.5	J	10	U	27.8		3.6	U	10	U	4.5	J
			GW-MW-119C-0210-FF	Dup	MY5ZJ5	2/22/10	33.3	J	1560000		10	U	100	U	74300		31.6		0.06	UJ	1.41E+07		35	U	1.83E+07		3.4	UJ	20	U	43.3	J-	981		6.6	UJ	5	U	4	UJ	6.5	J	10	U	28.1		3.6	U	10	U	4.3	J
	MW-19D	1	GW-MW-19D-1109		MY5LR3	11/17/09	85	U	142000		10	U	59.1	J	46000		562		0.2	U	6950		35	U	110000		60	U	2	U	2	R	50.6		0.66	UJ	0.5	UJ	0.76	J	0.57	U	0.072	J	3.8	J-	0.36	UR	0.035	J	0.91	J
		2	GW-MW-19D-0210-FF		MY5ZJ7	2/22/10	26.6	J	157000		10	U	48.2	UJ	46400		624		0.051	UJ	6300		35	U	110000		60	UJ	2	U	2.4	J-	46.9		0.66	UJ	0.5	U	0.88	J	0.81	J	1	U	3.6		0.36	U	1	U	0.34	J
	MW-20	1	GW-MW-20-1109-FF		MY5HC7	11/18/09	85	U	174000		10	U	1950		293000		614		0.2	U	189000		35	U	2180000		60	U	2	U	9	R	42		0.66	UJ	0.5	UJ	0.24	J	0.94	U	1	U	3.6	J-	0.36	UR	1	U	0.6	J
			GW-MW-120-1109-FF		MY5HC6	11/18/09	85	U	178000		10	U	1970		298000		622		0.2	U	191000		35	U	2160000		60	U	2	U	7.7	R	42.3		0.66	UJ	0.5	UJ	0.23	J	0.85	U	1	U	3.8	J-	0.36	UR	1	U	5	U
		2	GW-MW-20-0210-FF		MY5ZJ9	2/26/10	85	U	200000		0.72	UJ	1860		314000		625		0.03	UJ	218000		35	U	2410000		0.66	UJ	0.15	UJ	9.3		43.8		0.024		0.5	U	0.51	UJ	1.3	J	0.085	UJ	4.9		0.043	UJ	0.069	UJ	0.47	UJ
			GW-MW-120-0210-FF	Dup	MY5ZK1	2/26/10	85	U	197000		0.46	UJ	1840		310000		612		0.027	UJ	213000		35	U	2390000		60	U	0.096	UJ	7.6		44.5		0.66	U	0.5	U	0.48	UJ	1.3	J	1	U	4.7		0.024	UJ	0.043	UJ	0.45	UJ
	MW-21	1	GW-MW-21-1109-FF		MY5HD0	11/19/09	85	U	301000		10	U	3290		362000		637		0.2	U	105000	J	35	U	2040000		60	U	2	U	6.7		47.1	J	0.66	U	0.5	U	0.65	J	1.2	UJ	1	UJ	4.3		0.36	U	1	U	0.94	UJ
		2	GW-MW-21-0210-FF		MY5ZK3	2/23/10	85	U	286000		0.64	UJ	4130		320000		657		0.028	UJ	93200		35	U	1980000		3.7	UJ	0.13	UJ	12.2		35.6		0.66	U	0.5	U	0.96	UJ	2		0.095	UJ	8.5		0.36	U	0.072	UJ	0.69	J
	MW-21C	1	GW-MW-21C-0610-FF		MY6Q52	6/2/10	85	U	222000		10	U	3820		608000		680		0.2	UJ	241000	J	35	U	5690000		4.3	J	0.3	UJ	24		62.7		2	U	1.5	U	2.1	J	18.3		0.81	UJ	6.9		1.10	UJ	0.22	UJ	1.1	UJ
		2	GW-MW-21C-1010-FF		MY7BT6	10/26/10	85	U	332000		10	U	8420		890000		582		0.2	U	243000		5.5	J	6570000		0.93	UJ	0.49	UJ	24.3		36.8	J-	3.3	U	2.5	U	0.86	J	15.2		5	U	6		1.8	UJ	5	U	2.6	UJ
	MW-22	1	GW-MW-22-1109-FF		MY5HC9	11/19/09	54.6	J	273000		10	U	3320		345000		440		0.2	U	128000	J	35	U	2090000		60	U	2	U	7.8		38.5	J	0.66	U	0.5	U	0.54	J	1.2	UJ	1	UJ	4.1		0.36	U	1	U	1.1	
		2	GW-MW-22-0210-FF		MY5ZK5	2/24/10	85	U	294000		10	U	3730		358000		464		0.2	U	132000		35	U	2030000		7	UJ	2	U	13		36.5	J	0.66	U	0.5	U	0.77	UJ	1.7	J	0.084	J	10		0.36	U	1	U	0.81	UJ
	MW-23B	1	GW-MW-23B-0610-FF		MY6Q54	6/2/10	85	U	235000		10	U	2870		383000		740		0.2	UJ	145000	J	35	U	2940000		3.5	UJ	0.38	UJ	14.3		68.3		1.3	U	1	U	1.2	J	9.8		0.45	UJ	7.2		0.72	UJ	0.079	UJ	1.1	UJ
		2	GW-MW-23B-1010-FF		MY7BT8	10/26/10	48.3	J	241000		10	U	3890		356000		474		0.2	U	123000		3.1	J	2720000		4.8	UJ	0.24	UJ	11.1		35.2	J-	1.3	U	1	U	0.61	J	9.9		0.11	J	6.3		0.72	UJ	2	U	2.3	J
	MW-23C	1	GW-MW-23C-0610-FF		MY6Q56	6/2/10	27.3	J	306000		10	U	720		431000		961		0.2	UJ	162000	J	35	U	5050000		5.5	UJ	20	U	25.5		147		6.6	U	5	U	2.6	J	19	UJ	2.1	UJ	11.5		3.60	UJ	0.5	UJ	50	UJ
		2	GW-MW-23C-1010-FF		MY7BW0	10/26/10	85	U	311000		10	U	3710		570000		907		0.2	U	144000		35	U	4800000		1.6	UJ	10	U	27.9		65.9	J-	3.3	U	2.5	U	1.1	J	15.8		5	U	6.8		1.8	UJ	5	U	2.7	UJ
	MW-24	1	GW-MW-24-1109		MY5LR4	11/17/09	48	J	325000		10	U	5580		333000		1720		0.063	UJ	532000		35	U	2550000		9.7	UJ	2	U	18.8	R	62.2		0.66	UJ	0.5	UJ	1.6		1.1	U	0.092	J	5.3	J-	0.36	UR	1	U	0.58	J
		2	GW-MW-24-0210-FF		MY5ZK9	2/22/10	85	U	425000		10	U	15800		442000		3400		0.05	UJ	909000		35	U	3090000		3	UJ	4	U	26.5	J-	80.6		1.3	UJ	1	U	1.5	UJ	1.9	J	2	U	8.1		0.72	U	2	U	10	U
	MW-24C	1	GW-MW-24C-0610-FF		MY6Q58	6/2/10	41.6	J	654000		10	U	14100		719000		2710		0.2	U	4910000		35	U	1.15E+07		294		2.4	UJ	33.2		342	J	6.6	U	5	U	5.5	J	51.7		5.1	UJ	25.8		0.31	J	0.69	UJ	50	U
		2	GW-MW-24C-1010-FF		MY7BW2	10/26/10	85	U	1190000		10	U	10400		574000		2670		0.2	U	8070000		6.1	J	1.41E+07		0.79	UJ	1.6	UJ	67.8		229	J-	6.6	U	5	U	2.5	J	78.5		10	U	18.7		0.29	UJ	10	U	5.6	UJ
	MW-25B	1	GW-MW-25B-0610-FF		MY6Q60	6/2/10	50.4	J	287000		10	U	3330		351000		1680		0.2	U	50700		35	U	1980000		3.8	J	0.19	UJ	12.3		71	J	0.66	U	0.5	U	1.8		7.3		0.35	UJ	7.3		0.36	UJ	0.032	UJ	0.69	UJ
		2	GW-MW-25B-1010-FF		MY7BW4	10/26/10	32.5	J	410000		10	U	8430		455000		2270		0.2	U	52100		2.5	J	2370000		3.3	UJ	4	U	16.1		50	J-	1.3	U	1	U	1.1	J	6.7		2	U	9.2		0.72	UJ	2	U	1.8	UJ
	MW-25C	1	GW-MW-25C-0610-FF		MY6Q62	6/4/10	40	J	525000		10	U	6800		849000		3990		0.2	U	78800		35	U	4690000		5.8	J	0.4	UJ	25.7		111	J	1.3	U	1	U	3		18.8		0.83	UJ	14.8		0.72	UJ	2	U	10	U
		2	GW-MW-25C-1010-FF		MY7BW6	10/26/10	56	UJ	749000		10	U	14500		1040000		4280		0.2	U	74300		4.6	J	5220000		3.4	UJ	10	U	26.9		78.4	J-	3.3	U	2.5	U	2.2	J	16.7		5	U	12.9		1.8	UJ	5	U	2.8	UJ
	MW-27B	1	GW-MW-27B-0610-FF		MY6Q64	6/4/10	40.7	J	577000		10	U	7790		499000		3140		0.2	U	62700		35	U	2300000		5.3	J	0.16	UJ	24.1		69.1	J	0.66	U	0.5	U	3.9		8.3		0.35	UJ	14.4		0.36	UJ	1	U	0.35	UJ
		2	GW-MW-27B-1010-FF		MY7BW8	10/27/10	83	UJ	659000		10	U	15500		632000		3770		0.2	U	59000		4.7	J	2520000		2.5	UJ	0.53	UJ	28.4		47.9	J-	1.3	U	1	U	1.7	J	5.6		0.16	UJ	11.3		0.057	UJ	2	U	1.1	UJ
	MW-27C	1	GW-MW-27C-0610-FF		MY6Q66	6/4/10	42.9	J	268000		10	U	21.6	UJ	129000		146		0.2	U	39500		35	U	478000		8.6	J	2	U	5.3		55.9	J	0.66	U	0.5	U	0.69	J	2.7		0.33	UJ	7.6		0.36	UJ	1	U	7.6	
		2	GW-MW-27C-1010-FF		MY7BX0	10/27/10	42.8	J	359000		10	U	1310		137000		731		0.2	U	24200		6	J	358000		2.3	UJ	0.26	UJ	3.9		37.5	J-	0.66	U	0.5	U	0.86	J	0.62	J	0.084	UJ	6.4		0.36	UJ	1	U	1.2	J
	P-1	1	GW-P-1-0610-FF		MY6Q83	6/3/10	85	U	377000		10	U	960		258000		1900		0.2	UJ	17700	J	4.4	J	630000		7.6	UJ	0.21	UJ	2.3		26.2		0.66	U	0.098	J	1.6		4.4		0.095	UJ	11.3		0.36	UJ	0.037	UJ	0.44	UJ
		2	GW-P-1-1010-FF		MY7BX2	10/27/10	54.2	J	524000		10	U	3400		292000		2550		0.2	U	22300		2.4	J	933000		2.6	UJ	0.13	UJ	4		27	J-	0.66	U	0.14	UJ	1.7		2		0.039	UJ	10.8		0.36	UJ	1	U	1.1	J
	P-3	1	GW-P-3-0610-FF		MY6Q84	6/3/10	85	U	377000		10	U	10300		277000		2460		0.2	UJ	18300	J	35	U	729000		2.7	UJ	0.12	UJ	3.6		29		0.66	U	0.5	U	0.75	J	2.5		0.13	UJ	7.6		0.36	UJ	0.042	UJ	0.53	UJ
		2	GW-P-3-1010-FF		MY7BX6	10/27/10	54.4	J	450000		10	U	12000		315000		2530		0.2	U	15500		7.1	J	724000		2.1	UJ	0.14	UJ	3.8		21.9	J-	0.66	U	0.5	U	0.9	J	1.5	J	0.12	UJ	8.3		0.36	UJ	1	U	1.1	J
	P-4	1	GW-P-4-0610-FF		MY6Q85	6/3/10	28.4	J	296000		10	U	11300		249000		2480		0.2	UJ	16300	J	35	U	618000		2.9	UJ	2	U	4.1		19.6		0.66	U	0.5	U	0.63	J	2.4		0.13	UJ	5.7		0.36	UJ	0.036	UJ	0.42	UJ
		2	GW-P-4-1010-FF		MY7BX8	10/27/10	54.9	J	448000		10	U	9660		265000		2200		0.2	U	14700		2.9	J	603000		1.1	UJ	2	U	4.3		20.4	J-	0.66	U	0.5	U	0.91	J	1.2	J	0.043	UJ	7.2		0.36	UJ	1	U	0.88	UJ

Notes:

Units are in µg/L

Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit listed in the table.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity that may be biased high.

J- = The result is an estimated quantity that may be biased low.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

R = The data did not meet quality control criteria and are rejected as unusable. The analyte may or may not be present in the sample.

Analytical Method

ICP AES = Inductively Coupled Plasma Atomic Emission Spectroscopy

ICP MS = Inductively Coupled Plasma Mass Spectrometer

*Mercury analyzed by cold vapor atomic adsorption

TABLE 12

Radionuclide Analytical Results, Surface Water and Groundwater

Halaco Site Remedial Investigation, Oxnard, California

Matrix	Location ID	Sample No	Sample ID	Dup	Date	Time	Radium-226			Radium-228			Thorium-228			Thorium-230			Thorium-232		
							Result	Q	Unc	Result	Q	Unc	Result	Q	Unc	Result	Q	Unc	Result	Q	Unc
Surface Water	OCE-1	1	SW-OCE-001-1109		11/16/09	10:15	0.01	U	0.26	0.69	J	0.51	-0.01	U	0.06	0.07	U	0.08	0.00	U	0.03
		2	SW-OCE-001-0210		2/23/10	11:15	0.37	J	0.16	0.84	J	0.40	-0.03	U	0.03	0.48		0.29	0.04	U	0.08
	OCE-2	1	SW-OCE-002-1109		11/16/09	9:50	0.05	U	0.20	0.14	U	0.45	0.00	U	0.06	0.02	U	0.05	0.03	U	0.05
		2	SW-OCE-002-0210		2/23/10	10:45	0.21	U	0.24	0.57	J	0.46	0.04	U	0.10	0.04	U	0.10	0.13	U	0.14
	HUD-1	1	SW-HUD-001-1109		11/16/09	9:38	0.15	U	0.22	0.87	J	0.57	0.06	U	0.08	0.09	U	0.10	0.04	U	0.07
		2	SW-HUD-001-0210		2/26/10	8:45	0.26		0.10	0.38	U	0.44	0.02	U	0.06	0.08	U	0.10	0.02	U	0.06
	JSD-1	1	SW-JSD-001-1109		11/16/09	10:10	0.32	J	0.20	-0.31	U	1.02	0.00	U	0.07	0.12	J	0.09	0.02	U	0.04
		2	SW-JSD-001-0210		2/25/10	12:15	0.72		0.22	0.42	U	0.48	0.07	U	0.11	0.17	J	0.17	-0.01	U	0.01
	LAG-1	1	SW-LAG-001-1109		11/16/09	8:25	0.09	U	0.34	0.88	J	0.54	0.02	U	0.10	0.17	J	0.11	0.04	U	0.06
		2	SW-LAG-001-0210		2/25/10	13:30	0.20	J	0.10	0.96	J	0.56	-0.07	U	0.04	0.22	J	0.19	0.04	U	0.10
	LAG-2	1	SW-LAG-002-1109		11/16/09	11:05	0.02	U	0.20	-0.14	U	0.41	-0.01	U	0.10	0.19	J	0.13	0.03	U	0.06
		2	SW-LAG-002-0210		2/24/10	13:35	0.09	U	0.10	0.90	J	0.42	-0.01	U	0.08	0.12	U	0.15	0.12	U	0.15
	OID-1	1	SW-OID-001-1109		11/16/09	11:40	0.07	U	0.19	0.47	J	0.40	-0.01	U	0.09	0.04	U	0.07	0.01	U	0.04
			SW-OID-101-1109	Dup	11/16/09	11:40	0.11	U	0.36	0.89	J	0.54	0.00	U	0.10	0.39	J	0.24	0.08	U	0.11
		2	SW-OID-001-0210		2/24/10	12:40	0.04	U	0.17	0.43	J	0.41	-0.01	U	0.09	0.18	U	0.20	0.08	U	0.11
			SW-OID-101-0210	Dup	2/24/10	12:40	0.14	J	0.13	0.99	J	0.45	-0.01	U	0.02	0.63		0.32	0.06	U	0.10
	OID-2	1	SW-OID-002-1109		11/16/09	13:05	0.08	U	0.38	0.88	J	0.59	0.07	U	0.24	0.41	J	0.36	0.00	U	0.02
		2	SW-OID-002-0210		2/24/10	13:40	0.35		0.13	0.69	J	0.45	0.01	U	0.07	0.12	U	0.14	0.01	U	0.07
	OID-2	1	SW-OID-003-1109		11/16/09	13:30	0.32	J	0.32	0.14	U	0.57	-0.03	U	0.14	0.24	J	0.23	0.04	U	0.12
		2	SW-OID-003-0210		2/25/10	12:45	0.53		0.15	0.81	J	0.48	0.02	U	0.11	0.03	U	0.07	-0.01	U	0.01
	OID-4	1	SW-OID-004-1109		11/16/09	13:05	0.10	U	0.42	0.19	U	0.50	-0.07	U	0.14	0.31	J	0.29	0.03	U	0.11
			SW-OID-104-1109	Dup	11/16/09	13:05	0.56	J	0.44	0.25	U	0.55	-0.07	U	0.14	0.55	J	0.31	0.07	U	0.11
		2	SW-OID-004-0210		2/24/10	12:15	0.11	U	0.22	-0.21	U	0.58	0.10	U	0.13	0.09	U	0.12	0.06	U	0.12
			SW-OID-104-0210	Dup	2/24/10	12:15	0.24	U	0.29	0.58	J	0.45	0.13	U	0.16	0.10	U	0.14	-0.01	U	0.02
	OID-5	1	SW-OID-005-1109		11/16/09	12:15	0.09	U	0.42	0.29	U	0.64	0.15	U	0.27	0.76	J	0.44	0.11	U	0.18
		2	SW-OID-005-0210		2/24/10	13:45	0.04	U	0.13	0.29	U	0.44	0.11	U	0.14	0.25	J	0.20	0.11	U	0.14
	OID-6	1	SW-OID-006-1109		11/16/09	11:55	0.09	U	0.47	0.59	U	0.62	0.02	U	0.15	0.48	J	0.35	0.02	U	0.10
		2	SW-OID-006-0210		2/24/10	13:00	0.06	U	0.16	0.58	J	0.46	0.03	U	0.08	0.11	U	0.14	0.04	U	0.08
	OID-7	1	SW-OID-007-1109		11/16/09	11:15	1.96		0.70	0.25	U	0.70	0.13	U	0.21	0.55		0.27	0.07	U	0.10
		2	SW-OID-007-0210		2/24/10	12:40	0.13	U	0.15	1.02	J	0.43	-0.03	U	0.08	0.06	U	0.09	0.06	U	0.09
	OID-8	1	SW-OID-008-1109		11/16/09	8:50	0.31	J	0.30	0.51	U	0.66	-0.04	U	0.04	0.43	J	0.26	0.02	U	0.06
		2	SW-OID-008-0210		2/24/10	12:15	0.04	U	0.25	0.51	J	0.45	0.01	U	0.09	0.18	J	0.18	0.12	U	0.14
	WMU-1	1	SW-WMU-001-1109		11/16/09	8:45	0.05	U	0.32	0.54	J	0.52	0.19	U	0.21	0.33	J	0.25	0.04	U	0.12
	WMU-2	1	SW-WMU-002-1109		11/16/09	9:10	0.13	U	0.35	0.44	U	0.59	0.09	U	0.16	0.20	U	0.23	0.02	U	0.22
	NCE-1	1	SW-NCE-001-0610		6/2/10	7:45	0.54	J	0.37	0.56	U	0.58	0.08	U	0.13	0.11	U	0.16	0.04	U	0.09
		2	SW-NCE-101-0610	Dup	6/2/10	7:45	0.35	J	0.27	0.49	U	0.53	0.05	U	0.17	0.12	U	0.16	-0.02	U	0.03
	NCE-2	1	SW-NCE-002-0610		6/3/10	7:30	0.00	U	0.39	0.20	U	0.62	-0.06	U	0.06	0.21	U	0.24	0.07	U	0.14
	NCE-3	1	SW-NCE-003-0610		6/3/10	8:00	0.96	J	0.90	0.42	U	0.54	0.07	U	0.28	0.59	J	0.48	0.01	U	0.16
Ground-Water	MW-1R	1	GW-MW-1R-1109		11/19/09	11:50	0.30	J	0.27	3.03		0.62	0.40	J	0.25	0.23	J	0.20	0.10	U	0.13
		2	GW-MW-1R-0210		2/25/10	10:20	0.60		0.19	4.50		0.71	0.21	J	0.17	0.14	J	0.13	0.03	U	0.06
	MW-2RA	1	GW-MW-2RA-1109		11/18/09	7:10	0.27	J	0.22	1.96		0.54	0.09	U	0.14	0.16	U	0.17	-0.02	U	0.02
		2	GW-MW-2RA-0210		2/23/10	7:50	0.46	J	0.20	2.14		0.52	0.14	U	0.16	0.10	U	0.14	0.12	U	0.14
			GW-MW-102RA-0210	Dup	2/23/10	7:50	-0.10	U	0.27	2.44		0.60	0.03	U	0.10	0.08	U	0.11	0.03	U	0.06
	MW-2RB	1	GW-MW-2RB-1109		11/17/09	14:45	1.24		0.23	0.52	U	0.53	1.19		0.45	0.65		0.31	0.06	U	0.11
			GW-MW-102RB-1109	Dup	11/17/09	14:45	1.31		0.26	-0.11	U	0.48	1.01		0.37	0.38		0.20	-0.02	U	0.02
		2	GW-MW-2RB-0210		2/23/10	9:30	1.01		0.23	0.08	U	0.41	0.99		0.42	0.14	U	0.15	0.03	U	0.07
	MW-2C	1	GW-MW-2C-1109		11/17/09	14:30	11.06		0.72	51.65		1.89	1.42		0.48	0.50		0.25	0.17	J	0.14
		2	GW-MW-2C-0210		2/26/10	9:25	0.73		0.16	1.22	J	0.48	0.08	U	0.14	0.23	J	0.19	0.03	U	0.06
	MW-2D	1	GW-MW-2D-1109		11/17/09	12:10	1.16		0.26	0.80	J	0.67	0.74		0.32	0.92		0.34	0.63		0.27
		2	GW-MW-2D-0210		2/23/10	11:40	0.03	U	0.31	0.85	J	0.44	-0.01	U	0.10	0.15	U	0.16	0.10	U	0.13
	MW-3RA	1	GW-MW-3RA-1109		11/19/09	10:30	0.23	J	0.21	0.75	J	0.45	0.01	U	0.13	1.03		0.46	0.09	U	0.14
		2	GW-MW-3RA-0210		2/25/10	8:20	0.03	U	0.28	0.81	J	0.48	0.06	U	0.09	0.10	U	0.12	0.03	U	0.06
	MW-3RB	1	GW-MW-3RB-1109		11/19/09	9:25	0.14	U	0.24	0.86	J	0.55	0.32	J	0.30	0.33	J	0.27	-0.06	U	0.06
		2	GW-MW-3RB-0210		2/25/10	9:15	0.84		0.18	3.27		0.64	0.17	U	0.19	0.12	U	0.12	0.00	U	0.01
	MW-3C	1	GW-MW-3C-1109		11/18/09	8:20	1.04		0.23	0.49	J	0.41	0.40	J	0.31	0.08	U	0.13	0.23	J	0.21
		2	GW-MW-3C-0210		2/23/10	12:00	2.99		0.29	13.38		0.89	1.01		0.43	0.27	J	0.20	0.37	J	0.24
	MW-3D	1	GW-MW-3D-1109		11/18/09	7:10	0.43	J	0.21	0.74	J	0.58	0.27	J	0.24	0.08	U	0.12	0.15	U	0.16
		2	GW-MW-3D-0210		2/23/10	14:30	0.02	U	0.22	0.79	J	0.48	0.04	U	0.10	0.18	J	0.16	0.02	U	0.10
	MW-4RA	1	GW-MW-4RA-1109		11/20/09	6:40	3.18		0.38	0.16	U	0.38	0.03	U	0.08	0.03	U	0.08	0.00	U	0.08
		2	GW-MW-4RA-0210		2/24/10	10:05	0.31	J	0.13	1.19	J	0.44	0.02	U	0.10	0.17	J	0.16	-0.01	U	0.07
	MW-4RB	1	GW-MW-4RB-1109		11/20/09	7:10	0.22	J	0.20	1.13	J	0.44	0.28		0.19	0.21	J	0.17	0.12	U	0.12
		2	GW-MW-4RB-0210		2/24/10	10:35	0.90		0.34	1.12	J	0.46	0.63		0.28	0.05	U	0.09	0.09	U	0.10
	MW-5	1	GW-MW-5-1109		11/18/09	10:00	0.07	U	0.22	1.16	J	0.61	0.04	U	0.10	0.16	J	0.15	-0.01	U	0.02
		2	GW-MW-5-0210		2/24/10	8:45	0.20	J	0.16	2.56		0.52	0.03	U	0.13	0.04	U	0.09	0.03	U	0.06
	MW-6	1	GW-MW-6-1109		11/20/09	8:15	4.97		0.55	10.65		0.84	0.09	U	0.13	0.00	U	0.01	0.06	U	0.09
		2	GW-MW-6-0210		2/24/10	8:45	1.59		0.26	6.74		0.70	0.15	J	0.15	0.08	U	0.11	0.04	U	0.07
	MW-6C	1	GW-MW-6C-1109		11/18/09	11:05	4.02		0.45	16.14		1.22	0.37	J	0.23	0.14	J	0.14	0.01	U	0.06
		2	GW-MW-6C-0210		2/24/10	7:25	1.06		0.17	1.37	J	0.58	0.97		0.38	0.26	J	0.18	-0.01	U	0.02
	MW-6D	1	GW-MW-6D-1109		11/18/09	9:55	0.45	J	0.19	0.66	J	0.38	0.07	U	0.17	0.17	U	0.18	0.09	U	0.14
		2	GW-MW-6D-0210		2/24/10	7:25	0.36		0.14	0.18	U	0.46	0.12	U	0.14	0.08	U	0.11	0.04	U	0.08
	MW-11	1	GW-MW-11-1109		11/19/09	9:05	0.01	U	0.19	0.13	U	0.40	0.03	U	0.26	0.37	J	0.27	0.06	U	0.14
		2	GW-MW-11-0210		2/25/10	15:20	0.51	J	0.30	0.51	J	0.49	0.07	U	0.11	0.23	J	0.18	0.01	U	0.06

TABLE 12

Radionuclide Analytical Results, Surface Water and Groundwater

Halaco Site Remedial Investigation, Oxnard, California

Matrix	Location ID	Sample No	Sample ID	Dup	Date	Time	Radium-226			Radium-228			Thorium-228			Thorium-230			Thorium-232		
							Result	Q	Unc	Result	Q	Unc	Result	Q	Unc	Result	Q	Unc	Result	Q	Unc
	MW-12	1	GW-MW-12-1109		11/20/09	9:55	65.34		1.45	4.33		0.62	39.39		9.97	2.00		0.82	0.96		0.51
			GW-MW-112-1109	Dup	11/20/09	9:55	0.62		0.22	39.64		1.54	58.40		15.63	2.16		0.93	0.46	J	0.37
		2	GW-MW-12-0210		2/25/10	11:30	67.42		1.80	9.66		0.91	88.13		30.52	4.76		2.17	1.53	J	0.99
			GW-MW-112-0210	Dup	2/25/10	11:30	48.15		1.06	7.20		0.74									
	MW-12C	1	GW-MW-12C-0610		6/3/10	9:15	3.95		0.60	9.54		0.93	0.19	J	0.16	0.31	J	0.20	0.02	U	0.06
		2	GW-MW-12C-1010		10/26/10	13:08	2.80		0.64	21.87		1.23	0.31	J	0.23	0.26	J	0.20	0.10	U	0.12
	MW-13	1	GW-MW-13-1109		11/19/09	7:10	0.42	J	0.22	0.26	U	0.53	0.12	U	0.19	0.47	J	0.30	-0.01	U	0.03
		2	GW-MW-13-0210		2/25/10	10:10	3.27		0.39	0.18	U	0.49	0.18	U	0.18	0.01	U	0.08	0.20	J	0.18
	MW-13C	1	GW-MW-13C-0610		6/3/10	10:30	5.60		0.91	9.64		1.07	0.26	J	0.23	0.27	J	0.23	0.33	J	0.24
			GW-MW-113C-0610	Dup	6/3/10	10:30	4.91		0.86	10.08		0.93	0.24	J	0.18	0.12	U	0.14	0.13	U	0.14
		2	GW-MW-13C-1010		10/27/10	7:46	6.97		0.62	13.34		0.94	0.38	J	0.25	0.13	U	0.15	0.05	U	0.09
			GW-MW-113C-1010	Dup	10/27/10	7:46	1.73		0.33	17.05		1.21	0.60	J	0.40	1.27		0.62	-0.02	U	0.03
	MW-14	1	GW-MW-14-1109		11/18/09	14:20	0.20	U	0.22	1.41		0.49	0.48	J	0.31	1.23		0.49	0.90		0.41
		2	GW-MW-14-0210		2/24/10	15:30	0.34	J	0.23	0.75	J	0.61	0.02	U	0.08	0.25	J	0.18	0.03	U	0.05
	MW-15	1	GW-MW-15-1109		11/18/09	12:00	0.22	U	0.26	2.15		0.63	0.00	U	0.09	0.17	U	0.18	0.03	U	0.08
		2	GW-MW-15-0210		2/25/10	8:35	0.81		0.21	1.43	J	0.60	0.18	J	0.17	0.20	J	0.17	0.05	U	0.09
	MW-18	1	GW-MW-18-1109		11/20/09	10:30	193.97		4.99	10.66		1.32	1.59		0.62	0.43	J	0.28	0.59		0.34
		2	GW-MW-18-0210		2/23/10	8:35	11.84		0.74	4.20		0.60	4.35		1.14	4.12		1.09	3.92		1.04
	MW-19	1	GW-MW-19-1109		11/17/09	8:30	2.76		0.33	-0.09	U	0.45	0.54		0.25	0.24	J	0.16	0.08	U	0.09
		2	GW-MW-19-0210		2/22/10	15:15	11.74		0.64	24.12		1.21	0.80		0.36	0.08	U	0.11	0.03	U	0.09
	MW-19C	1	GW-MW-19C-1109		11/17/09	8:10	5.99		0.45	39.26		1.52	0.97		0.43	0.71		0.33	0.19	J	0.17
			GW-MW-119C-1109	Dup	11/17/09	8:10	9.02		0.52	48.30		2.10	0.85		0.29	0.17	J	0.13	0.08	U	0.09
		2	GW-MW-19C-0210		2/22/10	14:15	17.11		0.73	4.47		0.60	0.77	J	0.48	0.37	J	0.31	0.29	J	0.29
			GW-MW-119C-0210	Dup	2/22/10	14:15	20.16		0.99	1.28	J	0.47	0.91		0.41	0.05	U	0.10	0.13	U	0.15
	MW-19D	1	GW-MW-19D-1109		11/17/09	10:15	0.90		0.20	0.67	J	0.49	0.12	U	0.15	0.31	J	0.18	0.07	U	0.09
		2	GW-MW-19D-0210		2/22/10	11:15	0.47		0.13	1.03	J	0.49	0.11	U	0.12	0.11	U	0.12	0.17	J	0.15
	MW-20	1	GW-MW-20-1109		11/18/09	14:20	0.64	J	0.32	1.05	J	0.79	0.05	U	0.10	0.01	U	0.07	0.02	U	0.07
			GW-MW-120-1109	Dup	11/18/09	14:20	0.19	J	0.18	0.87	J	0.50	0.02	U	0.13	0.07	U	0.12	0.01	U	0.09
		2	GW-MW-20-0210		2/26/10	7:45	0.42		0.15	1.68		0.57	0.11	U	0.13	0.08	U	0.11	-0.01	U	0.07
			GW-MW-120-0210	Dup	2/26/10	7:45	3.96		0.49	1.89		0.51	0.12	U	0.14	0.11	U	0.12	0.02	U	0.06
	MW-21	1	GW-MW-21-1109		11/19/09	12:15	0.40	J	0.18	0.63	J	0.56	0.05	U	0.13	0.57	J	0.30	0.06	U	0.11
			GW-MW-21-1109	Dup	11/19/09	12:15	0.37	J	0.20	0.83	J	0.43	0.08	U	0.17	0.36	J	0.25	0.04	U	0.07
		2	GW-MW-21-0210		2/23/10	14:20	0.24	J	0.12	1.70		0.53	0.02	U	0.08	0.33	J	0.20	0.08	U	0.09
	MW-21C	1	GW-MW-21C-0610		6/3/10	12:00	0.38	U	0.59	2.23		0.70	0.08	U	0.10	0.12	U	0.12	0.09	U	0.10
		2	GW-MW-21C-1010		10/26/10	14:02	2.56		0.49	3.47		0.71	0.02	U	0.11	0.20	J	0.19	0.03	U	0.10
	MW-22	1	GW-MW-22-1109		11/19/09	7:10	0.36	J	0.36	0.93	J	0.47	0.05	U	0.15	0.51		0.24	0.02	U	0.07
		2	GW-MW-22-0210		2/24/10	15:15	0.33	J	0.17	1.11	J	0.44	0.03	U	0.09	0.01	U	0.06	0.07	U	0.10
	MW-23B	1	GW-MW-23B-0610		6/3/10	14:45	0.43	J	0.28	2.19		0.56	0.10	U	0.12	0.16	J	0.15	0.03	U	0.07
		2	GW-MW-23B-1010		10/26/10	11:04	2.05		0.46	1.38	J	0.53	0.06	U	0.12	0.20	J	0.17	0.03	U	0.06
	MW-23C	1	GW-MW-23C-0610		6/3/10	13:30	0.64	J	0.54	0.67	U	2.04	0.23	J	0.17	0.25	J	0.18	0.17	J	0.14
		2	GW-MW-23C-1010		10/26/10	11:39	1.66		0.29	1.84		0.60	0.10	U	0.16	0.24	J	0.18	0.02	U	0.06
	MW-24	1	GW-MW-24-1109		11/17/09	11:20	1.50		0.37	2.82		0.77	1.02		0.32	0.81		0.27	0.61		0.23
		2	GW-MW-24-0210		2/22/10	15:45	1.03		0.27	3.71		0.62	0.39	J	0.25	0.16	J	0.15	0.02	U	0.07
	MW-24C	1	GW-MW-24C-0610		6/2/10	14:45	6.13		0.79	27.40		1.40	0.73		0.35	0.25	J	0.19	0.03	U	0.07
		2	GW-MW-24C-1010		10/26/10	8:14	7.59		0.74	23.77		1.27	0.65	J	0.35	0.27	J	0.20	0.09	U	0.12
	MW-25B	1	GW-MW-25B-0610		6/2/10	11:30	0.17	U	0.57	1.22	J	0.59	0.09	U	0.13	0.03	U	0.09	0.02	U	0.07
		2	GW-MW-25B-1010		10/26/10	9:22	2.59		0.35	1.04	J	0.68	0.03	U	0.11	0.16	J	0.15	0.04	U	0.09
	MW-25C	1	GW-MW-25C-0610		6/2/10	12:45	1.28		0.36	1.87		0.65	0.24	J	0.20	0.11	U	0.15	0.09	U	0.13
		2	GW-MW-25C-1010		10/26/10	10:07	3.00		0.41	1.42	J	0.70	0.00	U	0.09	0.09	U	0.11	0.08	U	0.11
	MW-27B	1	GW-MW-27B-0610		6/2/10	9:00	0.66	J	0.37	1.51	J	0.65	0.07	U	0.14	0.05	U	0.09	0.02	U	0.07
		2	GW-MW-27B-1010		10/27/10	11:48	1.81		0.29	3.81		0.68	0.09	U	0.14	0.23	J	0.18	0.05	U	0.10
	MW-27C	1	GW-MW-27C-0610		6/2/10	10:10	0.50	J	0.43	0.72	J	0.61	0.18	U	0.21	0.07	U	0.11	0.00	U	0.01
		2	GW-MW-27C-1010		10/27/10	12:23	1.55		0.36	1.60		0.50	0.04	U	0.14	0.14	U	0.15	0.06	U	0.09

Notes:

Units are in pCi/L

Data Qualifiers (Q):

U = The error is greater than or equal to the result.

J = The result minus the error is less than the detection limit but greater than zero.

TABLE 13

VOC Analytical Results, Groundwater

Halaco Site Remedial Investigation, Oxnard, California

Location	Duplicate (Dup)	Sample ID	CLP ID	Date	Chloromethane		1,1,2-Trichloro-1,2,2-trifloroethane		Acetone		Carbon disulfide		Methylene chloride		Chloroform		Benzene		Toluene		Dibromochloromethane		m,p-Xylene		Bromoform	
					Res	Q	Res	Q	Res	Q	Res	Q	Res	Q	Res	Q	Res	Q	Res	Q	Res	Q	Res	Q	Res	Q
1		GW-MW-1R-1109	Y5H76	11/19/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2		GW-MW-2RA-1109	Y5H77	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-2RB-1109	Y5H80	11/17/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
	Dup	GW-MW-102RB-1109	Y5H79	11/17/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-2C-1109	Y5H81	11/17/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-2D-1109	Y5H82	11/17/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.14	J	0.5	U	0.12	J	0.5	U
3		GW-MW-3RA-1109	Y5H83	11/19/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-3RB-1109	Y5H84	11/19/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-3C-1109	Y5H85	11/18/09	0.92		0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-3D-1109	Y5H86	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
4		GW-MW-4RA-1109	Y5H87	11/20/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-4RB-1109	Y5H88	11/20/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
5		GW-MW-5-1109	Y5H90	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
6		GW-MW-6-1109	Y5H89	11/20/09	0.29	J	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.49	J	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-6C-1109	Y5H91	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-6D-1109	Y5H92	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.35	J
11		GW-MW-11-1109	Y5H93	11/19/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
12		GW-MW-12-1109	Y5H95	11/20/09	0.29	J	0.5	U	74	J	0.5	U	0.5	U	0.5	U	0.97		0.27	J	0.5	U	0.5	U	0.5	U
	Dup	GW-MW-112-1109	Y5H94	11/20/09	0.5	U	0.5	U	60		0.5	U	0.5	U	0.5	U	0.98		0.27	J	0.5	U	0.5	U	0.5	U
		GW-MW-12C-0610	Y6Q44	6/3/10	0.5	U	0.5	U	5	U	0.5	U	0.19	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
13		GW-MW-13-1109	Y5H96	11/19/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-13C-0610	Y6Q49	6/3/10	0.5	U	0.5	U	5	U	0.5	U	0.13	J	0.5	U	0.5	U	0.21	J	0.5	U	0.5	U	0.5	U
	Dup	GW-MW-113C-0610	Y6Q47	6/3/10	0.5	U	0.5	U	5	U	0.5	U	0.12	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
14		GW-MW-14-1109	Y5H97	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
15		GW-MW-15-1109	Y5H98	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
18		GW-MW-18-1109	Y5HA1	11/20/09	0.5	U	0.5	U	64	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
19		GW-MW-19-1109	Y5HA2	11/17/09	0.5	U	0.27	J	20	J	0.5	U	0.5	U	0.5	U	0.68		0.18	J	0.5	U	0.5	U	0.5	U
		GW-MW-19C-1109	Y5HA4	11/17/09	0.5	U	0.5	U	14	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
	Dup	GW-MW-119C-1109	Y5HA3	11/17/09	0.5	U	0.5	U	9.9	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-19D-1109	Y5HA5	11/17/09	0.5	U	0.5	U	5	U	0.5	U	0.06	J	0.5	U	0.5	U	0.12	J	0.5	U	0.12	J	0.5	U
20		GW-MW-20-1109	Y5HA7	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
	Dup	GW-MW-120-1109	Y5HA6	11/18/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
21		GW-MW-21-1109	Y5HA8	11/19/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-21C-0610	Y6Q51	6/3/10	0.5	U	0.5	U	4.9	J	0.5	U	0.35	J	0.62		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
22		GW-MW-22-1109	Y5HB0	11/19/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
23		GW-MW-23B-0610	Y6Q53	6/3/10	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.17	J	0.5	U	0.5	U	0.5	U
		GW-MW-23C-0610	Y6Q55	6/3/10	0.5	U	0.5	U	8.6		0.5	U	0.5	U	17		0.5	U	0.24	J	0.5	U	0.5	U	0.5	U
24		GW-MW-24-1109	Y5HB1	11/17/09	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-24C-0610	Y6Q57	6/2/10	0.5	U	0.5	U	5	U	0.14	J	0.5	U	0.5	U	0.5	U	0.11	J	0.17	J	0.5	U	0.25	J
25		GW-MW-25B-0610	Y6Q59	6/2/10	0.5	U	0.5	U	5.2		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-25C-0610	Y6Q61	6/2/10	0.5	U	0.5	U	6		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
27		GW-MW-27B-0610	Y6Q63	6/2/10	0.5	U	0.5	U	5	U	0.11	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
		GW-MW-27C-0610	Y6Q65	6/2/10	0.5	U	0.5	U	5	U	0.24	J	0.5	U	0.29	J	0.5	U	0.5	U	1.1		0.5	U	1.6	

Notes:

Units are in µg/L

Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected at a level greater than or equal to the detection limit listed in the table.

J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (because quality control criteria were not met, or the concentration of the analyte was below the reporting limit).

UJ = The analyte was not detected at a level greater than or equal to the detection limit. However, the reported detection limit is approximate.

R = The data did not meet quality control criteria and are rejected as unusable. The analyte may or may not be present in the sample.

TABLE 14
SVOC Analytical Results, Groundwater
Halaco Site Remedial Investigation, Oxnard, California

Location	Duplicate (Dup)	Sample ID	CLP ID	Date	Benzaldehyde	Phenol	2-Chlorophenol	2-Methylphenol	Acetophenone	4-Methylphenol	N-Nitroso-di-n-propylamine	Naphthalene	Caprolactam	2-Methylnaphthalene	2,4,6-Trichlorophenol	Acenaphthene	4-Nitrophenol	Dibenzofuran	2,4-Dinitrotoluene	Diethylphthalate	Fluorene	Pentachlorophenol	Phenanthrene	Di-n-butylphthalate	Fluoranthene	Pyrene	Butylbenzylphthalate	Benzo(a)anthracene	Chrysene	Bis(2-ethylhexyl)phthalate	Di-n-octylphthalate	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	2,3,4,6-Tetrachlorophenol
					Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Rs Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q	Res Q
1		GW-MW-1R-1109	Y5H76	11/19/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.32 J	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.50 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2		GW-MW-2RA-1109	Y5H77	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-2RB-1109	Y5H80	11/17/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.2 J	66	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	0.21 J	5 U	5 U	5 U	5 U	5 U	5 U	0.51 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
	Dup	GW-MW-102RB-1109	Y5H79	11/17/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	70	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.39 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
		GW-MW-2C-1109	Y5H81	11/17/09	5 U	2.7 J	5 U	5 U	5 U	2.6 J	5 U	0.17 J	130	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.43 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
		GW-MW-2D-1109	Y5H82	11/17/09	5 U	5 U	5 U	5 U	5 U	0.18 J	5 U	0.28 J	120	0.2 J	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.45 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
3		GW-MW-3RA-1109	Y5H83	11/19/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.28 J	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.49 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-3RB-1109	Y5H84	11/19/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	150	5 U	5 UJ	5 U	10 U	5 UJ	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.37 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
		GW-MW-3C-1109	Y5H85	11/18/09	5 U	1.3 J	5 U	5 U	5 U	0.34 J	5 U	5 U	77	5 U	5 U	5 U	10 U	5 U	5 U	0.24 J	5 U	10 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-3D-1109	Y5H86	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	160	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4		GW-MW-4RA-1109	Y5H87	11/20/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	220	5 U	5 U	5 U	10 U	5 U	5 U	0.64 J	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.33 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-4RB-1109	Y5H88	11/20/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
5		GW-MW-5-1109	Y5H90	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	440	5 U	5 UJ	5 U	10 U	5 U	5 U	0.26 J	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.38 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
6		GW-MW-6-1109	Y5H89	11/20/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-6C-1109	Y5H91	11/18/09	5 U	0.79 J	5 U	5 U	5 U	0.37 J	5 U	5 U	270	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	0.16 J	5 U	5 U	5 U	5 U	5 U	0.27 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-6D-1109	Y5H92	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	200	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
11		GW-MW-11-1109	Y5H93	11/19/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.41 J	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.21 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
12		GW-MW-12-1109	Y5H95	11/20/09	5 U	0.26 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.23 J
	Dup	GW-MW-112-1109	Y5H94	11/20/09	5 U	0.24 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.22 J
		GW-MW-12C-0610	Y6Q44	6/3/10	5 U	0.97 J	5 U	5 U	0.46 J	5 U	5 U	5 U	20	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
13		GW-MW-13-1109	Y5H96	11/19/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.25 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-13C-0610	Y6Q49	6/3/10	5 U	0.18 J	5 U	5 U	0.36 J	5 U	5 U	5 U	20	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	Dup	GW-MW-113C-0610	Y6Q47	6/3/10	5 U	0.43 J	5 U	5 U	0.32 J	5 U	5 U	5 U	14	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.8 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
14		GW-MW-14-1109	Y5H97	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.29 J	18	5 U	5 U	5 U	10 U	5 U	5 U	0.17 J	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
15		GW-MW-15-1109	Y5H98	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.17 J	90	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
18		GW-MW-18-1109	Y5HA1	11/20/09	5 U	0.53 J	5 U	5 U	5 U	0.23 J	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	0.22 J	5 U	10 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
19		GW-MW-19-1109	Y5HA2	11/17/09	5 U	10	1.3 J	0.22 J	1.2 J	0.49 J	5 U	0.74 J	5 U	0.36 J	0.36 J	0.29 J	10 U	0.21 J	5 U	5 U	0.3 J	10 U	0.73 J	5 U	0.28 J	0.2 J	5 U	5 U	5 U	0.49 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
		GW-MW-19C-1109	Y5HA4	11/17/09	5 U	0.67 J	5 U	5 U	5 U	5 U	5 U	5 U	84	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.63 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
	Dup	GW-MW-119C-1109	Y5HA3	11/17/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	96	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.59 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
		GW-MW-19D-1109	Y5HA5	11/17/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.21 J	250	5 U	5 UJ	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.62 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ
20		GW-MW-20-1109	Y5HA7	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.16 J	8.9	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
	Dup	GW-MW-120-1109	Y5HA6	11/18/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	83	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	0.2 J	0.32 J	0.32 J	1.2 J	0.44 J	0.34 J	0.39 J	0.47 J	0.39 J	0.3 J	0.52 J	5 U
21		GW-MW-21-1109	Y5HA8	11/19/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	17	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.25 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-21C-0610	Y6Q51	6/3/10	5 U	5 U	5 U	5 U	0.2 J	5 U	5 U	5 U	27	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
22		GW-MW-22-1109	Y5HB0	11/19/09	5 U	1.9 J	1.7 J	5 U	5 U	5 U	1.8 J	5 U	36	5 U	5 U	2.1 J	2.4 J	5 UJ	1.9 J	5 U	5 U	1.1 J	5 U	5 U	5 U	3.3 J	5 U	5 U	5 U	0.26 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
23		GW-MW-23B-0610	Y6Q53	6/3/10	0.34 J	0.41 J	5 U	5 U	0.34 J	5 U	5 U	5 U	26	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-23C-0610	Y6Q55	6/3/10	0.46 J	5 U	5 U	5 U	0.33 J	5 U	5 U	5 U	30	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.3 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
24		GW-MW-24-1109	Y5HB1	11/17/09	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	220	5 U	5 UJ	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.51 J	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ
		GW-MW-24C-0610	Y6Q57	6/2/10	0.66 J	1.4 J	5 U	0.36 J	0.75 J	5 U	5 U	5 U	89	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
25		GW-MW-25B-0610	Y6Q59	6/2/10	0.65 J	0.16 J	5 U	5 U	0.45 J	5 U	5 U	5 U	19	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.4 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-25C-0610	Y6Q61	6/2/10	0.4 J	5 U	5 U	5 U	0.32 J	5 U	5 U	5 U	32	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
27		GW-MW-27B-0610	Y6Q63	6/2/10	0.96 J	0.51 J	5 U	5 U	0.62 J	5 U	5 U	5 U	13	5 U	5 U	5 U	10 U	5 U	5 U	0.39 J	5 U	10 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.7 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		GW-MW-27C-0610	Y6Q65	6/2/10	0.49 J	5 U	5 U	5 U	0.55 J	5 U	5 U	5 U	190	5 U	5 UJ	5 U	10 U	5 U	5 U	2.5 J	5 U	10 UJ	5 U	5 U	5 U	5 U	0.21 J	5 U	5 U	1.8 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ

Notes:

Units are in µg/L

Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected at a level greater than or equal to the detection limit listed in the table.

J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (because quality control criteria were not met, or the concentration of the analyte was below the reporting limit).

UJ = The analyte was not detected at a level greater than or equal to the detection limit. However, the reported detection limit is approximate.

TABLE 15

TPH Analytical Results, Groundwater

Halaco Site Remedial Investigation, Oxnard, California

Location	Sample ID	Duplicate (Dup)	Date	Time	TPH as Gasoline Result	Q	TPH as Diesel Result	Q	TPH as Motor Oil Result	Q
1	GW-MW-1R-1109		11/19/09	11:50	50	U	240	U	940	U
2	GW-MW-2RA-1109		11/18/09	7:10	50	U	220	J	940	U
	GW-MW-2RB-1109		11/17/09	14:45	160		230	U	920	U
	GW-MW-102RB-1109	Dup	11/17/09	14:45	160		230	U	920	U
	GW-MW-2C-1109		11/17/09	14:30	340		210	J	900	U
	GW-MW-2D-1109		11/17/09	12:10	50	U	140	J	950	U
3	GW-MW-3RA-1109		11/19/09	10:30			240	U	940	U
	GW-MW-3RB-1109		11/19/09	9:25	50	U	210	J	940	U
	GW-MW-3C-1109		11/18/09	8:20	190		230	U	910	U
	GW-MW-3D-1109		11/18/09	7:10	50	U	260		950	U
4	GW-MW-4RA-1109		11/20/09	6:40	50	U	360		940	U
	GW-MW-4RB-1109		11/20/09	7:10	50	U	240	U	940	U
5	GW-MW-5-1109		11/18/09	10:00	50	U	340		940	U
6	GW-MW-6-1109		11/20/09	8:15	95		240		930	U
	GW-MW-6C-1109		11/18/09	11:05	460		300		910	U
	GW-MW-6D-1109		11/18/09	9:55	50	U	180	J	950	U
11	GW-MW-11-1109		11/19/09	9:05	50	U	260		1000	U
12	GW-MW-12-1109		11/20/09	9:55	93		1000		890	U
	GW-MW-112-1109	Dup	11/20/09	9:55	93		1100		890	U
	GW-MW-12C-0610		6/3/10	9:15	190		140		920	U
13	GW-MW-13-1109		11/19/09	7:10	50	U	320		940	U
	GW-MW-13C-0610		6/3/10	10:30	320		120		930	U
	GW-MW-113C-0610	Dup	6/3/10	10:30	300		230	U	920	U
14	GW-MW-14-1109		11/18/09	14:20	50	U	250	J	510	J
15	GW-MW-15-1109		11/18/09	12:00	50	U	240	U	940	U
18	GW-MW-18-1109		11/20/09	10:30	300		230	U	920	U
19	GW-MW-19-1109		11/17/09	8:30	260		280		920	U
	GW-MW-19C-1109		11/17/09	8:10	430		230	J	940	U
	GW-MW-119C-1109	Dup	11/17/09	8:10	440		180	J	900	U
	GW-MW-19D-1109		11/17/09	10:15	50	U	270		950	U
20	GW-MW-20-1109		11/18/09	14:20	50	U	160	J	940	U
	GW-MW-120-1109	Dup	11/18/09	14:20	50	U	220	J	940	U
21	GW-MW-21-1109		11/19/09	12:15	50	U	170	J	940	U
	GW-MW-21C-0610		6/3/10	12:00	50	U				
22	GW-MW-22-1109		11/19/09	7:10	50	U	130	J	1000	U
23	GW-MW-23B-0610		6/3/10	14:45	50	U	240	U	950	U
	GW-MW-23C-0610		6/3/10	13:30	50	U	3100		6200	
24	GW-MW-24-1109		11/17/09	11:20	50	U	250		940	U
	GW-MW-24C-0610		6/2/10	14:45	170		550		940	U
25	GW-MW-25B-0610		6/2/10	11:30	50	U	230	U	940	U
	GW-MW-25C-0610		6/2/10	12:45	33		240	U	950	U
27	GW-MW-27B-0610		6/2/10	9:00	50	U	230	U	940	U
	GW-MW-27C-0610		6/2/10	10:10	50	U	260		1000	U

Notes:

Units are in µg/L

Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

TABLE 16
General Chemistry and TDS/Potassium Ratio, Surface Water and Groundwate
Halaco Site Remedial Investigation, Oxnard, California

								General						Alkalinity								Anions								Nitrogen Species								TOC		Cations (Total Metals)								Iron and Manganese (Total)				
Matrix	Location	Location ID	Sample	Sample ID	Dup	Date	Time	Total Dissolved Solids		Specific Conductance (EC)		pH		Total Alkalinity		Hydroxide Alkalinity		Bi-carbonate Alkalinity		Carbonate Alkalinity		Chloride		Sulfate		Bromide		Fluoride		Ammonia as N		Nitrate as N		Nitrite as N		Nitrogen, Total Kjeldahl		Total Organic Carbon		Sodium		Potassium		Calcium		Magnesium		Iron		Manganese		TDS/ Potassium Ratio
								Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Surface Water	Ocean	OCE-1	1	SW-OCE-001-1109		11/16/09	10:15	33000		49000		8.1		120		10	U	120		10	U	21000		2600		66		10	U	0.03	U	10	U	100	U	0.05	J	0.5	U	10600		439	J	297		1280		0.0346	J	0.0016	J	75
			2	SW-OCE-001-0210		2/23/10	11:15	34000		48000		8.1		120		10	U	120		10	U	10000		2600		57		0.76		0.03	U	1	U	50	U	0.1	U			9590		498		324		1240		0.146		0.0061	UJ	68
		OCE-2	1	SW-OCE-002-1109		11/16/09	9:50	33000		49000		8.1		120		10	U	120		10	U	19000		2600		70		10	U	0.03	U	10	U	100	U	0.1	U	0.5	U	10400		433	J	290		1270		0.0815	J	0.0027	J	76
			2	SW-OCE-002-0210		2/23/10	10:45	36000		49000		8.1		110		10	U	110		10	U	11000		2700		61		0.84		0.03	U	1	U	50	U	0.1	U			9690		444		332		1260		0.158		0.0046	UJ	81
	Other Drains	HUD-1	1	SW-HUD-001-1109		11/16/09	9:38	5600		8900		7.7		370		10	U	370		10	U	2500		900		8.9		0.79		0.68		0.15		10	U	1.4		2.3		1570		65.5	J	250		219		1.81		0.527		85
			2	SW-HUD-001-0210		2/26/10	8:45	2800		4300		7.6		330		10	U	330		10	U	970		650		3.3		0.71		0.24		0.42		10	U	1		5.8		610		24.5		207		111		0.798		0.416		114
		JSD-1	1	SW-JSD-001		11/16/09	10:10	4300		6800		8.2		270		10	U	270		10	U	1800		910		7.1		0.63		0.11		0.83		5	U	2.6		6		1090		47.8	J	221		172		0.123		0.159		90
			2	SW-JSD-001-0210		2/25/10	12:15	16000		24		8		240		10	U	240		10	U	9000		1400		34		0.43		0.15		0.29		50	U	0.87		2		4410		173		265		535		0.53		0.243		92
	Lagoon	LAG-1	1	SW-LAG-001-1109		11/16/09	8:25	2700		4000		8.1		220		10	U	220		10	U	740		900		4.8		0.58		0.056		4.8		2	U	2		7.8		503		22.8	J	225		116		0.187		0.142		118
			2	SW-LAG-001-0210		2/25/10	13:30	8100		13000		8.2		170		10	U	170		10	U	4000		990		16		0.42		0.088		4.5		10	U	0.87		5.9		2280		89.3		203		294		0.468		0.206		91
		LAG-2	1	SW-LAG-002-1109		11/16/09	11:05	2900		4300		8.3		210		10	U	210		10	U	890		880		4.9		0.59		0.03	U	3.2		2	U	1.9		8.9		576		26.2	J	212		120		0.202		0.116		111
			2	SW-LAG-002-0210		2/24/10	13:35	9100		14000		8.3		220		10	U	220		10	U	4100		1500		17		0.65		0.03	U	8.7		10	U	0.52		2.9		2310		101	J	320		380		0.211		0.325		90
	Oxnard Industrial Drain	OID-1	1	SW-OID-001-1109		11/16/09	11:40	2600		3800		8.2		220		10	U	220		10	U	670		920		4.8		0.6		0.057		5.8		2	U	2		8.6		461		19.1	J	230		113		0.061	J	0.0333		136
				SW-OID-101-1109	Dup	11/16/09	11:40	2600		3700		8.2		220		10	U	220		10	U	630		900		4.8		0.6		0.064		6		2	U	1.9		8.2		468		20.1	J	236		115		0.22		0.171		129
			2	SW-OID-001-0210		2/24/10	12:40	6800		12000		8.3		250		10	U	250		10	U	3300		1500		13		0.57		0.03	U	9.5		10	U	0.49				1730		72.5	J	343		309		0.291		0.378		94
				SW-OID-101-0210	Dup	2/24/10	12:40	4300		12000		8.3		250		10	U	250		10	U	3400		1500		14		0.63		0.037		10		10	U	0.55				2190		95.2	J	318		358		0.289		0.335		45
		OID-2	1	SW-OID-002-1109		11/16/09	13:05	2400		3300		8.1		220		10	U	220		10	U	460		970		4.7		0.6		0.09		8.4		2	U	1.6		8		372		15.9	J	249		108		0.23		0.226		151
			2	SW-OID-002-0210		2/24/10	13:40	7200		11000		8.2		260		10	U	260		10	U	3100		1500		12		0.59		0.023		9.5		10	U	1.3		2.7		1690		70.9	J	338		301		0.292		0.366		102
		OID-3	1	SW-OID-003-1109		11/16/09	13:30	2400		3300		8.1		220		10	U	220		10	U	450		970		4.6		0.6		0.094		8.6		2	U	1.8		7.5		372		16.2	J	244		106		0.206		0.191		148
			2	SW-OID-003-0210		2/25/10	12:45	3300		5300		7.8		160		10	U	160		10	U	1300		660		5.8		0.34		0.2		5.3		10	U	1.4				842		33.6		168		131		0.696		0.245		98
		OID-4	1	SW-OID-004-1109		11/16/09	13:05	2400		3200		8.1		220		10	U	220		10	U	420		980		4.6		0.6		0.094		9		0.1	U	1.9		7.7		376		15.4	J	253		107		0.235		0.24		156
				SW-OID-104-1109	Dup	11/16/09	13:05																							0.099						1.8		8.6		366		15.9	J	255		108		0.246		0.246		0
			2	SW-OID-004-0210		2/24/10	12:15	6900		11000		8.2		260		10	U	260		10	U	3000		1500		13		0.66		0.036		11		10	U	0.62				1690		71	J	346		308		0.306		0.378		97
				SW-OID-104-0210	Dup	2/24/10	12:15	7200		11000		8.1		260		10	U	260		10	U	2900		1500		13		0.69		0.054		11		10	U	0.59				1570		66	J	341		296		0.309		0.375		109
		OID-5	1	SW-OID-005-1109		11/16/09	12:15	2300		3100		8.1		220		10	U	220		10	U	340		960		4.6		0.6		0.12		10		0.07	J	1.5		7.1		327		14.1	J	260		106		0.262		0.199		163
			2	SW-OID-005-0210		2/24/10	13:45	5900		9300		8.1		270		10	U	270		10	U	2300		1500		11		0.71		0.094		13		10	U	0.71				1340		54.2	J	361		270		0.411		0.375		109
		OID-6	1	SW-OID-006-1109		11/16/09	11:55	2300		3000		8.1		220		10	U	220		10	U	320		950		4.6		0.61		0.13		11		0.07	J	1.3		7.2		321		13.5	J	260		105		0.271		0.222		170
			2	SW-OID-006-0210		2/24/10	13:00	5200		7900		8.1		290		10	U	290		10	U	1800		1500		9.2		0.74		0.043		15		10	U	0.62		3.6		1100		43.1	J	369		233		0.277		0.303		121
		OID-7	1	SW-OID-007-1109		11/16/09	11:15	2100		2600		8.2		220		10	U	220		10	U	120		1100		4.6		0.59		0.14		15		0.12		1.1		6.4		233		9.03	J	292		102		0.18		0.126		233
			2	SW-OID-007-0210		2/24/10	12:40	4200		6100		8.2		280		10	U	280		10	U	1100		1500		8		0.68		0.054		18		10	U	0.7				752		27.6	J	374		190		0.385		0.3		152
		OID-8	1	SW-OID-008-1109		11/16/09	8:50	1500		2000		8.5		300		10	U	290		18		97		690		2.3		0.63		0.03	U	0.1	U	2	U	0.92		9.9		185		9.26	J	206		83.3		0.24		0.0779		162
			2	SW-OID-008-0210		2/24/10	12:15	2600		3100		8.3		220		10	U	220		10	U	130		1400		5.7		0.67		0.03	U	20		1	U	0.1	U	4.8		241		5.3	J	384		133		0.284		0.179		491
	WMU Ditch	WMU-1	1	SW-WMU-001-1109		11/16/09	8:45	2700		4000		8		210		10	U	210		10	U	740		870		4.8		0.61		0.12		4.4		2	U	2		8.4		522		23.5	J	224		117		0.149		0.162		115
		WMU-2	1	SW-WMU-002-1109		11/16/09	9:10	2700		3900		7.8		220		10	U	220		10	U	700		870		4.8		0.61		0.19		4.4		2	U	1.8		8.5		516		22.8	J	223		114		0.128		0.188		118
	NCE-East	NCE-1	1	SW-NCE-001-0610		6/2/10	7:45	6900						150		10	U	150		10	U	3100		1400		12		0.6		0.06		0.09		10	U	2.3		14		1700		81.3		219		247		0.461		0.163		85
				SW-NCE-101-0610	Dup	6/2/10	7:45	6800						160		10	U	160		10	U	3100		1400		13		0.6		0.099		0.12		10	U	2.3		17		1710		81.4		209		238		0.396		0.155		84
		NCE-2	1	SW-NCE-002-0610		6/3/10	7:30	7100						160		10	U	160		10	U	3000		1400		13		0.56		0.036		0.1	U	10	U	2.6				1780		87.5	J	244		267		0.465		0.21		81
		NCE-3	1	SW-NCE-003-0610		6/3/10	8:00	6600						150		10	U	150		10	U	3200		1500		13		0.57		0.022		0.1	U	10	U	2.3				1760		83.9	J	232		257		0.131		0.162		79
Ground-water	1	MW-1R	1	GW-MW-1R-1109		11/19/09	11:50	7700		13000		6.3		190		10	U	190		10	U	3600		820		10		3		46		0.1	U	10	U	40				1590		1280		120		149		6.2		0.438		6
			2	GW-MW-1R-0210		2/25/10	10:20	10000		16000		7.5		280		10	U	280		10	U	4800		1000		14		2.8		63		0.06		10	U	52				2140		1830		168		211		6.53		0.686		5
	2	MW-2RA	1	GW-MW-2RA-1109		11/18/09	7:10	15000		22000		8		260		10	U	260		10	U	7800		2000		24		3.9		29		2.1		20	U	25				3180		1310		329		641		0.1	U	0.942		11
			2	GW-MW-2RA-0210		2/23/10	7:50	17000		2400		8		270		10	U	270		10	U	4300		2000		13		4.5		39		0.59		20	U	36				3330		1500		311		663		0.0377	UJ	1.2		11
				GW-MW-102RA-0210	Dup	2/23/10	7:50	18000		27000		7.9		260		10	U	260		10	U	5000		1900		19		4.3		37		0.98		50	U	35				3300		1470		309		648		0.0305	UJ	1.18		12
		MW-2RB	1	GW-MW-2RB-1109		11/17/09	14:45	40000		69000		7.1		85		10	U	85		10	U	28000		550		49		5	U	500		5	U	100	U	460				9130		7750		795		926		7.55		2.84		5
			`	GW-MW-102RB-1109	Dup	11/17/09	14:45	48000		69000		7.1		87		10	U	87		10	U	27000		520		48		5	U	520		5	U	100	U	450				9170		7580		791		920		7.35		2.79		6
			2	GW-MW-2RB-0210		2/23/10	9:30	53000		72000		7.2		92		10	U	92		10	U	31000		780		44		0.79		49		1	U	100	U	420				9330		7710		873		975		11.9		3.32		7
		MW-2C	1	GW-MW-2C-1109		11/17/09	14:30	83000		110000		6.7		120		10	U	120		10	U	46000		930		96		5	U	810		5	U	100	U	730				15800		14300		1220		404		36.4		8.67		6
			2	GW-MW-2C-0210		2/23/10	10:30	75000		100000		6.8		120		10	U	120		10	U	45000		900		87		1	U	74		1	U	100	U	680				14700		13900		1250		398		38.8		8.4		5
		MW-2D	1	GW-MW-2D-1109		11/17/09	12:10	870		1300		7.6		230		10	U	230		10	U	96		330		0.42		0.61		120		0.1	U	1	U	1				107		6.81		113		35.9		5.37		0.386		128
			2	GW-MW-2D-0210		2/23/10	11:40	890		1500		7.9		220		10	U	220		10	U	89		360		0.42		0.57		0.32		0.1	U	1	U	0.66				105		5.82		118		37.2		0.571		0.402		153
	3	MW-3RA	1	GW-MW-3RA-1109		11/19/09	10:30	4000		5800		7.2		230		10	U	230		10	U	1100		1400		5.2		1.5		0.41		0.1	U	5	U	1				778		39.5		254		198		4.82		0.9		101
			2	GW-MW-3RA-0210		2/25/10	8:20	2500		4100		7.8		230		10	U	230		10	U	990		440		4.3		1.1		1.1		2.3		10	U	1.6				572		38		130		119		1.69		0.244		66
		MW-3RB	1	GW-MW-3RB-1109		11/19/09	9:25	4100		6800		7.4		260		10	U	260		10	U	1500		1100		6.7		2.2		15		0.1	U	5	U	14				892		519		89.2		114		0.798		0.225		8
			2	GW-MW-3RB-0210		2/25/10	9:15	6800		11000		7.9		280		10	U	280		10	U	3200		950		10		2		27		0.1	U	10	U	24				1440		852		200		264		1.53		0.467		8
		MW-3C	1	GW-MW-3C-1109		11/18/09	8:20	67000		88000		7.3		170		10	U	170		10	U	38000		1400		120		2.8	J	480		5	U	100	U	440				14500		8740		1070		819		10.7		3.55		8
			2	GW-MW-3C-0210		2/23/10	12:00	73000		94000		6.8		140		10	U	140		10	U	42000		1400		120		1	U	52		1	U	100	U	460				14500		9510		1160		835		40.9		4.65		8
		MW-3D	1	GW-MW-3D-1109		11/18/09	7:10	940		1400		7.9		230		10	U	230		10	U	110		350		0.44		0.58		0.29		0.1	U	1	U	0.52				108		6.56		122		45.2		1.48		0.424		143
			2	GW-MW-3D-0210		2/23/10	14:30	960		1600		7.9		240		10	U	240		10	U	110		370		0.47		0.62		0.35		0.1	U	1	U	0.6				103		6.01		132		49.9		2.26		0.754		160
	4	MW-4RA	1	GW-MW-4RA-1109		11/20/09	6:40	2200		3600		7.6		330		10	U	330		10	U	720		560		3.5		2.7		0.03	U	0.1	U	2	U	0.34				495		36.4		97.1		109		0.231		0.417		60
			2	GW-MW-4RA-0210		2/24/10	10:05	5200		8300		7.4		370		10	U	370		10	U	2200		1000		9.2		3.7		0.12		1	U	10	U	0.63				1170		83.9	J	201		325		0.244		1.12		62
		MW-4RB	1	GW-MW-4RB-1109		11/20/09	7:10	6000		9400		6.3		470		10	U	470		10	U	2500		1200		11		1.1		0.48		0.1	U	5	U	1.1				1390		76.6		246		225		9.02		1.18		78
			2	GW-MW-4RB-0210		2/24/10	10:35	6500		10000		7.3		500		10	U	500		10	U	2700		1300		12		0.96		0.25		1	U	10	U	0.79				1570		87.8	J	300		275		10.3		1.34		74
	5	MW-5	1	GW-MW-5-1109		11/18/09	10:00	12000		19000		7.7		200		10	U	200		10	U	6700		1300		27		4.2		33		30		20	U	24				2650		1290		225		345		1.14		0.863		9
			2	GW-MW-5-0210		2/24/10	8:45	21000		34000		7.5		190		10	U	190		10	U	13000		730		32		5.5		73		12		50	U	51				4180		3300	J	271		557		0.227		0.645		6
	6	MW-6	1	GW-MW-6-1109		11/20/09	8:15	33000		52000		8.1		130		10	U	130		10	U	19000		670		37		1.2		680		1	U	100	U	580				6920		5400		339		210		0.199		0.443		6
			2	GW-MW-6-0210		2/24/10	8:45	24000		36000		8.1		62		10	U	58		10	U	13000		170		25		2.6		200		180		50	U	100				4160		3620	J	750		353		0.318		0.648		7
		MW-6C	1	GW-MW-6C-1109		11/18/09	11:05	70000		98000		8.2		320		10	U	320		10	U	41000		780		110		2	U	1200		2	U	100	U	1200				15500		12100		308		10.5		0.803		0.174		6
			2	GW-MW-6C-0210		2/24/10	7:25	64000		97000		8.2		310		10	U	260		46		41000		710		84		1	U	1500		1	U	100	U	1000				15200		11800	J	366		8.85		0.183		0.106		5
		MW-6D	1	GW-MW-6D-1109		11/18/09	9:55	1200		1800		7.7		200		10	U	200		10	U	290		350		1.1		0.58		0.75		0.18		2	U	1				139		14.9		161		57.8		0.899		0.555		81
			2	GW-MW-6D-0210		2/24/10	7:25	1100		1700		7.6		210		10	U	210		10	U	200		350		0.69		0.65		0.54		1	U	10	U	0.91				119		11.1	J	151		45.7		0.141		0.636		99
	11	MW-11	1	GW-MW-11-1109		11/19/09	9:05	4600		7200		7.2		520		10	U	520		10	U	1600		1000		6.6		1.2		1.5		0.46		5	U	2.5				997		240		230		195		9.48		0.828		19
			2	GW-MW-11-0210		2/25/10	15:20	4700		6900		7.4		270		10	U	270		10	U	1800		660		3.2		1.3		0.12		7.1		10	U	1				278		833		471		152		0.0987	J	0.329		6

TABLE 16
General Chemistry and TDS/Potassium Ratio, Surface Water and Groundwate
Halaco Site Remedial Investigation, Oxnard, Californi

								General						Alkalinity								Anions								Nitrogen Species						TOC		Cations (Total Metals)								Iron and Manganese (Total)				
Matrix	Location	Location ID	Sample	Sample ID	Dup	Date	Time	Total Dissolved Solids		Specific Conductance (EC)		pH		Total Alkalinity		Hydroxide Alkalinity		Bi-carbonate Alkalinity		Carbonate Alkalinity		Chloride		Sulfate		Bromide		Fluoride		Ammonia as N		Nitrate as N		Nitrite as N		Nitrogen, Total Kjeldahl		Total Organic Carbon		Sodium		Potassium		Calcium		Magnesium		Iron		Manganese		TDS/ Potassium Ratio
								Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
	12	MW-12	1	GW-MW-12-1109		11/20/09	9:55	120000		130000		9.3		790		530		10	U	260		60000		5	U	100		2.9		870		1	U	200	U	680				12100		19800		5020		2610		0.189		0.877		6
				GW-MW-112-1109	Dup	11/20/09	9:55	120000		130000		9.2		740		450		10	U	290		61000		5	U	100		2.9		850		1	U	200	U	710				12000		19700		4970		2590		0.685		1.05		6
			2	GW-MW-12-0210		2/25/10	11:30	180000		140000		9.1		930		230		10	U	710		73000		2.5	U	140		4.2		830		3.5		500	U	640				14300		23600		6650		3330		4.67		1.78		8
				GW-MW-112-0210	Dup	2/25/10	11:30	140000		140000		9.1		790		190		10	U	610		70000		2.5	U	140		3.6		820		3.8		500	U	640				14300		23500		6580		3420		7.17		2.5		6
		MW-12C	1	GW-MW-12C-0610		6/3/10	9:15	53000						440		10	U	330		110		30000		1200		98		2.3		1200		0.5	U	100	U	940				10400		7430	J	732		685		1.82		0.561		7
			2	GW-MW-12C-1010		10/26/10	13:08	53000		70000		7.6		230		10	U	230		10	U	30000		1400		100		10	U	810		10	U	100	U	740				10200		6870		985		769		2.43		1.86		8
	13	MW-13	1	GW-MW-13-1109		11/19/09	7:10	10000		17000		7.5		430		10	U	430		10	U	5400		890		18		0.1	U	31		0.1	U	20	U	27				2030		1430		251		479		4.27		0.719		7
			2	GW-MW-13-0210		2/25/10	10:10	10000		16000		7.6		440		10	U	440		10	U	5600		940		20		0.1	U	27		0.1	U	20	U	25				2050		1380		288		479		4.47		1.09		7
		MW-13C	1	GW-MW-13C-0610		6/3/10	10:30	48000						400		10	U	400		10	U	30000		3200		120		0.47		460		0.5	U	100	U	420				14400		1990	J	523		1480		13.4		0.824		24
				GW-MW-113C-0610	Dup	6/3/10	10:30	47000						400		10	U	400		10	U	30000		3200		120		0.48		480		0.5	U	100	U	410				14300		2010	J	549		1500		11.8		0.821		23
			2	GW-MW-13C-1010		10/27/10	7:46	50000		60000		7.1		440		10	U	440		10	U	30000		3000		120		0.1	U	520		23		100	U	480				14500		2140		518		1380		11.1		0.723		23
				GW-MW-113C-1010	Dup	10/27/10	7:46	51000		70000		7		440		10	U	440		10	U	30000		3000		150		0.1	U	510		23		100	U	440				14900		2200		520		1440		11.2		0.731		23
	14	MW-14	1	GW-MW-14-1109		11/18/09	14:20	5600		9600		7.4		450		10	U	450		10	U	2800		1200		11		1.2		1.5		0.1	U	10	U	2.6				1440		112		257		243		13.8		1.71		50
			2	GW-MW-14-0210		2/24/10	15:30	5600		8800		7.3		450		10	U	450		10	U	2400		990		10		1.3		1.6		1	U	10	U	2.3				1310		109	J	275		247		11.1		1.69		51
	15	MW-15	1	GW-MW-15-1109		11/18/09	12:00	5400		8100		7.2		290		10	U	290		10	U	2100		1400		8.7		1		4.1		0.05	J	10	U	2				1250		104		228		193		6.32		1.04		52
			2	GW-MW-15-0210		2/25/10	8:35	5500		8300		7.3		300		10	U	300		10	U	2000		1500		8.9		0.88		1.4		0.38		10	U	2				1450		106		254		195		7.43		0.984		52
	18	MW-18	1	GW-MW-18-1109		11/20/09	10:30	52000		75000		8.5		180		10	U	47		130		30000		230		47		4		720		1	U	100	U	670				10600		7970		1190		396		2.54		2.48		7
			2	GW-MW-18-0210		2/23/10	8:35	61000		75000		8.3		450		10	U	320		130		31000		260		54		3.8		670		1	U	100	U	590				10200		7900		1220		407		69.2		3.19		8
	19	MW-19	1	GW-MW-19-1109		11/17/09	8:30	55000		82000		8.4		220		10	U	43		170		34000		170		80		5	U	890		5	U	100	U	880				11100		9430		782		610		0.275		1.96		6
			2	GW-MW-19-0210		2/22/10	15:15	62000		84000		8.4		280		10	U	200		77		34000		210		87		1.5		890		1	U	100	U	810				11400		10300		805		741		0.338		2		6
		MW-19C	1	GW-MW-19C-1109		11/17/09	8:10	81000		100000		9.5		1300		950		10	U	320		45000		820		110		5	U	870		5	U	100	U	830				16500		13000		1310		55.4		1.41		0.17		6
				GW-MW-119C-1109	Dup	11/17/09	8:10	81000		100000		9.5		1300		940		10	U	310		44000		810		110		5	U	860		5	U	100	U	810				16400		12700		1310		54.2		2.15		0.17		6
			2	GW-MW-19C-0210		2/22/10	14:15	82000		110000		9.2		750		340		10	U	410		50000		1000		120		10	U	890		10	U	100	U	790				17700		13900		1590		81		3.54		0.133		6
				GW-MW-119C-0210	Dup	2/22/10	14:15	88000		110000		9.2		760		400		10	U	360		47000		990		120		10	U	890		10	U	100	U	810				17600		14000		1590		80.6		3.93		0.134		6
		MW-19D	1	GW-MW-19D-1109		11/17/09	10:15	1000		1500		7.8		210		10	U	210		10	U	170		340		0.67		0.53		5.8		0.1	U	1	U	0.61				108		7.46		140		44.5		2.77		0.582		134
			2	GW-MW-19D-0210		2/22/10	11:15	1000		1600		7.8		210		10	U	210		10	U	170		370		0.71		0.59		0.38		0.1	U	1	U	0.61				104		5.62		150		44.9		0.472		0.645		178
	20	MW-20	1	GW-MW-20-1109		11/18/09	14:20	8200		13000		7.7		310		10	U	310		10	U	3900		1400		16		1.9		4		0.12		10	U	4.1				2210		192		179		306		2.14		0.646		43
				GW-MW-120-1109	Dup	11/18/09	14:20	8200		13000		7.7		310		10	U	310		10	U	4000		1500		16		1.8		3.7		0.15		10	U	4.1				2180		193		171		306		2.28		0.659		42
			2	GW-MW-20-0210		2/26/10	7:45	8500		13000		7.5		330		10	U	330		10	U	4000		1500		14		1.9		5.4		0.1	U	10	U	5.5				2480		217		199		336		1.99		0.663		39
				GW-MW-120-0210	Dup	2/26/10	7:45	8600		13000		7.6		330		10	U	330		10	U	4000		1400		16		1.6		5.6		0.1	U	10	U	7.6				2460		222		198		327		2.04		0.651		39
	21	MW-21	1	GW-MW-21-1109		11/19/09	12:15	7800		13000		7.4		280		10	U	280		10	U	3800		1300		15		0.7		0.33		0.05	J	10	U	0.87				2080		105		307		373		3.59		0.661		74
			2	GW-MW-21-0210		2/23/10	14:20	8600		12000		7.7		330		10	U	330		10	U	3300		1400		14		0.74		0.35		0.1	U	10	U	0.89				1960		89.4		275		308		5.15		0.639		96
		MW-21C	1	GW-MW-21C-0610		6/3/10	12:00	23000						280		10	U	280		10	U	11000		2300		39		0.8		2.8		0.5	U	50	U	2.8				6510		289	J	285		824		6.36		0.65		80
			2	GW-MW-21C-1010		10/26/10	14:02	22000		32000		7.3		310		10	U	310		10	U	12000		2600		43		0.34		2.5		0.1	U	50	U	2.7				5610		230		259		689		6.84		0.518		96
	22	MW-22	1	GW-MW-22-1109		11/19/09	7:10	7900		13000		7.5		370		10	U	370		10	U	3600		1300		14		0.69		0.44		0.1	U	10	U	0.9				2080		127		270		345		3.62		0.452		62
			2	GW-MW-22-0210		2/24/10	15:15	8300		12000		7.5		370		10	U	370		10	U	3600		1400		14		0.8		0.42		1	U	10	U	0.95				1970		122	J	292		360		5.78		0.466		68
	23	MW-23B	1	GW-MW-23B-0610		6/3/10	14:45	11000						400		10	U	400		10	U	5400		1500		20		1		0.93		0.1	U	20	U	1.2				2980		158	J	261		434		3.36		0.744		70
			2	GW-MW-23B-1010		10/26/10	11:04	9300		14000		7.6		220		10	U	220		10	U	4900		1500		17		0.8		0.7		0.1	U	20	U	1				2460		121		213		308		3.5		0.433		77
		MW-23C	1	GW-MW-23C-0610		6/3/10	13:30	18000						280		10	U	280		10	U	8700		2400		33		0.57		2.7		0.1	U	50	U	2.7				5130		167	J	352		488		2.66		0.956		108
			2	GW-MW-23C-1010		10/26/10	11:39	16000		23000		7.4		350		10	U	350		10	U	9000		1900		31		0.41		1.9		0.1	U	20	U	2.6				4660		163		292		532		3.4		0.874		98
	24	MW-24	1	GW-MW-24-1109		11/17/09	11:20	10000		16000		7.2		420		10	U	420		10	U	4700		1700		21		0.19		72		0.1	U	100	U	65				2560		543		322		324		15.7		1.76		18
			2	GW-MW-24-0210		2/22/10	15:45	13000		21000		7.5		370		10	U	370		10	U	6800		1900		25		10	U	58		10	U	20	U	53				2880		866		426		441		16		3.3		15
		MW-24C	1	GW-MW-24C-0610		6/2/10	14:45	57000						190		10	U	190		10	U	33000		1800		110		0.1	U	700		0.5	U	100	U	600				13700		4810		1130		895		16.7		3.26		12
			2	GW-MW-24C-1010		10/26/10	8:14	56000		80000		6.9		230		10	U	230		10	U	34000		2600		120		10	U	770		10	U	100	U	680				13500		7720		1040		499		9.71		2.56		7
	25	MW-25B	1	GW-MW-25B-0610		6/2/10	11:30	8700						320		10	U	320		10	U	2600		2800		8.3		0.18		3.9		0.1	U	10	U	4.3				1890		49.6		281		342		3.48		1.7		175
			2	GW-MW-25B-1010		10/26/10	9:22	9500		12000		7.4		530		10	U	530		10	U	3100		3600		11		0.2		3.8		0.1	U	10	U	4				2190		58.5		366		403		7.86		2.14		162
		MW-25C	1	GW-MW-25C-0610		6/2/10	12:45	20000						310		10	U	310		10	U	9100		2800		35		0.1	U	8.3		0.1	U	100	U	7.6				4840		78.1		525		872		8.72		4.19		256
			2	GW-MW-25C-1010		10/26/10	10:07	18000		26000		7.3		330		10	U	330		10	U	9600		2900		37		0.06		7.8		0.1	U	20	U	8				4530		77.3		678		865		10.1		3.72		233
	27	MW-27B	1	GW-MW-27B-0610		6/2/10	9:00	9600						310		10	U	310		10	U	4600		2400		18		0.24		3.9		0.1	U	10	U	3.7				2260		60.3		575		528		8.26		3.22		159
			2	GW-MW-27B-1010		10/27/10	11:48	11000		16000		7.1		340		10	U	340		10	U	4400		3300		16		0.33		3		0.1	U	10	U	3				2510		63.5		489		573		12.6		3.22		173
		MW-27C	1	GW-MW-27C-0610		6/2/10	10:10	3000						220		10	U	220		10	U	750		1100		2.4		0.43		1.8		0.1	U	2	U	2.1				398		32.9		293		126		0.898		0.434		91
			2	GW-MW-27C-1010		10/27/10	12:23	2700		3600		7.5		280		10	U	280		10	U	650		990		2		0.37		1.4		0.1	U	2	U	1.8				359		27		312		116		1.25		0.722		100
	AWPF	P-1	1	GW-P-1-0610		6/4/10	9:00	4700						430		10	U	430		10	U	400		2500		2.3		0.51		1.8		0.56		1	U	2.6				617		18.2	J	387		269		4.11		1.84		258
	Piezo-		2	GW-P-1-1010		10/27/10	9:22	5700		6600		7.2		430		10	U	430		10	U	850		2800		3.7		0.44		3.5		0.1	U	5	U	4				847		24.4		444		243		3.66		2.43		234
	meters	P-3	1	GW-P-3-0610		6/4/10	10:45	5100						460		10	U	460		10	U	320		2900		2.7		0.59		2.6		0.1	U	1	U	2.8				721		18.1	J	423		317		15.8		2.67		282
			2	GW-P-3-1010		10/27/10	10:09	3800		5700		7.2		450		10	U	450		10	U	460		2700		2.7		0.58		1.8		0.1	U	1	U	3.2				676		17.4		385		265		17.2		2.5		218
		P-4	1	GW-P-4-0610		6/4/10	10:00	4200						380		10	U	380		10	U	490		2100		1.9		0.38		2.3		0.1	U	5	U	2.4				621		16	J	334		284		13.7		2.69		263
			2	GW-P-4-1010		10/27/10	10:44	4400		4800		7.2		370		10	U	370		10	U	760		940		2.8		0.72		1.6		0.1	U	2	U	2.3				548		15.7		380		222		9.19		2.12		280

Notes:

Units are in mg/L. except for EC and pH. EC is in umhos/cm. pH is in pH units.

Data Qualifiers (Q):

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

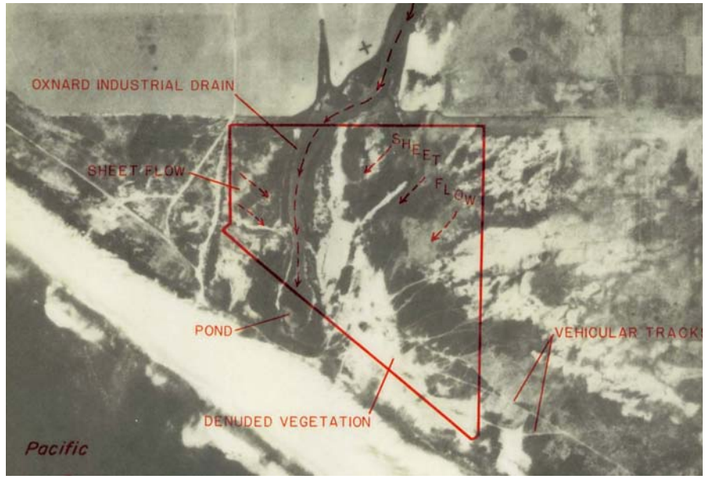
Figures

Aerial image © Google Earth, 2007. Annotation by CH2M HILL, 2008.

FIGURE 1a
Halaco Superfund Site Areas
Halaco Site Remedial Investigation
Oxnard, California

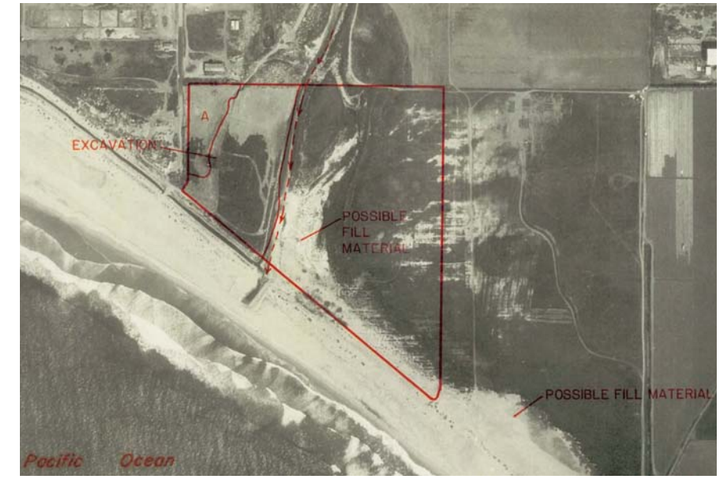
CH2MHILL

WB012009003SCO385135.FI.01 Halaco_site_v4.ai 2/11

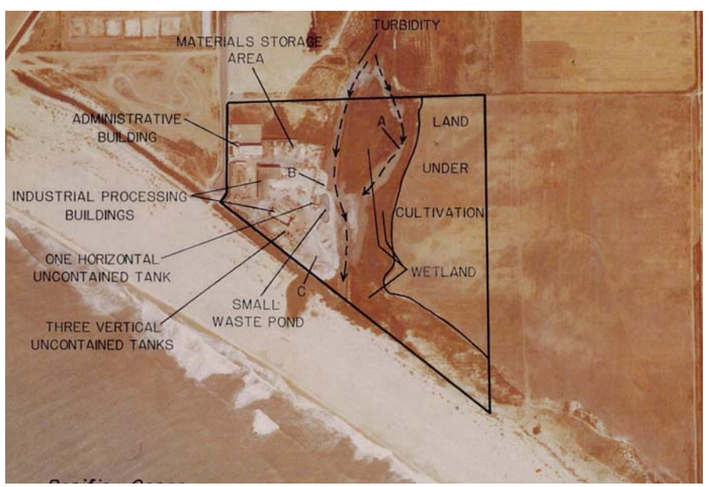


1929 – Predevelopment conditions

1959 – OID realigned, dump activities at smelter parcel

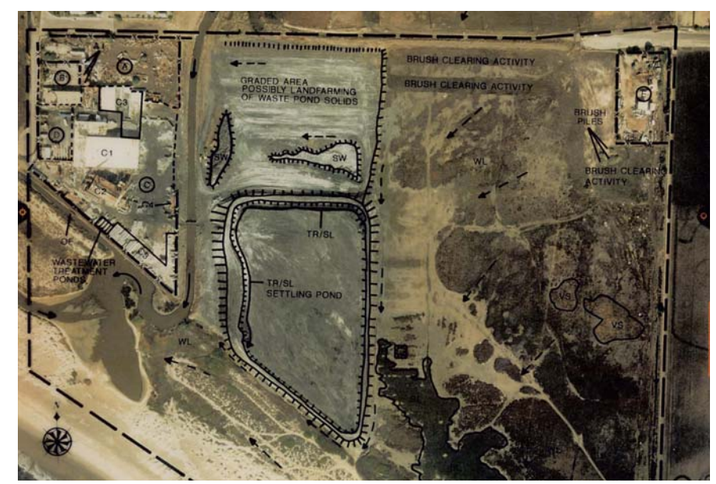


1965 – Preparation for Halaco smelter facilities



1969 – Halaco operations at smelter parcel with process waste discharge to OID and small pond

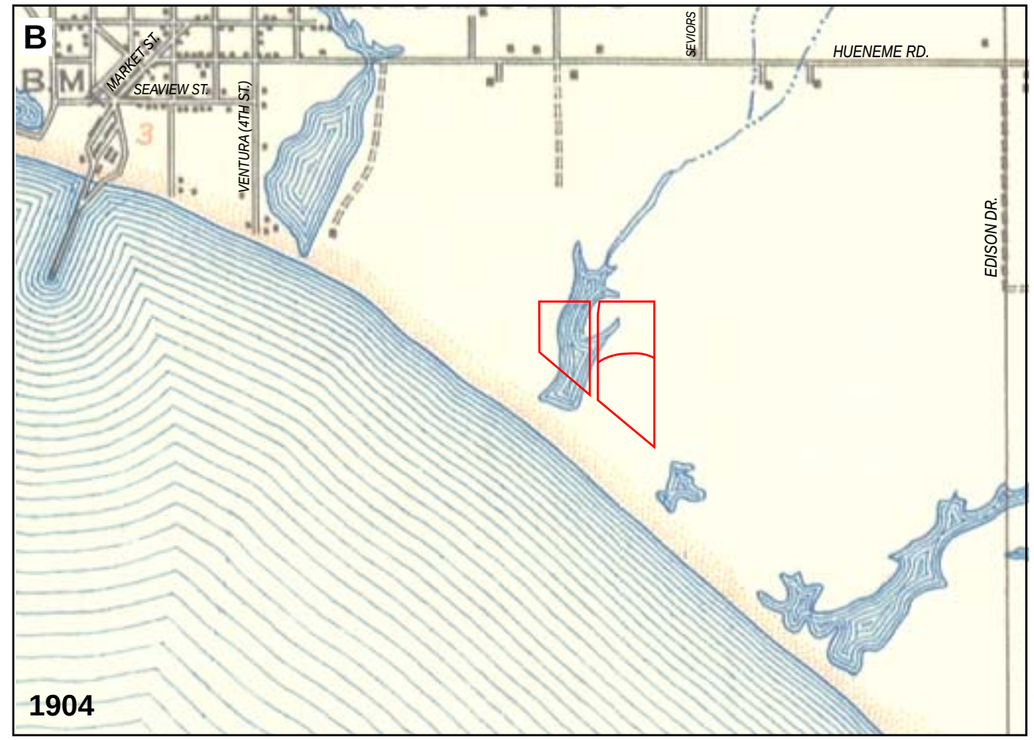
1971 – OID realigned, Halaco operations at smelter parcel with process waste discharged to WMU

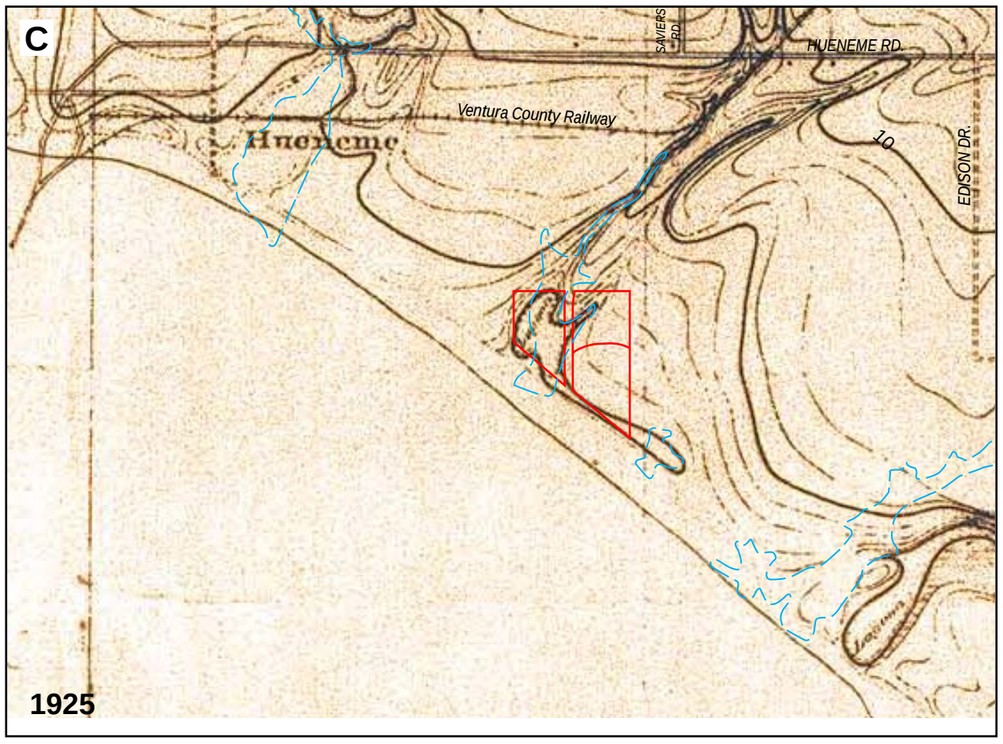


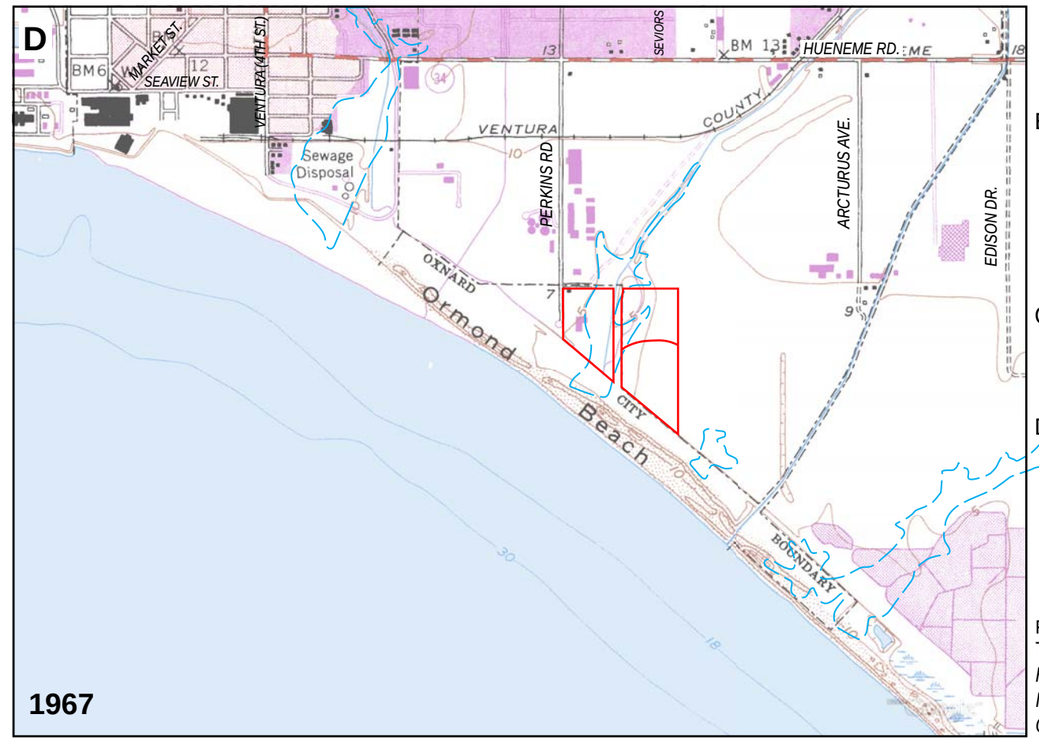
1991 – Halaco operations at smelter parcel with process waste discharged to WMU and WDA

FIGURE 1b
Aerial Photograph Chronology
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL







Legend:

Surface water features identified in 1855/1857 Coastal Survey (A) and 1904 USGS Topographic Map (B)

Halaco Site

A. US Coast Survey. River Santa Clara southward to Hueneme (1855) and Hueneme eastward to Point Mugu (1857).

B. US Geological Survey. Hueneme 15 minute Quadrangle (1904, Reprinted 1947). Annotated by CH2M HILL, 2007.

C. Ventura County. Topographic Map of the Oxnard Plain (1925).

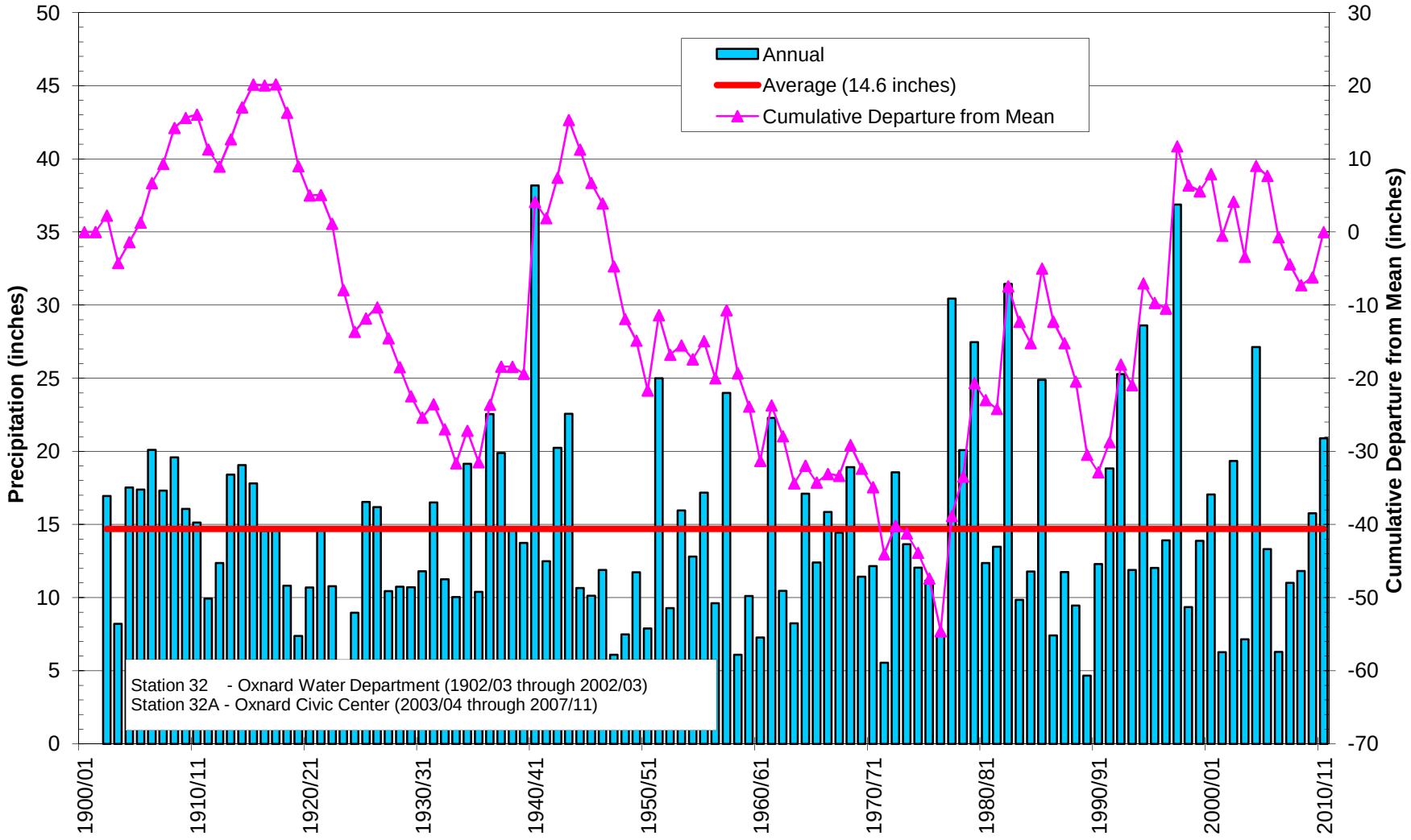
D. US Geological Survey. Oxnard 7.5 minute Quadrangle (1949). Photo revised (1967). Annotated by CH2M HILL, 2007.

FIGURE 1c
Topographic Map Chronology
Halaco Site Remedial Investigation
Oxnard, California

FIGURE 1d
Overview of Halaco Properties and Vicinity,
1972 Aerial Photograph
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

Figure 2a
Annual Precipitation
Stations 32 and 32A



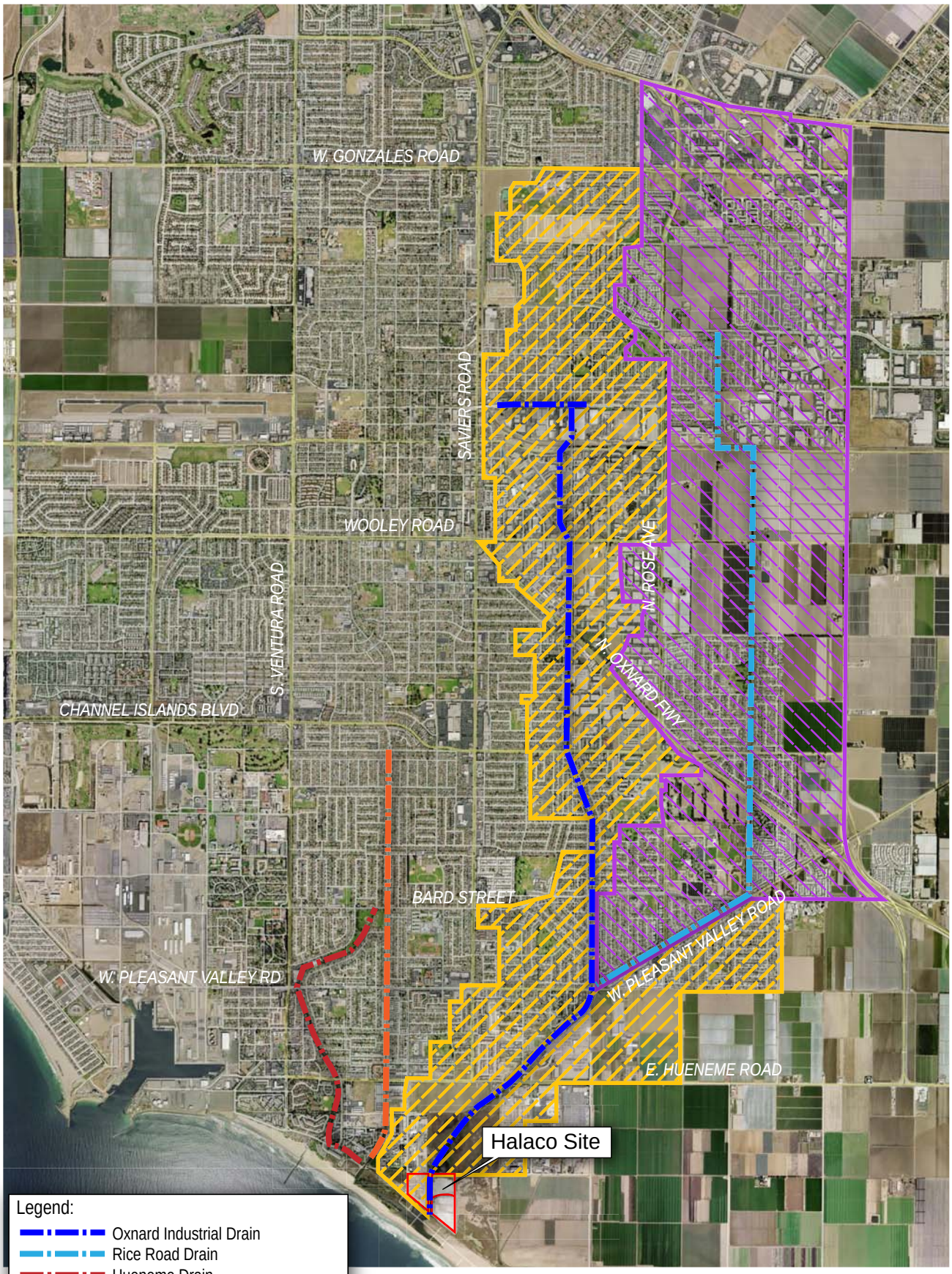
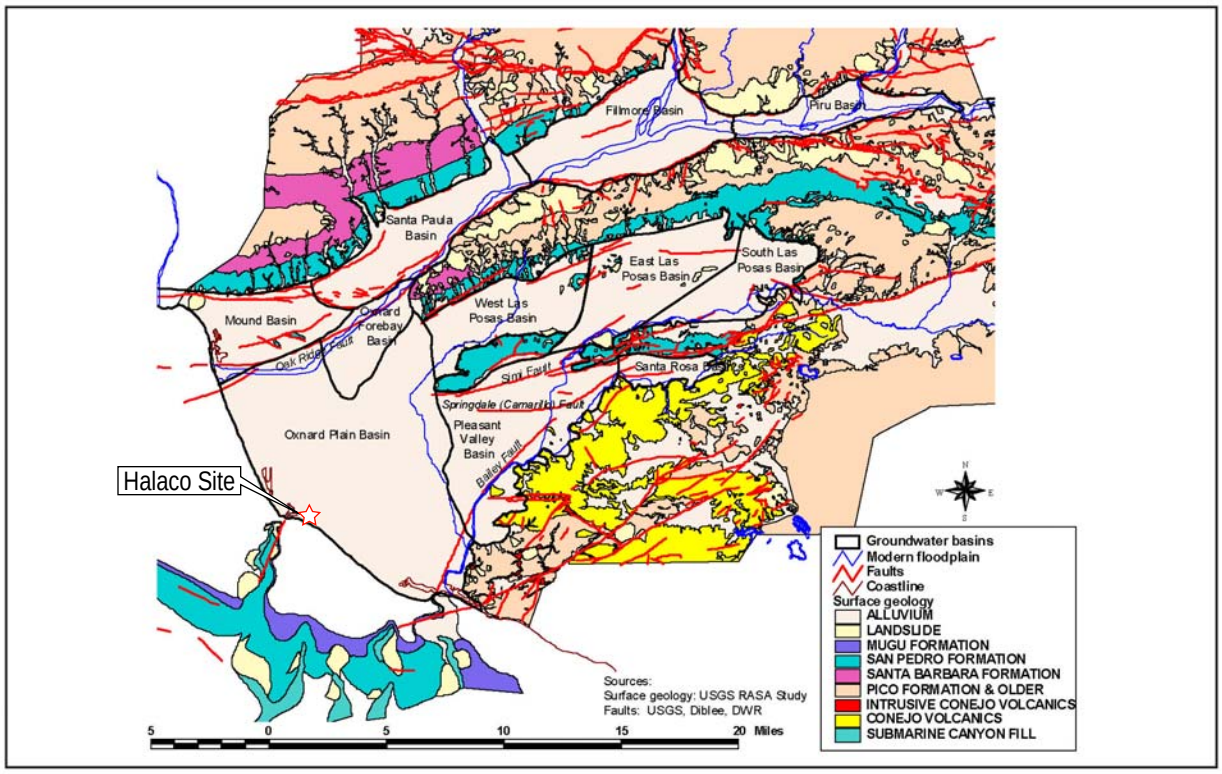


FIGURE 2b
Surface Water Drainages
Halaco Site Remedial Investigation
Oxnard, California

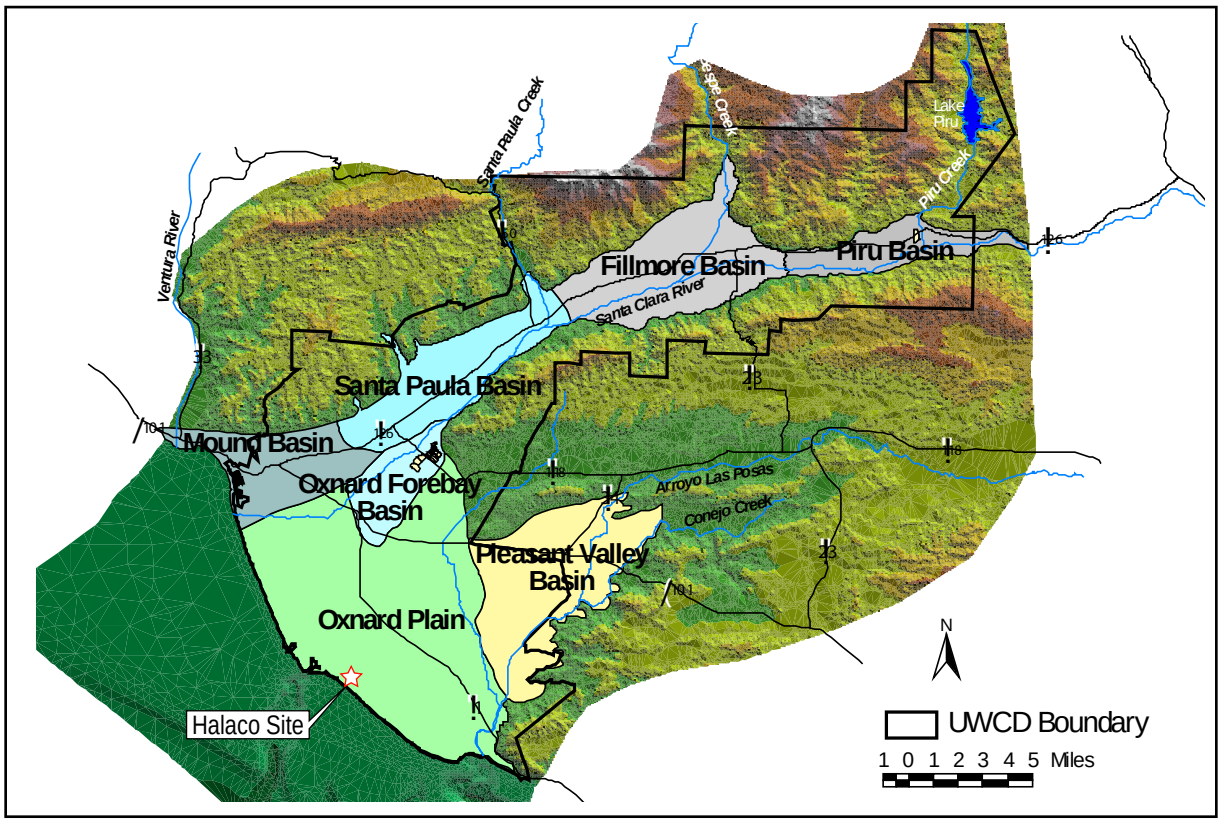
Source: Modified from TetraTech, 2006
Aerial image © Google Earth, 2008. Annotation by CH2M HILL, 2011.

WB012009003SCO385135.DE.01 Halaco_drainages_v2.ai 9/11

CH2MHILL



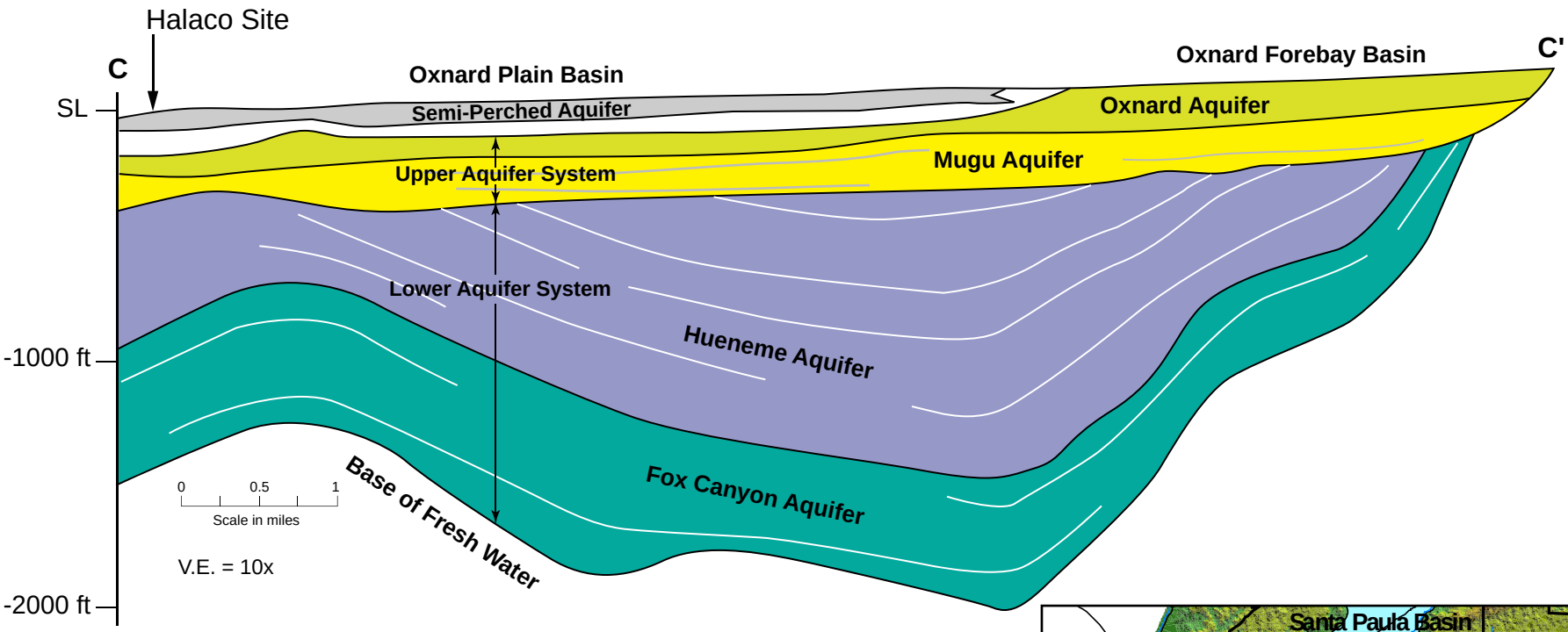
(a) Surface Geology



(a) Groundwater Basins

FIGURE 2c
Geology and
Groundwater Basins
Halaco Site Remedial Investigation
Oxnard, California

Source: UWCD, 2004



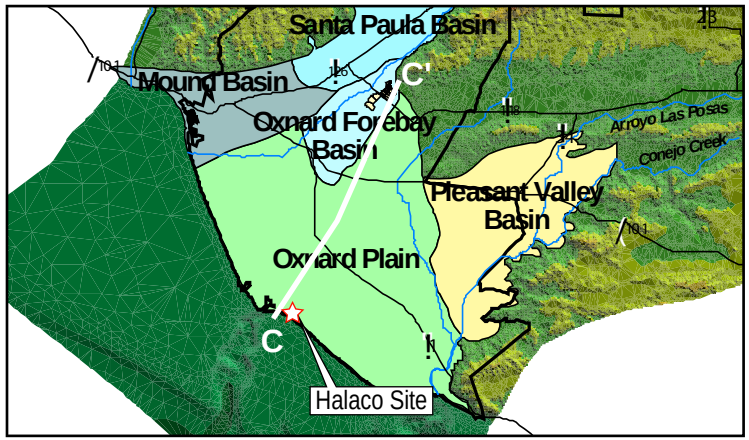
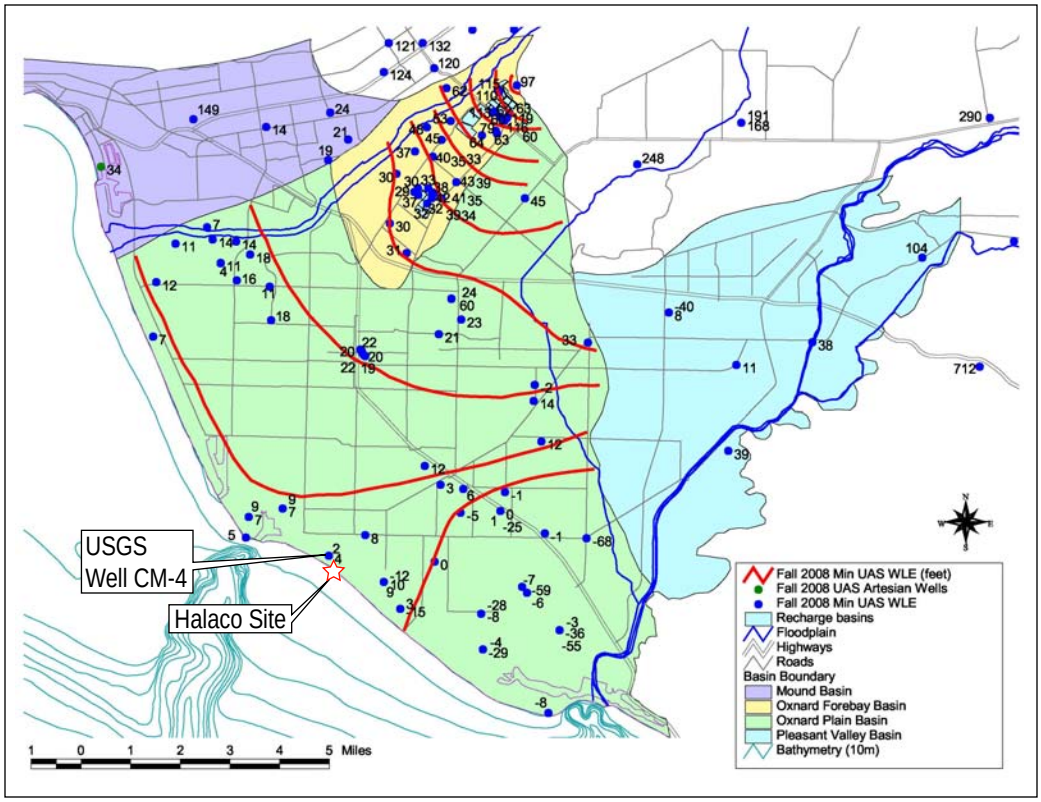


FIGURE 2d
Geologic Cross Section
Halaco Site Remedial Investigation
Oxnard, California

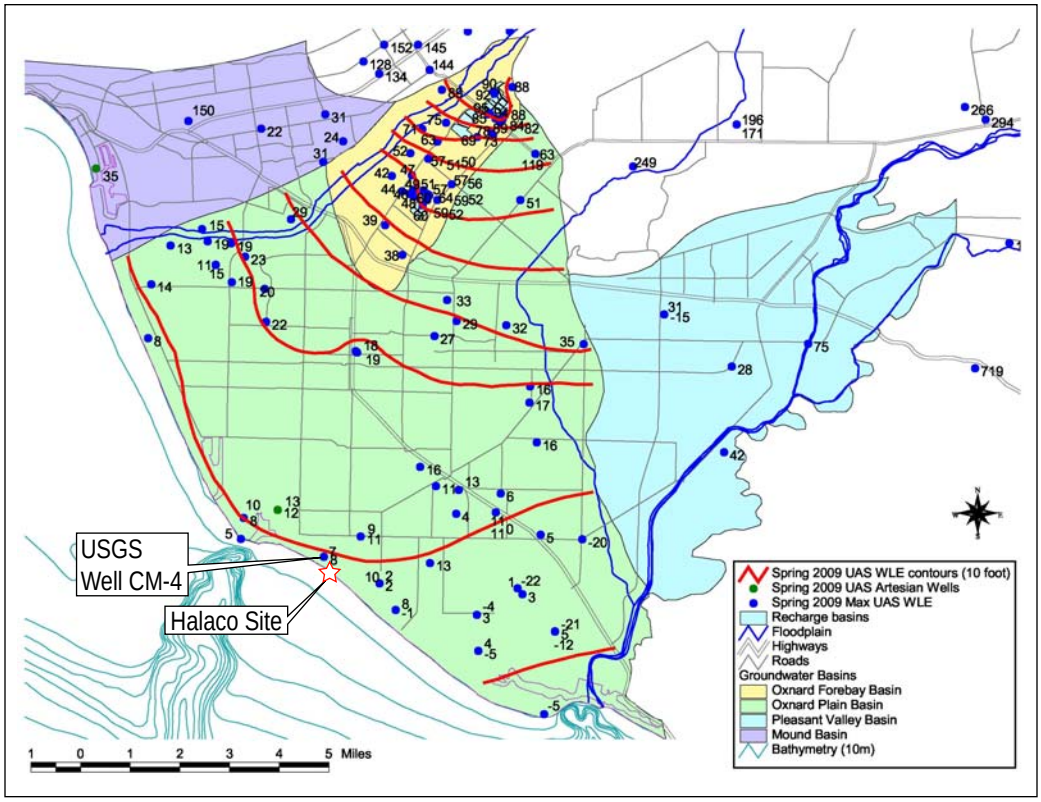
Source: Modified from Mukae and Turner, 1975

CH2MHILL

WB012009003SCO385135.DE.01 Halaco_crosssection_v2.ai 9/11



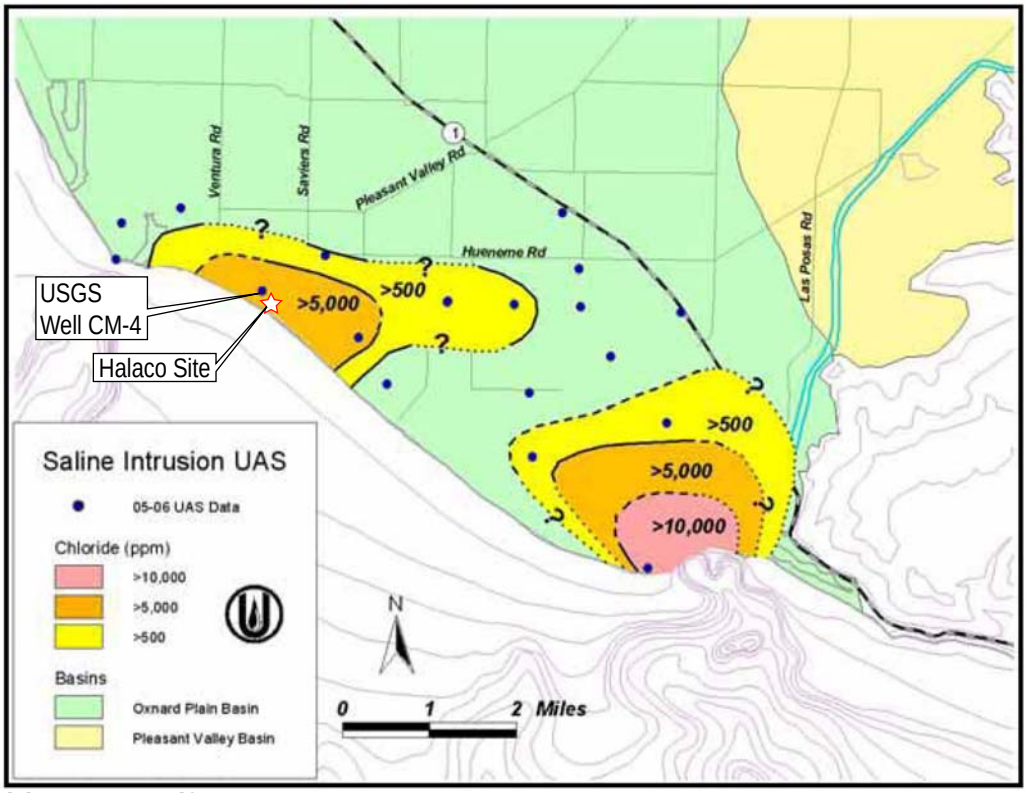
(a) Upper Aquifer System, Fall 2008



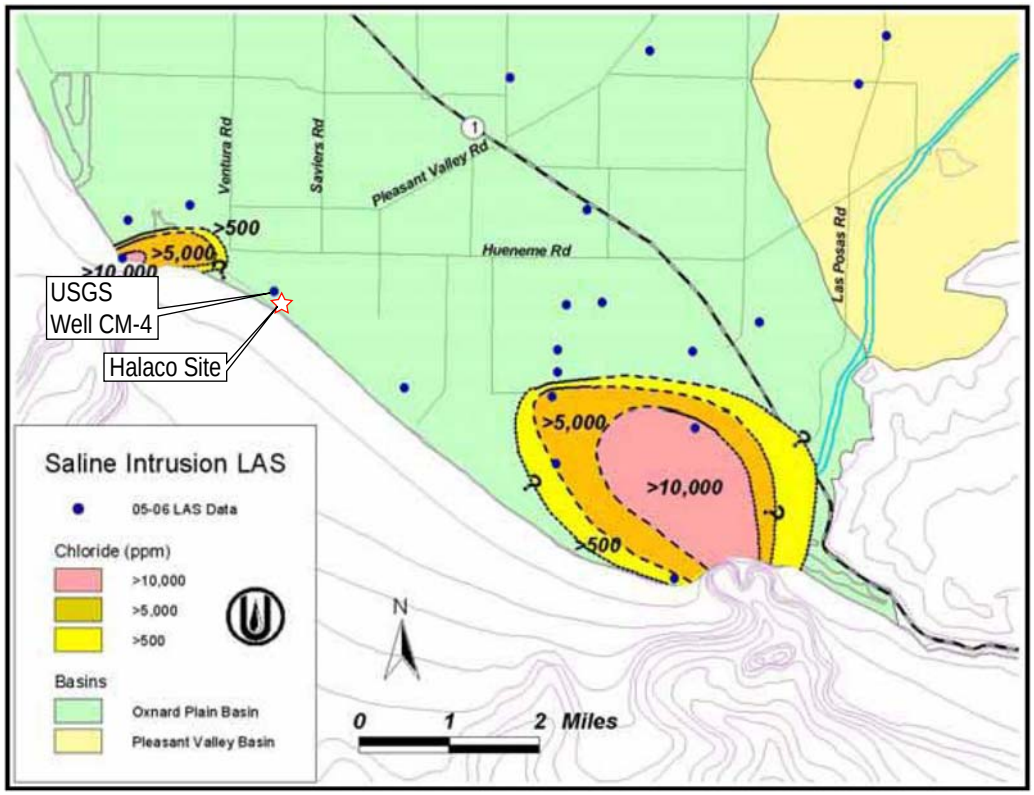
(b) Upper Aquifer System, Spring 2009

FIGURE 2e
Groundwater Elevations in UAS – Fall 2008 and Spring 2009
Halaco Site Remedial Investigation, Oxnard, California

Source: United Water Conservation District, 2011.



(a) Upper Aquifer System



(b) Lower Aquifer System

FIGURE 2f
Saline Intrusion in UAS and LAS - 2005 and 2006
Halaco Site Remedial Investigation
Oxnard, California

Source: Fox Canyon Groundwater Management Agency, 2007.

Figure 2g
CM4 Groundwater Elevations

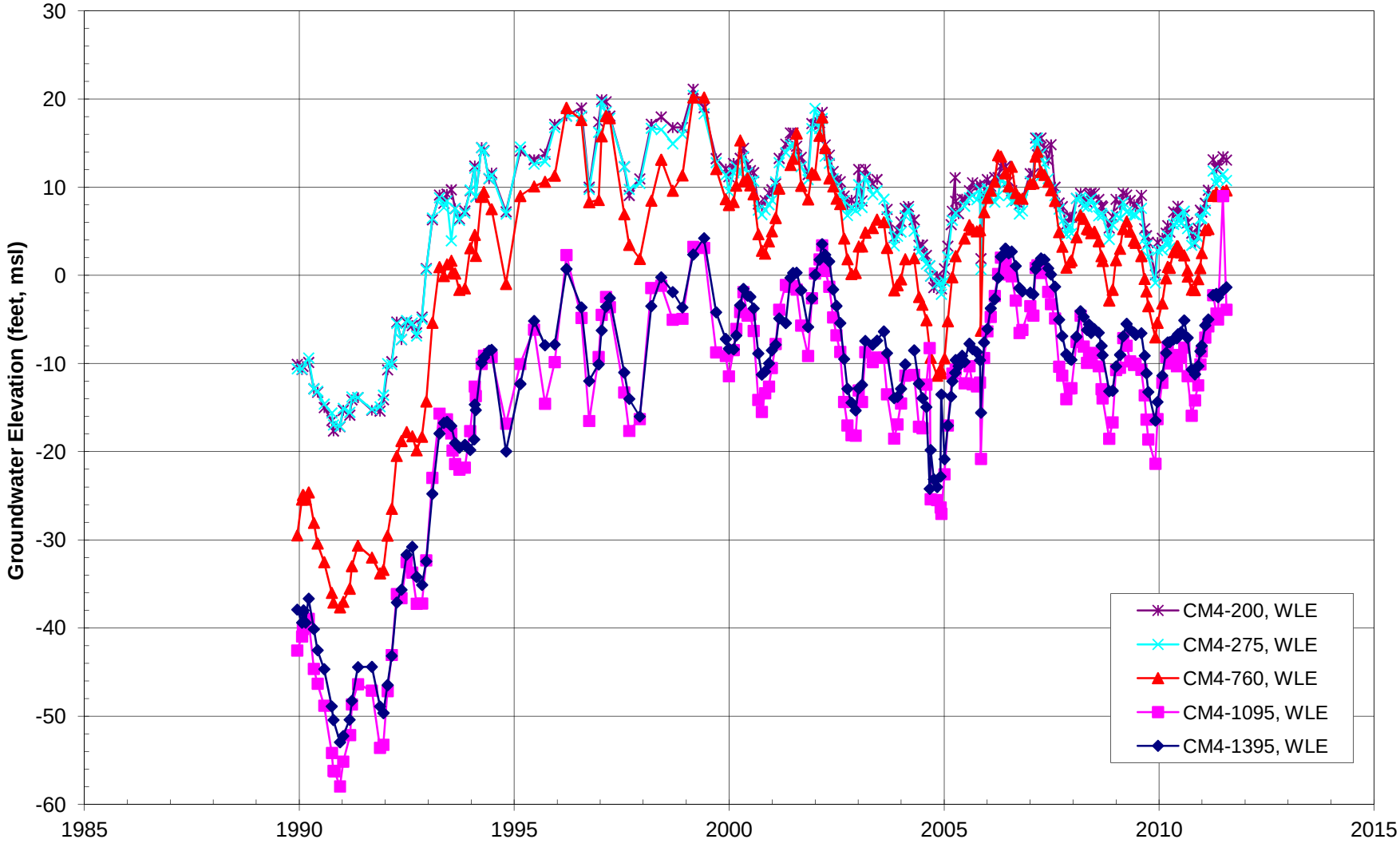


Figure 2h
CM-4-200 Groundwater Elevations and Salinity Levels

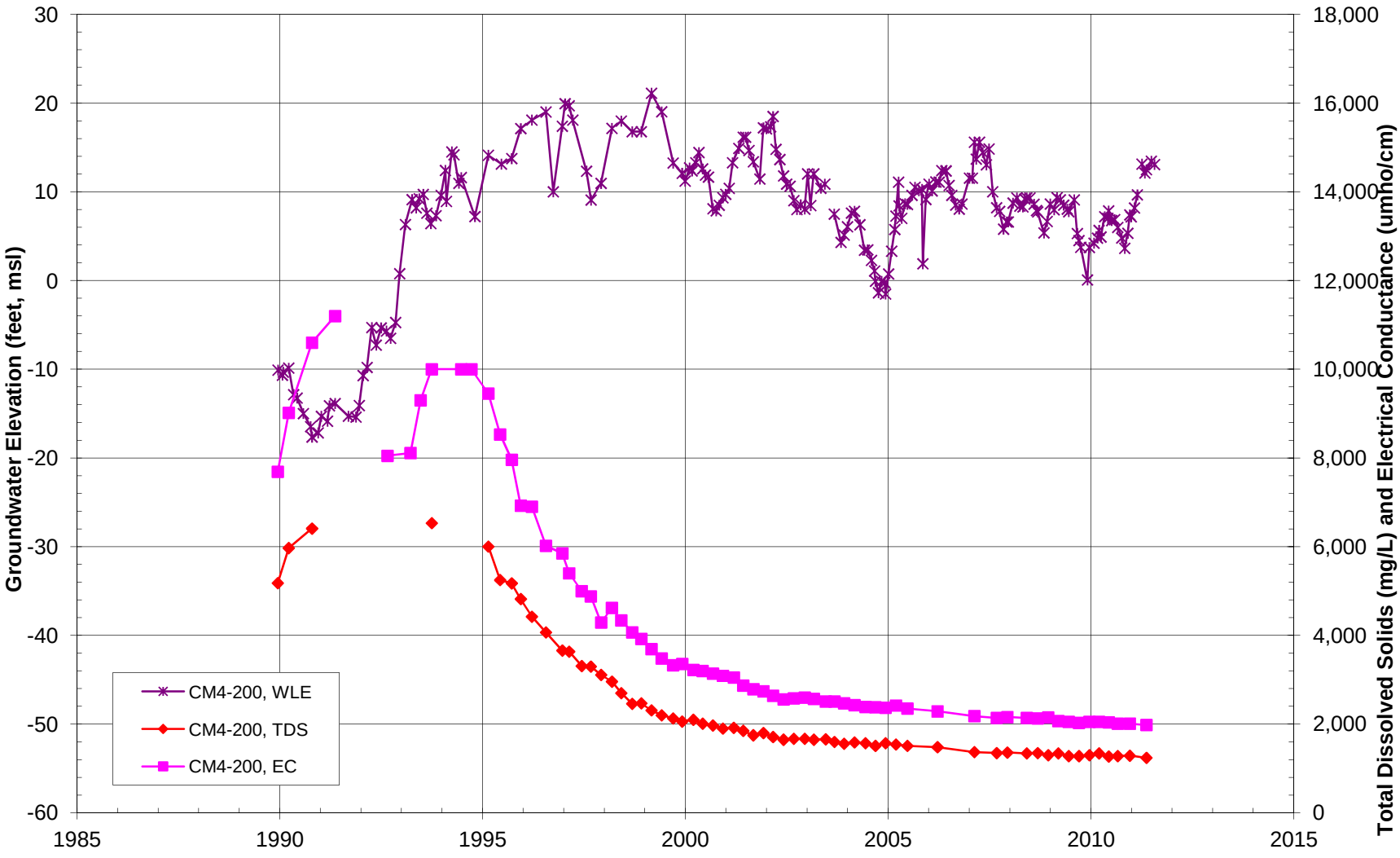


Figure 2i
Wastewater - Electrical Conductivity, Magnesium, Oil & Grease, and pH
Long-term Monitoring

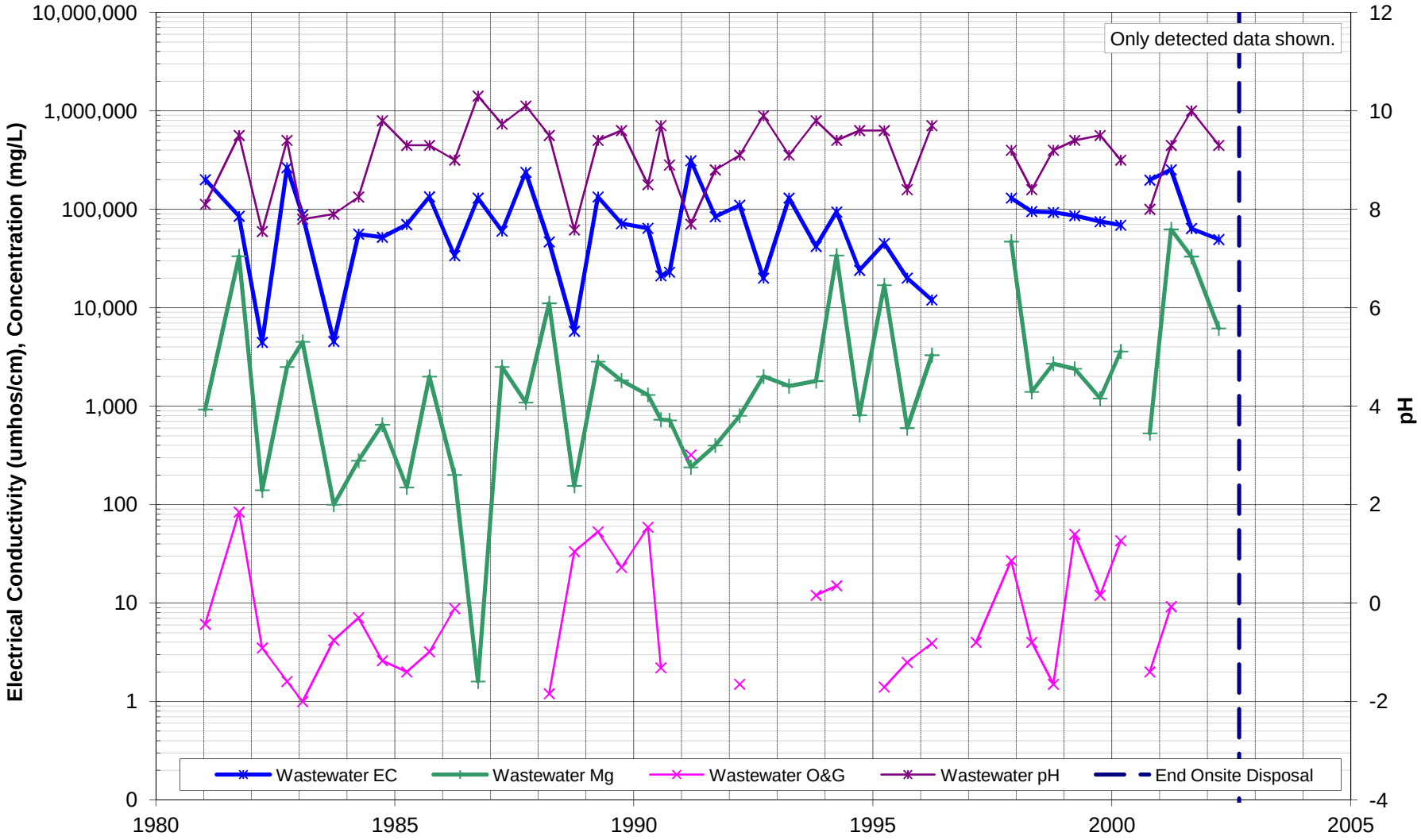


Figure 2j
Wastewater - Electrical Conductivity, Aluminum, Copper, and Zinc
Long-term Monitoring

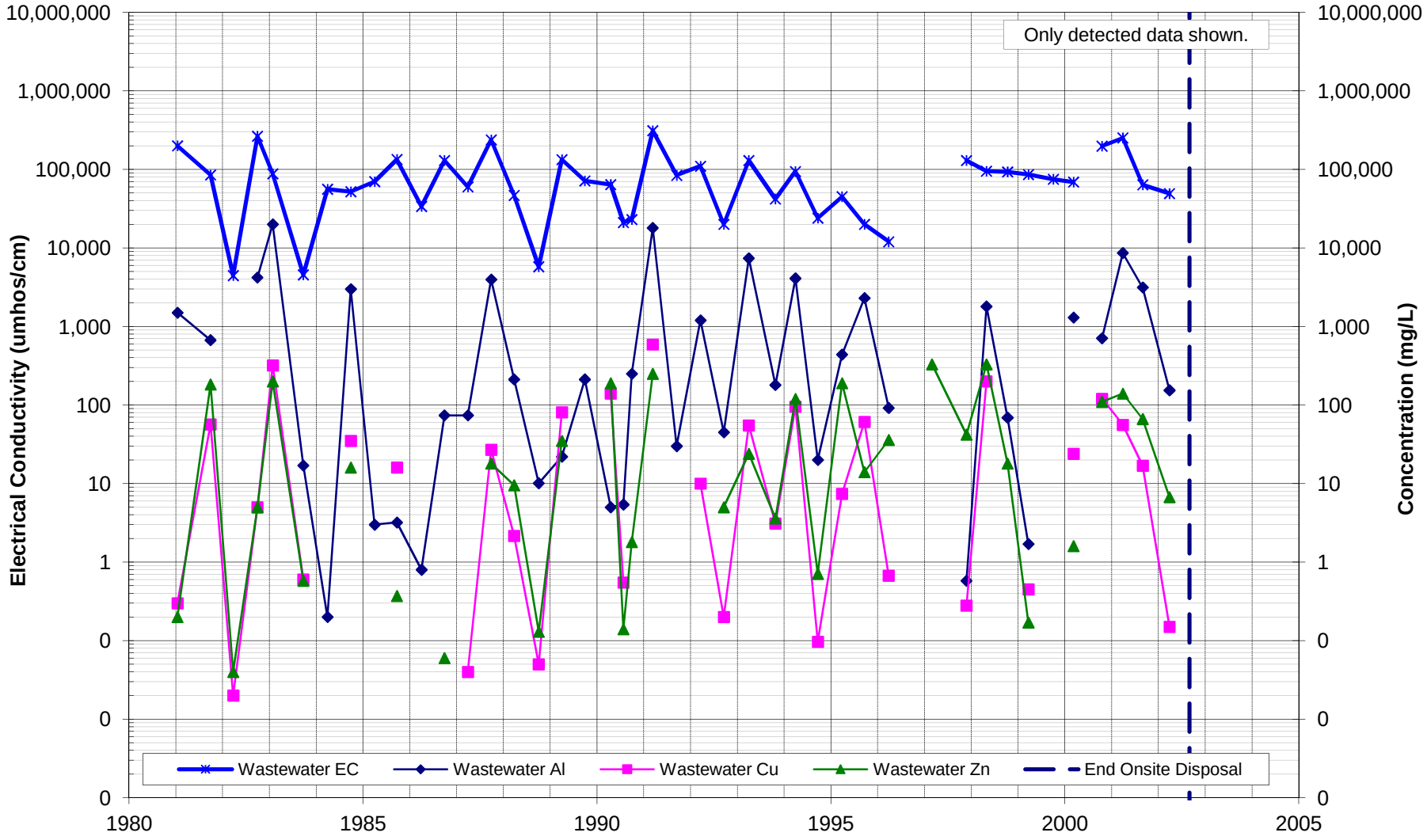


Figure 2k
Wastewater - General Chemistry
1998/99 RWQCB and 2001 Halaco Samples

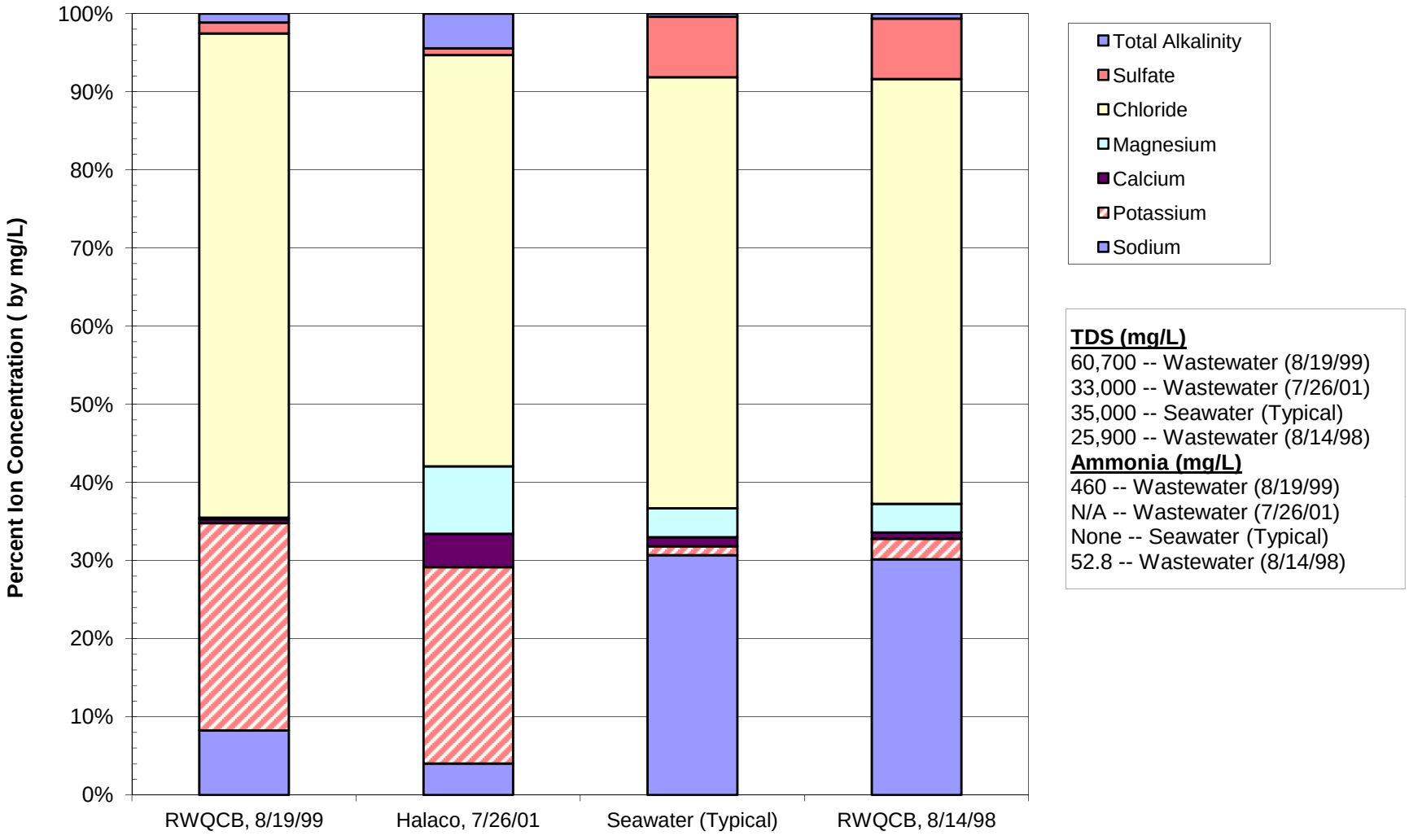
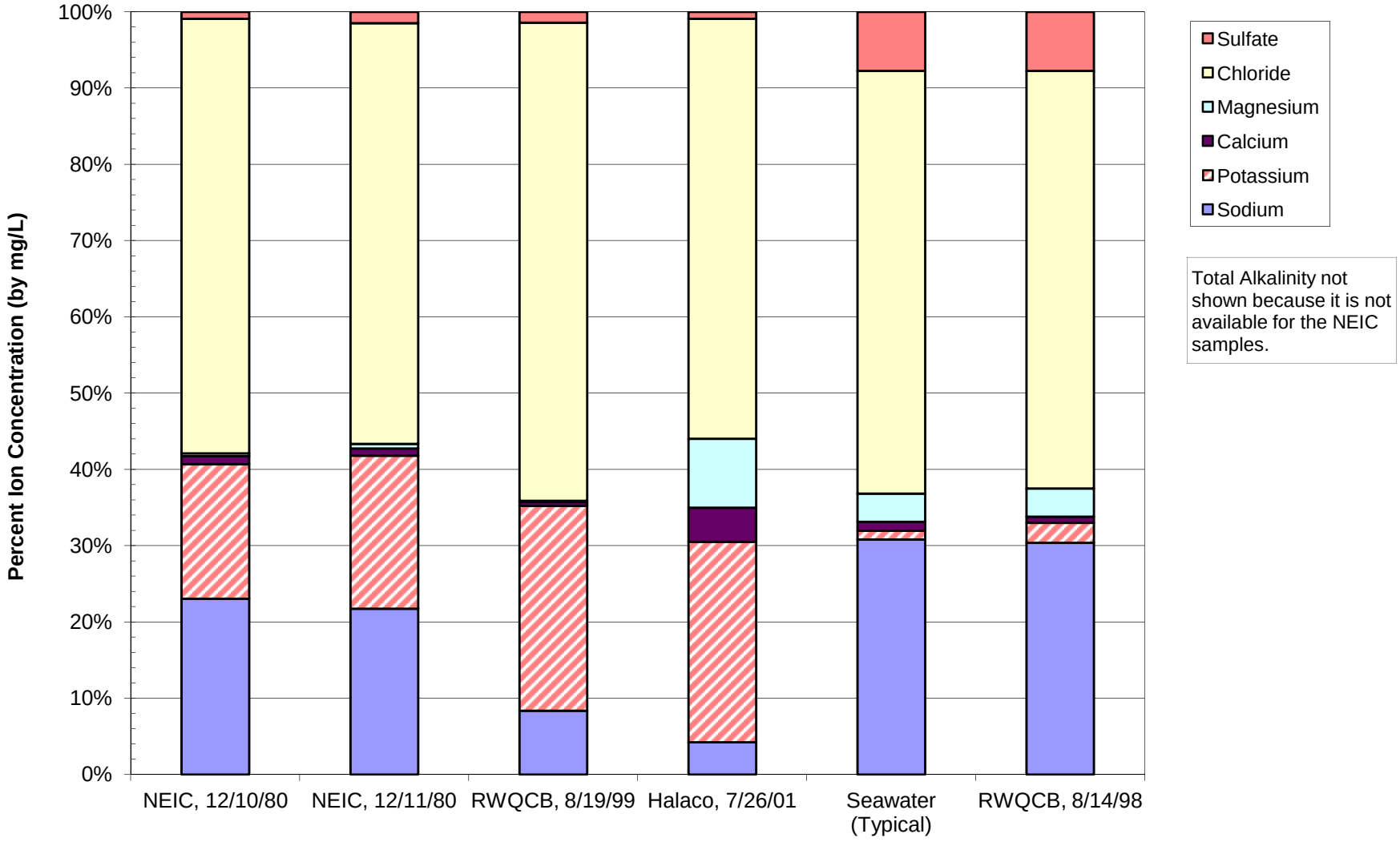


Figure 2l
Wastewater - General Chemistry
1980 NEIC, 1998/99 RWQCB, and 2001 Halaco Samples



LEGEND

- RI Surface Water Sample Locations
- Ormond Beach Regional Investigation (AMEC 2006)
- Halaco Routine Monitoring
- Integrated Assessment (Weston, 2007)

Ground Elevation Contours, ft msl (AMEC 2006)

- 2 ft Contour
- 10 ft Contour

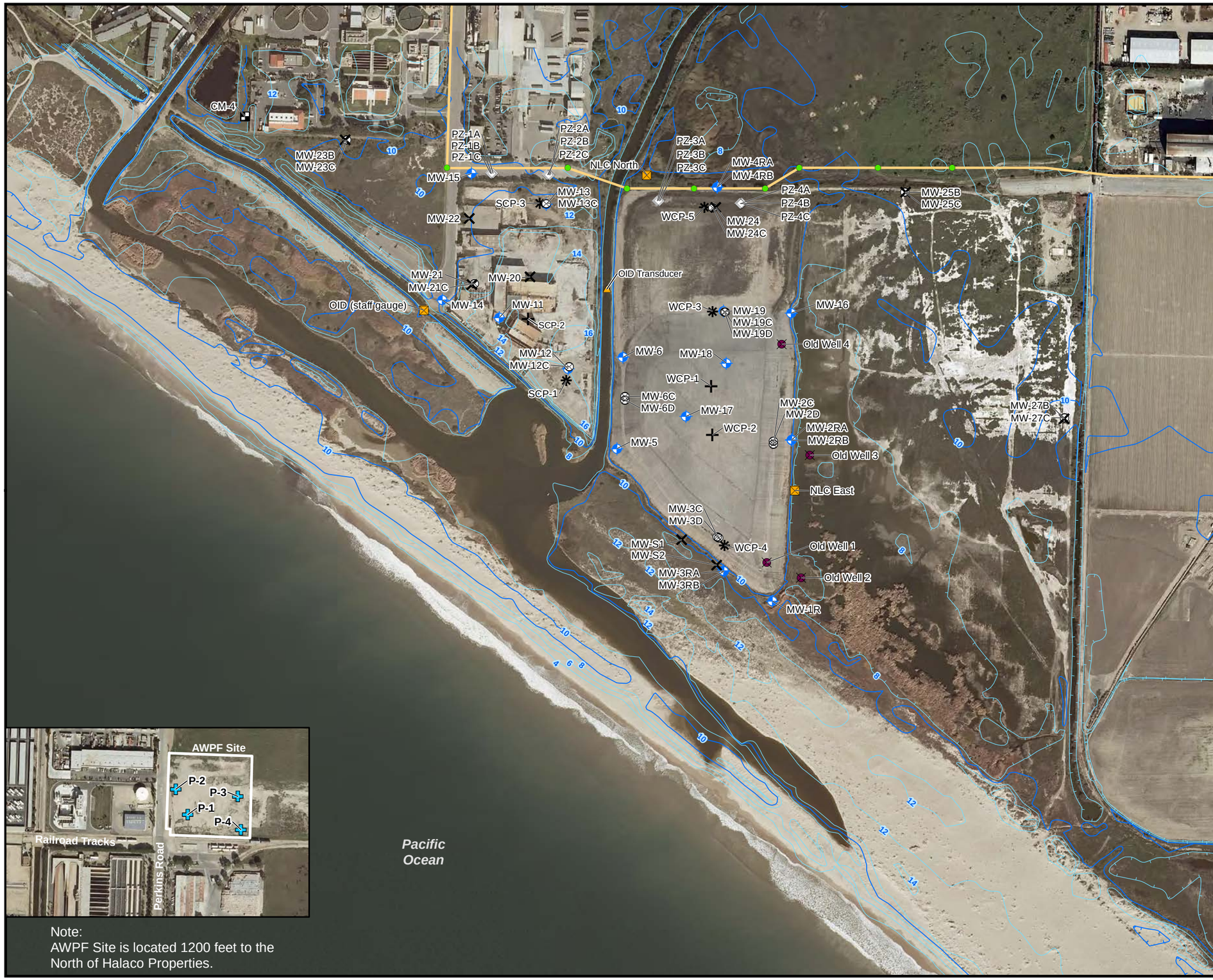
N

0 300 600
Feet
1 inch = 600 feet

FIGURE 3
Surface Water Sampling Locations

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\GROUPS\EMS\PROJECTS\Halaco\MapFiles\GW\2011_Sept\Halaco_FIG3_SurfaceWater_Locs.mxd SWOLFSKI 9/22/2011 2:58:06 PM



Note:
AWPF Site is located 1200 feet to the North of Halaco Properties.

LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- Shallow CPT Boring
- Deep CPT Boring
- New Piezometer Cluster, Water Level
- Former Monitoring Well (Destroyed)
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer
- AWPF Piezometers

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft msl (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 4
Groundwater Monitoring Well Locations
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\Halaco\MapFiles\GW\PROJECTS\Halaco\MapFiles\GW\2011_Sept\HALACO_FIG4_GWMW_LOCS.MXD SWOLFSKI 2/27/2012 4:46:26 PM

LEGEND

Hydrogeologic Transect Line

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- Shallow CPT Boring
- Deep CPT Boring
- New Piezometer Cluster, Water Level
- Former Monitoring Well (Destroyed)
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer
- Approximate Extent of Former Process Waste Settling Pond

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft msl (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

N

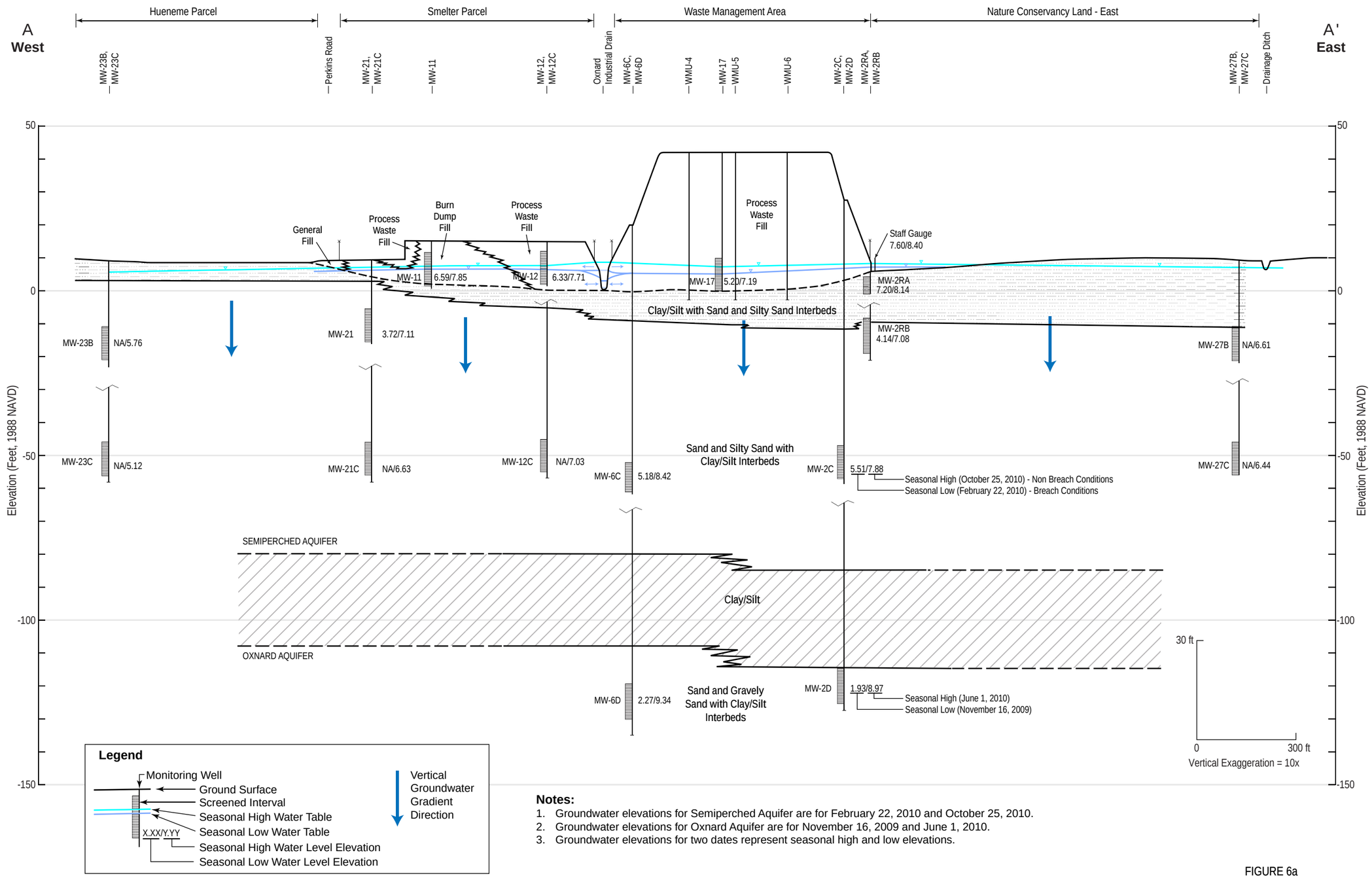
0 200 400

Feet

1 inch = 400 feet

FIGURE 5
Hydrogeologic Cross Section Locations
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\Halaco\MapFiles\GW\PROJECTS\Halaco\MapFiles\GW\2011_Sept\HALACO_FIG5_GWMW_TRANSECTS.MXD SWOLFSKI 9/22/2011 3:03:08 PM



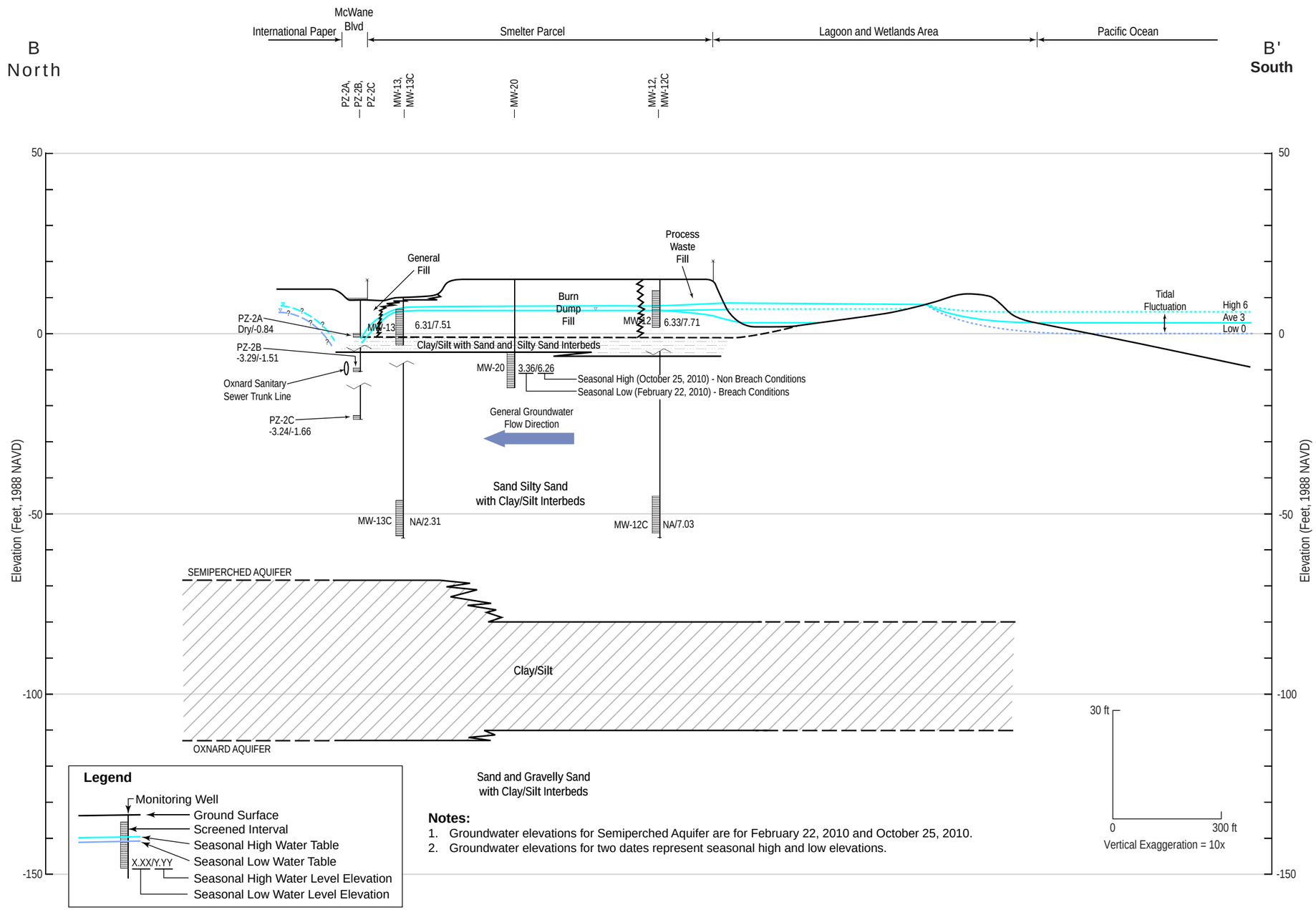
Notes:

1. Groundwater elevations for Semiperched Aquifer are for February 22, 2010 and October 25, 2010.
2. Groundwater elevations for Oxnard Aquifer are for November 16, 2009 and June 1, 2010.
3. Groundwater elevations for two dates represent seasonal high and low elevations.

FIGURE 6a
Hydrogeologic Cross Section A-A'
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section AA'_rev2.ai 9/11



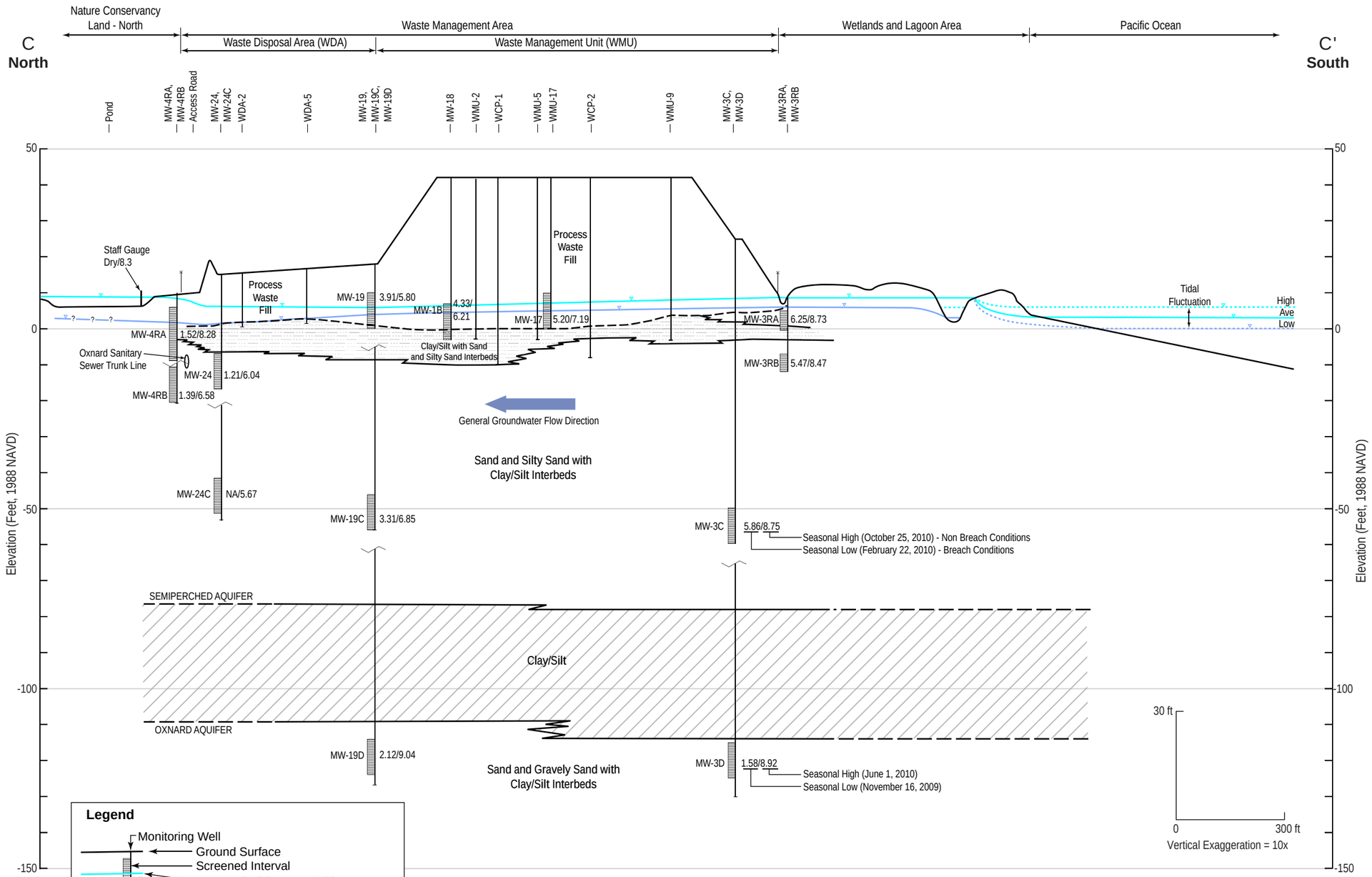
Notes:

1. Groundwater elevations for Semiperched Aquifer are for February 22, 2010 and October 25, 2010.
2. Groundwater elevations for two dates represent seasonal high and low elevations.

FIGURE 6b
Hydrogeologic Cross Section B-B'
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section BB'_rev2.ai 9/11



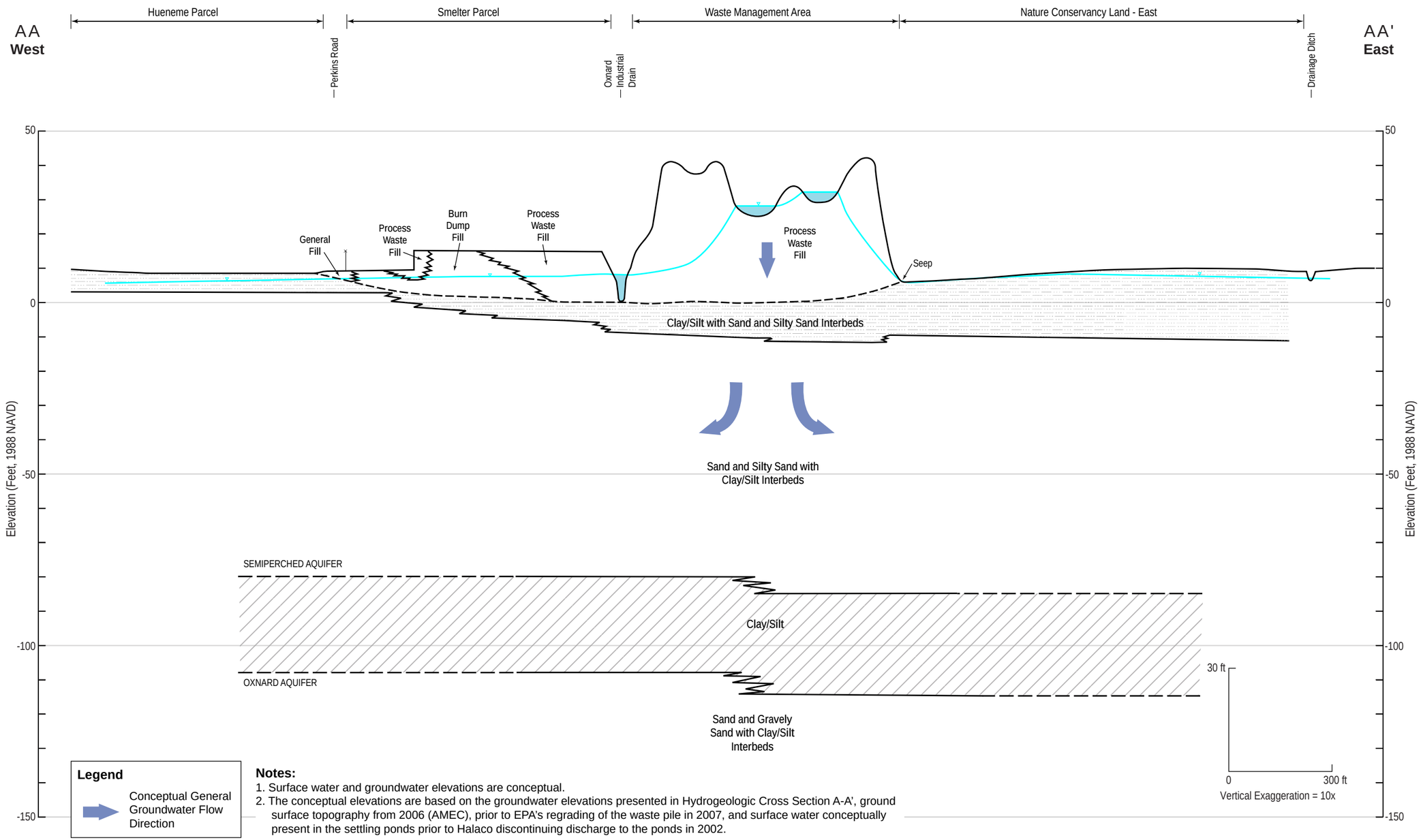
Notes:

1. Groundwater elevations for Semiperched Aquifer are for February 22, 2010 and October 25, 2010.
2. Groundwater elevations for Oxnard Aquifer are for November 16, 2009 and June 1, 2010.
3. Groundwater elevations for two dates represent seasonal high and low elevations.

FIGURE 6c
Hydrogeologic Cross Section C-C'
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section CC'_rev2.ai 9/11



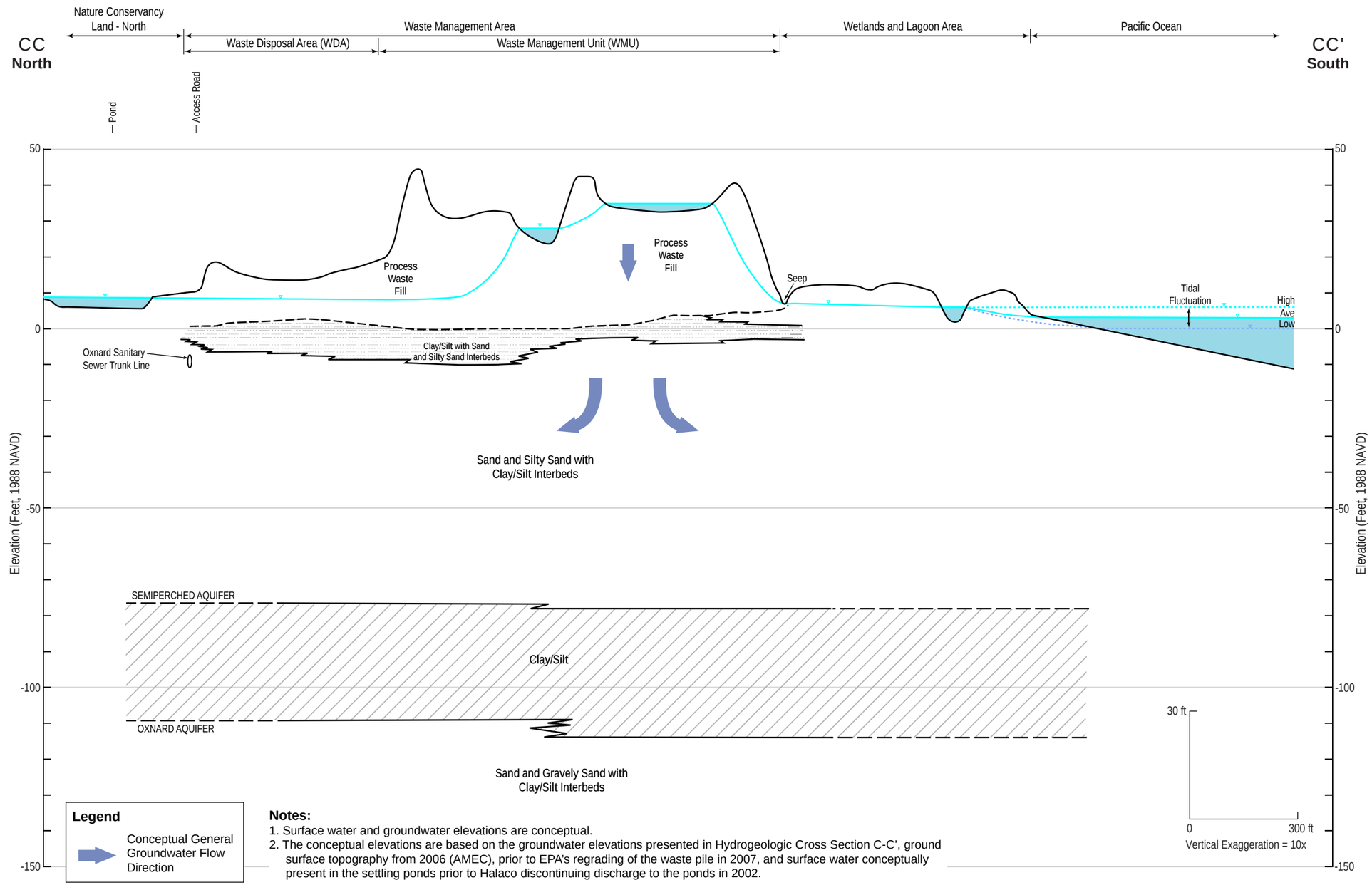
Notes:

1. Surface water and groundwater elevations are conceptual.
2. The conceptual elevations are based on the groundwater elevations presented in Hydrogeologic Cross Section A-A', ground surface topography from 2006 (AMEC), prior to EPA's regrading of the waste pile in 2007, and surface water conceptually present in the settling ponds prior to Halaco discontinuing discharge to the ponds in 2002.

FIGURE 7a
Conceptual Hydrogeologic Cross Section AA-AA' of Historical Conditions
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section AA'_hist_rev2.ai 9/11



Notes:

1. Surface water and groundwater elevations are conceptual.
2. The conceptual elevations are based on the groundwater elevations presented in Hydrogeologic Cross Section C-C', ground surface topography from 2006 (AMEC), prior to EPA's regrading of the waste pile in 2007, and surface water conceptually present in the settling ponds prior to Halaco discontinuing discharge to the ponds in 2002.

FIGURE 7b
Conceptual Hydrogeologic Cross Section CC-CC' of Historical Conditions
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section CC'_hist_rev2.ai 9/11

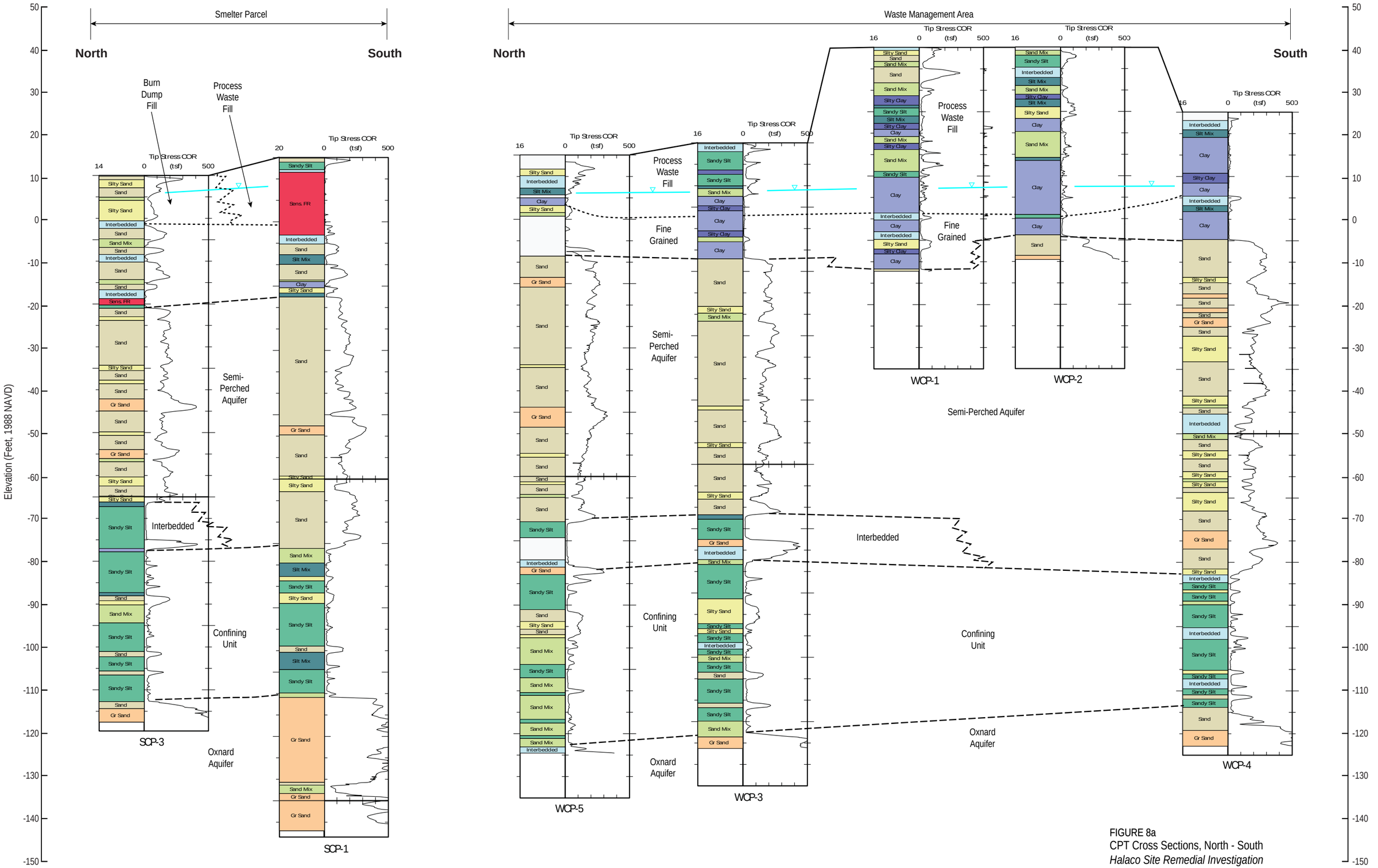


FIGURE 8a
CPT Cross Sections, North - South
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 HSRI_CPT_cross_north_south.ai 8/11

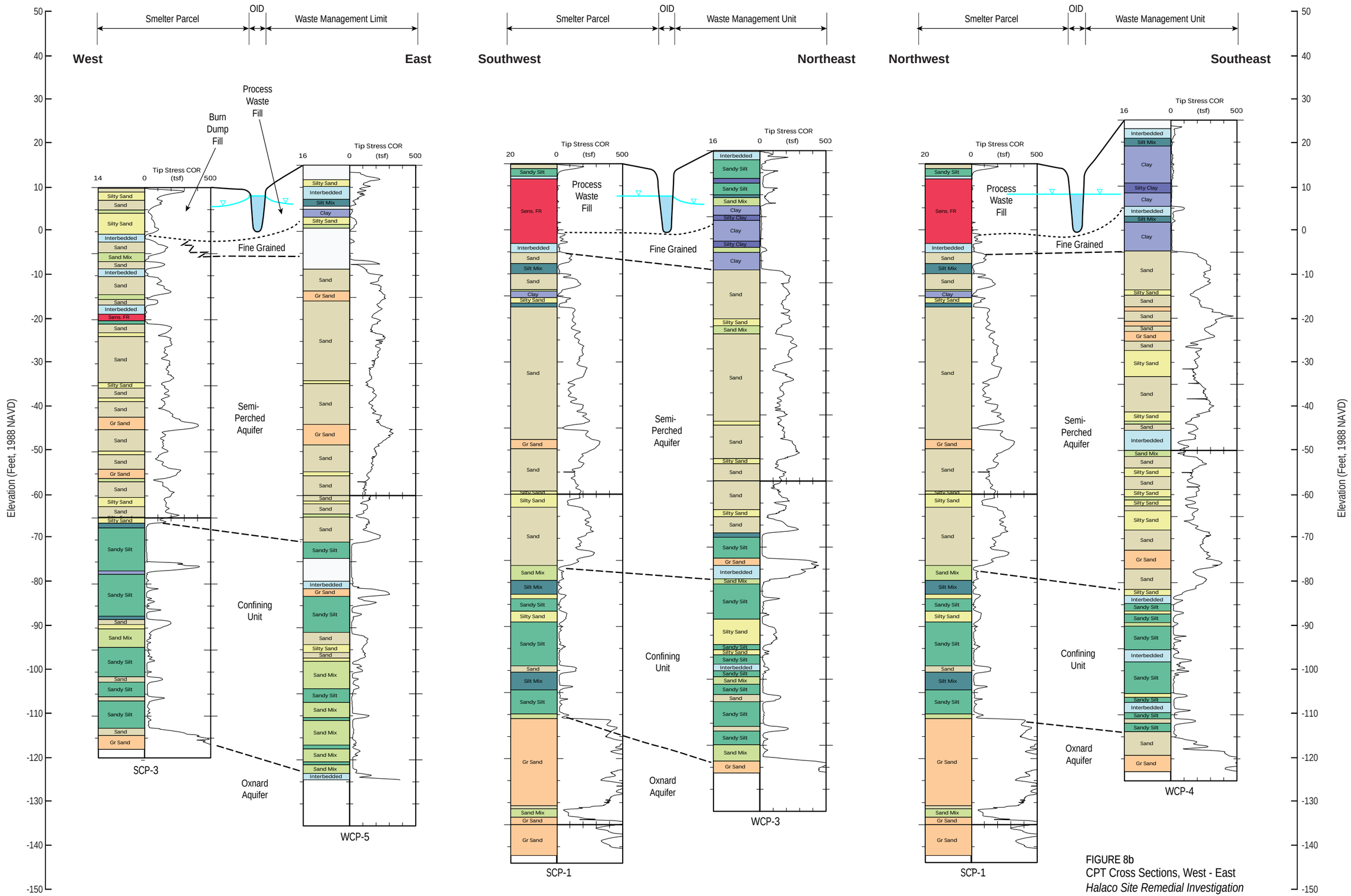
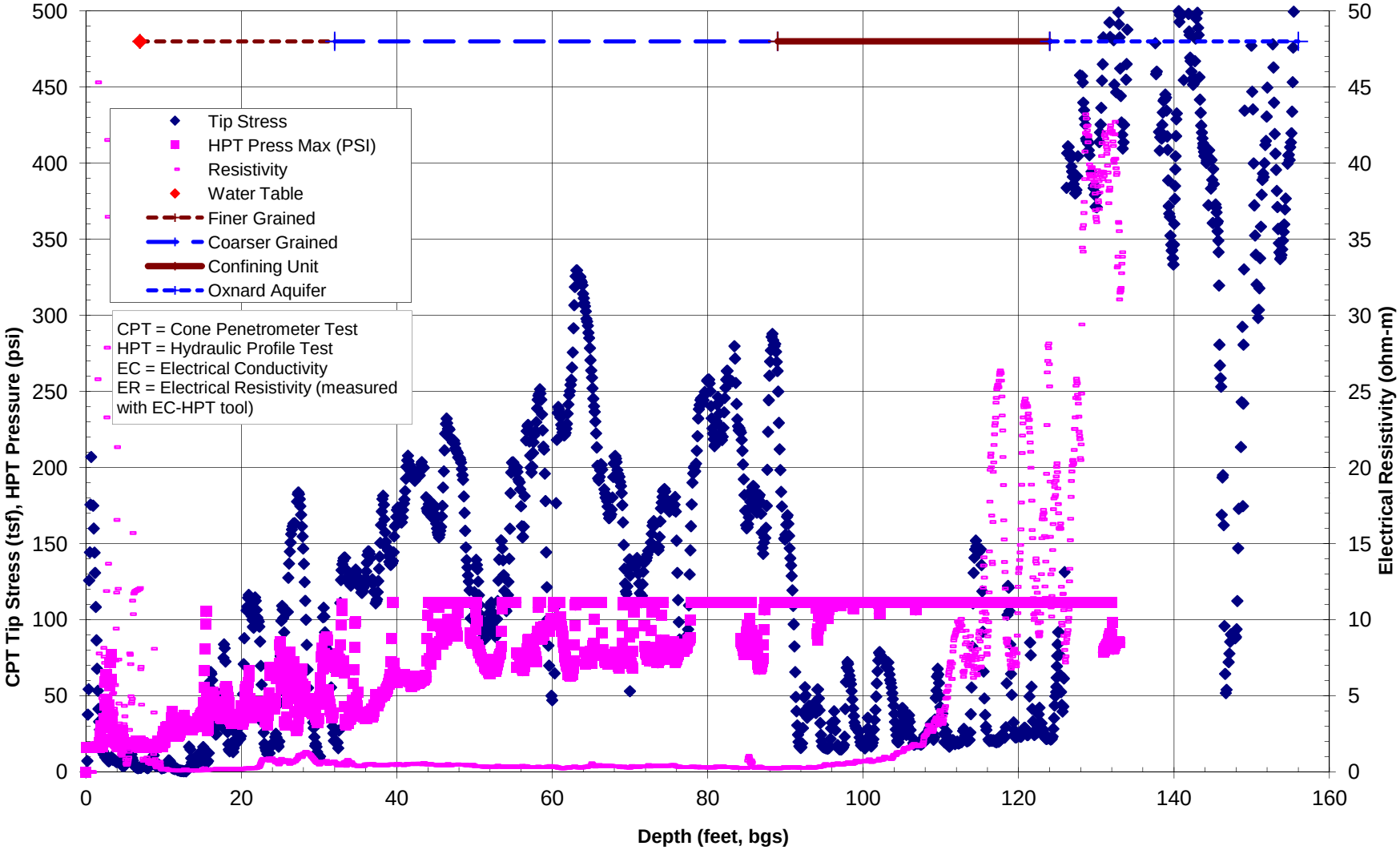


FIGURE 8b
CPT Cross Sections, West - East
Halaco Site Remedial Investigation
Oxnard, California

WBG110210203057SCO385135.DE.01 HSRI_CPT_cross_west_east.ai 8/11

CH2MHILL

Figure 8c
SCP-1
CPT Tip Stress and HPT Maximum Pressure



LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Groundwater Elevation Contours

- Shallow "A" and "B" Wells 1 ft Contour
- Deeper "C" Wells 0.5 ft Contour

Groundwater Elevation, ft

- MW-21: 6.38

Surface Water Elevation, ft

- NCL East: 7.95

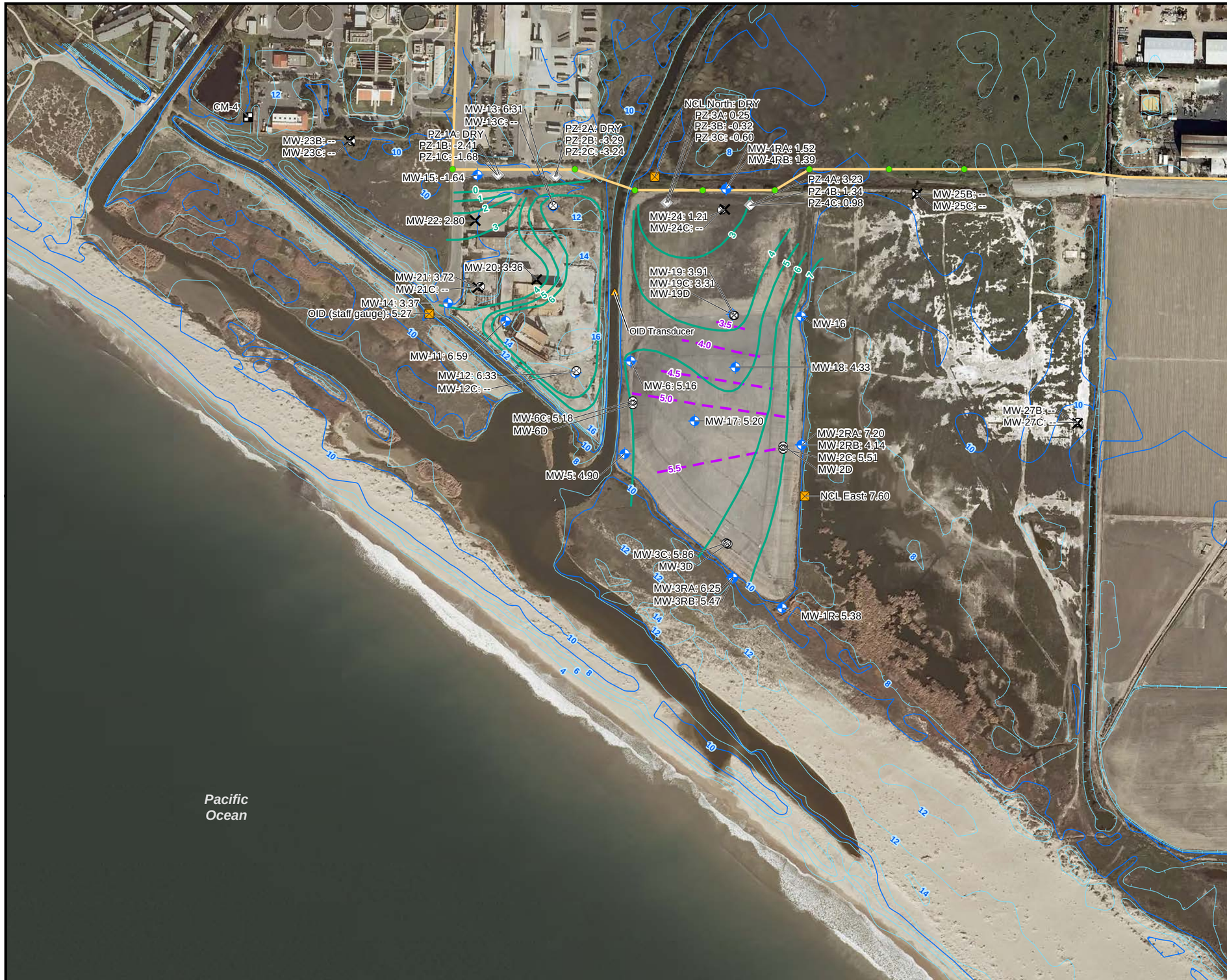
Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 9a
Groundwater Elevation Contour Map
Semiperched Aquifer - 11/16/2009
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\Halaco\MapFiles\GW\PROJECTS\HALACO\MAPFILES\GW\2011_SEPT\HALACO_FIG9a_GW_SEMPERCHAQU_20091116.MXD SWOLFSKI 2/27/2012 5:08:35 PM



LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Groundwater Elevation Contours

- Shallow "A" and "B" Wells 1 ft Contour
- Deeper "C" Wells 0.5 ft Contour

Groundwater Elevation, ft

- MW-21: 3.72

Surface Water Elevation, ft

- NCL East: 7.60

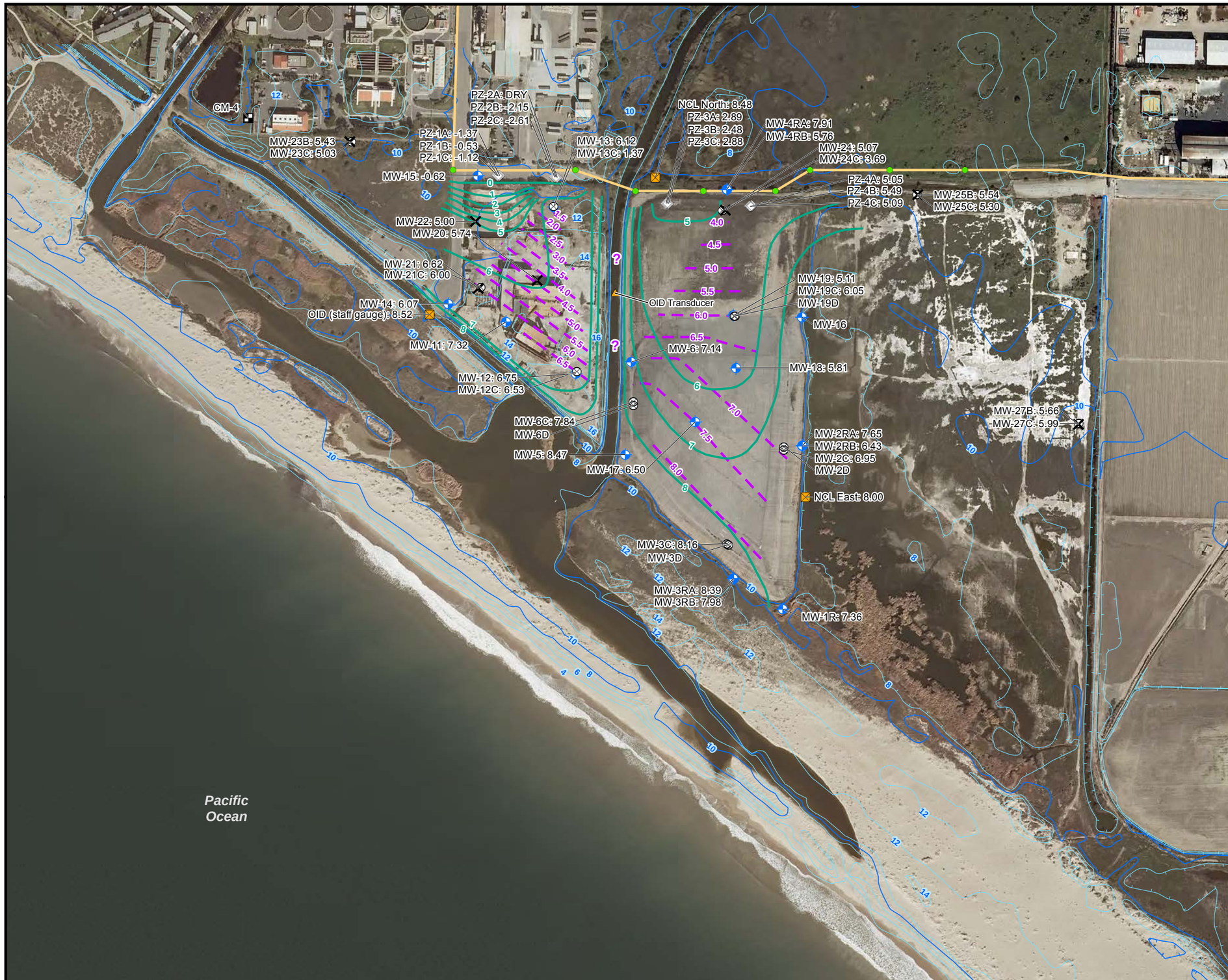
Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 9b
Groundwater Elevation Contour Map
Semiperched Aquifer - 2/22/2010
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\Halaco\MapFiles\GW\PROJECTS\HALACO\MAPFILES\GW\2011_SEPT\HALACO_FIG9b_GW_SEMPERCHAQU_20100222.MXD SWOLFSKI 2/27/2012 6:35:19 PM



LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Groundwater Elevation Contours

- Shallow "A" and "B" Wells 1 ft Contour
- Deeper "C" Wells 0.5 ft Contour

? Continuity of groundwater elevation contours is uncertain between the deeper "C" wells at the Smelter Parcel and the Waste Management Area.

Groundwater Elevation, ft

MW-21: 6.62

Surface Water Elevation, ft

NCL East: 8.00

Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 9c
Groundwater Elevation Contour Map
Semiperched Aquifer - 6/1/2010
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\Halaco\MapFiles\GW\PROJECTS\HALACO\MAPFILES\GW\2011_SEPT\HALACO_FIG9c_GW_SEMPERCHAQU_20100601.MXD SWOLFSKI 2/27/2012 6:46:00 PM

LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft msl (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Groundwater Elevation Contours

- Shallow "A" and "B" Wells 1 ft Contour
- Deeper "C" Wells 0.5 ft Contour

? Continuity of groundwater elevation contours is uncertain between the deeper "C" wells at the Smelter Parcel and the Waste Management Area.

Groundwater Elevation, ft

MW-21: 7.11

Surface Water Elevation, ft

NCL East: 8.40

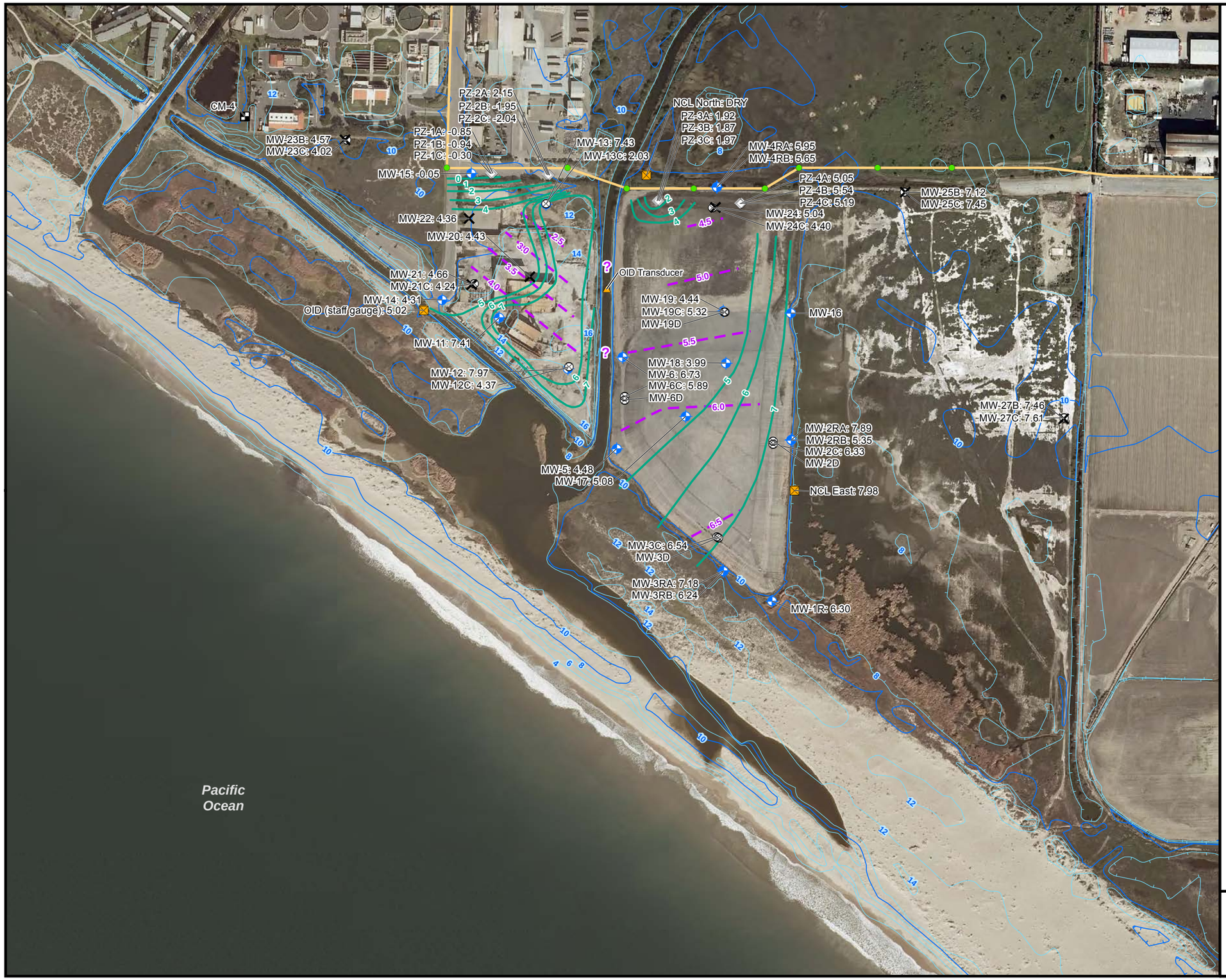
Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 9d
Groundwater Elevation Contour Map
Semiperched Aquifer - 10/25/2010
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\Halaco\MapFiles\GW\PROJECTS\HALACO\MAPFILES\GW\2011_SEPT\HALACO_FIG9d_GW_SEMPERCHAQU_20101025.MXD SWOLFSKI 2/27/2012 6:46:45 PM



LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Groundwater Elevation Contours

- Shallow "A" and "B" Wells 1 ft Contour
- Deeper "C" Wells 0.5 ft Contour

? Continuity of groundwater elevation contours is uncertain between the deeper "C" wells at the Smelter Parcel and the Waste Management Area.

Groundwater Elevation, ft

MW-21: 4.66

Surface Water Elevation, ft

NCL East: 7.98

Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 9e
Groundwater Elevation Contour Map
Semiperched Aquifer - 12/27/2010
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\Halaco\MapFiles\GW\PROJECTS\HALACO\MAPFILES\GW\2011_SEPT\HALACO_FIG9e_GW_SEMPERCHAQU_20101227.MXD SWOLFSKI 2/27/2012 6:47:26 PM

LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Groundwater Elevation Contours

- 0.2 ft Contours

Groundwater Elevation, ft

- MW-3D: 1.58

Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 10a
Groundwater Elevation Contour Map
Oxnard Aquifer - 11/16/2009
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\GROUPS\EMS\PROJECTS\HALACO\MAPFILES\GW\2011_SEPT\HALACO_FIG10a_GW_OXNARDAQU_20091116.MXD SWOLFSKI 2/27/2012 6:00:34 PM

LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Groundwater Elevation Contours

- 0.2 ft Contours

Groundwater Elevation, ft

- MW-3D: 8.92

Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet
1 inch = 400 feet

FIGURE 10b
Groundwater Elevation Contour Map
Oxnard Aquifer - 6/1/2010
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

\\ICONIA\GROUPS\EMS\Halaco\MapFiles\GW\2011_SEPT\HALACO_FIG10B_GW_OXNARDAQU_20100601.MXD SWOLFSKI 2/27/2012 6:08:16 PM

Figure 11a
Surface Water Elevation Hydrograph, Transducer Data
2007 - 2009

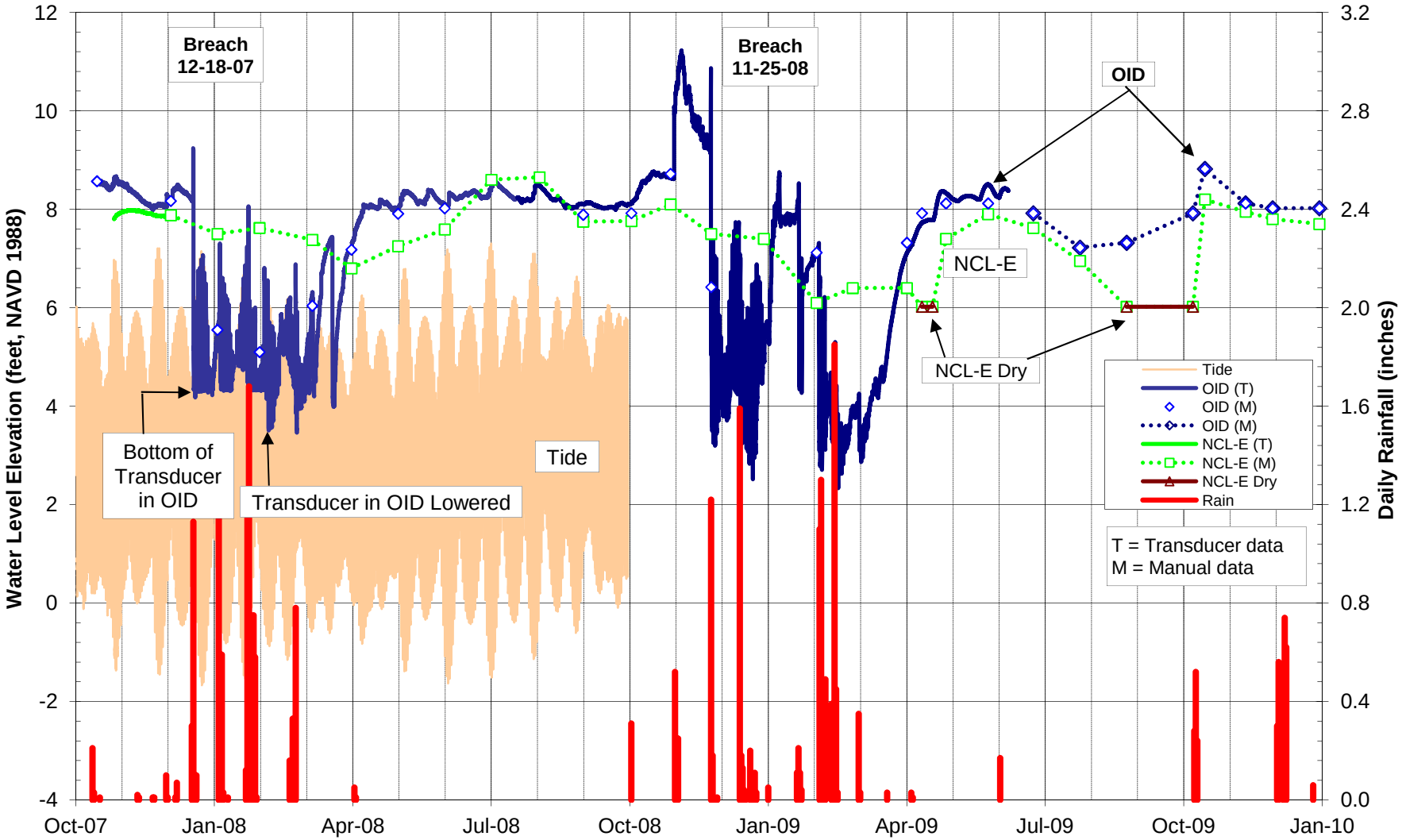


Figure 11b
Surface Water Elevation Hydrograph, Transducer Data
December 2007 - April 2008

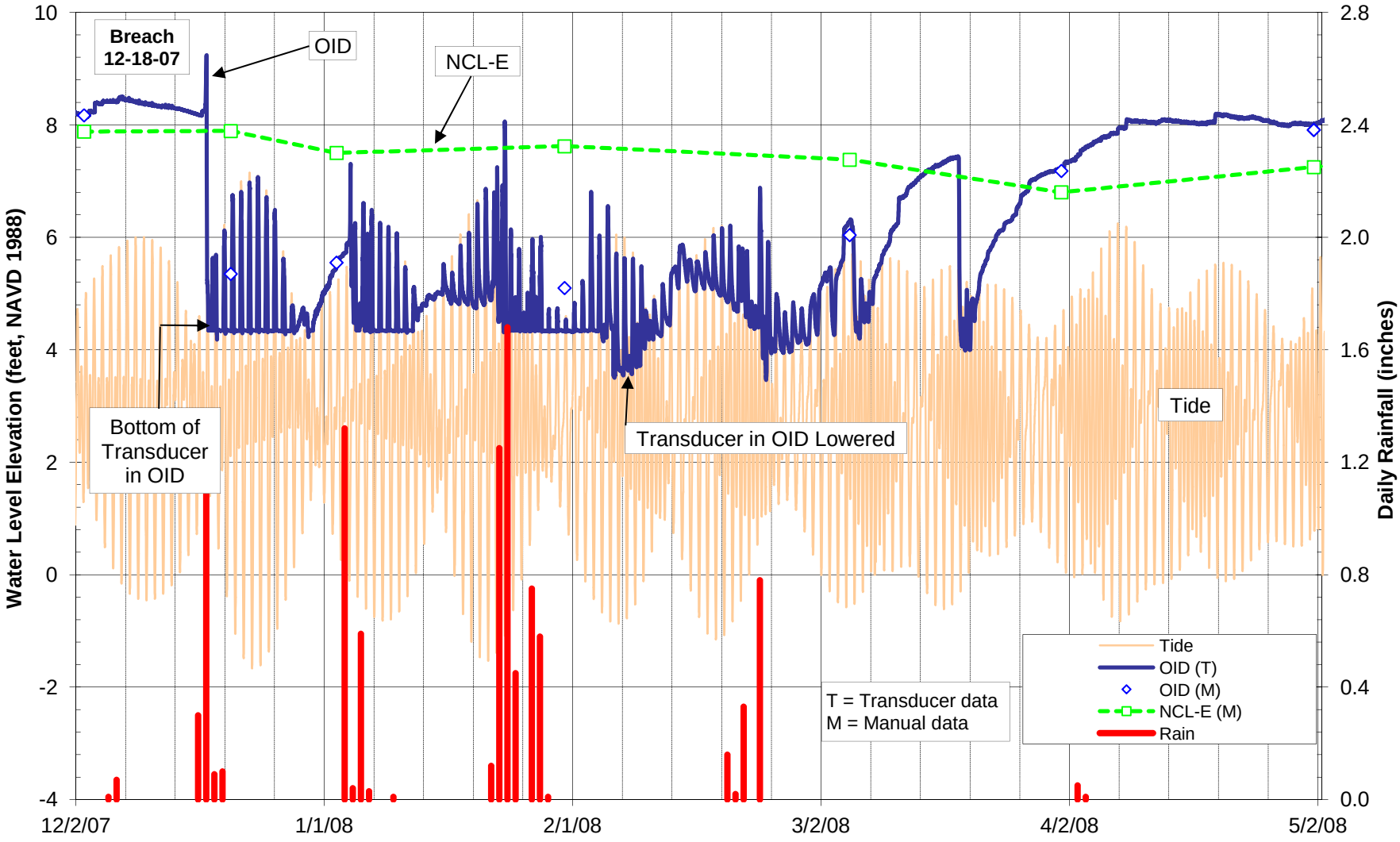


Figure 11c
Surface Water Elevation Hydrograph
October 2007 - August 2011

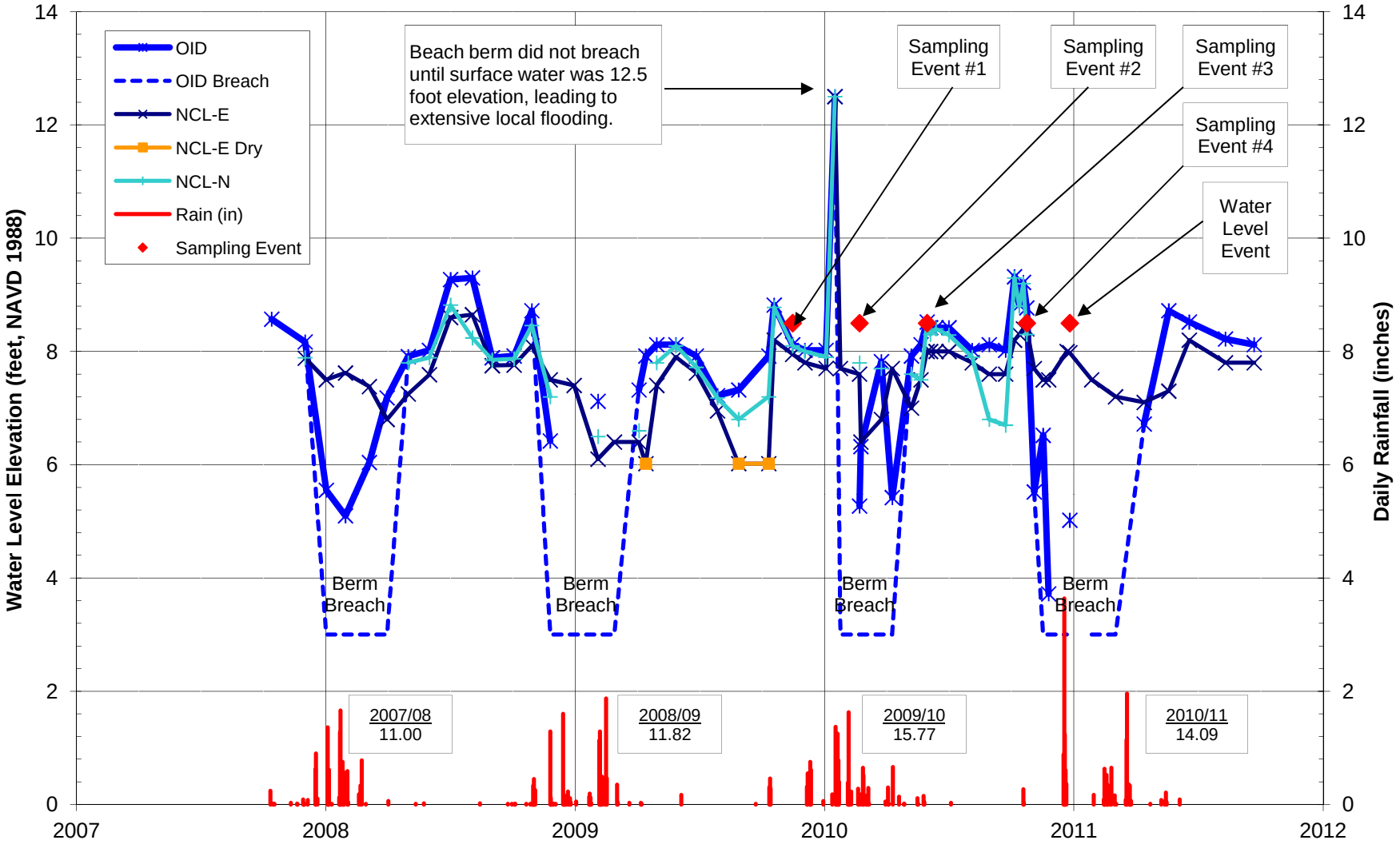


Figure 12a
Groundwater Elevation Hydrograph, Waste Management Area
2007 - 2010

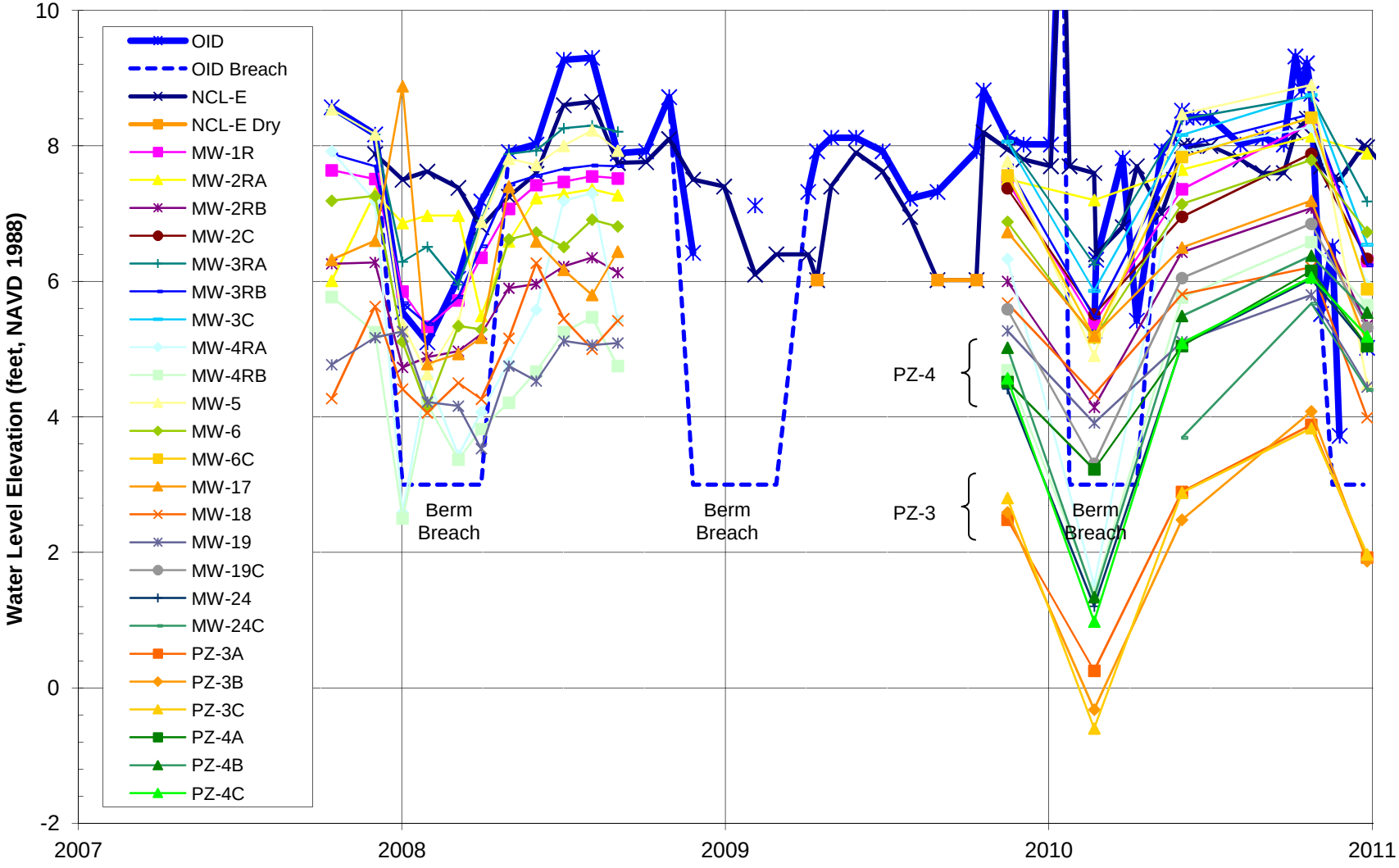


Figure 12b
Groundwater Elevation Hydrograph, Smelter Parcel
2007 - 2010

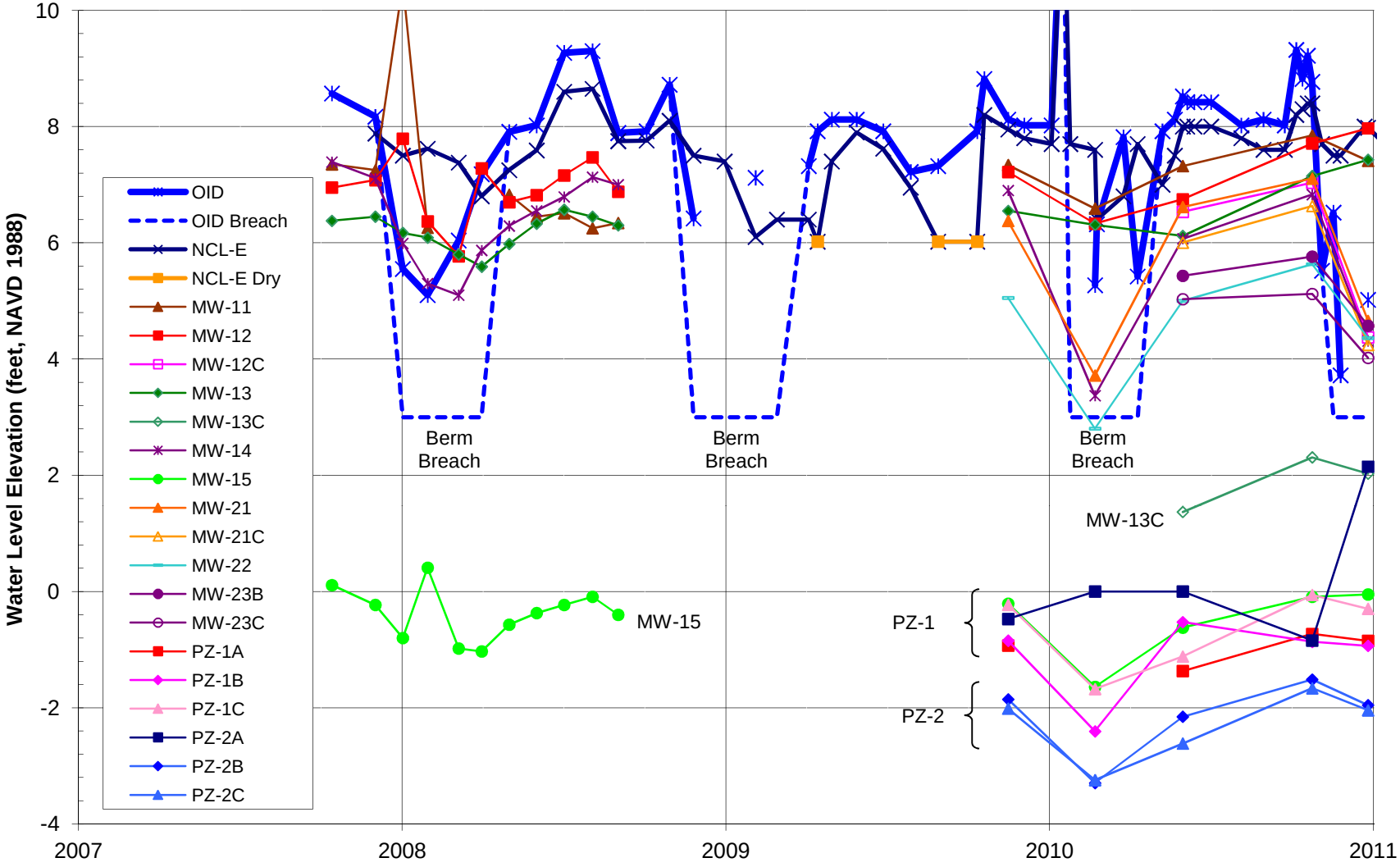


Figure 13a
Groundwater Elevation Hydrograph, Waste Management Area
2009 - 2010

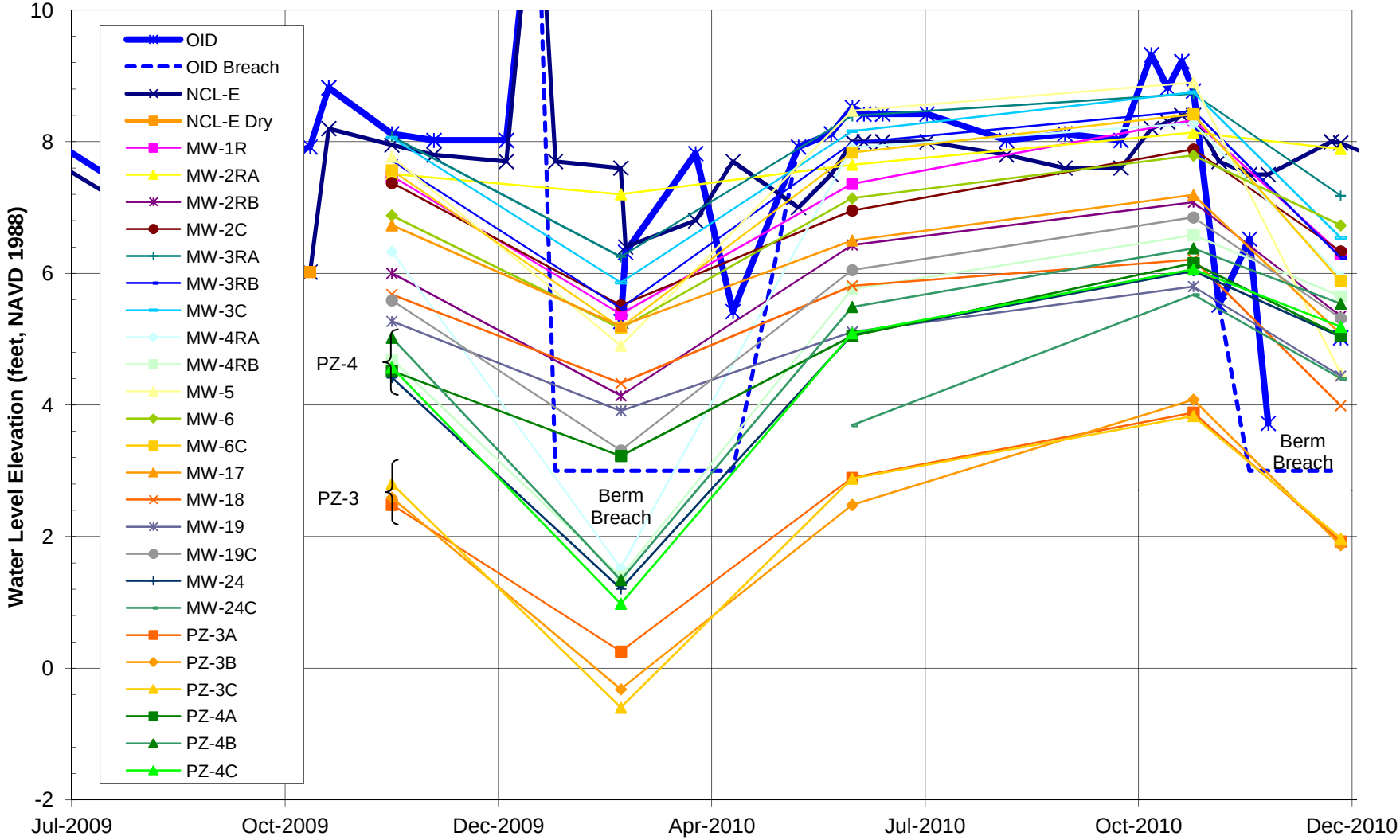


Figure 13b
Groundwater Elevation Hydrograph, Smelter Parcel
2009 - 2010

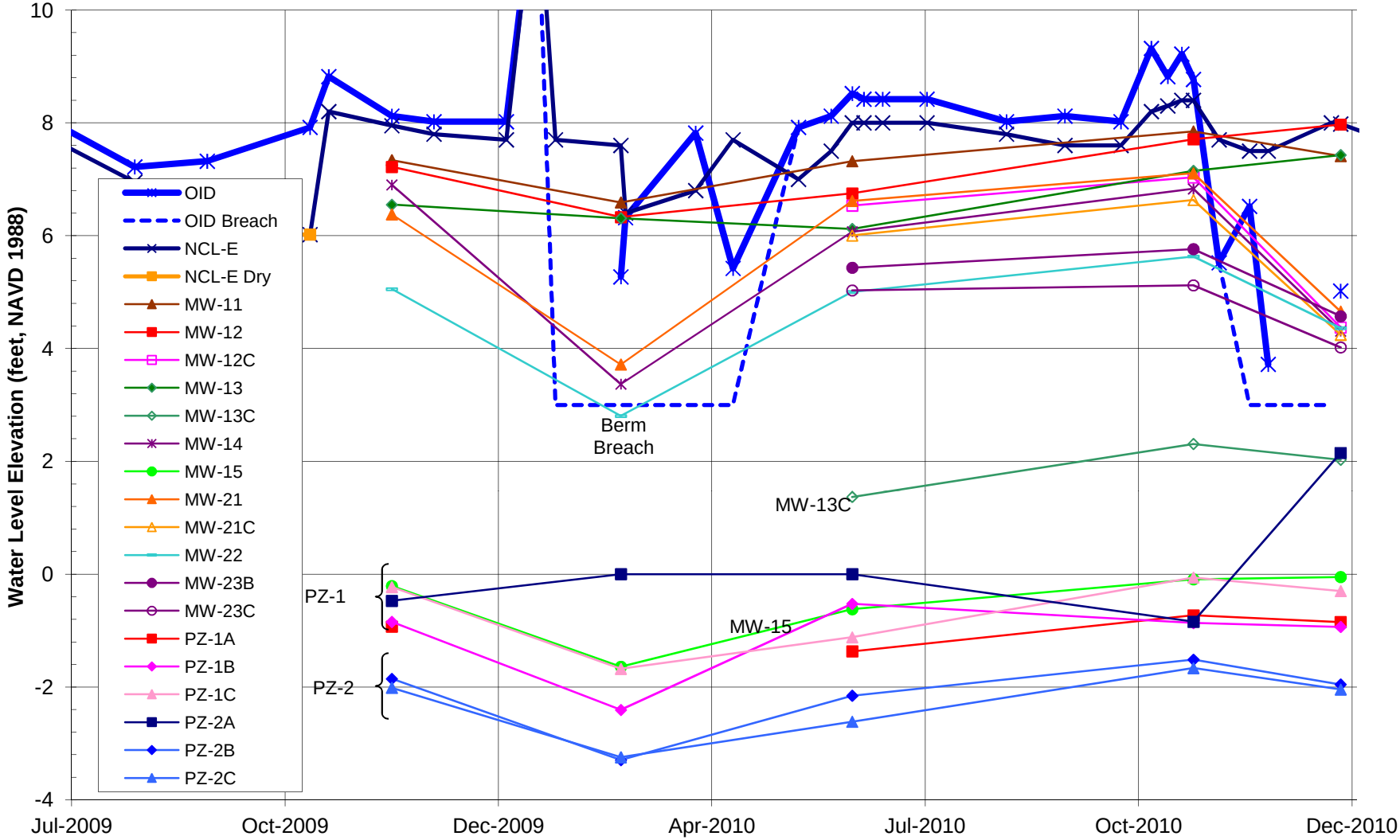


Figure 13c
Groundwater Elevation Hydrograph, Hueneme Parcel and NCL East
2009 - 2010

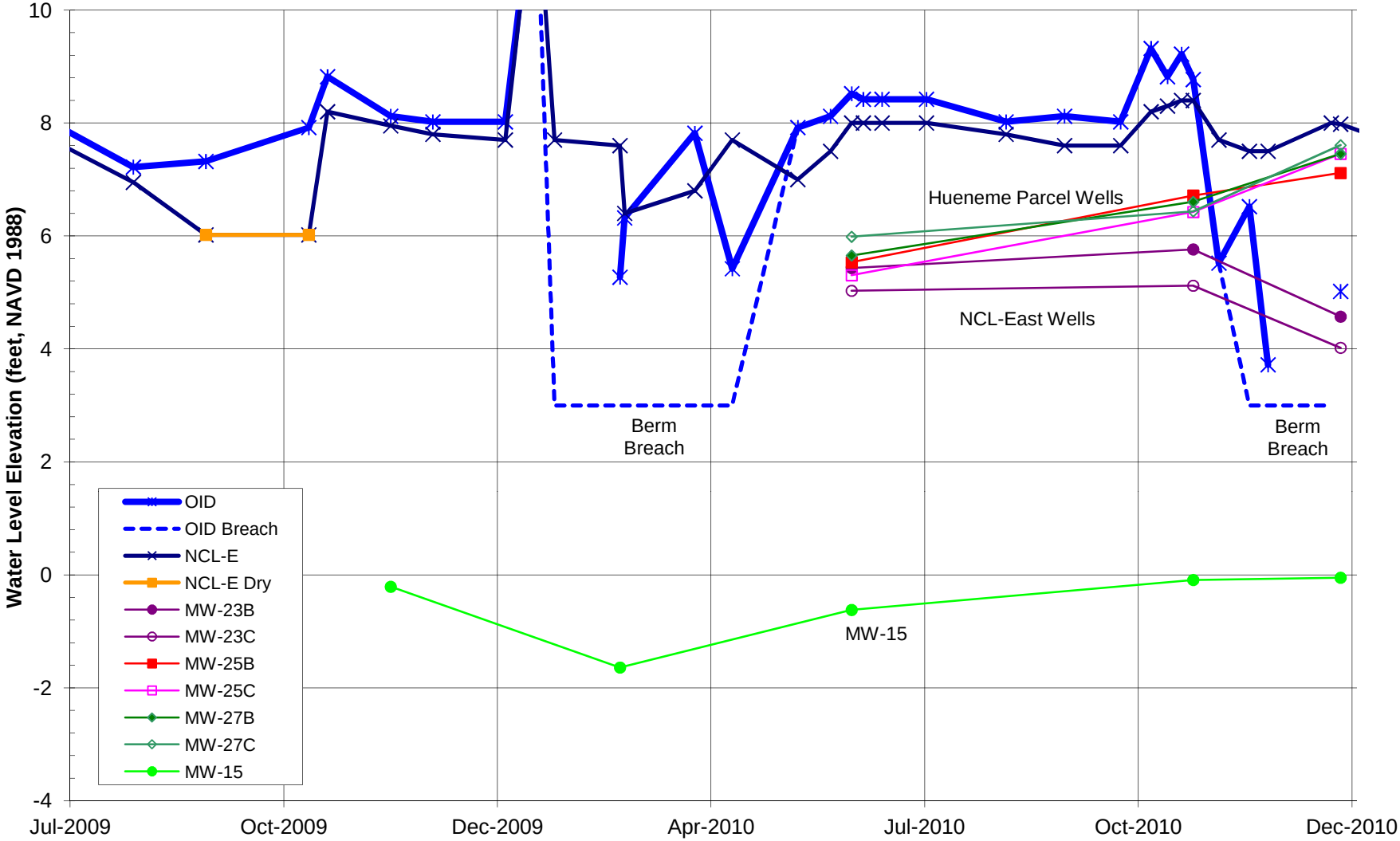


Figure 14a
Groundwater Elevation Hydrograph, Waste Management Area "C" Zone Wells
2009 - 2010

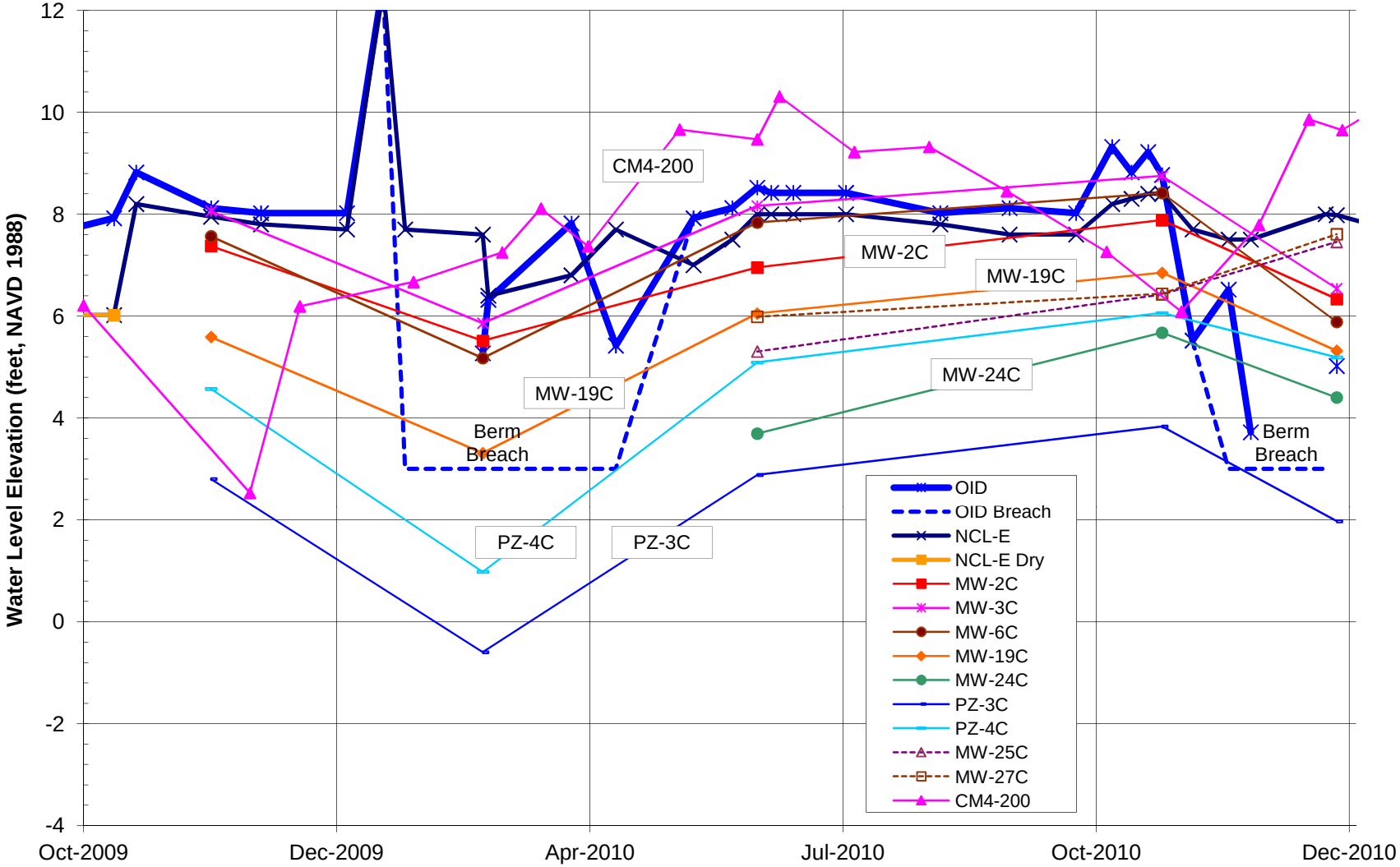


Figure 14b
Groundwater Elevation Hydrograph, Smelter Parcel "C"Zone Wells
2009 - 2010

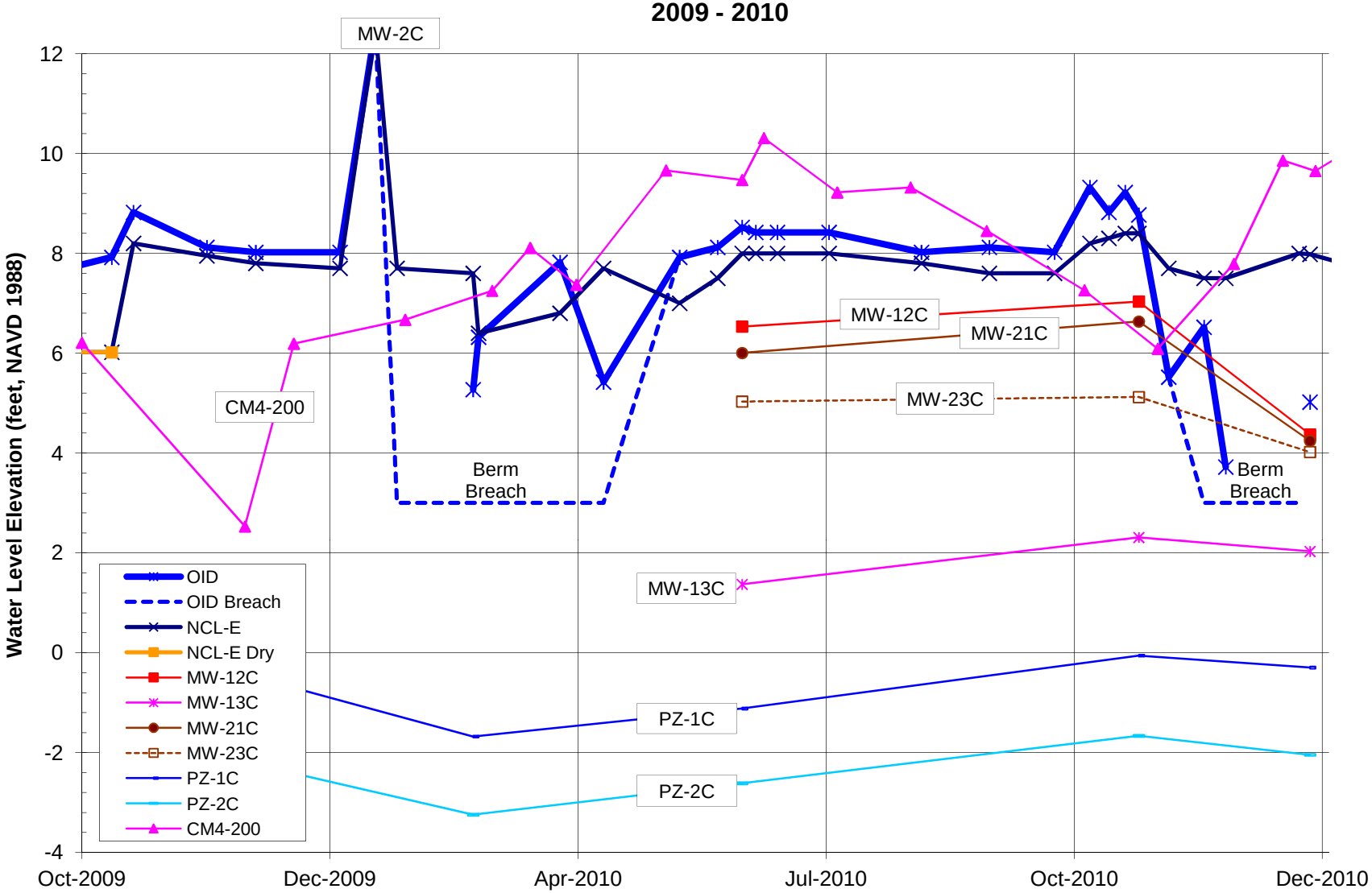


Figure 15a
Groundwater Elevation Hydrograph, "D" Zone Wells and CM4-200
2007 - 2011

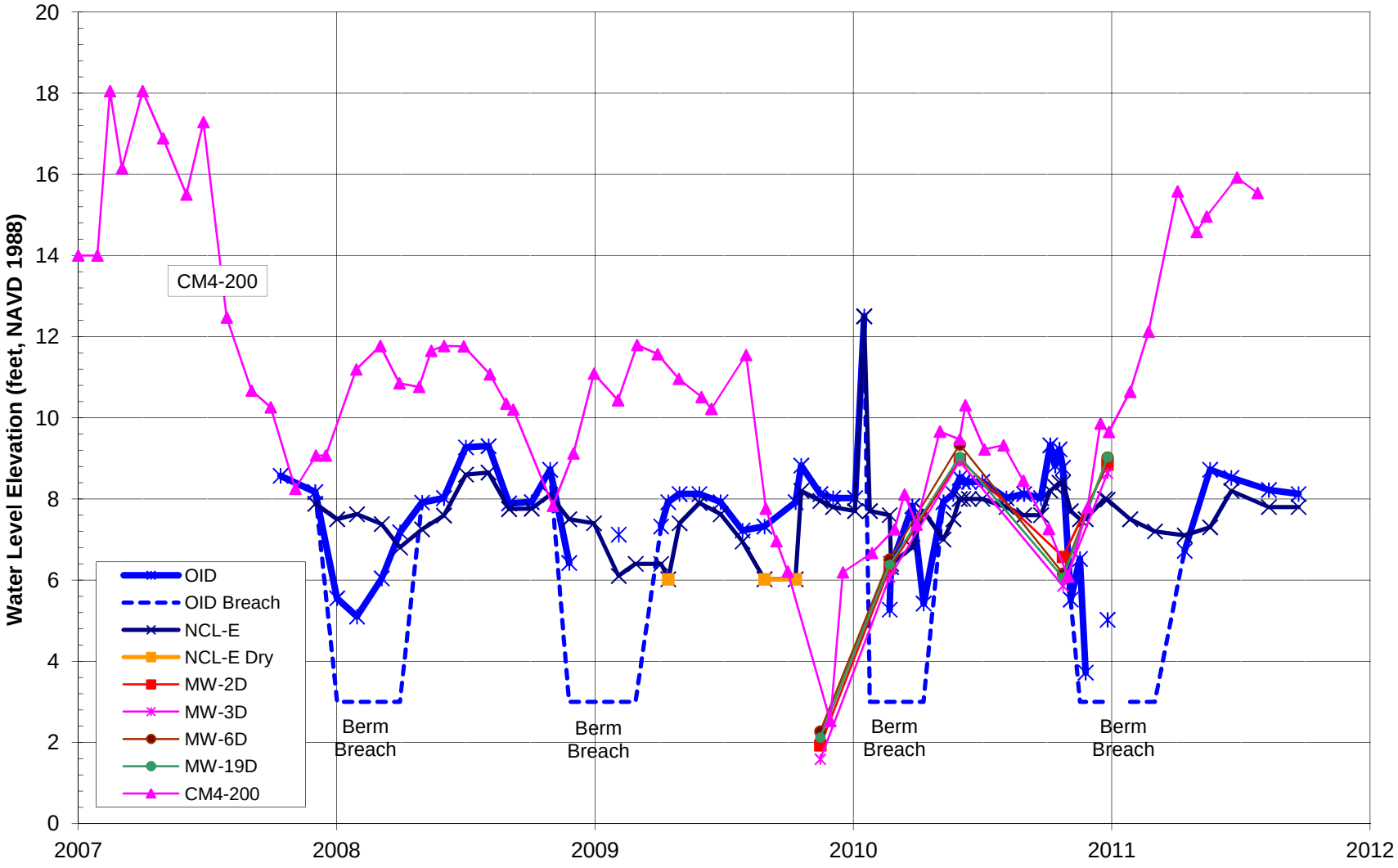


Figure 15b
Groundwater Elevation Hydrograph, "D" Zone Wells and CM4-200
2009 - 2010

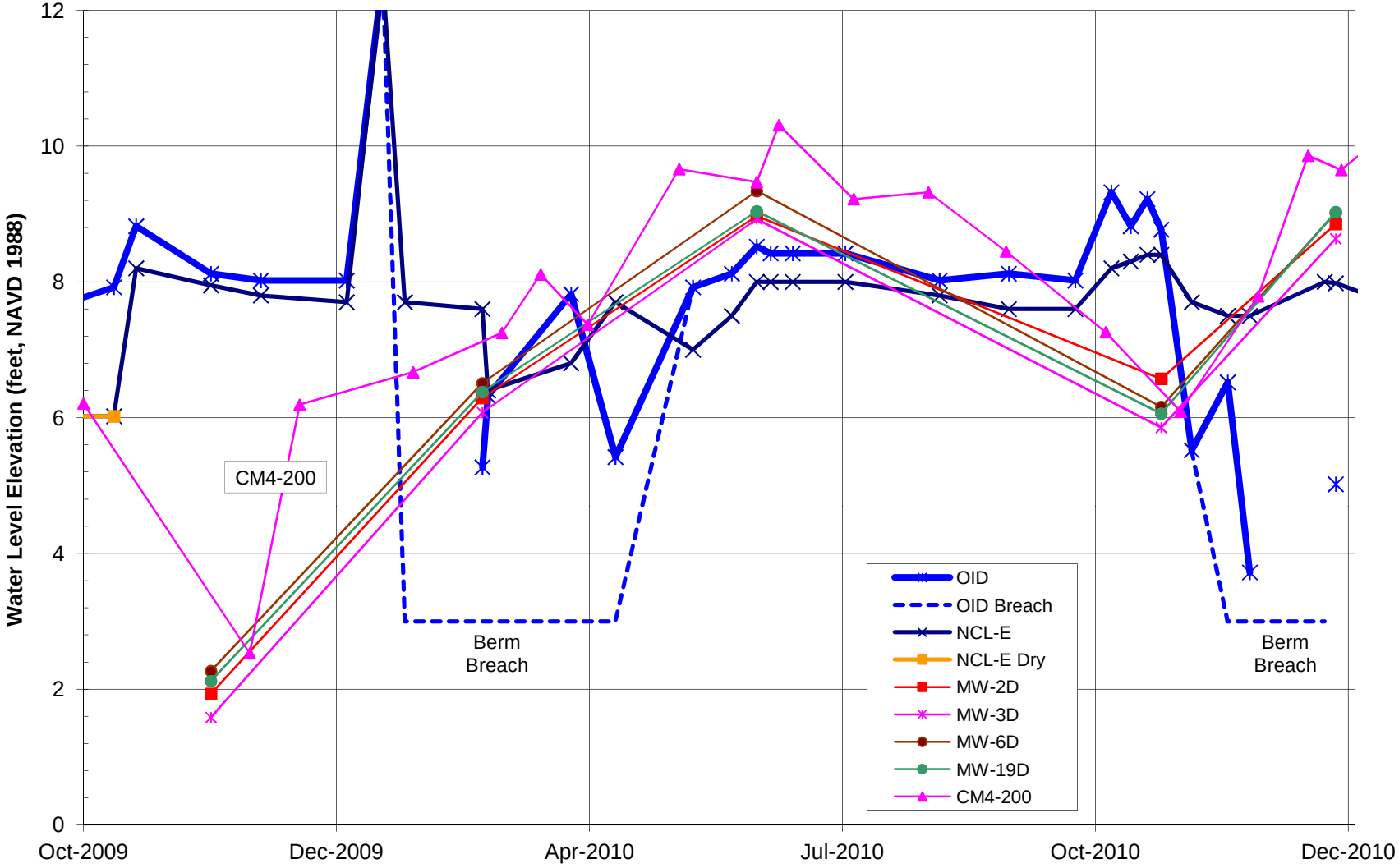
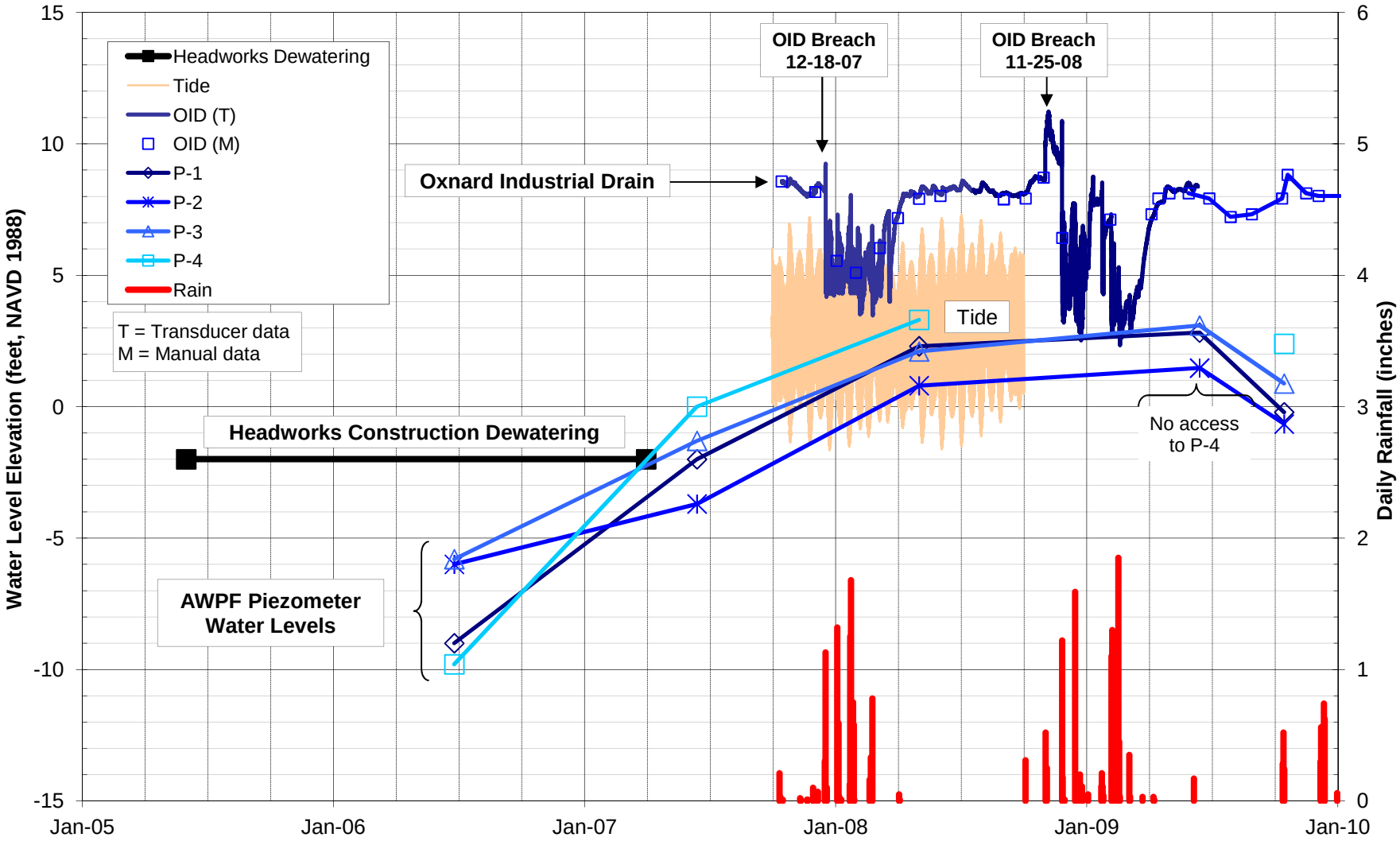
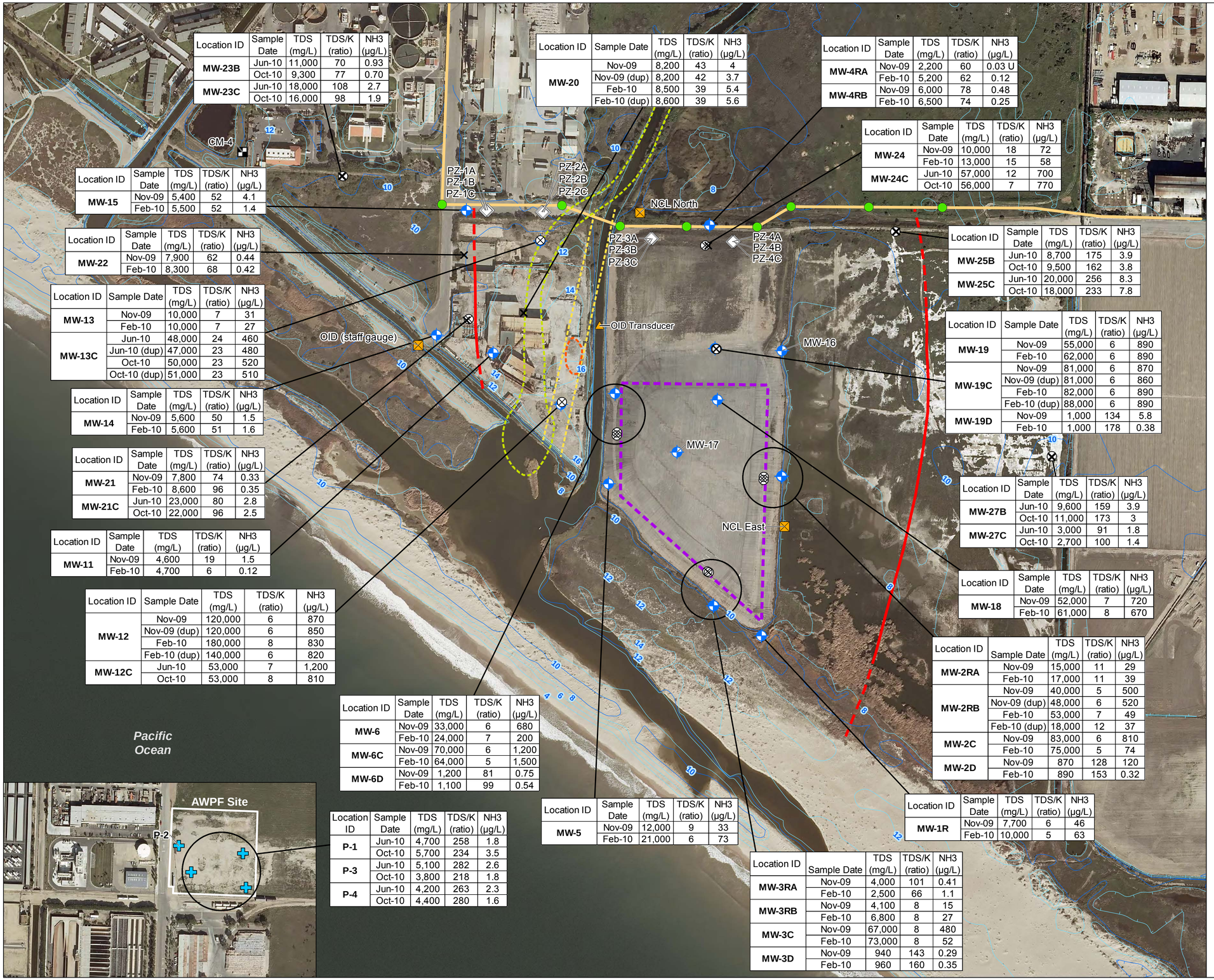


Figure 16
Surface Water Elevation Hydrograph, AWPF Wells
2005 - 2010





Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-23B	Jun-10	11,000	70	0.93
	Oct-10	9,300	77	0.70
MW-23C	Jun-10	18,000	108	2.7
	Oct-10	16,000	98	1.9

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-20	Nov-09	8,200	43	4
	Nov-09 (dup)	8,200	42	3.7
	Feb-10	8,500	39	5.4
	Feb-10 (dup)	8,600	39	5.6

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-4RA	Nov-09	2,200	60	0.03 U
	Feb-10	5,200	62	0.12
MW-4RB	Nov-09	6,000	78	0.48
	Feb-10	6,500	74	0.25

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-24	Nov-09	10,000	18	72
	Feb-10	13,000	15	58
MW-24C	Jun-10	57,000	12	700
	Oct-10	56,000	7	770

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-15	Nov-09	5,400	52	4.1
	Feb-10	5,500	52	1.4

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-22	Nov-09	7,900	62	0.44
	Feb-10	8,300	68	0.42

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-25B	Jun-10	8,700	175	3.9
	Oct-10	9,500	162	3.8
MW-25C	Jun-10	20,000	256	8.3
	Oct-10	18,000	233	7.8

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-13	Nov-09	10,000	7	31
	Feb-10	10,000	7	27
MW-13C	Jun-10	48,000	24	460
	Jun-10 (dup)	47,000	23	480
	Oct-10	50,000	23	520
	Oct-10 (dup)	51,000	23	510

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-19	Nov-09	55,000	6	890
	Feb-10	62,000	6	890
MW-19C	Nov-09	81,000	6	870
	Nov-09 (dup)	81,000	6	860
	Feb-10	82,000	6	890
	Feb-10 (dup)	88,000	6	890
MW-19D	Nov-09	1,000	134	5.8
	Feb-10	1,000	178	0.38

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-14	Nov-09	5,600	50	1.5
	Feb-10	5,600	51	1.6

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-21	Nov-09	7,800	74	0.33
	Feb-10	8,600	96	0.35
MW-21C	Jun-10	23,000	80	2.8
	Oct-10	22,000	96	2.5

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-27B	Jun-10	9,600	159	3.9
	Oct-10	11,000	173	3
MW-27C	Jun-10	3,000	91	1.8
	Oct-10	2,700	100	1.4

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-11	Nov-09	4,600	19	1.5
	Feb-10	4,700	6	0.12

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-18	Nov-09	52,000	7	720
	Feb-10	61,000	8	670

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-12	Nov-09	120,000	6	870
	Nov-09 (dup)	120,000	6	850
	Feb-10	180,000	8	830
	Feb-10 (dup)	140,000	6	820
MW-12C	Jun-10	53,000	7	1,200
	Oct-10	53,000	8	810

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-2RA	Nov-09	15,000	11	29
	Feb-10	17,000	11	39
MW-2RB	Nov-09	40,000	5	500
	Nov-09 (dup)	48,000	6	520
	Feb-10	53,000	7	49
	Feb-10 (dup)	18,000	12	37
MW-2C	Nov-09	83,000	6	810
	Feb-10	75,000	5	74
MW-2D	Nov-09	870	128	120
	Feb-10	890	153	0.32

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-6	Nov-09	33,000	6	680
	Feb-10	24,000	7	200
MW-6C	Nov-09	70,000	6	1,200
	Feb-10	64,000	5	1,500
MW-6D	Nov-09	1,200	81	0.75
	Feb-10	1,100	99	0.54

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-5	Nov-09	12,000	9	33
	Feb-10	21,000	6	73

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-1R	Nov-09	7,700	6	46
	Feb-10	10,000	5	63

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
P-1	Jun-10	4,700	258	1.8
	Oct-10	5,700	234	3.5
P-3	Jun-10	5,100	282	2.6
	Oct-10	3,800	218	1.8
P-4	Jun-10	4,200	263	2.3
	Oct-10	4,400	280	1.6

Location ID	Sample Date	TDS (mg/L)	TDS/K (ratio)	NH3 (µg/L)
MW-3RA	Nov-09	4,000	101	0.41
	Feb-10	2,500	66	1.1
MW-3RB	Nov-09	4,100	8	15
	Feb-10	6,800	8	27
MW-3C	Nov-09	67,000	8	480
	Feb-10	73,000	8	52
MW-3D	Nov-09	940	143	0.29
	Feb-10	960	160	0.35

LEGEND

Groundwater Monitoring Locations

- USGS Regional Monitoring Well
- Existing Shallow Groundwater Monitoring Well
- New Shallow Well, Water Quality
- New Deeper Well, Water Quality
- New Piezometer Cluster, Water Level
- Surface Water Gauging Station
- Former Surface Water Pressure Transducer
- AWPF Piezometers

Sewer Line

- Oxnard Sewer Trunk Line
- Manhole

Ground Elevation Contours, ft (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Approximate Extent of Impacted Groundwater and Former Ponds

- Approximate East-West Extent of Groundwater Impacted by Halaco's Operations
- Approximate Extent of Former Process Waste Settling Pond

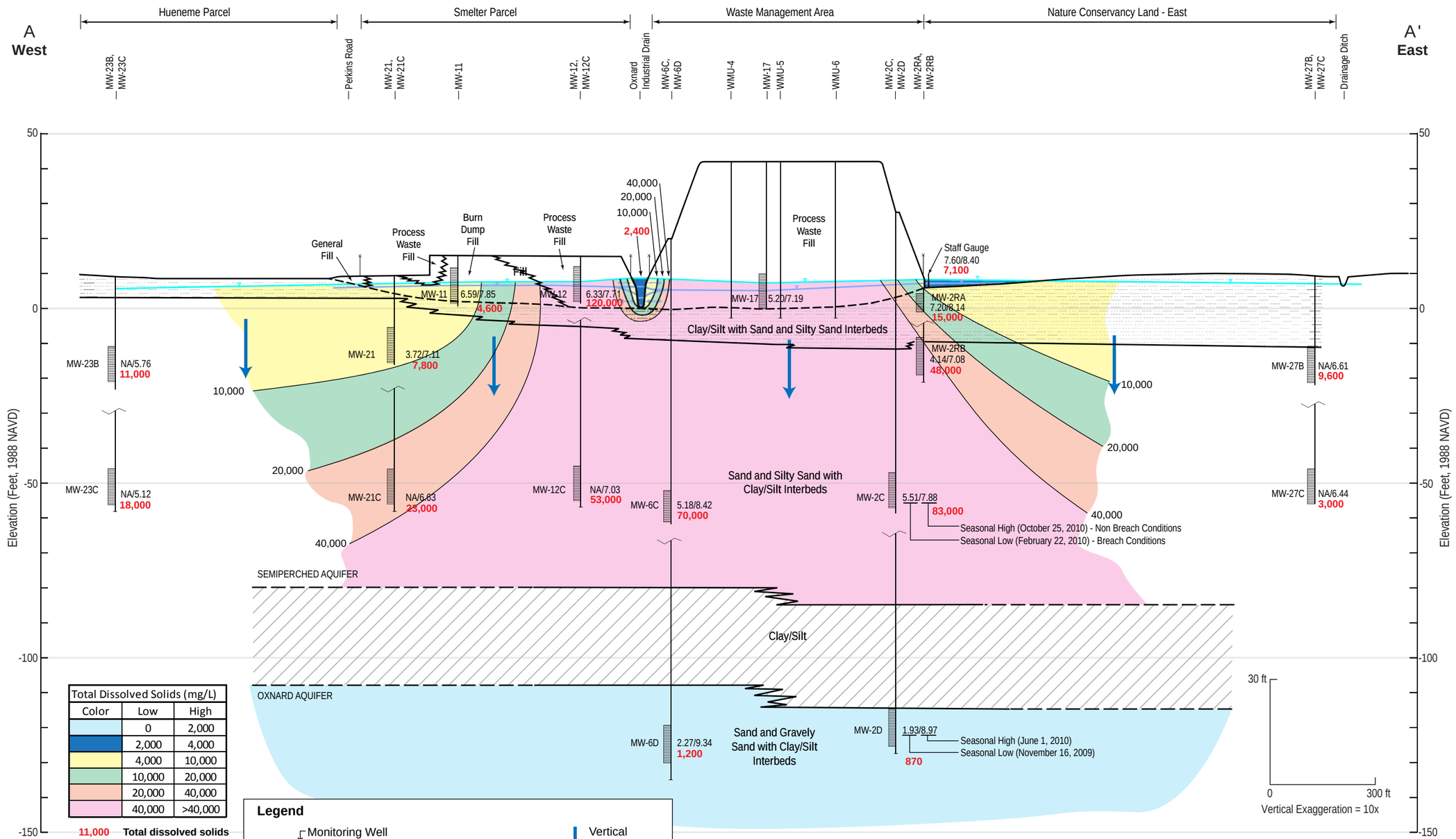
Note:
Elevation Datum is NAVD 1988

N

0 200 400
Feet

1 inch = 200 feet

FIGURE 17
Approximate East-West Extent of Groundwater Impacted by Halaco's Operations
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA



Total Dissolved Solids (mg/L)		
Color	Low	High
	0	2,000
	2,000	4,000
	4,000	10,000
	10,000	20,000
	20,000	40,000
	40,000	>40,000

11,000 **Total dissolved solids concentrations (mg/L)**

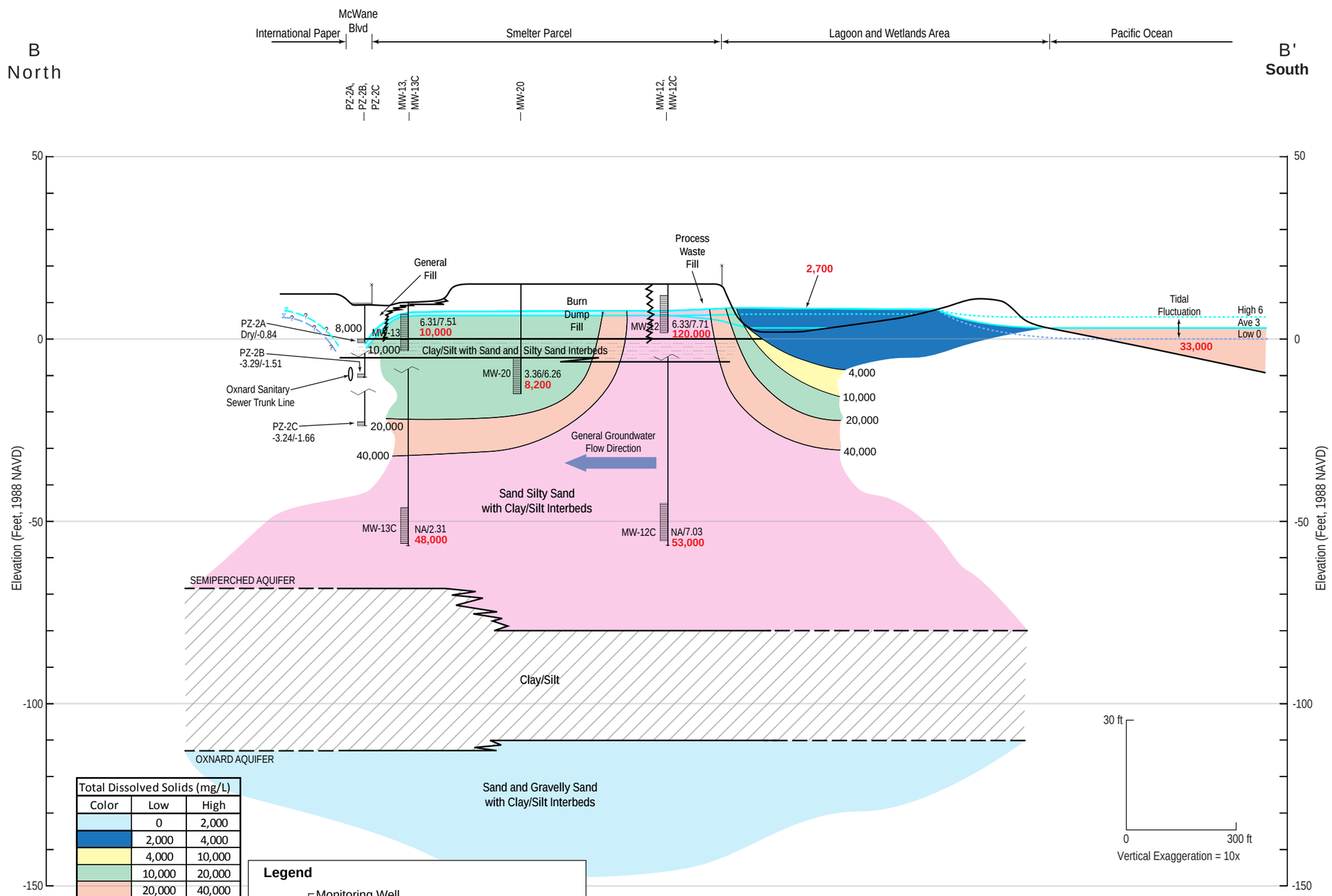
Notes:

1. See Hydrogeologic Cross Section A-A' for notes on surface water and groundwater elevations.
2. TDS concentrations are for the first of two surface water and groundwater sampling events. These samples were collected either during November 2009 or June 2010.

FIGURE 18a
Hydrogeologic Cross Section A-A' with TDS
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section AA'_v2rev.ai 9/11



Total Dissolved Solids (mg/L)		
Color	Low	High
	0	2,000
	2,000	4,000
	4,000	10,000
	10,000	20,000
	20,000	40,000
	40,000	>40,000

11,000 **Total dissolved solids concentrations (mg/L)**

Legend

- Monitoring Well
- Ground Surface
- Screened Interval
- Seasonal High Water Table
- Seasonal Low Water Table
- Seasonal High Water Level Elevation
- Seasonal Low Water Level Elevation

X.XX/Y.YY

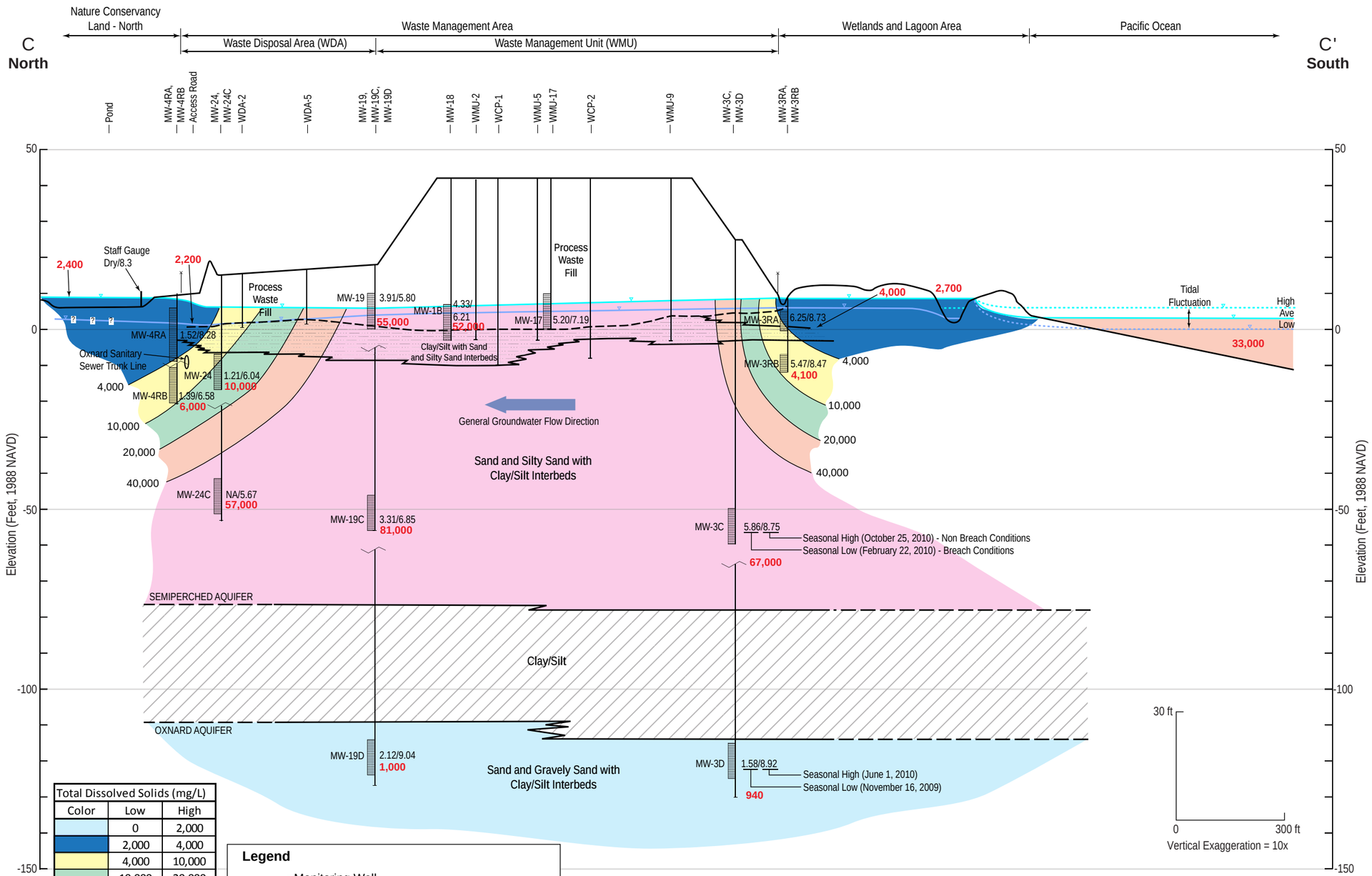
Notes:

1. See Hydrogeologic Cross Section B-B' for notes on surface water and groundwater elevations.
2. TDS concentrations are for the first of two surface water and groundwater sampling events. These samples were collected either during November 2009 or June 2010.

FIGURE 18b
Hydrogeologic Cross Section B-B' with TDS
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section BB'_v2rev.ai 9/11



Total Dissolved Solids (mg/L)		
Color	Low	High
	0	2,000
	2,000	4,000
	4,000	10,000
	10,000	20,000
	20,000	40,000
	40,000	>40,000

11,000 **Total dissolved solids concentrations (mg/L)**

Legend

- Monitoring Well
- Ground Surface
- Screened Interval
- Seasonal High Water Table
- Seasonal Low Water Table
- X.XX/Y.YY — Seasonal High Water Level Elevation
- Seasonal Low Water Level Elevation

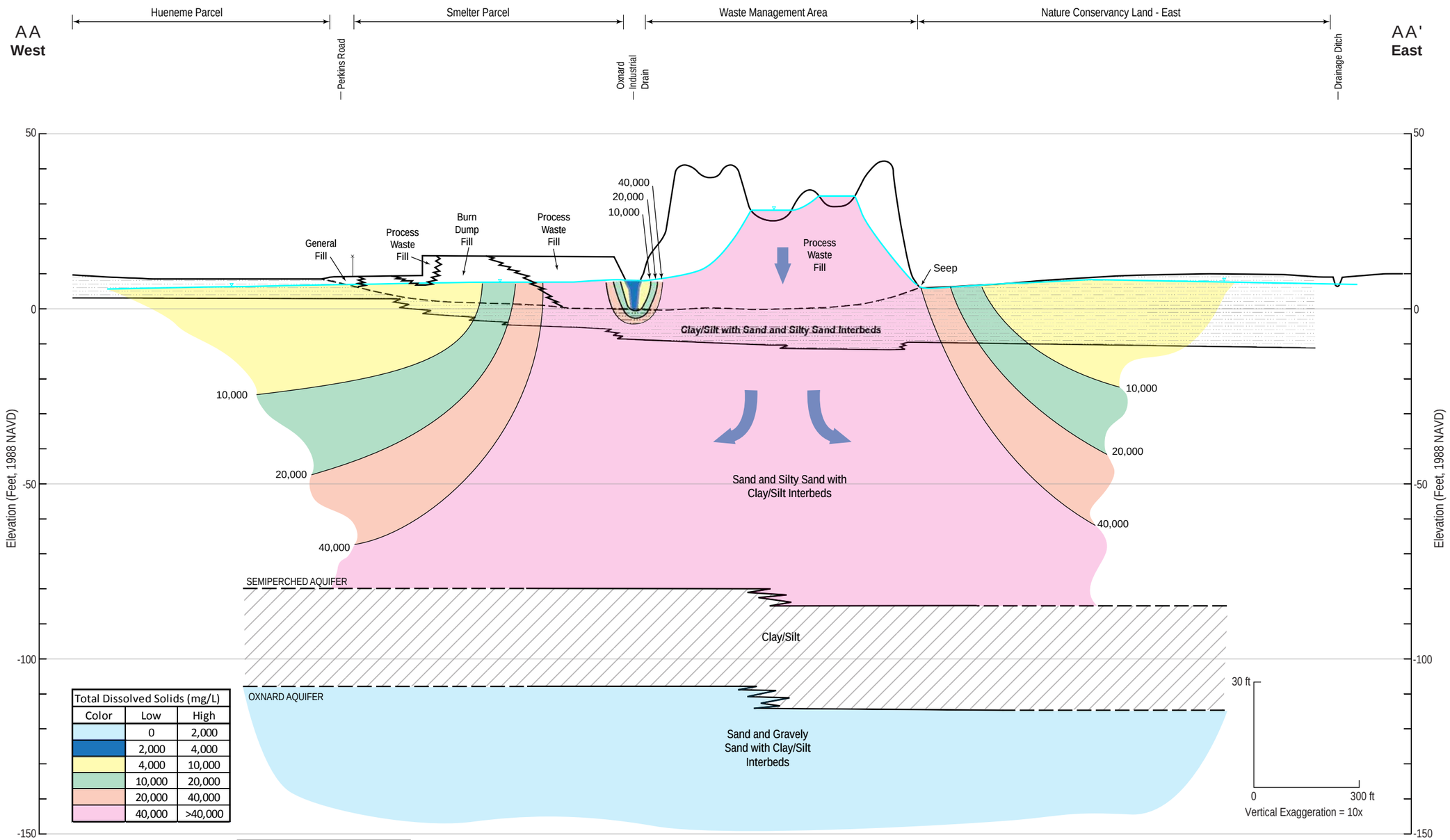
Notes:

1. See Hydrogeologic Cross Section C-C' for notes on surface water and groundwater elevations.
2. TDS concentrations are for the first of two surface water and groundwater sampling events. These samples were collected either during November 2009 or June 2010.

FIGURE 18c
Hydrogeologic Cross Section C-C' with TDS
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section CC'_v2rev.ai 9/11



Total Dissolved Solids (mg/L)		
Color	Low	High
	0	2,000
	2,000	4,000
	4,000	10,000
	10,000	20,000
	20,000	40,000
	40,000	>40,000

Legend

Conceptual General Groundwater Flow Direction

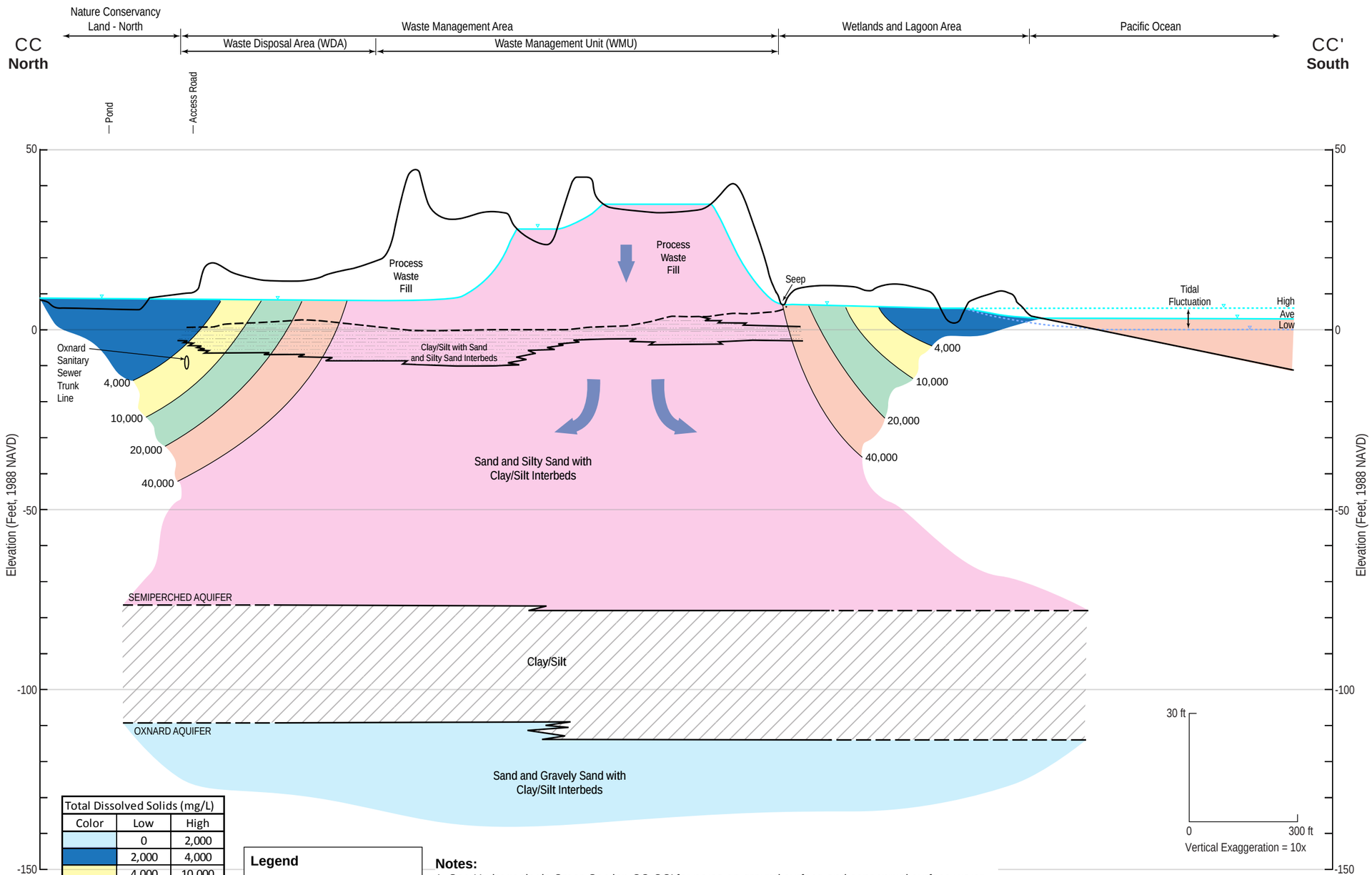
Notes:

1. See Hydrogeologic Cross Section AA-AA' for notes on ground surface and conceptual surface water and groundwater elevations.
2. TDS concentrations are based on the concentrations in Hydrogeologic Cross Section A-A' and then adjusted to represent potential conditions when Halaco discharged to the ponds in 2002.

FIGURE 19a
Conceptual Hydrogeologic Cross Section AA-AA' of Historical Conditions with TDS
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

WBG110210203057SCO385135.DE.01 Halaco_cross-section AA'_hist_v2rev.ai 9/11



Total Dissolved Solids (mg/L)		
Color	Low	High
	0	2,000
	2,000	4,000
	4,000	10,000
	10,000	20,000
	20,000	40,000
	40,000	>40,000

Legend

Conceptual General Groundwater Flow Direction

Notes:

1. See Hydrogeologic Cross Section CC-CC' for notes on ground surface and conceptual surface water and groundwater elevations.
2. TDS concentrations are based on the concentrations in Hydrogeologic Cross Section C-C' and then adjusted to represent potential conditions when Halaco discharged to the ponds in 2002.

FIGURE 19b
Conceptual Hydrogeologic Cross Section CC-CC' of Historical Conditions with TDS
Halaco Site Remedial Investigation
Oxnard, California

CH2MHILL

Figure 20a
Major Ion Chemistry
Sample No. 1

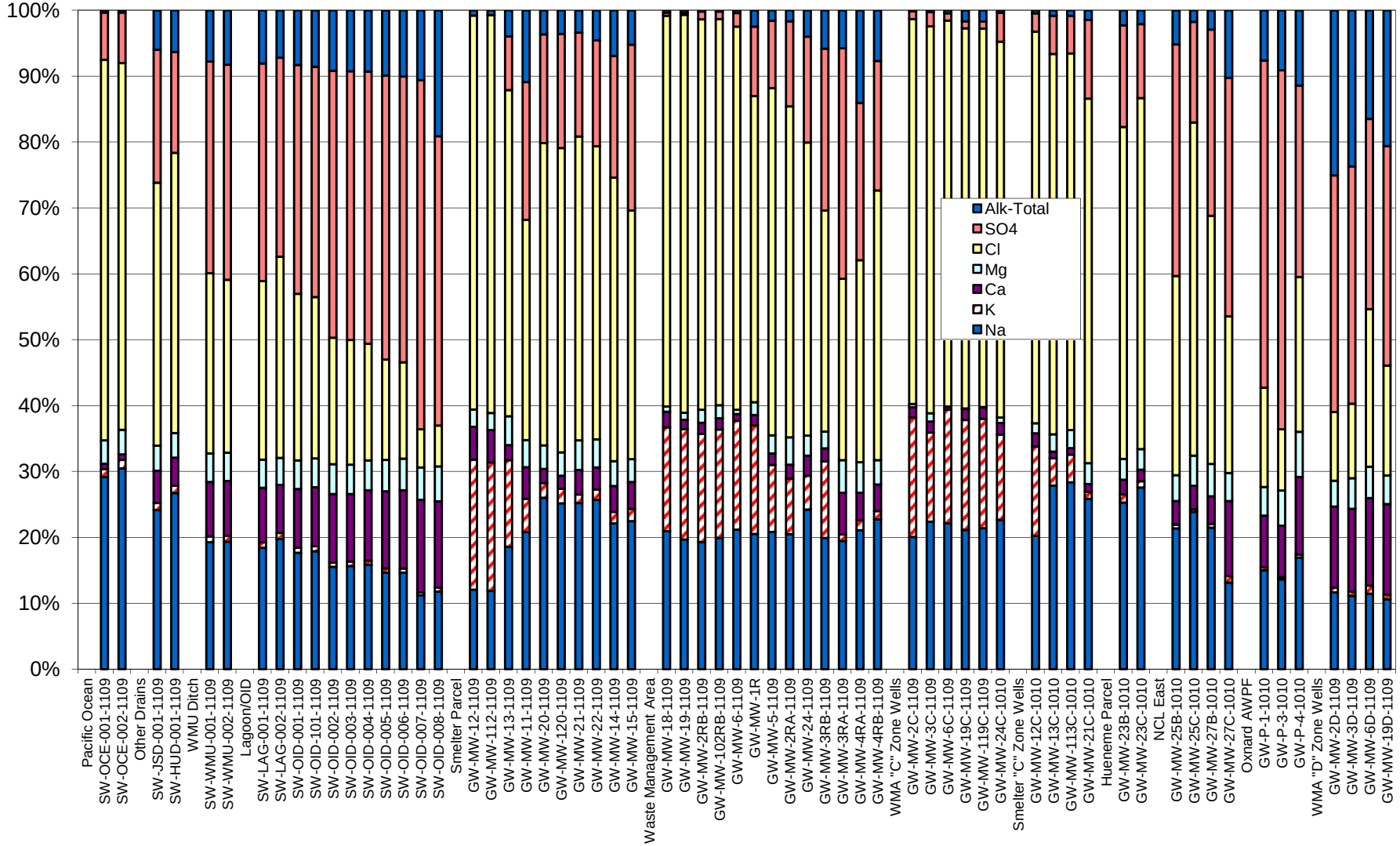


Figure 20b
Major Ion Chemistry
Sample No. 2

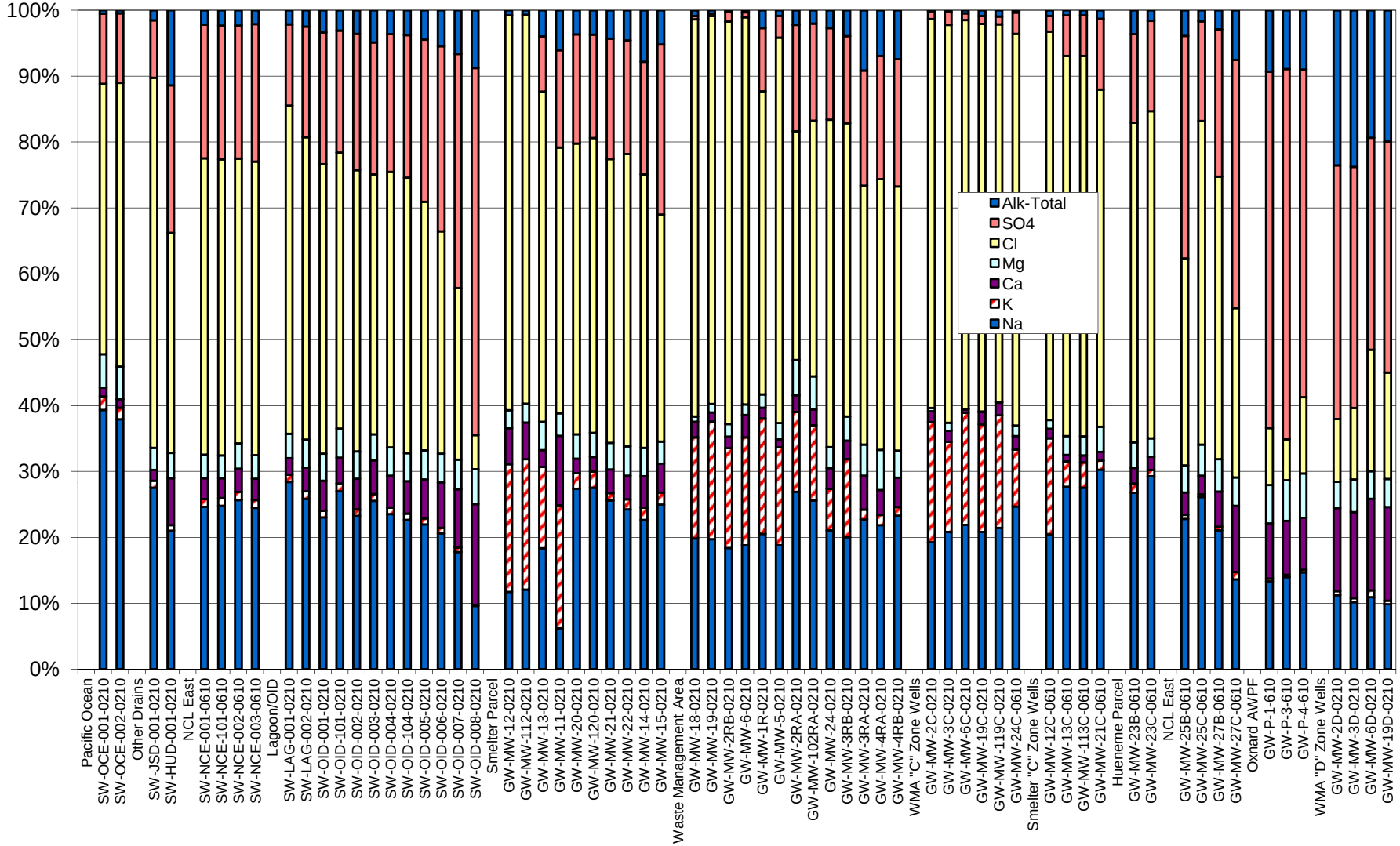


Figure 20c
Major Ion Chemistry
Surface Water

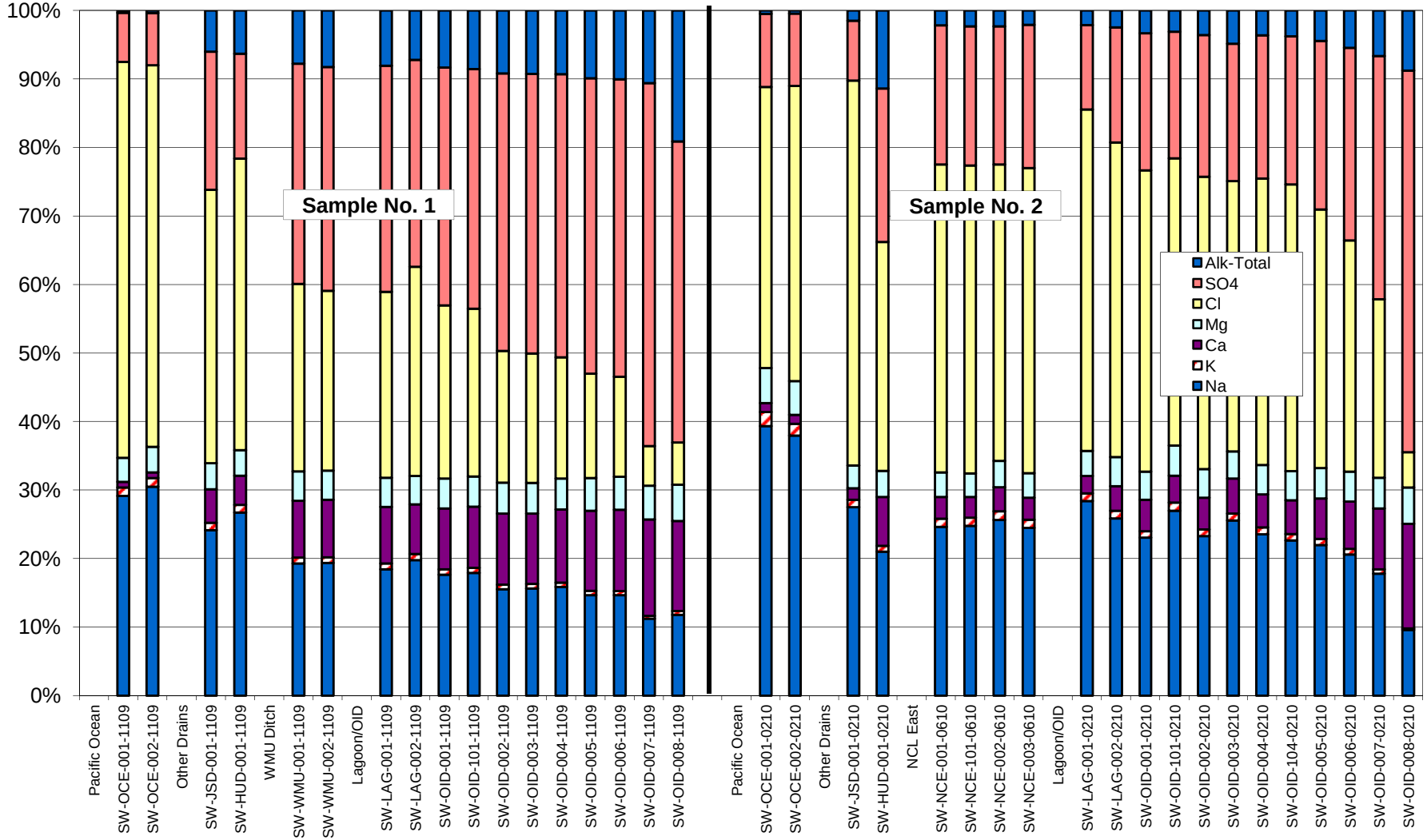


Figure 21a
Total Dissolved Solids Concentrations and pH
Sample No. 1

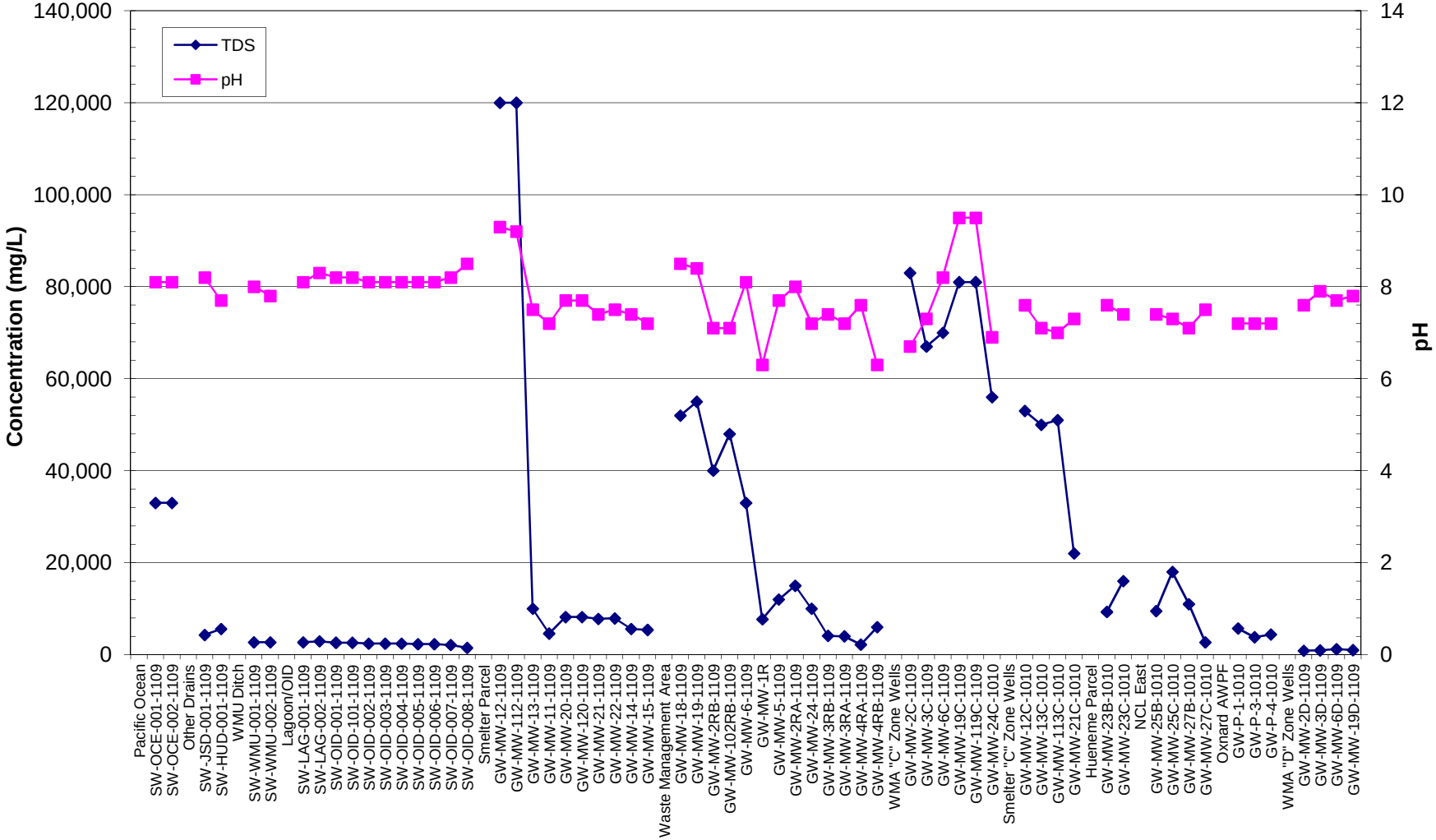


Figure 21b
Total Dissolved Solids Concentrations and pH
Sample No. 2

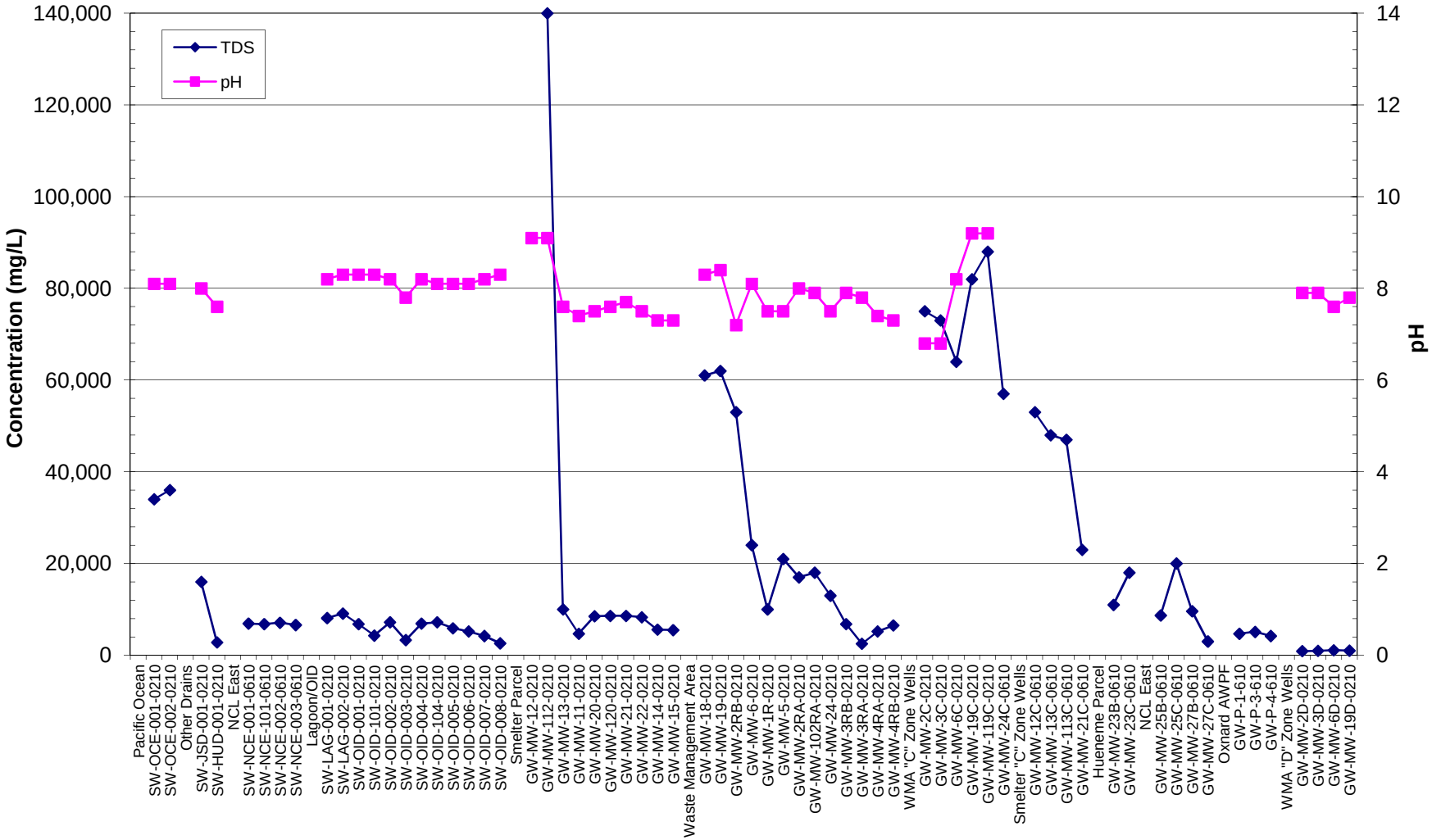


Figure 21c
Total Dissolved Solids Concentrations and pH
Surface Water

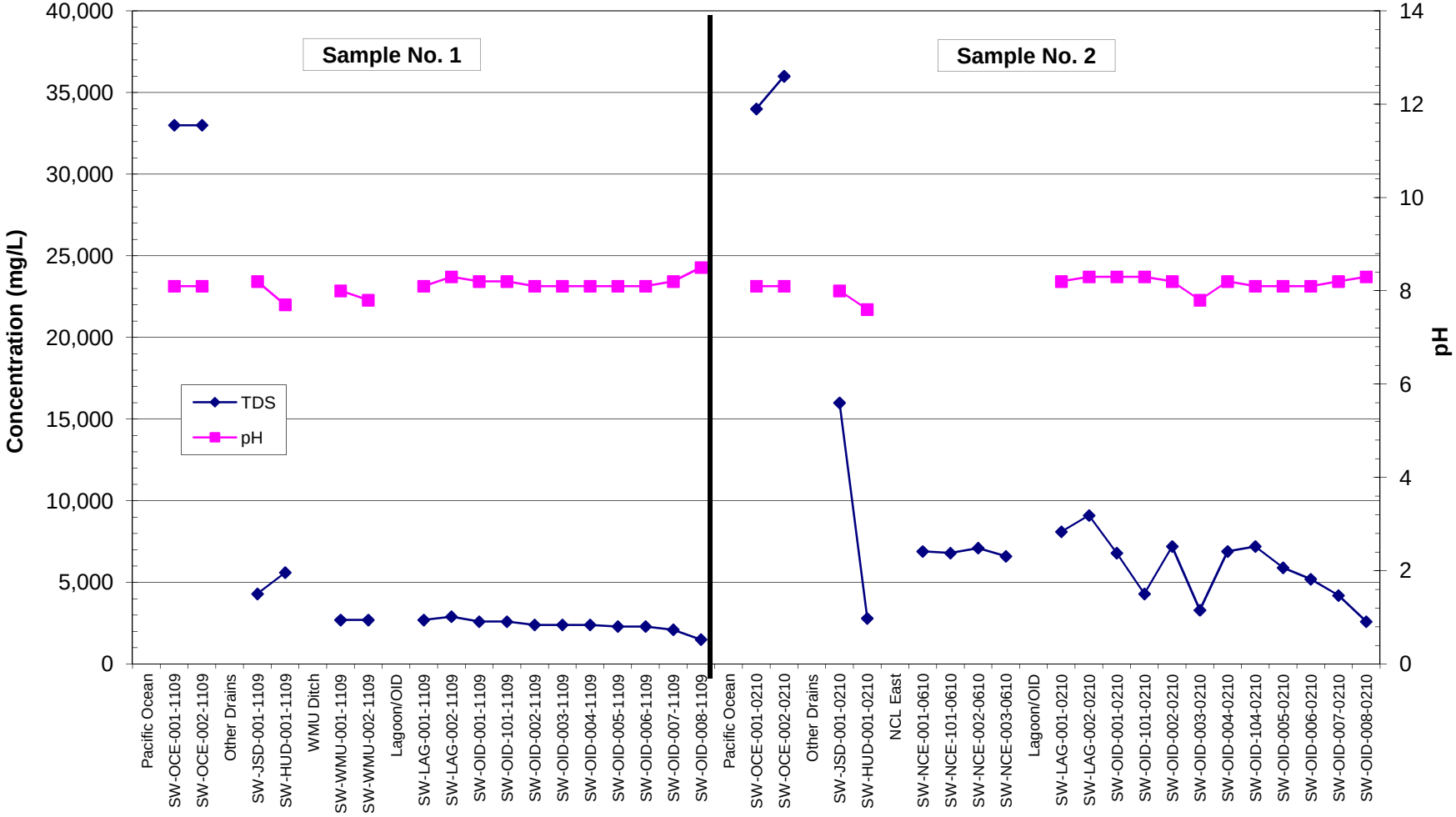


Figure 22a
Total Dissolved Solids and Ammonia Concentrations
Sample No. 1

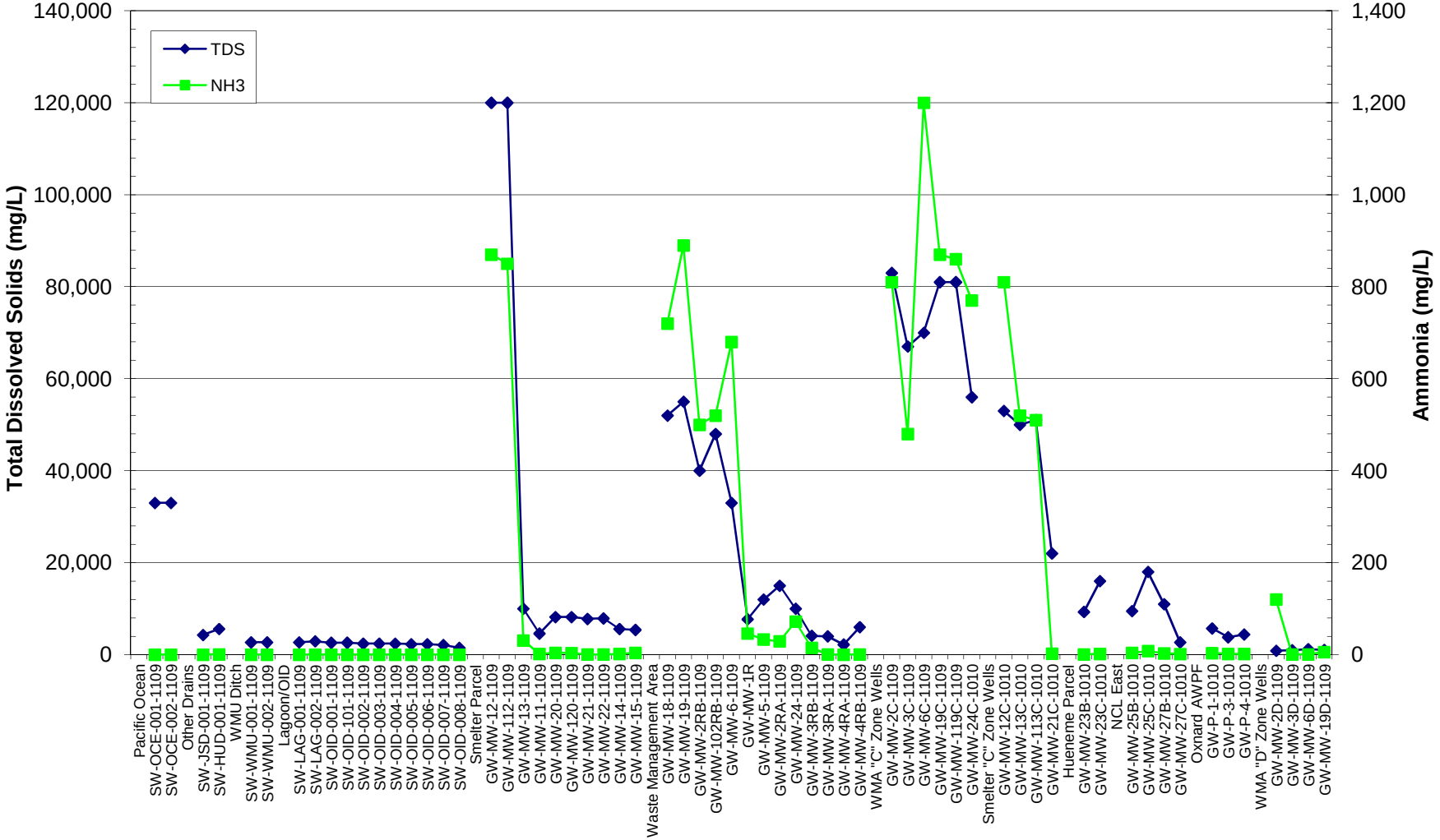


Figure 22b
Total Dissolved Solids and Ammonia Concentrations
Sampling No. 2

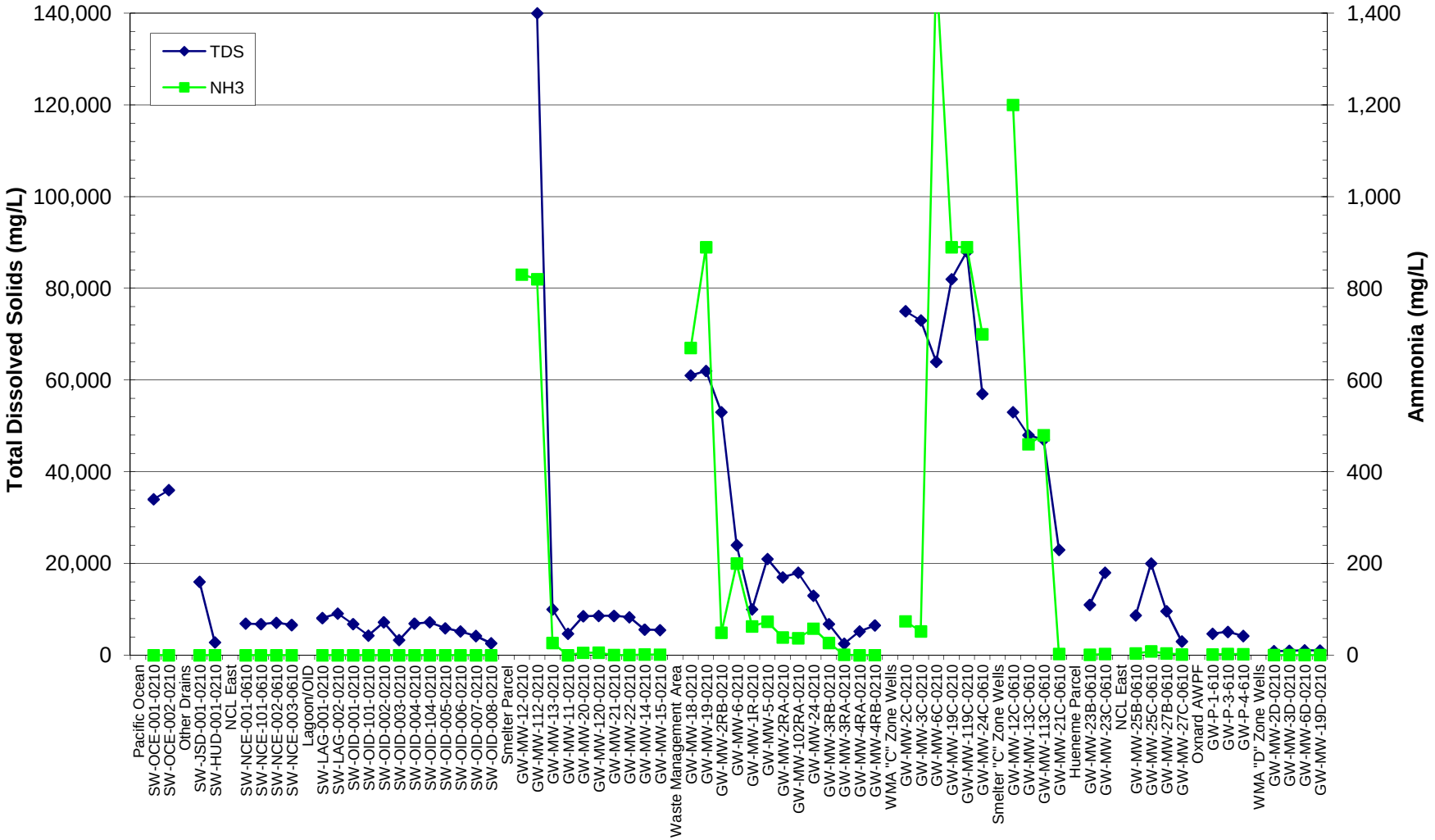


Figure 22c
Total Dissolved Solids, Ammonia, and Nitrate Concentrations
Surface Water

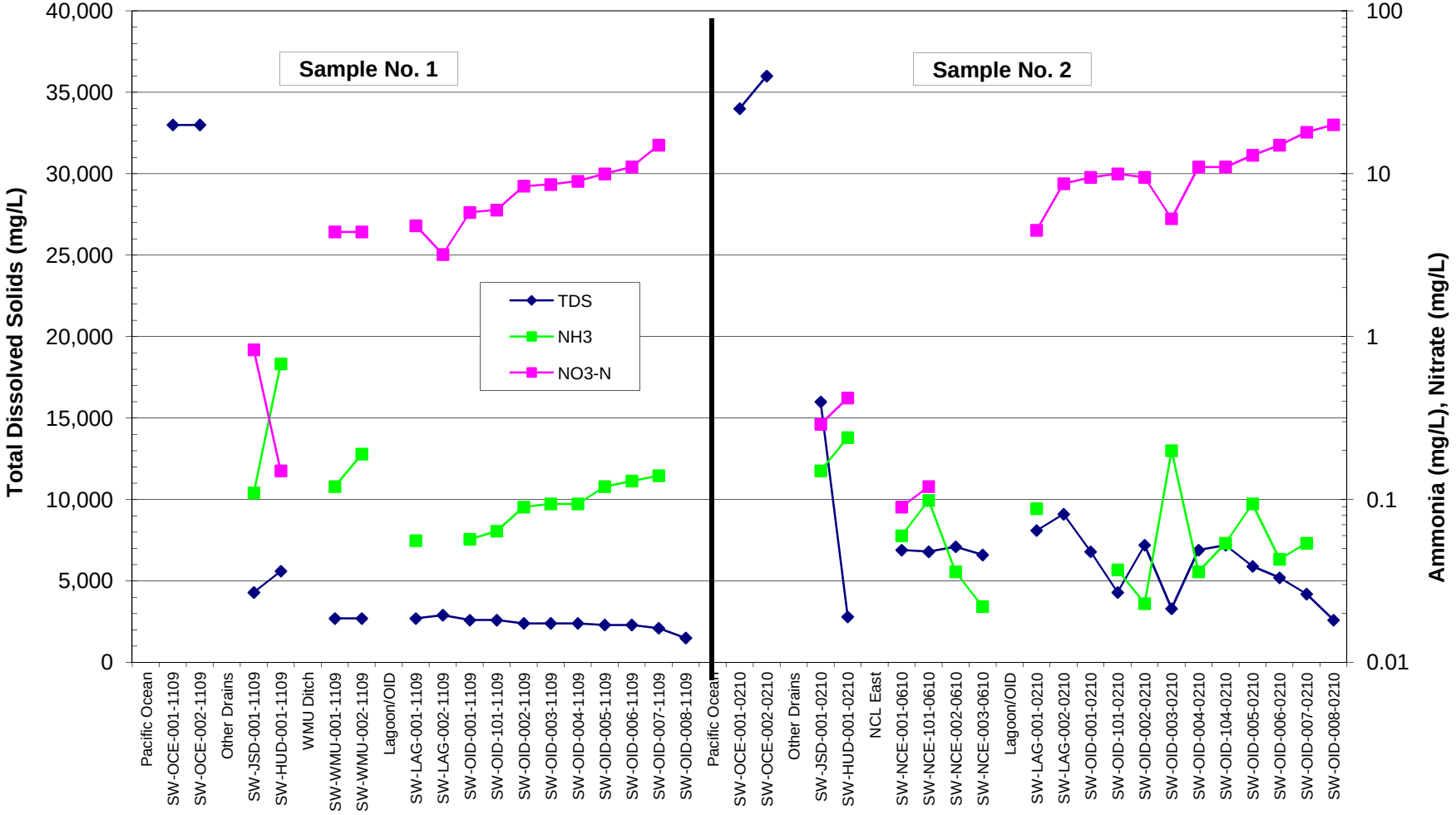


Figure 23a
Total Dissolved Solids, Bromide, and Fluoride Concentrations
Sample No. 1

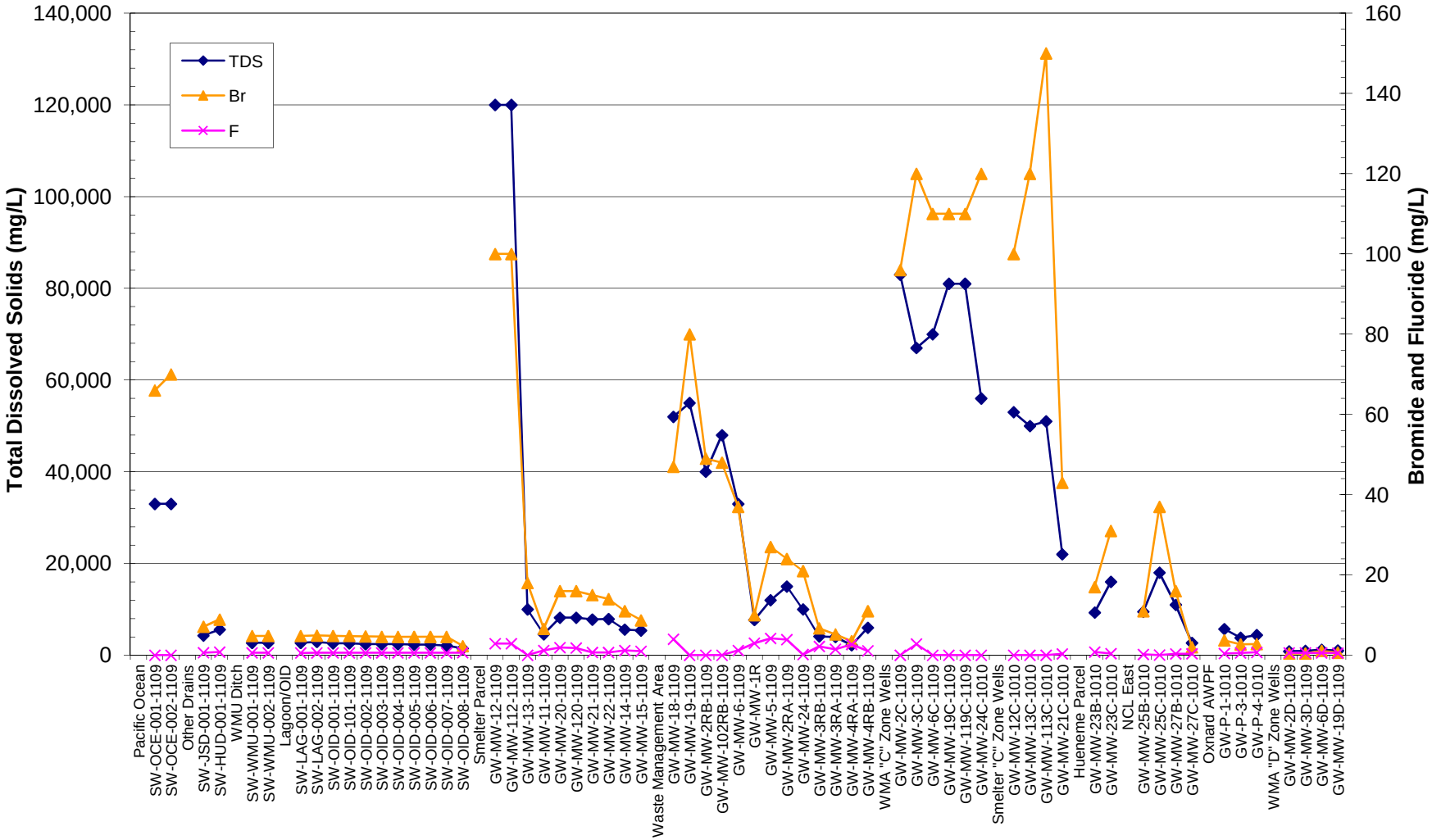


Figure 23b
Total Dissolved Solids, Bromide, and Fluoride Concentrations
Sample No. 2

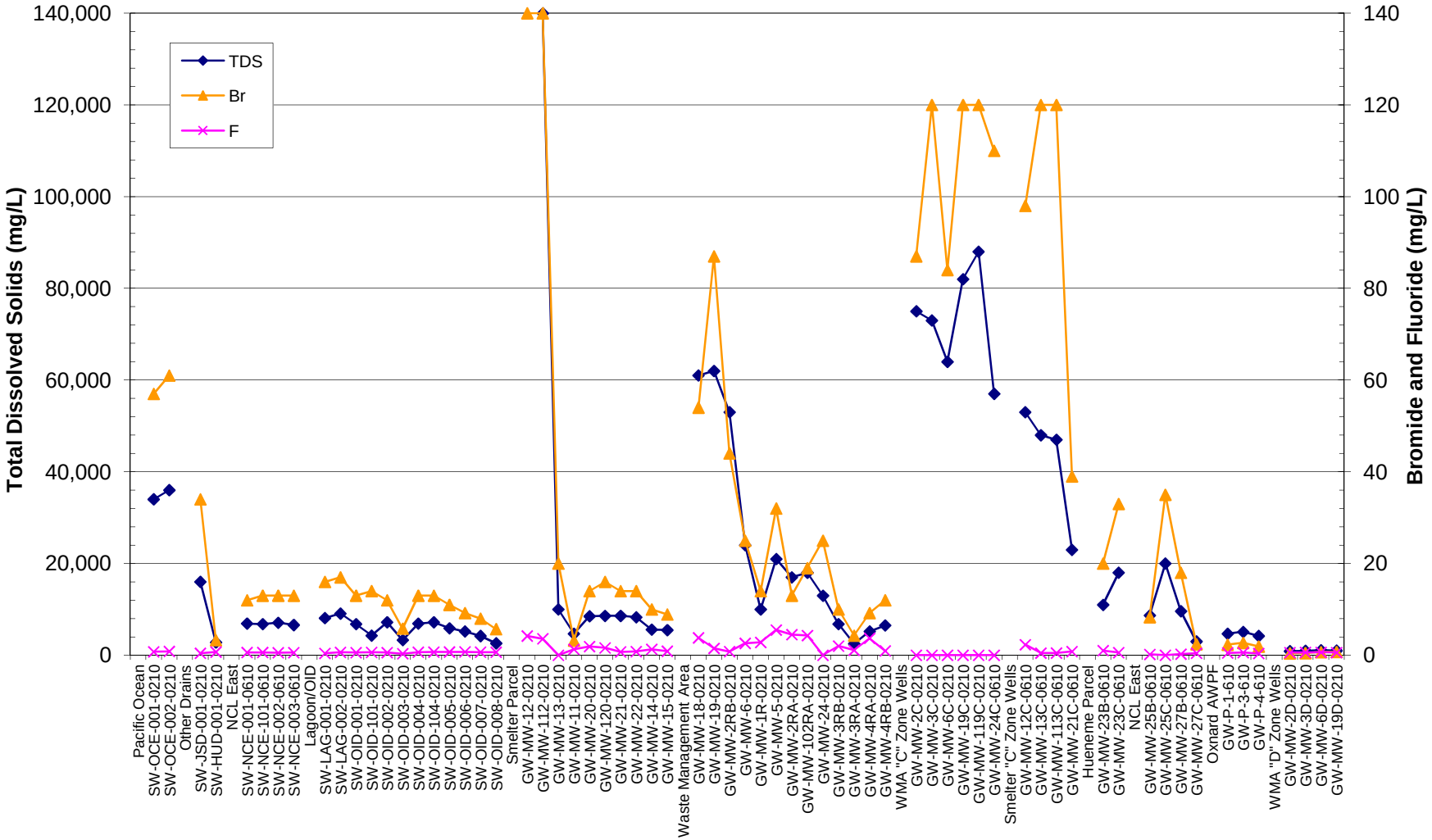


Figure 23c
Total Dissolved Solids, Bromide, and Fluoride Concentrations
Surface Water

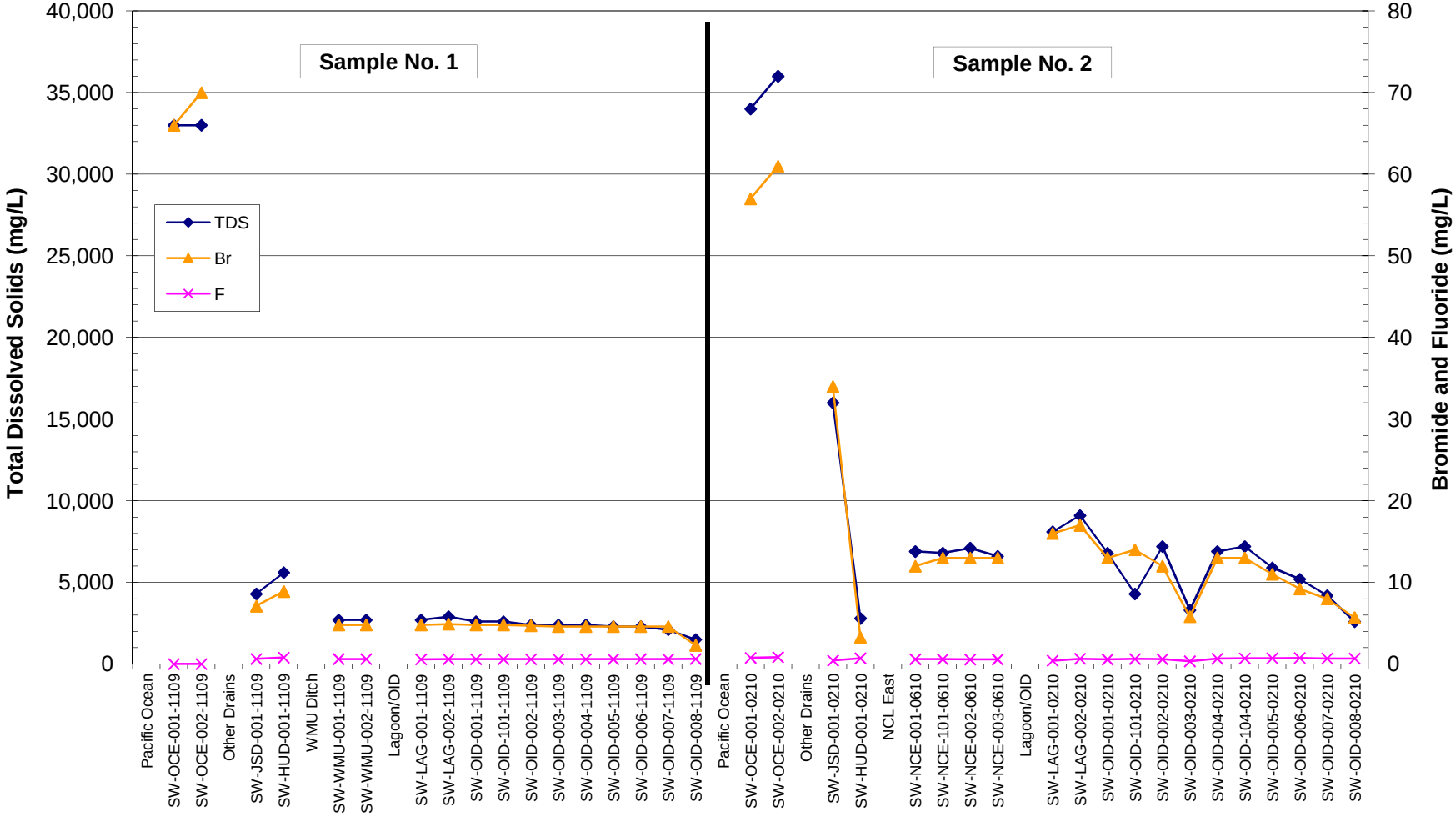


Figure 24a
Total Metals
Sample No. 1

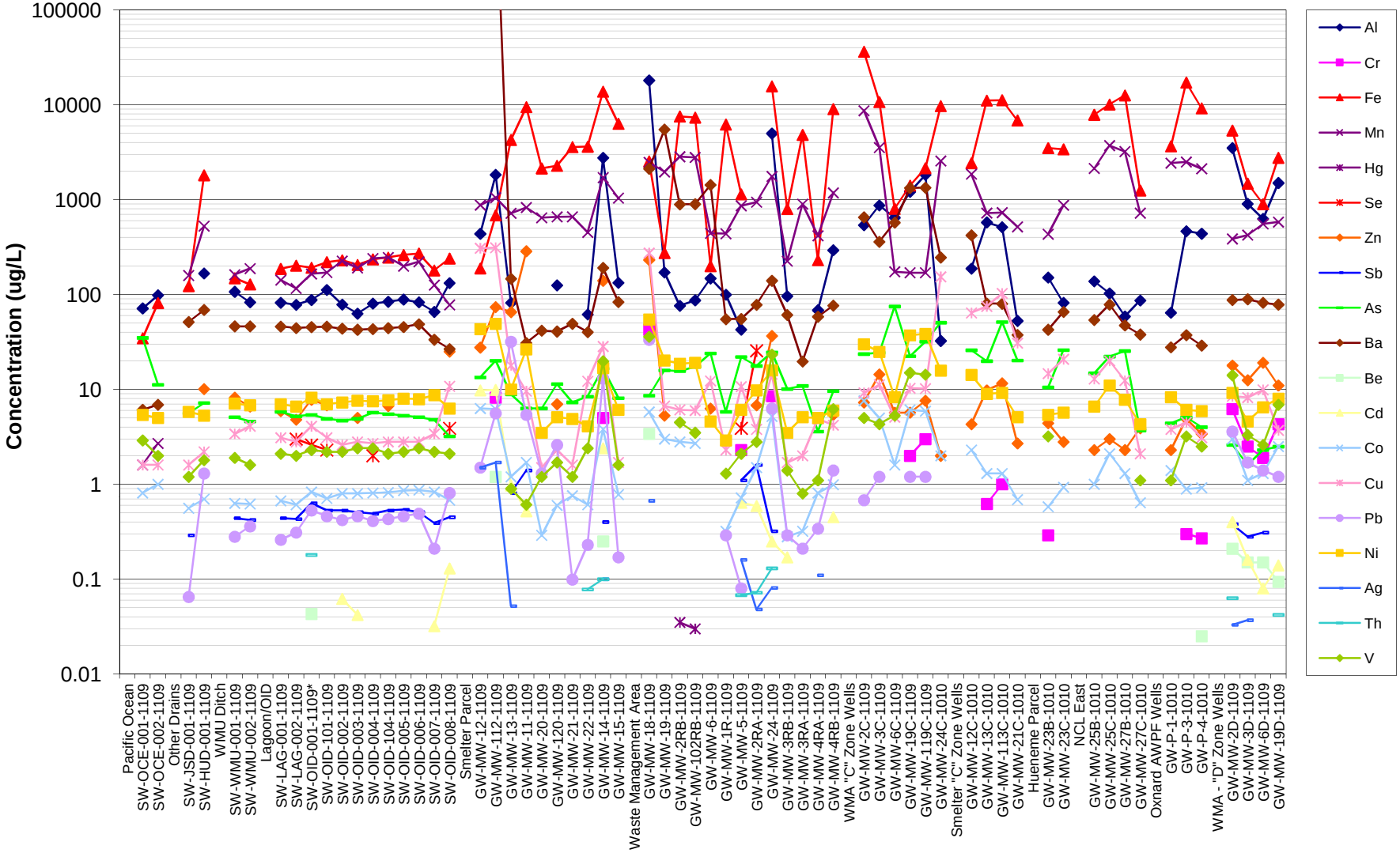


Figure 24b
Total Metals
Sample No. 2

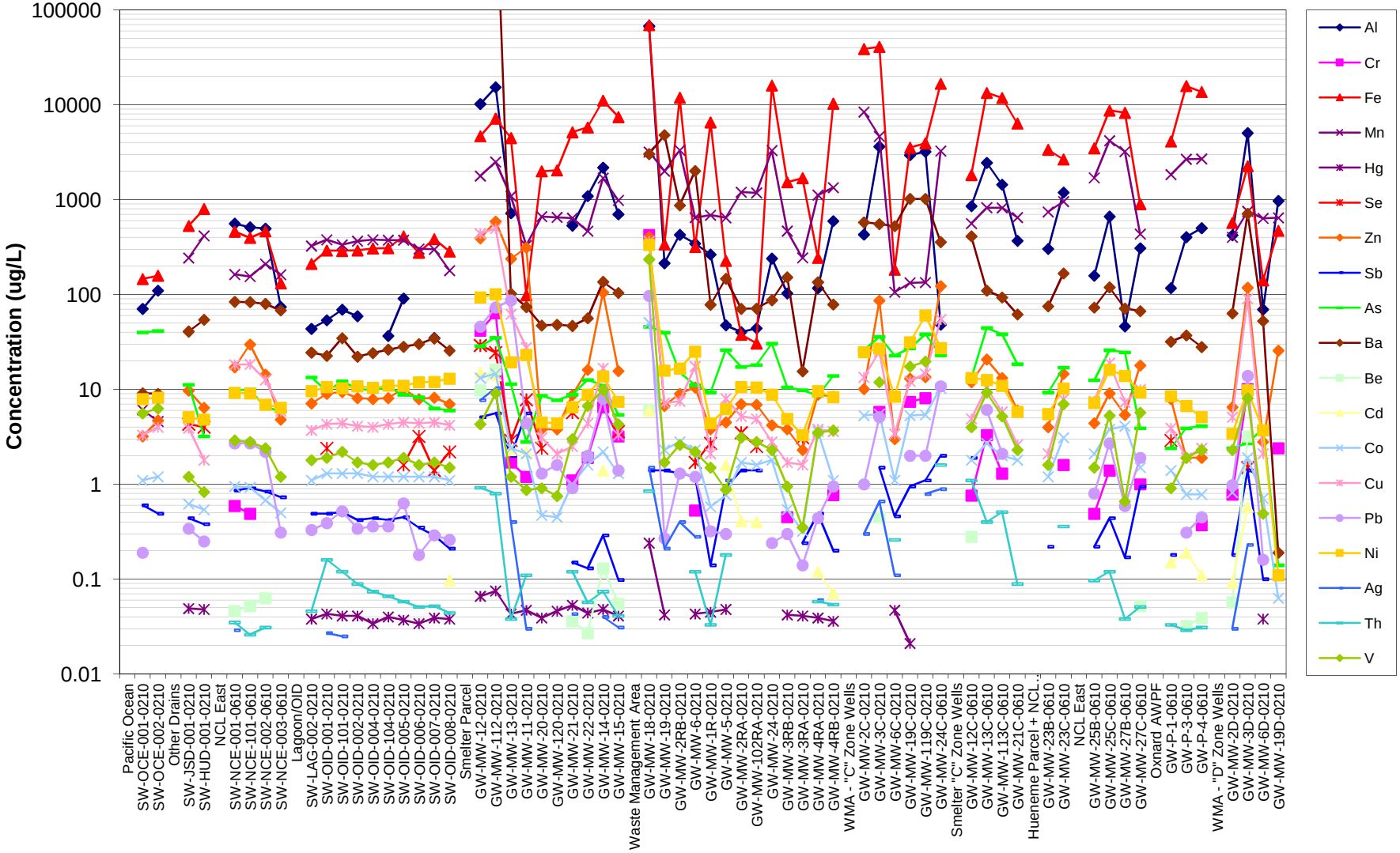


Figure 24c
Total Metals
Surface Water

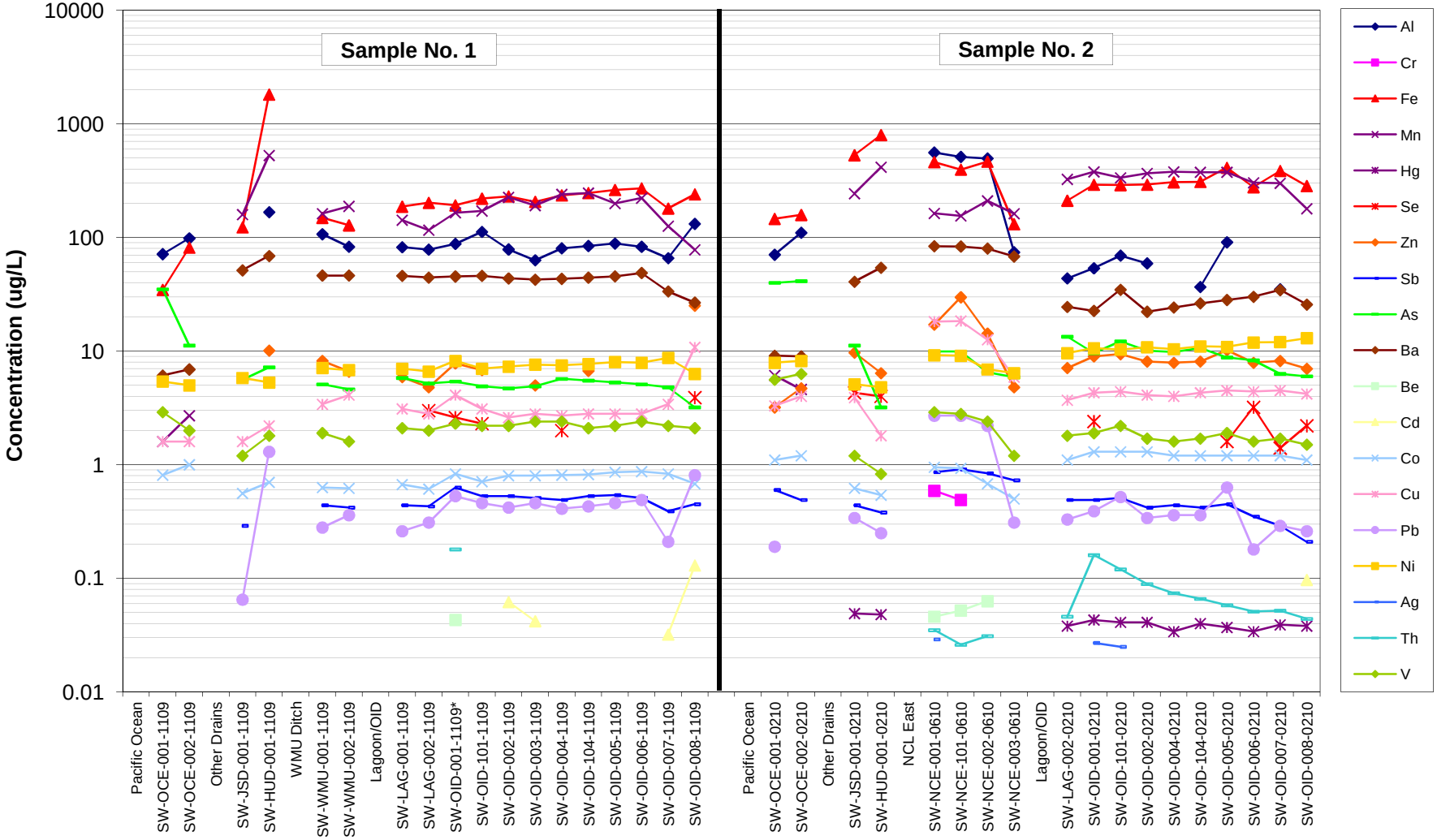


Figure 25a
Dissolved Metals
Sample No. 1

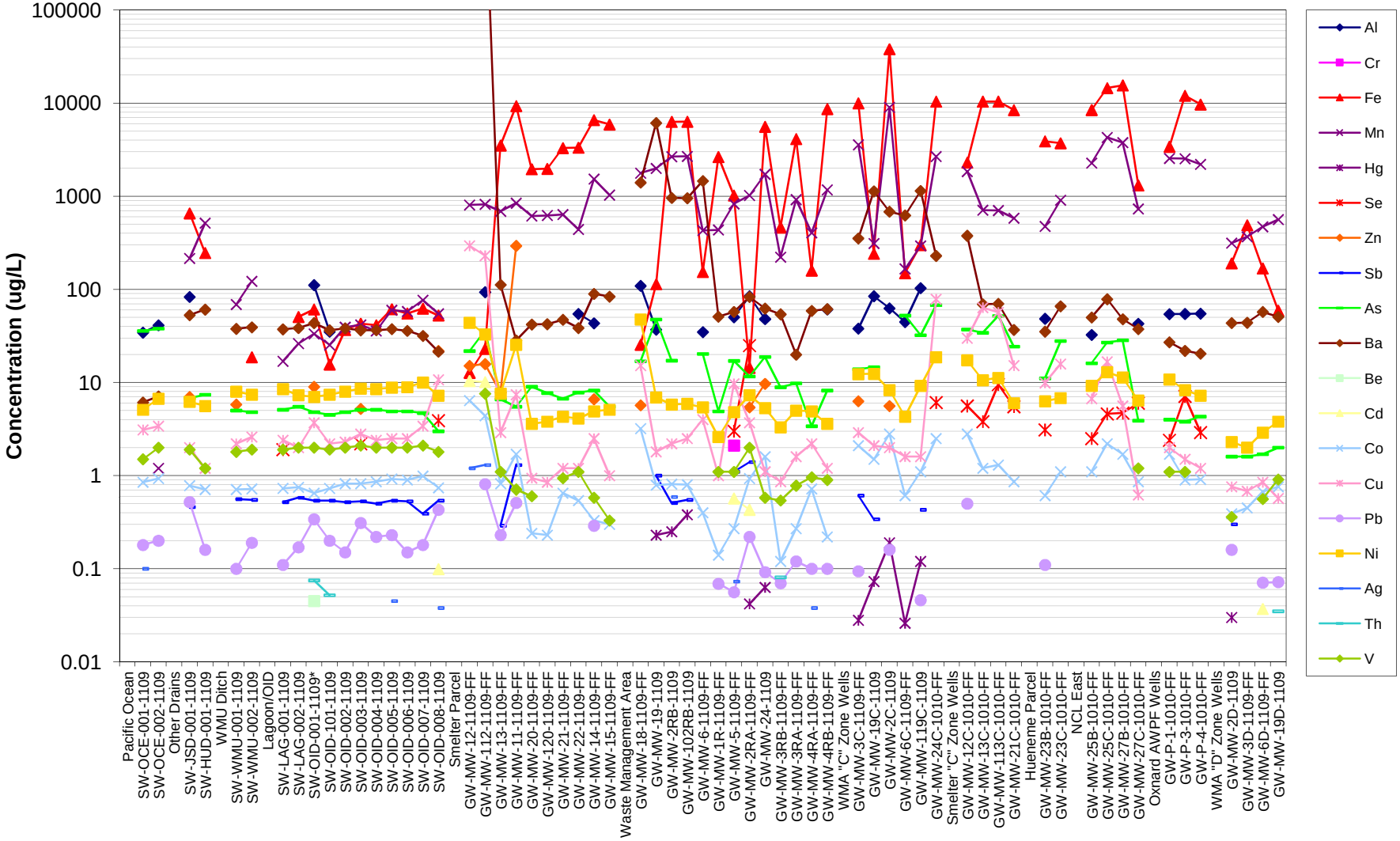


Figure 25b
Dissolved Metals
Sample No. 2

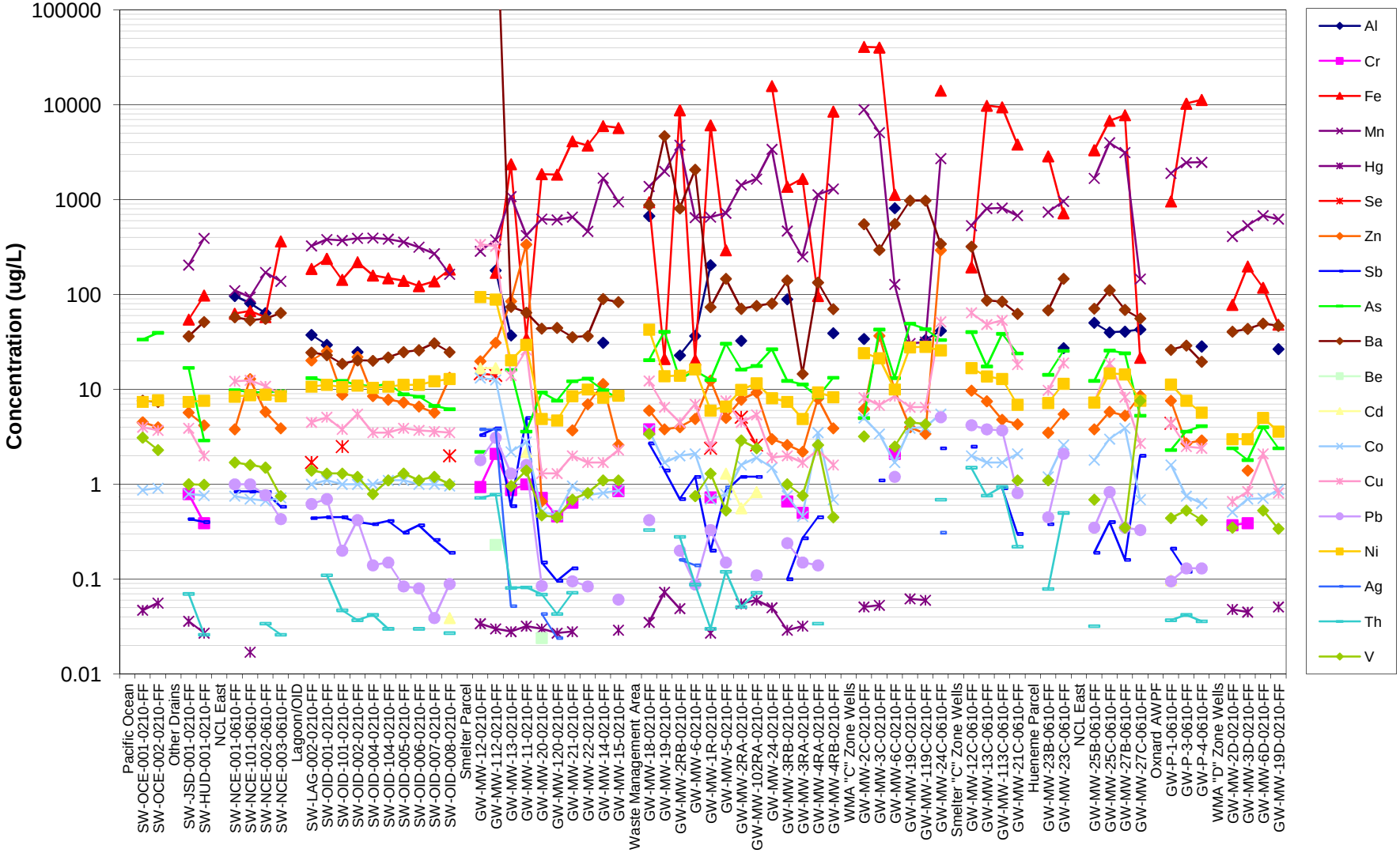


Figure 25c
Dissolved Metals
Surface Water

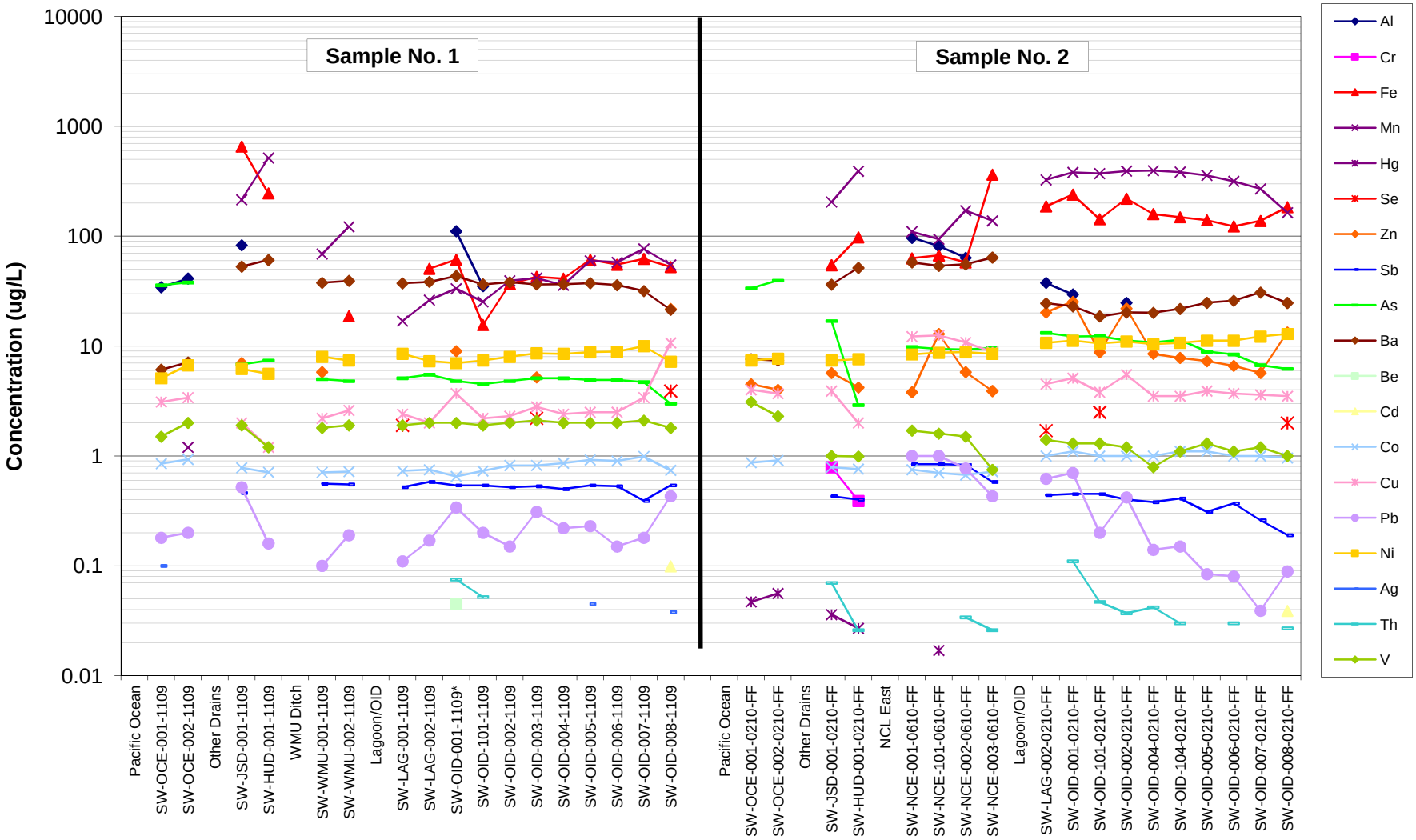


Figure 26a
Thorium and Radium Radionuclide Activities
Sample No. 1

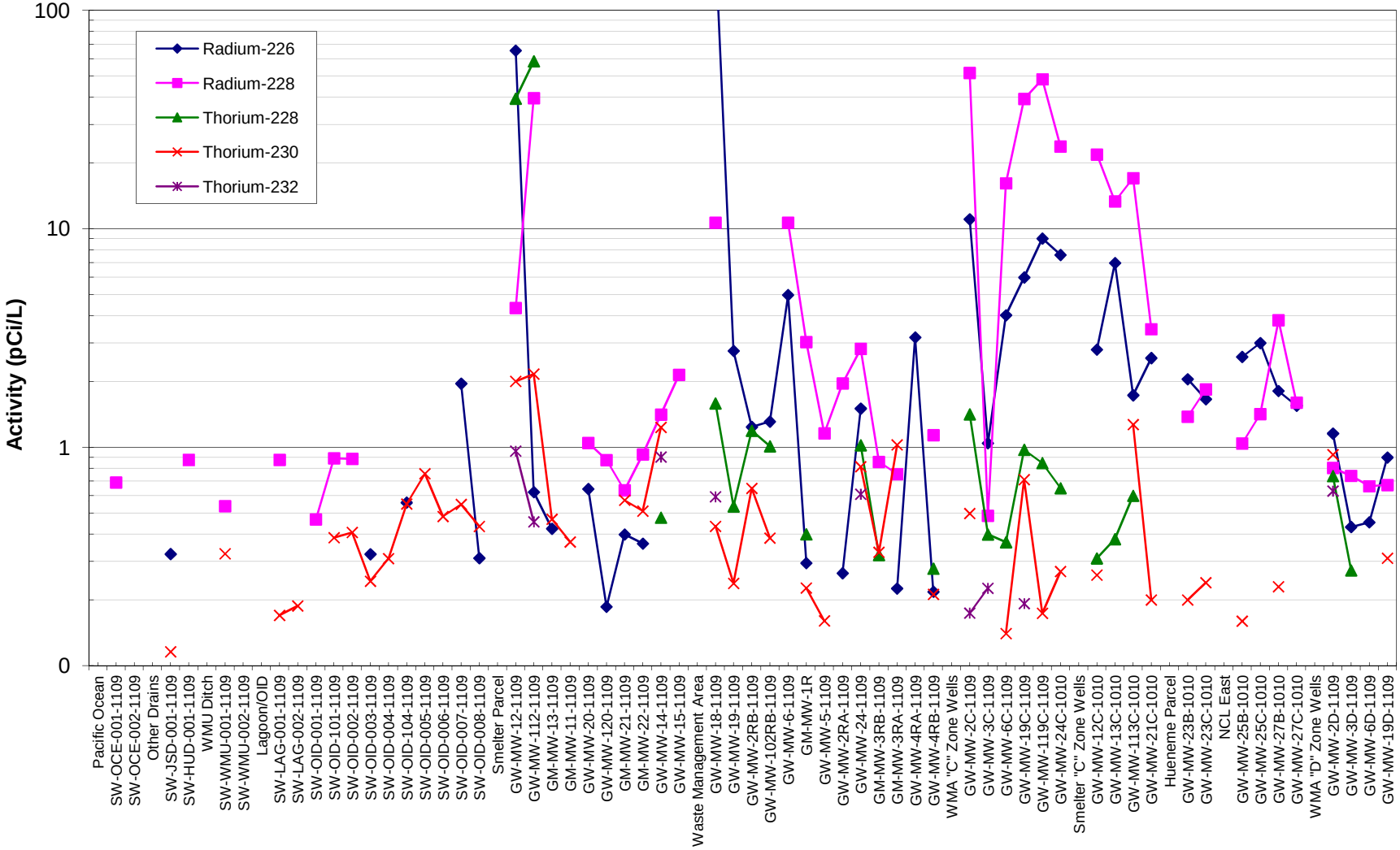


Figure 26b
Thorium and Radium Radionuclide Activities
Sample No. 2

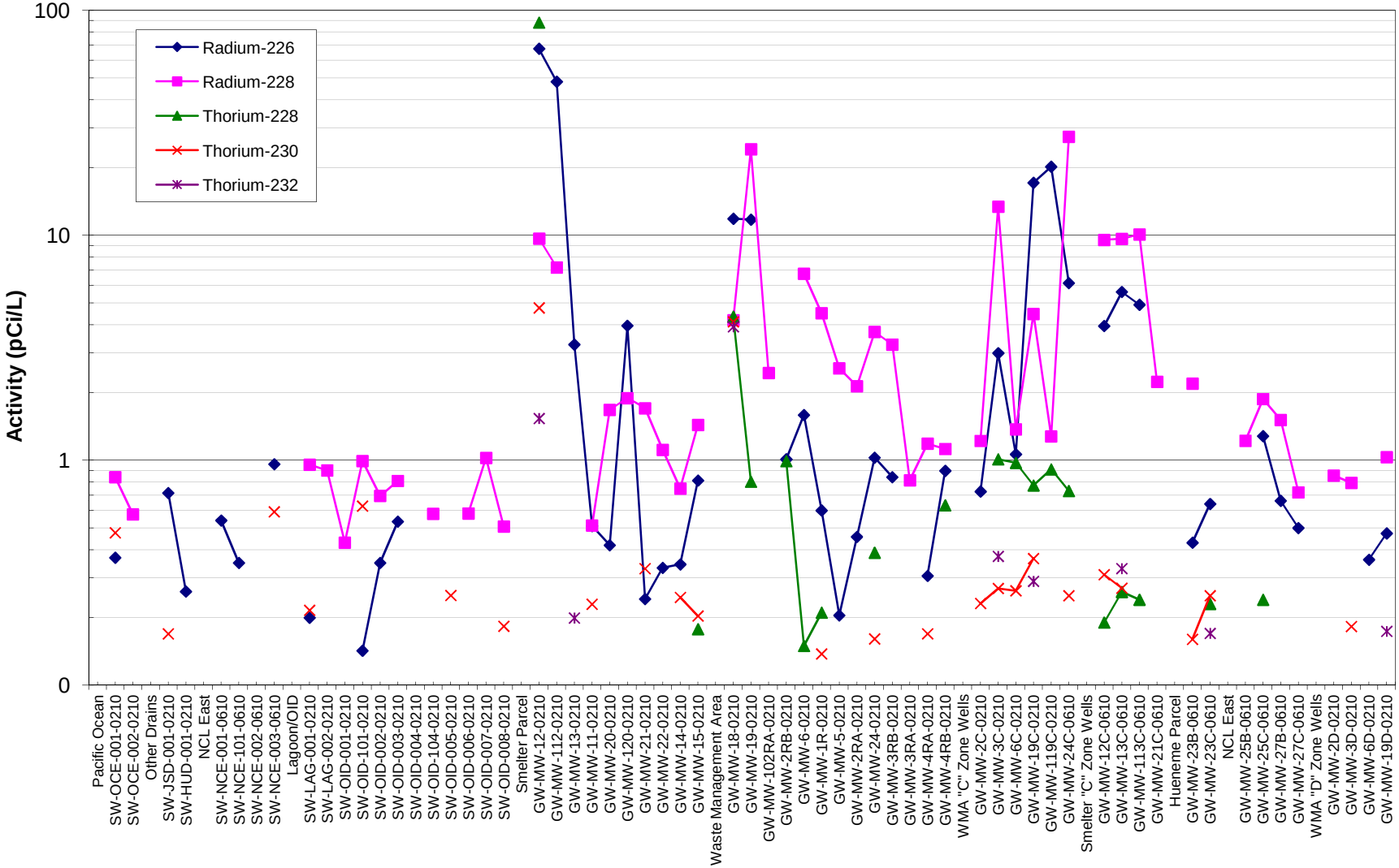


Figure 26c
Thorium and Radium Radionuclide Activities
Surface Water

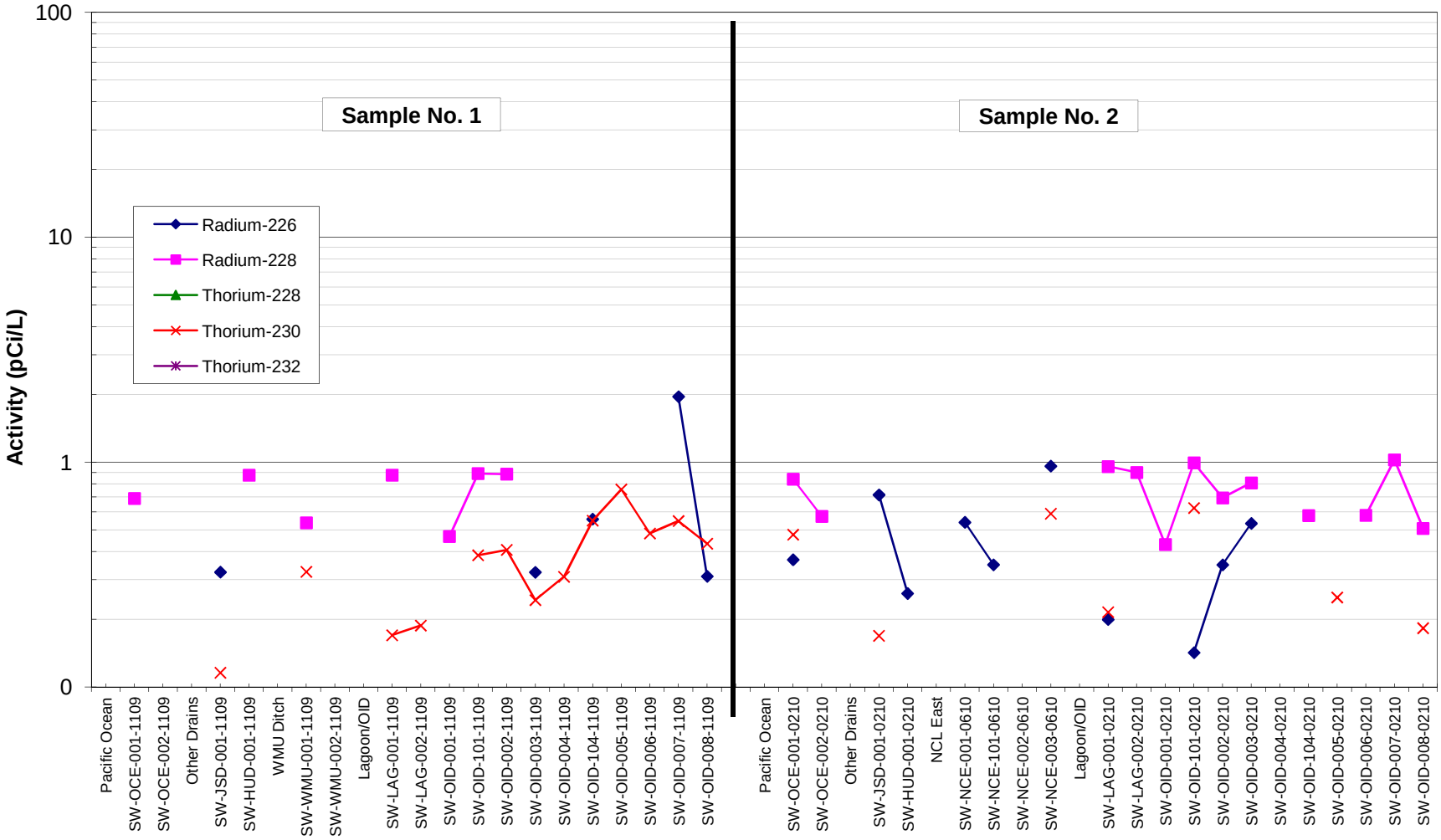


Figure 27
TDS/K Ratios
Samples No 1 and No 2

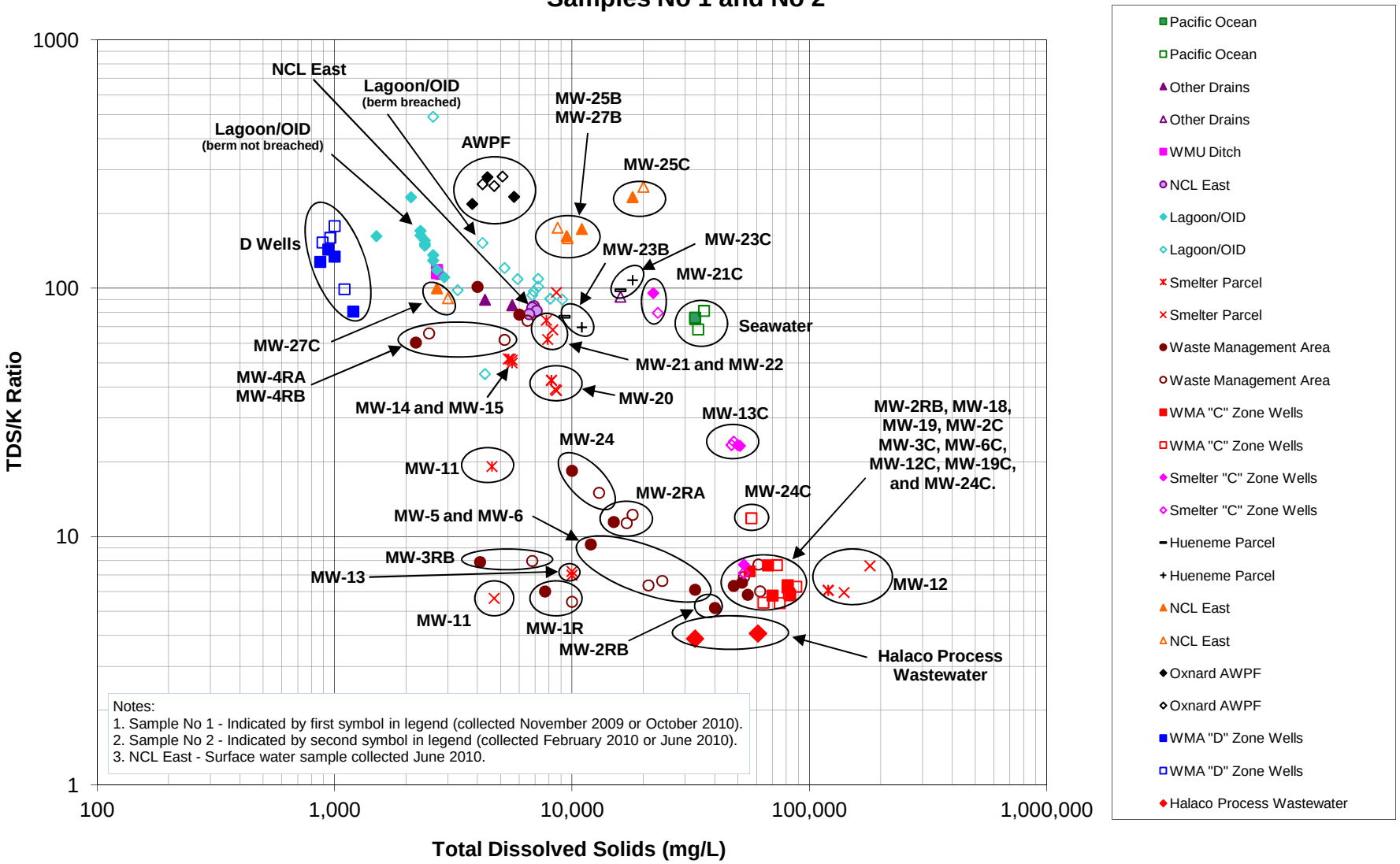


Figure 28a
Time-series Concentration Chart, OID Surface Water - Electrical Conductivity
2003 - 2004

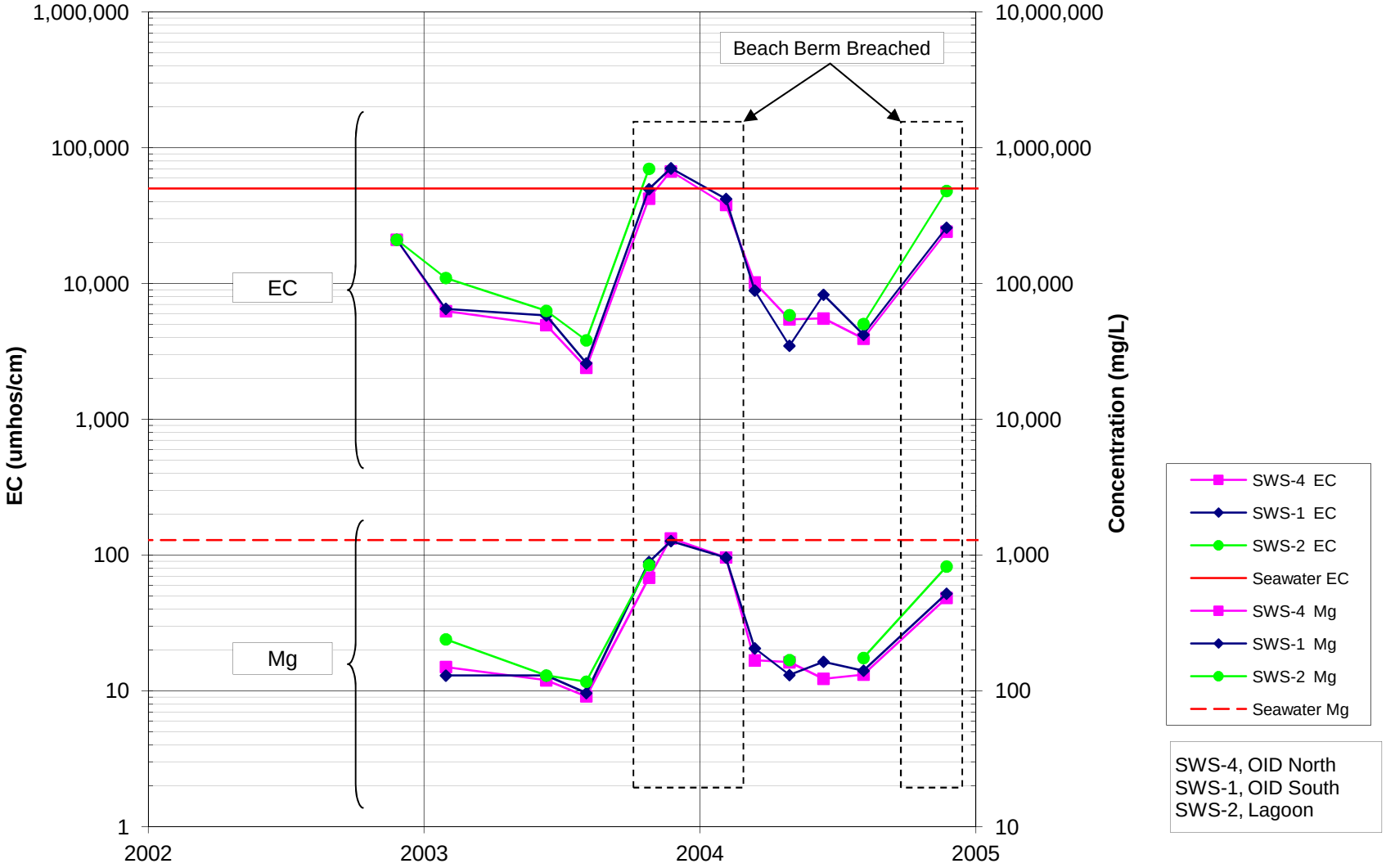


Figure 28b
Time-series Concentration Chart, OID Surface Water - Electrical Conductivity
1980 - 2010

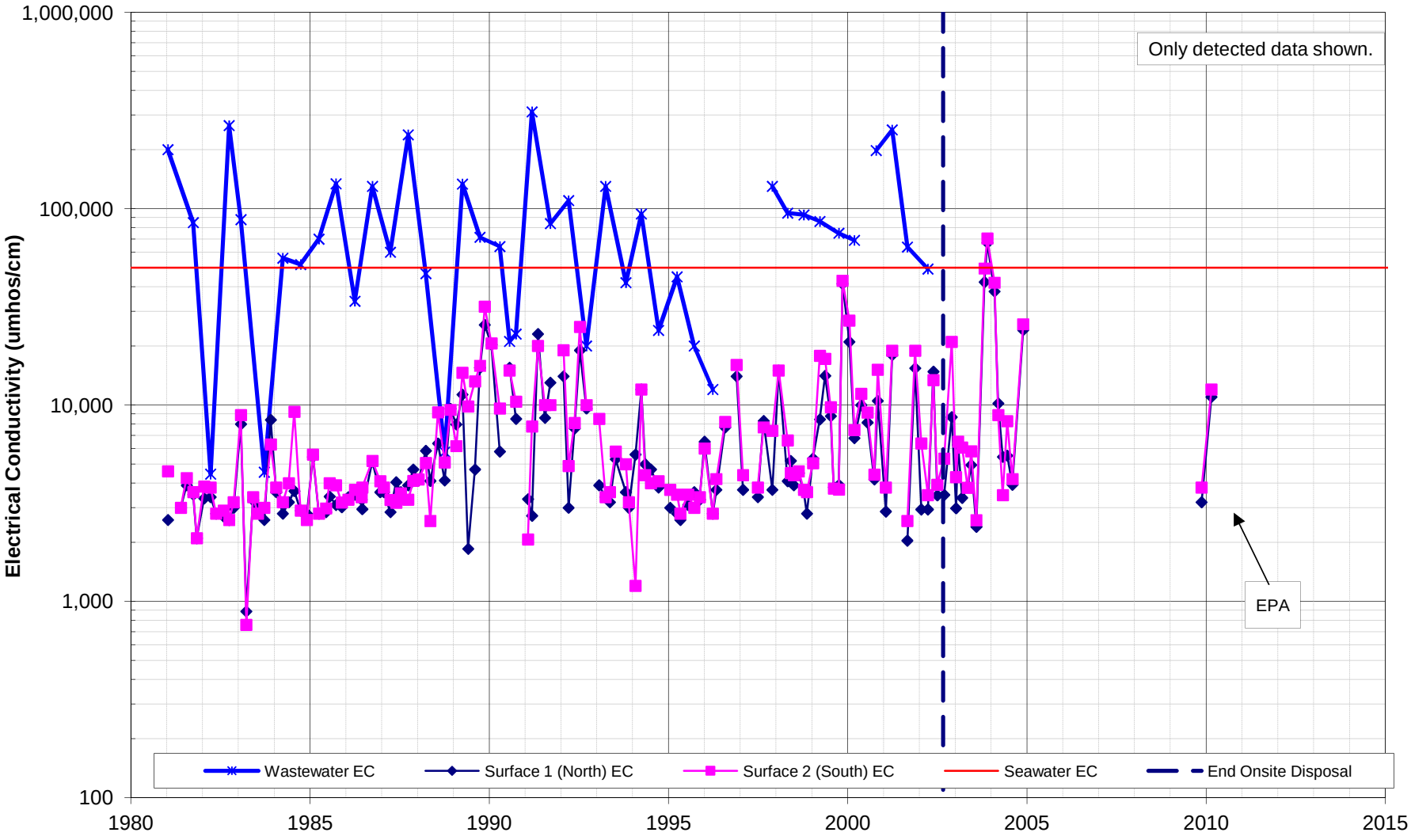


Figure 29a
Time-series Concentration Chart, Groundwater , Electrical Conductivity
1980 - 2003

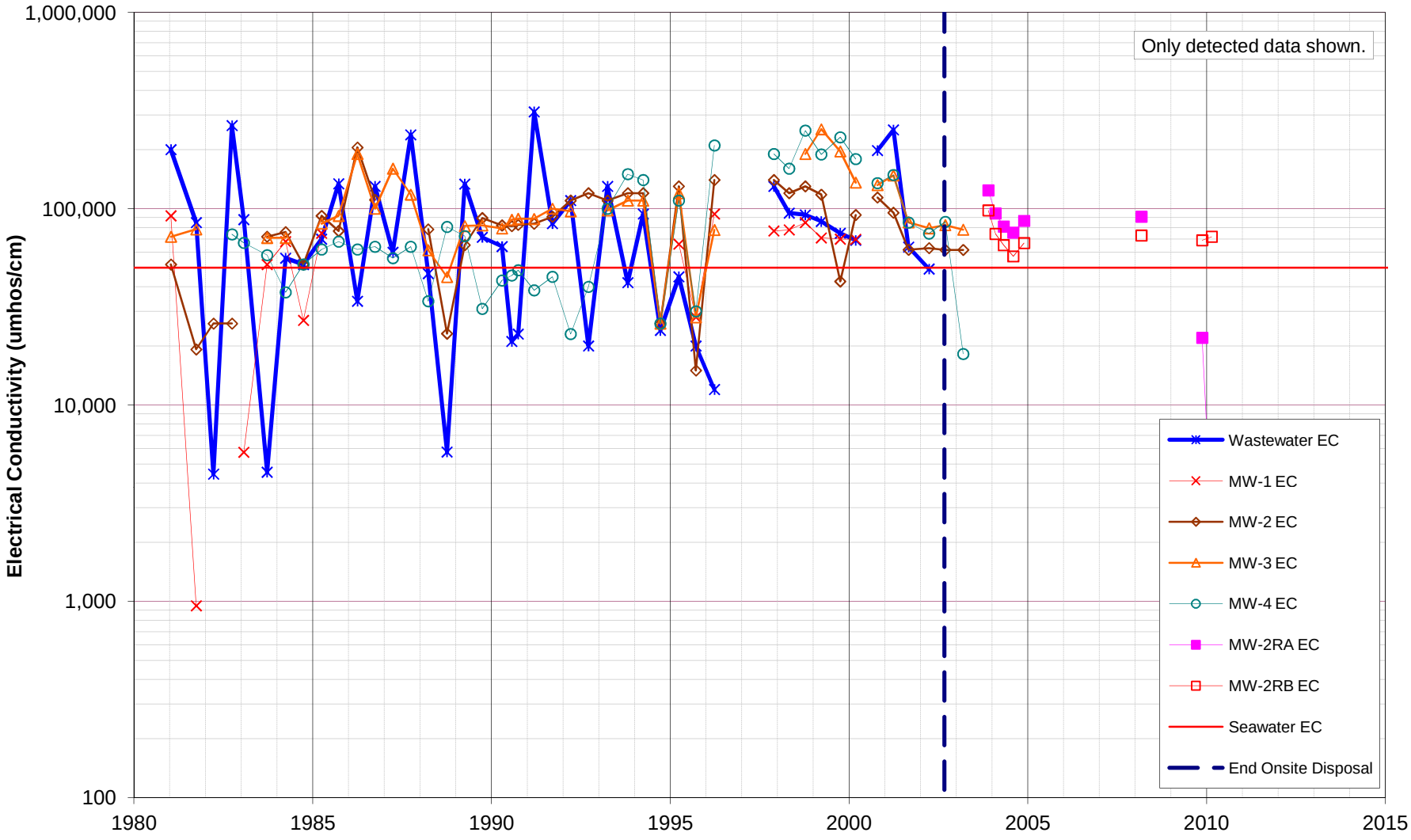


Figure 29b
Time-series Concentration Chart, Groundwater , Total Dissolved Solids
2003 - 2010

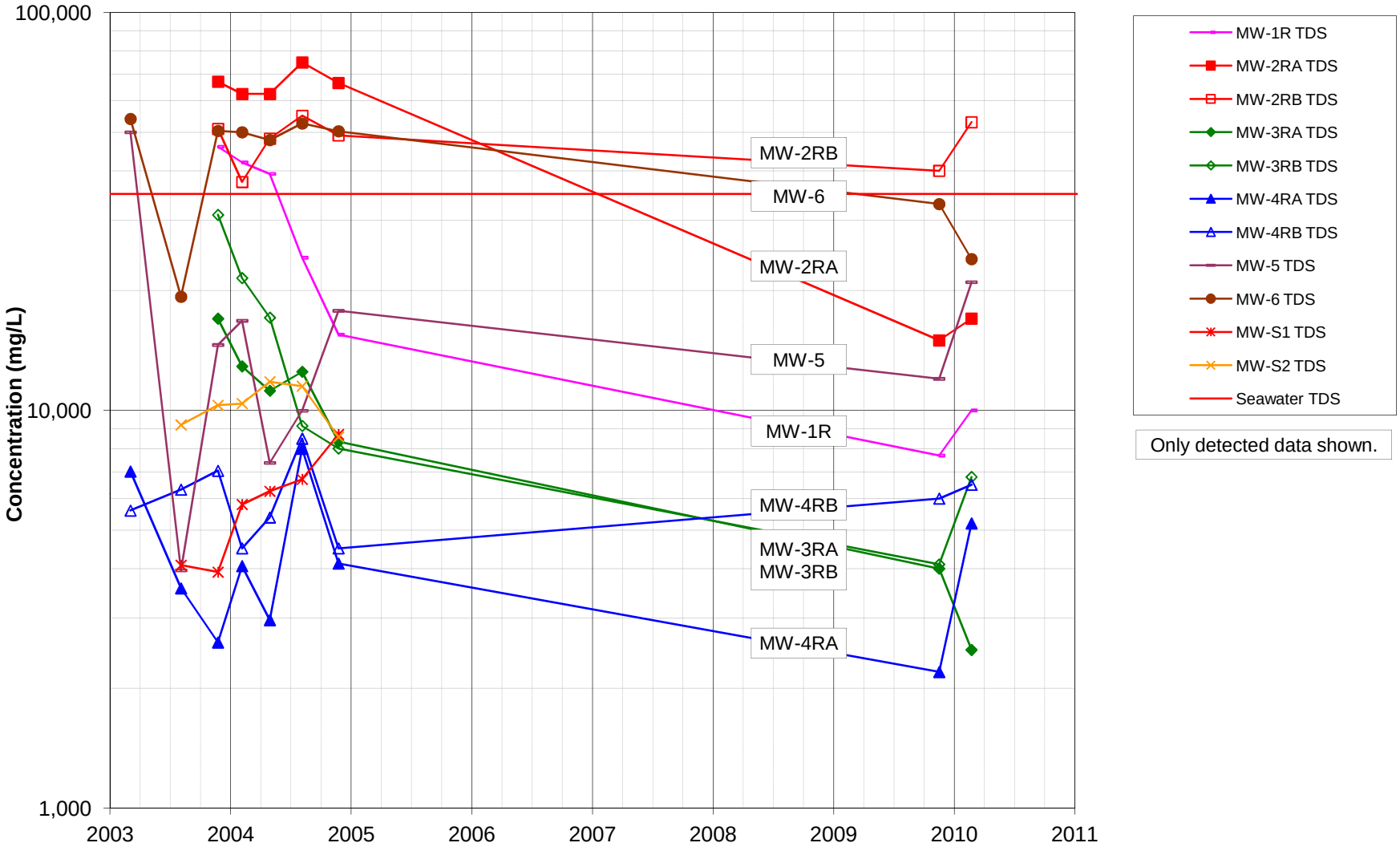
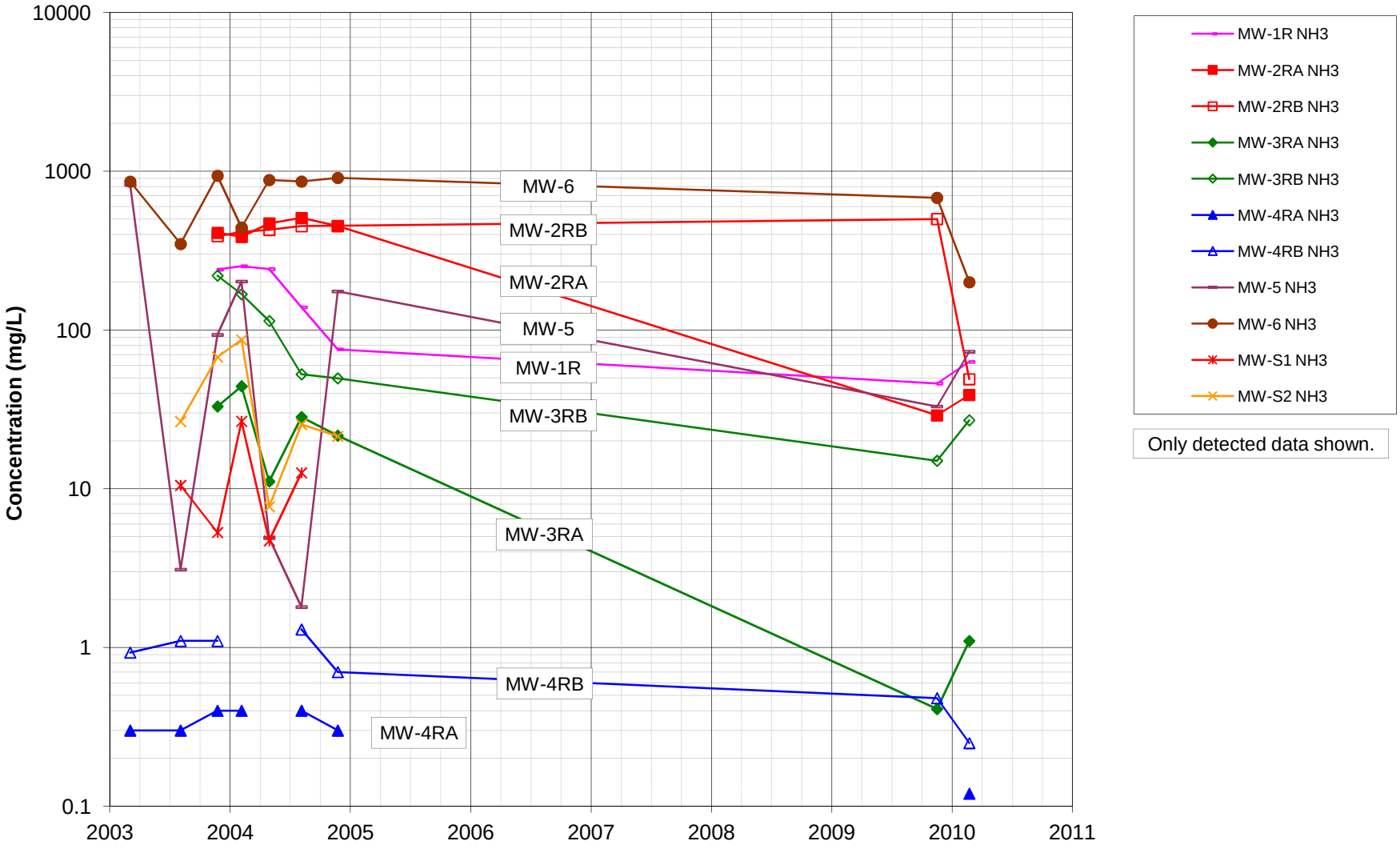


Figure 29c
Time-series Concentration Chart, Groundwater - Ammonia
2003 - 2010



Attachment A
Historical Aerial Photographs

TS-AMD-82043
May 1982

PHOTOGRAPHIC ANALYSIS OF A WASTE DISPOSAL SITE

Ventura County, California

by

D. R. Williams
Environmental Programs
Lockheed Engineering and Management Services Company, Inc.
Las Vegas, Nevada 89114

Contract No. 68-03-3049

Project Officer

C. E. Lake
Advanced Monitoring Systems Division
Environmental Monitoring Systems Laboratory
Las Vegas, Nevada 89114

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89114

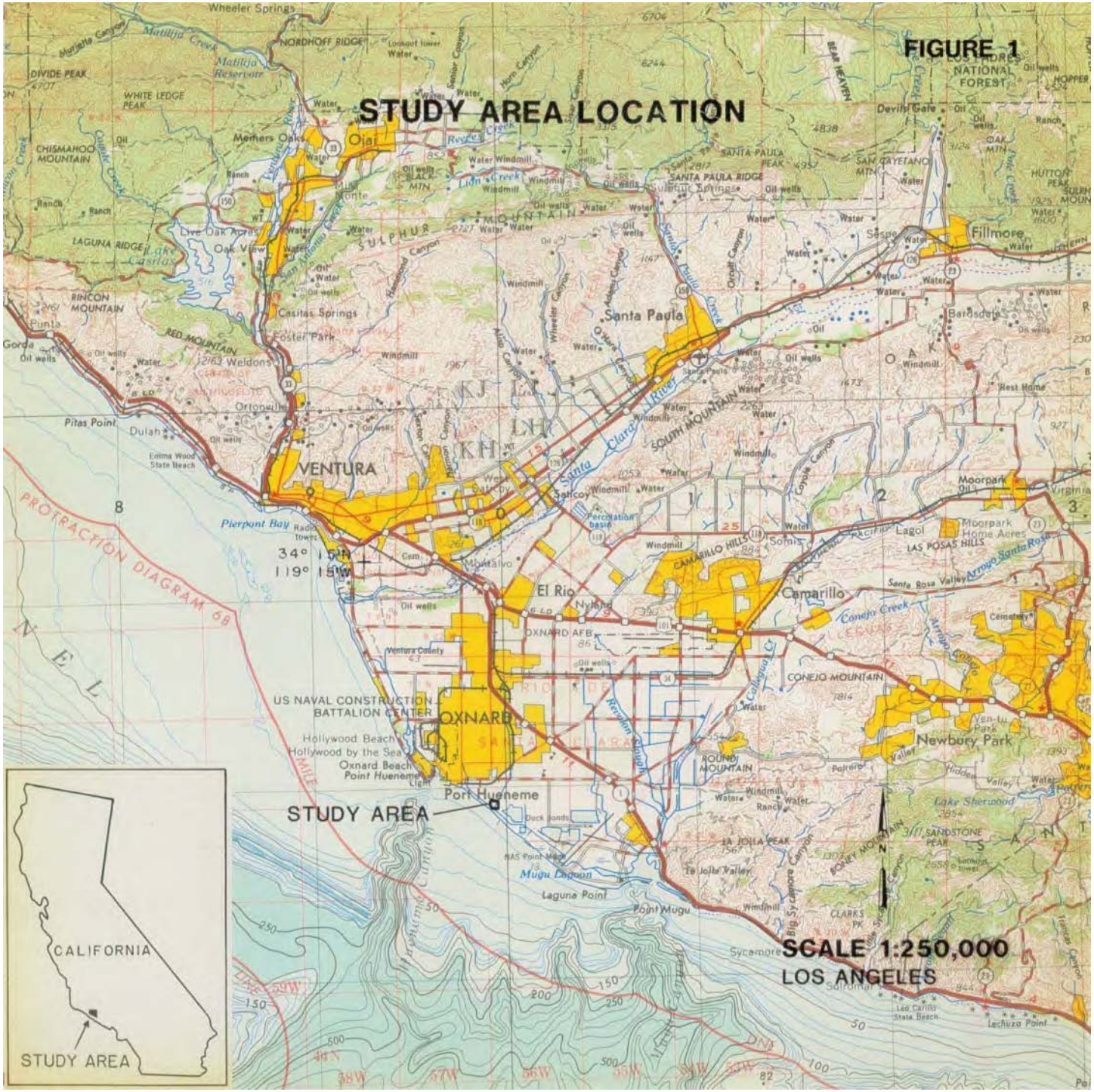


FIGURE 1
STUDY AREA LOCATION
Ojai
Fillmore
Santa Paula
VENTURA
Moorpark
El Rio
Camarillo
OXNARD
Newbury Park
Port Hueneme
STUDY AREA
CALIFORNIA
STUDY AREA
SCALE 1:250,000
LOS ANGELES
34° 15'N
119° 15'W
PROTRACTION DIAGRAM 68

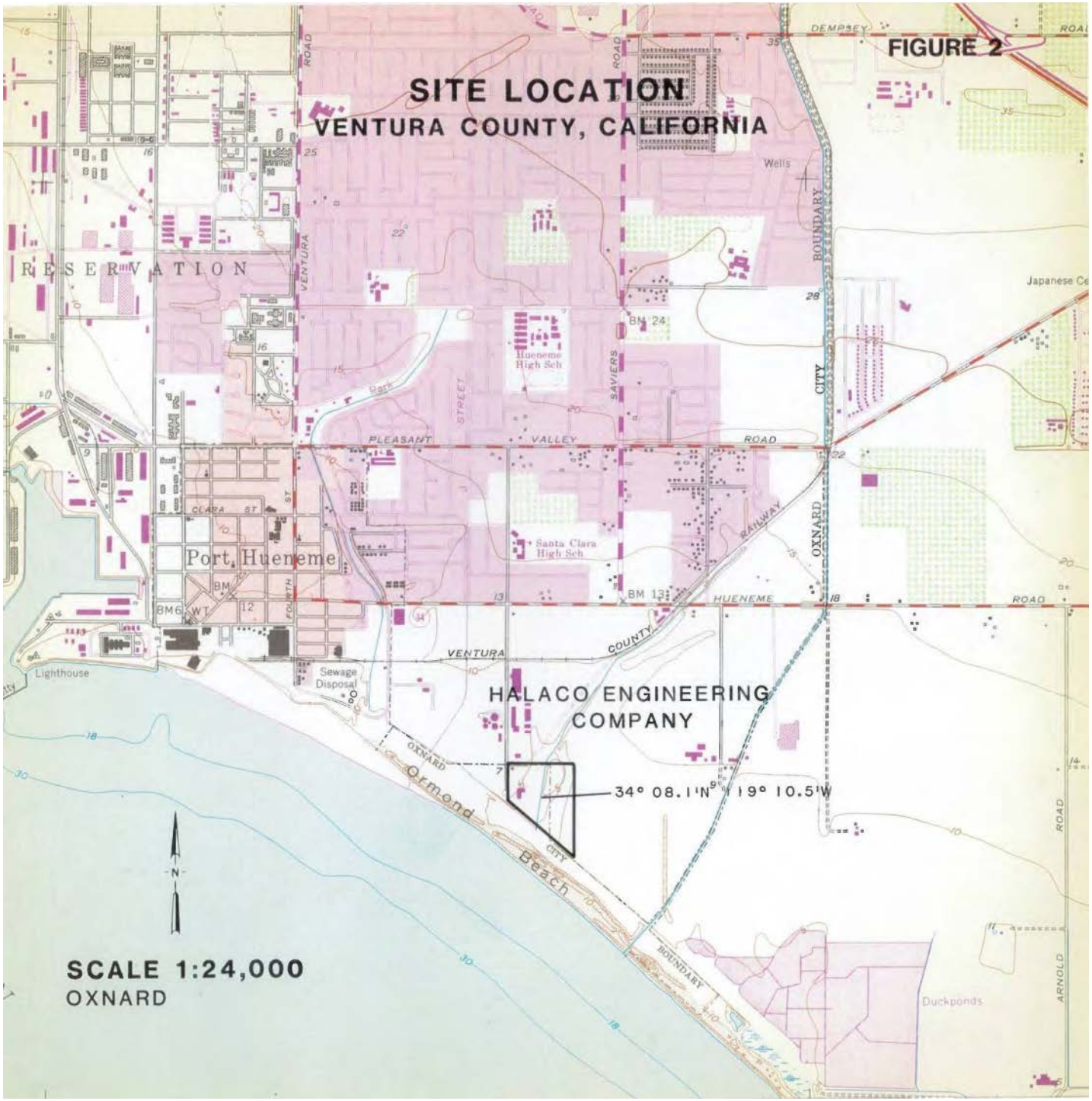


FIGURE 2
SITE LOCATION
VENTURA COUNTY, CALIFORNIA
RESERVATION
Port Hueneme
Lighthouse
Sewage Disposal
HALACO ENGINEERING COMPANY
34° 08.1'N 119° 10.5'W
Ormond Beach
Duckponds
Hueneme High Sch
Santa Clara High Sch
Japanese Ce
Wells
PLEASANT VALLEY ROAD
HUENEME ROAD
VENTURA COUNTY
OXNARD
CITY BOUNDARY
SAVIERS ROAD
VENTURA ROAD
DEMPSEY ROAD
ARNOLD ROAD
RAILWAY
CLARA ST
FOURTH ST
N
SCALE 1:24,000
OXNARD

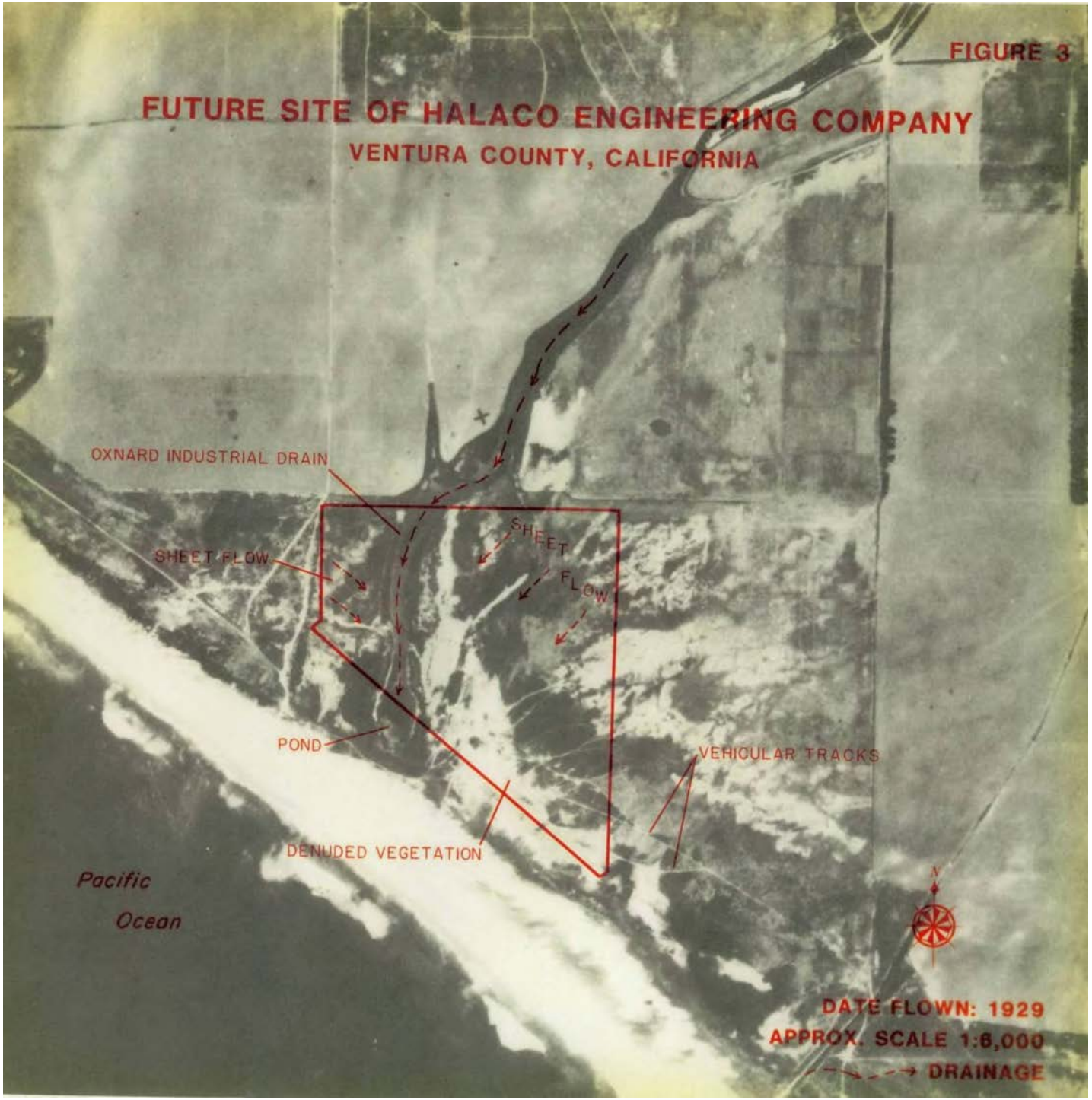
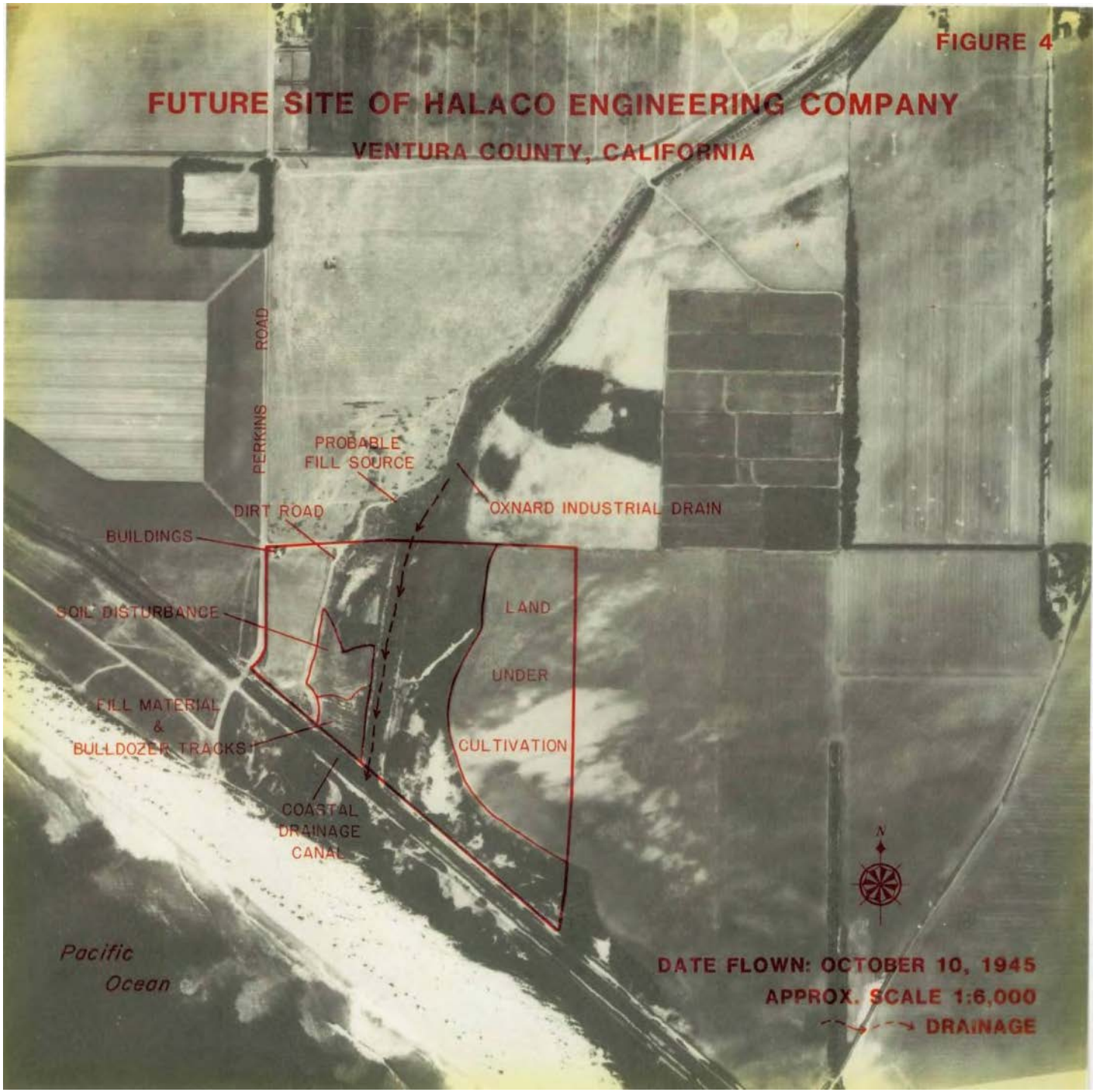


FIGURE 3
FUTURE SITE OF HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
OXNARD INDUSTRIAL DRAIN
SHEET FLOW
SHEET FLOW
POND
VEHICULAR TRACKS
DENUDED VEGETATION
Pacific
Ocean
N
DATE FLOWN: 1929
APPROX. SCALE 1:6,000
DRAINAGE

1929



October 10, 1945

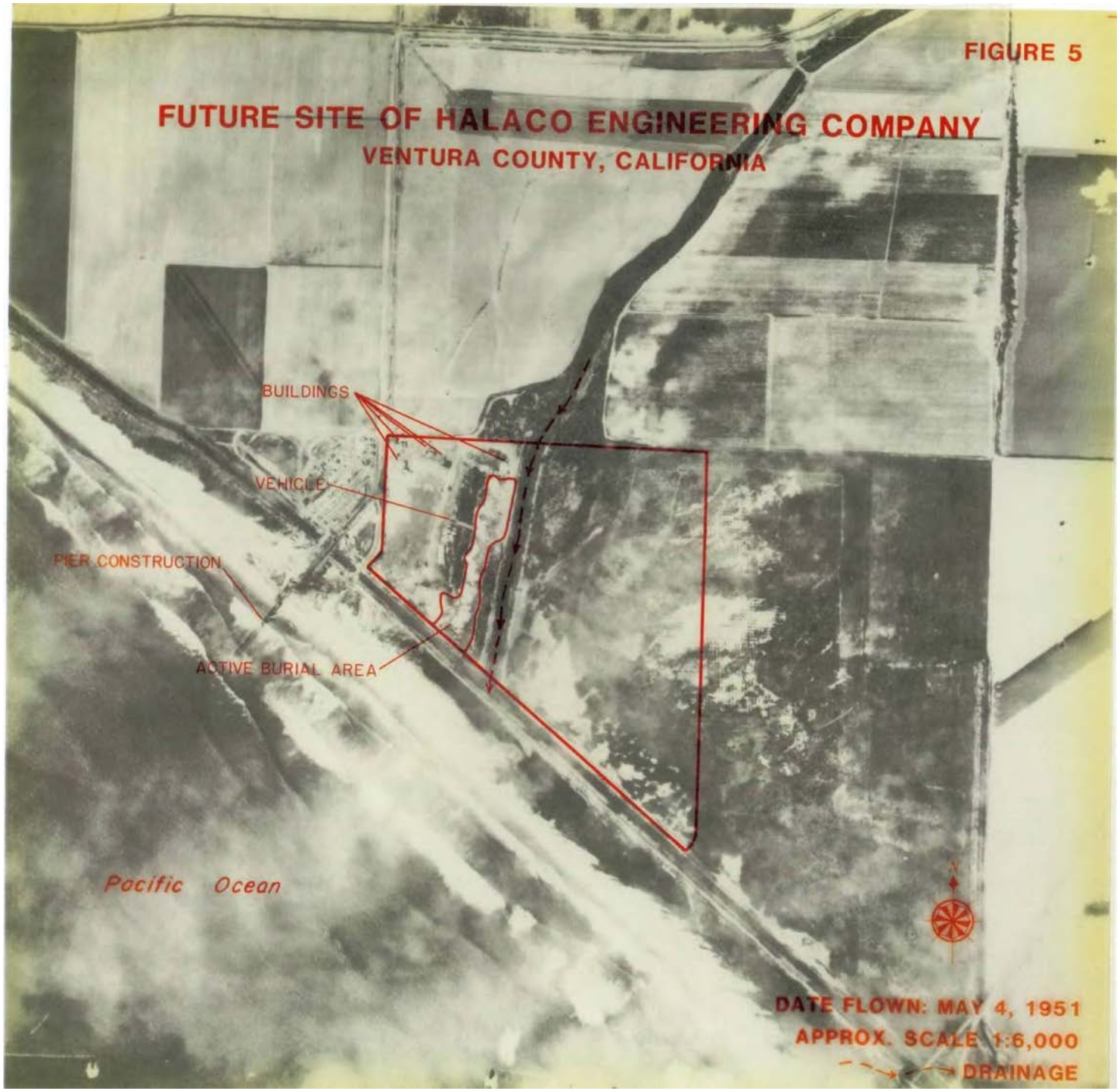
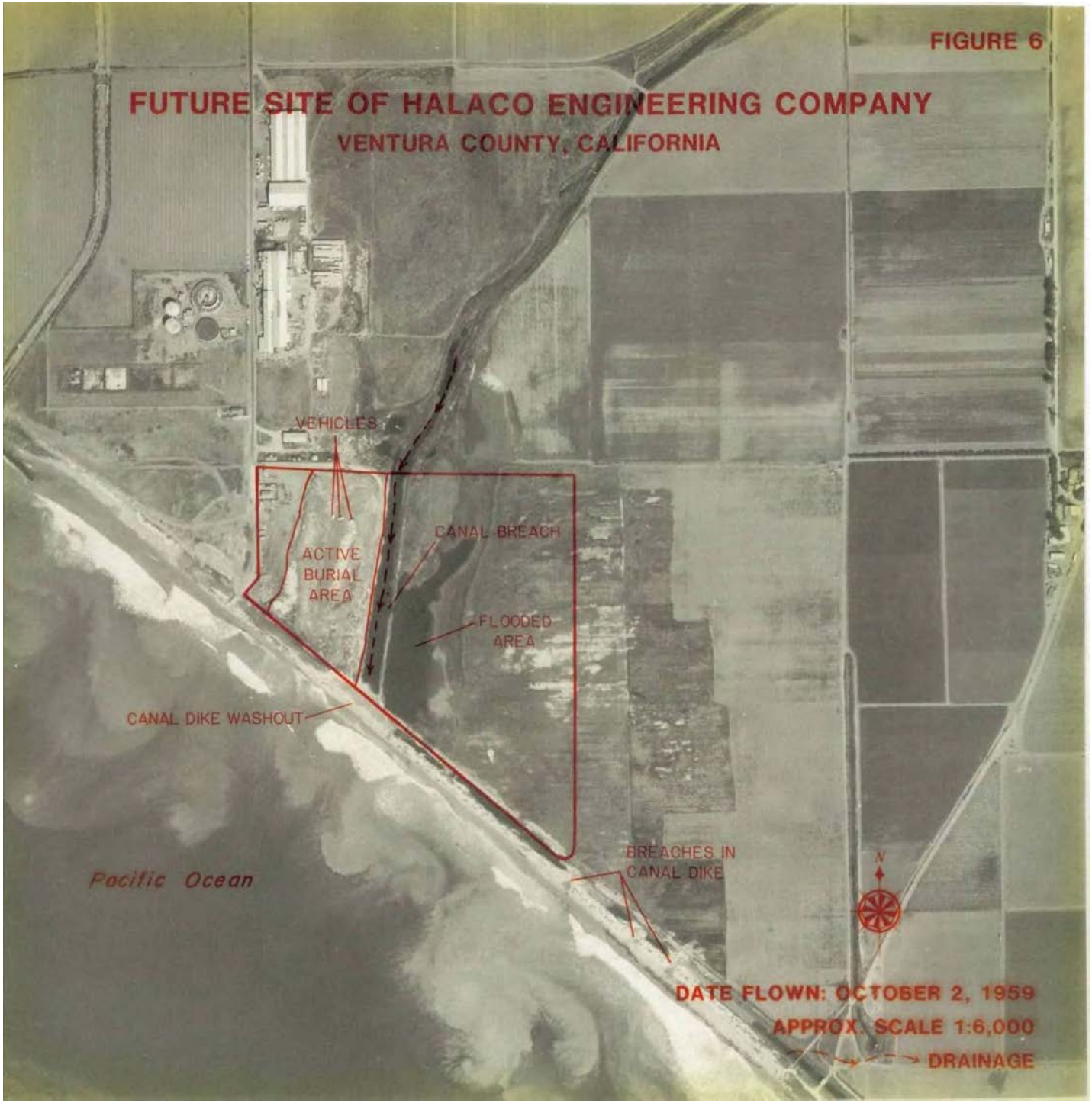


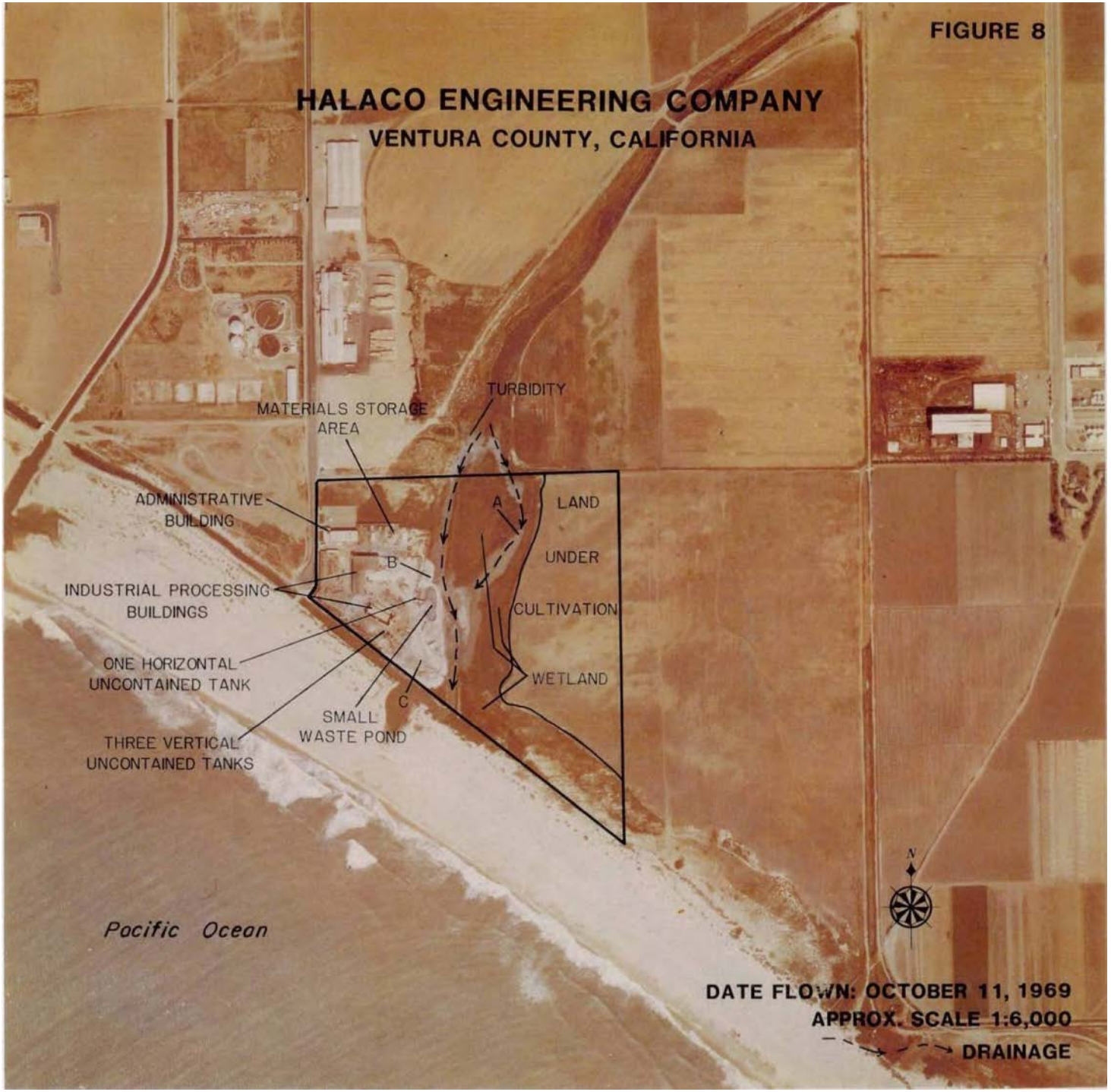
FIGURE 5
FUTURE SITE OF HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
BUILDINGS
VEHICLE
PIER CONSTRUCTION
ACTIVE BURIAL AREA
Pacific Ocean
N
DATE FLOWN: MAY 4, 1951
APPROX. SCALE 1:6,000
DRAINAGE

May 4, 1951

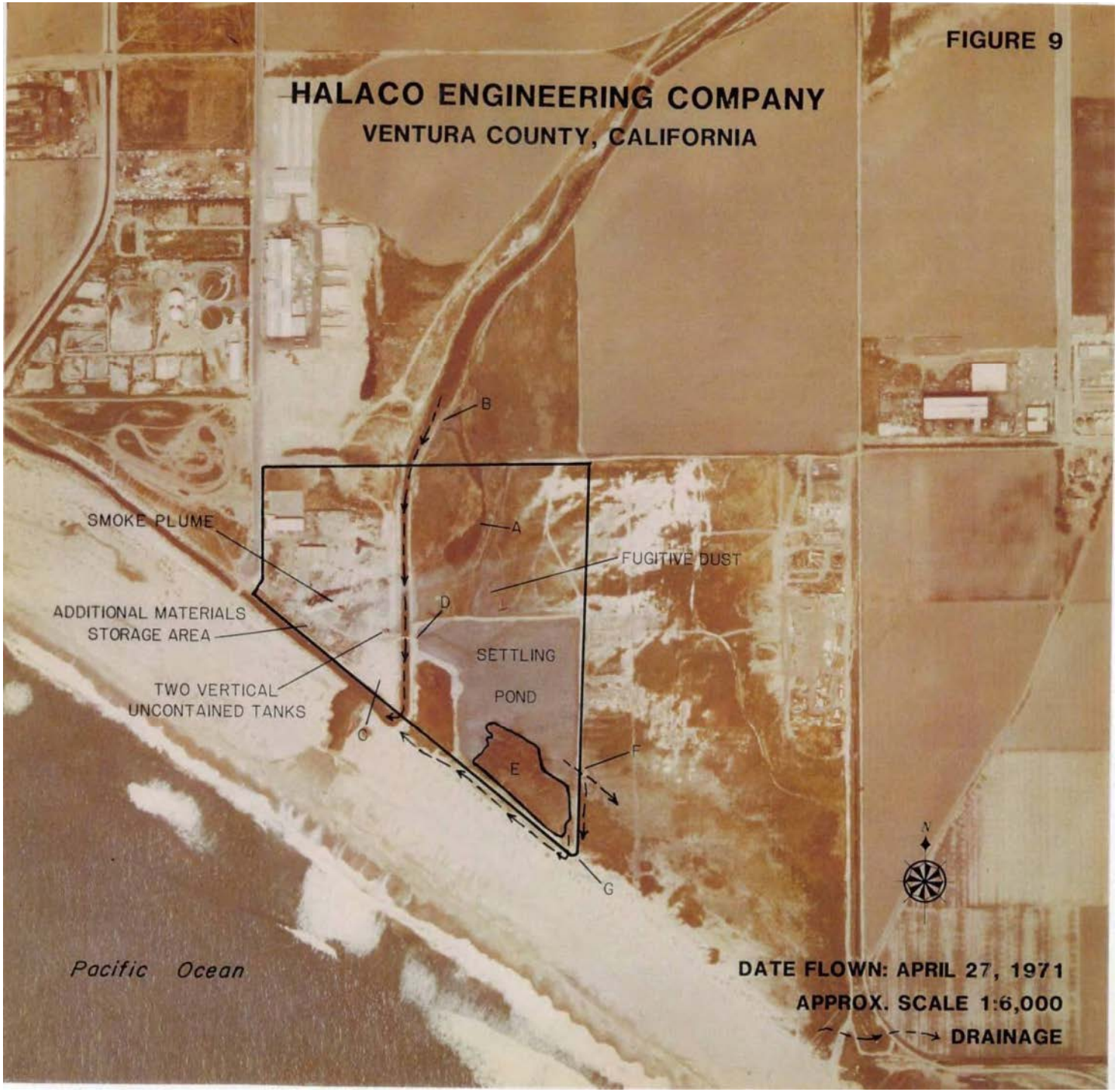


October 2, 1959

September 20, 1965



October 11, 1969



April 27, 1971

March 26, 1972

August 23, 1973

FIGURE 12
HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
STANDING WATER
ONE VERTICAL
CONTAINED TANK
ADDITIONAL WASTE MATERIAL
FOUR VERTICAL
UNCONTAINED TANKS
A
B
STANDING
WATER
N
DATE FLOWN: MARCH 4, 1974
APPROX. SCALE 1:6,000
DRAINAGE

March 4, 1974

October 7, 1975

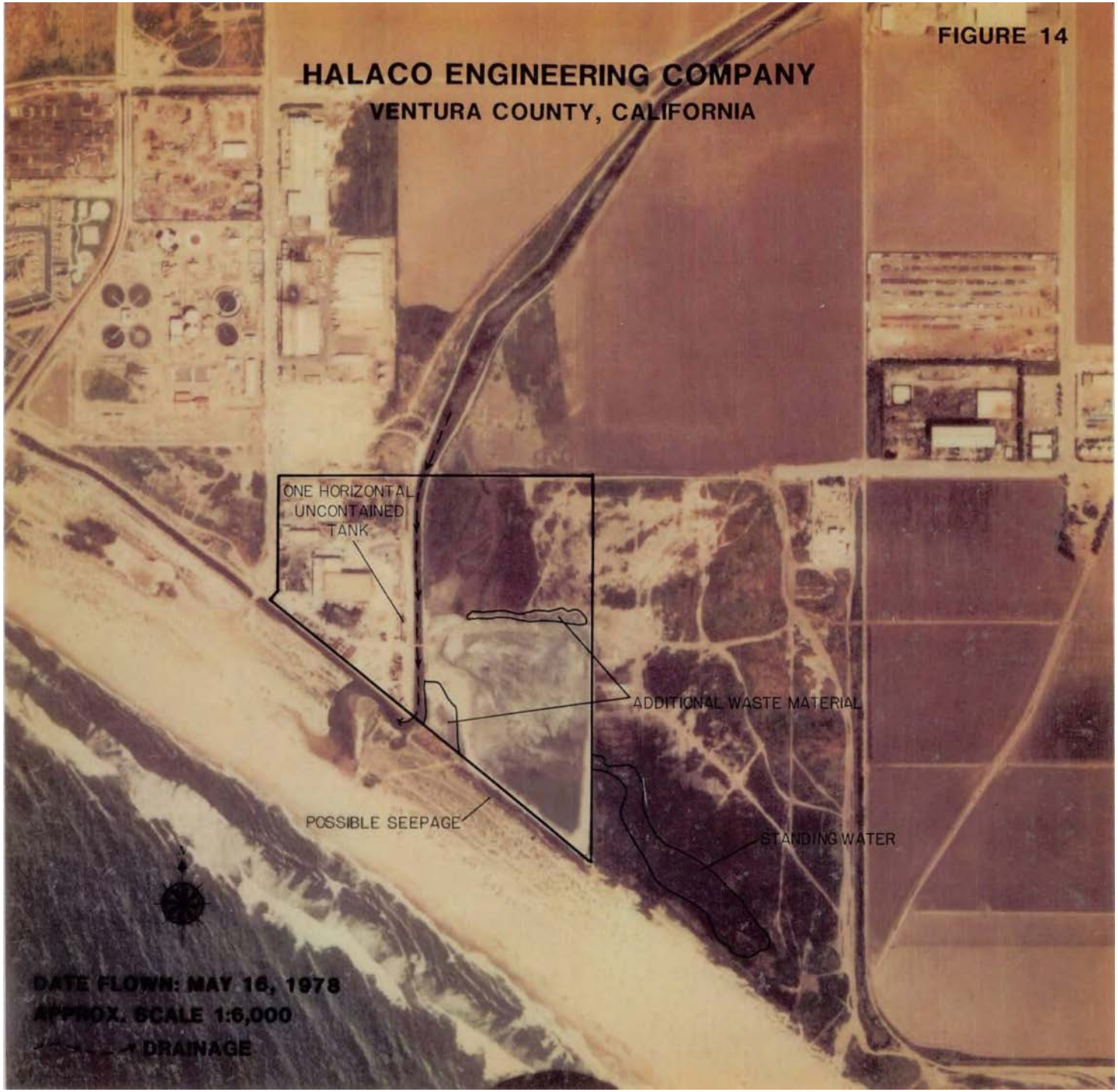


FIGURE 14
HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
ONE HORIZONTAL UNCONTAINED TANK
ADDITIONAL WASTE MATERIAL
POSSIBLE SEEPAGE
STANDING WATER
DATE FLOWN: MAY 16, 1978
APPROX. SCALE 1:6,000
DRAINAGE

May 16, 1978

FIGURE 15
HALACO ENGINEERING COMPANY
VENTURA COUNTY, CALIFORNIA
BULLDOZER TRACKS
ADDITIONAL WASTE MATERIAL
DRUM STORAGE
STANDING WATER
ONE HORIZONTAL CONTAINED TANK
WASTEWATER OUTFALL
WATER TREATMENT EQUIPMENT
FIVE VERTICAL UNCONTAINED TANKS
FORMER FILL AREA
Ocean
DATE FLOWN: JUNE 22, 1981

June 22, 1981

TS-PIC-91730
February 1991

AERIAL PHOTOGRAPHIC ANALYSIS OF THE MALACO ENGINEERING FACILITY

Oxnard, California

by

A. B. Divers
Environmental Programs
Lockheed Engineering and Sciences Company
Las Vegas, Nevada 89193-3478

Contract No. 68-C0-0050

Project Officer

P. A. Arberg
Advanced Monitoring Systems Division
Environmental Monitoring Systems Laboratory
Las Vegas, Nevada 89193-3478

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89193-3478

January 10, 1991

Attachment B
Photographs of CPT Testing and Monitoring Well Installation Activities

PHOTO B-1
CPT Truck at the Smelter Parcel

PHOTO B-2
CPT Truck at the Waste Management Unit

PHOTO B-3
CPT Rods

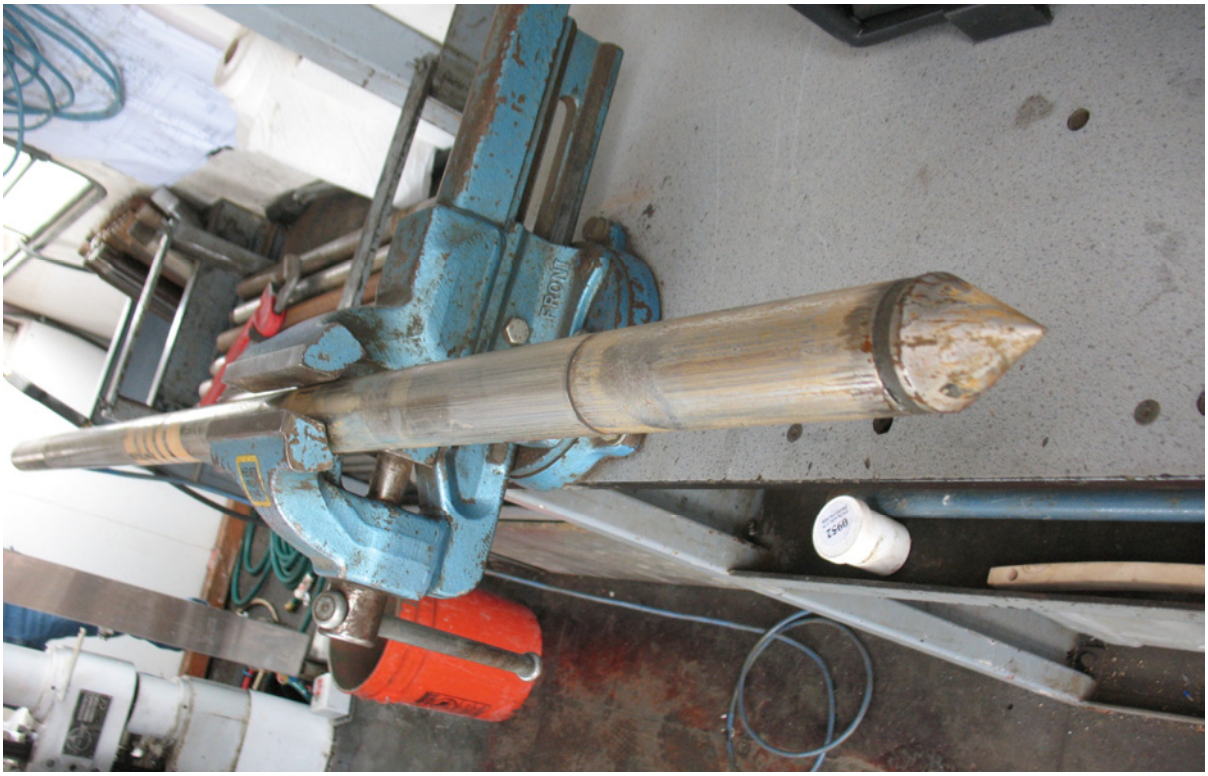


PHOTO B-4
CPT Cone

PHOTO B-5
CPT Cone Pushing

PHOTO B-6
Sonic Drilling at the Smelter Parcel

PHOTO B-7
Sonic Drilling at the Waste Management Unit with 10-foot-long Core Barrel

PHOTO B-8
Sonic Drilling Continuous Core

PHOTO B-9
Installing 2-inch-diameter PVC Well Casing

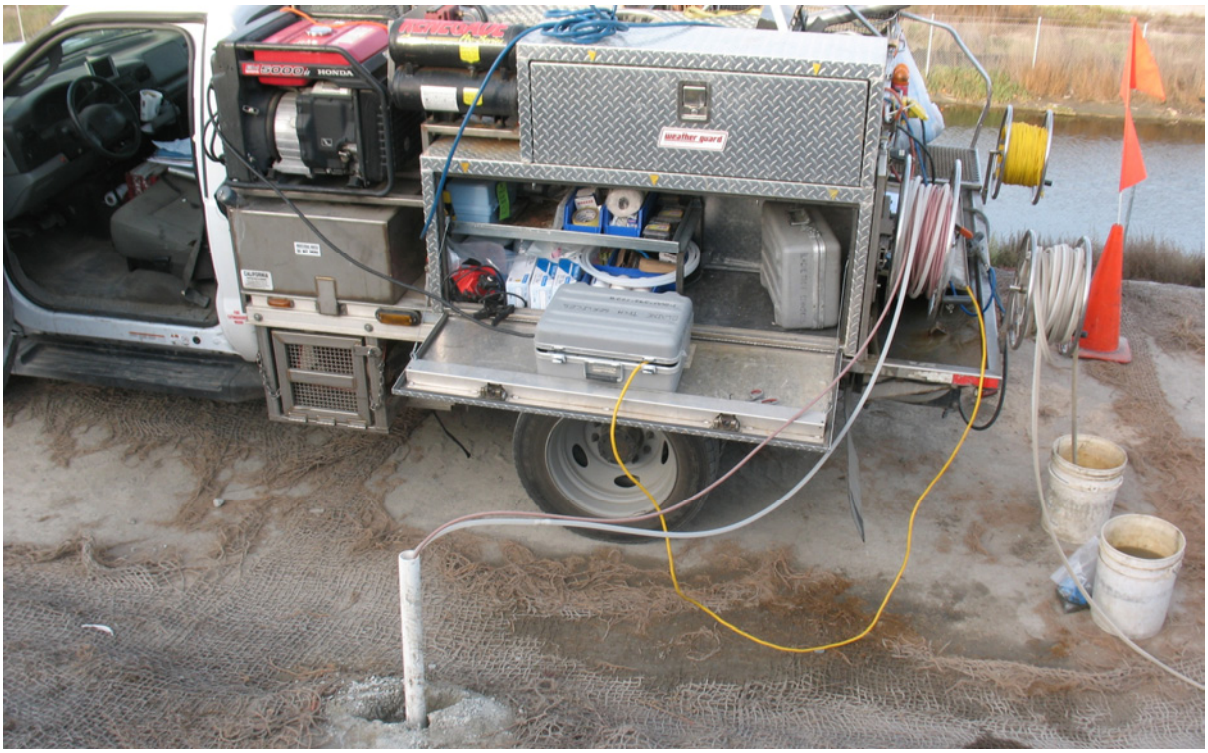


PHOTO B-10
Developing a New Monitoring Well

PHOTO B-11
Measuring Depth to Water in a Finished Monitoring Well

Attachment C
CPT Testing Report (Lankelma) and EC-HPT Log (Vironex)

Attachment C-1

GEOTECHNICAL & ENVIRONMENTAL
SITE INVESTIGATION

Lankelma, Inc.
1961 Meeker Ave.
Richmond, CA 94804
T: (510) 229 8335
F: (510) 263 6041

Project No.: R09C003
November 19, 2009

Mr. Mark Wuttig
CH2M Hill
6 Hutton Centre Drive, Suite 700
Santa Ana, CA 92707

Cone Penetration Testing Services
Halaco Superfund Site
Oxnard, California

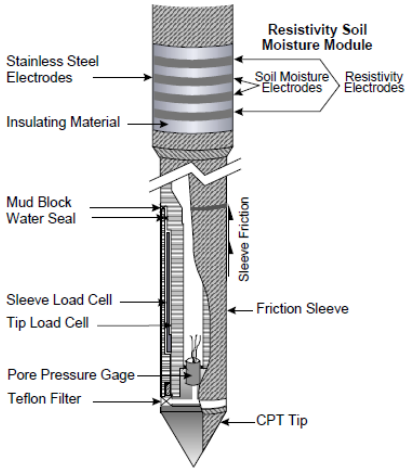
Lankelma, Inc. (Lankelma) is pleased to submit this final report of Piezo Cone Penetration Test (PCPT) with Soil Moisture Resistivity Temperature (SMRT) tooling performed at Halaco Superfund site in Oxnard, California. Lankelma was subcontracted by WDC Exploration and Wells. Our services were authorized by Mr. Bill Stuckey with Purchase Order No. TC 206450. Our services were directed in the field by CH2M Hill. This report documents Lankelma's PCPT testing conducted from October 12, 13, 14 and 24, 2009. Additionally, Lankelma subcontracted Vironex to perform EC-HPT test at one location on October 15, 2009. The EC-HPT test results were submitted by Vironex to CH2M Hill and are not included in this report. This report includes a summary of testing activities, data analysis techniques, and test results.

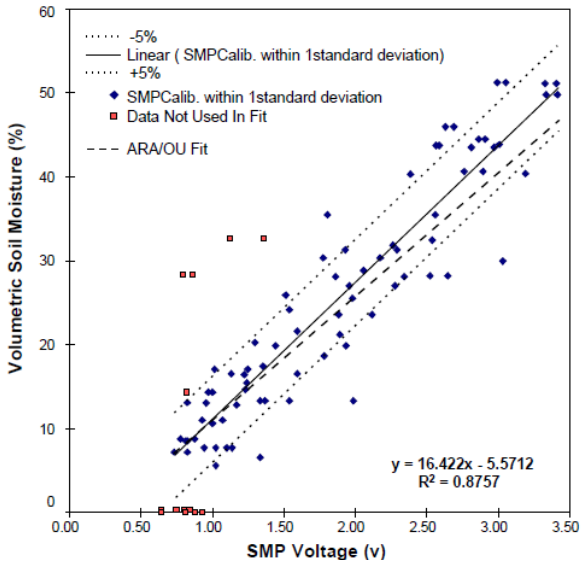
PCPT

Original scope consisted of performing PCPTs at selected locations. The scope was modified to perform PCPT with SMRT tool at possible locations. A total of 8 locations were explored. The two PCPTs were performed in general accordance with ASTM D 5778. We used a 15 sq.cm. cone in accordance with ASTM D 5778 for exploration. The Cone used for exploration was manufactured by Vertek and consists of a conical tip (1.75-in. diameter) and a friction sleeve (6.5-in. long) that independently measure vertical resistance beneath the tip as well as frictional resistance on the side of the probe as a function of depth. A pressure transducer in the cone is used to measure the pore water pressure as the probe is pushed into the ground (PCPT). The penetrometer is advanced vertically into the soil at a constant rate of about 48 inches/minute (2 cm/second). The CPT holes were grouted upon completion of testing.

SMRT Tool

The cone selected for most of the locations consisted of integrated SMRT module. SMRT tooling consists of 4 electrodes and temperature sensor. Two electrodes are used to measure the resistivity and the other two electrodes are used for volumetric soil moisture content based on a built in correlation. A cross-section of the cone with Soil Moisture correlation is presented below for your reference.





Data Analyses

The attached profiles present the obtained PCPT profiles at each of the 8 locations. The plots present friction sleeve stress, tip stress, friction ratio, and penetration pore pressure, soil behavior type and stratigraphy based on corrected friction ratio. Additionally, volumetric soil moisture content, resistivity, and temperature profiles are presented for locations where the SMRT tooling was used. The piezo-cone probe senses the pore pressure immediately behind the tip. As requested, we performed interpretations to estimate soil behavior type based on Robertson et al. 1986.

The temperature sensor in the cone measures the temperature of the cone rod. In sands and abrasive soils the reading is impacted by the heat generated during pushing/testing (frictional) and does not necessarily indicate the subsurface soil temperature. A more accurate reading of soil temperature could be obtained, if needed, by pausing the test to dissipate the generated heat. The temperature profile was not critical for this project.

Moisture content readings have been impacted due to highly conductive insitu material and/or conductive pore water and hence do not necessarily represent insitu moisture content. However, this information could be used to confirm areas that do not contain highly conductive pore water. Please contact us if you need further information on used methods and/or correlations.

Limitations

Findings and interpretations presented in this data report are based on the data obtained from the field program and interpretation of the data. The interpretations were performed using generally accepted methods and in a manner consistent with the level of care and skill ordinarily exercised by professionals performing similar services. No warranty or guarantee, expressed or implied, is made or intended. The interpretations presented are estimated values and are only intended to provide guidance. The user should carefully review the data and should be fully aware of the techniques and limitations of methods used in interpretations. Lankelma, Inc. is not responsible for any claims, damages, or liability associated with use of the data and estimated properties

presented in this report. The obtained and interpreted data indicate subsurface conditions (Soil Behavior Type) only at the specific location and time, and only to the depths explored. The data does not necessarily reflect strata variations that may exist at the site.

Closing

We appreciate the opportunity to assist you with the requested services. If we may be of further assistance, please call us at your convenience.

Sincerely,
Lankelma, Inc.

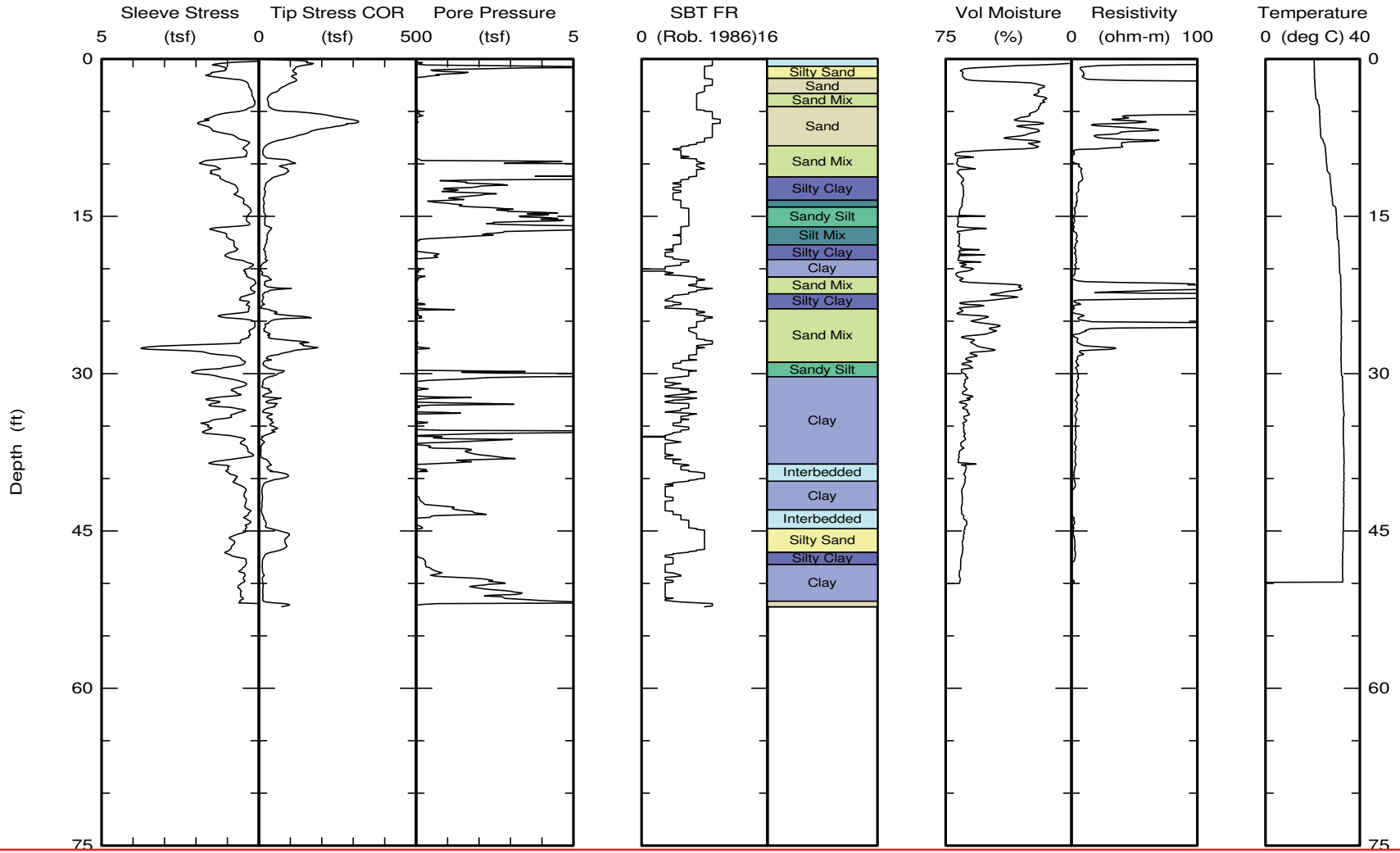
Umesh K. Bachu
Vice President

Attachments: References
CPT Graphs
Soil Behavior Chart
Data Files

References

1) Robertson, P.K. and Campanella, R.G., 1983, "Interpretation of Cone Penetration Tests - PART I (SAND) and PART II (CLAY)", Canadian Geotechnical Journal, Vol. 20, No. 4.
2) Robertson, P.K., 1990, Soil Classification using the CPT, Canadian Geot. Journal, V.27,No.1, Feb, p151-158.
3) Jefferies, M.G. and Davies, M.P.,1991,"Soil Classification by the CPT": Discussion Canadian Geot. Jour.,V28(1),173-6
4) James Shinn et. al, Development of a CPT deployed probe for In Situ measurement of volumetric soil moisture content and electrical resistivity.

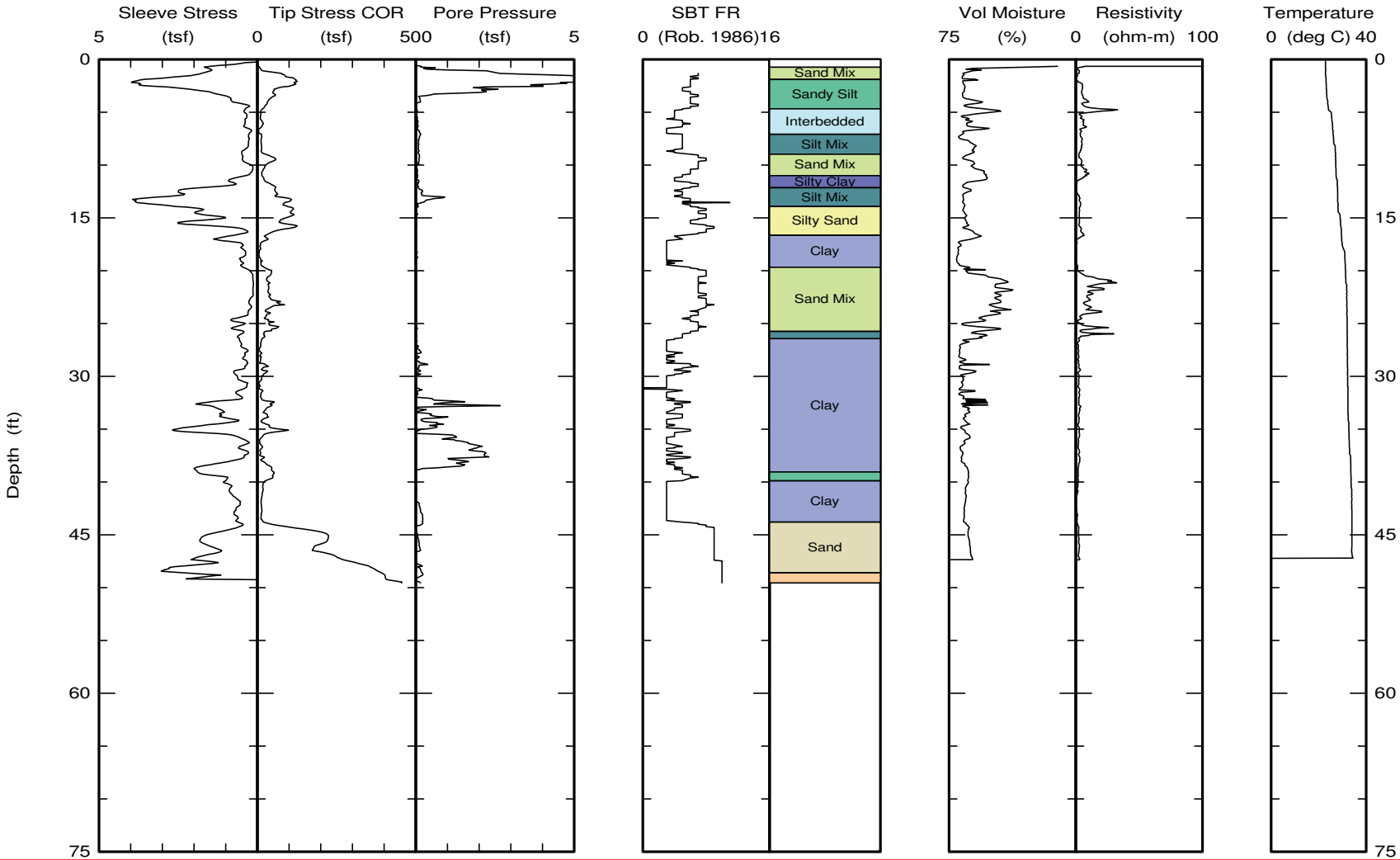
Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 12/Oct/2009 Test ID: WCP-1 Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	



Note: 1. The sounding location was at the top of the slag pile. The stratigraphy shows behavior of similar soil type and is based on resistance to pushing and is not indicative of material present below ground surface.

2. Moisture content readings have been impacted due to highly conductive insitu material and pore water salinity possibly and hence do not necessarily represent insitu moisture content. The plot shown above is for information purposes

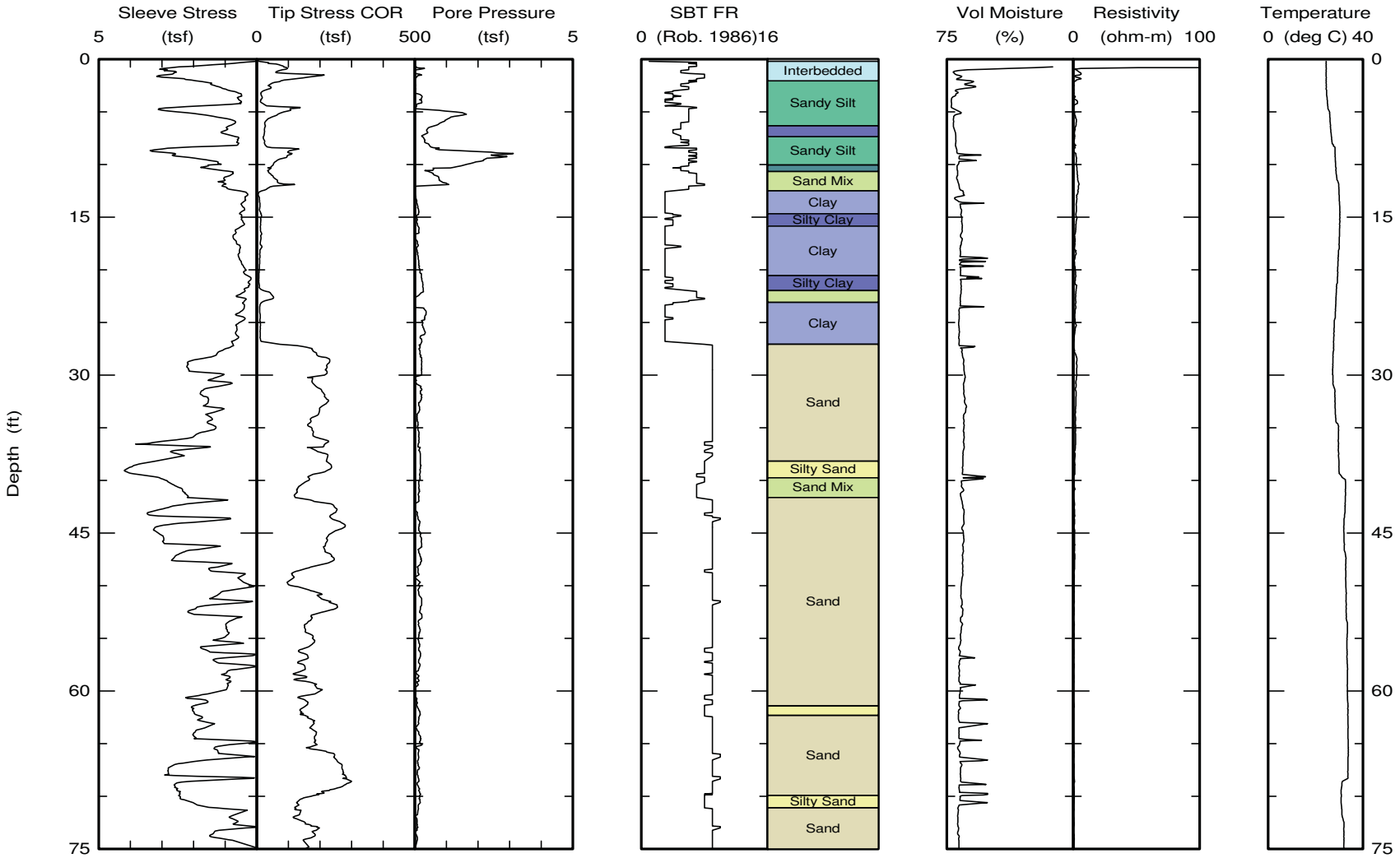
Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 12/Oct/2009 Test ID: WCP-2 Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	



Note: 1. The sounding location was at the top of the slag pile. The stratigraphy shows behavior of similar soil type and is based on resistance to pushing and is not indicative of material present below ground surface.

2. Moisture content readings have been impacted due to highly conductive insitu material and pore water salinity possibly and hence do not necessarily represent insitu moisture content. The plot shown above is for information purposes

Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 13/Oct/2009 Test ID: WCP-3R Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	

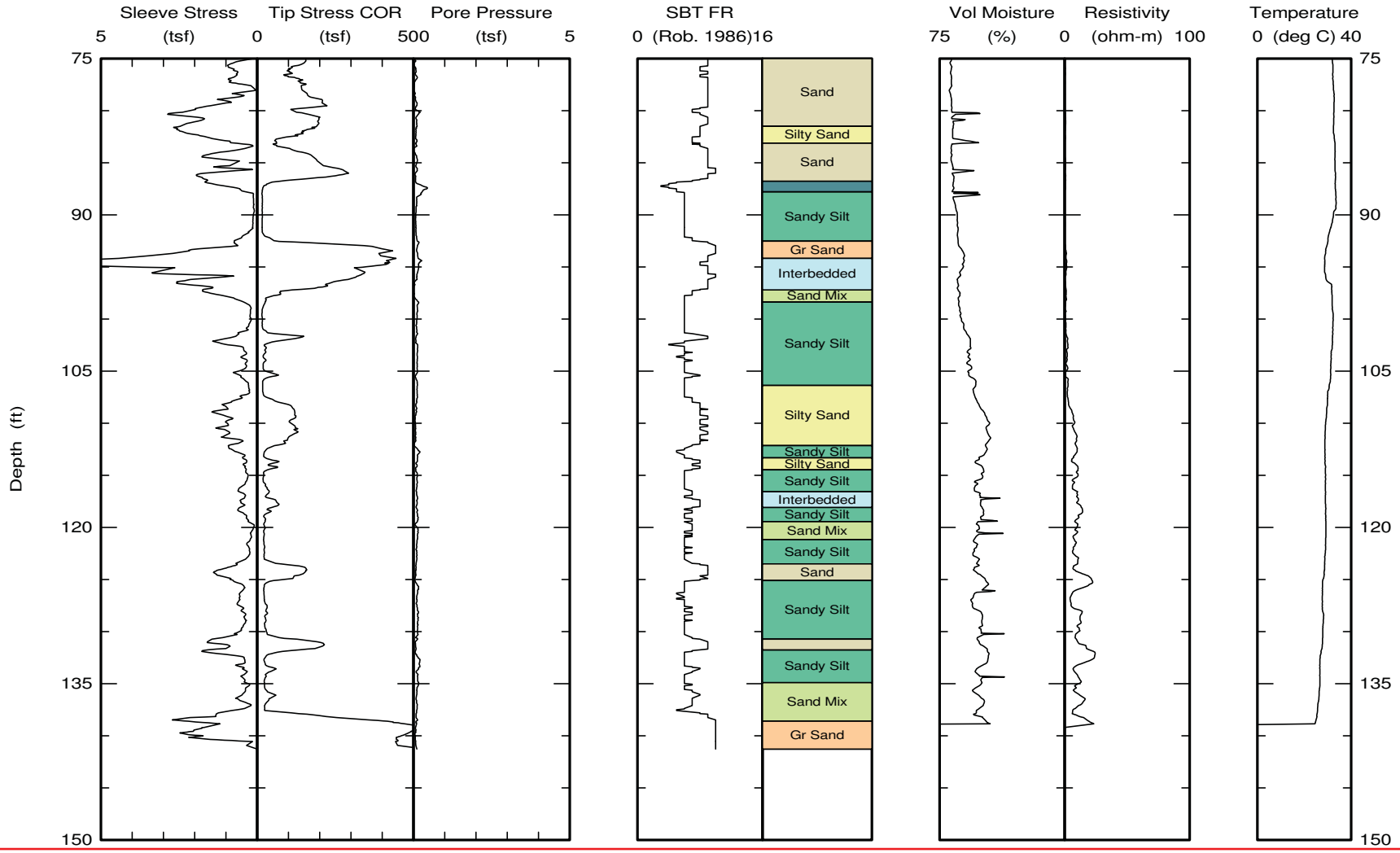


Note: 1. Moisture content readings have been impacted due to highly conductive insitu material and/or pore water salinity and hence do not necessarily represent insitu moisture content. The plot shown above is for information purposes.

2. The maximum moisture content that can be read by the tool is about 67% and is based on empirical correlations from research. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

ID: WCP-3R
File: 213O0902C.ECP

Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 13/Oct/2009 Test ID: WCP-3R Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	

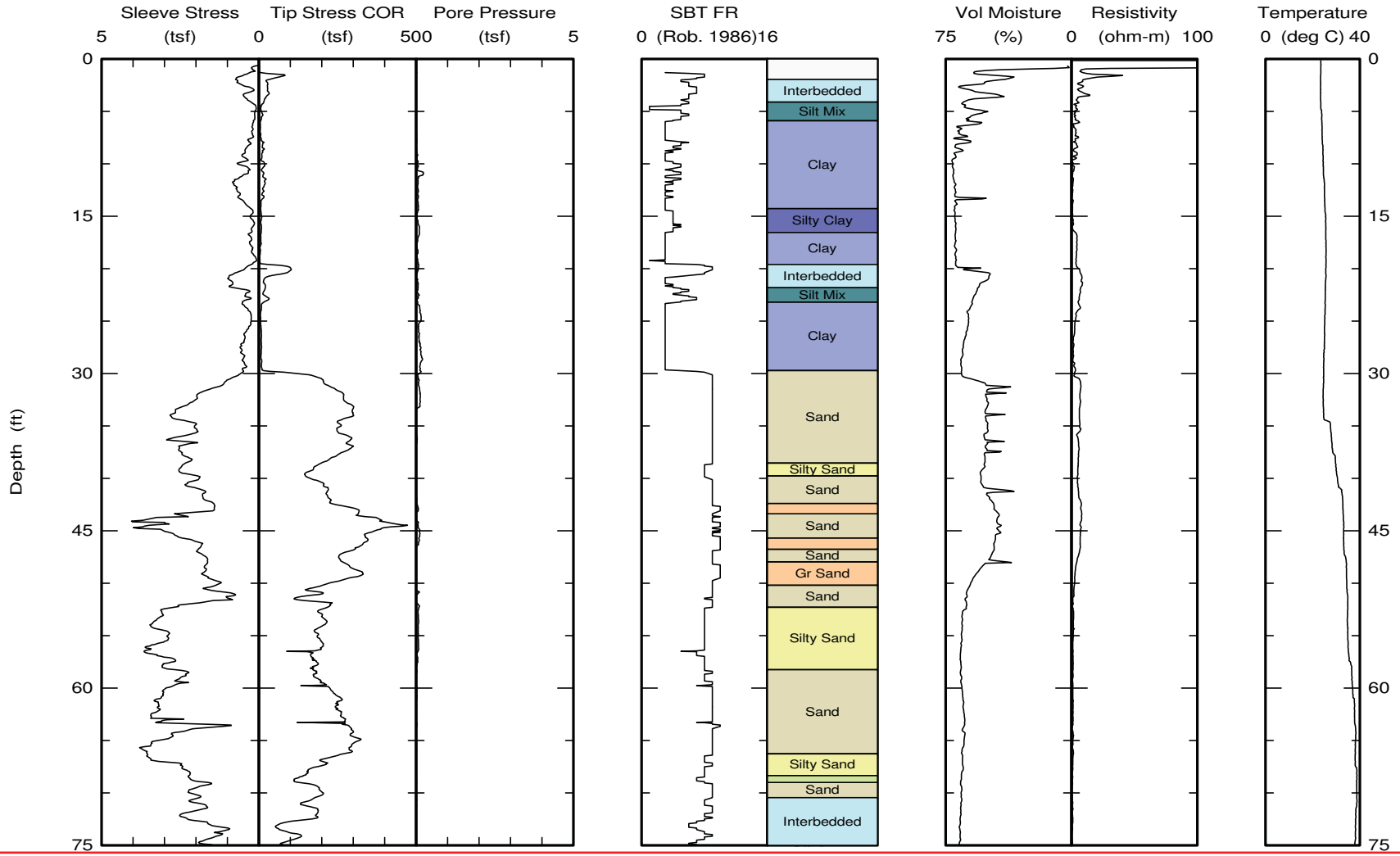


Note: 1. Moisture content readings have been impacted due to highly conductive insitu material and/or pore water salinity and hence do not necessarily represent insitu moisture content. The plot shown above is for information purposes.

2. The maximum moisture content that can be read by the tool is about 67% and is based on empirical correlations from research. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

Test ID: WCP-3R
File: 213O0902C.ECP

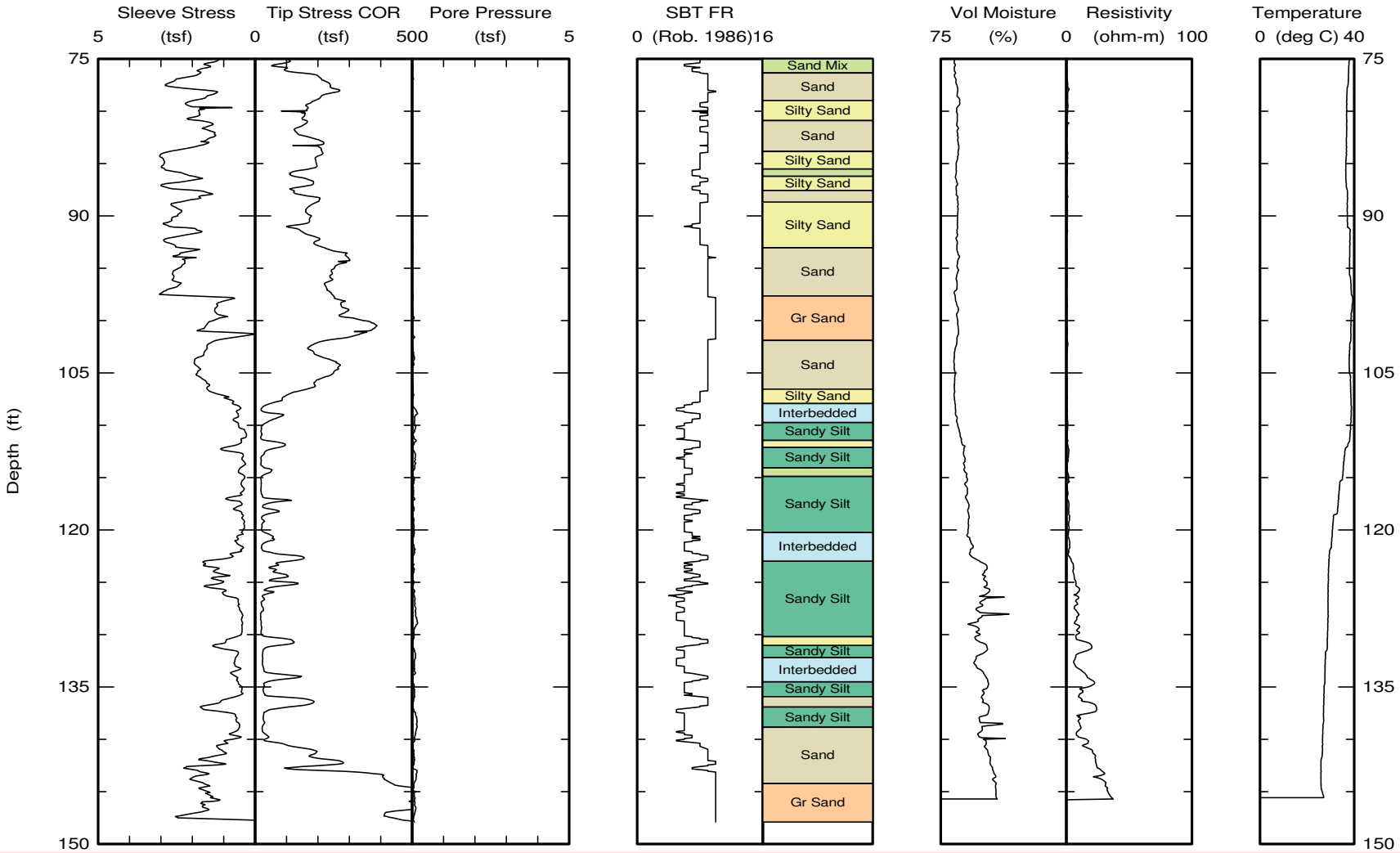
Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 13/Oct/2009 Test ID: WCP-4 Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	



Note: 1. Moisture content readings have been impacted due to highly conductive insitu material and pore water salinity possibly and hence do not necessarily represent insitu moisture content. The plot shown above is for information purposes.

2. The maximum moisture content that can be read by the tool is about 67% and is based on empirical correlations from research. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 13/Oct/2009 Test ID: WCP-4 Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	

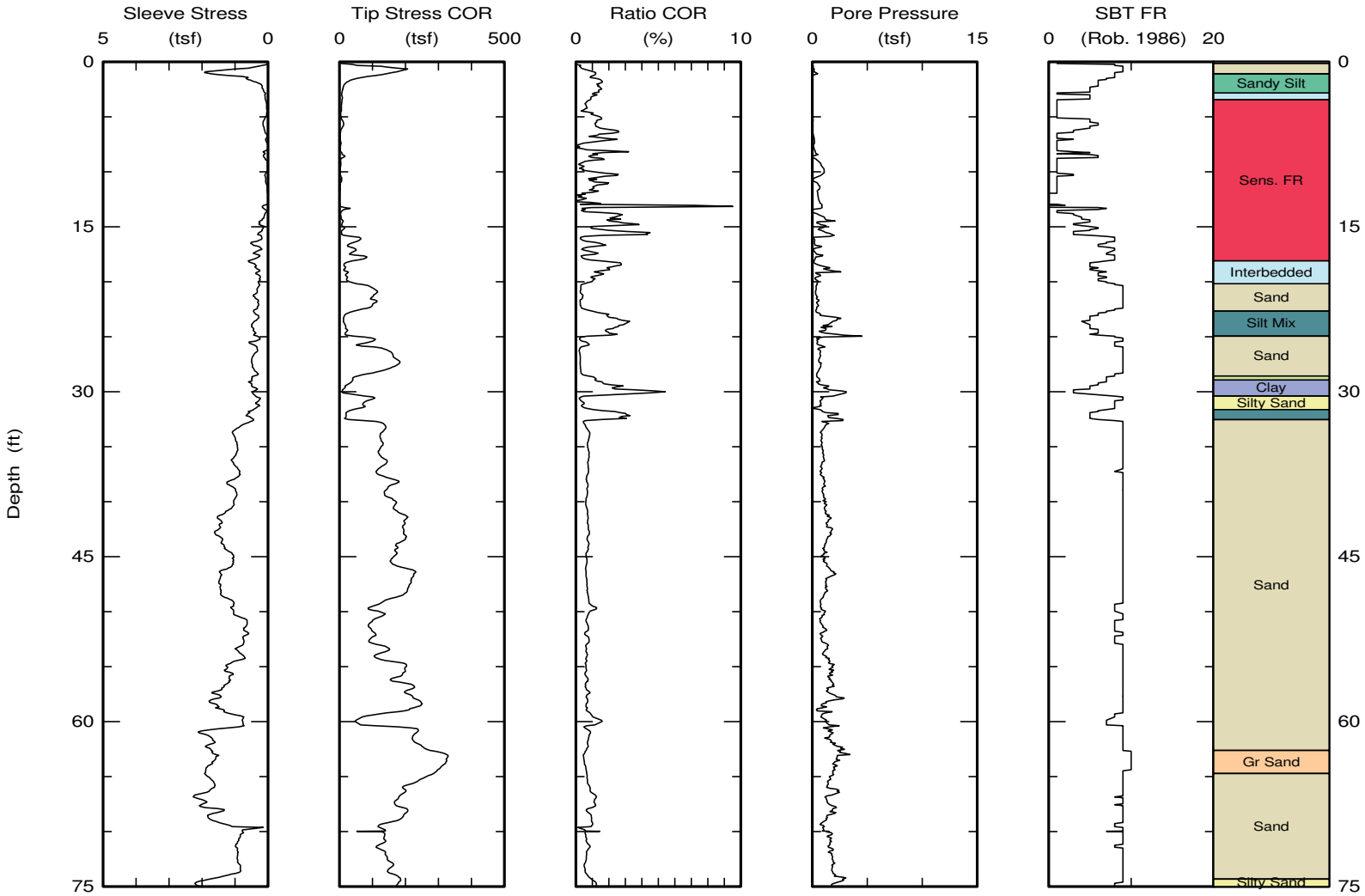


Note: 1. Moisture content readings have been impacted due to highly conductive insitu material and pore water salinity possibly and hence do not necessarily represent insitu moisture content. The plot shown above is for information purposes.

2. The maximum moisture content that can be read by the tool is about 67% and is based on empirical correlations from research. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

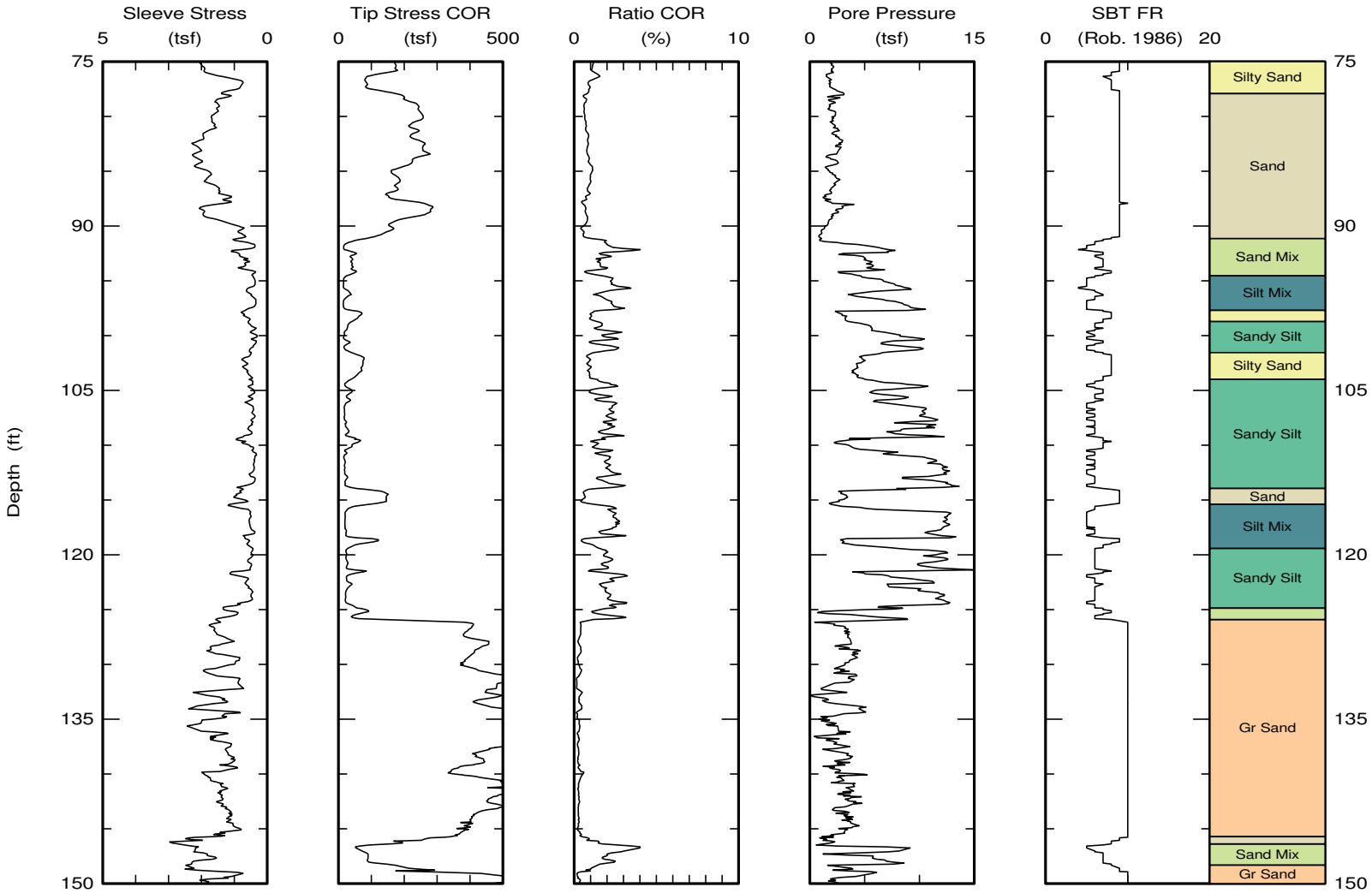
Test ID: WCP-4
File: 213O0903C.ECP

Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 14/Oct/2009 Test ID: SCP-1 Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	



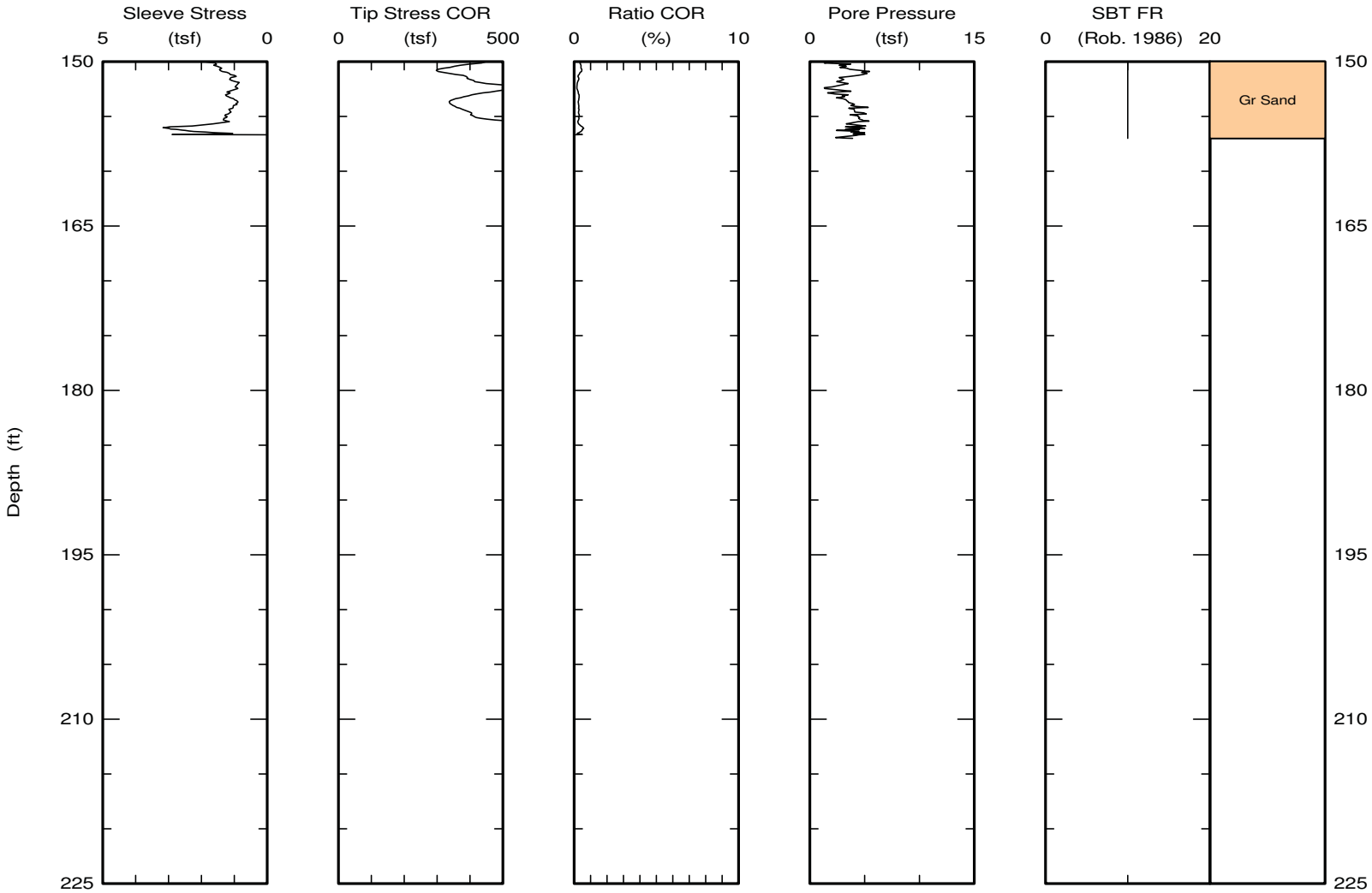
Maximum depth: 157.01 (ft)

Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 14/Oct/2009 Test ID: SCP-1 Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	



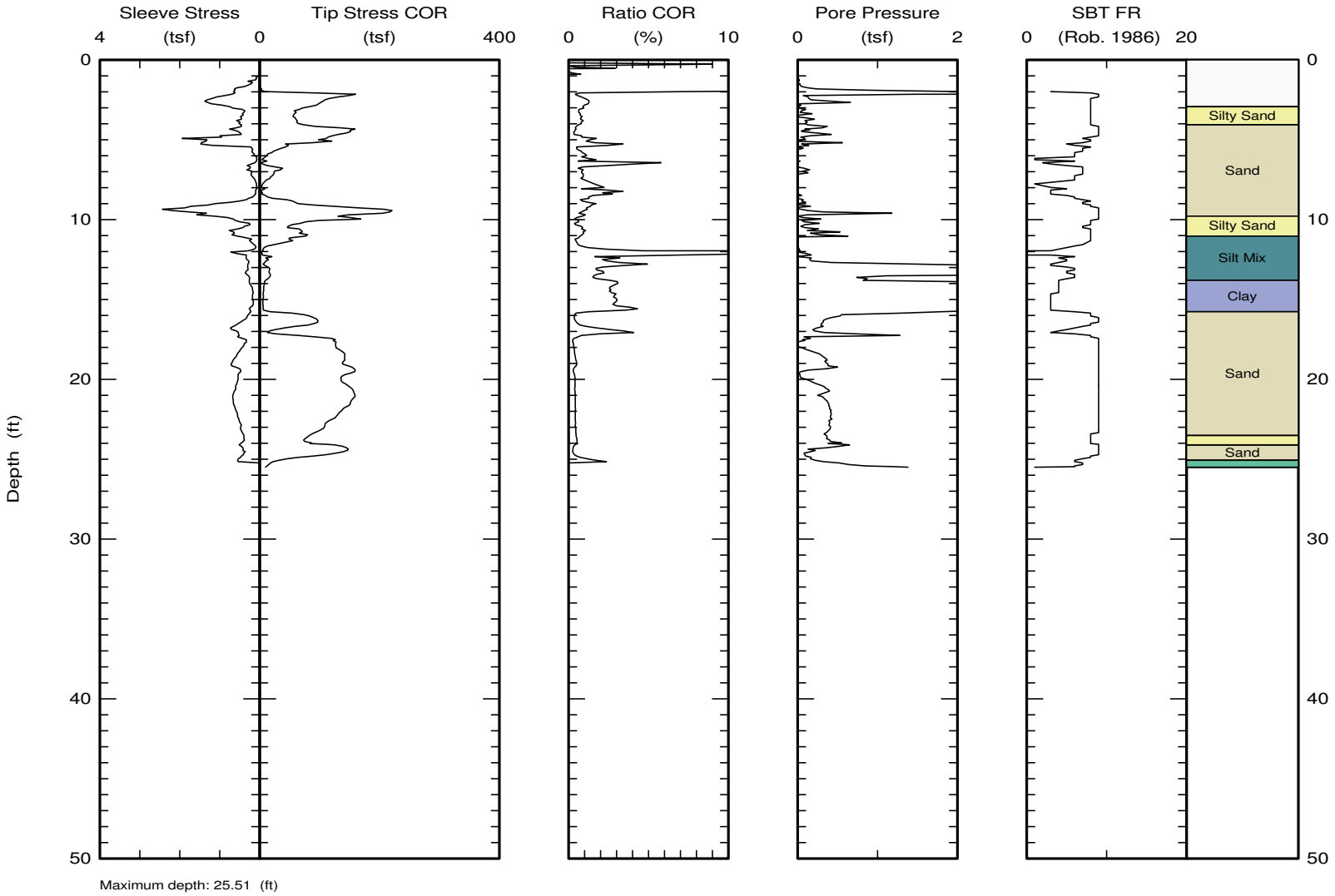
Maximum depth: 157.01 (ft)

Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 14/Oct/2009 Test ID: SCP-1 Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	



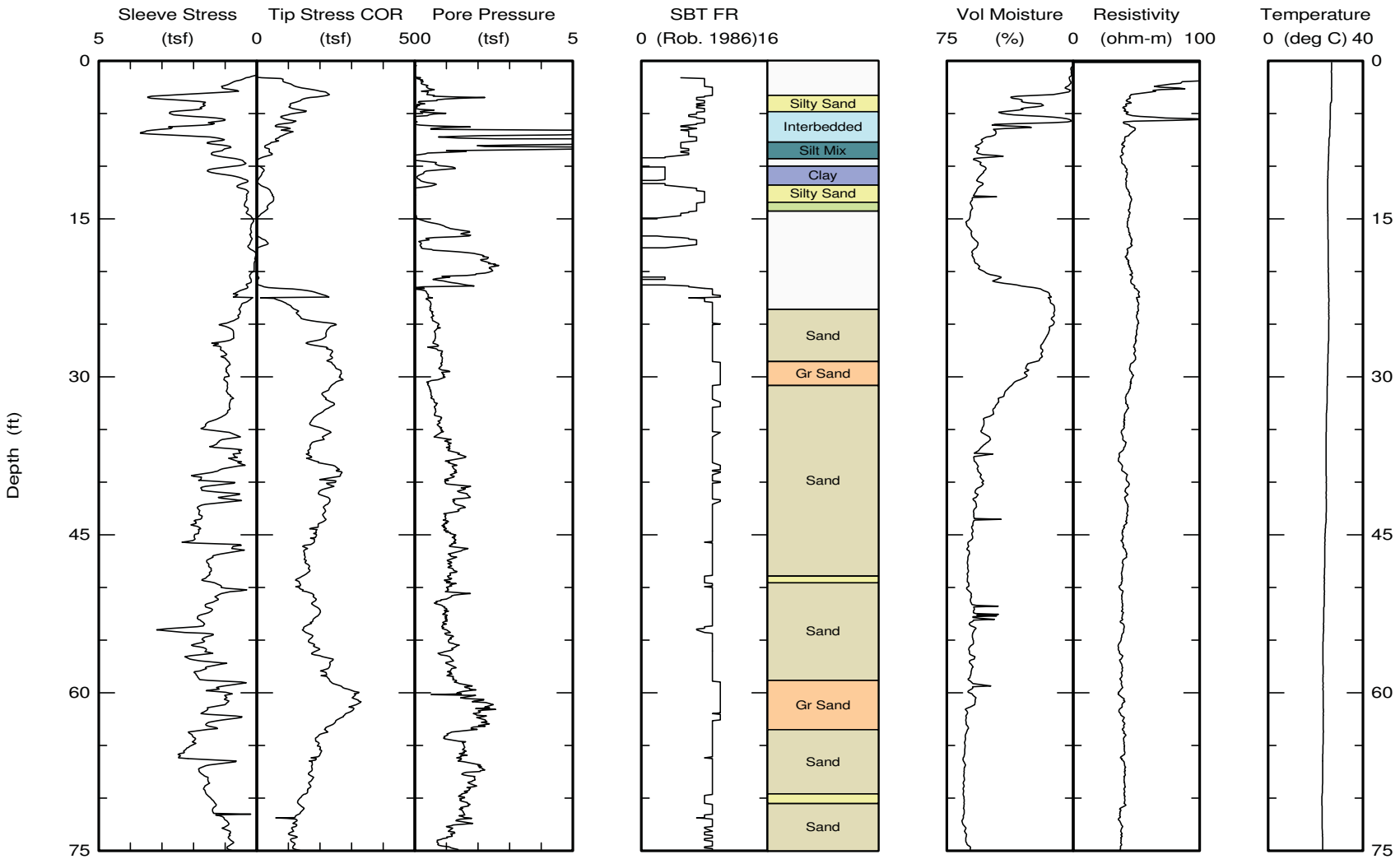
Maximum depth: 157.01 (ft)

Applied Research Associates, Inc. South Royalton, VT 05068 802-763-8348 cpt@ned.ara.com www.ara.com	Northing: Easting: Elevation:	Date: 14/Oct/2009 Test ID: SCP-2RA Project: R09C003
	Client: WDC-CH2M-HILL Job Site: HALACO	



Maximum depth: 25.51 (ft)

Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 24/Oct/2009 Test ID: WCP-5R Project: R09C003
	Client: CMH2HILL Job Site: HALACO	

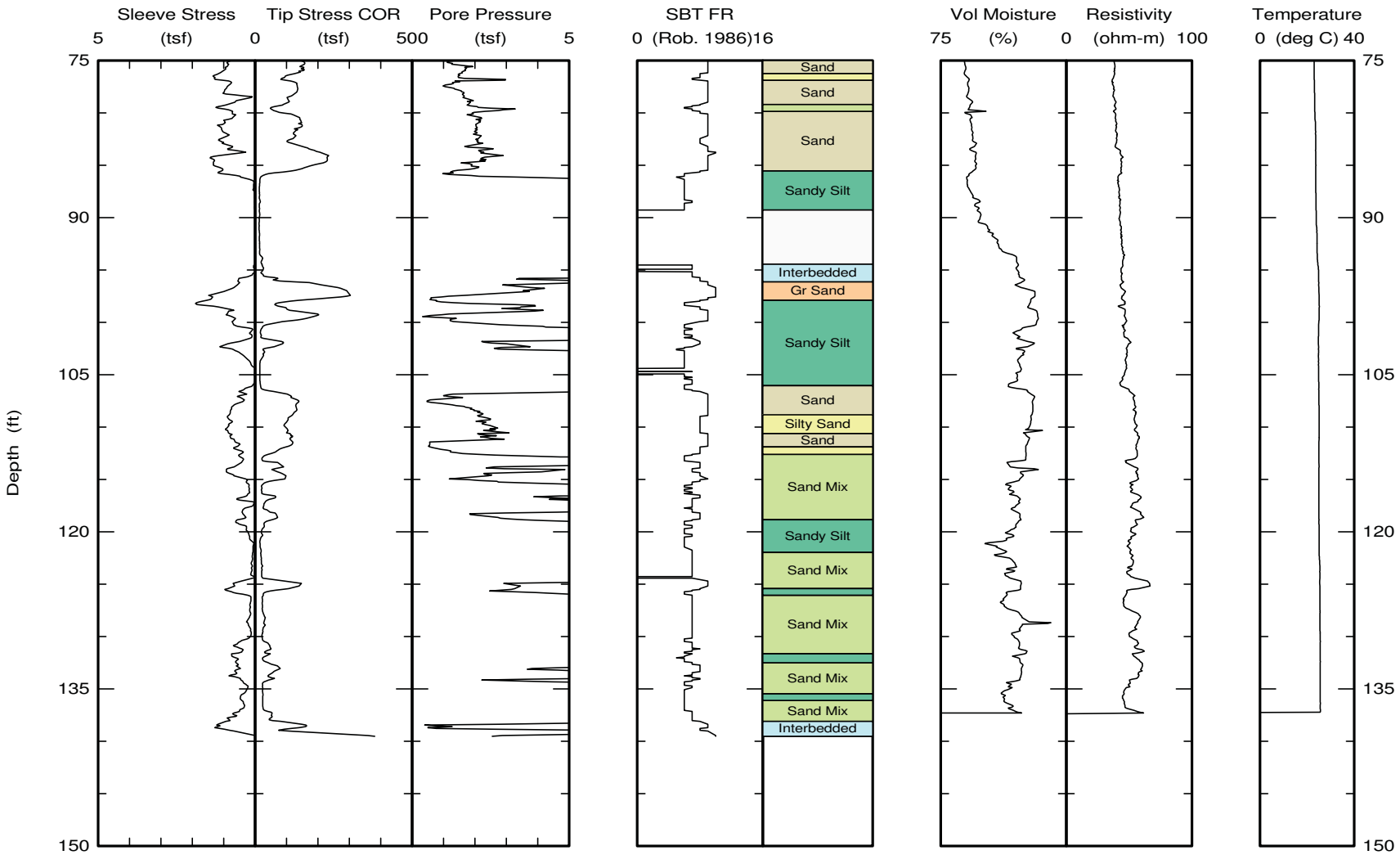


Note: 1. Moisture content readings have been impacted due to highly conductive insitu material and/or pore water salinity and hence do not necessarily represent insitu moisture content. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

2. The collected data indicates low resistance from depth 15 to 23 ft and 87 to 95 ft indicative of either soft soils are erroneous data.

: WCP-5R
File: CA24O0902C.ECP

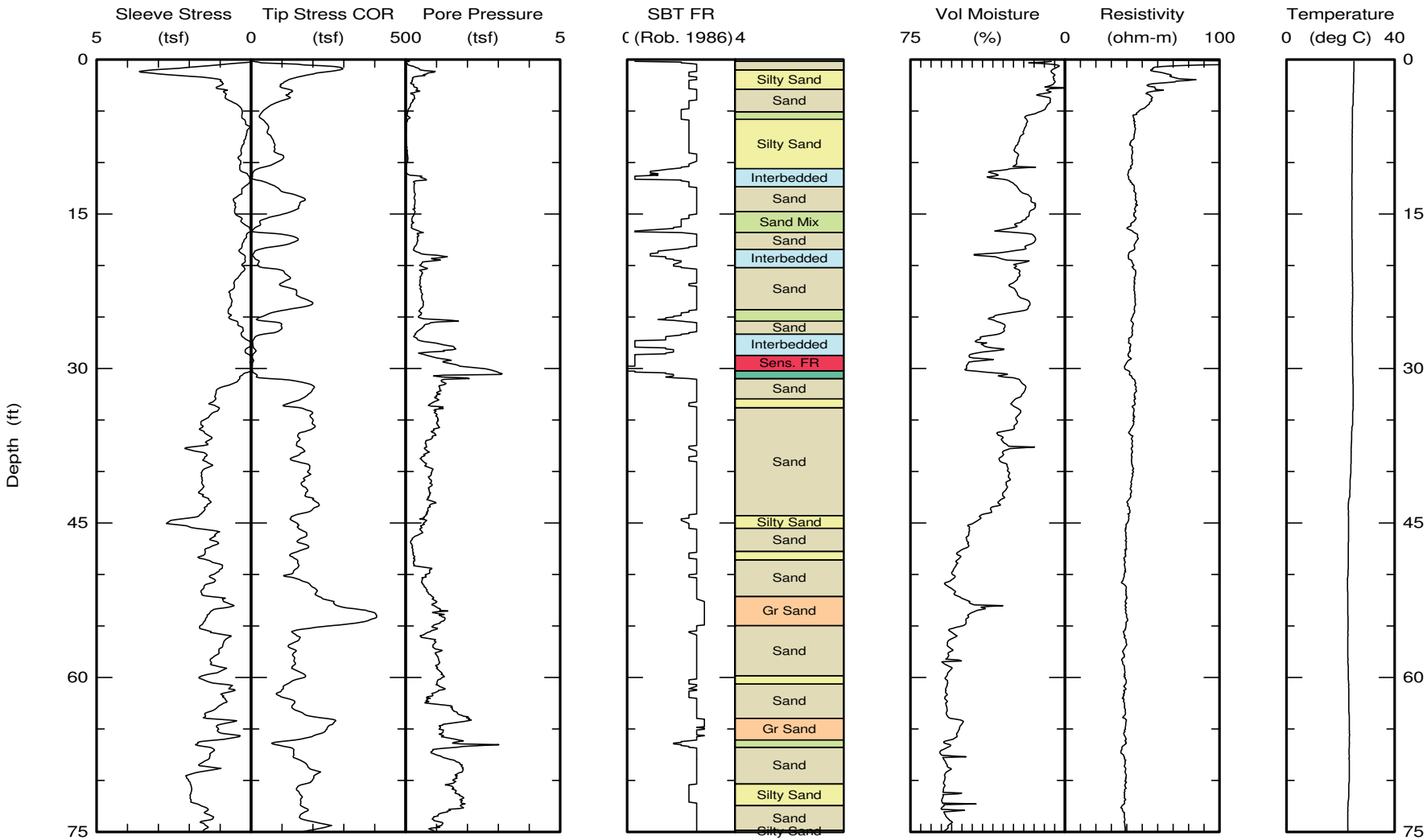
Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 24/Oct/2009 Test ID: WCP-5R Project: R09C003
	Client: CMH2HILL Job Site: HALACO	



Note: 1. Moisture content readings have been impacted due to highly conductive insitu material and/or pore water salinity and hence do not necessarily represent insitu moisture content. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

2. The collected data indicates low resistance from depth 15 to 23 ft and 87 to 95 ft indicative of either soft soils are erroneous data.

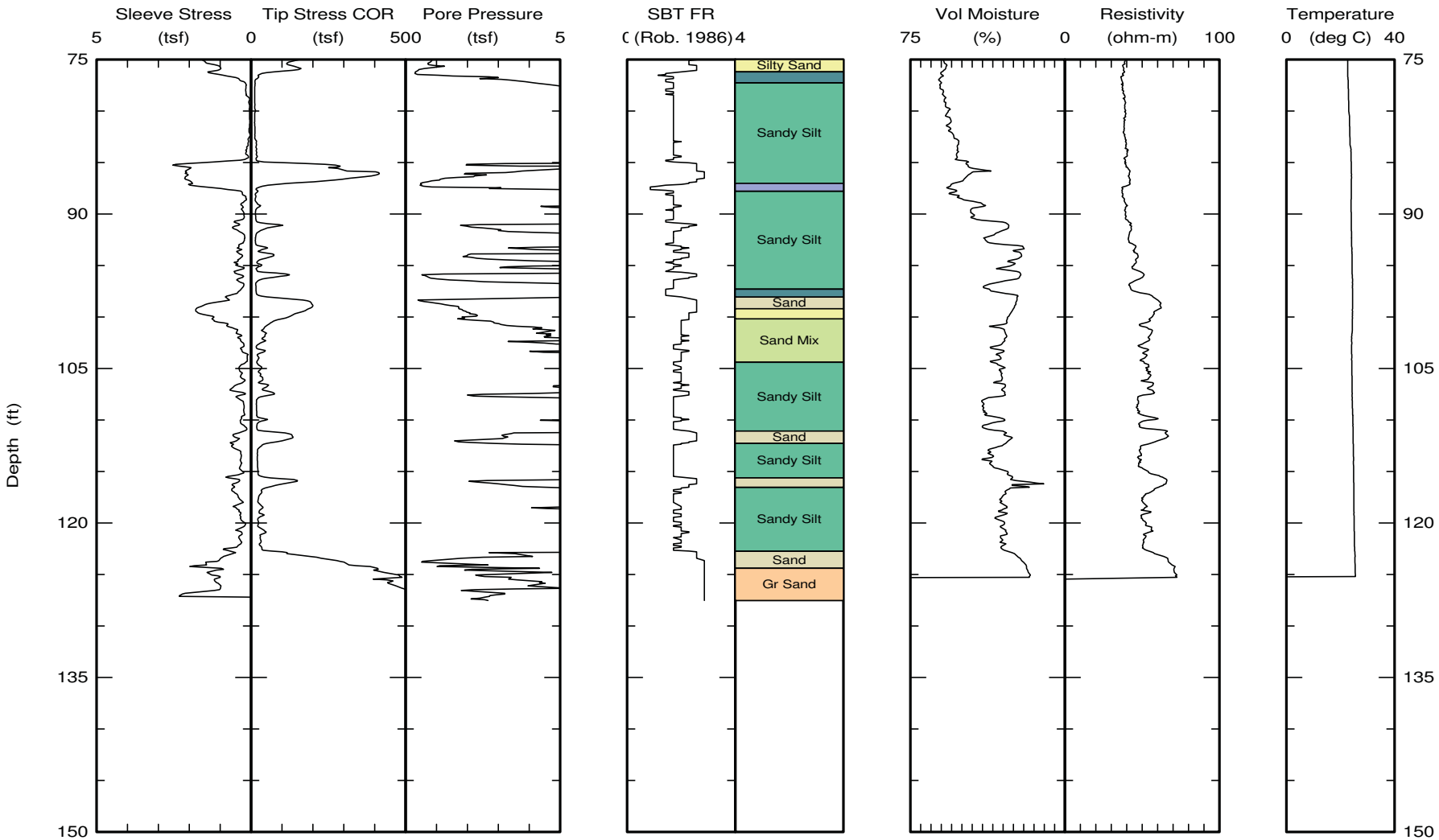
Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 24/Oct/2009 Test ID: SCP-3 Project: R09C003
	Client: CMH2HILL Job Site: HALACO	



Maximum depth: 127.54 (ft)

Note: Moisture content readings have been impacted due to highly conductive insitu material and/or pore water salinity and hence do not necessarily represent insitu moisture content. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

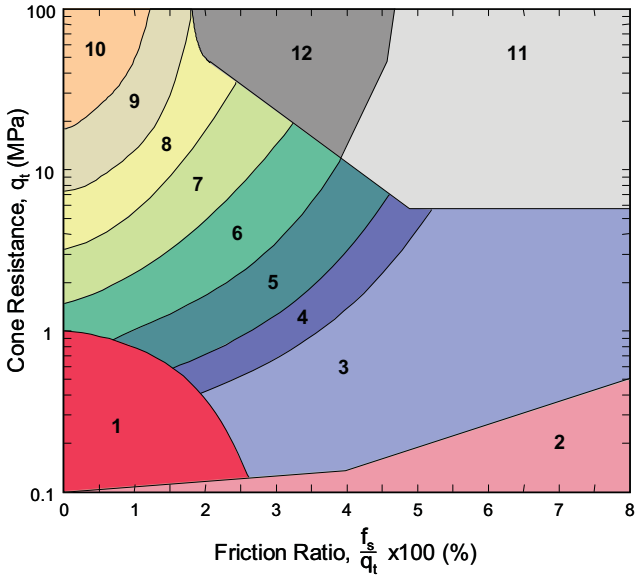
Lankelma, Inc. Richmond, California (832) 364-1025 umeshbachu@lankelma.com www.lankelmainc.com	Northing: Easting: Elevation:	Date: 24/Oct/2009 Test ID: SCP-3 Project: R09C003
	Client: CMH2HILL Job Site: HALACO	

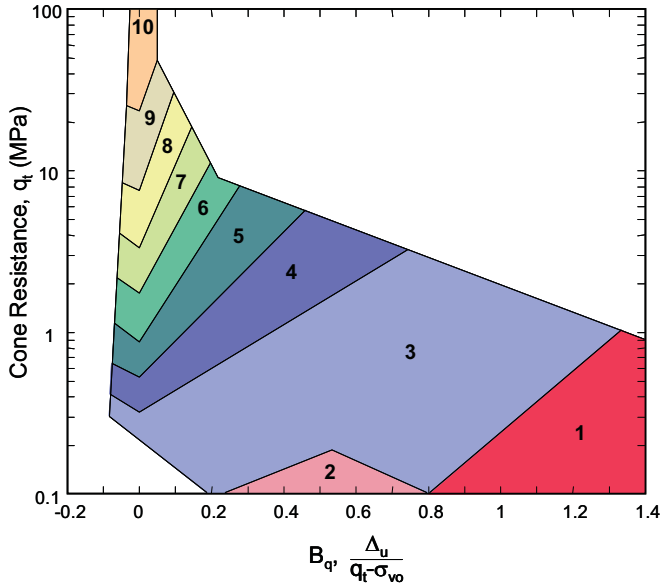


Maximum depth: 127.54 (ft)

Note: Moisture content readings have been impacted due to highly conductive insitu material and/or pore water salinity and hence do not necessarily represent insitu moisture content. The test results are not applicable for highly conductive soils and/or soils with highly conductive pore water.

CPT Soil Behavior Type Legend
(Robertson et al. 1986)





Zone	Soil Behavior Type
1	Sensitive, Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained*
12	Sand to Clayey Sand*

*Overconsolidated or Cemented

Attachment C-2

1225 East McFadden Ave
Santa Ana, CA 92705
P:(714) 647-6290
F:(714) 647-6291
www.vironex.com

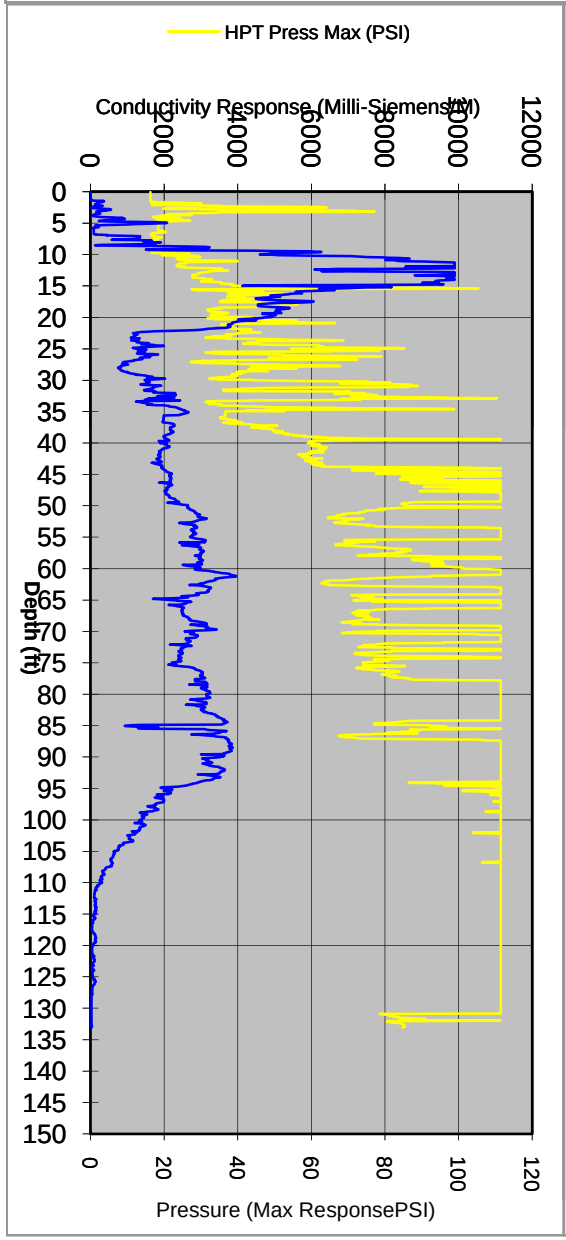
Boring Name: SCP-1

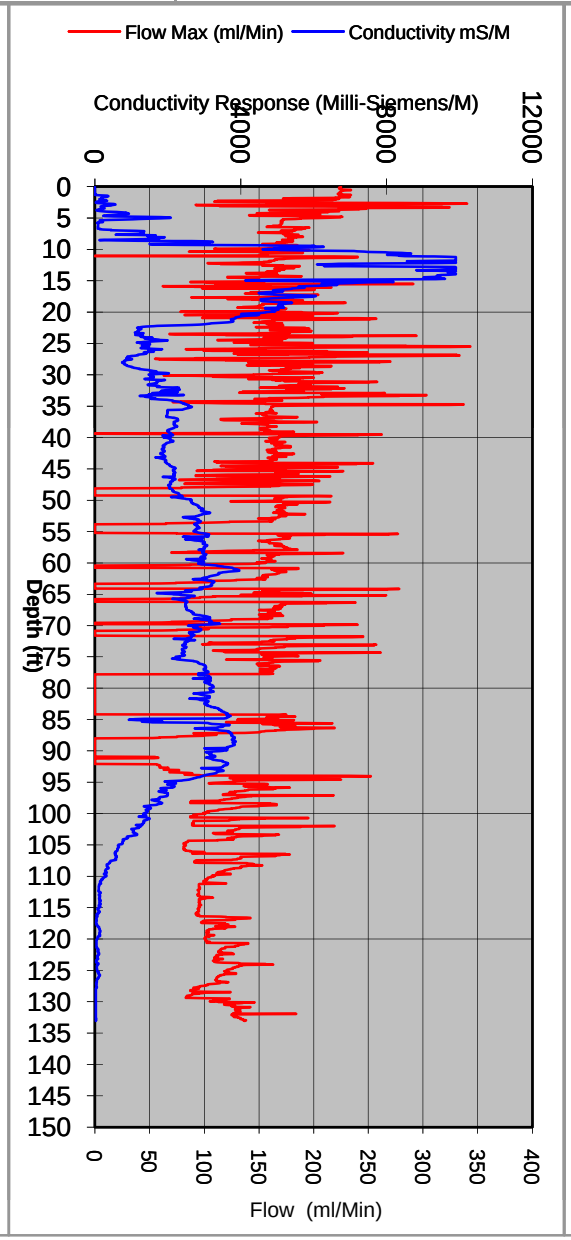
Total Depth (ft): 133.05

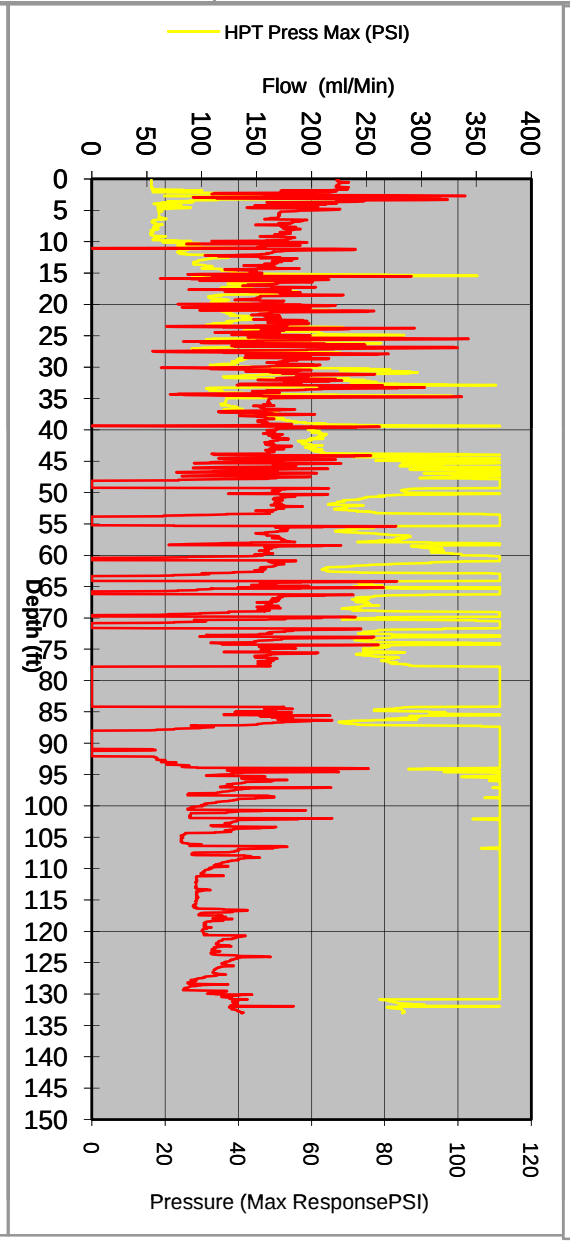
Notes:
High conductivity readings in upper zone due to brackish conditions. Broke rods at 133' BGS.

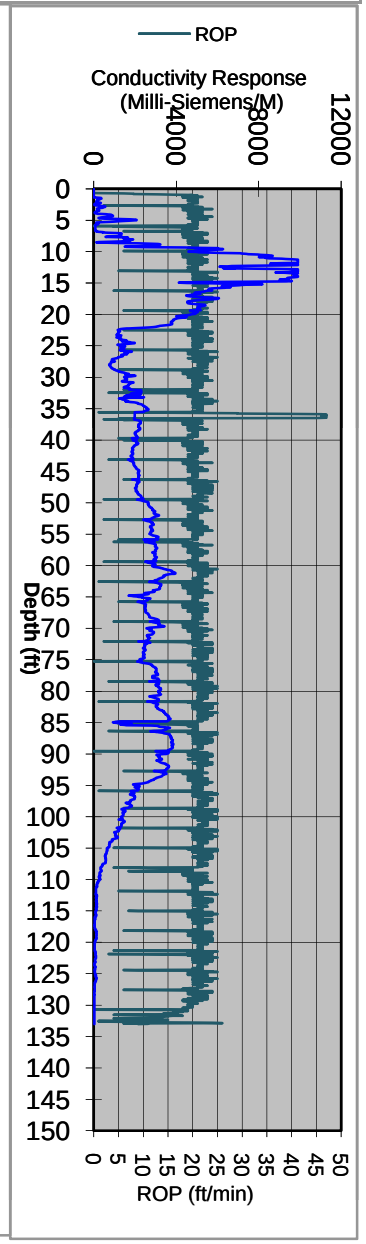
GW Depth (ft):
Depth of GW Provided by Client

Job Information		MIP Sampling Information			
Client Company:	Lankelma, Inc.	Trunkline Length:	300	Start Boring Time:	Thu Oct 15 2009 10:26
Project Name:	Halaco Superfund Site	Probe Type:	Wenner - HPT	End Boring Time:	Thu Oct 15 2009 12:00
Site Address:	Perkins Road, Oxnard CA	Rig Type:	CPT Unit	HPT Specialist:	Kyle Ervin

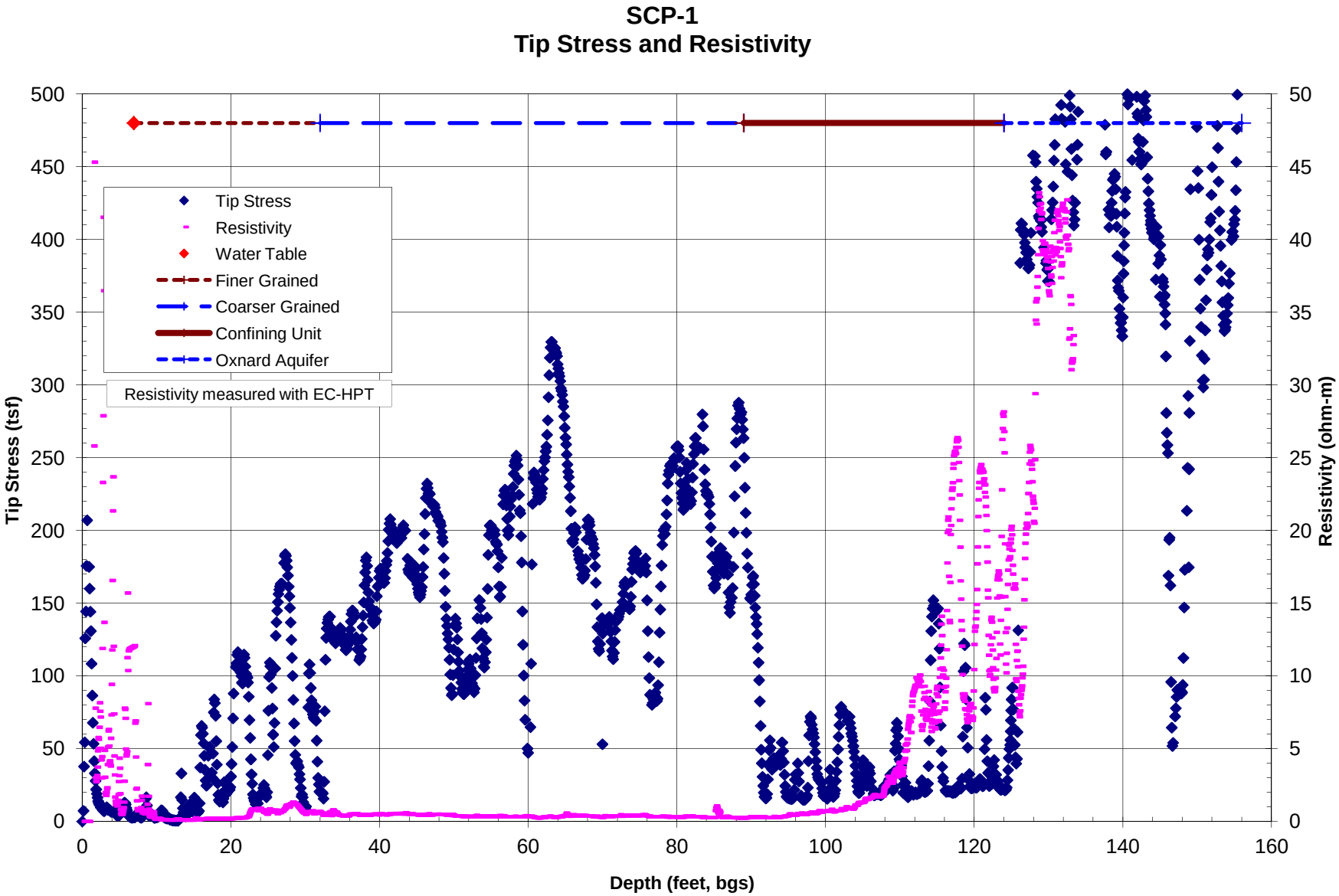


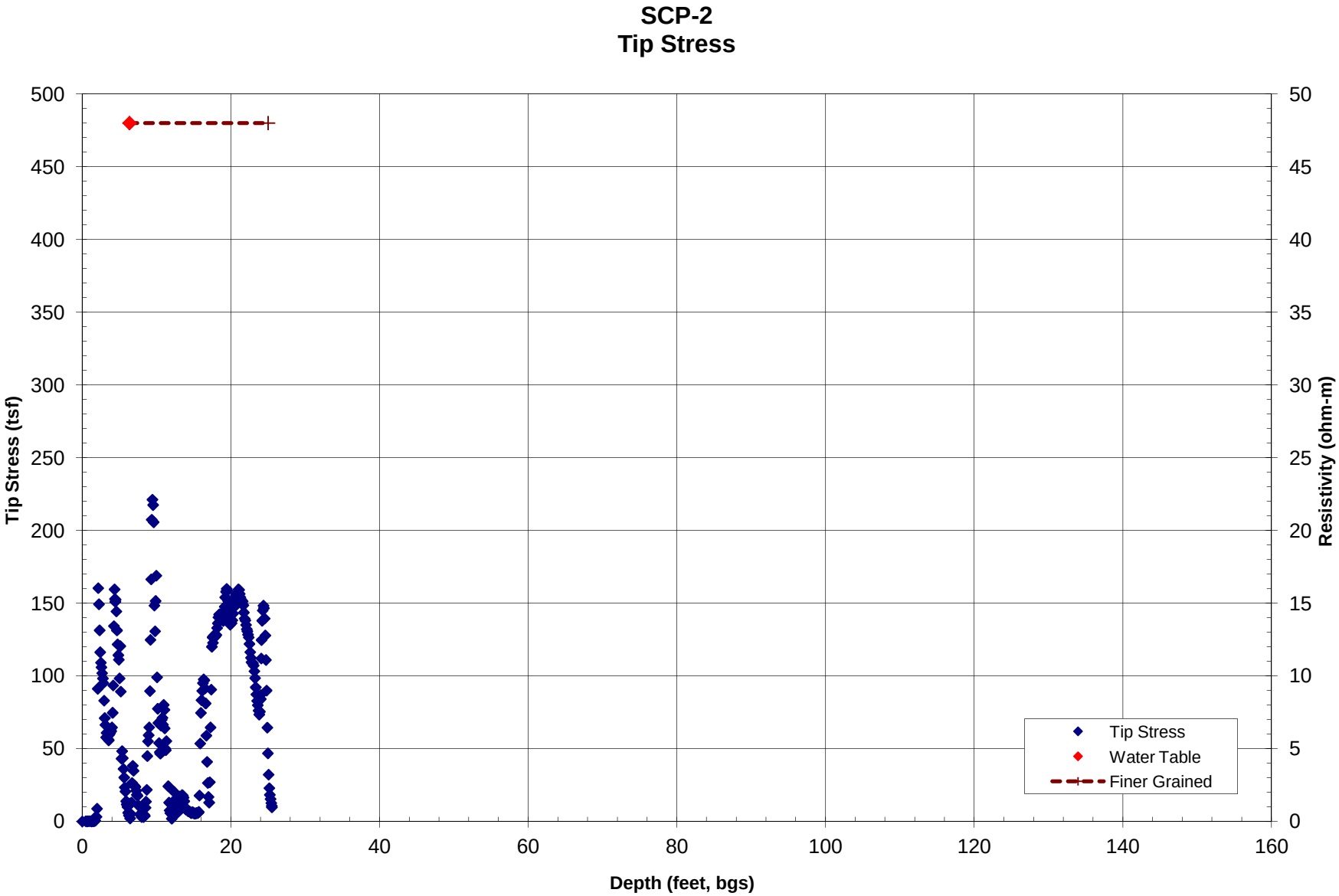


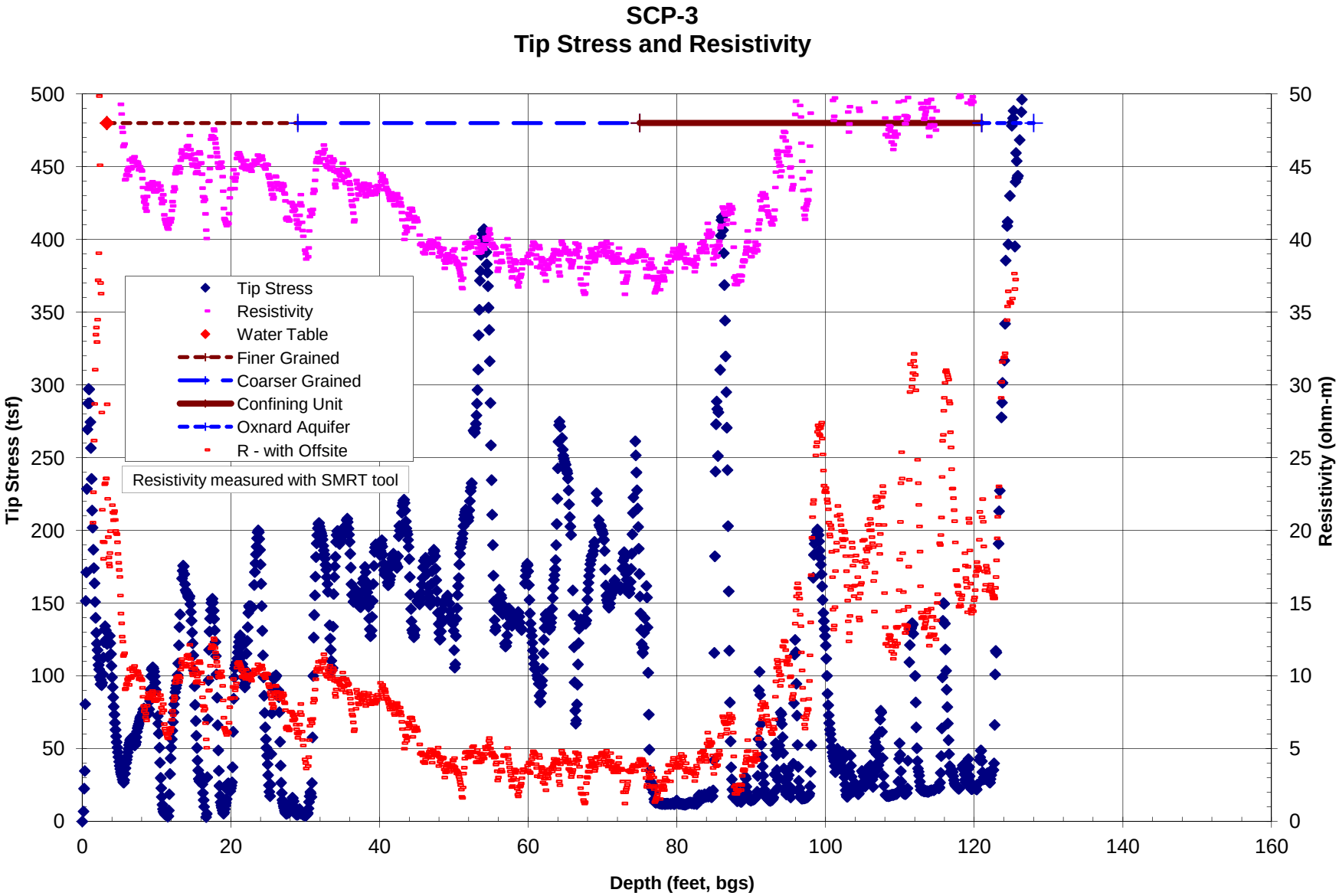


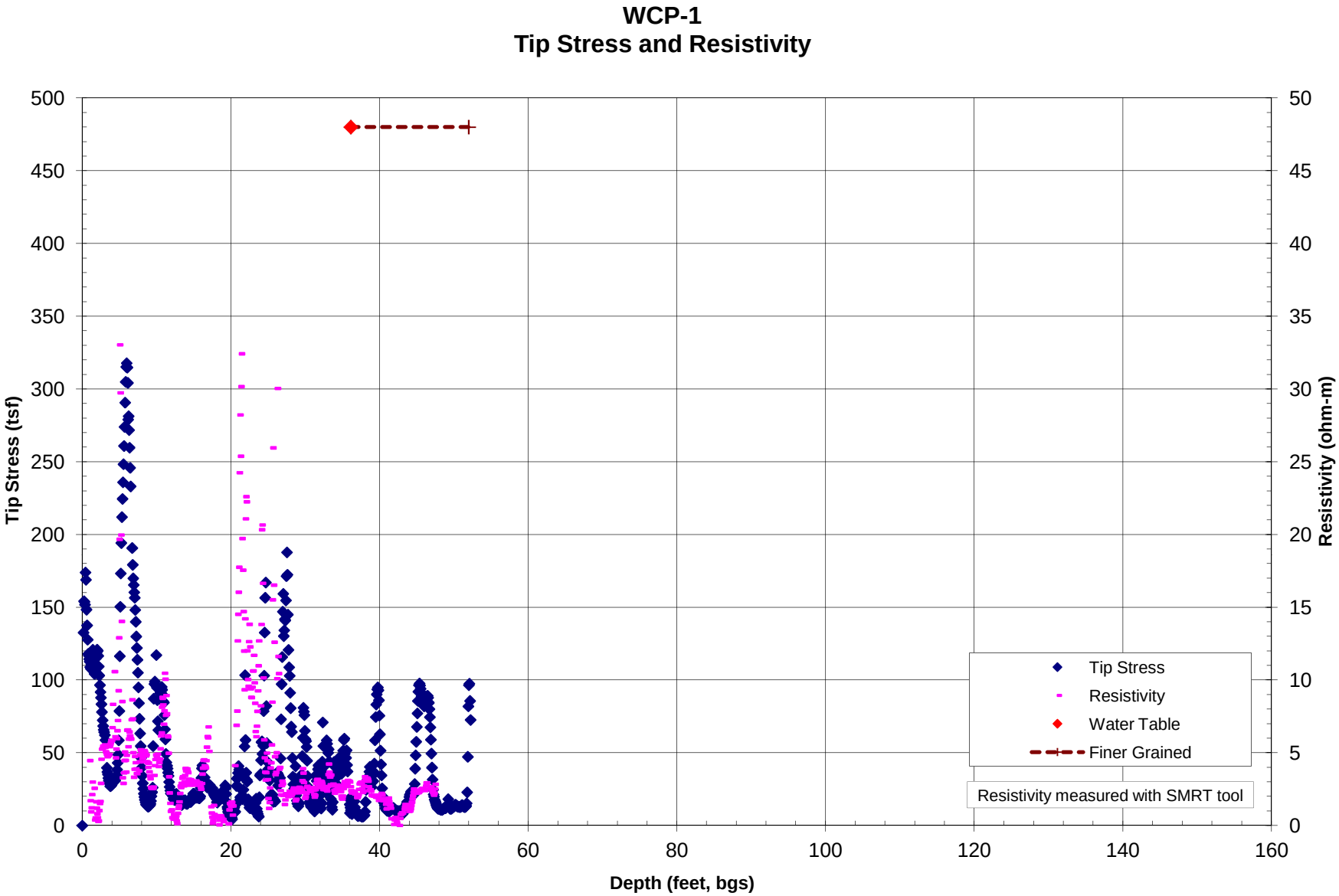


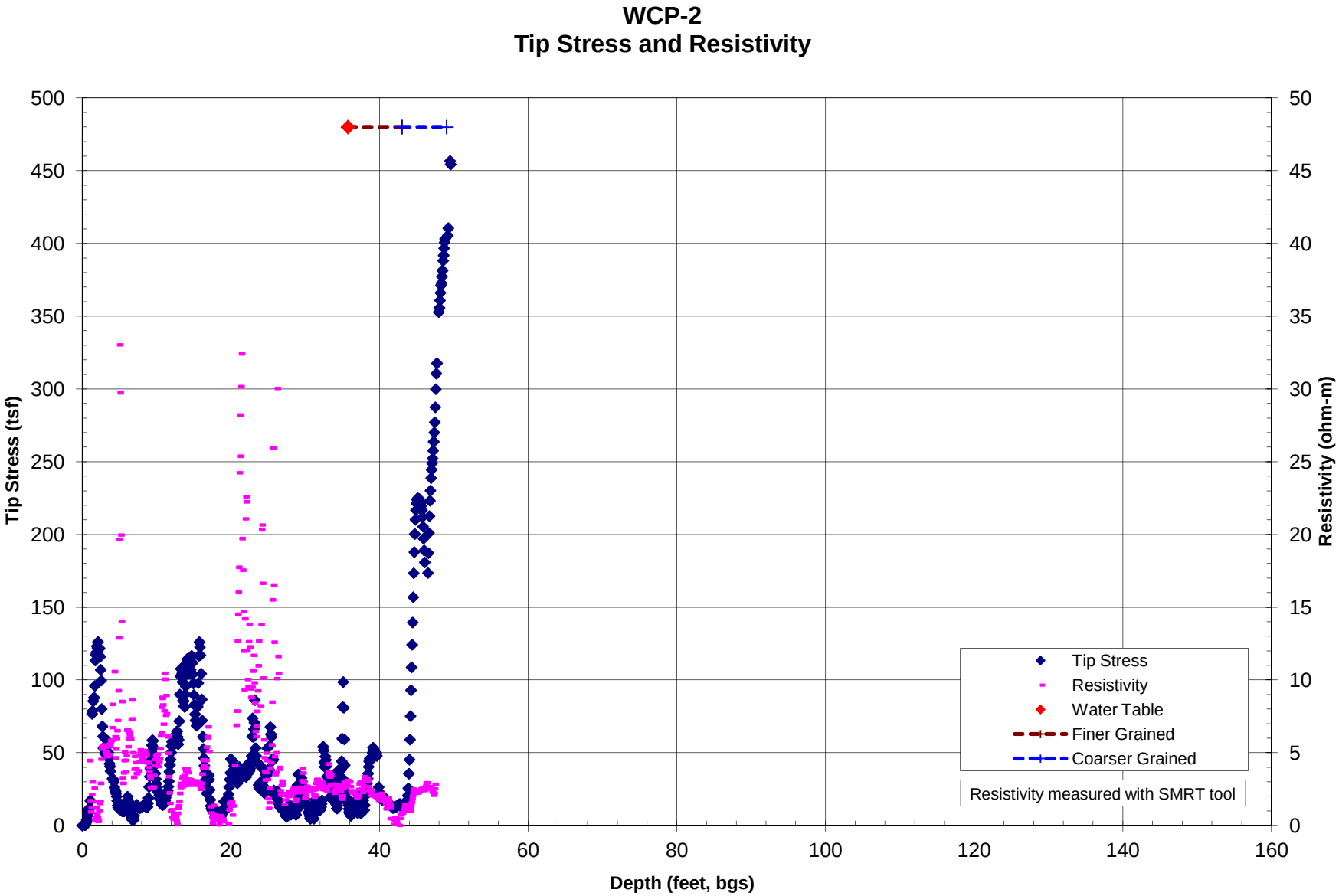
Attachment D
CPT, SMRC, EC-HPT Data Charts

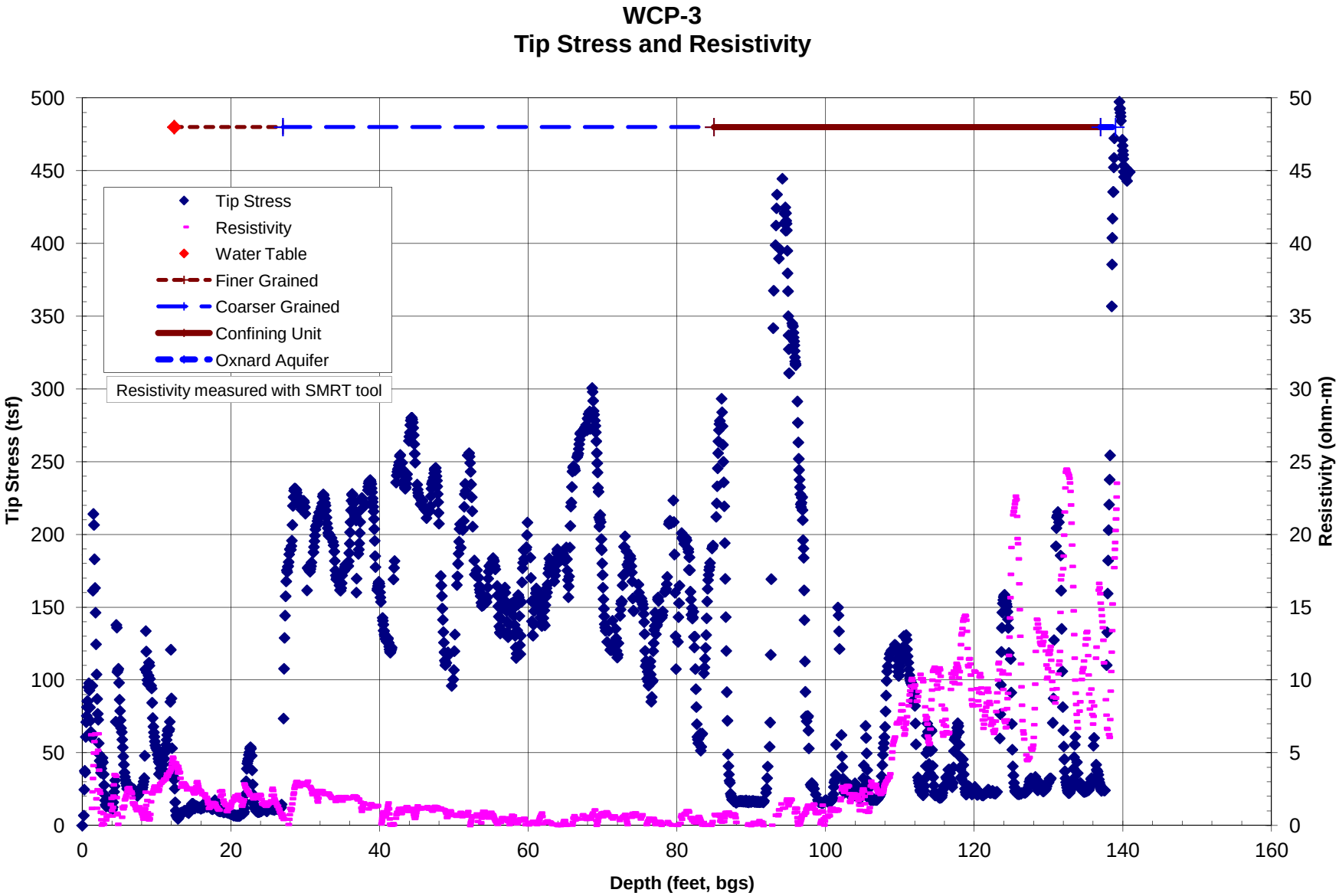

SCP-1
Tip Stress and Resistivity
Tip Stress
Resistivity
Water Table
Finer Grained
Coarser Grained
Confining Unit
Oxnard Aquifer
Resistivity measured with EC-HPT
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35
40
45
50
0
20
40
60
80
100
120
140
160

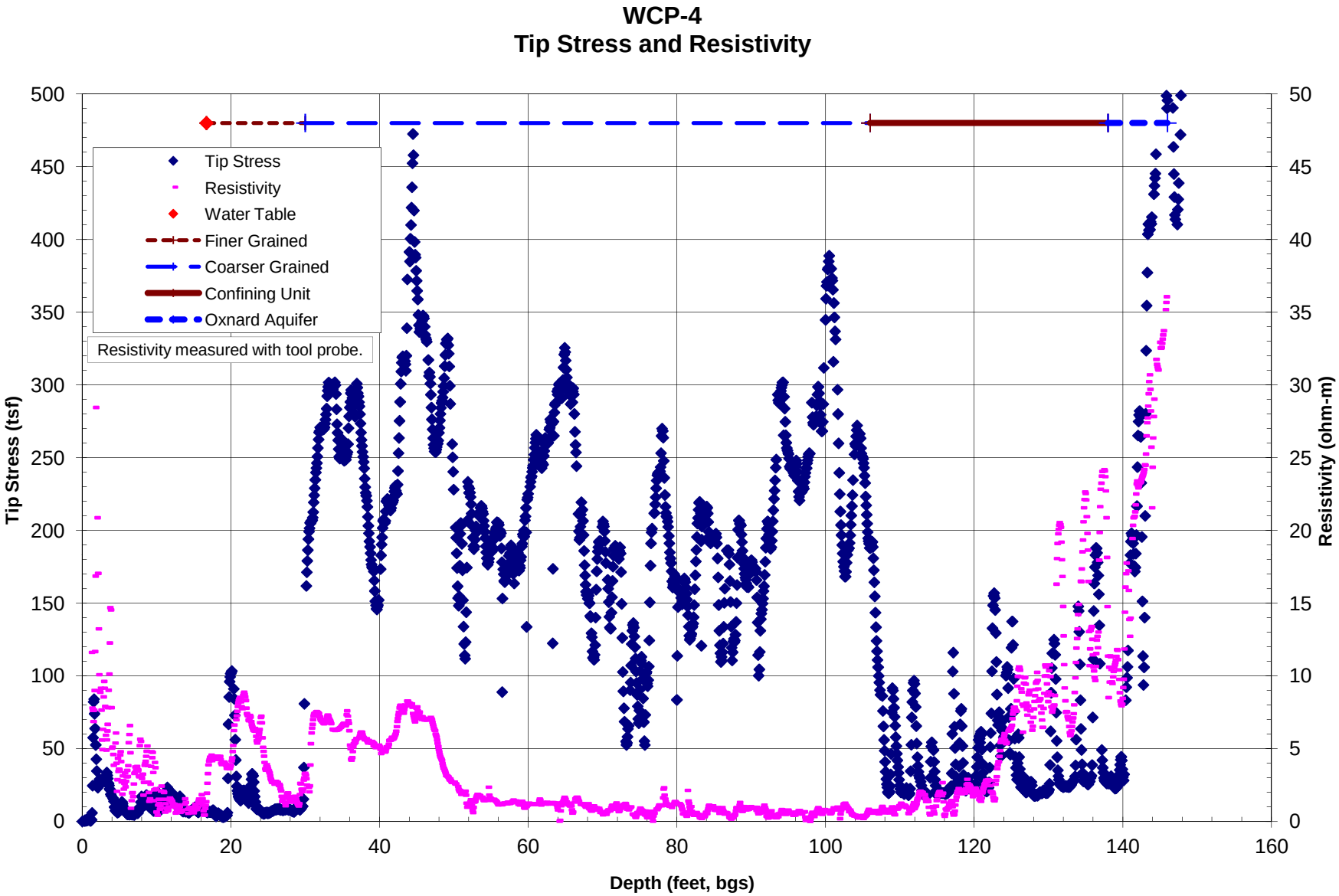

SCP-2
Tip Stress
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35
40
45
50
0
20
40
60
80
100
120
140
160
Tip Stress
Water Table
Finer Grained

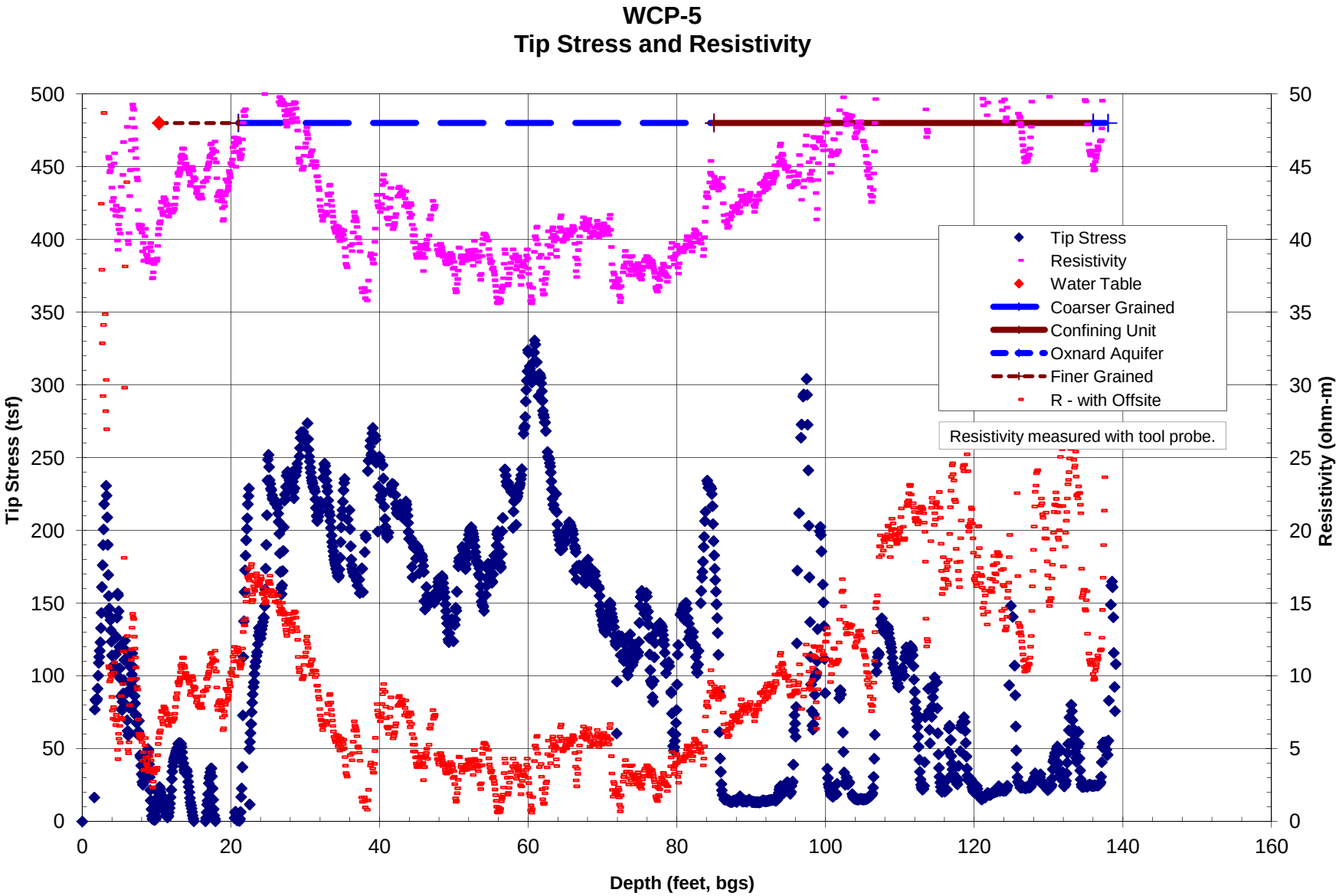

SCP-3
Tip Stress and Resistivity
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
Tip Stress
Resistivity
Water Table
Finer Grained
Coarser Grained
Confining Unit
Oxnard Aquifer
R - with Offsite
Resistivity measured with SMRT tool
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35
40
45
50
0
20
40
60
80
100
120
140
160


WCP-1
Tip Stress and Resistivity
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35
40
45
50
0
20
40
60
80
100
120
140
160
Tip Stress
Resistivity
Water Table
Finer Grained
Resistivity measured with SMRT tool


WCP-2
Tip Stress and Resistivity
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35
40
45
50
0
20
40
60
80
100
120
140
160
Tip Stress
Resistivity
Water Table
Finer Grained
Coarser Grained
Resistivity measured with SMRT tool


WCP-3
Tip Stress and Resistivity
Tip Stress
Resistivity
Water Table
Finer Grained
Coarser Grained
Confining Unit
Oxnard Aquifer
Resistivity measured with SMRT tool
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35
40
45
50
0
20
40
60
80
100
120
140
160


WCP-4
Tip Stress and Resistivity
Tip Stress
Resistivity
Water Table
Finer Grained
Coarser Grained
Confining Unit
Oxnard Aquifer
Resistivity measured with tool probe.
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35
40
45
50
0
20
40
60
80
100
120
140
160


WCP-5
Tip Stress and Resistivity
Tip Stress (tsf)
Resistivity (ohm-m)
Depth (feet, bgs)
Tip Stress
Resistivity
Water Table
Coarser Grained
Confining Unit
Oxnard Aquifer
Finer Grained
R - with Offsite
Resistivity measured with tool probe.

Attachment E
Monitoring Well and Piezometer Soil Boring Logs and Construction Diagrams

ATTACHMENT E

Monitoring Well and Piezometer Boring Logs and Construction Diagrams

Boring Logs

E-1 Wells and Piezometers Installed during October and November 2009

- MW-2D
- MW-3D
- MW-6D
- MW-19D
- MW-20
- MW-21
- MW-22
- MW-24
- PZ-1C
- PZ-2C
- PZ-3C
- PZ-4C

E-2 Wells Installed during May 2010

- MW-12C
- MW-13C
- MW-21C
- MW-23B
- MW-23C
- MW-24C
- MW-25B
- MW-25C
- MW-27B
- MW-27C

Construction Diagrams

E-3 Wells and Piezometers Installed during October and November 2009

- MW-2C
- MW-2D
- MW-3C
- MW-3D
- MW-6C
- MW-6D
- MW-19C
- MW-19D
- MW-20
- MW-21
- MW-22
- MW-24

E-4 Wells Installed during May 2010

- MW-12C
- MW-13C
- MW-21C
- MW-23B
- MW-23C
- MW-24C
- MW-25B
- MW-25C
- MW-27B
- MW-27C

Attachment E-1

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-2D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/20/2009 / **DATE COMPLETED:** 10/21/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: East side-bench road		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	0	100	**FILL** SILT (ML), black (5Y 2.5/1), damp, medium stiff, homogeneous, weak cementation, no odor, no staining. FINES: non plastic, low dry strength, rapid dilatancy, low toughness. With slag. HALACO WASTE.			
1											
2											
3											
4											
5											
6									0		
7											
8											
9											
10					0	0	100	**FILL** SILT (ML), gray (7.5YR 5/1), wet, soft, no odor, no staining. FINES: low plasticity, no dry strength, slow dilatancy, low toughness. Trace roots. HALACO WASTE.	0		
11					0	0	100	**FILL** SILT (ML), black (5Y 2.5/1), moist, medium stiff, homogeneous, no odor, no staining. FINES: non plastic, low dry strength, rapid dilatancy, low toughness. Little slag. HALACO WASTE.			
12											
13											
14											
15					0	0	100	Same but damp. *Length estimation due to poor recovery.	0		
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-2D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/20/2009 / **DATE COMPLETED:** 10/21/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: East side-bench road		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	0	100	**FILL** SILT (ML), gray (7.5YR 5/1), wet, soft, no odor, no staining. FINES: low plasticity, no dry strength, slow dilatancy, low toughness. Trace roots. HALACO WASTE.			
26					0	0	100	**FILL** SILT (ML), light gray (10YR 7/2), moist, soft, no odor, no staining. FINES: low plasticity, no dry strength, slow dilatancy, no toughness. With roots. HALACO WASTE.			
27					0	0	100	**FILL** SILT (ML), black (5Y 2.5/1), wet, medium stiff, homogeneous, weak cementation, no odor, no staining. FINES: non plastic, low dry strength, rapid dilatancy, low toughness. With organics. HALACO WASTE.			
28								Same but moist and no organics.	0.3		
29					0	45	55	**SANDY SILT (ML)** Dark grayish brown (10YR 4/2), moist, soft, no odor, no staining. FINES: non plastic, low dry strength, no dilatancy, no toughness. SAND: fine grained.			
30					0	0	100	**ELASTIC SILT (MH)** Dark grayish brown (10YR 4/2), moist, medium stiff, no odor, no staining. FINES: high plasticity, low dry strength, no dilatancy, medium toughness.	0.2		
31									4.3		
32					0	90	10	**WELL GRADED SAND WITH SILT (SW-SM)** Grayish brown (2.5Y 5/2), wet, medium dense, homogeneous, no odor, no staining. SAND: fine grained, subrounded.			
33									1.5		
34					0	75	25	**SILTY SAND (SM)** Grayish brown (2.5Y 5/2), wet, medium dense, homogeneous, no odor, no staining. SAND: fine grained, subrounded. With roots.			
35									1.2		
36					0	90	10	**WELL GRADED SAND WITH SILT (SW-SM)** Grayish brown (2.5Y 5/2), moist, loose, homogeneous, no odor, no staining. SAND: fine to medium grained, subrounded.			
37					0	90	10	Same but medium dense with fine grained sand.			
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-2D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/20/2009 / **DATE COMPLETED:** 10/21/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: East side-bench road		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
51					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Grayish brown (2.5Y 5/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained.	1.1		
52											
53											
54											
55											
56									1		
57					0	80	20	**SILTY SAND (SM)** Very dark grayish brown (2.5Y 3/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained.			
58											
59					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Very dark grayish brown (2.5Y 3/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained. With roots and organic thin lenses.			
60											
61									0.2		
62											
63											
64											
65											
66									0.3		
67											
68											
69											
70					0	90	10	Same but with no roots.			
71									0.2		
72											
73											
74											
75											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-2D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/20/2009 / **DATE COMPLETED:** 10/21/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: East side-bench road		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	100	0	**WELL GRADED SAND (SW)** Grayish brown (2.5Y 5/2), moist, loose, homogeneous, no odor, no staining. SAND: fine grained, subrounded.	0.4		
76					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Very dark grayish brown (2.5Y 3/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained.			
77											
78											
79					0	90	10	Same but with shells.			
80											
81									0.1		
					0	15	85	**SILT WITH SAND (ML)** Very dark grayish brown (2.5Y 3/2), moist, very stiff, no odor, no staining. FINES: non plastic, no dry strength, rapid dilatancy, no toughness. SAND: fine grained.			
82											
83					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Very dark grayish brown (2.5Y 3/2), moist, medium dense, homogeneous, no odor, no staining. SAND: fine grained. With shells.			
84					0	90	10	Same but very dense and no shells.			
85											
86									0.2		
87											
88											
89											
90											
91									0.3		
92					0	90	10	Same but medium dense and with shells.			
93					0	100	0	**POORLY GRADED SAND (SP)** Dark grayish brown (2.5Y 4/2), wet, dense, homogeneous, no odor, no staining. SAND: medium grained, subangular. With shells.			
94					0	100	0	**POORLY GRADED SAND (SP)** Dark olive gray (5Y 3/2), moist, medium dense, homogeneous, no odor, no staining. SAND: fine grained. With shells and some silt.			
95									0.1		
96											
97											
98											
99											
100											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-2D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/20/2009 / **DATE COMPLETED:** 10/21/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS
LOCATION: East side-bench road			**LOGGED BY:** J. BALE

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
101									0.3		
102											
103											
104											
105											
106									0.2		
107					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), damp, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some fine sand and organics.			
108											
109					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Very dark grayish brown (2.5Y 3/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained.			
110											
111									0.1		
112					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), damp, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some fine sand and organics.			
113					0	0	100	Same but very stiff and mottled with calcareous nodules approximately 1/4 inch.			
114											
115					0	0	100	Same but little fine sand and with peat/organic lenses.			
116									0		
117											
118											
119											
120											
121									0		
122											
123											
124											
125											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-2D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/20/2009 / **DATE COMPLETED:** 10/21/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: East side-bench road		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
126									0		
127											
128											
129											
130											
131									0		
132											
133											
134											
135					0	100	0	**POORLY GRADED SAND (SP)** Very dark grayish brown (2.5Y 3/2), wet, loose, homogeneous, no odor, no staining. SAND: fine grained, rounded.			
136					0	90	10	**POORLY GRADED SAND WITH CLAY (SP-SC)** Very dark grayish brown (2.5Y 3/2), wet, dense, homogeneous, no odor, no staining. SAND: fine grained.	0		
137					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), saturated, soft to medium stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some fine sand.			
138											
139											
140											
141									0		
142											
143					0	100	0	**WELL GRADED SAND (SW)** Very dark grayish brown (2.5Y 3/2), wet, loose, homogeneous, no odor, no staining. SAND: fine to medium grained, subrounded. Little coarse gravel.			
144											
145											
146									0		
147											
148											
149											
150											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-2D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/20/2009 / **DATE COMPLETED:** 10/21/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS
LOCATION: East side-bench road			**LOGGED BY:** J. BALE

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
151									0		
152					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), moist, soft to medium stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. With organics and roots.			
153											
154											
155					40	60	0	**POORLY GRADED SAND WITH GRAVEL (SP)** Dark gray (2.5Y 4/1), moist, dense, stratified, moderate cementation, no odor, iron oxide staining. SAND: medium/coarse grained, subrounded, hard hardness. GRAVEL: coarse grained, rounded, very hard hardness, flat and elongated.	0		

Boring Terminated at 155 feet bgs

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-3D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/19/2009 / **DATE COMPLETED:** 10/20/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: SOUTH SIDE WDA		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	10	90	**FILL** ELASTIC SILT (MH), very dark grayish brown (2.5Y 3/2), damp, very soft, homogeneous, weak cementation. FINES: medium plasticity, low dry strength, no dilatancy, low toughness. SAND: fine to medium grained, subangular. HALACO WASTE.			
1					0	5	95				
2					0	10	90	**FILL** ELASTIC SILT/LEAN CLAY (MH/CL), very dark gray (2.5Y 3/1), moist, medium stiff, homogeneous, weak cementation. FINES: medium plasticity, medium dry strength, no dilatancy, medium toughness. SAND: fine grained, subangular. HALACO WASTE.			
3					0	5	95				
					0	80	20				
4					0	25	75				
					10	10	80	**FILL** ELASTIC SILT (MH), very dark grayish brown (2.5Y 3/2), damp, soft, homogeneous, weak cementation. FINES: medium plasticity, low dry strength, no dilatancy, low toughness. SAND: fine to medium grained, subangular. HALACO WASTE.			
5											
6								**FILL** ELASTIC SILT/LEAN CLAY (MH/CL), very dark gray (2.5Y 3/1), moist, medium stiff, homogeneous, weak cementation. FINES: medium plasticity, medium dry strength, no dilatancy, medium toughness. SAND: fine grained, subangular. HALACO WASTE.			
7											
8								**FILL** SILTY SAND (SM), very dark grayish brown (2.5Y 3/2), damp, very loose, homogeneous. SAND: fine to medium grained, angular, medium hardness, flat and elongated. FINES: non plastic, low dry strength, no dilatancy, low toughness. Little coarse sand. HALACO WASTE.			
9											
10					0	0	100				
11								**FILL** ELASTIC SILT WITH SAND/LEAN CLAY WITH SAND (MH/CL), very dark gray (2.5Y 3/1), moist, soft, homogeneous, weak cementation, no odor. FINES: medium plasticity, medium dry strength, no dilatancy, medium toughness. SAND: fine and coarse grained, subangular, hard hardness. HALACO WASTE.			
12											
13								**FILL** SILT WITH SAND, black (2.5Y 2.5/1), moist, very soft to stiff, homogeneous, weak cementation, no odor. FINES: medium plasticity, low dry strength, rapid dilatancy, low toughness. SAND: fine to coarse grained, subrounded, hard hardness, flat and elongated. With slag clasts up to 2 inches. HALACO WASTE.			
14											
15								**FILL** SILT (ML), black (2.5YR 2.5/1), wet, very soft, homogeneous, weak cementation, no odor. FINES: medium plasticity, no dry strength, rapid dilatancy, low toughness. HALACO WASTE.			
16											
17					0	100 / 0	100	**FILL** POORLY GRADED SAND (SP), black (5Y 2.5/1), wet, medium dense, lensed, no odor. SAND: fine and medium grained, subrounded, hard hardness. HALACO WASTE.			
18											
19								**FILL** SILT (ML), black (2.5YR 2.5/1), wet, very soft, homogeneous, weak cementation, no odor. FINES: medium plasticity, no dry strength, rapid dilatancy, low toughness. HALACO WASTE.			
20						100					
					0	5	95				
21					0	70	30	**FILL** POORLY GRADED SAND (SP), black (5Y 2.5/1), wet, medium dense, homogeneous, no odor. SAND: fine and medium grained, subrounded, hard hardness. Little fine gravel. HALACO WASTE.			
					0	80	20				
22								**FILL** ELASTIC SILT (MH), black (7.5YR 2.5/1), wet, very soft, homogeneous, no odor. FINES: low plasticity, no dry strength, slow dilatancy, low toughness. SAND: medium grained, subrounded, hard hardness. With organics. HALACO WASTE.			
23					0	10	90				
24								**FILL** SILTY SAND (SM), black (10YR 2/1), moist, very loose,			
25											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-3D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/19/2009 / **DATE COMPLETED:** 10/20/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: SOUTH SIDE WDA		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								homogeneous, no odor, no staining. SAND: medium grained, subrounded, hard hardness. FINES: low plasticity, low dry strength, slow dilatancy, low toughness. With roots and organics. HALACO WASTE.			
26								Same but medium dense and no roots or organics.			
27								**ELASTIC SILT (MH)** Olive brown (2.5Y 4/4), moist, medium stiff, moderate cementation, no odor, iron oxide staining. FINES: high plasticity, low dry strength, no dilatancy, medium toughness. SAND: fine grained, subrounded.			
28					0	100	0	**POORLY GRADED SAND (SP)** Light olive brown (2.5Y 5/4), moist, medium dense, homogeneous, no odor, no staining. SAND: medium grained, subangular.			
29											
30					0	100	0	Same but dark grayish brown (2.5Y 4/2) with fine grained, subrounded sand.			
31											
32											
33					0	100	0	Same but dense with fine to medium grained, subrounded sand.			
34					0	100	0	Same but with fine grained, subrounded sand.			
35											
36											
37											
38											
39					0	85	15	**SILTY SAND (SM)** Dark grayish brown (2.5Y 4/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained, subrounded. FINES: non plastic, no dilatancy, low toughness.			
40											
41											
42					0	100	0	**POORLY GRADED SAND (SP)** Dark grayish brown (2.5Y 4/2), moist, loose, homogeneous, no odor, no staining. SAND: medium grained, subangular.			
43											
44											
45					0	100	0	Same but with cobbles.			
46					0	100	0	Same but no cobbles.			
47											
48											
49											
50											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-3D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/19/2009 / **DATE COMPLETED:** 10/20/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: SOUTH SIDE WDA		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
51					0	80	20	**SILTY SAND (SM)** Dark grayish brown (2.5Y 4/2), moist, dense, homogeneous, moderate cementation, no odor, no staining. SAND: fine grained. FINES: medium plasticity, low dry strength, no dilatancy, medium toughness.			
52											
53											
54											
55											
56											
57											
58											
59											
60											
61											
62											
63											
64											
65											
66											
67											
68											
69											
70											
71											
72											
73											
74											
75											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-3D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/19/2009 / **DATE COMPLETED:** 10/20/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: SOUTH SIDE WDA		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	80	20	Same but wet.			
76											
77											
78											
79					0	100	0	**POORLY GRADED SAND (SP)** Dark grayish brown (2.5Y 4/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained, subangular.			
80					0	100	0	Same but with shells.			
81											
82											
83					0	80	20	**SILTY SAND (SM)** Dark grayish brown (2.5Y 4/2), wet, dense, homogeneous, moderate cementation, no odor, no staining. SAND: fine grained. FINES: medium plasticity, low dry strength, no dilatancy, medium toughness.			
84											
85					0	65	35	Same but increasing fines.			
86					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Dark grayish brown (2.5Y 4/2), wet, dense, homogeneous, moderate cementation, no odor, no staining. SAND: fine grained. FINES: medium plasticity, low dry strength, no dilatancy, medium toughness. With shells.			
87											
88											
89											
90											
91											
92											
93					0	100	0	**POORLY GRADED SAND (SP)** Dark grayish brown (2.5Y 4/2), wet, dense, homogeneous, no odor, no staining. SAND: medium grained, subangular. With shells.			
94					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Dark grayish brown (2.5Y 4/2), moist, dense, homogeneous, no odor, no staining. SAND: fine grained. FINES: medium plasticity, low dry strength, no dilatancy, medium toughness.			
95											
96											
97											
98					0	55	45	**SILTY SAND (SM)** Dark grayish brown (2.5Y 4/2), moist, dense, homogeneous, moderate cementation, no odor, no staining. SAND: fine grained. FINES: medium plasticity, low dry strength, no dilatancy, medium toughness. Trace shells.			
99											
100											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-3D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/19/2009 / **DATE COMPLETED:** 10/20/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS
LOCATION: SOUTH SIDE WDA			**LOGGED BY:** J. BALE

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
101											
102											
103					0	30	70	**SANDY ELASTIC SILT (MH)** Dark grayish brown (2.5Y 4/2), moist, medium stiff, moderate cementation, no odor, no staining. FINES: high plasticity, no dilatancy, medium toughness. SAND: fine grained.			
104											
105					0	45	55	Same but with some fine gravel.			
106											
107											
108					0	10	90	**ELASTIC SILT (MH)** Dark grayish brown (2.5Y 4/2), moist, stiff, moderate cementation, no odor, no staining. FINES: high plasticity, medium dry strength, no dilatancy, medium toughness. SAND: fine grained.			
109											
110											
111											
112											
113											
114											
115								No recovery. Rod separated and soil encased in rod. Expected as same as previous interval.			
116											
117											
118											
119											
120											
121											
122											
123											
124											
125											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-3D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/19/2009 / **DATE COMPLETED:** 10/20/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: SOUTH SIDE WDA		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
126					0	0	100	**FAT CLAY (CH)** Very dark grayish brown (2.5Y 3/2), damp, stiff to very stiff, no odor, iron oxide staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some coarse sand, fine gravel, and little peat and roots.			
127											
128											
129											
130											
131											
132											
133											
134											
135											
136											
137											
138					0	20	80	**FAT CLAY WITH SAND (CH)** Very dark grayish brown (2.5Y 3/2), moist, medium stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained.			
139											
140						95	5	**WELL GRADED SAND (SW)** Olive (5Y 4/3), wet, medium dense, homogeneous, weak cementation, no odor, no staining. SAND: medium grained, angular, very hard hardness, elongated. With coarse sand and fine gravel.			
141											
142											
143											
144					20	80	0	**POORLY GRADED SAND WITH GRAVEL (SP)** Olive (5Y 4/3), wet, medium dense, homogeneous, no odor, no staining. SAND: medium/coarse grained, angular, very hard hardness, elongated. GRAVEL: medium to coarse grained, subrounded, very hard hardness, elongated.			
145											
146						100	0	**WELL GRADED SAND (SW)** Olive (5Y 4/3), wet, medium dense, homogeneous, no odor, no staining. SAND: medium grained, angular, very hard hardness, elongated. Little coarse sand and fine gravel.			
147											
148											
149					20	80	0	**POORLY GRADED SAND WITH GRAVEL (SP)** Olive (5Y 4/3), wet, medium dense, homogeneous, no odor, no staining. SAND: medium/coarse grained, angular, very hard hardness,			
150					0	0	100				

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-3D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/19/2009	**DATE COMPLETED:** 10/20/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: SOUTH SIDE WDA			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								elongated. GRAVEL: medium to coarse grained, subrounded, very hard hardness, elongated.			
151								**FAT CLAY (CH)** Very dark grayish brown (2.5Y 3/2), damp, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some coarse sand, fine gravel, and little peat and roots.			
152											
153											
154					0	100	0	**WELL GRADED SAND (SW)** Olive (5Y 4/3), wet, medium dense, homogeneous, no odor, no staining. SAND: medium grained, angular, very hard hardness, elongated. Little coarse sand and fine gravel.			
155					0	100	0	Same but with hard sand and trace coarse sand and fine gravel.			

Boring Terminated at 155 feet bgs

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-6D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/25/2009	**DATE COMPLETED:** 10/26/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: West side-Waste pile			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
1					0	0	100	**FILL** SILT/ELASTIC SILT (ML/MH), black (7.5YR 2.5/1), damp, soft, no odor, no staining, moderate HCL reaction. FINES: low plasticity, low dry strength, slow dilatancy, low toughness. With slag clasts and ferrous nodules. HALACO WASTE.	0		
2											
3											
4											
5											
6									3.2		
7					0	90	10	**FILL** POORLY GRADED SAND WITH SILT (SP-SM), black (7.5YR 2.5/1), damp, very loose, mottled, no odor, no staining, strong HCL reaction. SAND: fine grained. With ~ 1/4 inch white crystals. HALACO WASTE.			
8					20	70	10	**FILL** WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), black (7.5YR 2.5/1), dry, very loose, dessicated, no odor, iron oxide staining, strong HCL reaction. SAND: fine to coarse grained, soft hardness. GRAVEL: fine to coarse grained, subrounded, medium hardness. With varying size white crystals. HALACO WASTE.			
9					0	15	85				
10											
11								**FILL** SILT WITH SAND/ELASTIC SILT WITH SAND (ML/MH), dark brown (10YR 3/3), damp, stiff, mottled, no odor, no staining, weak HCL reaction. FINES: low plasticity, low dry strength, slow dilatancy, low toughness. SAND: fine grained. Some fine gravel and varying size white crystals. HALACO WASTE.	3.8		
12											
13					0	0	100	**FILL** SILT (ML), black (5Y 2.5/1), damp, medium stiff, homogeneous, weak cementation, no odor, no staining, moderate HCL reaction. FINES: non plastic, low dry strength, rapid dilatancy, low toughness. HALACO WASTE.			
14											
15					0	60	40	**FILL** SILTY SAND (SM), very dark gray (10YR 3/1), moist, medium dense, homogeneous, no odor, iron oxide staining, moderate HCL reaction. SAND: fine and coarse grained, subangular, medium hardness. FINES: non plastic, rapid dilatancy. With roots. HALACO WASTE.	0		
16											
17											
18											
19					0	0	100	**FILL** SILT (ML), (7.5YR 2/) and very dark gray (10YR 3/1), damp, medium stiff, lensed, no odor, no staining. FINES: low plasticity, no dry strength, slow dilatancy, low toughness. Little roots and some fine sand. HALACO WASTE.			
20					0	0	100		0		
21								**FAT CLAY (CH)** Dark grayish brown (2.5Y 4/2) and dark gray (2.5Y 4/1), damp, stiff, mottled, no odor, no staining, moderate HCL reaction. FINES: high plasticity, medium dry strength, no dilatancy, medium toughness. With significant iron oxide staining.			
22											
23											
24											
25											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-6D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/25/2009 / **DATE COMPLETED:** 10/26/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: West side-Waste pile		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
26									0		
27											
28											thin lens of fine sand
29					0	100	0	**WELL GRADED SAND (SW)** Olive gray (5Y 4/2), moist, medium dense, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded.			
30					0	100	0	Same but loose and fine to medium grained sand.	0		
31											
32											
33					0	100	0	Same but fine grained sand.			
34					0	100	0	Same but fine to medium grained sand and trace fine gravel and coarse sand.			
35											
36									0		
37											
38											
39											
40											
41									0		
42											
43											
44											
45											
46									0		
47					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Olive gray (5Y 4/2), moist, very dense, homogeneous, no odor, no staining, moderate HCL reaction. SAND: fine grained, subrounded, hard hardness. Some organic thin lenses.			
48											
49											
50											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-6D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/25/2009 / **DATE COMPLETED:** 10/26/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: West side-Waste pile		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
51									0		
52											
53											
54											
55											
56									0		
57											
58											
59											
60											
61									0		
62											
63											
64											
65											
66									0		
67											
68					0	100	0	**WELL GRADED SAND (SW)** Olive gray (5Y 4/2), moist, loose, homogeneous, weak cementation, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded, hard hardness. With shells and little fine gravel.			
69											
70					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Olive gray (5Y 4/2), moist, very dense, homogeneous, no odor, no staining, moderate HCL reaction. SAND: fine grained, subrounded, hard hardness. Trace shells.			
71									0		
72											
73					0	100	0	**WELL GRADED SAND (SW)** Olive gray (5Y 4/2), moist, medium dense, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine to medium grained, subrounded, hard hardness. Trace fine gravel and coarse sand.			
74					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Olive gray (5Y 4/2), moist, very dense, homogeneous, weak			
75											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-6D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/25/2009 / **DATE COMPLETED:** 10/26/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: West side-Waste pile		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								cementation, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded, hard hardness. Some shells.			
76									0		
77											
78											
79											
80											
81									0		
82											
83											
84											
85											
86									0		
87											
88											
89											
90											
91									0		
92											
93											
94											
95											
96									0		
97											
98											
99											
100											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-6D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/25/2009 / **DATE COMPLETED:** 10/26/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS
LOCATION: West side-Waste pile			**LOGGED BY:** J. BALE

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
101					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1) and gray (7.5YR 5/1), moist, stiff to very stiff, stratified, no odor, no staining, strong HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Little fine sand, thin organic lenses, and trace shells.	0		
102											
103											
104											
105											
106									0		
107											
108											
109											
110											
111									0		
112											
113											
114											
115											
116									0		
117											
118											
119											
120											
121									0		Large root mass
122											
123											
124											
125											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-6D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/25/2009 / **DATE COMPLETED:** 10/26/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: West side-Waste pile		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
126									0		Large root mass
127											
128					0	100	0	**WELL GRADED SAND (SW)** Grayish brown (2.5Y 5/2), wet, loose, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine to medium grained, subrounded. Some fine to coarse gravel and coarse sand.			
129											
130											
131									0		
132											
133					0	100	0	Same but fine to coarse grained sand and some fine to coarse gravel.			
134											
135											
136									0		
137											
138											
139											
140											
141									0		
142											
143											
144											
145											
146									0		
147											
148											
149											
150											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-6D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 155.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/25/2009	**DATE COMPLETED:** 10/26/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: West side-Waste pile			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
151									0		
152											
153					40	0	60	**GRAVELLY FAT CLAY (CH)** Grayish brown (2.5Y 5/2), moist, stiff, no odor, iron oxide staining, weak HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. GRAVEL: fine to coarse grained, rounded, very hard hardness, flat and elongated. With fine to coarse sand and cobbles.			
154					0	100	0	**WELL GRADED SAND (SW)** Grayish brown (2.5Y 5/2), wet, loose, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine to medium grained, subrounded, hard hardness. Some fine to coarse gravel and coarse sand.	0		
155								*Boring Terminated at 155 feet bgs*			

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-19D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 145.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/22/2009 / **DATE COMPLETED:** 10/22/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: NORTH SIDE WASTE PILE		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	0	100	**FILL**			
1					0	0	100	SILT (ML), very dark gray (2.5Y 3/1), dry, very soft, no odor, no staining, moderate HCL reaction. FINES: Non plastic, no dry strength, rapid dilatancy, no toughness. With fine slag clasts. HALACO WASTE.	1.5		
2								**FILL**			
3								SILT/ELASTIC SILT (ML/MH), very dark grayish brown (10YR 3/2), damp, soft, chemical odor, no staining, weak HCL reaction. FINES: low plasticity, low dry strength, slow dilatancy, low toughness. Little coarse sand and medium to coarse gravel. HALACO WASTE.	4.7		
4					10	5	85	**FILL**			
5								SILT WITH GRAVEL (ML), very dark brown (10YR 2/2), moist, soft, chemical odor, no staining, weak HCL reaction. FINES: low plasticity, no dry strength, rapid dilatancy, low toughness. GRAVEL: fine to medium grained, subangular, hard hardness. SAND: medium to coarse grained, subangular. HALACO WASTE.	88.5		
6					0	0	100	**FILL**			Strong ammonia odor immediately above soil cuttings, Cannot be detected with PID but sensed when standing up to 5-6 feet from cuttings.
7								SILT/ELASTIC SILT (ML/MH), black (7.5YR 2/1), damp, medium stiff, chemical odor, no staining. FINES: low plasticity, low dry strength, slow dilatancy, low toughness. HALACO WASTE.	361		
8					0	0	100	**FILL**			
9								SILT (ML), very dark gray (10YR 3/1), damp, soft, chemical odor, no staining. FINES: low plasticity, low dry strength, rapid dilatancy, no toughness. HALACO WASTE.	221		
10											
11									115		
					0	0	100	**FILL**			
12								SILT (ML), black (5Y 2.5/1), damp, medium stiff, homogeneous, weak cementation, no odor, no staining, moderate HCL reaction. FINES: non plastic, low dry strength, rapid dilatancy, low toughness. With slag clasts. HALACO WASTE.	121		
13									41.8		
14									36.8		
					0	0	100	**FILL**			
15								ELASTIC SILT (MH), black (5Y 2.5/1), moist, medium stiff, chemical odor, no staining, weak HCL reaction. FINES: non plastic, medium dry strength, slow dilatancy, medium toughness. HALACO WASTE.	16		
					0	0	100	Same but saturated and very soft with roots.			
16									11.2		
17									3.3		
18											
19									6.1		
20					0	0	100	**SILT/ELASTIC SILT (ML/MH)**			
21								Very dark grayish brown (10YR 3/2) with black (5Y 2.5/1), moist, medium stiff, mottled, no odor, no staining, strong HCL reaction.	8.3		
					0	0	100	FINES: low plasticity, low dry strength, slow dilatancy, low toughness.			
22								**SILT (ML)**			
23								Very dark grayish brown (2.5Y 3/2), moist, soft, lensed, no odor, no staining, moderate HCL reaction. FINES: non plastic, low dry strength, slow dilatancy, no toughness. Some fine sand.	1.1		
24					0	20	80	**SILT WITH SAND (ML)**			
					0	0	100	Very dark grayish brown (2.5Y 3/2), moist, soft, homogeneous, no odor, no staining, moderate HCL reaction. FINES: non plastic, low dry	0.8		
25											

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-19D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 145.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/22/2009	**DATE COMPLETED:** 10/22/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: NORTH SIDE WASTE PILE			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								strength, slow dilatancy, no toughness.			
26								**FAT CLAY (CH)** Very dark grayish brown (2.5Y 3/2), moist, medium stiff, no odor, no staining. FINES: high plasticity, medium dry strength, no dilatancy, medium toughness.	0.4		
27					0	100	0	**POORLY GRADED SAND (SP)** Olive brown (2.5Y 4/4), moist, loose, homogeneous, no odor, no staining, moderate HCL reaction. SAND: fine grained, subrounded.			
28											
29									0.3		
30											
31									0.4		
32											
33											
34											
35					0	100	0	**WELL GRADED SAND (SW)** Olive brown (2.5Y 4/4), saturated, very loose, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded.	0.2		
36											
37											
38											
39											
40					0	100	0	Same but wet and medium dense.	0.1		
41											
42											
43											
44											
45					0	85	15	**SILTY SAND (SM)** Olive brown (2.5Y 4/4), moist, medium dense, homogeneous, weak cementation, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded.	0		
46											
47											
48											
49											
50											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-19D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 145.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/22/2009	**DATE COMPLETED:** 10/22/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic		**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: NORTH SIDE WASTE PILE			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
51									0		
52											
53											
54											
55											
56									0		
57											
58											
59					0	100	0	**WELL GRADED SAND (SW)** Olive brown (2.5Y 4/4), wet, loose, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded. With shells and little medium to coarse gravel.			
60											
61									0		
62					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Olive brown (2.5Y 4/4), wet, dense, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded. With some shells and thin organic striations.			
63											
64											
65											
66									0		
67											
68											
69											
70											
71									0		
72											
73											
74					0	70	30	**SILTY SAND (SM)** Olive brown (2.5Y 4/4), wet, dense, homogeneous, weak cementation,			
75											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-19D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 145.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/22/2009 / **DATE COMPLETED:** 10/22/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: NORTH SIDE WASTE PILE		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded. FINES: non plastic.			
76					0	85	15	**POORLY GRADED SAND WITH SILT (SP-SM)** Olive brown (2.5Y 4/4), wet, dense, homogeneous, weak cementation, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded. FINES: non plastic. With shells and iron oxide mottling.	0		
77											
78											
79											
80											
81									0.1		
82											
83											
84					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), moist, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some fine sand and thin organic lenses.			
85											
86									0		
87											
88											
89											
90					0	70	30	**CLAYEY SAND (SC)** Olive brown (2.5Y 4/4), wet, very dense, homogeneous, weak cementation, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded. FINES: non plastic, high dry strength, no dilatancy, medium toughness. With shells.			
91									0		
92											
93											
94											
95					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), moist, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Trace shells, thin organic lenses, and minor iron mottling.			
96											
97											
98											
99											
100											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-19D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 145.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/22/2009 / **DATE COMPLETED:** 10/22/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: NORTH SIDE WASTE PILE		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
101					0	30	70	**SANDY FAT CLAY (CH)** Very dark gray (2.5Y 3/1), moist, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained, subrounded.			
102											
103											
104											
105					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), moist, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Trace shells, thin organic lenses, and minor iron mottling.			
106											
107											
108											
109											
110											
111											
112											
113											
114											
115					0	80	20	**CLAYEY SAND (SC)** Olive brown (2.5Y 4/4), wet, very dense, homogeneous, weak cementation, no odor, no staining, weak HCL reaction. SAND: fine grained, subrounded. FINES: non plastic, high dry strength, no dilatancy, medium toughness. With shells.			
116					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), moist, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. With gray nodules < 0.5 inches, thin organic lenses, and minor iron mottling.			
117											
118											
119											
120											
121											
122											
123											
124											
125											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-19D*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 145.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 10/22/2009 / **DATE COMPLETED:** 10/22/2009
WATER LEVEL: ---	**DRILLING METHOD:** Sonic	**DRILLING EQUIPMENT:** GUS Pech 400 RS	
LOCATION: NORTH SIDE WASTE PILE		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
126											
127					0	90	10	**WELL GRADED SAND WITH CLAY (SW-SC)** Olive brown (2.5Y 4/4), damp, dense, homogeneous, strong cementation, no odor, no staining. SAND: fine to medium grained, subangular, flat. With fine to coarse gravel.			
128					0	100	0	**WELL GRADED SAND (SW)** Olive brown (2.5Y 4/4), wet, loose, homogeneous, no odor, no staining. SAND: fine to coarse grained, subangular, flat. With fine to coarse gravel.			
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											
141											
142											
143											
144					0	0	100	**FAT CLAY (CH)** Very dark gray (2.5Y 3/1), moist, stiff to very stiff, no odor, no staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. With gray nodules < 0.5 inches, thin organic lenses, and minor iron mottling.			
145					0	100	0	**WELL GRADED SAND (SW)** Olive brown (2.5Y 4/4), wet, loose, homogeneous, no odor, no staining. SAND: fine to coarse grained, subangular, flat. With fine to coarse gravel.			

Boring Terminated at 145 feet bgs

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-20*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 30.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/6/2009 / **DATE COMPLETED:** 11/6/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: Center of Smelter Parcel		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Concrete.			
1								Crushed stone.			
2					15	65	20	**FILL** SILTY SAND WITH GRAVEL (SM), very dark grayish brown (2.5Y 3/2), dry, medium dense, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine grained. GRAVEL: fine to coarse grained, subrounded. With little broken porcelain pieces.			
3						60	40				
4					0	20	80	**FILL** SILTY SAND (SM), very dark gray (10YR 3/1), dry, very loose, homogeneous, no odor, no staining. SAND: fine grained. With significant glass fragments. BURN DUMP WASTE.			
5								**FILL** SILT WITH SAND (ML), very dark gray (10YR 3/1), dry, stiff, stratified, no odor, no staining, strong HCL reaction. FINES: low plasticity, low dry strength, rapid dilatancy, low toughness. SAND: fine grained. With organics, concrete pieces, and miscellaneous trash. HCl addition created strong sulphur odor. BURN DUMP WASTE.			
6											
7											
8											
9					10	70	20	**FILL** SILTY SAND (SM), very dark grayish brown (2.5Y 3/2), damp, dense, homogeneous, weak cementation, no odor, no staining. SAND: fine grained, subangular. GRAVEL: fine to medium grained, subrounded. Some organics. BURN DUMP WASTE.			
10								No recovery.			
11											
12											
13											
14											
15											
16											
17											
18											
19											
20					0	100	0	**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), saturated, very loose, homogeneous, no odor, no staining. SAND: fine to medium grained, subrounded.			
21											
22											
23											
24											
25											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-20*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 30.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/6/2009	**DATE COMPLETED:** 11/6/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: Center of Smelter Parcel			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	100	0	**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), saturated, loose, homogeneous, no odor, no staining. SAND: fine grained, subrounded.			Concrete piece stuck in core tip
26	–										
27	–										
28	–										
29	–										
30	–										1-2 inch cobbles

Boring Terminated at 30 feet bgs

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-21*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 25.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/6/2009 / **DATE COMPLETED:** 11/6/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: SW end of Smelter Parcel		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Concrete.			
1					10	80	10	**FILL** WELL GRADED SAND (SW), brown (10YR 4/3), dry, loose, homogeneous, no odor, no staining. SAND: fine grained, subangular. GRAVEL: fine grained, subangular. Little medium to coarse sand.			
2					0	80	20	**FILL** SILTY SAND (SM), very dark grayish brown (2.5Y 3/2), damp, medium dense, homogeneous, no odor, no staining. SAND: fine grained.			
3						60	40	**FILL** SILTY SAND (SM), very dark gray (10YR 3/1), damp, very loose, homogeneous, no odor, no staining. SAND: fine grained. With significant glass fragments. BURN DUMP WASTE.			
4					0	20	80	**FILL** SILT WITH SAND (ML), very dark gray (10YR 3/1), damp, stiff, stratified, no odor, no staining, moderate HCL reaction. FINES: low plasticity, low dry strength, rapid dilatancy, low toughness. SAND: fine grained. With very thin organic lenses and dull white mottling. HCl addition created strong sulphur odor. BURN DUMP WASTE.			
5					0	80	20	**SILTY SAND (SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, medium dense, mottled, weak cementation, no odor, iron oxide staining, moderate HCL reaction. SAND: fine grained. FINES: medium plasticity, rapid dilatancy. With thin organic lenses and significant iron mottling.			
6					0	10	90	**FAT CLAY (CH)** Brown (10YR 4/3) and gray (10YR 5/1), moist, medium stiff, mottled, no odor, iron oxide staining, weak HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained.			
7					0	90	10	**WELL GRADED SAND WITH SILT (SW-SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, medium dense, mottled, weak cementation, no odor, iron oxide staining, moderate HCL reaction. SAND: fine grained. FINES: medium plasticity, rapid dilatancy. With thin organic lenses and significant iron mottling.			
8					0	100	0	**POORLY GRADED SAND (SP)** Dark grayish brown (2.5Y 4/2), saturated, loose, homogeneous, no odor, no staining. SAND: fine grained.			
9					0	100	0	**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), saturated, very loose, homogeneous, no odor, no staining. SAND: fine to medium grained.			
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20					0	100	0	**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), saturated, loose, homogeneous, no odor, no staining. SAND: fine grained, subrounded. With medium sand.			
21											
22											
23											
24											
25											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-21*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 25.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/6/2009	**DATE COMPLETED:** 11/6/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: SW end of Smelter Parcel			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Boring Terminated at 25 feet bgs			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-22*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 25.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/5/2009 / **DATE COMPLETED:** 11/5/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: West end of Smelter Parcel		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Asphalt.			
1					20	70	10	**WELL GRADED SAND WITH GRAVEL (SW)** Brown (10YR 4/3), dry, loose, homogeneous, no odor, no staining. SAND: fine to medium grained, subangular. GRAVEL: fine to medium grained, subangular. Little coarse sand.			
2											
3					0	30	70	**SANDY SILT (ML)** Very dark gray (5Y 3/1), dry, soft, no odor, no staining. FINES: low plasticity, no dry strength, rapid dilatancy, low toughness. SAND: fine grained. With shells.			
4											
5					0	70	30	**SILTY SAND (SM)**			
					0	10	90	Brown (10YR 4/3) and gray (10YR 5/1), damp, mottled, no odor, iron oxide staining. SAND: fine grained.			
6					0	70	30	**FAT CLAY (CH)** Brown (10YR 4/3) and gray (10YR 5/1), damp, medium stiff, mottled, no odor, iron oxide staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained.			
7					0	10	90	**SILTY SAND (SM)** Brown (10YR 4/3) and gray (10YR 5/1), damp, mottled, no odor, iron oxide staining. SAND: fine grained.			
8					0	100	0	**FAT CLAY (CH)** Brown (10YR 4/3) and gray (10YR 5/1), damp, medium stiff, mottled, no odor, iron oxide staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained.			
9					0	100	0	**POORLY GRADED SAND (SP)** Dark grayish brown (2.5Y 4/2), wet, medium dense, homogeneous, no odor, no staining. SAND: fine grained.			
10								**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), saturated, loose, homogeneous, no odor, no staining. SAND: fine grained.			
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22					0	100	0	Same but fine to medium grained sand.			
23											
24					0	0	100	**FAT CLAY (CH)**			
25					0	100	0	Gray (10YR 5/1), moist, medium stiff, no odor, iron oxide staining.			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-22*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 25.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/5/2009	**DATE COMPLETED:** 11/5/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: West end of Smelter Parcel			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some organic lenses. **WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), saturated, loose, homogeneous, no odor, no staining. SAND: fine grained. *Boring Terminated at 25 feet bgs*			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-24*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 32.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/9/2009	**DATE COMPLETED:** 11/9/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: North center just south of berm in WMU			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	90	10	**FILL** POORLY GRADED SAND WITH SILT (SP-SM), dark yellowish brown (10YR 4/6), dry, very loose, homogeneous, no odor, no staining, moderate HCL reaction. SAND: fine grained.			
1											
2											
3											
4											
5								No recovery due to large rock jammed in continuous core tip.			
6											
7											
8											
9											
10					0	20	80	**FILL** ELASTIC SILT WITH SAND (MH), very dark gray (10YR 3/1), damp, soft, no odor, no staining. FINES: low plasticity, medium dry strength, slow dilatancy, low toughness. SAND: fine grained. HALACO WASTE.			
11					0	80	20	**SILTY SAND (SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, medium dense, mottled, weak cementation, no odor, iron oxide staining, moderate HCL reaction. SAND: fine grained. FINES: medium plasticity, rapid dilatancy.			
12											
13					0	100	0	**POORLY GRADED SAND (SP)** Brown (10YR 4/3) and gray (10YR 5/1), moist, loose, mottled, weak cementation, no odor, iron oxide staining, moderate HCL reaction. SAND: fine grained. With significant iron mottling.			
14					0	0	100	**FAT CLAY (CH)** Brown (10YR 4/3) and gray (10YR 5/1), damp to moist, stiff, mottled, no odor, no staining, weak HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some organics and roots.			
15											
16											
17											
18											
19											
20											
21											
22					0	100	0	**WELL GRADED SAND (SW)** Dark gray (10YR 4/1), saturated, medium dense, homogeneous, weak cementation, no odor, no staining. SAND: fine grained, rounded.			
23					0	100	0	**WELL GRADED SAND (SW)** Dark gray (10YR 4/1), saturated, very loose, homogeneous, no odor, no staining. SAND: fine to medium grained, subrounded. Little coarse sand.			
24											
25											

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*MW-24*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 32.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/9/2009	**DATE COMPLETED:** 11/9/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: North center just south of berm in WMU			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								No recovery.			
26											
27											
28											
29											
30											
31											
32											
								Boring Terminated at 32 feet bgs			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-01C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 32.50	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/5/2009 / **DATE COMPLETED:** 11/5/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: West end of paved portion fo McWane north of smelter		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Asphalt.			
1					30	60	10	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM)**			
					0	90	10	Brown (10YR 4/3), dry, dense, homogeneous, no odor, no staining. SAND: fine to coarse grained, subangular. GRAVEL: fine to medium grained, subangular.	0.1		
2									0		
					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Very dark gray (10YR 3/1), damp, medium dense, homogeneous, no odor, no staining. SAND: fine grained.			
3											
4								**POORLY GRADED SAND WITH SILT (SP-SM)** Brown (10YR 4/3) and gray (10YR 5/1), damp, mottled, no odor, iron oxide staining. SAND: fine grained.			
5					0	70	30	**SILTY SAND (SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, mottled, weak cementation, no odor, iron oxide staining. SAND: fine grained. FINES: medium plasticity, rapid dilatancy. With thin organic lenses, significant iron mottling, and trace roots.	0		
6											
7											
8											
9					0	100	0	**POORLY GRADED SAND (SP)** Dark grayish brown (2.5Y 4/2), wet, medium dense, homogeneous, no odor, no staining. SAND: fine grained.			
10											
11									0		
12					0	100	0	**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), wet, medium dense, homogeneous, no odor, no staining. SAND: fine grained.			
13											
14					0	85	15	**SILTY SAND (SM)** Very dark grayish brown (2.5Y 3/2), saturated, medium dense, homogeneous, no odor, no staining. SAND: fine grained.			
15											
16									0		
17											
18											
19											
20					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Very dark grayish brown (2.5Y 3/2), moist, dense, homogeneous, weak cementation, no odor, no staining. SAND: fine grained. Little organics.	0		
21					0	100	0	**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), saturated, very loose, homogeneous, no odor, no staining. SAND: medium grained, subrounded.			
22											
23					0	100	0	Same but loose and fine to medium grained sand.			
24											
25											

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-01C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 32.50	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/5/2009	**DATE COMPLETED:** 11/5/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: West end of paved portion fo McWane north of smelter			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	100	0	Same but very loose and medium grained sand.			
26											
27											
28											
29											
30											
31											
32											
								Boring Terminated at 32.5 feet bgs			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-02C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 33.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/5/2009 / **DATE COMPLETED:** 11/5/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: East end of paved portion fo McWane north of smelter		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	OVM (ppm): HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								Asphalt.			
1					30	60	10	**FILL** WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown (10YR 4/3), dry, dense, homogeneous, no odor, no staining. SAND: fine to coarse grained, subangular. GRAVEL: fine to medium grained, subangular. With glass and concrete pieces.			
2									0		
3											
4					0	90	10	**FILL** POORLY GRADED SAND WITH SILT (SP-SM), brown (10YR 4/3), damp, homogeneous, no odor, iron oxide staining. SAND: fine grained. With glass.			
5					0	90	10	**FILL** POORLY GRADED SAND WITH SILT (SP-SM), black (10YR 2/1), medium dense. SAND: fine grained. With glass and gravel. BURN DUMP WASTE.	0		
6											
7											
8					0	70	30	**SILTY SAND (SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, mottled, weak cementation, no odor, iron oxide staining. SAND: fine grained. FINES: medium plasticity, rapid dilatancy. With thin organic lenses, significant iron mottling, and trace roots.			
9											
10											
11					0	0	100	**FAT CLAY (CH)** Gray (10YR 5/1), moist, medium stiff, no odor, iron oxide staining. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some organic lenses.	0		
12					0	70	30	**CLAYEY SAND (SC)** Gray (10YR 5/1), moist, homogeneous, weak cementation, no odor, iron oxide staining. SAND: fine grained. FINES: high plasticity, no dilatancy. With thin organic lenses, iron mottling, and trace roots.			
13											
14											
15					0	100	0	**WELL GRADED SAND (SW)** Dark grayish brown (2.5Y 4/2), wet, medium dense, homogeneous, no odor, no staining. SAND: fine to medium grained. Little coarse sand and fine gravel.			
16									0		
17											
18											
19											
20											
21									0		
22					0	100	0	Same but fine grained sand.			
23											
24											
25											

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-02C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 33.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/5/2009 / **DATE COMPLETED:** 11/5/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: East end of paved portion fo McWane north of smelter		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	100	0	Same but very loose and medium grained sand.			
26									0		
27											
28											
29											
30											
31									0		
32											
33											
								Boring Terminated at 33 feet bgs			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-03C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 39.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/9/2009 / **DATE COMPLETED:** 11/9/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: Just south of NW end of berm in WMU		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					15	35	50	**FILL** SANDY SILT WITH GRAVEL (ML), dark yellowish brown (10YR 4/4), dry, very soft, no odor, no staining. FINES: non plastic, no dry strength, slow dilatancy, no toughness. SAND: fine grained. GRAVEL: fine to medium grained, subangular.			
1											
2											
3											
4											
5					0	90	10	**FILL** WELL GRADED SAND WITH SILT (SW-SM), black (2.5Y 2.5/1) and very dark grayish brown (2.5Y 3/2), medium dense, homogeneous. SAND: fine grained, subrounded. Some slag. HALACO WASTE.			
6					0	90	10	**FILL** POORLY GRADED SAND WITH SILT (SP-SM), very dark grayish brown (2.5Y 3/2), loose, homogeneous. SAND: fine grained, subrounded. HALACO WASTE.			
7					0	100	0	**FILL** POORLY GRADED SAND (SP), black (5YR 2.5/1), dry, loose, homogeneous, no odor, no staining. SAND: fine grained, subrounded. Some gravel to cobble sized slag. HALACO WASTE.			
8											
9											
10					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, dense, mottled, weak cementation, no odor, iron oxide staining, moderate HCL reaction. SAND: fine grained. FINES: medium plasticity, rapid dilatancy. With significant iron mottling.			
11											
12											
13											
14					0	10	90	**FAT CLAY (CH)** Brown (10YR 4/3) and gray (10YR 5/1), moist, stiff, mottled, no odor, iron oxide staining, weak HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained.			
15					0	90	10	**POORLY GRADED SAND WITH SILT (SP-SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, dense, mottled, weak cementation, no odor, iron oxide staining, moderate HCL reaction. SAND: fine grained. FINES: medium plasticity, rapid dilatancy. With significant iron mottling.			
16					0	10	90	**FAT CLAY (CH)** Brown (10YR 4/3) and gray (10YR 5/1), moist, stiff, mottled, no odor, iron oxide staining, weak HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained. With roots and organics.			
17						100		**POORLY GRADED SAND (SP)** Very dark gray (10YR 3/1), wet, dense, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine grained.			
18					0	10	90	**FAT CLAY (CH)** Gray (10YR 5/1), moist, stiff, mottled, no odor, iron oxide staining, weak HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. SAND: fine grained.			
19						100		**POORLY GRADED SAND (SP)** Very dark gray (10YR 3/1), saturated, loose, homogeneous, no odor, no staining, weak HCL reaction. SAND: fine grained.			
20					0	100	0	**WELL GRADED SAND (SW)** Olive brown (2.5Y 4/4), saturated, loose, homogeneous, no odor, no staining. SAND: fine to medium grained, subrounded.			
21											
22											
23											
24											
25											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-03C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 39.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/9/2009	**DATE COMPLETED:** 11/9/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: Just south of NW end of berm in WMU			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
								No recovery.			
26											
27											
28											
29											
30					0	100	0	**WELL GRADED SAND (SW)** Very dark grayish brown (2.5Y 3/2), saturated, loose, homogeneous, weak cementation, no odor, no staining. SAND: fine to medium grained, subrounded.			
31											
32											
33											
34											
35											
36											
37											
38											
39								*Boring Terminated at 39 feet bgs*			

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-04C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY	**HOLE DEPTH (ft):** 36.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/6/2009 / **DATE COMPLETED:** 11/6/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger	**DRILLING EQUIPMENT:** CME 85	
LOCATION: Just south of NE end of berm in WMU		**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
1					15	5	80	**FILL** SILT WITH GRAVEL (ML), dark yellowish brown (10YR 4/4), dry, very soft, no odor, iron oxide staining. FINES: non plastic, no dry strength, slow dilatancy, no toughness. GRAVEL: fine grained, subangular. SAND: fine to coarse grained.			
2					0	90	10				
					0	15	85	**FILL** POORLY GRADED SAND WITH SILT (SP-SM), dark yellowish brown (10YR 4/6), very loose, homogeneous. SAND: fine grained.			
3					0	100	0	**FILL** ELASTIC SILT WITH SAND (MH), dark brown (10YR 3/3), dry, medium stiff, no odor, no staining. FINES: low plasticity, medium dry strength, slow dilatancy, low toughness. SAND: fine grained.			
4								**FILL** POORLY GRADED SAND (SP), black (5YR 2.5/1), dry, loose, homogeneous, no odor, no staining. SAND: fine grained, subrounded. Some gravel to cobble sized slag. HALACO WASTE.			
5											
6											
7											
8											
9											
10					0	80	20	**SILTY SAND (SM)** Brown (10YR 4/3) and gray (10YR 5/1), moist, medium dense, mottled, weak cementation, no odor, iron oxide staining, moderate HCL reaction. SAND: fine grained. FINES: medium plasticity, rapid dilatancy. With thin organic lenses and significant iron mottling.			
11					0	0	100	**FAT CLAY (CH)** Brown (10YR 4/3) and gray (10YR 5/1), moist, stiff, mottled, no odor, iron oxide staining, weak HCL reaction. FINES: high plasticity, high dry strength, no dilatancy, high toughness. Some organics.			
12											
13											
14											
15					0	0	100	Same but grayish brown (2.5Y 5/2) and medium stiff with organics and roots.			
16											
17											
18											
19											
20					0	100	0	**WELL GRADED SAND (SW)** Dark gray (10YR 4/1), wet to saturated, medium dense, homogeneous, no odor, no staining. SAND: fine grained, rounded.			
21											
22											
23											
24											
25											

PROJECT NUMBER:	BORING NUMBER:
385135.FI.01	*PZ-04C*

SOIL BORING LOG

PROJECT NAME: HALACO ENGINEERING COMPANY		**HOLE DEPTH (ft):** 36.00	**DRILLING CONTRACTOR:** Water Development Corp.	
SURFACE ELEVATION: ---	**NORTHING (CCS NAD83 Z2):** ---	**EASTING (CCS NAD83 Z2):** ---	**DATE STARTED:** 11/6/2009	**DATE COMPLETED:** 11/6/2009
WATER LEVEL: ---	**DRILLING METHOD:** Hollow Stem Auger		**DRILLING EQUIPMENT:** CME 85	
LOCATION: Just south of NE end of berm in WMU			**LOGGED BY:** J. BALE	

DEPTH (ft bgs)	INTERVAL (feet)	RECOVERY (%)	#TYPE	SPT RESULTS 6"-6"-6"-6" (N)	SIZE DISTRIBUTION %G	%S	%F	SOIL DESCRIPTION: USCS GROUP NAME (USCS GROUP SYMBOL): color, moisture, mineralogy, density, structure, cementation, staining/odor, reaction with HCL. COARSE FRACTION: grain size, angularity, hardness, shape. FINE FRACTION: plasticity, dry strength, toughness, dilatancy. Additional comments.	OVM (ppm): BREATHING ZONE	HEAD SPACE	COMMENTS (e.g.: DRILLING FLUID LOSS, TESTS, OR DRILLER COMMENTS, ETC.)
					0	100	0	**WELL GRADED SAND (SW)** Light brownish gray (10YR 6/2), saturated, very loose, homogeneous, no odor, no staining. SAND: medium to coarse grained, subrounded, elongated.			
26											
27											
28											
29											
30					0	100	0	**POORLY GRADED SAND (SP)** Light brownish gray (10YR 6/2), saturated, loose, homogeneous, no odor, no staining. SAND: medium grained, subrounded, elongated.			
31											
32											
33											
34											
35											
36											

Boring Terminated at 36 feet bgs

Attachment E-2

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-12C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/12/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Fill** variable color from tones of white to gray (Gley1 6/N), smelter fill, mostly fines, moist, medium stiff	
5	SS		1,2,4			19.3 ppm
10	SS		3,5,6		**Fill** dark grayish brown (10YR 4/2), consists of silty sand, wet, medium dense, locally white spots of smelter waste material	10.5 ppm
15	SS		10,10,10		**Fill** light gray (Gley1 7/N), wet, very stiff, 100% fines, medium plasticity	20 ppm
					Silt (ML) dark greenish gray (Gley1 4/5G), moist, low plasticity	
20	SS		10,11,14		**Fill** light gray (Gley1 7/N), same as at 15'	1.7 ppm
					Poorly Graded Sand (SP) dark gray (5Y 4/1), wet, medium dense, 60% medium sand, 40% fine sand, trace mica	
25						3.4 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-12C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/12/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		10,13,16		**Fill** light gray (Gley1 7/N), wet, very stiff, medium plasticity, smelter waste material made up of fines	
					Poorly Graded Sand (SP) dark gray (5Y 4/2), wet, 60% medium sand, 40% fine sand, trace mica	
30	SS		13,17,20		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 70% coarse sand, 30% medium sand, 3" thick, olive (5Y 4/3), low plasticity fines at 34.8'	3.5 ppm
35	SS		13,17,21		**Well Graded Sand (SW)** dark gray (5Y 5/1), wet, dense, 10% fine sand, 50% medium sand, 40% coarse sand, trace mica and seashells	12.7 ppm
					Fat Clay (CH) very dark greenish gray (Gley1 3/10Y), moist, hard, 100% fines, high plasticity	
40	SS		12,14,23		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 60% medium sand, 40% coarse sand, trace gravel, subrounded	32.8 ppm
					Poorly Graded Sand (SP) olive gray (5Y 4/2), wet, 100% fine sand, trace fine mica	
45	SS		15,18,23		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 70% medium sand, 30% coarse sand, trace m ica, 3" thick silt at 46-46.2' separating 100% fine sand at bottom	7.4 ppm
50						4.9 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-12C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/12/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		14,18,25		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 90% fine sand, 10% medium to coarse sand as thin interbeds, trace mica	
55	SS		18,20,28		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 100% fine sand, trace mica	7.8 ppm
60	SS		15,18,23		**Sily Sand (SM)** dark gray (5Y 4/1), wet, dense, 30% nonplastic fines, 70% fine sand, trace mica	6.2 ppm
65	SS		18,20,33		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, very dense, 30% fine sand, 70% medium sand, trace mica, trace gravel up to 1", subrounded, clean sand	6.2 ppm
70	SS		22,26,28		**Poorly Graded Sand (SP)** same as above, no gravel, 30% fine sand, 70% medium sand, trace mica and seashells, become 100% fine sand at bottom 2"	1.9 ppm
					End of Boring	Total depth = 72' bgs
75						Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-13C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/11/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silty Sand (SM)** brown (10YR4/3), moist, 40% fines, 60% fine sand	
5	SS		3,4,6		**Fill** black (10YR 2/1) to dark brown (10YR 3/3), wet, loose, glass fragments within silty material, possibly landfill material	1.1 ppm
10	SS		10,12,14		**Fill** very dark greenish gray (Gley1 3/10Y), moist, fill material consisting of sandy silt, possibly smelter fill	0.4 ppm
					Poorly Graded Sand (SP) dark greenish gray (Gley1 3/10Y), wet, medium dense, 95% fine sand, 5% nonplastic fines, trace mica	
15	SS		12,14,17		**Poorly Graded Sand (SP)** dark greenish gray (Gley1 4/10Y), wet, dense, 40% fine sand, 55% medium sand, 5% fill material consisting of glass pieces in black silty material within 3" zone at 16'	0.8 ppm
20	SS		6,16,18		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 80% medium sand, 20% coarse sand, trace fine sand, trace mica	2.2 ppm
25						1.5 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-13C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/11/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		10,11,14		**Poorly Graded Sand (SP)** dark greenish gray (Gley1 4/10Y), wet, medium dense, 30% fine sand, 70% medium sand, trace coarse sand, trace mica	
30	SS		8,16,19		**Poorly Graded Sand (SP)** same as above, dense	2.1 ppm
35	SS		12,17,23		**Poorly Graded Sand (SP)** dark gray (Gley1 4/1), wet, dense, 90% fine sand, 10% medium sand, trace fine mica	1.8 ppm
40	SS		8,19,25		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, 100% fine sand, trace mica	2.2 ppm
45	SS		17,20,27		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 90% fine sand, 10% medium sand, trace coarse sand, trace mica, 1" thick silty zone at 46.5'	5.5 ppm
50						5.0 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-13C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/11/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		18,22,30		**Silty Sand (SM)** olive gray (5Y 4/2), wet, very dense, 40% fines, 60% fine sand, trace fine mica	
55	SS		20,26,33		**Silty Sand (SM)** olive gray (5Y 4/2), wet, very dense, 40% nonplastic fines, 60% fine sand, trace mica, a few rock fragments of thinly laminated siltstone at 56.5'	7.4 ppm
60	SS		14,29,35		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 75% coarse sand, 20% medium sand, 5% fine gravel, subrounded, trace mica, trace seashells	4.8 ppm
65	SS		13,26,37		**Sand with Silt (SP-SM)** olive gray (5Y 4/2), wet, very dense, 90% fine sand, 10% nonplastic fines, silt inside the sampler shoe, trace mica	3.5 ppm
					End of Boring	Total depth = 68' bgs
70						Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
75						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-21C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/10/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Sandy Silt (ML)** olive gray (5Y 4/2), moist, stiff, 30% fine sand, 70% fines, low plasticity, locally clayey at 5.3"	
5	SS		4,6,6			0.0 ppm
					Poorly Graded Sand (SP) olive gray (5Y 4/2), 95% fine sand, 5% fines, trace mica	
10	SS		7,8,10		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, medium dense, 60% fine sand, 40% medium sand, trace mica	0.0 ppm
15	SS		11,13,16		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, medium dense, 70% medium sand, 30% coarse sand, 1" thick silt band at bottom	0.1 ppm
20	SS		10,14,18		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 90% fine sand, 10% medium sand, trace mica	0.1 ppm
25						0.1

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-21C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/10/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		7,16,20		**Well Graded Sand (SW)** dark gray (5Y 4/1), wet, dense, 30% fine sand, 40% medium sand, 30% coarse sand, trace gravel up to 1", subrounded, trace mica	
30						0.2 ppm
	SS		14,18,24			
					Silty Sand (SM) dark gray (5Y 4/1), wet, dense, 85% fine sand, 15% nonplastic fines, trace mica	
35						0.2 ppm
	SS		10,20,26		**Well Graded Sand (SW)** dark gray (5Y 4/1), wet, dense, 60% medium sand, 30% fine sand, 10% coarse sand	
					Poorly Graded Sand (SP) dark gray (5Y 4/1), wet, very dense, 100% fine sand, trace mica	
40						0.4 ppm
	SS		18,23,29			
45						3.7 ppm
	SS		16,26,31		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, very dense, 60% fine sand, 40% medium sand, grades down, become fine sand at 46', 1" thick nonplastic fines at 46.5', trace mica	
50						4.4 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-21C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** Smelter Parcel

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/10/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		21,25,33		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 60% fine sand, 40% medium sand, trace mica	
					Silt (ML) dark gray (5Y 4/1), wet, hard, 100% fines, trace fine mica, nonplastic	
55	SS		19,26,33		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, very dense, 30% fine sand, 70% medium sand, trace mica	5.7 ppm
					Silt with Sand (ML) dark gray (5Y 4/1), wet, 90% nonplastic fines, 10% fine sand, 1" thick fine sand at bottom'	
					Poorly Graded Sand (SP) dark gray (5Y 4/1), wet, very dense, 40% medium sand, 60% fine sand, trace coarse sand, becomes finer downward, trace mica, a few seashell fragments at 61'	
60	SS		22,24,36			7.6 ppm
65	SS		24,31,38		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, very dense, 100% fine sand, trace medium sand, trace mica	2.8 ppm
					End of Boring	Total depth = 67' bgs
70						Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
75						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-23B

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** South of Wastewater Treatment Plant

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/18/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silty Clay (CL)** olive brown (2.5Y 4/3), moist, low to medium plasticity, 100% fines	
5	SS		7,10,14		**Silt (ML)** dark grayish brown (10Y 4/2), moist, very stiff, 100% fines, low plasticity	2.2 ppm
					Poorly Graded Sand (SP) light olive brown (2.5Y 5/3), wet, medium dense, 100% fine sand	
10	SS		9,18,24		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 80% fine sand, 20% medium sand, micaceous, 3" zone of honey color material resembling crude oil/ organics at top	5.3 ppm
15	SS		3,23,32		**Sand with Gravel (SP)** olive gray (5Y 4/2), wet, very dense, 80% coarse sand, 10% medium sand, 10% fine gravel up to 1/2", subrounded	6.2 ppm
20	SS		12,16,40		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 60% medium sand, 40% coarse sand, trace fine sand	2.3 ppm
25						4.1 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-23B

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** South of Wastewater Treatment Plant

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/18/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		5,20,25		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 60% medium sand, 40% coarse sand, trace fine sand	
30	SS		10,20,40		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 60% coarse sand, 40% medium sand	5.0 ppm
					End of Boring	Total depth = 32' bgs
35						Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
40						
45						
50						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-23C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/18/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silty Clay (CL)** olive brown (2.5Y 4/3), moist, low to medium plasticity, 100% fines	
5	SS		7,10,14		**Silt (ML)** dark grayish brown (10Y 4/2), moist, very stiff, 100% fines, low plasticity	2.2 ppm
					Poorly Graded Sand (SP) light olive brown (2.5Y 5/3), wet, medium dense, 100% fine sand	
10	SS		9,18,24		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 80% fine sand, 20% medium sand, micaceous, 3" zone of honey color material resembling crude oil/ organics at top	5.3 ppm
15	SS		3,23,32		**Sand with Gravel (SP)** olive gray (5Y 4/2), wet, very dense, 80% coarse sand, 10% medium sand, 10% fine gravel up to 1/2", subrounded	6.2 ppm
20	SS		12,16,40		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 60% medium sand, 40% coarse sand, trace fine sand	2.3 ppm
25						4.1 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-23C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/18/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		5,20,25		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 60% medium sand, 40% coarse sand, trace fine sand	
30	SS		10,20,40		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 60% coarse sand, 40% medium sand	5.0 ppm
35	SS		10,25,40		**Poorly Graded Sand with Silt (SP-SM)** olive gray (5Y 4/2), wet, dense, 95% fine sand, 5% nonplastic fines, trace fine mica, locally thinly laminated, slightly siltier at bottom	3.9 ppm
40	SS		15,27,33		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 100% fine sand, trace fine mica	4.2 ppm
45	SS		33,42,45		**Sandy Silt (ML)** olive gray (5Y 4/2), wet, hard, 30% fine sand, 70% nonplastic fines	2.7 ppm
					Silty Sand (SM) olive gray (5Y 4/2), wet, 70% fine sand, 30% nonplastic fines	
50						4.0 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-23C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/18/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		10,25,37		**Silty Sand (SM)** olive gray (5Y 4/2), wet, very dense, 70% fine sand, 30% nonplastic fines	
55	SS		10,27,33		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 90% fine sand, 10% fines from 3" silty zone at 55.8', trace fine mica	3.7 ppm
60	SS		11,33,38		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 100% fine sand, trace fine mica	5.2 ppm
65	SS		12,22,30			8.2 ppm
					End of Boring	Total depth = 67' bgs Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
70						
75						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-24C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** WDA

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/17/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silt (ML)** brown (10YR 5/3), moist, 100% fines, low plasticity	0.0 ppm
5	SS		18,33,33		**Fill** variable color from brown (10YR 5/3) to gray (Gley1 5/N), moist, hard, predominantly fines, some angular gravel, smelter waste material	2.2 ppm
10	SS		10,8,8		**Silt (ML)** very dark gray (2.5Y 3/1), moist, very stiff, 100% fines, low plasticity,	2.5 ppm
15	SS		10,10,8		**Fill** greenish gray (Gley1 5/10Y), moist, fill material consisting of silty sand	3.2 ppm
					Clay (CL) black (2.5Y 2.5/1), moist, medium plasticity, very stiff, small wood fragments, possibly landfill material	
20	SS		12,18,22		**Silt-Clay (ML-CL)** greenish gray (Gley1 5/2), moist, 90% fines, 100% fines, siltier at top, more clayey progressively until sharp contact with sand at 21.2'	5.0 ppm
					Poorly Graded Sand (SP) greenish gray (Gley1 5/10Y), wet, 60% fine sand, 40% medium sand, trace coarse sand	
25						4.2 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-24C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** WDA

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/17/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		12,12,8		**Poorly Graded Sand (SP)** greenish gray (Gley1 5/10Y), wet, medium dense, 60% medium sand, 40% coarse sand	
30	SS		12,13,8		**Poorly Graded Sand (SP)** greenish gray (Gley1 5/10Y), wet, medium dense, 70% medium sand, 30% coarse sand, trace fine sand, trace gravel up to 1", subrounded	3.7 ppm
35	SS		10,16,25		**Poorly Graded Sand (SP)** greenish gray (Gley1 5/10y), wet, dense, 40% medium sand, 60% coarse sand	2.9 ppm
40	SS		5,8,12		**Poorly Graded Sand (SP)** same as above, wet, medium dense, trace fine gravel	2.7 ppm
45	SS		7,16,16		**Poorly Graded Sand (SP)** same as above, wet, dense	2.5 ppm
50						1.9 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-24C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** WDA

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/17/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		10,12,18		**Poorly Graded Sand (SP)** olive gray (5Y 5/2), wet, medium dense, 70% medium sand, 30% coarse sand, trace fine sand	
55	SS		5,7,11		**Poorly Graded Sand (SP)** same as above	2.6 ppm
60	SS		4,8,15		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, medium dense, 30% fine sand, 70% medium sand, trace coarse sand, trace gravel up to 1"	1.6 ppm
65	SS		5,12,15		**Poorly Graded Sand (SP)** same as above	2.8 ppm
70					End of Boring	Total depth = 69' bgs Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
75						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-25B

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/13/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silt (ML)** dark grayish brown (10YR 4/2), moist, low plasticity, trace mica	Hand augered to 5' bgs
5	SS		2,3,5		**Clay (CL)** dark grayish brown (10YR 4/2), moist, medium stiff, medium plasticity, trace mica	1.7 ppm
10	SS		4,6,8		**Clay (CL)** same as above, wet, black stringers of decayed organic material,	1.9 ppm
					Poorly Graded Sand (SP) olive (5Y 5/3), wet, medium dense, 95% fine sand, 5% nonplastic fines, trace mica	
15	SS		5,6,8		**Fat Clay (CH)** olive gray (5Y 5/2), wet, stiff, high plasticity, 100% fines	3.7 ppm
20	SS		4,6,10		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, medium dense, 90% medium sand, 10% fine sand, trace coarse sand, trace mica, 1" thick interbedded clay at 21'	4.5 ppm
25						5.8 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-25B

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/13/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		4,8,13		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, medium dense, 20% fine sand, 80% medium sand, trace mica	
30	SS		12,16,21		**Poorly Graded Sand (SP)** same as above, wet, dense, trace coarse sand, trace mica	6.0 ppm
					End of Boring	Total depth = 32' bgs Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
35						
40						
45						
50						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-25C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/13/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silt (ML)** dark grayish brown (10YR 4/2), moist, low plasticity, trace mica	Hand augered to 5' bgs
5	SS		2,3,5		**Clay (CL)** dark grayish brown (10YR 4/2), moist, medium stiff, medium plasticity, trace mica	1.7 ppm
10	SS		4,6,8		**Clay (CL)** same as above, wet, black stringers of decayed organic material,	1.9 ppm
					Poorly Graded Sand (SP) olive (5Y 5/3), wet, medium dense, 95% fine sand, 5% nonplastic fines, trace mica	
15	SS		5,6,8		**Fat Clay (CH)** olive gray (5Y 5/2), wet, stiff, high plasticity, 100% fines	3.7 ppm
20	SS		4,6,10		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, medium dense, 90% medium sand, 10% fine sand, trace coarse sand, trace mica, 1" thick interbedded clay at 21'	4.5 ppm
25						5.8 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-25C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/13/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		4,8,13		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, medium dense, 20% fine sand, 80% medium sand, trace mica	
30	SS		12,16,21		**Poorly Graded Sand (SP)** same as above, wet, dense, trace coarse sand, trace mica	6.0 ppm
35	SS		14,18,23		**Poorly Graded Sand (SP)** same as above, sharp contact with 100% fine sand at 36'	5.6 ppm
40	SS		18,21,26		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, dense, 20% fine sand, 80% medium sand, trace coarse sand, grades down to silty fine sand at 41'	5.1 ppm
45	SS		17,20,29		**Poorly Graded Sand with Silt (SP-SM)** dark gray (5Y 4/1), wet, dense, 40% fine sand, 50% medium sand, 10% nonplastic fines, gradually grades down to sandy silt at 46', trace mica	4.6 ppm
					Sandy Silt (ML) dark gray (5Y 4/1), wet, 30% fine sand, 70% nonplastic fines	
50						4.1 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-25C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/13/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		15,22,27		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, very dense, 60% fine sand, 40% medium sand, trace coarse sand and gravel at 50.8', subrounded, sharp contact with 100% fine sand at 51'	
55	SS		19,26,30		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, very dense, 95% fine sand, 5% nonplastic fines, trace mica, trace fine gravel, subangular	3.9 ppm
60	SS		22,28,34		**Poorly Graded Sand with Gravel (SP)** dark gray (5Y 4/1), wet, very dense, 95% fine sand, 5% fine gravel throughout, subrounded, trace mica	2.6 ppm
65	SS		13,30,37		**Poorly Graded Sand (SP)** dark gray (5Y 4/1), wet, very dense, 80% fine sand, 20% medium sand, trace fine gravel locally, trace mica, gradually grades down to silty fine sand at 66'	5.6 ppm
					Silty Sand (SM) dark gray (5Y 4/1), wet, 30% nonplastic fines, 70% fine sand	Total depth = 67' bgs
70					End of Boring	Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
75						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-27B

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/14/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silt (ML)** dark grayish brown (10YR 4/2), moist, 100% fines, low plasticity	
5	SS		2,3,6		**Fat Clay (CH)** yellowish brown (10YR 5/4), wet at 5.5', stiff, 100% fines, medium to high plasticity	1.2 ppm
10	SS		4,4,7		**Fat Clay** same as above, color become olive gray (5Y 4/2) at 10.5' sharp contact with silty sand at 11'	1.0 ppm
					Silty Sand (SM) olilve gray (5Y 4/2), wet, medium dense, 20% nonplastic fines, 80% fine sand, trace mica	
15	SS		5,6,9		**Fat Clay (CH)** olive (5Y 4/3), wet, stiff, mottled, high plasticity, sharp contact with sand at 16'	3.5 ppm
					Poorly Graded Sand (SP) olive gray (5Y 4/3), wet, 90% fine sand, 10% medium sand, trace mica	
20	SS		12,16,18		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 30% fine sand, 70% medium sand, trace mica	3.2 ppm
25						3.1 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-27B

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/14/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		8,12,20		**Poorly Graded Sand (SP)** olive gray (5Y 5/2), wet, dense, 40% fine sand, 60% medium sand	
30	SS		14,19,21			4.2 ppm
					Silty Sand (SM) olive gray (5Y 5/2), wet, dense, 20% nonplastic fines, 80% fine sand, trace fine mica	
					End of Boring	Total depth = 32' bgs
35						Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
40						
45						
50						

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-27C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/14/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0	Grab				**Silt (ML)** dark grayish brown (10YR 4/2), moist, 100% fines, low plasticity	
5	SS		2,3,6		**Fat Clay (CH)** yellowish brown (10YR 5/4), wet at 5.5', stiff, 100% fines, medium to high plasticity	1.2 ppm
10	SS		4,4,7		**Fat Clay** same as above, color become olive gray (5Y 4/2) at 10.5' sharp contact with silty sand at 11'	1.0 ppm
					Silty Sand (SM) olilve gray (5Y 4/2), wet, medium dense, 20% nonplastic fines, 80% fine sand, trace mica	
15	SS		5,6,9		**Fat Clay (CH)** olive (5Y 4/3), wet, stiff, mottled, high plasticity, sharp contact with sand at 16'	3.5 ppm
					Poorly Graded Sand (SP) olive gray (5Y 4/3), wet, 90% fine sand, 10% medium sand, trace mica	
20	SS		12,16,18		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 30% fine sand, 70% medium sand, trace mica	3.2 ppm
25						3.1 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-27C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/14/10 **LOGGER:** C. Kamali

DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		8,12,20		**Poorly Graded Sand (SP)** olive gray (5Y 5/2), wet, dense, 40% fine sand, 60% medium sand	
30						4.2 ppm
	SS		14,19,21		**Silty Sand (SM)** olive gray (5Y 5/2), wet, dense, 20% nonplastic fines, 80% fine sand, trace fine mica	
35						4.5 ppm
	SS		16,19,26		**Poorly Graded Sand (SP)** olive gray (5Y 5/2), wet, dense, 90% medium sand, 10% fine sand, trace coarse sand, trace mica, sharp contact with silty fine sand at 36.2'	
					Silty Sand (SM) olive gray (5Y 4/2), wet, 60% fine sand, 40% nonplastic fines	
40						4.2 ppm
	SS		12,21,26		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, dense, 10% fine sand, 90% medium sand, trace mica, sharp contact with silty fine sand at 41'	
					Silty Sand (SM) olive gray (5Y 4/2), wet, 30% nonplastic fines, 70% fine sand, trace fine mica	
45						5.8 ppm
	SS		18,26,28		**Poorly Graded Sand (SP)** olive gray (5Y 4/2), wet, very dense, 30% fine sand, 70% medium sand, transitions to 100% fine sand at 46'	
50						3.8 ppm

PROJECT NUMBER: 385135.FI.01 **BORING NUMBER:** MW-27C

SOIL BORING LOG

PROJECT: EPA Halaco Superfund Site **LOCATION:** NCL

ELEVATION: **DRILLING CONTRACTOR:** WDC Exploration and Wells

DRILLING METHOD AND EQUIPMENT: HSA; CME-85; 8" Augers

WATER LEVELS: **START:** 5/14/10 **LOGGER:** C. Kamali

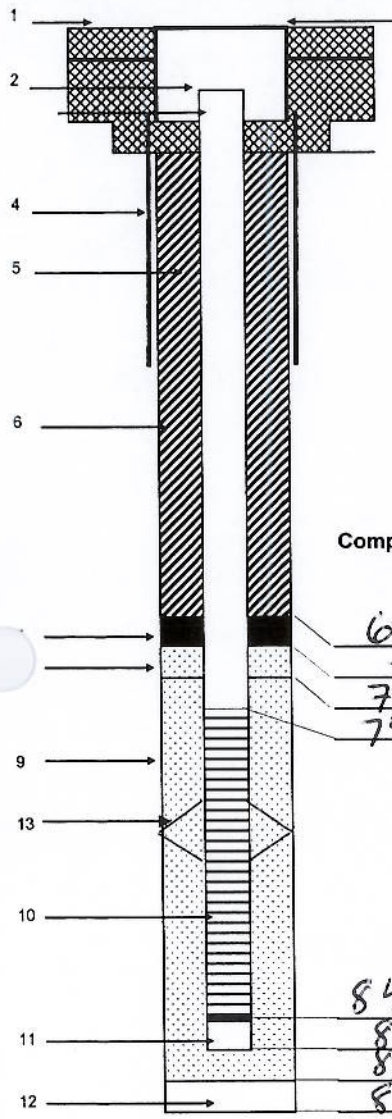
DEPTH BELOW (Feet)	SAMPLE TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	SS		21,28,31		**Poorly Graded Sand with Gravel (SP)** olive gray (5Y 4/2), wet, very dense, 80% fine sand, 20% m edium sand, trace mica, sharp contact with silty fine sand at 50.9'	
					Silty Sand (SM) olive gray (5Y 4/2), wet, 30% nonplastic fines, 70% fine sand	
55						4.2 ppm
	SS		18,18,30		**Poorly Graded Sand (SM)** very dark greenish gray (Gley1 3/10Y), wet, dense, 95% fine sand, 5% nonplastic fines, some seashells at 55-56', trace mica	
60						3.7 ppm
	SS		21,28,34		**Poorly Graded Sand with Silt (SP-SM)** very dark greenish gray (Gley1 3/10Y), wet, very dense, 90% fine sand, 10% nonplastic fines, trace fine mica, transitions to silt with sand at 66'	
65						2.7 ppm
	SS		18,20,36			
					Silt with Sand (ML) dark gray (5Y 4/1), wet, 90% nonplastic fines, 10% fine sand, trace fine mica	
					End of Boring	Total depth = 67' bgs
70						Logging based on ASTM D2488 standard (visual-manual procedure) and Munsell color chart 2000 edition
75						

Attachment E-3

CH2MHILL	PROJECT NUMBER 385135.F1.01	WELL NUMBER MW-2C
	WELL COMPLETION DIAGRAM	

PROJECT NAME: HALACO
NORTHING: TBD EASTING EASTING: TBD
START DATE: 10/24/09 END DAT END DATE: 10/24/09
BOREHOLE DIAMETER: 6 in
TOTAL BOREHOLE DEPTH: 85 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: SONIC
DRILLING EQUIPMENT: 400 RS
LOGGED BY: JOSH BACE



Component Depths BGS

69	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
72	Top of pack (ft bgs)
74.6	Top of screen (ft bgs)
84.6	Bottom of screen (ft bgs)
85	Bottom of sump (ft bgs)
85	Bottom of pack (ft bgs)
85	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

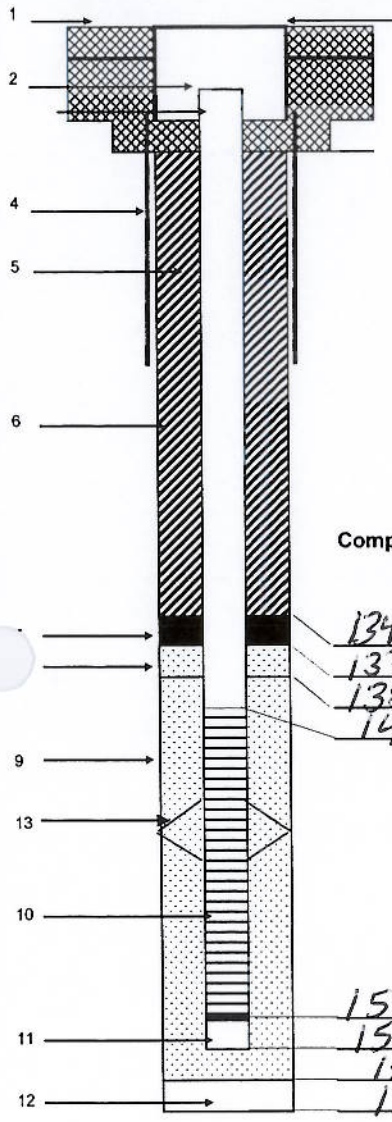
1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE-GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in Ø
c) Bollards: 2 FOR MW-2C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 76.6 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 100 ga
c) Calculated volume: ft^3 gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bag
b) Calculated quantity: ft^3 50 lb bags
8- Transition filter pack type: NONE
a) Quantity used: —
b) Calculated quantity: — ft^3 100 lb bags
9- Filter pack type: #2-/16 MONTEREY SAND
a) Quantity used: 4.5 X 50 lb bags
b) Calculated quantity: ft^3 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.010 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: NONE
a) Quantity used: — ft^3
b) Calculated quantity: — ft^3
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 33, 73

Well Development
Start Date/Time: 10/24/09 / 1415
End Date/Time: 10/24/09 / 0900
Development Method: POSITIVE AIR DISPLACEMENT
Duration: 2 hours 35 mins
Purgevolume: 107 gal
Volume of water injected during drilling/ well installation: ? gal
Calculated well volume: 9.6 gal

Comments: TBD - TO BE DETERMINED

CH2MHILL	PROJECT NUMBER 385135.F1.01	WELL NUMBER MW-2D
	WELL COMPLETION DIAGRAM	

PROJECT NAME: HALACO
LOCATION NAME: OXNARD, CA
NORTHING: TBD EASTING EASTING: TBD
DRILLING CONTRACTOR: WDC
START DATE: 10/20/09 END DAT END DATE: 10/21/09
DRILLING METHOD: SONIC
BOREHOLE DIAMETER: 6 in
DRILLING EQUIPMENT: 400 RS
TOTAL BOREHOLE DEPTH: 155 ft
LOGGED BY: JOSH BACE



Component Depths BGS

134.6	Top of seal (ft bgs)
137.7	Top of transition sand (ft bgs)
138.9	Top of pack (ft bgs)
142	Top of screen (ft bgs)
152	Bottom of screen (ft bgs)
152.4	Bottom of sump (ft bgs)
155	Bottom of pack (ft bgs)
155	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE-GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in Ø
c) Bollards: 2 FOR MW-2C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 144 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 2.00 ga
c) Calculated volume: ft³ gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 0.75 X 50 lb bag
b) Calculated quantity: ft³ 50 lb bags
8- Transition filter pack type: #0/30 MONTEREY SAND
a) Quantity used: 0.25 X 50 lb bag
b) Calculated quantity: ft³ 100 lb bags
9- Filter pack type: #3 MONTEREY SAND
a) Quantity used: 4.5 X 50 lb bag
b) Calculated quantity: ft³ 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.020 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: BENTONITE CHIPS
a) Quantity used: 0.5 X 50 lb bag ft³
b) Calculated quantity: ft³
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 40, 90, 137

Well Development
Start Date/Time: 10/26/09 / 1255
End Date/Time: 10/27/09 / 0845
Development Method: ELECTRIC SUBMERSIBLE/POSITIVE AIR DISPLACEMENT
Duration: 4 hrs 25 min
Purgevolume: 399 gal
Volume of water injected during drilling/ well installation: ? gal
Calculated well volume: 19 gal

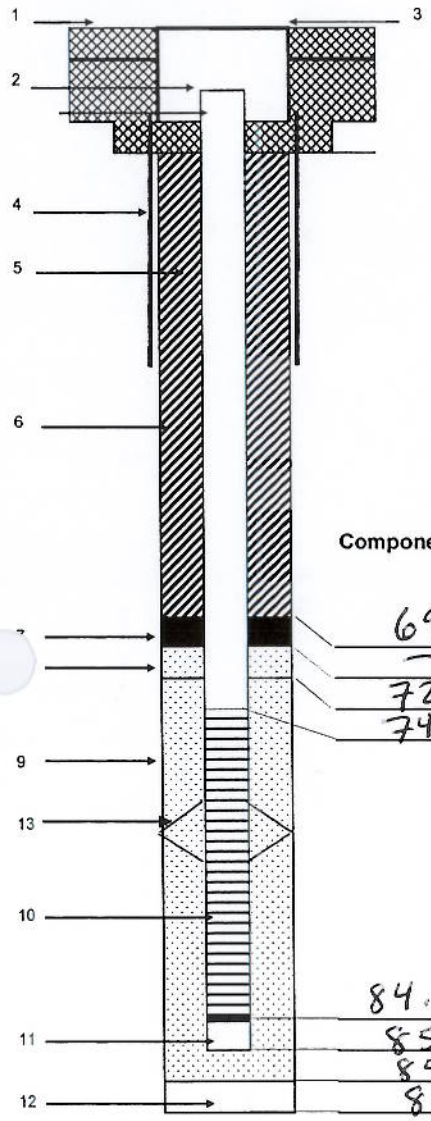
Comments: TBD - TO BE DETERMINED

CH2MHILL	PROJECT NUMBER 385135.F1.01	WELL NUMBER MW-3C

WELL COMPLETION DIAGRAM

PROJECT NAME: HALACO
NORTHING: TBD EASTING EASTING: TBD
START DATE: 10/24/09 END DAT END DATE: 10/24/09
BOREHOLE DIAMETER: 6 in
TOTAL BOREHOLE DEPTH: 85 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: SONIC
DRILLING EQUIPMENT: 400 RS
LOGGED BY: JOSH BALE



Component Depths BGS

69	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
72	Top of pack (ft bgs)
74.6	Top of screen (ft bgs)
84.6	Bottom of screen (ft bgs)
85	Bottom of sump (ft bgs)
85	Bottom of pack (ft bgs)
85	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE-GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in Ø
c) Bollards: 2 AROUND MW-3C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 76.6 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 100 ga
c) Calculated volume: ft^3 gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bag
b) Calculated quantity: ft^3 50 lb bags
8- Transition filter pack type: NONE
a) Quantity used: —
b) Calculated quantity: — ft^3 100 lb bags
9- Filter pack type: #2-/16 MONTEREY SAND
a) Quantity used: 5 X 50 lb bag
b) Calculated quantity: ft^3 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.010 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: NONE
a) Quantity used: — ft^3
b) Calculated quantity: — ft^3
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 33, 73

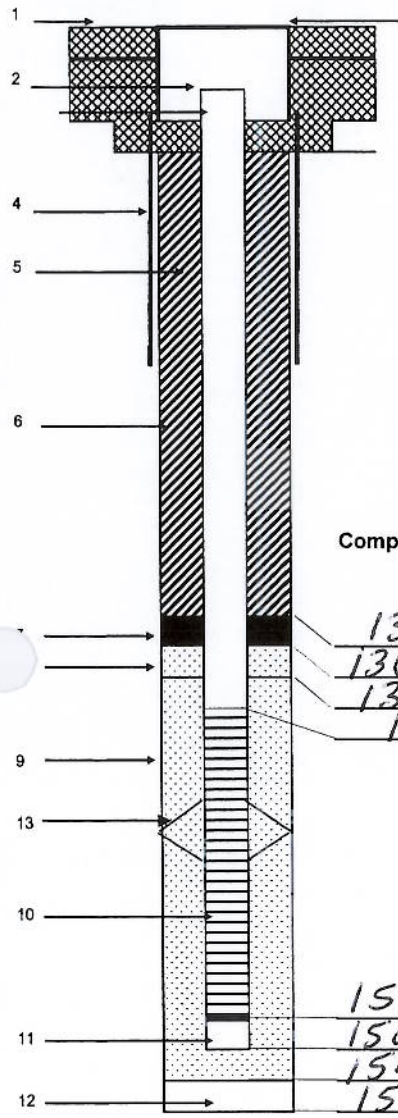
Well Development
Start Date/Time: 10/27/09 / 1100
End Date/Time: 10/27/09 / 1355
Development Method: POSITIVE AIR DISPLACEMENT
Duration: 3 hours
Purgevolume: 137 gal
Volume of water injected during drilling/ well installation: ? gal
Calculated well volume: 10.6 gal

Comments: TBD - TO BE DETERMINED

CH2MHILL	PROJECT NUMBER 385135.F1.01	WELL NUMBER MW-3D
	WELL COMPLETION DIAGRAM	

PROJECT NAME: HALACO
NORTHING: TBD EASTING EASTING: TBD
START DATE: 10/19/09 END DAT END DATE: 10/20/09
BOREHOLE DIAMETER: 6 in
TOTAL BOREHOLE DEPTH: 155 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: SONIC
DRILLING EQUIPMENT: 400 RS
LOGGED BY: JOSH BALE



Component Depths BGS

131	Top of seal (ft bgs)
136.1	Top of transition sand (ft bgs)
137	Top of pack (ft bgs)
140	Top of screen (ft bgs)
150	Bottom of screen (ft bgs)
150.4	Bottom of sump (ft bgs)
151	Bottom of pack (ft bgs)
155	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE-GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in
c) Bollards: 2 AROUND MW-3C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 142 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 200 ga
c) Calculated volume: ft^3 gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bag
b) Calculated quantity: ft^3 50 lb bags
8- Transition filter pack type: #0/30 MONTEREY SAND
a) Quantity used: 0.25 X 50 lb bag
b) Calculated quantity: ft^3 100 lb bags
9- Filter pack type: #3 MONTEREY SAND
a) Quantity used: 3.75 X 50 lb bag
b) Calculated quantity: ft^3 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.020 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bag ft^3
b) Calculated quantity: ft^3
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 40, 90, 137

Well Development
Start Date/Time: 10/27/09 / 1029
End Date/Time: 10/27/09 / 1329
Development Method: ELECTRIC SUBMERSIBLE/POSITIVE AIR DISPLACEMENT
Duration: 3 HOURS
Purgevolume: 208 gal
Volume of water injected during drilling/ well installation: 7 gal
Calculated well volume: 20.6 gal

Comments: TBD - TO BE DETERMINED

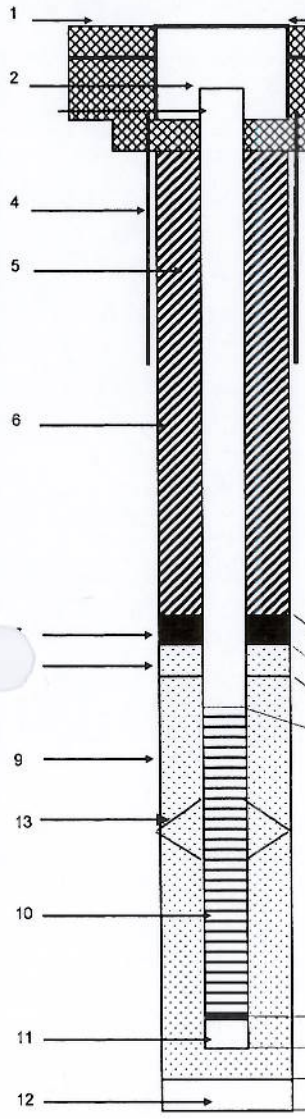
CH2MHILL

PROJECT NUMBER	WELL NUMBER
385135.F1.01	MW-6C

WELL COMPLETION DIAGRAM

ECT NAME: HALACO
HING: TBD EASTING EASTING: TBD
START DATE: 10/27/09 END DAT END DATE: 10/27/09
BOREHOLE DIAMETER: 6 in
TOTAL BOREHOLE DEPTH: 82 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: SONIC
DRILLING EQUIPMENT: 400 RS
LOGGED BY: JOSH BALE



Component Depths BGS

64.5	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
68	Top of pack (ft bgs)
71.6	Top of screen (ft bgs)
81.6	Bottom of screen (ft bgs)
82	Bottom of sump (ft bgs)
82	Bottom of pack (ft bgs)
82	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE-GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in ⌀
c) Bollards: 2 AROUND MW-6C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 73.6 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 100 ga
c) Calculated volume: ft^3 gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bags
b) Calculated quantity: ft^3 50 lb bags
8- Transition filter pack type: NONE
a) Quantity used: —
b) Calculated quantity: — ft^3 100 lb bags
9- Filter pack type: #2-/16 MONTEREY SAND
a) Quantity used: 4.5 x 50 lb bags
b) Calculated quantity: ft^3 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.010 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: NONE
a) Quantity used: — ft^3
b) Calculated quantity: — ft^3
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 30, 70

Well Development
Start Date/Time: 10/28/09 / 0710
End Date/Time: 10/28/09 / 1011
Development Method: POSITIVE AIR DISPLACEMENT
Duration: 3 hours
Purgevolume: 1460 gal
Volume of water injected during drilling/ well installation: ? gal
alculated well volume: 11.2 gal

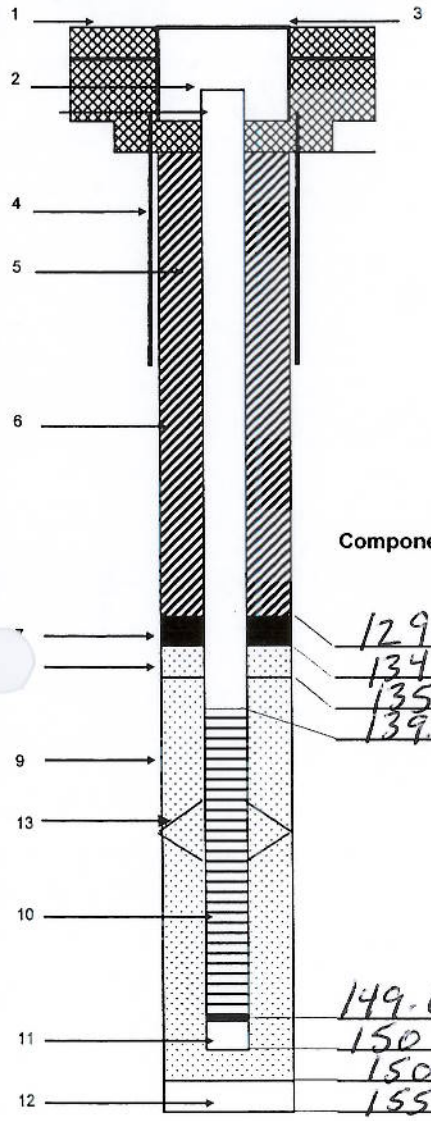
Comments: TBD - TO BE DETERMINED

CH2MHILL	PROJECT NUMBER 385135.F1.01	WELL NUMBER MW-6D

WELL COMPLETION DIAGRAM

PROJECT NAME: HALACO
NORTHING: TBD EASTING EASTING: TBD
START DATE: 10/25/09 END DAT END DATE: 10/26/09
BOREHOLE DIAMETER: 6 in
TOTAL BOREHOLE DEPTH: 155 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: SONIC
DRILLING EQUIPMENT: 400 RS
LOGGED BY: JOSH BALE



Component Depths BGS

129	Top of seal (ft bgs)
134	Top of transition sand (ft bgs)
135	Top of pack (ft bgs)
139.6	Top of screen (ft bgs)
149.6	Bottom of screen (ft bgs)
150	Bottom of sump (ft bgs)
150	Bottom of pack (ft bgs)
155	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE-GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in ø
c) Bollards: 2 AROUND MW-6C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 141.6 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 175 ga
c) Calculated volume: ft^3 gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bag
b) Calculated quantity: ft^3 50 lb bags
8- Transition filter pack type: #0/16 MONTEREY SAND
a) Quantity used: 0.5 X 50 lb bag
b) Calculated quantity: ft^3 100 lb bags
9- Filter pack type: #3 MONTEREY SAND
a) Quantity used: 4.5 X 50 lb bag
b) Calculated quantity: ft^3 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.020 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: NATIVE SOIL (HEAVE)
a) Quantity used: — ft^3
b) Calculated quantity: — ft^3
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 57, 97, 137

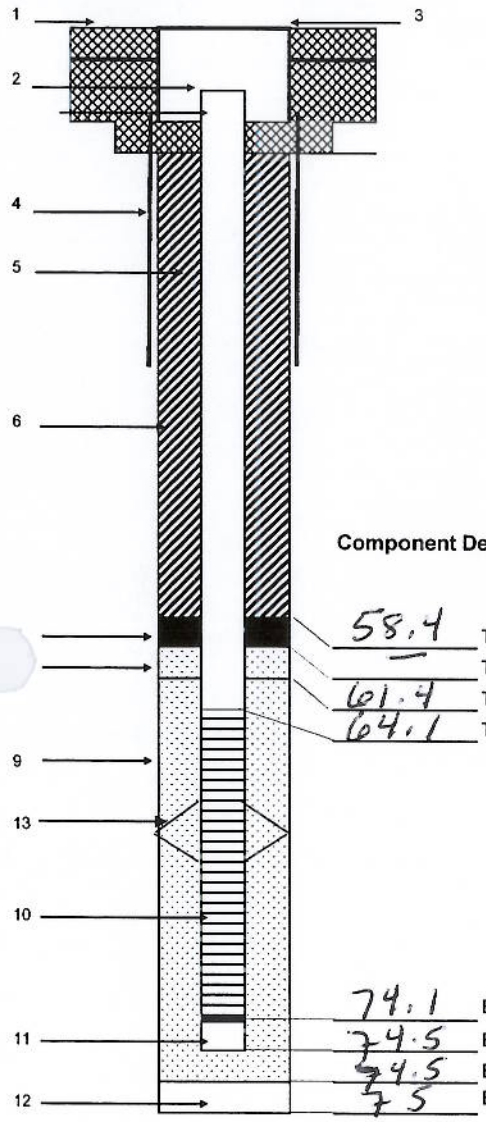
Well Development
Start Date/Time: 10/28/09 / 0647
End Date/Time: 10/28/09 / 0917
Development Method: ELECTRIC SUBMERSIBLE / POSITIVE AIR DISPLACEMENT
Duration: 2 hours 30 mins
Purgevolume: 21.6 gal
Volume of water injected during drilling/ well installation: ? gal
Calculated well volume: 21.6 gal

Comments: TBD - TO BE DETERMINED

CH2MHILL	PROJECT NUMBER 385135.F1.01	WELL NUMBER MW-19C
	WELL COMPLETION DIAGRAM	

PROJECT NAME: HALACO
NORTHING: TBD EASTING EASTING: TBD
START DATE: 10/23/09 END DATE END DATE: 10/23/09
BOREHOLE DIAMETER: 6 in
TOTAL BOREHOLE DEPTH: 75 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: SONIC
DRILLING EQUIPMENT: 400 RS
LOGGED BY: JOSH BALE



Component Depths BGS

58.4	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
61.4	Top of pack (ft bgs)
64.1	Top of screen (ft bgs)
74.1	Bottom of screen (ft bgs)
74.5	Bottom of sump (ft bgs)
74.5	Bottom of pack (ft bgs)
75	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in Ø
c) Bollards: 3 AROUND MW-19 A/C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 66.1 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 90 ga
c) Calculated volume: ft^3 gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bag
b) Calculated quantity: ft^3 50 lb bags
8- Transition filter pack type: NONE
a) Quantity used: —
b) Calculated quantity: — ft^3 100 lb bags
9- Filter pack type: # 2-1/16 MONTEREY SAND
a) Quantity used: 5 X 50 lb bag
b) Calculated quantity: ft^3 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.010 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: NATIVE SOIL (HEAVE)
a) Quantity used: — ft^3
b) Calculated quantity: — ft^3
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 15, 60

Well Development
Start Date/Time: 10/26/09 / 1006
End Date/Time: 10/26/09 / 1210
Development Method: ELECTRIC SUBMERSIBLE/POSITIVE AIR DISPLACEMENT
Duration: 2 hours
Purgevolume: 83 gal
Volume of water injected during drilling/ well installation: ? gal
Calculated well volume: 7.6 gal

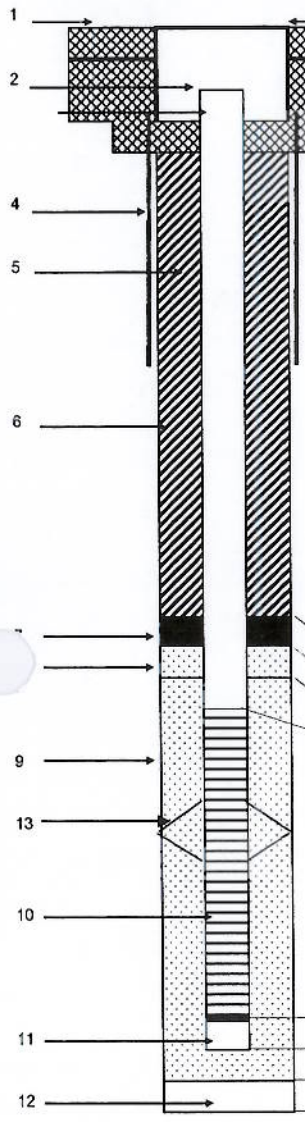
Comments: TBD - TO BE DETERMINED

CH2MHILL

PROJECT NUMBER	WELL NUMBER
385135.F1.01	MW-19D

WELL COMPLETION DIAGRAM

PROJECT NAME: HALACO
LOCATION NAME: OXNARD, CA
NORTHING: TBD
EASTING EASTING: TBD
DRILLING CONTRACTOR: WDC
START DATE: 10/22/09
END DAT END DATE: 10/23/09
DRILLING METHOD: SONIC
BOREHOLE DIAMETER: 6 in
DRILLING EQUIPMENT: 400 RS
TOTAL BOREHOLE DEPTH: 145 ft
LOGGED BY: JOSH BALE



Component Depths BGS

125	Top of seal (ft bgs)
128.3	Top of transition sand (ft bgs)
129.1	Top of pack (ft bgs)
132	Top of screen (ft bgs)
142	Bottom of screen (ft bgs)
142.4	Bottom of sump (ft bgs)
142.4	Bottom of pack (ft bgs)
145	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: ABOVE-GRADE
a) Diameter: 8.5 in
b) Concrete pad dimensions: 18 in Ø
c) Bollards: 3 AROUND MW-19A/C/D
4- Conductor casing type: STEEL
a) Diameter: 8.5 in
b) Length: 5 ft
5- Well casing type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: ~~[illegible]~~ 134 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE PUMP
b) Volume of grout used: 160 ga
c) Calculated volume: ft³ gal
7 Transition seal type: BENTONITE CHIPS
a) Quantity used: 1 X 50 lb bag
b) Calculated quantity: ft³ 50 lb bags
8- Transition filter pack type: #0/30 MONTEREY SAND
a) Quantity used: 0.5 X 50 lb bag
b) Calculated quantity: ft³ 100 lb bags
9- Filter pack type: #3 MONTEREY SAND
a) Quantity used: 5 X 50 lb bag
b) Calculated quantity: ft³ 100 lb bags
10- Screen type / slot size: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.020 in
11- Sump / end cap type: SCHEDULE 80 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: NATIVE SOIL (HEAVE)
a) Quantity used: — ft³
b) Calculated quantity: — ft³
13- Centralizer type: STAINLESS STEEL
a) Depths (ft bgs): 50, 90, 130

Well Development
Start Date/Time: 10/26/09 / 0820
End Date/Time: 10/26/09 / 1059
Development Method: ELECTRIC SUBMERSIBLE / POSITIVE AIR DISPLACEMENT
Duration: 2 HOURS 40 MINS
Purgevolume: 205 gal
Volume of water injected during drilling/ well installation: ? gal
Calculated well volume: 20.5 gal

Comments: TBD - TO BE DETERMINED

CH2MHILL

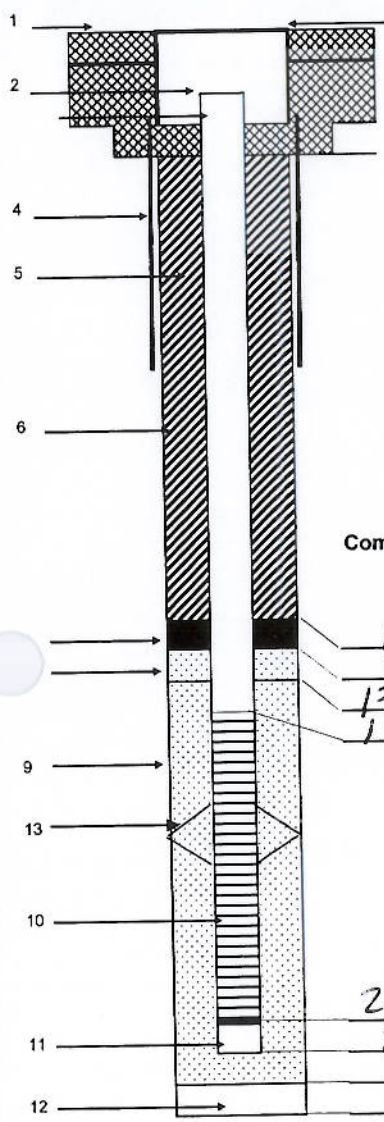
PROJECT NUMBER: 385135.F1.01

WELL NUMBER: MW-20

WELL COMPLETION DIAGRAM

PROJECT NAME: HALACO
NORTHING: TBD EASTING EASTING: TBD
START DATE: 11/6/09 END DAT END DATE:
BOREHOLE DIAMETER: 8 in
TOTAL BOREHOLE DEPTH: 30 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING EQUIPMENT: CME 85
LOGGED BY: JOSH BALE



Component Depths BGS

16	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
17.6	Top of pack (ft bgs)
19.6	Top of screen (ft bgs)
29.6	Bottom of screen (ft bgs)
30	Bottom of sump (ft bgs)
30	Bottom of pack (ft bgs)
30	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl

2- Top of casing elevation: TBD ft above msl

3- Surface completion type: FLUSH MOUNT
- a) Diameter: 8 in
- b) Concrete pad dimensions: 24 x 24 in
- c) Bollards: —

4- Conductor casing type: HDPE
- a) Diameter: 8 in
- b) Length: 1.0 ft

5- Well casing type: SCHEDULE 40 PVC
- a) Diameter: 2 in
- b) Length: 19.1 ft

6- Sanitary seal type: CEMENT-BENTONITE GROUT
- a) Method of placement: TREMIE PUMP
- b) Volume of grout used: 45 ga
- c) Calculated volume: ft^3 gal

7 Transition seal type: BENTONITE TABLETS
- a) Quantity used: 1.5 x 50 lb bucket
- b) Calculated quantity: ft^3 50 lb bags

8- Transition filter pack type: NONE
- a) Quantity used: —
- b) Calculated quantity: — ft^3 100 lb bags

9- Filter pack type: #2-/16 MONTEREY SAND
- a) Quantity used: 4 x 100 lb bags
- b) Calculated quantity: ft^3 100 lb bags

10- Screen type / slot size: SCHEDULE 40 PVC
- a) Diameter: 2 in
- b) Length: 10 ft
- c) Slot size: 0.010 in

11- Sump / end cap type: SCHEDULE 40 PVC
- a) Diameter: 2 in
- b) Length: 0.4 ft

12- Backfill type: NONE
- a) Quantity used: — ft^3
- b) Calculated quantity: — ft^3

13- Centralizer type: —
- a) Depths (ft bgs): —

Well Development

Start Date/Time: 11/9/09 / 0920
End Date/Time: 11/9/09 / 1113
Development Method: POSITIVE AIR DISPLACEMENT
Duration: 2 hours
Purgevolume: 96 gal
Volume of water injected during drilling/ well installation: ? gal
Calculated well volume: 3.7 gal

Comments: TBD - TO BE DETERMINED

CH2MHILL

PROJECT NUMBER: 385135.F1.01

WELL NUMBER: MW-21

WELL COMPLETION DIAGRAM

PROJECT NAME: HALACO

LOCATION NAME: OXNARD, CA

NORTHING: TBD

EASTING EASTING: TBD

DRILLING CONTRACTOR: WDC

START DATE: 11/6/09

END DAT END DATE: 11/6/09

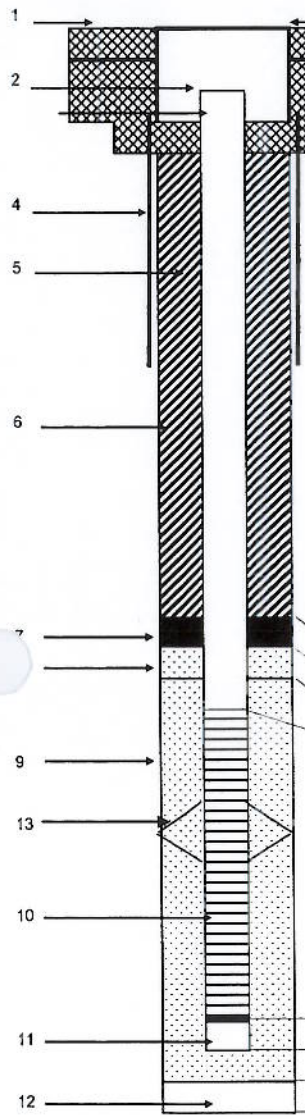
DRILLING METHOD: HOLLOW STEM AUGER

BOREHOLE DIAMETER: 8 in

DRILLING EQUIPMENT: CME 85

TOTAL BOREHOLE DEPTH: 25 ft

LOGGED BY: JOSH BALE



Component Depths BGS

10.5	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
13	Top of pack (ft bgs)
14.6	Top of screen (ft bgs)
24.6	Bottom of screen (ft bgs)
25	Bottom of sump (ft bgs)
25	Bottom of pack (ft bgs)
25	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl

2- Top of casing elevation: TBD ft above msl

3- Surface completion type: FLUSH MOUNT
- a) Diameter: 8 in
- b) Concrete pad dimensions: 24 IN x 24 IN in
- c) Bollards: —

4- Conductor casing type: HDPE
- a) Diameter: 8 in
- b) Length: 1.0 ft

5- Well casing type: SCHEDULE 40 PVC
- a) Diameter: 2 in
- b) Length: 14.0 ft

6- Sanitary seal type: CEMENT-BENTONITE GROUT
- a) Method of placement: TREMIE PUMP
- b) Volume of grout used: 30 ga
- c) Calculated volume: ft^3 gal

7 Transition seal type: BENTONITE TABLETS
- a) Quantity used: 1.5 x 50 lb buckets
- b) Calculated quantity: ft^3 50 lb bags

8- Transition filter pack type: NONE
- a) Quantity used: —
- b) Calculated quantity: — ft^3 100 lb bags

9- Filter pack type: #2-/16 MONTEREY SAND
- a) Quantity used: 2.5 x 100 lb bag
- b) Calculated quantity: ft^3 100 lb bags

10- Screen type / slot size: SCHEDULE 40 PVC
- a) Diameter: 2 in
- b) Length: 10 ft
- c) Slot size: 0.010 in

11- Sump / end cap type: SCHEDULE 40 PVC
- a) Diameter: 2 in
- b) Length: 0.4 ft

12- Backfill type: NONE
- a) Quantity used: — ft^3
- b) Calculated quantity: — ft^3

13- Centralizer type: —
- a) Depths (ft bgs): —

Well Development

Start Date/Time: 11/6/09 / 1130

End Date/Time: 11/6/09 / 1305

Development Method: POSITIVE AIR DISPLACEMENT

Duration: 1 hour 35 mins

Purgevolume: 72 gal

Volume of water injected during drilling/ well installation: ? gal

alculated well volume: 3.7 gal

Comments: TBD - TO BE DETERMINED

CH2MHILL

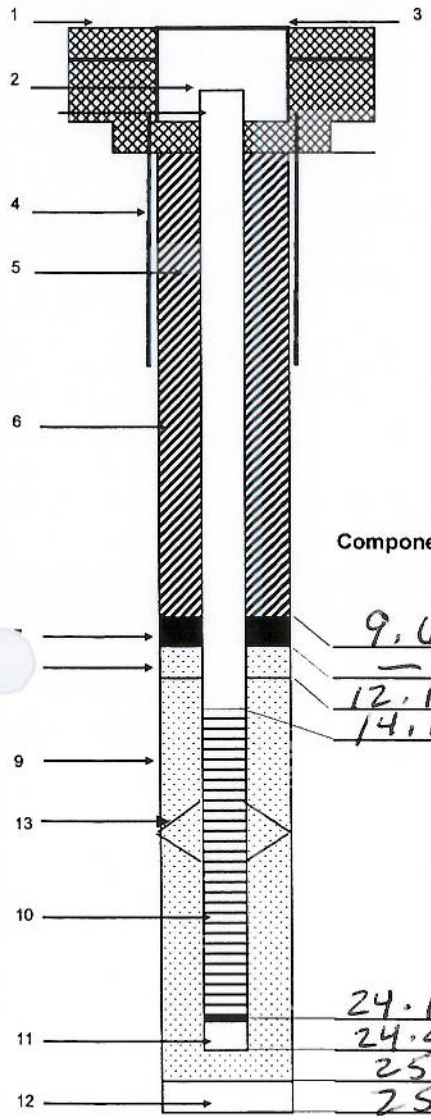
PROJECT NUMBER: 385135.F1.01

WELL NUMBER: MW-22

WELL COMPLETION DIAGRAM

PROJECT NAME: HALACO
NORTHING: TBD EASTING EASTING: TBD
START DATE: 11/5/09 END DAT END DATE: 11/6/09
BOREHOLE DIAMETER: 8 in
TOTAL BOREHOLE DEPTH: 25 ft

LOCATION NAME: OXNARD, CA
DRILLING CONTRACTOR: WDC
DRILLING METHOD: HOLLOW STEM AUGER
DRILLING EQUIPMENT: CME 85
LOGGED BY: JOSH BALE



Component Depths BGS

9.6	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
12.1	Top of pack (ft bgs)
14.1	Top of screen (ft bgs)
24.1	Bottom of screen (ft bgs)
24.5	Bottom of sump (ft bgs)
25	Bottom of pack (ft bgs)
25	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well: TBD ft above msl
2- Top of casing elevation: TBD ft above msl
3- Surface completion type: FLUSH MOUNT
a) Diameter: 8 in
b) Concrete pad dimensions: 12 in ϕ
c) Bollards: —
4- Conductor casing type: HDPE
a) Diameter: 8 in
b) Length: 1.0 ft
5- Well casing type: SCHEDULE 40 PVC
a) Diameter: 2 in
b) Length: 13.5 ft
6- Sanitary seal type: CEMENT-BENTONITE GROUT
a) Method of placement: TREMIE GROUT
b) Volume of grout used: 30 ga
c) Calculated volume: ft^3 gal
7 Transition seal type: BENTONITE TABLETS
a) Quantity used: 1.5 x 50 lb bucket
b) Calculated quantity: ft^3 50 lb bags
8- Transition filter pack type: NONE
a) Quantity used: —
b) Calculated quantity: — ft^3 100 lb bags
9- Filter pack type: #2/16 MONTEREY SAND
a) Quantity used: 2.5 x 100 lbs bag
b) Calculated quantity: ft^3 100 lb bags
10- Screen type / slot size: SCHEDULE 40 PVC
a) Diameter: 2 in
b) Length: 10 ft
c) Slot size: 0.010 in
11- Sump / end cap type: SCHEDULE 40 PVC
a) Diameter: 2 in
b) Length: 0.4 ft
12- Backfill type: NATIVE SOIL (HEAVE)
a) Quantity used: — ft^3
b) Calculated quantity: — ft^3
13- Centralizer type: —
a) Depths (ft bgs): —

Well Development
Start Date/Time: 11/6/09 / 0940
End Date/Time: 11/6/09 / 1124
Development Method: POSITIVE AIR DISPLACEMENT
Duration: 2 hrs 45 mins
Purgevolume: 77 gal
Volume of water injected during drilling/ well installation: 7 gal
Calculated well volume: 3.4 gal

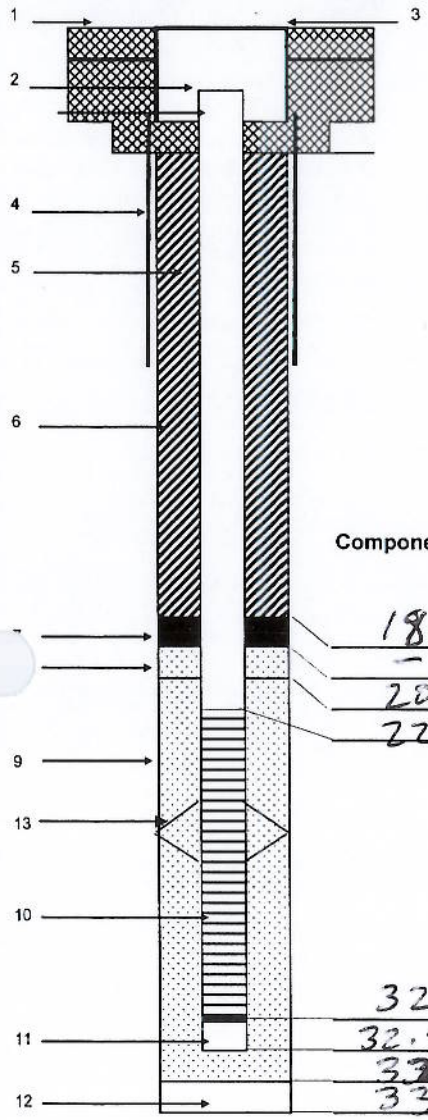
Comments: TBD - TO BE DETERMINED

CH2MHILL

PROJECT NUMBER	WELL NUMBER
385135.F1.01	MW-24

WELL COMPLETION DIAGRAM

ECT NAME :	HALACO	LOCATION NAME:	OXNARD, CA
HING:	TBD EASTING EASTING: TBD	DRILLING CONTRACTOR:	WDC
START DATE:	11/9/09 END DAT END DATE: 11/9/09	DRILLING METHOD:	HOLLOW STEM AUGER
BOREHOLE DIAMETER:	8 in	DRILLING EQUIPMENT:	CME 85
TOTAL BOREHOLE DEPTH:	33 ft	LOGGED BY:	JOSH BALE



Component Depths BGS

18.5	Top of seal (ft bgs)
—	Top of transition sand (ft bgs)
20	Top of pack (ft bgs)
22	Top of screen (ft bgs)
32	Bottom of screen (ft bgs)
32.4	Bottom of sump (ft bgs)
32.4	Bottom of pack (ft bgs)
33	Bottom of borehole (ft bgs

NOTE: DRAWING NOT TO SCALE

1- Ground elevation at well	TBD	ft above msl
2- Top of casing elevation	TBD	ft above msl
3- Surface completion type	ABOVE-GRADE	
a) Diameter	8.5	in
b) Concrete pad dimensions	18	in Ø
c) Bollards	3	
4- Conductor casing type	STEEL	
a) Diameter	8.5	in
b) Length	5	ft
5- Well casing type	SCHEDULE 40 PVC	
a) Diameter	2	in
b) Length	24	ft
6- Sanitary seal type	CEMENT-BENTONITE GROUT	
a) Method of placement	TREMIE PUMP	
b) Volume of grout used	45	ga
c) Calculated volume	ft^3	gal
7 Transition seal type	BENTONITE CHIPS	
a) Quantity used	1 X 50 lb bag	
b) Calculated quantity	ft^3	50 lb bags
8- Transition filter pack type	NONE	
a) Quantity used	—	
b) Calculated quantity	— ft^3	100 lb bags
9- Filter pack type	#2-16 MONTEREY SAND	
a) Quantity used	4 X 100 lb bag	
b) Calculated quantity	ft^3	100 lb bags
10- Screen type / slot size	SCHEDULE 40 PVC	
a) Diameter	2	in
b) Length	10	ft
c) Slot size	0.010	in
11- Sump / end cap type	SCHEDULE 40 PVC	
a) Diameter	2	in
b) Length	0.4	ft
12- Backfill type	NATIVE SOIL (HEAVE)	
a) Quantity used	—	ft^3
b) Calculated quantity	—	ft^3
13- Centralizer type	—	
a) Depths (ft bgs)	—	

Well Development

Start Date/Time:	11/9/09 / 1230	
End Date/Time:	11/9/09 / 1511	
Development Method:	POSITIVE AIR DISPLACEMENT	
Duration:	2 hrs 40 mins	
Purgevolume:	148	gal
Volume of water injected during drilling/ well installation:	?	gal
lculated well volume:	3.6	gal

Comments: TBD - TO BE DETERMINED

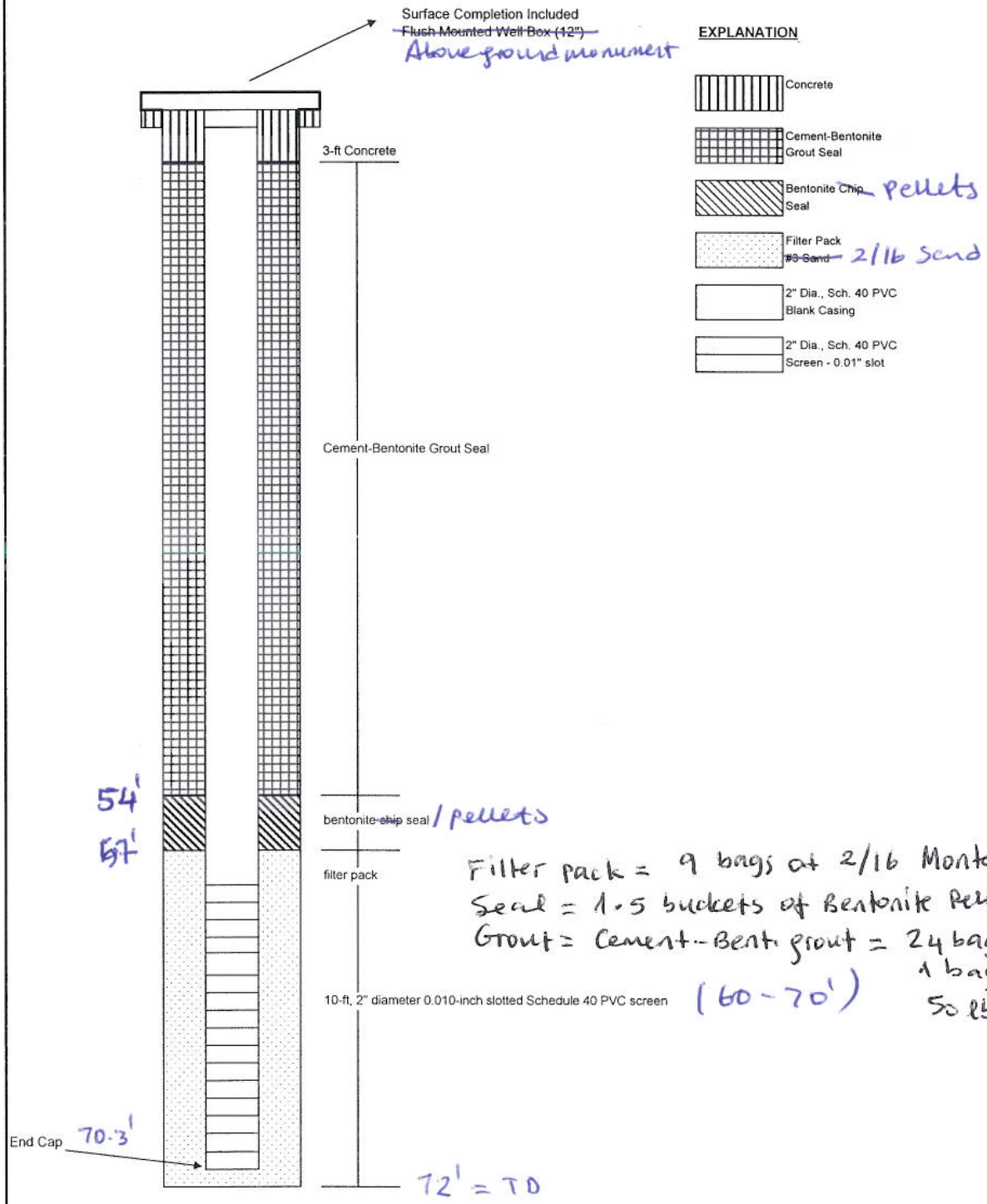
Attachment E-4

CH2MHILL

PROJECT NUMBER	WELL NUMBER
385135.F1.01	MW-12C SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Halaco Superfund site
LOCATION: Smelter parcel
DRILLING CONTRACTOR: WDC Exploration & Wells
GROUND SURFACE ELEVATION: TBD
DRILLING METHOD AND EQUIPMENT USED: HSA; CME 85; 8"
REFERENCE POINT ELEVATION: TBD
BOREHOLE DIAMETER: 8"
START: 5/12/10 END: 5/12/10 LOGGER: C. Kamali



Filter pack = 9 bags of 2/16 Monterey Sand, 50 lbs/bag
Seal = 1.5 buckets of Bentonite Pellets
Grout = Cement-Bent. grout = 24 bags of Portland
1 bag of Volclay
50 lbs/bag.

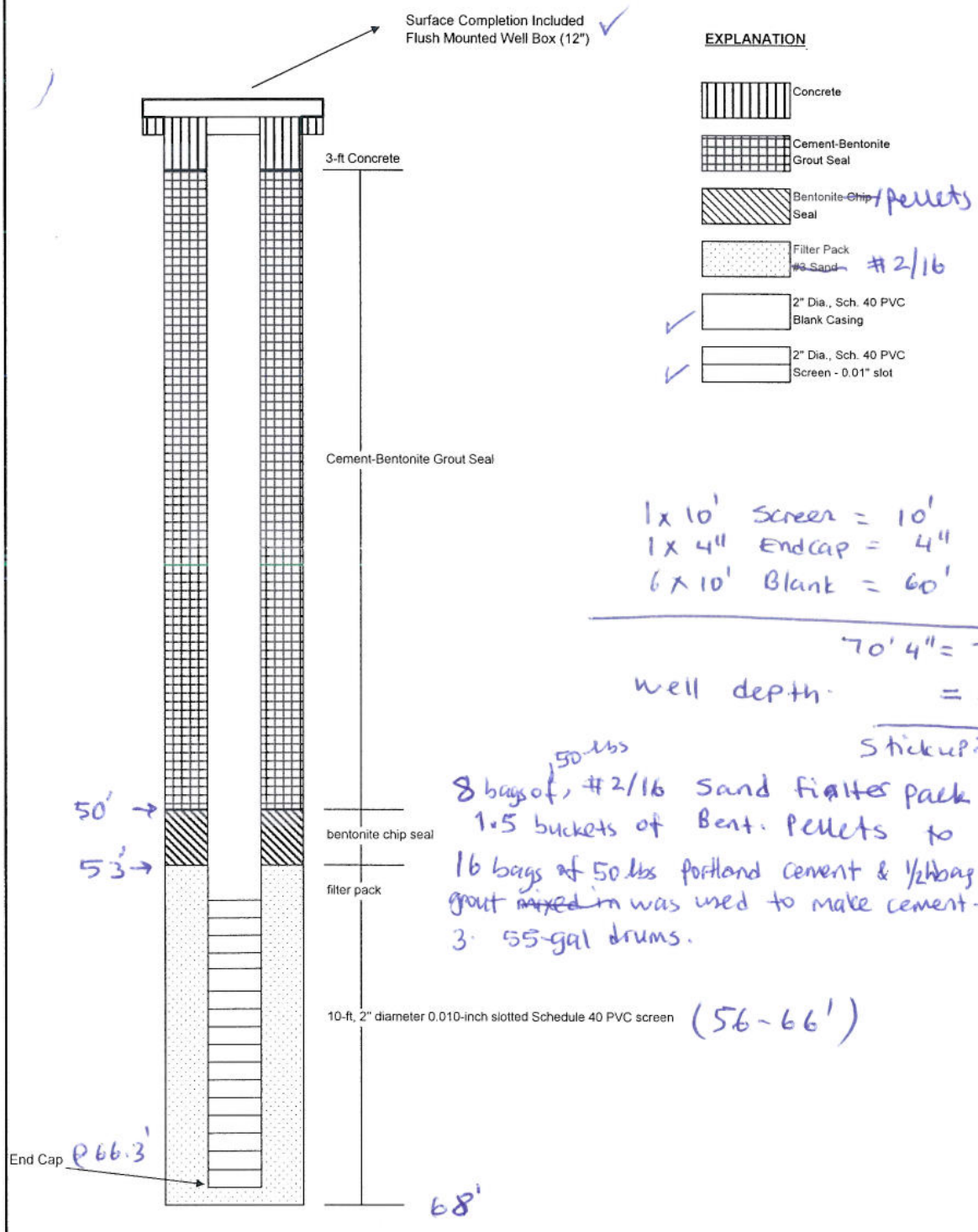
Not to Scale, depths approximate

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
385135.F1.01	MW-13C	SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Helaco Superfund
LOCATION: Smelter
DRILLING CONTRACTOR: VDC Exploration & Wells
GROUND SURFACE ELEVATION:
DRILLING METHOD AND EQUIPMENT USED: HSA; CME 85
REFERENCE POINT ELEVATION:
BOREHOLE DIAMETER: 8"
START: 5/11/10 END: 5/11/10 LOGGER: C. Kamali



1 x 10' Screen = 10'
1 x 4" Endcap = 4"
6 x 10' Blank = 60'

70' 4" = 70.3'
well depth = 66.3
Stickup = 4.0

8 bags of 50 lbs #2/16 Sand filter pack to 53'
1.5 buckets of Bent. Pellets to 50'
16 bags of 50 lbs Portland cement & ½ bag of volclay grout ~~mixed in~~ was used to make cement-grout in 3 55-gal drums.

Not to Scale, depths approximate

CH2MHILL

PROJECT NUMBER: 385135.FI.01

WELL NUMBER: MW-21C

SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: EPA HALACO

LOCATION: Smelter Parcel

DRILLING CONTRACTOR: WDC Exploration & Wells

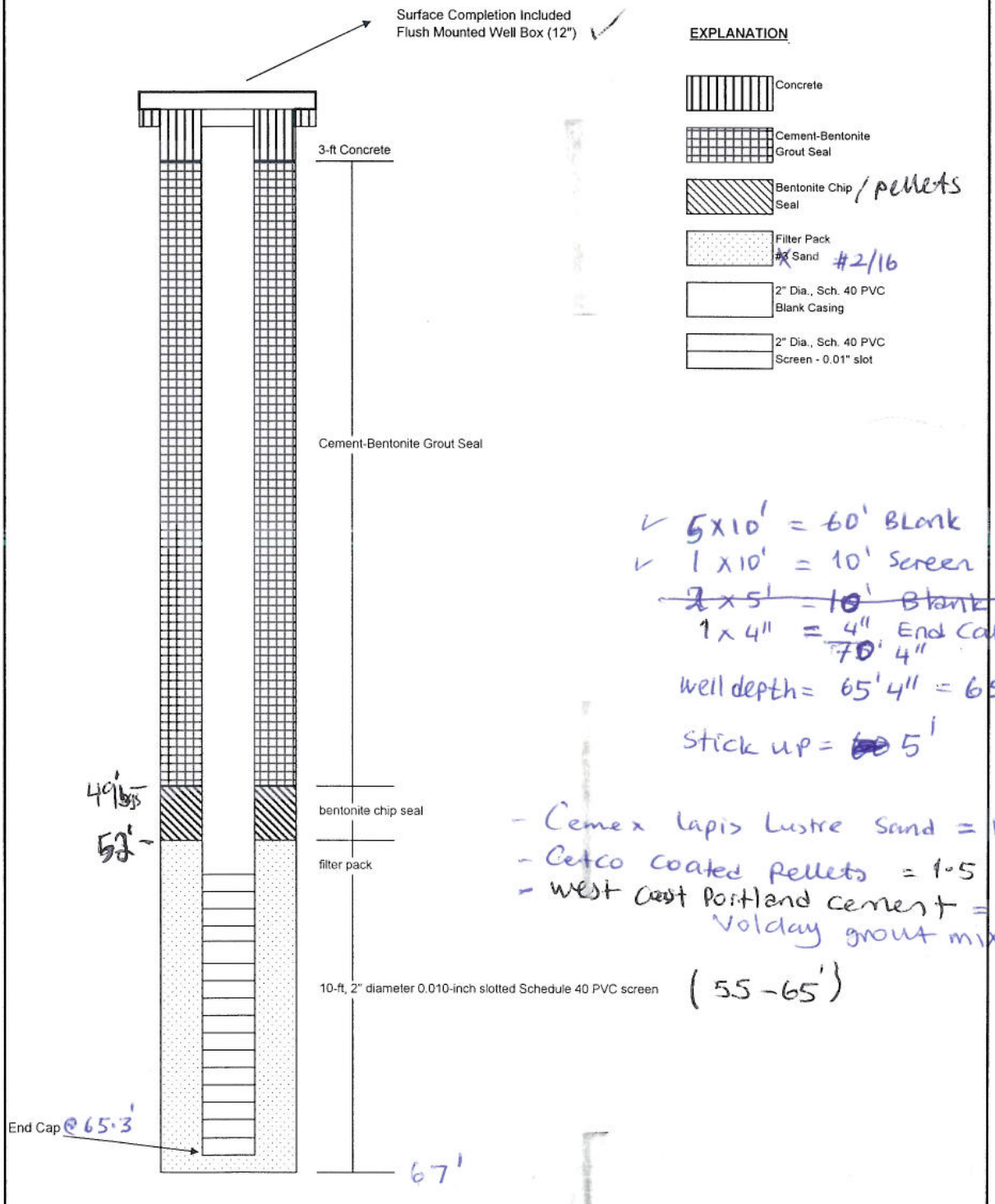
GROUND SURFACE ELEVATION:

DRILLING METHOD AND EQUIPMENT USED: HSA; CME-85, 8" OD

REFERENCE POINT ELEVATION:

BOREHOLE DIAMETER: 8"

START: 5/10/10 END: 5/10/10 LOGGER: C. Kamali



✓ 6 x 10' = 60' Blank

✓ 1 x 10' = 10' Screen

~~2 x 5' = 10' Blank~~ slot

1 x 4" = 4" End Cap/Sump

~~70'~~ 65' 4"

well depth = 65' 4" = 65.3'

Stick up = ~~60~~ 5'

- Cemex Lapis Lustre Sand = 12 x 50 lbs
- Cetco Coated Pellets = 1.5 buckets
- West Coast Portland cement = 13 x 50 lbs
- Volclay grout mix = 1/2 bags

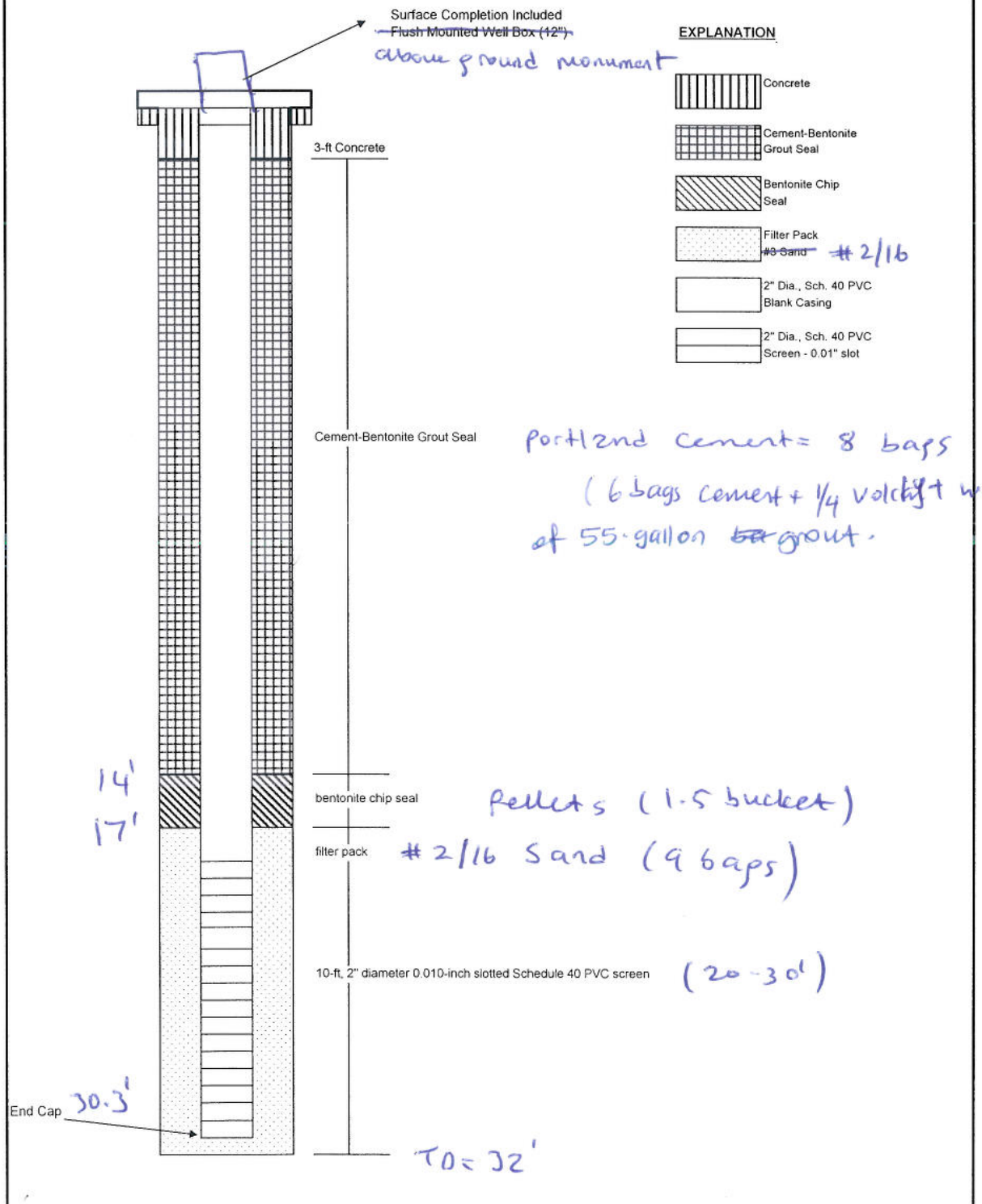
CH2MHILL

PROJECT NUMBER	WELL NUMBER
385135. F1.01	MW-23B

SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Helaco Superfund Site	LOCATION: South of water treatment plant
DRILLING CONTRACTOR: WDC Exploration & Wells	GROUND SURFACE ELEVATION: TBD
DRILLING METHOD AND EQUIPMENT USED: HSA, CME85	REFERENCE POINT ELEVATION: TBD
BOREHOLE DIAMETER: 8"	
START: 3/18/10 END: 3/18/10 LOGGER: C. Kamali	



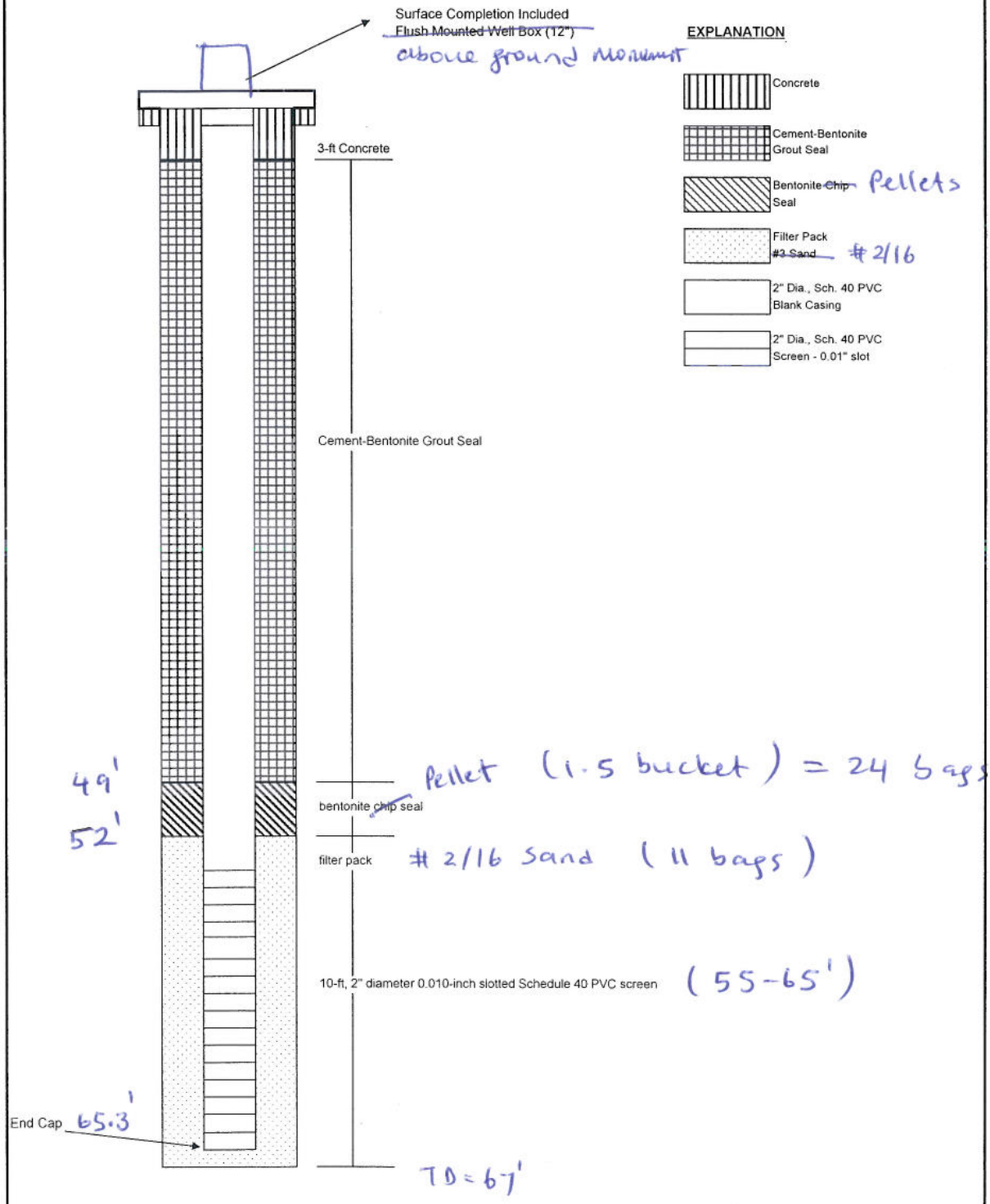
Not to Scale, depths approximate

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
385135.FI.01	MW-23C	SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Halaco Superfund site
LOCATION: South of water treatment plant
DRILLING CONTRACTOR: WDC Exploration & wells
GROUND SURFACE ELEVATION: TBD
DRILLING METHOD AND EQUIPMENT USED: HSA; CME-85
REFERENCE POINT ELEVATION: TBD
BOREHOLE DIAMETER: 8"
START: 3/18 END: 3/18/10 LOGGER: C. Kamali



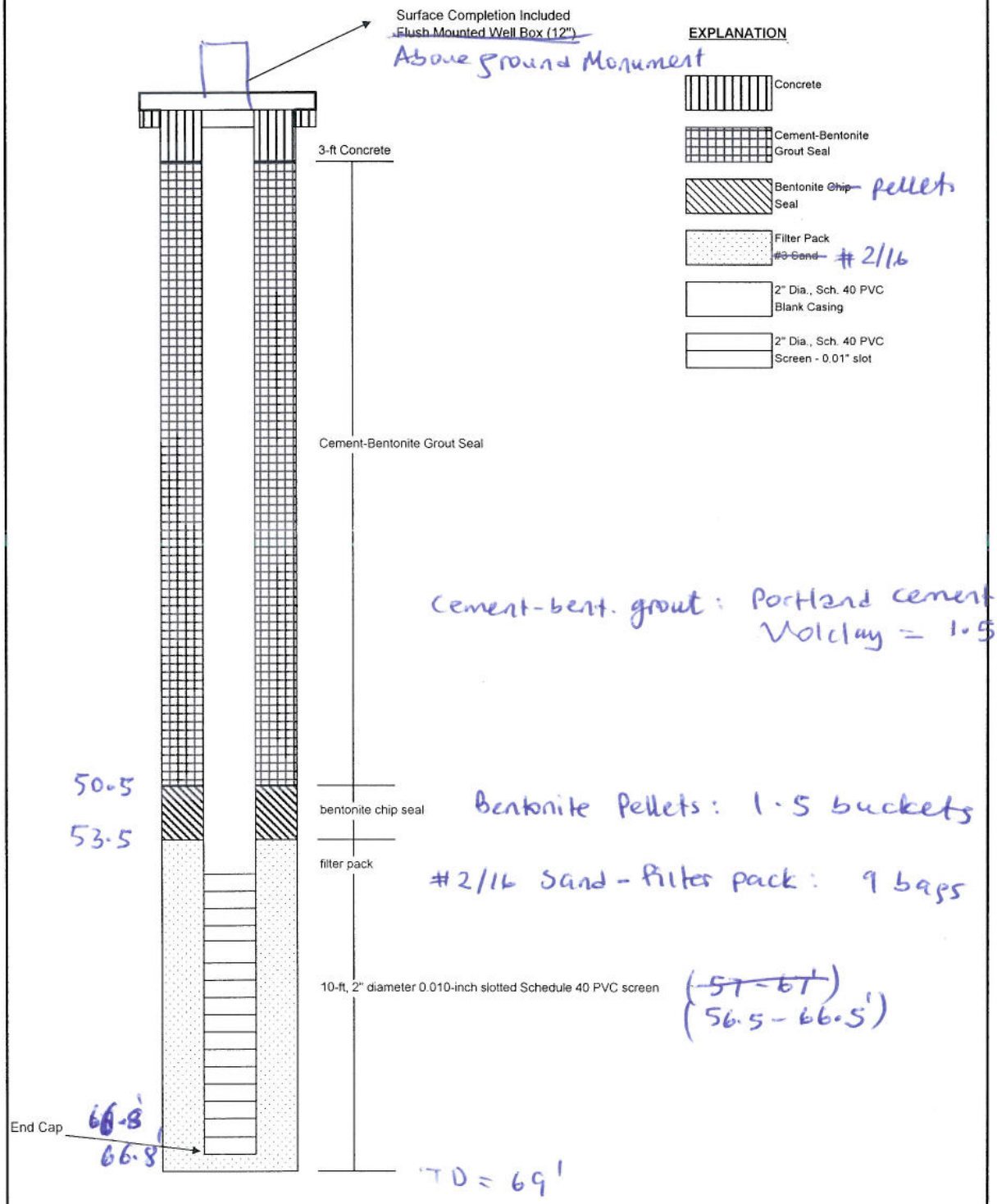
Not to Scale, depths approximate

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
385135.F1.01	MW-24C	SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Halaco Superfund Site
LOCATION: MW-24C
DRILLING CONTRACTOR: WDC Exploration & Wells
GROUND SURFACE ELEVATION: TBD
DRILLING METHOD AND EQUIPMENT USED: HSA; CME 85
REFERENCE POINT ELEVATION: TBD
BOREHOLE DIAMETER: 8"
START: 5/17/10 END: 5/17/10 LOGGER: C. Kamali



Cement-bent. grout: Portland cement: 34
Vol clay = 1.5

Bentonite Pellets: 1.5 buckets

#2/16 Sand - Filter pack: 9 bags

Not to Scale, depths approximate

CH2MHILL

PROJECT NUMBER: 385135.F1.01

WELL NUMBER: MW-25B

SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Halaco Superfund Site

LOCATION: NCL East

DRILLING CONTRACTOR: WDC Exploration & Wells

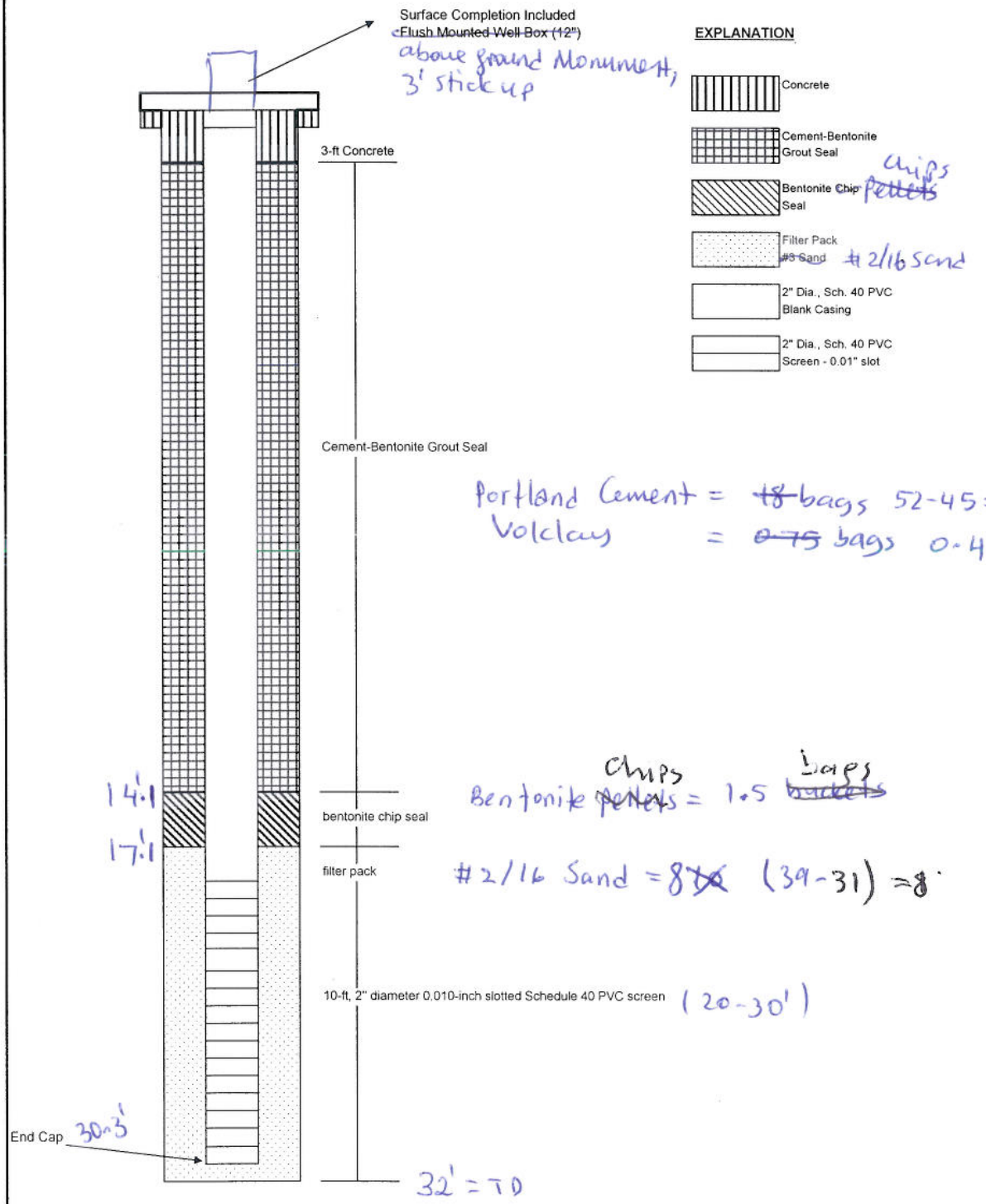
GROUND SURFACE ELEVATION: TBD

DRILLING METHOD AND EQUIPMENT USED: HSA; CME-85

REFERENCE POINT ELEVATION: TBD

BOREHOLE DIAMETER: 8"

START: 5/13/10 END: 5/13/10 LOGGER: C. Kamali



Portland Cement = ~~18~~ bags 52-45 = 7 bags

Volclay = ~~0.75~~ bags 0.4 bags

Bentonite ~~Pellets~~ Chips = 1.5 ~~buckets~~ bags

#2/16 Sand = 8 ~~30~~ (39-31) = 8

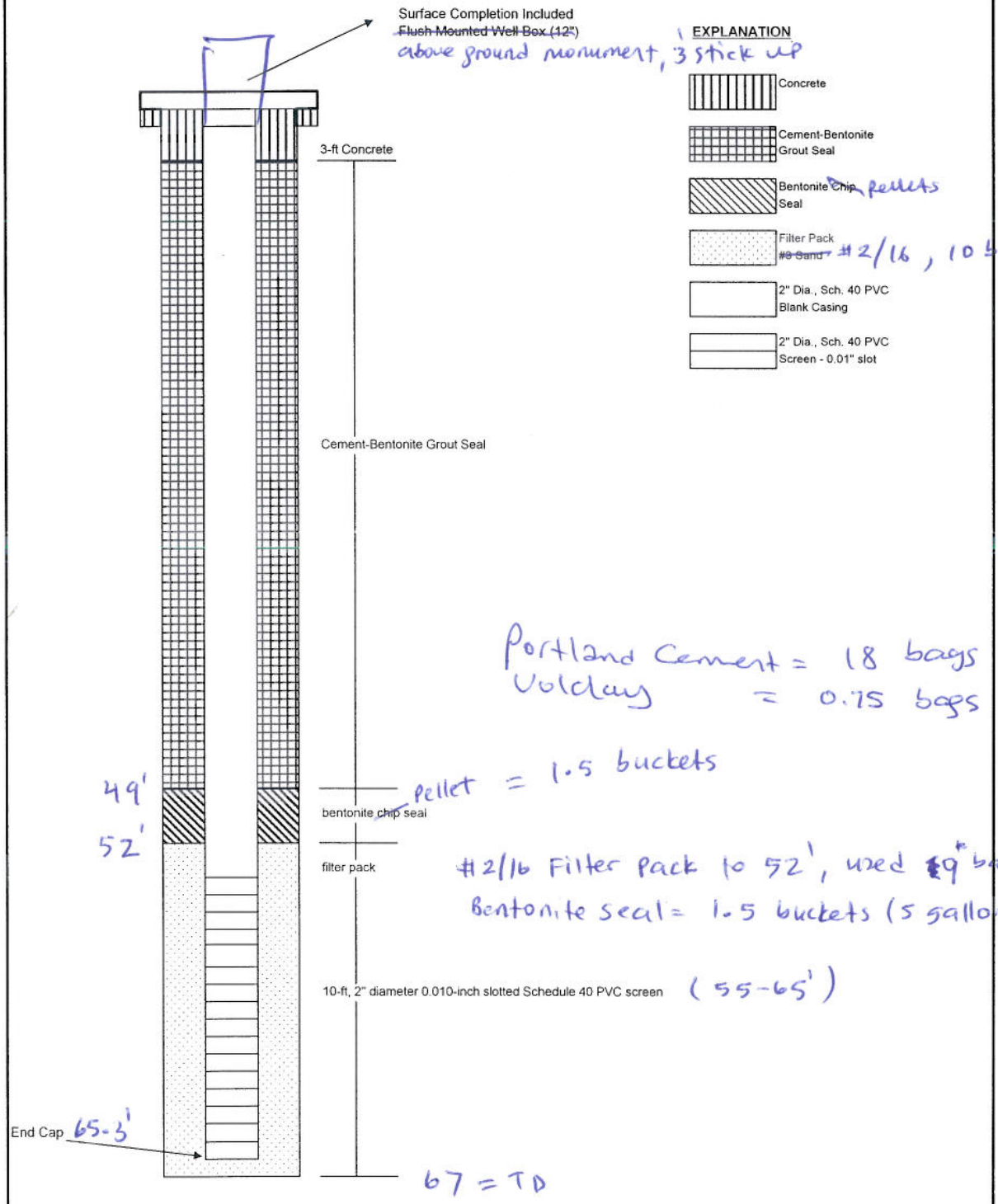
Not to Scale, depths approximate

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
385135.F1.01	MW-25C	SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Halaco Superfund Site
LOCATION: NCL East
DRILLING CONTRACTOR: VDC Exploration & Wells
GROUND SURFACE ELEVATION: TBD
DRILLING METHOD AND EQUIPMENT USED: HSA, CME-85
REFERENCE POINT ELEVATION: TBD
BOREHOLE DIAMETER: 8"
START: 5/13/10 END: 5/13/10 LOGGER: C. Kamali



Portland Cement = 18 bags
Volclay = 0.75 bags

Not to Scale, depths approximate

CH2MHILL

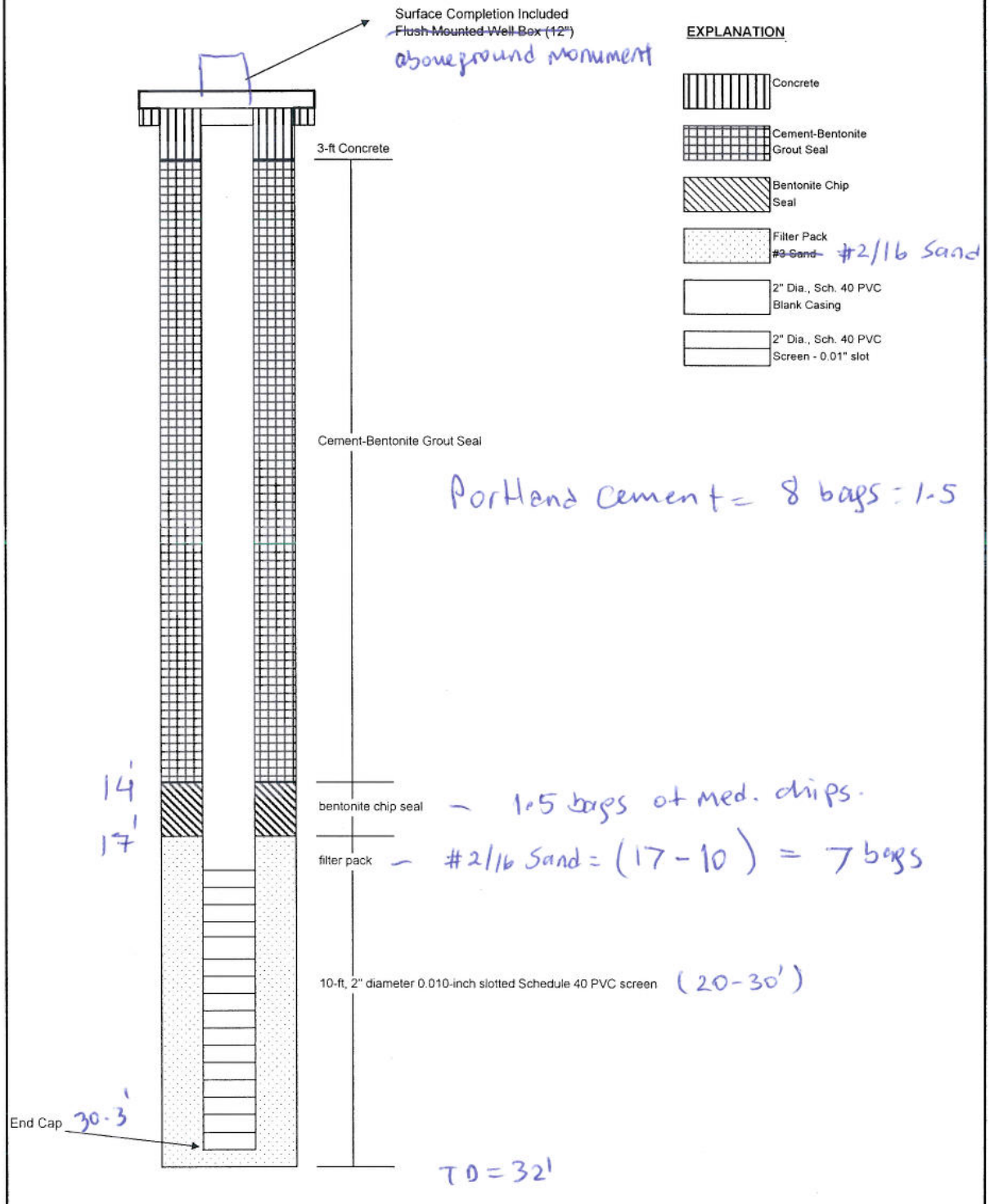
PROJECT NUMBER: 385135.F1.01

WELL NUMBER: MW-27B

SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Halaco Superfund Site
LOCATION: NCL East
DRILLING CONTRACTOR: WDC Exploration & wells
GROUND SURFACE ELEVATION: TBD
DRILLING METHOD AND EQUIPMENT USED: HSA; CME 85
REFERENCE POINT ELEVATION: TBD
BOREHOLE DIAMETER: 8"
START: 3/14/10 END: 3/14/10 LOGGER: C. Kamali



Not to Scale, depths approximate

CH2MHILL

PROJECT NUMBER: 385135.F1.01

WELL NUMBER: MW-27C

SHEET 1 OF 1

GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Halaco Superfund Site

LOCATION: NCL East

DRILLING CONTRACTOR: WDC Exploration & Wells

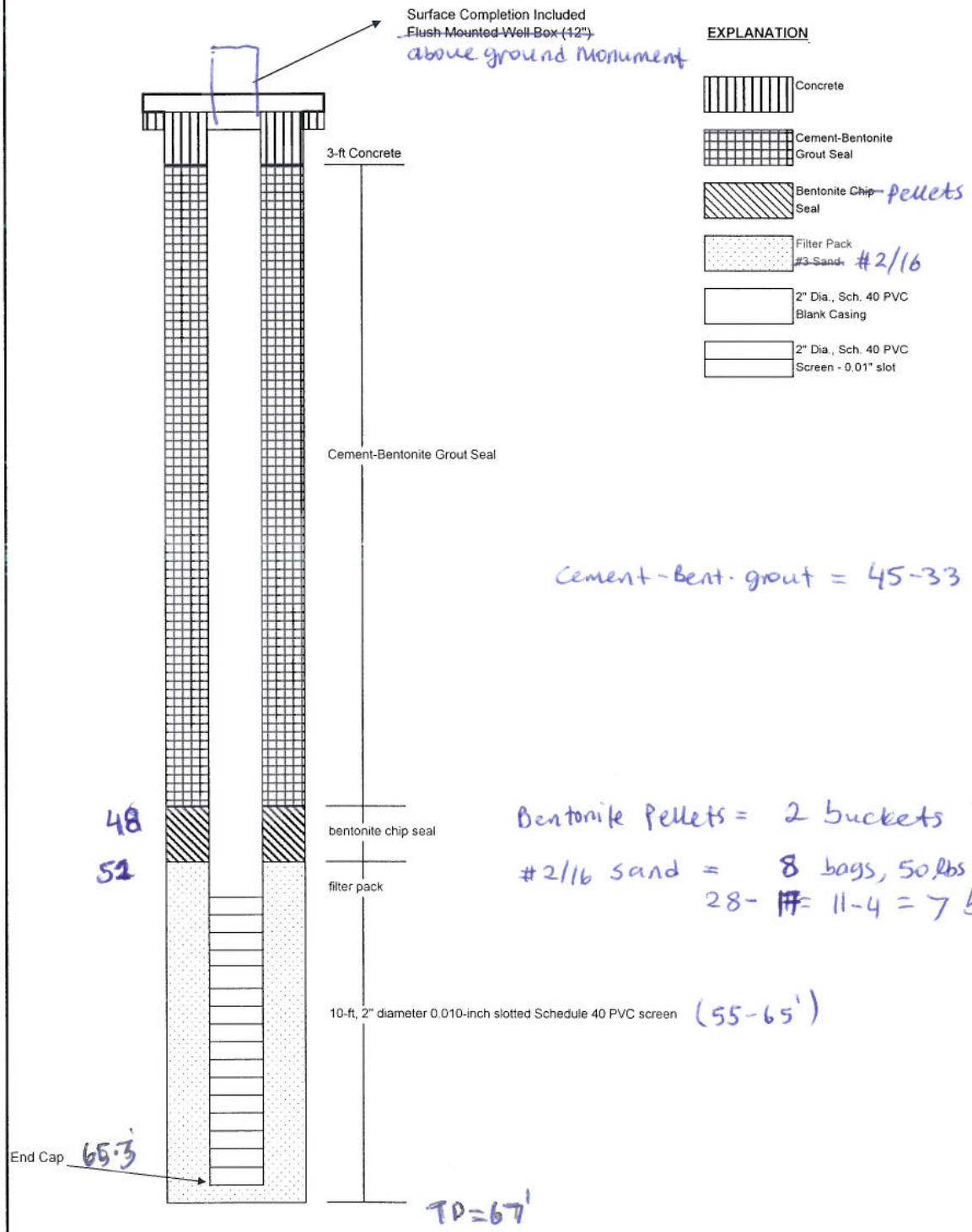
GROUND SURFACE ELEVATION: TBD

DRILLING METHOD AND EQUIPMENT USED: HSA; CME 85

REFERENCE POINT ELEVATION: TBD

BOREHOLE DIAMETER: 8"

START: 5/14/10 END: 5/14 LOGGER: C. Kamali



Cement-Bent. grout = 45-33 = 12 bags = 2 drum

Bentonite Pellets = 2 buckets

#2/16 sand = 8 bags, 50 lbs each

28- ~~17~~ = 11-4 = 7 bags

Not to Scale, depths approximate

Attachment F
Monitoring Well and Piezometer Survey Reports (SAGE)

Attachment F-1

SAGE Consultants, Inc.

LAT 34° – 13' – 00" N LONG 119° – 02' – 40" W ELEV 55.438m

December 22, 2009
JO: 523-V-1972

CH2MHILL Inc.
325 East Hillcrest Drive
Suite 125
THOUSAND OAKS CA 91360-5828

Attn.: Mark Wuttig, Project Manager

Subject: Survey Report for monitoring wells, HALACO Superfund Site, Perkins Road, Oxnard.

Reference: CH2MHILL Purchase Order 937052

Dear Mr. Wuttig:

This report covers the recently completed location survey of 12 monitoring wells at the subject site.

Scope of Work

The scope of work was to locate 12 monitoring wells using RTK GPS surveying techniques. RTK measurements were collected using dual frequency, survey grade GPS receivers.

The horizontal datum for all survey work is the North American Datum of 1983 (NAD 83). The vertical datum is North American Vertical Datum of 1988 (NAVD 88), Mean Sea Level (MSL). Horizontal values are the results obtained from measurements using dual frequency, survey grade GPS receivers. Vertical measurements are the result of closed leveling circuits using differential leveling techniques. All reported measurements are in U.S. Survey Feet and/or degrees, minutes, seconds.

Equipment

Horizontal location of the monitoring wells was derived from RTK measurements on the north side of the Monitoring Wellhead using TOPCON HIPER XT receivers meaning 10/1 second reading in a SEP of 0.10 feet. Data obtained on GPS receivers SN # 360-1094 and SN # 360-1135 GPS was recorded on a Carlson data collector with Carlson Survey software. A copy of the raw data recovery is attached as Appendix A.

Vertical measurements were obtained by differential leveling techniques using a Leitz/Sokkisha automatic level SN #80662 and a plumbed level rod graduated in 0.01 feet increments. Monitoring Well elevations are on the north side of the outer steel casing and the north side of the free standing open PVC pipe Wellhead inside the outer casing. Ground elevations are on the north side of the outer steel casing. A copy of the Level Notes is attached as Appendix B.

Control

City of Oxnard monument #1251 as shown on map filed in book 51 Record of Survey page 93 in the office of the City Surveyor was used as the control monument for this survey. The monument is described as "Set S. & W. 'CITY OF OXNARD 1251' in W. end of parking lot 0.1 KM s/o McWayne Blvd." The monument was recovered in good condition. The horizontal location used for this survey was the

Latitude and Longitude obtained from a 2+ hour Static session with GPS receiver SN # 1135. A Copy of the Precise Orbit NGS OPUS Solution Report is attached as Appendix C.

Coordinate Transformation

Latitude/Longitude was transformed into the California Zone 5 datum from the NAD83 HARN reference via Geoid 03. A copy of the Interactive Conversion Report using "CORPSCON 6" is attached as Appendix D.

Deliverables

The Excel spread sheet identifying Point ID, North Latitude, West Longitude, Easting and Northing,(X,Y) horizontal locations together with outer casing, wellhead and ground elevation for each surveyed monitoring well has been previously forwarded via email. All reported elevations are on NAVD 88 datum. A copy of the spread sheet is attached as Appendix E.

We appreciate the opportunity to provide this service. If you have questions regarding this report or require additional services, please call.

Respectfully submitted,

Sage Consultants, Inc.

Robert Littell, P.E.

cc: addressee (2)

file (1)

encl: (5)

REGISTERED PROFESSIONAL ENGINEER
ROBERT E. LITTELL
No. 13395
Exp. 03-31-11
CIVIL
STATE OF CALIFORNIA

SAGE CONSULTANTS INC.
JO: 522-V-1972

HALACO MONITORING WELL SURVEY
6200 PERKINS ROAD, OXNARD CA

SHEET __1__ of ___1_
Date: December 22, 2009

					Elevation*** (BM #1251)		
Point ID	North Latitude *	West Longitude *	(X) Easting**	(Y) Northing**	Outer Casing	Well Head	Ground
#1251 Cty Oxnard	34-08-21.51155	119-11-05.76985	6203116.92	1875192.68			16.29
MW-2C	34-08-13.67557	119-10-46.44658	6204732.07	1874381.55	30.03	29.63	27.57
MW-2D	34-08-13.79673	119-10-46.43842	6204732.90	1874393.79	30.23	29.67	27.46
MW-3C	34-08-09.85207	119-10-49.10103	6204504.42	1873997.68	27.42	27.10	24.77
MW-3D	34-08-09.81535	119-10-49.02910	6204510.43	1873993.90	27.69	27.35	25.13
MW-6C	34-08-15.46151	119-10-53.76754	6204118.86	1874569.30	21.85	21.17	19.70
MW-6D	34-08-15.33293	119-10-53.76887	6204118.60	1874556.31	22.02	21.71	19.92
MW-19C	34-08-18.99854	119-10-48.94008	6204528.81	1874922.06	20.46	19.85	17.99
MW-19D	34-08-18.99660	119-10-48.98592	6204524.96	1874921.91	20.43	19.86	18.00
MW-20	34-08-20.25587	119-10-58.53427	6203723.92	1875058.63	13.37	12.99	13.37
MW-21	34-08-19.88501	119-11-01.24339	6203485.78	1875023.83	9.10	8.60	9.10
MW-22	34-08-22.56769	119-11-01.56806	6203471.68	1875295.32	8.55	8.18	8.44
MW-24	34-08-18.99660	119-10-48.98592	6204486.08	1875351.11	17.68	16.87	14.74

* ___ degrees, minutes, seconds (NAD 1983) (CORPSCON6)
** __ CA State Plane Coordinates System Zone 5, Survey feet
*** - MSL elevation, survey feet (NAVD 1988)

P.O. No. 937052
Appendix E

Attachment F-2

SAGE Consultants, Inc.

LAT 34° – 13' – 00" N LONG 119° – 02' – 40" W ELEV 55.438m

July 8, 2010
JO: 523-V-1980

CH2MHILL Inc.
325 East Hillcrest Drive
Suite 125
THOUSAND OAKS CA 91360-5828

Attn.: Mark Wuttig, Project Manager

Subject: Survey Report for monitoring wells, HALACO Superfund Site, Perkins Road, Oxnard.

Reference: CH2MHILL Purchase Orders 937052 and 940531

Dear Mr. Wuttig:

This report covers the recently completed location survey of 3 monitoring wells (P.O. 937052) and 7 monitoring wells (P.O. 940531) at the subject site.

Scope of Work

The scope of work was to locate a total of 10 monitoring wells using RTK GPS surveying techniques. RTK measurements were collected using dual frequency, survey grade GPS receivers.

The horizontal datum for all survey work is the North American Datum of 1983 (NAD 83). The vertical datum is North American Vertical Datum of 1988 (NAVD 88), Mean Sea Level (MSL). Horizontal values are the results obtained from measurements using dual frequency, survey grade GPS receivers. Vertical measurements are the result of closed leveling circuits using differential leveling techniques. All reported measurements are in U.S. Survey Feet and/or degrees, minutes, seconds.

Equipment

Horizontal location of the monitoring wells was derived from RTK measurements on the north side of the Monitoring Wellhead using TOPCON HIPER XT receivers meaning 10/1 second reading in a SEP of 0.10 feet. Data obtained on GPS receivers SN # 360-1094 and SN # 360-1135 GPS was recorded on a Carlson data collector with Carlson Survey software. A copy of the raw data recovery is attached as Appendix A.

Vertical measurements were obtained by differential leveling techniques using a Leitz/Sokkisha automatic level SN #80662 and a plumbed level rod graduated in 0.01 feet increments. Monitoring Well elevations are on the north side of the outer steel casing and the north side of the free standing open PVC pipe Wellhead inside the outer casing. Ground elevations are on the north side of the outer steel casing. A copy of the Level Notes is attached as Appendix B.

Control

City of Oxnard monument #1251 as shown on map filed in book 51 Record of Survey page 93 in the office of the City Surveyor was used as the control monument for this survey. The monument is described as "Set S. & W. 'CITY OF OXNARD 1251' in W. end of parking lot 0.1 KM s/o McWayne Blvd." The monument was recovered in good condition. The horizontal location used for this survey was the

Latitude and Longitude obtained from a 2+ hour Static session with GPS receiver SN # 1135. A Copy of the Precise Orbit NGS OPUS Solution Report is attached as Appendix C.

Coordinate Transformation

Latitude/Longitude was transformed into the California Zone 5 datum from the NAD83 HARN reference via Geoid 03. A copy of the Interactive Conversion Report using "CORPSCON 6" is attached as Appendix D.

Deliverables

The Excel spread sheet identifying Point ID, North Latitude, West Longitude, Easting and Northing,(X,Y) horizontal locations together with outer casing, wellhead and ground elevation for each surveyed monitoring well has been previously forwarded via email. All reported elevations are on NAVD 88 datum. A copy of the spread sheet is attached as Appendix E.

We appreciate the opportunity to provide this service. If you have questions regarding this report or require additional services, please call.

Respectfully submitted,

Sage Consultants, Inc.

Robert E Littell

Robert Littell, P.E.

cc: addressee (2)

file (1)

encl: (5)

REGISTERED PROFESSIONAL ENGINEER
ROBERT E. LITTELL
No. 13395
Exp. 03-31-11
CIVIL
STATE OF CALIFORNIA

SAGE CONSULTANTS INC.
JO: 522-V-1980

HALACO MONITORING WELL SURVEY
6200 PERKINS ROAD, OXNARD CA

SHEET __1__ of ___1_
Date: July 8, 2010__

					Elevation*** (BM #1251)		
Point ID	North Latitude *	West Longitude *	(X) Easting**	(Y) Northing**	Outer Casing	Well Head	Ground
#1251 Cty Oxnard	34-08-21.51155	119-11-05.76985	6203116.92	1875192.68			16.29
MW-12C	34-08-16.63955	119-10-56.51753	6203888.77	1874691.06	17.60	17.29	14.86
MW-13C	34-08-23.26095	119-10-57.81198	6203787.85	1875361.64	9.72	9.37	9.79
MW-21C	34-08-19.94239	119-11-01.23851	6203495.90	1875029.58	9.03	8.65	9.10
MW-23B	34-08-25.66515	119-11-07.71368	6202958.49	1875614.46	11.99	11.91	9.39
MW-23C	34-08-25.66507	119-11-07.65143	6202963.72	1875614.39	11.81	11.48	9.02
MW-24C	34-08-23.23656	119-10-49.64984	6204473.84	1875351.11	18.12	17.92	14.95
MW-25B	34-08-24.02964	119-10-40.22484	6205266.93	1875421.98	12.31	12.06	9.56
MW-25C	34-08-24.03023	119-10-40.28074	6205262.23	1875422.09	12.42	12.21	9.60
MW-27B	34-08-14.93769	119-10-32.23112	6205928.04	1874495.09	11.70	11.54	8.90
MW-27C	34-08-14.98209	119-10-32.22595	6205928.53	1874499.57	11.73	11.44	8.86

* ___ degrees, minutes, seconds (NAD 1983) (CORPSCON6)
** __ CA State Plane Coordinates System Zone 5, Survey feet
*** - MSL elevation, survey feet (NAVD 1988)

P.O. No. 940531
Appendix E

Attachment F-3

SAGE Consultants, Inc.

LAT 34° – 13' – 00" N LONG 119° – 02' – 40" W ELEV 55.438m

December 19, 2009
JO: 523-V-1973
CH2MHILL Inc.
325 East Hillcrest Drive
Suite 125
THOUSAND OAKS CA 91360-5828

Attn.: Mark Wuttig, Project Manager

Subject: Survey Report for Pieometer Wells, HALACO Superfund Site, Perkins Road, Oxnard.

Reference: CH2MHILL Purchase Order 937053

Dear Mr. Wuttig:

This report covers the recently completed location survey of 12 piezometer wells at the subject site.

Scope of Work

The scope of work was to locate monitoring wells using RTK GPS surveying techniques. RTK measurements were collected using dual frequency, survey grade GPS receivers.

The horizontal datum for all survey work is the North American Datum of 1983 (NAD 83). The vertical datum is North American Vertical Datum of 1988 (NAVD 88), Mean Sea Level (MSL). Horizontal values are the results obtained from measurements using dual frequency, survey grade GPS receivers. Vertical measurements are the result of closed leveling circuits using differential leveling techniques. All reported measurements are in U.S. Survey Feet and/or degrees, minutes, seconds.

Equipment

Horizontal location of the monitoring wells was derived from RTK measurements on the north side of the Monitoring Wellhead using TOPCON HIPER XT receivers meaning 10/1 second reading in a SEP of 0.10 feet. Data obtained on GPS receivers SN # 360-1094 and SN # 360-1135 GPS was recorded on a Carlson data collector with Carlson Survey software. A copy of the raw data recovery is attached as Appendix A.

Vertical measurements were obtained by differential leveling techniques using a Leitz/Sokkisha automatic level SN #80662 and a plumbed level rod graduated in 0.01 feet increments. Monitoring Well elevations are on the north side of the outer steel casing and the north side of the free standing open PVC pipe Wellhead inside the outer casing. Ground elevations are on the north side of the outer steel casing. A copy of the Level Notes is attached as Appendix B.

Control

City of Oxnard monument #1251 as shown on map filed in book 51 Record of Survey page 93 in the office of the City Surveyor was used as the control monument for this survey. The monument is described as "Set S. & W. 'CITY OF OXNARD 1251' in W. end of parking lot 0.1 KM s/o McWayne Blvd." The monument was recovered in good condition. The horizontal location used for this survey was the Latitude and Longitude obtained from a 2+ hour Static session with GPS receiver SN # 1135. A Copy of the Precise Orbit NGS OPUS Solution Report is attached as Appendix C.

Coordinate Transformation

Latitude/Longitude was transformed into the California Zone 5 datum from the NAD83 HARN reference via Geoid 03. A copy of the Interactive Conversion Report using "CORPSCON 6" is attached as Appendix D.

Deliverables

The Excel spread sheet identifying Point ID, North Latitude, West Longitude, Easting and Northing,(X,Y) horizontal locations together with outer casing, wellhead and ground elevation for each surveyed monitoring well has been previously forwarded via email. All reported elevations are on NAVD 88 datum. A copy of the spread sheet is attached as Appendix E.

We appreciate the opportunity to provide this service. If you have questions regarding this report or require additional services, please call.

Respectfully submitted,

Sage Consultants, Inc.

Robert Littell, P.E.

cc: addressee (2)

file (1)

encl: (5)

REGISTERED PROFESSIONAL ENGINEER
ROBERT E. LITTELL
No. 13395
Exp. 03-31-11
CIVIL
STATE OF CALIFORNIA

SAGE CONSULTANTS INC.
JO: 522-V-1973

HALACO PIEZOMETER WELL SURVEY
6200 PERKINS ROAD, OXNARD CA

SHEET __1__ of ___1_
Date: December 19, 2009

					Elevation*** (BM #1251)		
Point ID	North Latitude *	West Longitude *	(X) Easting**	(Y) Northing**	Outer Casing	Well Head	Ground
#1251 Cty Oxnard	34-08-21.51155	119-11-05.76985	6203116.92	1875192.68			16.29
PZ-1A	34-08-24.42817	119-11-00.45275	6203567.64	1875482.27	8.67	8.55	8.66
PZ-1B	34-08-24.42322	119-11-00.53463	6203560.75	1875481.85	8.65	8.34	8.64
PZ-1C	34-08-24.42721	119-11-00.58040	6203556.91	1875482.30	8.65	8.39	8.64
PZ-2A	34-08-24.41167	119-10-57.66602	6203801.84	1875477.85	9.31	9.13	9.30
PZ-2B	34-08-24.41386	119-10-57.73587	6203795.97	1875478.14	9.35	9.19	9.34
PZ-2C	34-08-24.42190	119-10-57.79015	6203791.42	1875479.01	9.22	9.00	9.21
PZ-3A	34-08-23.46007	119-10-52.38485	6204244.58	1875376.44	17.12	17.00	15.24
PZ-3B	34-08-23.46399	119-10-52.33225	6204249.01	1875376.79	17.31	17.08	15.22
PZ-3C	34-08-23.46149	119-10-52.27638	6204253.70	1875376.48	17.29	17.11	15.28
PZ-4A	34-08-23.41592	119-10-48.33490	6204584.92	1875367.98	15.41	15.07	13.36
PZ-4B	34-08-23.42272	119-10-48.28289	6204589.30	1875368.62	15.38	15.07	13.25
PZ-4C	34-08-23.43159	119-10-48.23133	6204593.64	1875369.46	15.18	15.02	13.12

* ___ degrees, minutes, seconds seconds (NAD 1983) (CORPSCON6)
** __ CA State Plane Coordinates System Zone 5, Survey feet
*** - MSL elevation, survey feet (NAVD 1988)

P.O. No, 937053

Appendix E

Attachment G
Field Parameters Measured during Well Development

TABLE G-1

Field Paramters for Piezometer and Monitoring Well Development

Halaco Site Remedial Investigation, Oxnard, California

Well Type	Location	Well Name	Date	Time	Temp-erature (ºF)	pH	Conductivity (µS)	Turbidity (NTU)	Volume Removed (gal)	Comment
Monitoring Wells	2	MW-2C	10/26/09	9:00	69.0	6.7	83,220	7	107.0	
		MW-2D	10/26/09	8:45	67.5	7.4	1,296	5	399.0	
	3	MW-3C	10/26/09	13:58	73.8	7.0	59,990	9	137.0	
		MW-3D	10/27/09	13:29	69.4	7.6	1,935	6	208.0	
	6	MW-6C	10/26/09	10:11	72.5	7.6	72,000	6	146.0	
		MW-6D	10/28/09	9:17	72.4	7.6	1,255	4	216.0	
	11	MW-11	11/9/09	8:50	68.7	7.3	6,988	310	3.0	Redevelopment
	12	MW-12C	5/19/10	9:57	68.7	8.8	76,030	10	130.0	
	13	MW-13C	5/12/10	10:38	68.5	7.6	71,870	7.7	182.0	
	19	MW-19C	10/26/09	12:10	76.1	8.7	103,500	8	83.0	
		MW-19D	10/26/09	10:59	72.9	7.7	1,383	8	205.0	
	20	MW-20	11/9/09	11:13	64.2	7.8	11,400	6	96.0	
	21	MW-21	11/9/09	13:05	67.4	7.8	12,850	9	72.0	
			2/8/10	12:18	65.6	7.5	12,260	3	216.0	Redevelopment
		MW-21C	5/12/10	14:30	67.4	7.6	35,980	18	290.0	
	22	MW-22	11/6/09	11:24	70.3	7.8	11,790	7	77.0	
	23	MW-23B	5/20/10	9:49	63.4	7.7	16,150	10	81.0	
		MW-23C	5/20/10	9:17	64.8	7.6	35,100	10	123.0	
	24	MW-24	11/6/09	13:11	67.5	7.4	28,410	9	148.0	
		MW-24C	5/19/10	15:16	70.8	7.5	96,920	8	108.0	
	25	MW-25B	5/20/10	13:23	70.2	7.7	12,760	9	103.5	
		MW-25C	5/20/10	12:42	70.7	7.2	25,710	9	144.0	
	27	MW-27B	5/19/10	13:10	65.6	7.6	16,050	10	85.5	
		MW-27C	5/19/10	13:00	64.6	8.1	3,936	10	135.0	
Piezo-meters	1	PZ-1A	11/6/09	7:53	64.7	7.6	4,912	>1000	0.2	
		PZ-1B	11/6/09	8:07	68.9	7.5	13,390	>1000	2.0	
		PZ-1C	11/6/09	8:27	67.8	7.4	32,400	>1000	5.0	
	2	PZ-2A	11/6/09	8:54	67.0	8.0	12,690	>1000	0.3	
		PZ-2B	11/6/09	9:09	67.5	7.9	15,570	>1000	2.0	
		PZ-2C	11/6/09	9:25	67.5	7.4	63,750	>1000	5.0	
	3	PZ-3A	11/10/09	9:42	66.5	7.6	53,320	>1000	1.0	
		PZ-3B	11/10/09	10:03	69.1	7.9	41,280	>1000	3.0	
		PZ-3C	11/10/09	10:32	69.4	7.1	77,100	>1000	5.0	
	4	PZ-4A	11/6/09	7:24	66.4	6.9	53,980	34	1.0	
		PZ-4B	11/6/09	7:42	66.2	7.5	16,080	>1000	3.0	
		PZ-4C	11/10/09	8:06	65.9	7.4	53,440	>1000	5.5	

Attachment H
Field Parameters Measured during Surface Water and Groundwater Sampling

TABLE H-1
Field Paramters for Surface Water and Groundwater Sampling
Halaco Site Remedial Investigation, Oxnard, California

							Field Parameter Data						Laboratory Data			Relative Percent Difference	
Matrix	Sample Location	Sample Location	Sample No	Sample ID	Date	Time	Temperature (ºC)	pH (pH units)	Electrical Conductivity (µS)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Total Dissolved Solids (mg/L)	Electrical Conductivity (µS)	pH (pH units)	EC (%)	pH (%)
Surface Water	Ocean	OCE-1	1	SW-OCE-001-1109	11/16/09	10:15	16.56	8.21	51,520	3	7.84	207.6	33,000	49,000	8.1	5.0	1.3
			2	SW-OCE-001-0210	2/23/10	11:15	17.53	7.94	46,010	5	6.30	-4.7	34,000	48,000	8.1	-4.2	-2.0
		OCE-2	1	SW-OCE-002-1109	11/16/09	9:50	15.06	8.19	50,410	8	6.91	256.3	33,000	49,000	8.1	2.8	1.1
			2	SW-OCE-002-0210	2/23/10	10:45	17.80	7.87	46,410	6	6.51	-6.6	36,000	49,000	8.1	-5.4	-2.9
	Other Drains	HUD-1	1	SW-HUD-001-1109	11/16/09	9:38	14.42	7.70	4,589	30	11.36	218.5	5,600	8,900	7.7	-63.9	0.0
			2	SW-HUD-001-0210	2/26/10	8:45	14.46	7.67	4,717	26	3.61	4.7	2,800	4,300	7.6	9.2	0.9
		JSD-1	1	SW-JSD-001-1109	11/16/09	10:10	14.52	5.68	7,100	24	10.85	420.3	4,300	6,800	8.2	4.3	-36.3
			2	SW-JSD-001-0210	2/25/10	12:15	19.80	8.17	35,780	18	7.65	51.7	16,000	24	8.0	199.7	2.1
	Lagoon	LAG-1	1	SW-LAG-001-1109	11/16/09	8:25	14.08	8.10	3,952	13	8.02	198.7	2,700	4,000	8.1	-1.2	0.0
			2	SW-LAG-001-0210	2/25/10	13:30	19.32	8.19	12,890	109	6.70	49.0	8,100	13,000	8.2	-0.8	-0.1
		LAG-2	1	SW-LAG-002-1109	11/16/09	11:15	14.60	8.57	4,541	15	10.42	186.4	2,900	4,300	8.3	5.5	3.2
			2	SW-LAG-002-0210	2/24/10	13:35	14.34	8.32	12,830	25	8.64	56.9	9,100	14,000	8.3	-8.7	0.2
	Oxnard Industrial Drain	OID-1	1	SW-OID-001-1109	11/16/09	11:40	16.04	8.50	3,887	13	9.16	192.4	2,600	3,800	8.2	2.3	3.6
			2	SW-OID-001-0210	2/24/10	12:40	14.09	8.29	11,290	19	12.83	77.2	6,800	12,000	8.3	-6.1	-0.1
		OID-2	1	SW-OID-002-1109	11/16/09	13:10	18.23	8.30	3,466	10	8.86	243.6	2,400	3,300	8.1	4.9	2.4
			2	SW-OID-002-0210	2/24/10	13:40	14.62	8.22	11,420	27	8.61	106.9	7,200	11,000	8.2	3.7	0.2
		OID-3	1	SW-OID-003-1109	11/16/09	13:30	18.07	8.30	3,353	11	7.97	165.2	2,400	3,300	8.1	1.6	2.4
			2	SW-OID-003-0210	2/25/10	12:45	20.56	8.07	7,600	24	5.67	32.0	3,300	5,300	7.8	35.7	3.4
		OID-4	1	SW-OID-004-1109	11/16/09	13:10	16.93	8.32	1,993	12	9.57	174.0	2,400	3,200	8.1	-46.5	2.7
			2	SW-OID-004-0210	2/24/10	12:15	16.47	8.10	10,357	17	9.30	60.0	6,900	11,000	8.2	-6.0	-1.2
		OID-5	1	SW-OID-005-1109	11/16/09	12:15	18.39	8.27	3,184	9	8.80	252.0	2,300	3,100	8.1	2.7	2.1
			2	SW-OID-005-0210	2/24/10	13:45	15.16	8.01	8,189	10	90.40	10.2	5,900	9,300	8.1	-12.7	-1.1
		OID-6	1	SW-OID-006-1109	11/16/09	11:55	17.88	8.29	3,204	6	9.09	263.1	2,300	3,000	8.1	6.6	2.3
			2	SW-OID-006-0210	2/24/10	13:00	15.23	8.01	8,018	9	9.21	16.6	5,200	7,900	8.1	1.5	-1.1
		OID-7	1	SW-OID-007-1109	11/16/09	11:15	16.08	8.40	3,314	5	8.63	246.0	2,100	2,600	8.2	24.1	2.4
			2	SW-OID-007-0210	2/24/10	12:40	15.77	8.14	5,494	10	10.87	40.4	4,200	6,100	8.2	-10.5	-0.7
		OID-8	1	SW-OID-008-1109	11/16/09	8:50	10.92	8.41	2,056	14	14.40	218.0	1,500	2,000	8.5	2.8	-1.1
			2	SW-OID-008-0210	2/24/10	12:15	16.36	8.47	3,367	34	20.51	138.0	2,600	3,100	8.3	8.3	2.0
	WMU Ditch	WMU-1	1	SW-WMU-001-1109	11/16/09	8:45	13.94	8.20	4,099	14	7.20	279.8	2,700	4,000	8.0	2.4	2.5
		WMU-2	1	SW-WMU-002-1109	11/16/09	9:10	14.08	7.97	4,059	13	7.48	216.0	2,700	3,900	7.8	4.0	2.2
	NCE-East	NCE-1	1	SW-NCE-001-0610	6/2/10	8:00	17.65	7.65	10,929	15	6.29	207.3	6,900	n/a	n/a	n/a	n/a
		NCE-2	1	SW-NCE-002-0610	6/3/10	7:30	17.19	7.89	5,899	47	6.48	68.9	7,100	n/a	n/a	n/a	n/a
		NCE-3	1	SW-NCE-003-0610	6/3/10	8:00	17.89	8.04	10,570	25	7.81	44.8	6,600	n/a	n/a	n/a	n/a
Ground-water	1	MW-1R	1	GW-MW-1R-1109	11/19/09	11:33	17.75	5.80	13,400	4	6.00	238.6	7,700	13,000	6.3	3.0	-8.3
			2	GW-MW-1R-0210	2/25/10	10:14	15.56	7.48	17,440	5	0.46	-154.6	10,000	16,000	7.5	8.6	-0.3
	2	MW-2RA	1	GW-MW-2RA-1109	11/18/09	6:54	17.81	7.71	42,274	10	0.48	148.5	15,000	22,000	8.0	63.1	-3.7
			2	GW-MW-2RA-0210	2/23/10	7:46	15.81	7.73	28,510	6	1.91	177.6	17,000	2,400	8.0	168.9	-3.4
		MW-2RB	1	GW-MW-2RB-1109	11/17/09	14:30	20.34	7.39	72,758	15	0.34	-96.9	40,000	69,000	7.1	5.3	4.0
			2	GW-MW-2RB-0210	2/23/10	9:30	18.91	7.25	69,730	43	0.40	-160.1	53,000	72,000	7.2	-3.2	0.7
		MW-2C	1	GW-MW-2C-1109	11/17/09	14:24	23.20	6.72	114,300	5	2.60	69.2	83,000	110,000	6.7	3.8	0.3
			2	GW-MW-2C-0210	2/23/10	10:22	20.54	6.78	115,400	2	0.32	-91.6	75,000	100,000	6.8	14.3	-0.3
		MW-2D	1	GW-MW-2D-1109	11/17/09	12:03	23.08	7.70	1,309	260	1.28	113.7	870	1,300	7.6	0.7	1.3
			2	GW-MW-2D-0210	2/23/10	11:37	21.05	7.53	1,200	15	0.51	-141.8	890	1,500	7.9	-22.2	-4.8
	3	MW-3RA	1	GW-MW-3RA-1109	11/19/09	10:15	17.77	7.35	5,800	7	1.15	22.1	4,000	5,800	7.2	0.0	2.1
			2	GW-MW-3RA-0210	2/25/10	8:14	12.94	7.64	4,374	2	0.83	-139.4	2,500	4,100	7.8	6.5	-2.1
		MW-3RB	1	GW-MW-3RB-1109	11/19/09	9:25	17.84	7.94	7,040	7	1.15	238.7	4,100	6,800	7.4	3.5	7.0
			2	GW-MW-3RB-0210	2/25/10	9:11	15.82	7.85	11,910	3	0.52	-169.2	6,800	11,000	7.9	7.9	-0.6
		MW-3C	1	GW-MW-3C-1109	11/18/09	8:16	19.37	7.64	94,160	8	1.17	188.4	67,000	88,000	7.3	6.8	4.6
			2	GW-MW-3C-0210	2/23/10	11:51	18.44	7.01	106,500	4	0.27	-129.8	73,000	94,000	6.8	12.5	3.0
		MW-3D	1	GW-MW-3D-1109	11/18/09	7:00	18.39	7.68	1,367	5	1.05	194.1	940	1,400	7.9	-2.4	-2.8
			2	GW-MW-3D-0210	2/23/10	14:19	19.60	7.46	1,281	10	0.45	-117.6	960	1,600	7.9	-22.1	-5.7
	4	MW-4RA	1	GW-MW-4RA-1109	11/20/09	6:36	14.64	7.42	3,564	8	0.89	-11.8	2,200	3,600	7.6	-1.0	-2.4
			2	GW-MW-4RA-0210	2/24/10	10:01	15.39	7.20	8,072	6	0.78	-5.5	5,200	8,300	7.4	-2.8	-2.7
		MW-4RB	1	GW-MW-4RB-1109	11/20/09	7:02	15.27	6.57	9,670	8	4.05	244.8	6,000	9,400	6.3	2.8	4.2
			2	GW-MW-4RB-0210	2/24/10	10:33	15.00	7.24	11,190	4	0.63	-129.8	6,500	10,000	7.3	11.2	-0.8
	5	MW-5	1	GW-MW-5-1109	11/18/09	9:59	20.35	7.44	27,003	8	0.63	-65.0	12,000	19,000	7.7	34.8	-3.4
			2	GW-MW-5-0210	2/24/10	8:45	19.00	7.42	33,310	4	0.78	-22.2	21,000	34,000	7.5	-2.1	-1.1
	6	MW-6	1	GW-MW-6-1109	11/20/09	8:11	22.49	7.96	55,027	8	0.29	-26.8	33,000	52,000	8.1	5.7	-1.7
			2	GW-MW-6-0210	2/24/10	8:40	19.83	8.14	39,180	5	0.45	-31.1	24,000	36,000	8.1	8.5	0.5
		MW-6C	1	GW-MW-6C-1109	11/18/09	11:05	24.37	8.32	102,100	9	0.90	135.0	70,000	98,000	8.2	4.1	1.5
			2	GW-MW-6C-0210	2/24/10	7:23	19.76	8.29	106,900	5	0.45	-169.8	64,000	97,000	8.2	9.7	1.1
		MW-6D	1	GW-MW-6D-1109	11/18/09	9:48	24.28	7.72	1,869	7	0.97	201.8	1,200	1,800	7.7	3.8	0.3
			2	GW-MW-6D-0210	2/24/10	7:20	21.05	7.38	1,489	5	0.59	-21.0	1,100	1,700	7.6	-13.2	-2.9
	11	MW-11	1	GW-MW-11-1109	11/19/09	9:01	18.32	7.07	7,332	18	0.85	-162.4	4,600	7,200	7.2	1.8	-1.8
			2	GW-MW-11-0210	2/25/10	15:14	16.57	7.31	7,418	1	1.22	95.1	4,700	6,900	7.4	7.2	-1.2
	12	MW-12	1	GW-MW-12-1109	11/20/09	9:52	21.23	9.14	137,067	13	0.61	74.9	120,000	130,000	9.3	5.3	-1.7
			2	GW-MW-12-0210	2/25/10	11:27	19.35	9.05	143,700	18	0.27	-140.2	180,000	140,000	9.1	2.6	-0.6
		MW-12C	1	GW-MW-12C-0610	6/3/10	8:59	18.50	8.85	75,180	9	0.50	99.0	53,000	n/a	n/a	n/a	n/a
			2	GW-MW-12C-1010	10/26/10	13:07	20.50	7.62	76,188	4	0.15	-151.3	53,000	70,000	7.6	8.5	0.3
	13	MW-13	1	GW-MW-13-1109	11/19/09	7:03	19.21	7.53	17,943	7	0.69	-261.4	10,000	17,000	7.5	5.4	0.4
			2	GW-MW-13-0210	2/25/10	10:06	18.28	7.39	16,480	8	0.51	-52.8	10,000	16,000	7.6	3.0	-2.8
		MW-13C	1	GW-MW-13C-0610	6/3/10	10:13	19.10	7.17	75,290	10	0.39	-65.4	48,000	n/a	n/a	n/a	n/a
			2	GW-MW-13C-1010	10/27/10	7:45	19.60	7.03	78,980	21	0.16	-215.9	50,000	60,000	7.1	27.3	-1.0
	14	MW-14	1	GW-MW-14-1109	11/18/09	14:17	19.50	7.39	9,940	702	2.00	168.7	5,600	9,600	7.4	3.5	-0.1
			2	GW-MW-14-0210	2/24/10	15:29	16.31	7.21	8,458	27	0.51	-50.6	5,600	8,800	7.3	-4.0	-1.2
	15	MW-15	1	GW-MW-15-1109	11/18/09	11:53	20.76	7.05	8,479	15	1.23	-82.3	5,400	8,100	7.2	4.6	-2.1
			2	GW-MW-15-0210	2/25/10	8:29	17.55	7.15	8,253	14	0.86	-24.0	5,500	8,300	7.3	-0.6	-2.1
	18	MW-18	1	GW-MW-18-1109	11/20/09	10:23	23.98	8.57	78,140	331	1.95	248.3	52,000	75,000	8.5	4.1	0.8
			2	GW-MW-18-0210	2/23/10	8:33	18.68	8.49	82,290	>1000	1.48	134.4	61,000	75,000	8.3	9.3	2.3
	19	MW-19	1	GW-MW-19-1109	11/17/09	8:25	20.68	8.43	86,137	60	1.52	-30.6	55,000	82,000	8.4	4.9	0.4
			2	GW-MW-19-0210	2/22/10	15:06	17.45	8.36	92,500	27	0.56	-70.9	62,000	84,000	8.4	9.6	-0.5
		MW-19C	1	GW-MW-19C-1109	11/17/09	8:13	21.83	9.75	107,400	10	1.70	88.3	81,000	100,000	9.5	7.1	2.6
			2	GW-MW-19C-0210	2/22/10	13:51	22.20	9.28	105,900	10	0.31	-98.4	82,000	110,000	9.2	-3.8	0.9
		MW-19D	1	GW-MW-19D-1109	11/17/09	10:12	22.89	7.66	1,541	6	1.48	110.7	1,000	1,500	7.8	2.7	-1.8
			2	GW-MW-19D-0210	2/22/10	11:10	21.99	7.35	1,388	16	0.54	-99.4	1,000	1,600	7.8	-14.2	-5.9
	20	MW-20	1	GW-MW-20-1109	11/18/09	14:17	18.11	7.46	13,148	8	0.48	-111.3	8,200	13,000	7.7	1.1	-3.2
			2	GW-MW-20-0210	2/26/10	7:41	16.51	7.49	14,110	2	0.73	-179.0	8,500	13,000	7.5	8.2	-0.1
	21	MW-21	1	GW-MW-21-1109	11/19/09	12:09	19.56	7.41	3,399	17	0.54	-114.0	7,800	13,000	7.4	-117.1	0.1
			2	GW-MW-21-0210	2/23/10	14:13	17.10	7.51	12,770	5	0.39	-146.1	8,600	12,000	7.7	6.2	-2.5
		MW-21C	1	GW-MW-21C-0610	6/3/10	11:43	18.51	7.42	30,039	9	0.39	-52.3	23,000	n/a	n/a	n/a	n/a
			2	GW-MW-21C-1010	10/26/10	14:01	19.10	7.30	30,495	1	0.18	-178.2	22,000	32,000	7.3	-4.8	0.0
	22	MW-22	1	GW-MW-22-1109	11/19/09	7:02	20.02	7.59	13,070	6	1.52	209.9	7,900	13,000	7.5	0.5	1.2
			2	GW-MW-22-0210	2/24/10	15:11	18.70	7.50	13,310	4	0.47	-156.2	8,300	12,000	7.5	10.4	0.0
	23	MW-23B	1	GW-MW-23B-0610	6/3/10	14:13	17.29	7.34	17,590	10	0.37	-52.4	11,000	n/a	n/a	n/a	n/a
			2	GW-MW-23B-1010	10/26/10	11:03	18.60	7.47	15,815	5	0.41	-158.8	9,300	14,000	7.6	12.2	-1.7
		MW-23C	1	GW-MW-23C-0610	6/3/10	13:18	17.51	7.66	26,730	8	0.39	25.4	18,000	n/a	n/a	n/a	n/a
			2	GW-MW-23C-1010	10/26/10	11:38	18.40	7.08	25,383	2	0.21	-169.6	16,000	23,000	7.4	9.9	-4.4
	24	MW-24	1	GW-MW-24-1109	11/17/09	11:18	20.44	7.21	22,568	12	2.64	-34.8	10,000	16,000	7.2	34.1	0.1
			2	GW-MW-24-0210	2/22/10	15:43	19.64	7.04	19,280	15	0.42	-159.1	13,000	21,000	7.5	-8.5	-6.3
		MW-24C	1	GW-MW-24C-0610	6/2/10	14:12	19.56	7.28	42,454	6	0.41	109.7	57,000	n/a	n/a	n/a	n/a
			2	GW-MW-24C-1010	10/26/10	8:13	18.60	6.81	88,334	3	0.11	-248.6	56,000	80,000	6.9	9.9	-1.3
	25	MW-25B	1	GW-MW-25B-0610	6/2/10	11:24	17.74	7.00	10,871	7	0.59	45.7	8,700	n/a	n/a	n/a	n/a
			2	GW-MW-25B-1010	10/26/10	9:21	18.60	7.19	11,671	3	0.31	-152.9	9,500	12,000	7.4	-2.8	-2.9
		MW-25C	1	GW-MW-25C-0610	6/2/10	11:32	18.82	7.13	27,348	7	0.70	-92.6	20,000	n/a	n/a	n/a	n/a
			2	GW-MW-25C-1010	10/26/10	10:06	18.50	7.05	28,315	3	0.17	-249.3	18,000	26,000	7.3	8.5	-3.5
	27	MW-27B	1	GW-MW-27B-0610	6/2/10	8:57	17.55	7.01	16,097	6	1.06	-25.8	9,600	n/a	n/a	n/a	n/a
			2	GW-MW-27B-1010	10/27/10	11:47	18.90	7.07	16,619	3	0.23	-165.9	11,000	16,000	7.1	3.8	-0.4
		MW-27C	1	GW-MW-27C-0610	6/2/10	10:07	17.75	8.30	4,565	10	0.67	52.5	3,000	n/a	n/a	n/a	n/a
			2	GW-MW-27C-1010	10/27/10	12:22	18.80	7.36	4,038	4	0.23	-135.3	2,700	3,600	7.5	11.5	-1.9
	AWPF Piezometers	P-1	1	GW-P-1-0610	6/4/10	8:45	17.90	6.91	5,415	9	0.65	106.0	4,700	n/a	n/a	n/a	n/a
			2	GW-P-1-1010	10/27/10	9:21	19.90	7.05	7,244	7	0.36	-108.0	5,700	6,600	7.2	9.3	-2.1
		P-3	1	GW-P-3-0610	6/4/10	10:29	17.99	7.13	5,714	18	0.82	-92.6	5,100	n/a	n/a	n/a	n/a
			2	GW-P-3-1010	10/27/10	10:08	19.00	7.14	6,121	62	0.31	-162.9	3,800	5,700	7.2	7.1	-0.8
		P-4	1	GW-P-4-0610	6/4/10	9:34	17.51	6.98	5,210	10	1.13	-42.3	4,200	n/a	n/a	n/a	n/a
			2	GW-P-4-1010	10/27/10	10:43	18.60	7.17	5,658	16	0.29	-161.7	4,400	4,800	7.2	16.4	-0.4

Figure H-1
Field Parameters for Surface Water and Groundwater Sampling
Sample No. 1

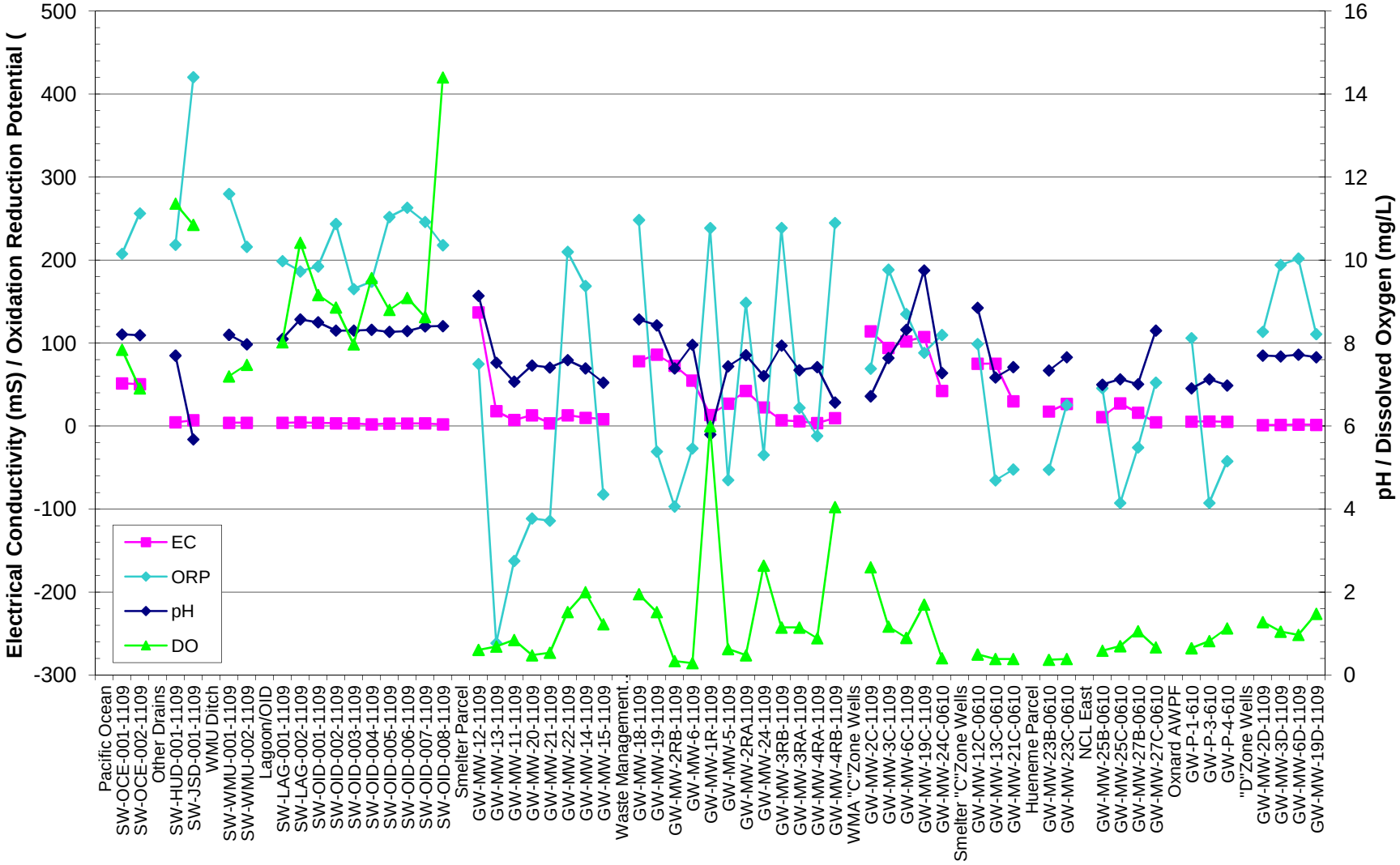
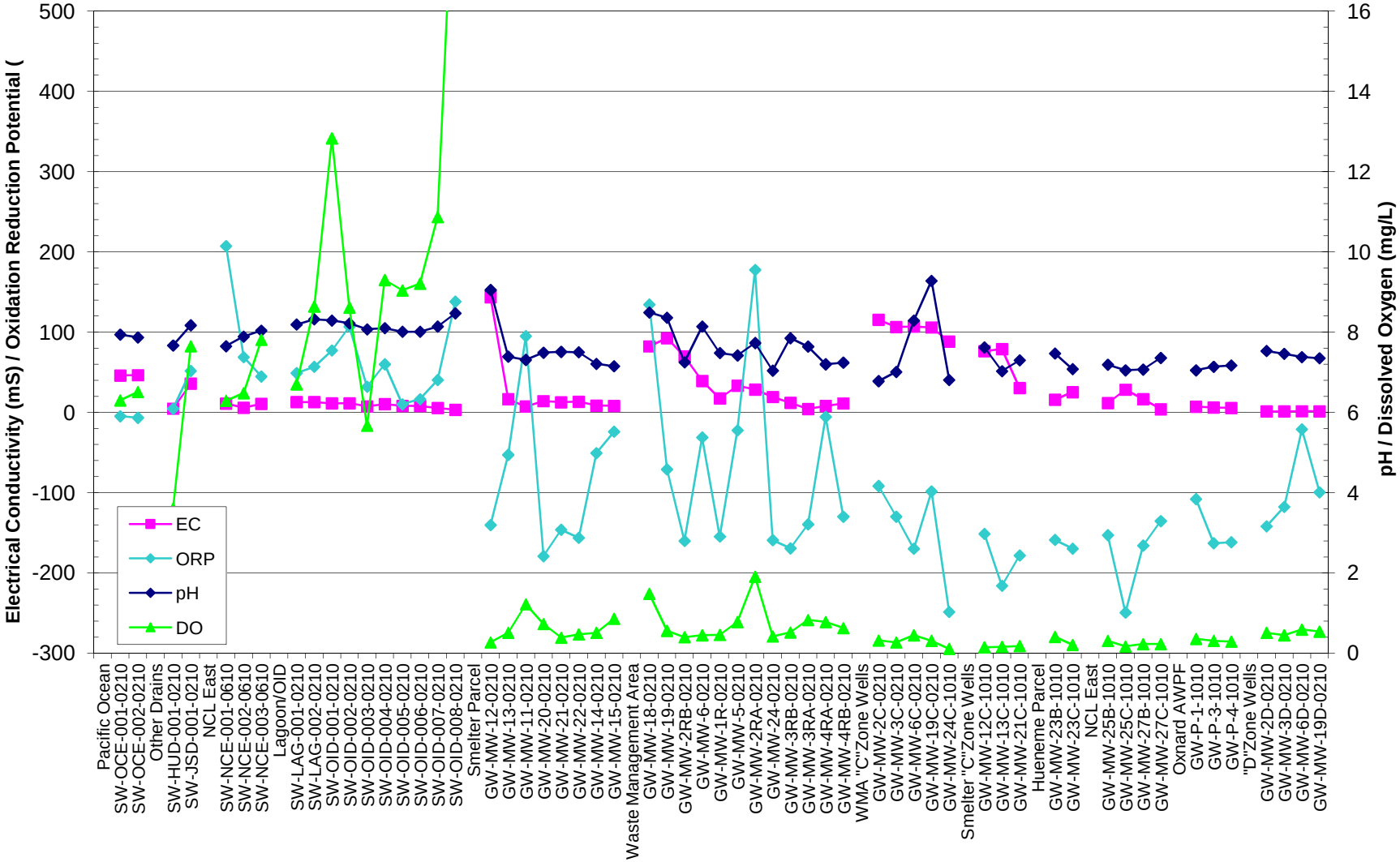


Figure H-2
Field Parameters for Surface Water and Groundwater Sampling
Sample No. 2



Attachment I
Groundwater Elevation Hydrographs

Figure I-1
Water Table Well Smelter Parcel Hydrograph
October 2007 - August 2011

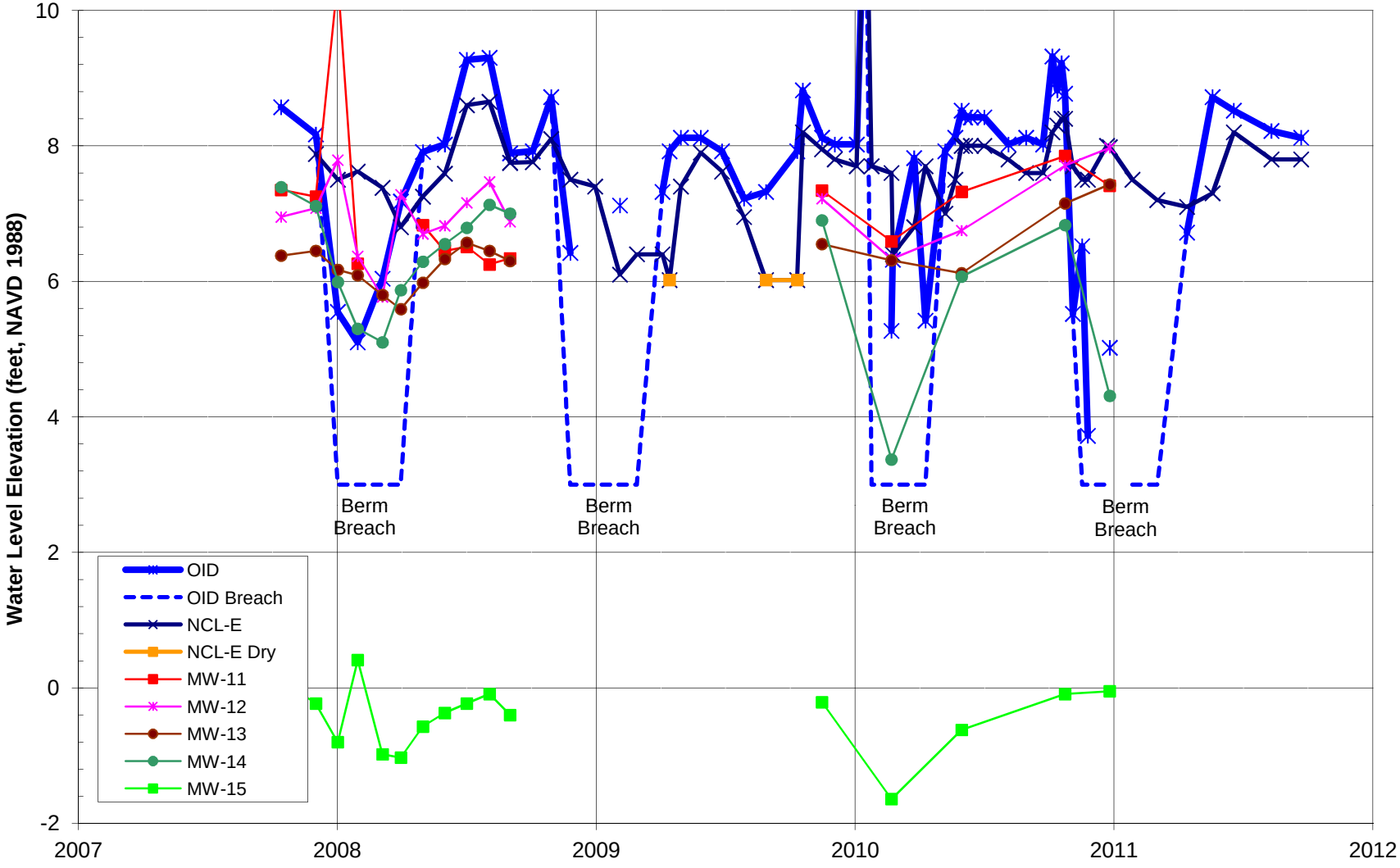


Figure I-2
Water Table Well Waste Managent Area Hydrograph
October 2007 - August 2011

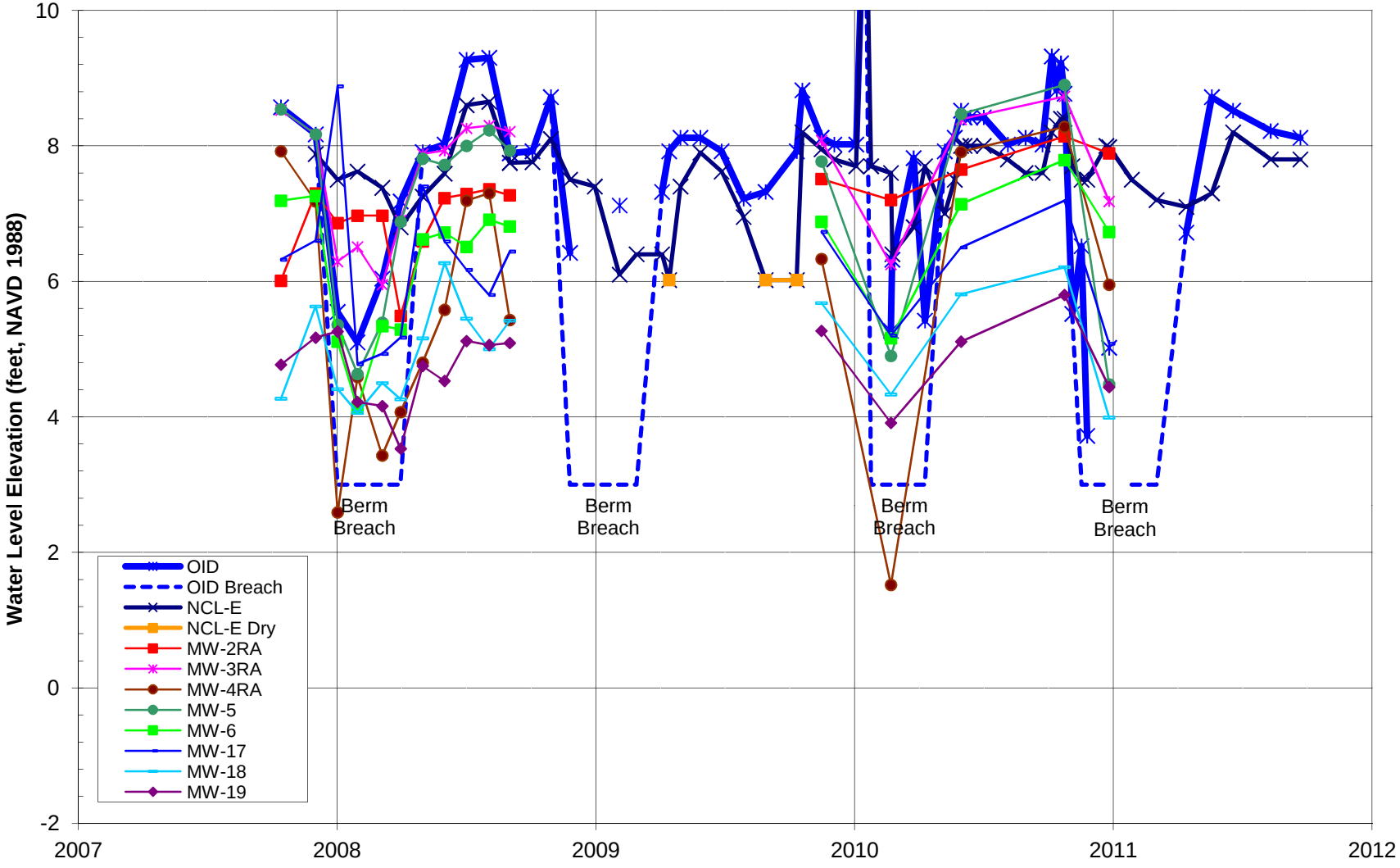


Figure I-3
MW-2 Well Cluster Hydrograph
October 2007 - August 2011

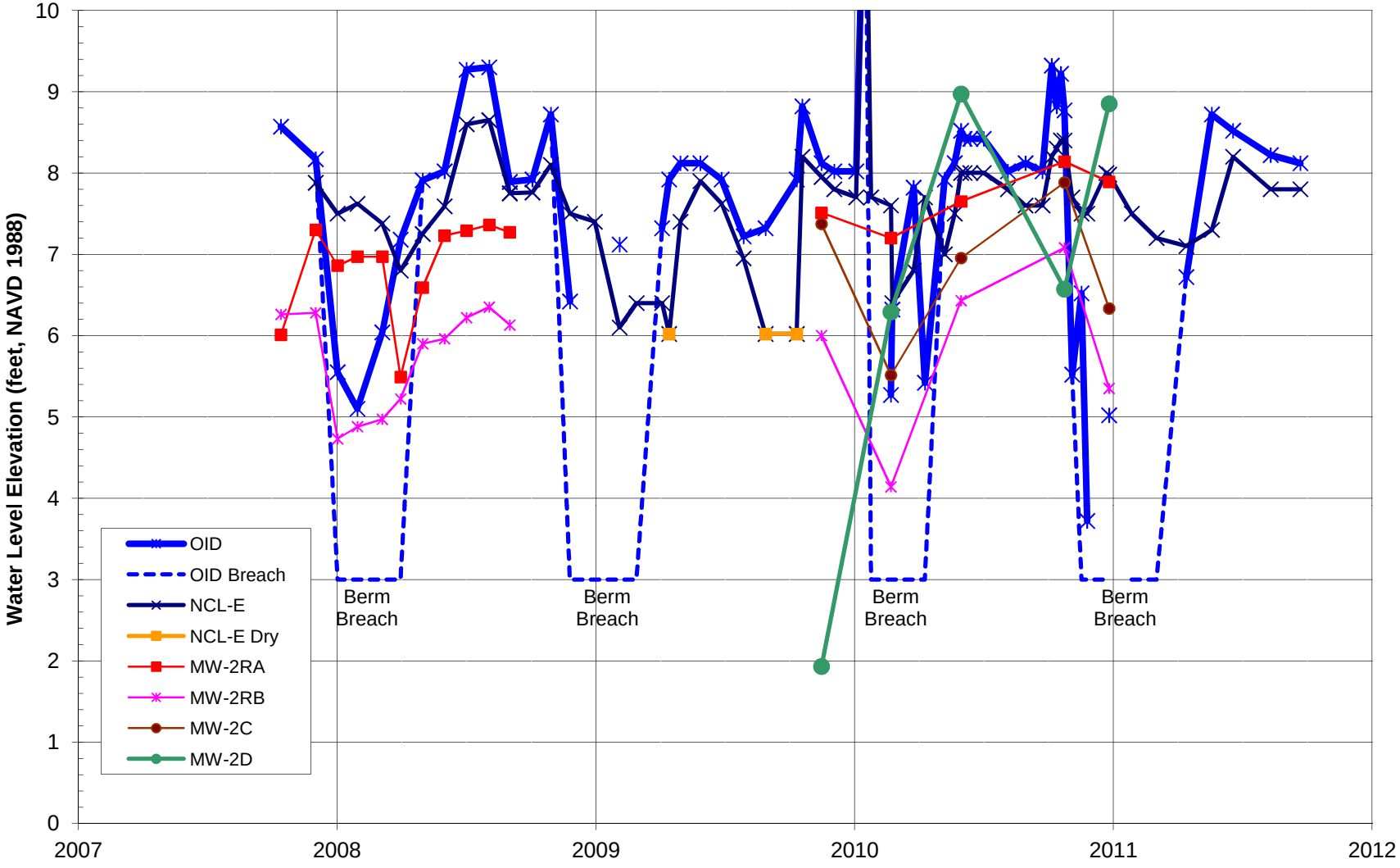


Figure I-4
MW-3 Well Cluster Hydrograph
October 2007 - August 2011

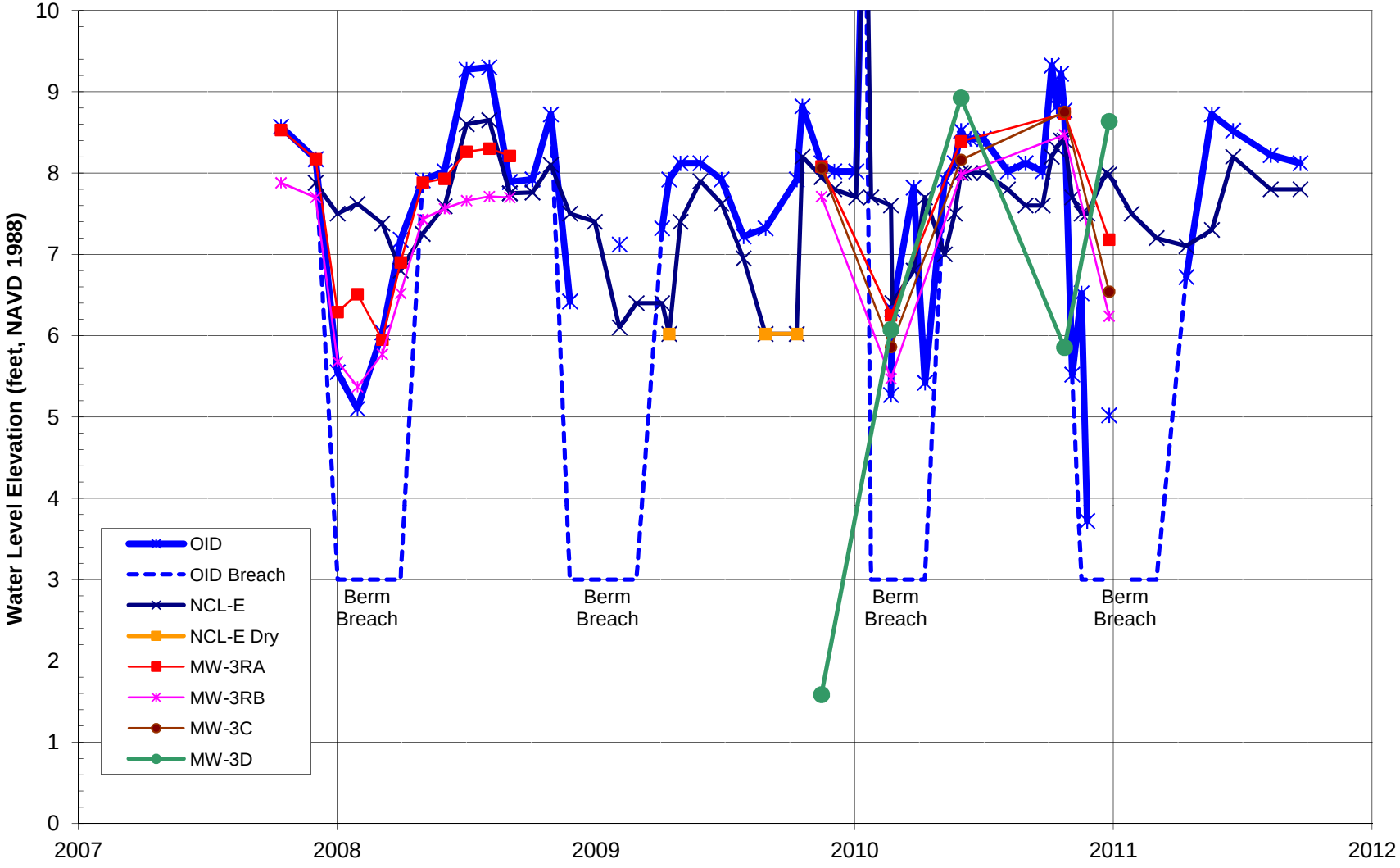


Figure I-5
MW-4 Well Cluster Hydrograph
October 2007 - August 2011

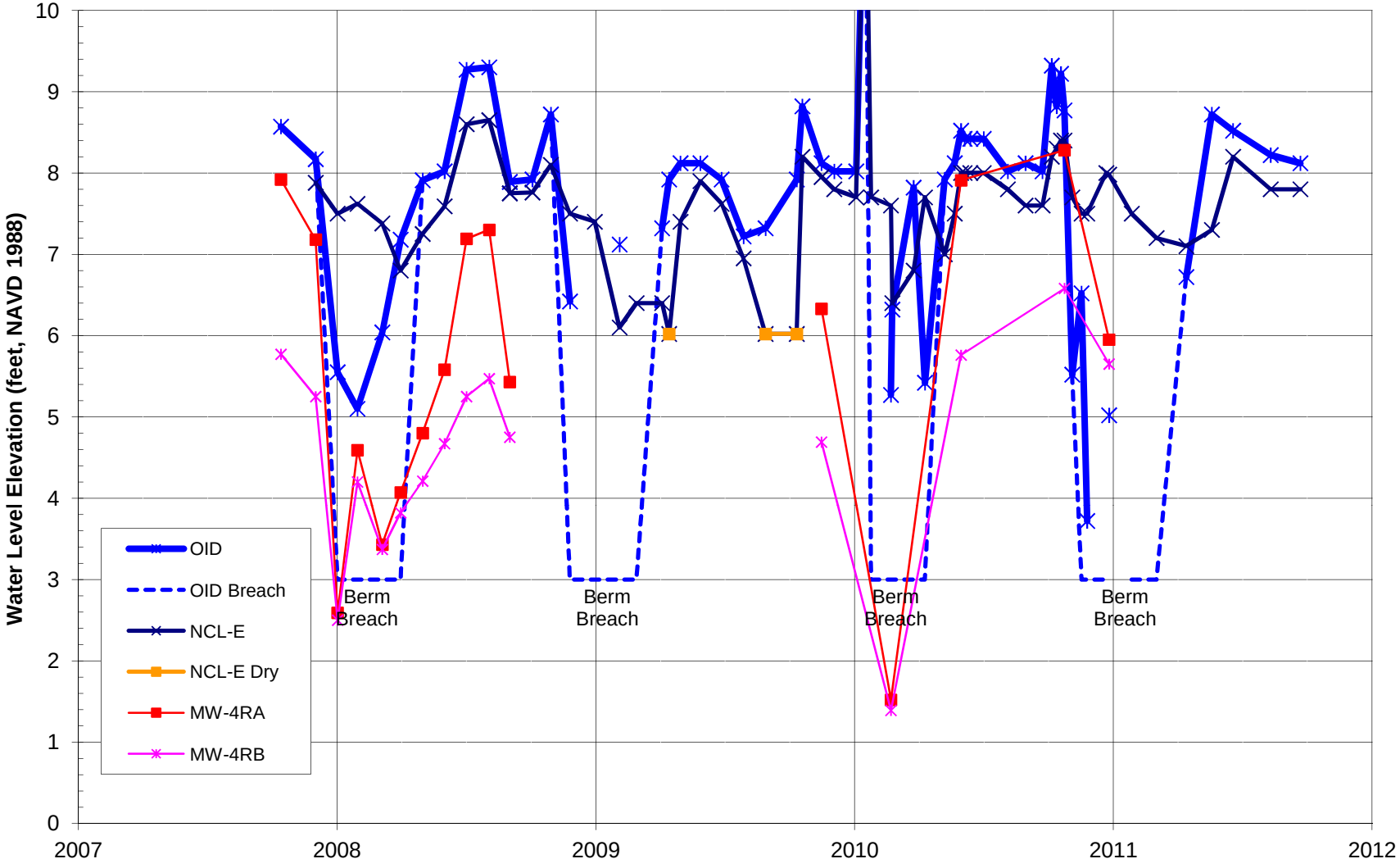


Figure I-6
MW-6 Well Cluster Hydrograph
October 2007 - August 2011

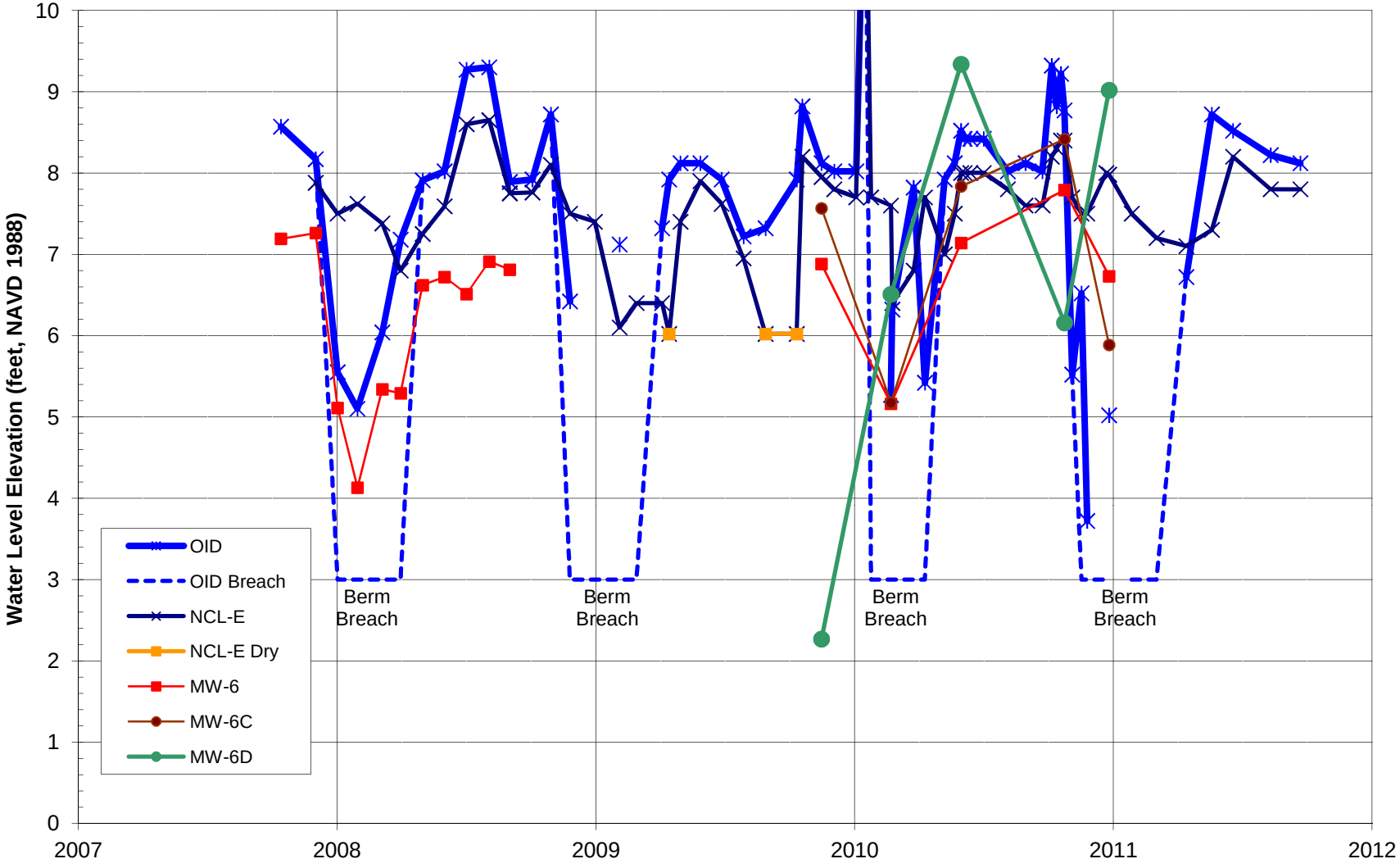


Figure I-7
MW-12 Well Cluster Hydrograph
October 2007 - August 2011

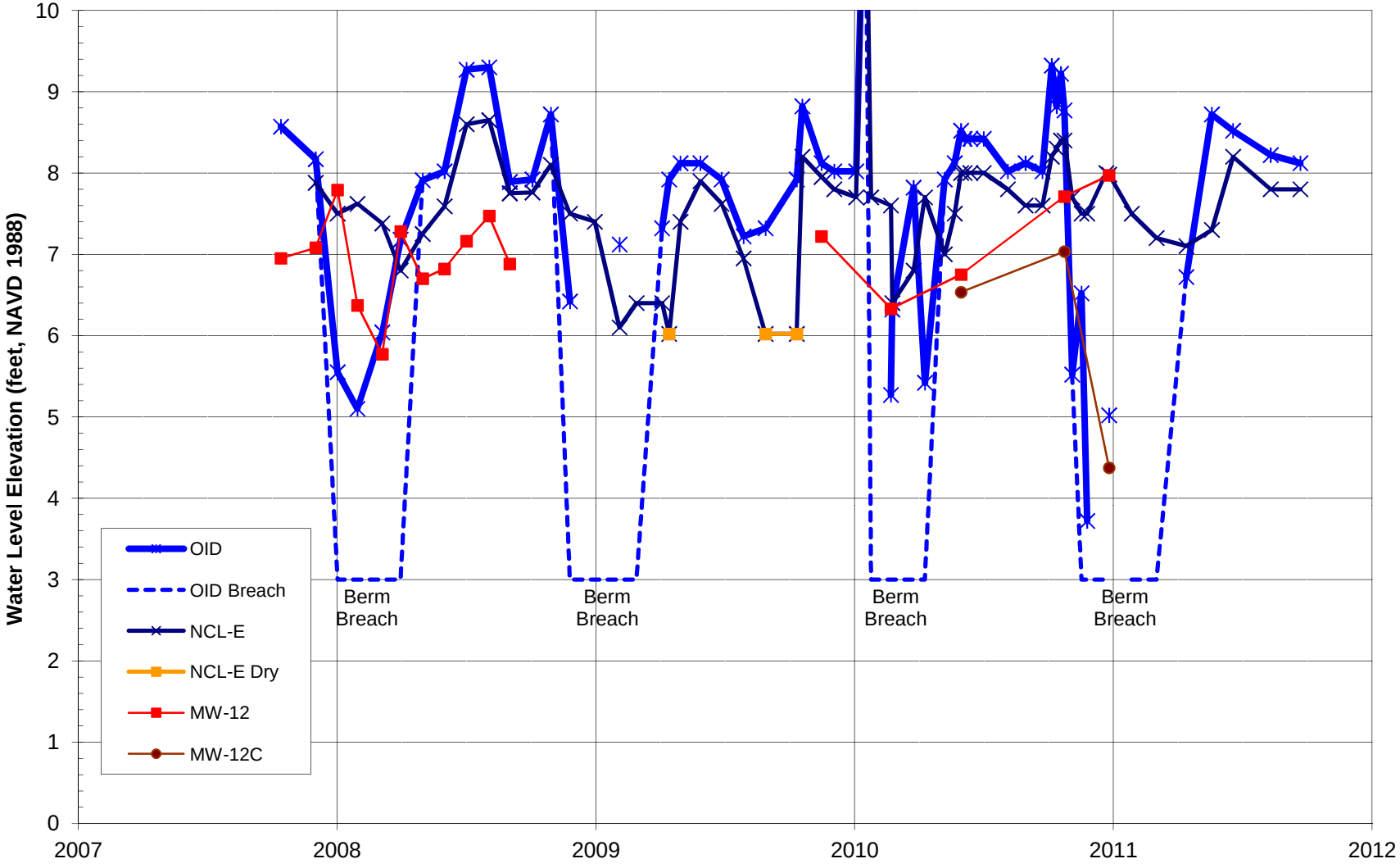


Figure I-8
MW-13 Well Cluster Hydrograph
October 2007 - August 2011

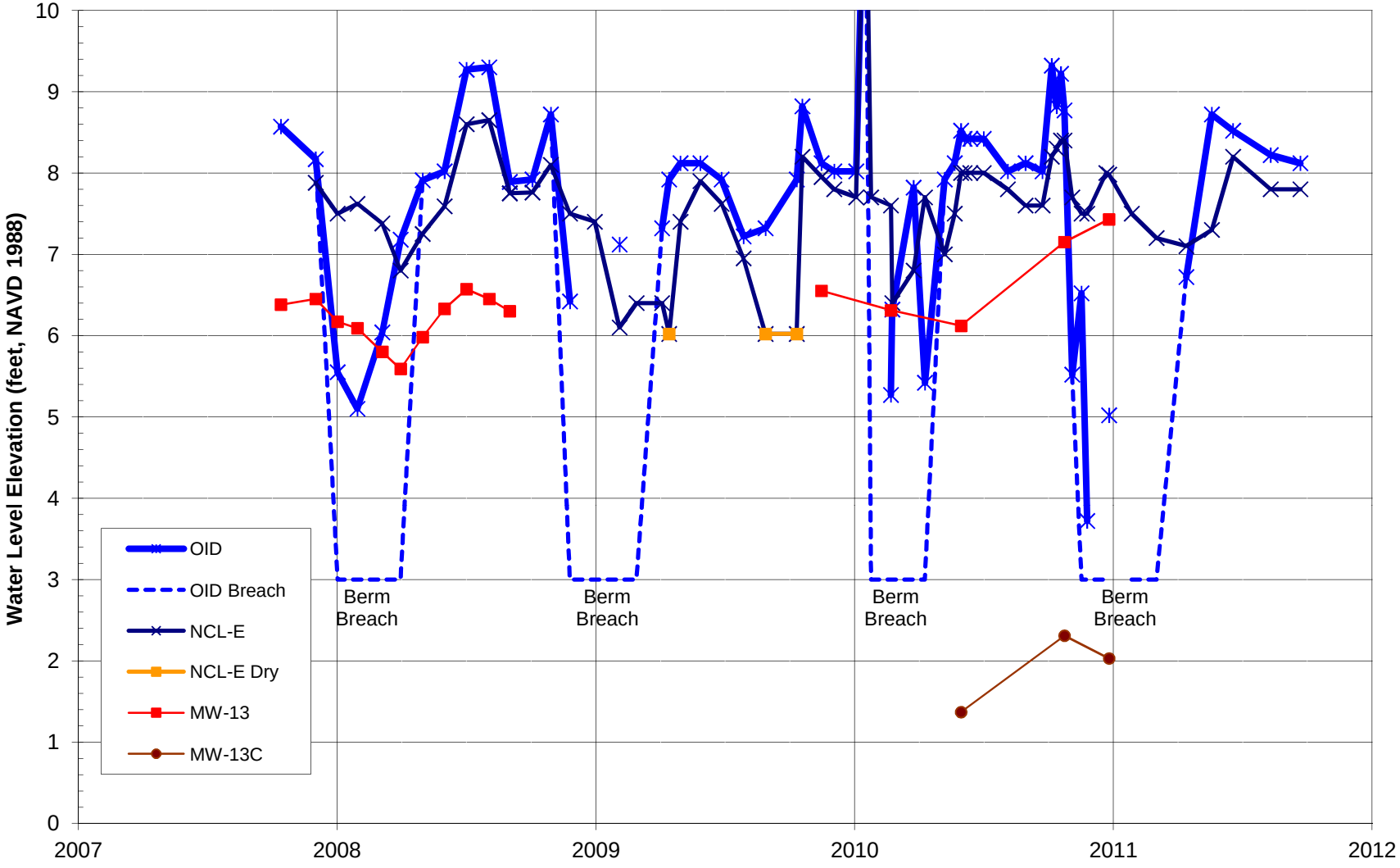


Figure I-9
MW-19 Well Cluster Hydrograph
October 2007 - August 2011

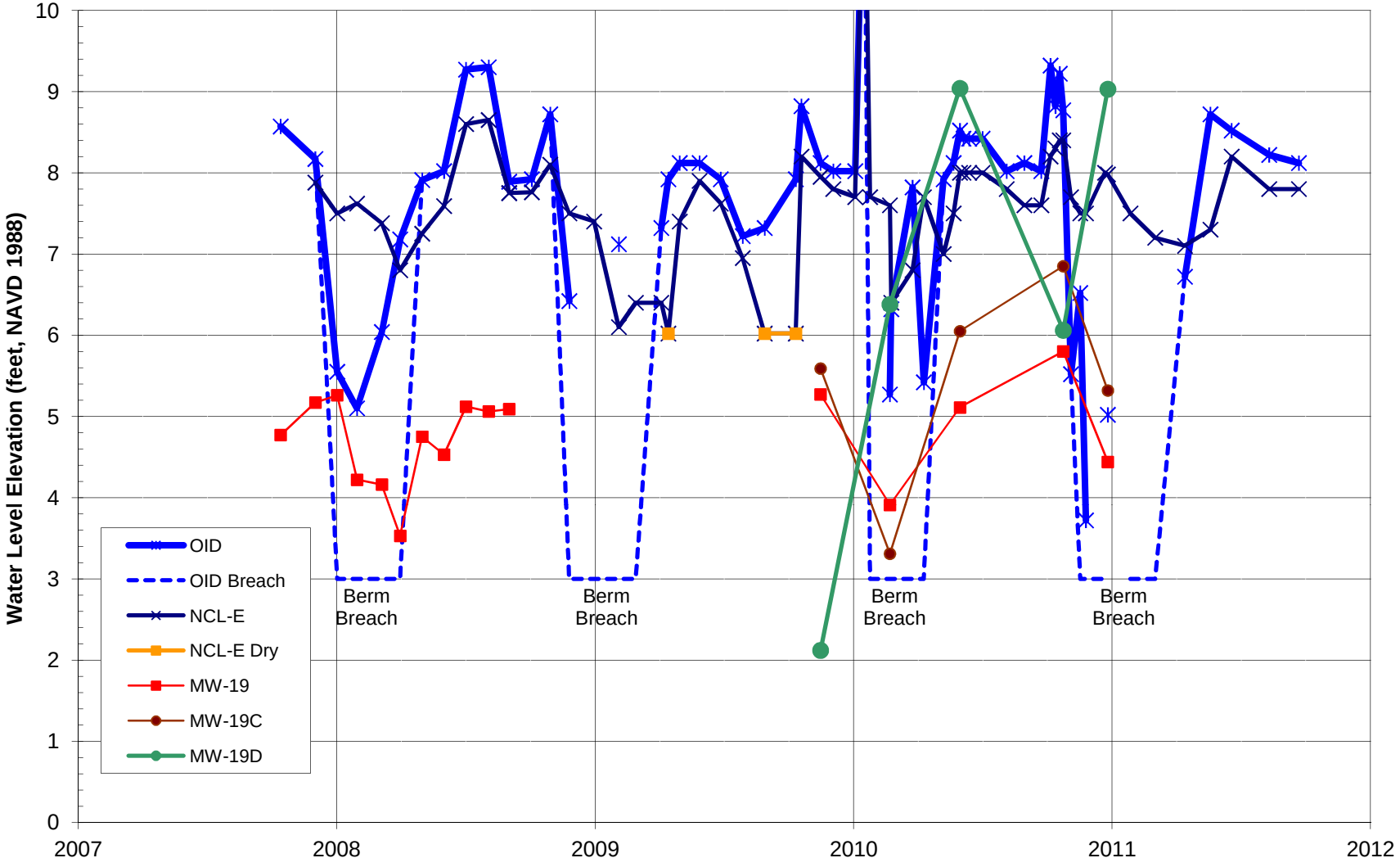


Figure I-10
MW-21 Well Cluster Hydrograph
October 2007 - August 2011

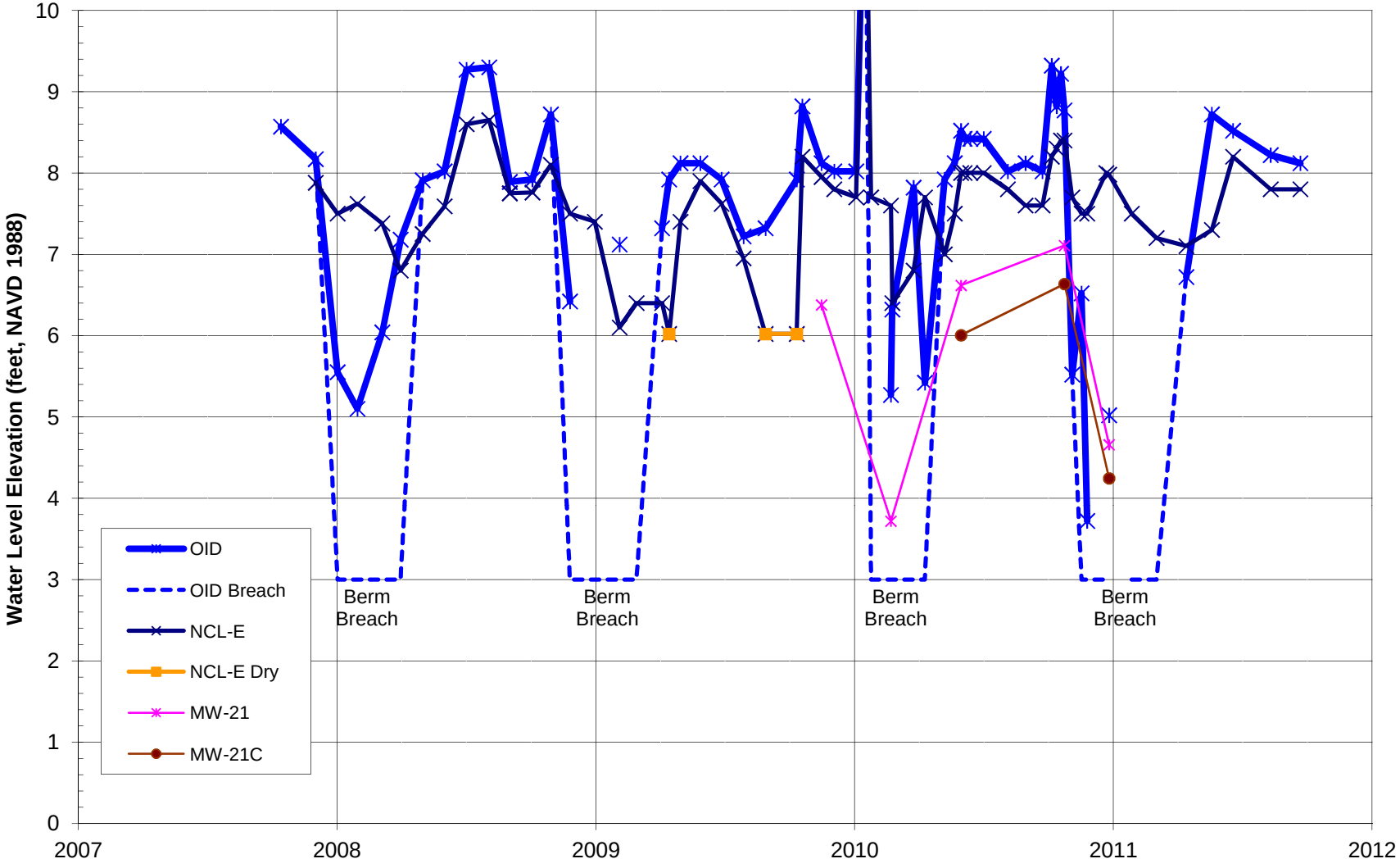


Figure I-11
MW-23 Well Cluster Hydrograph
October 2007 - August 2011

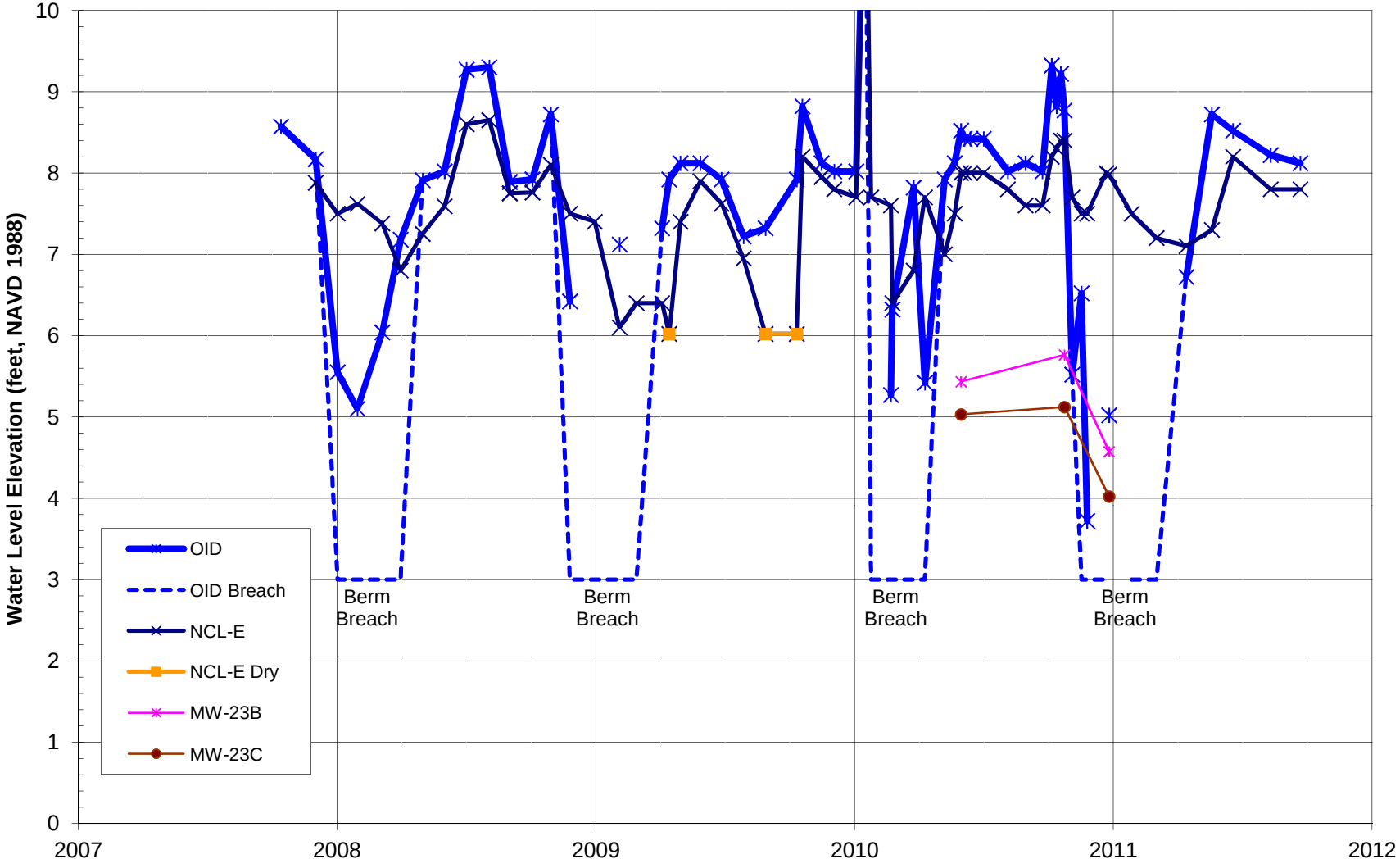


Figure I-12
MW-24 Well Cluster Hydrograph
October 2007 - August 2011

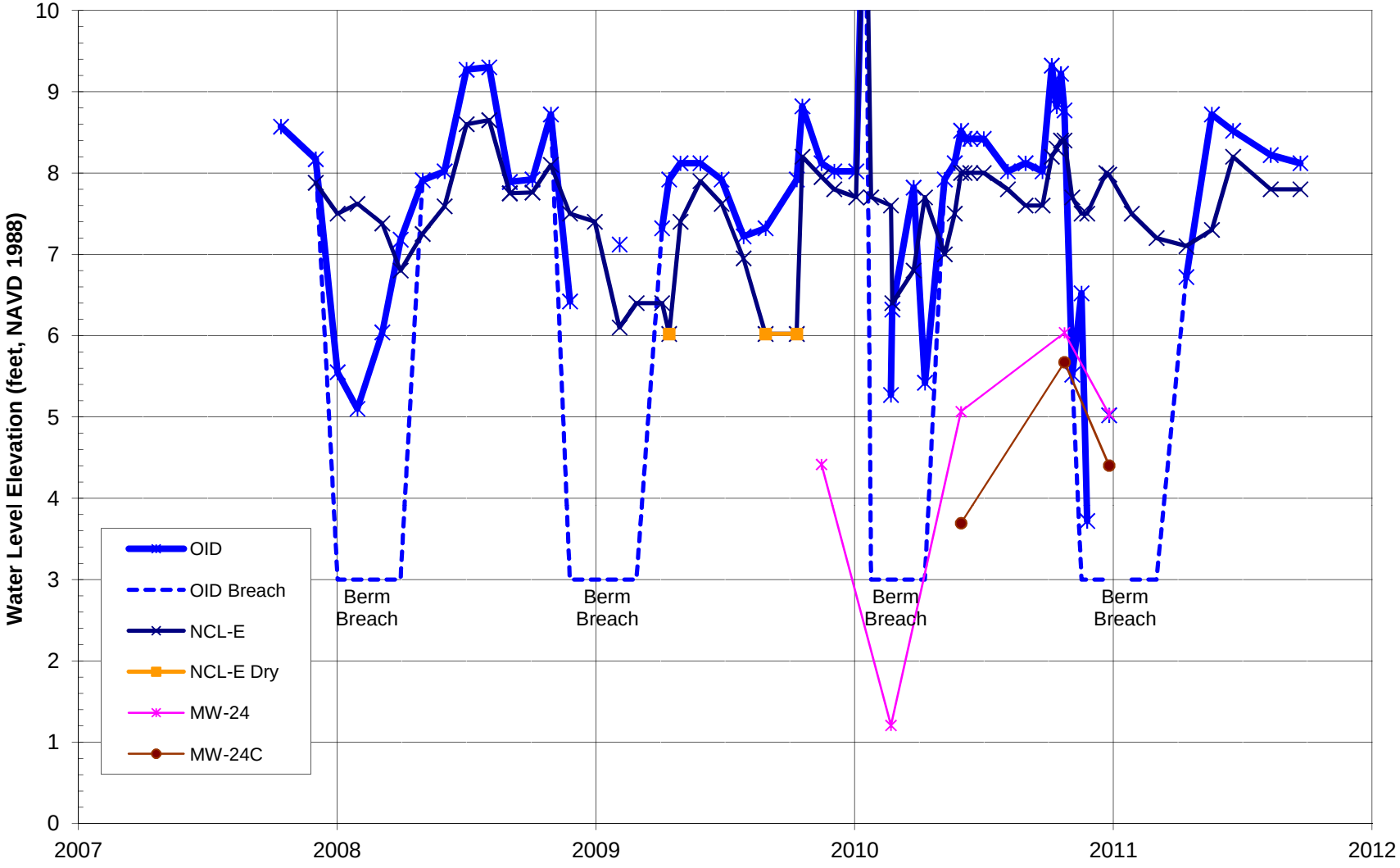


Figure I-13
MW-25 Well Cluster Hydrograph
October 2007 - August 2011

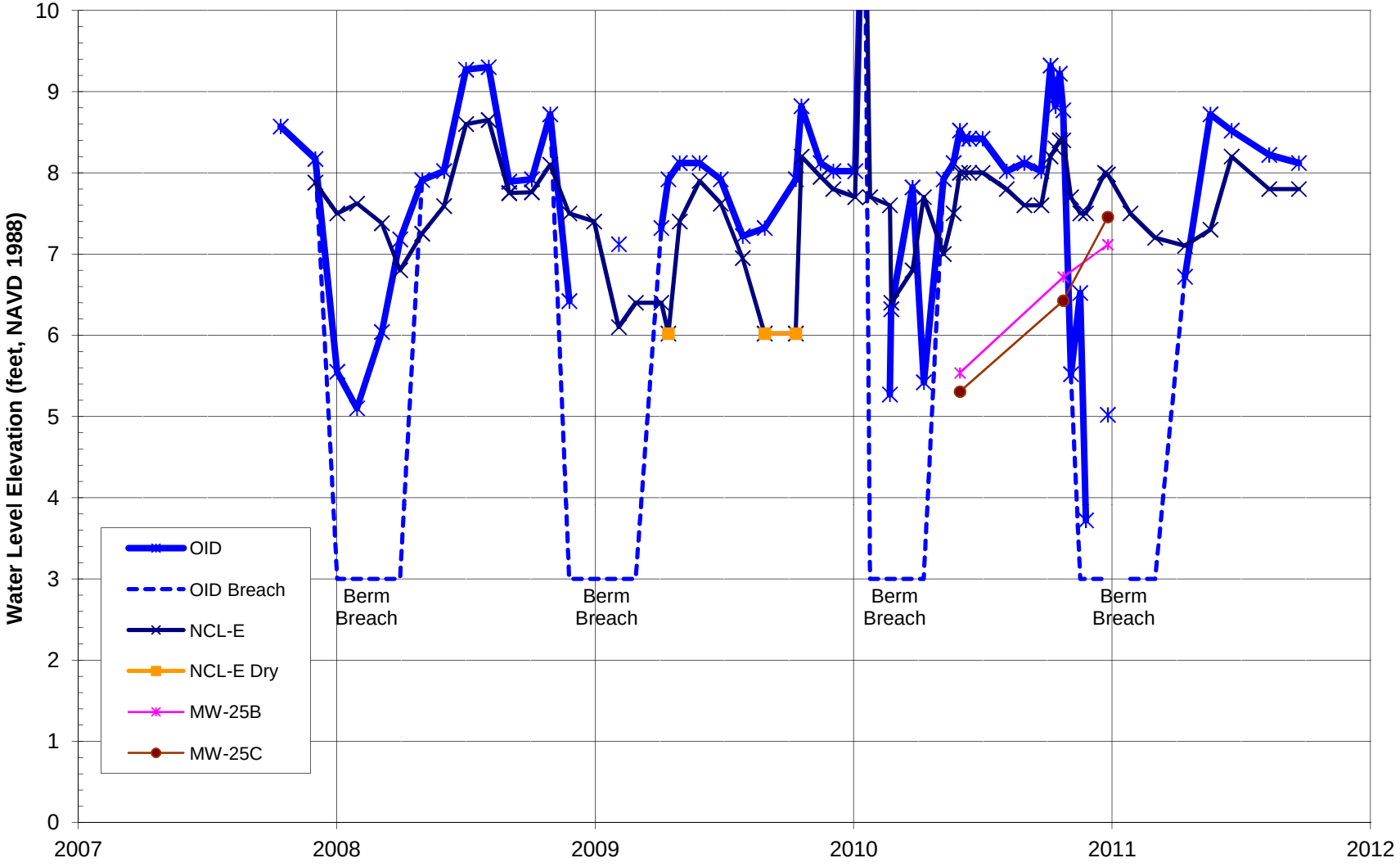


Figure I-14
MW-27 Well Cluster Hydrograph
October 2007 - August 2011

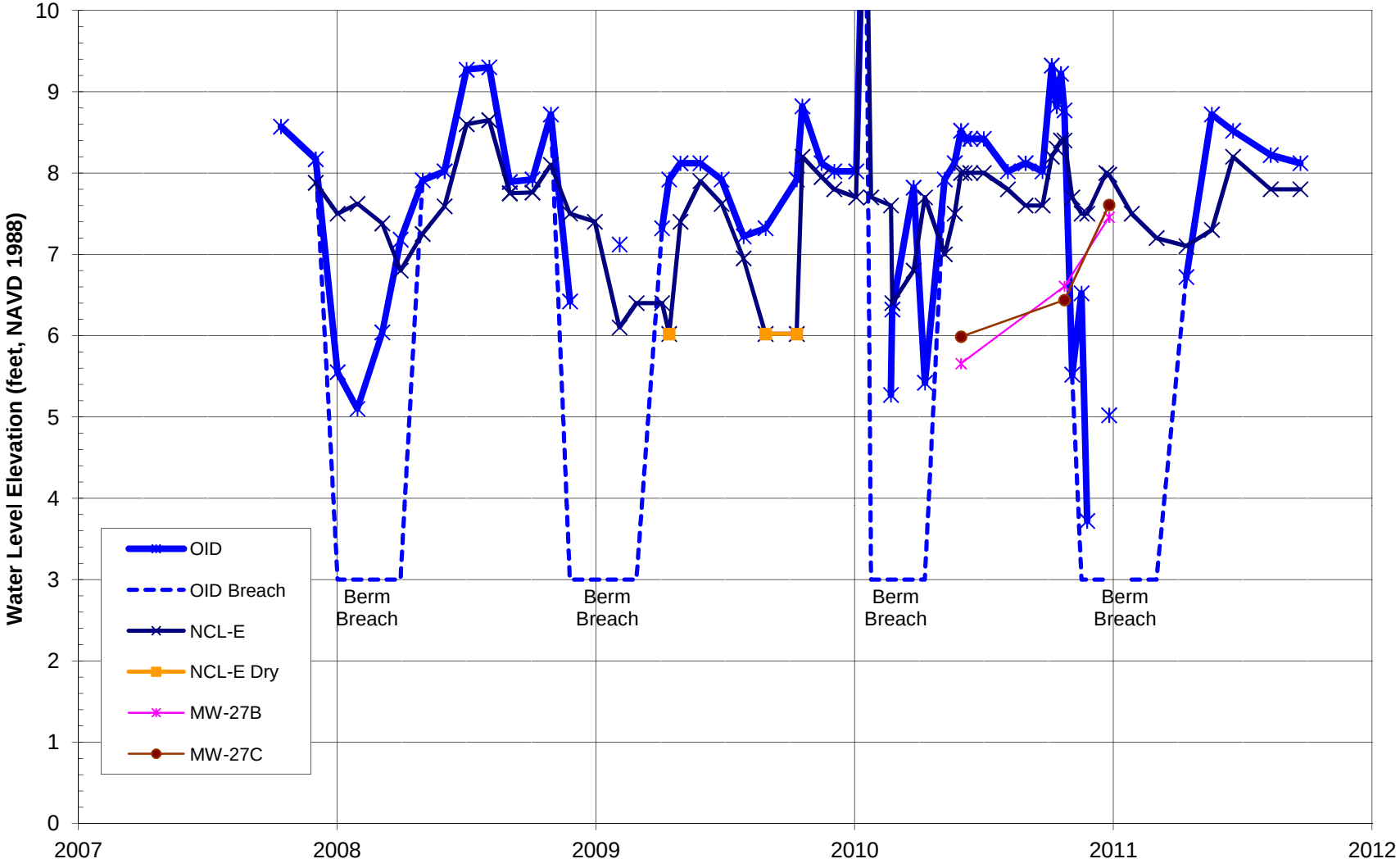
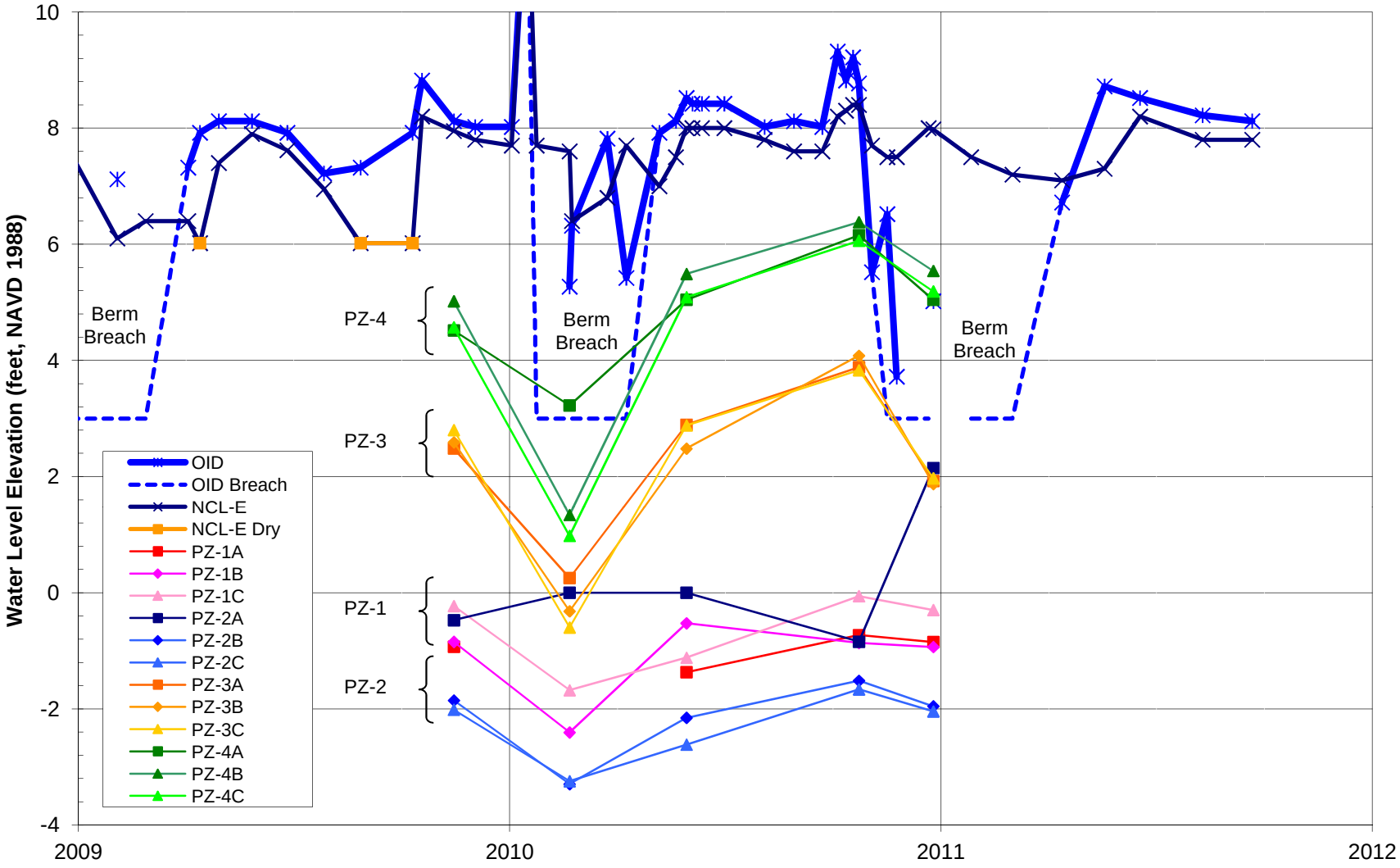


Figure I-15
PZ-1, PZ-2, PZ-3, and PZ-4 Piezomter Hydrograph
October 2007 - August 2011



Attachment J
Analyte List and CRQLs for Metals, VOCs, and SVOCs

ATTACHMENT J-1

Contract Required Quantitation Limit for Metals in Water

Halaco Site Remedial Investigation, Oxnard, California

No.	Parameter	ICP AES	ICP MS
1	Aluminum	200	--
2	Antimony	60	2
3	Arsenic	10	1
4	Barium	200	10
5	Beryllium	5	1
6	Cadmium	5	1
7	Calcium	5000	--
8	Chromium	10	2
9	Cobalt	50	1
10	Copper	25	2
11	Iron	100	--
12	Lead	10	1
13	Magnesium	5000	--
14	Manganese	15	1
15	Mercury	0.2	--
16	Nickel	40	1
17	Potassium	5000	--
18	Selenium	35	5
19	Silver	10	1
20	Sodium	5000	--
21	Thallium	25	1
22	Vanadium	50	5
23	Zinc	60	2

Notes:

Units are in µg/L

ICP AES = Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP MS = Inductively Coupled Plasma Mass Spectrometer

ATTACHMENT J-2

Contract Required Quantitation Limit for VOCs in Water

Halaco Site Remedial Investigation, Oxnard, California

No.	Volatiles	CRQL	No.	Volatiles	CRQL
1	Dichlorodifluoromethane	0.5	27	1,2-Dichloropropane	0.5
2	Chloromethane	0.5	28	Bromodichloromethane	0.5
3	Vinyl chloride	0.5	29	cis-1,3-Dichloropropene	0.5
4	Bromomethane	0.5	30	4-Methyl-2-Pentanone	5
5	Chloroethane	0.5	31	Toluene	0.5
6	Trichlorofluoromethane	0.5	32	trans-1,3-Dichloropropene	0.5
7	1,1-Dichloroethene	0.5	33	1,1,2-Trichloroethane	0.5
8	1,1,2-Trichloro-1,2,2-trifluoroethane	0.5	34	Tetrachloroethene	0.5
9	Acetone	5	35	2-Hexanone	5
10	Carbon disulfide	0.5	36	Dibromochloromethane	0.5
11	Methyl acetate	0.5	37	1,2-Dibromoethane	0.5
12	Methylene chloride	0.5	38	Chlorobenzene	0.5
13	trans-1,2-Dichloroethene	0.5	39	Ethylbenzene	0.5
14	Methyl tert-butyl ether	0.5	40	o-Xylene	0.5
15	1,1-Dichloroethane	0.5	41	m,p-Xylene	0.5
16	cis-1,2-Dichloroethene	0.5	42	Styrene	0.5
17	2-Butanone	5	43	Bromoform	0.5
18	Bromochloromethane	0.5	44	Isopropylbenzene	0.5
19	Chloroform	0.5	45	1,1,2,2-Tetrachloroethane	0.5
20	1,1,1-Trichloroethane	0.5	46	1,3-Dichlorobenzene	0.5
21	Cyclohexane	0.5	47	1,4-Dichlorobenzene	0.5
22	Carbon tetrachloride	0.5	48	1,2-Dichlorobenzene	0.5
23	Benzene	0.5	49	1,2-Dibromo-3-chloropropane	0.5
24	1,2-Dichloroethane	0.5	50	1,2,4-Trichlorobenzene	0.5
25	Trichloroethene	0.5	51	1,2,3-Trichlorobenzene	0.5
26	Methylcyclohexane	0.5			

Note:

Units are in µg/L

ATTACHMENT J-3

Contract Required Quantitation Limit for SVOCs in Water

Halaco Site Remedial Investigation, Oxnard, California

No.	Semivolatiles	CRQL	No.	Semivolatiles	CRQL
1	Benzaldehyde	5	35	4-Nitrophenol	10
2	Phenol	5	36	Dibenzofuran	5
3	Bis(2-chloroethyl)ether	5	37	2,4-Dinitrotoluene	5
4	2-Chlorophenol	5	38	Diethylphthalate	5
5	2-Methylphenol	5	39	Fluorene	5
6	2,2'-Oxybis(1-chloropropane)	5	40	4-Chlorophenyl-phenylether	5
7	Acetophenone	5	41	4-Nitroaniline	10
8	4-Methylphenol	5	42	4,6-Dinitro-2-methylphenol	10
9	N-Nitroso-di-n-propylamine	5	43	N-Nitrosodiphenylamine	5
10	Hexachloroethane	5	44	1,2,4,5-Tetrachlorobenzene	5
11	Nitrobenzene	5	45	4-Bromophenyl-phenylether	5
12	Isophorone	5	46	Hexachlorobenzene	5
13	2-Nitrophenol	5	47	Atrazine	5
14	2,4-Dimethylphenol	5	48	Pentachlorophenol	10
15	Bis(2-chloroethoxy)methane	5	49	Phenanthrene	5
16	2,4-Dichlorophenol	5	50	Anthracene	5
17	Naphthalene	5	51	Carbazole	5
18	4-Chloroaniline	5	52	Di-n-butylphthalate	5
19	Hexachlorobutadiene	5	53	Fluoranthene	5
20	Caprolactam	5	54	Pyrene	5
21	4-Chloro-3-methylphenol	5	55	Butylbenzylphthalate	5
22	2-Methylnaphthalene	5	56	3,3'-Dichlorobenzidine	5
23	Hexachlorocyclopentadiene	5	57	Benzo(a)anthracene	5
24	2,4,6-Trichlorophenol	5	58	Chrysene	5
25	2,4,5-Trichlorophenol	5	59	Bis(2-ethylhexyl)phthalate	5
26	1,1'-Biphenyl	5	60	Di-n-octylphthalate	5
27	2-Chloronaphthalene	5	61	Benzo(b)fluoranthene	5
28	2-Nitroaniline	10	62	Benzo(k)fluoranthene	5
29	Dimethylphthalate	5	63	Benzo(a)pyrene	5
30	2,6-Dinitrotoluene	5	64	Indeno(1,2,3-cd)pyrene	5
31	Acenaphthylene	5	65	Dibenzo(a,h)anthracene	5
32	3-Nitroaniline	10	66	Benzo(g,h,i)perylene	5
33	Acenaphthene	5	67	2,3,4,6-Tetrachlorophenol	5
34	2,4-Dinitrophenol	10			

Note:

Units are in µg/L

Attachment K
Time Series Concentration Charts for Surface Water, 1980 – 2010

Figure K-1
OID Surface Water - pH
Long-term Monitoring

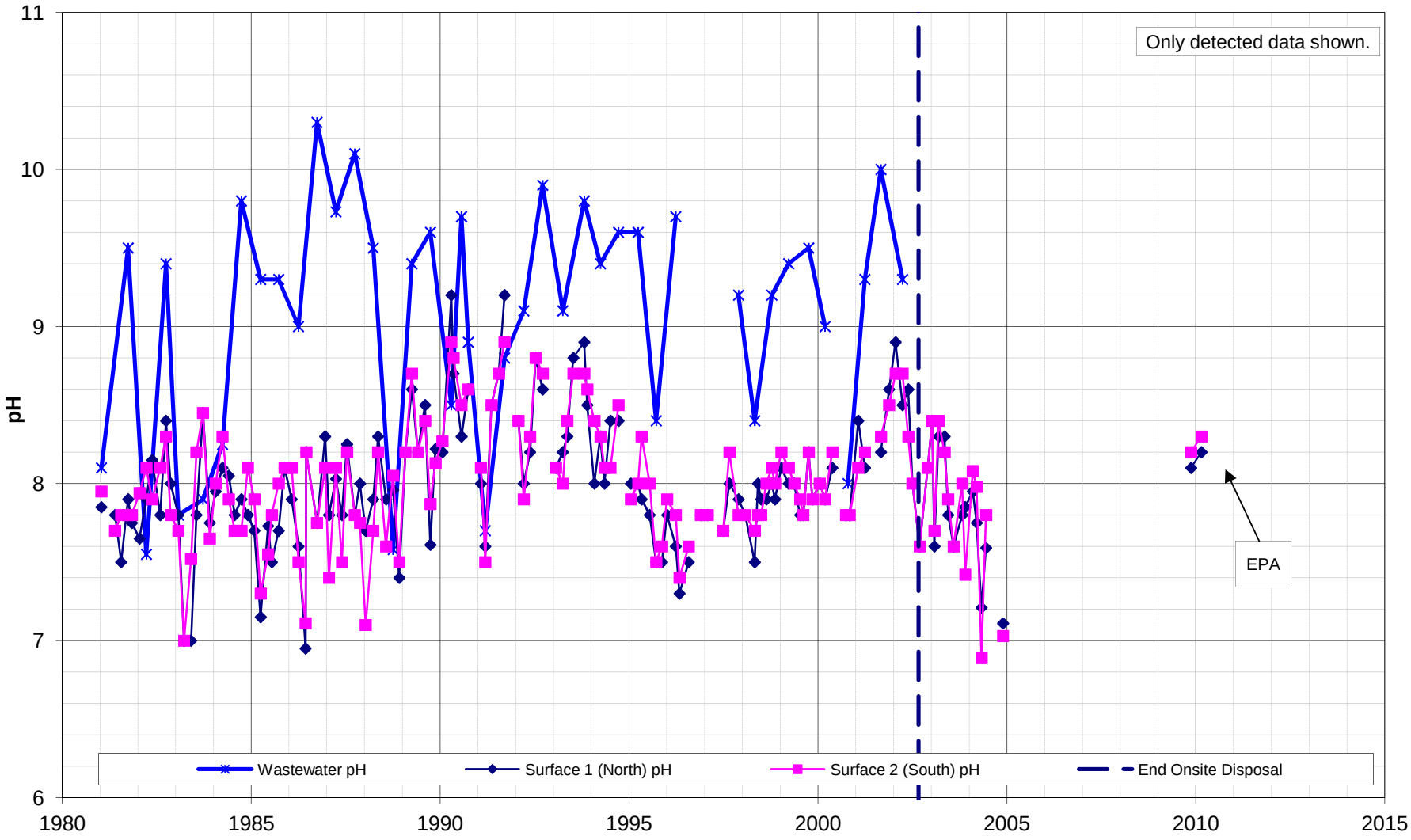


Figure K-2
OID Surface Water - Magnesium
Long-term Monitoring

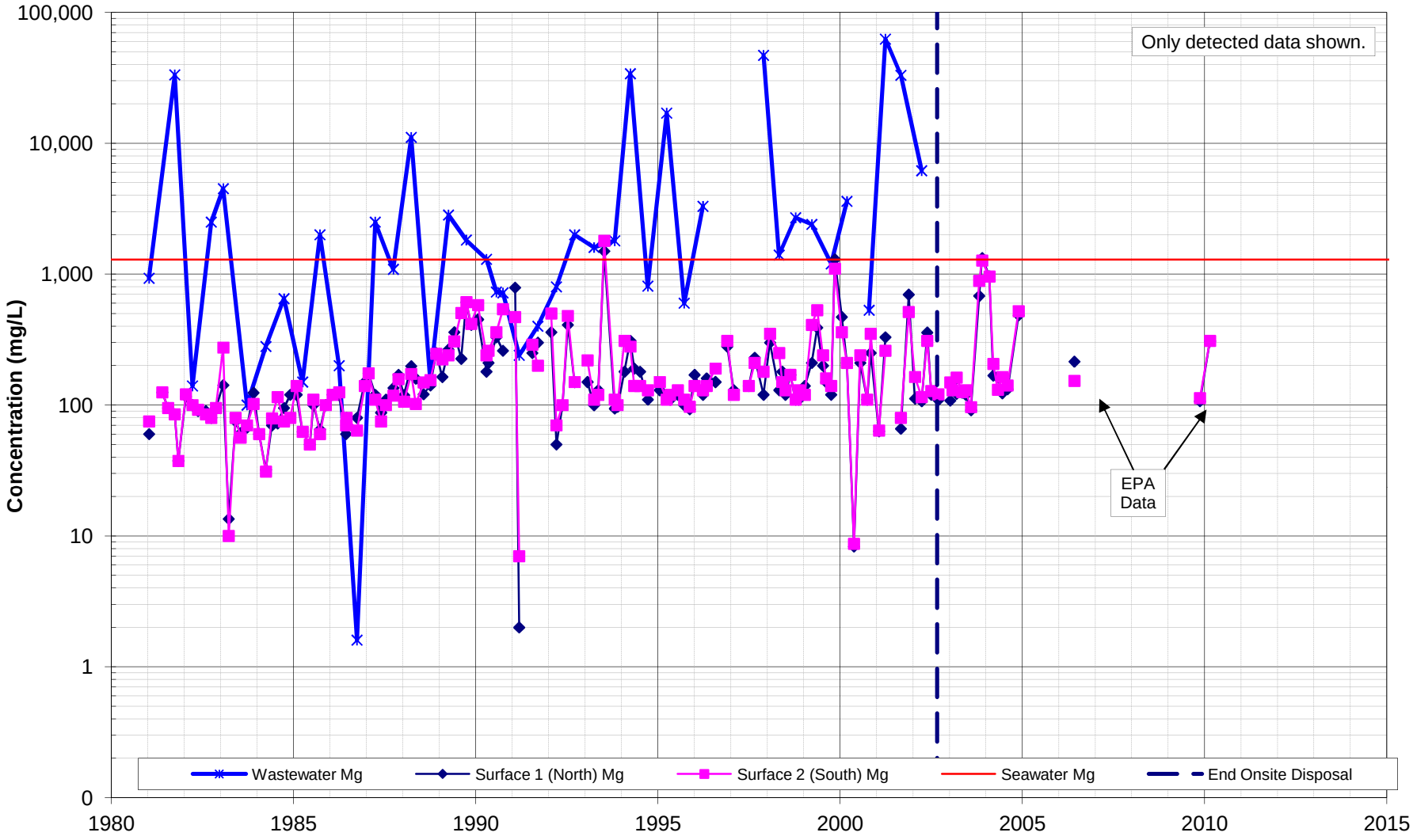


Figure K-3
OID Surface Water - Aluminum
Long-term Monitoring

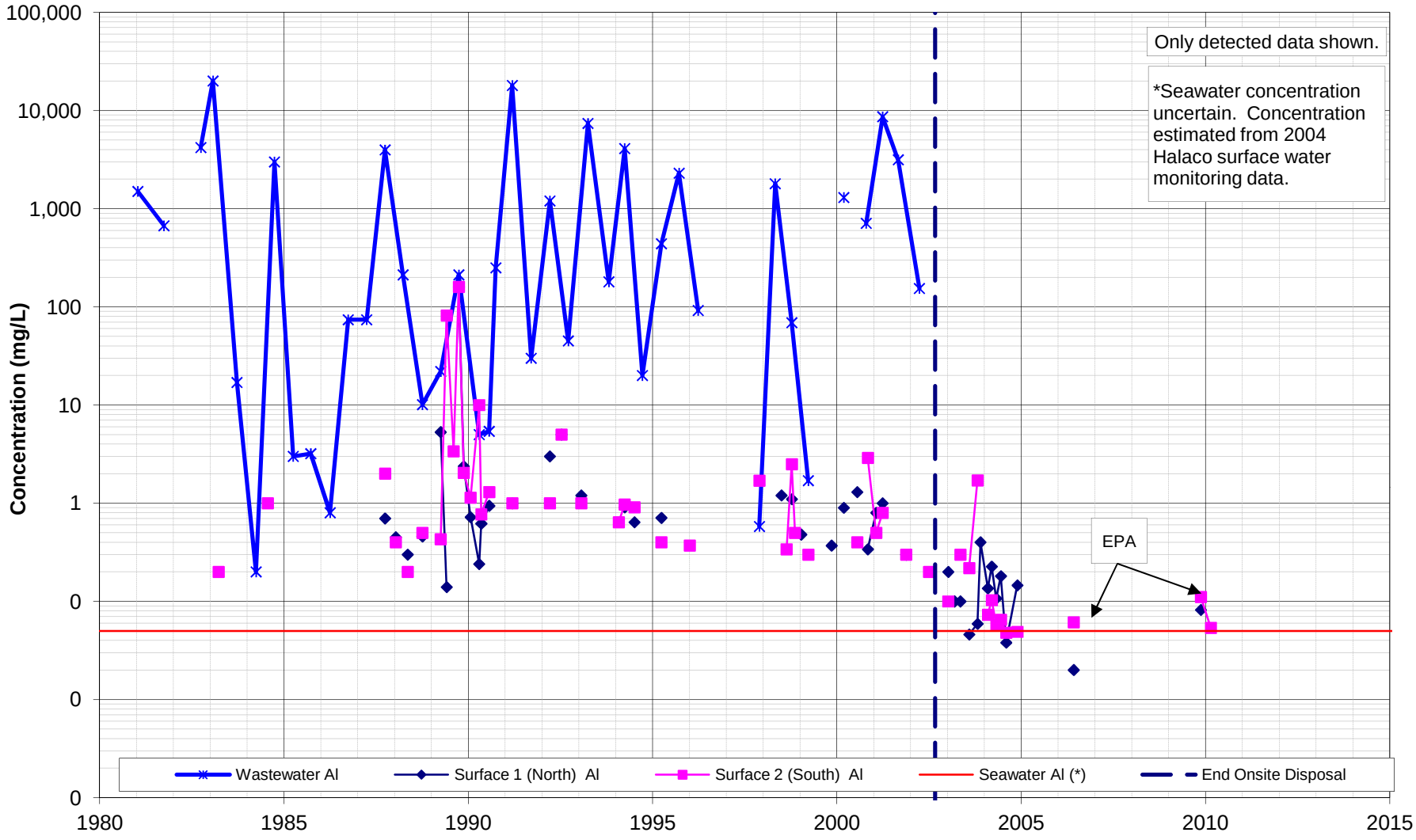


Figure K-4
OID Surface Water - Copper
Long-term Monitoring

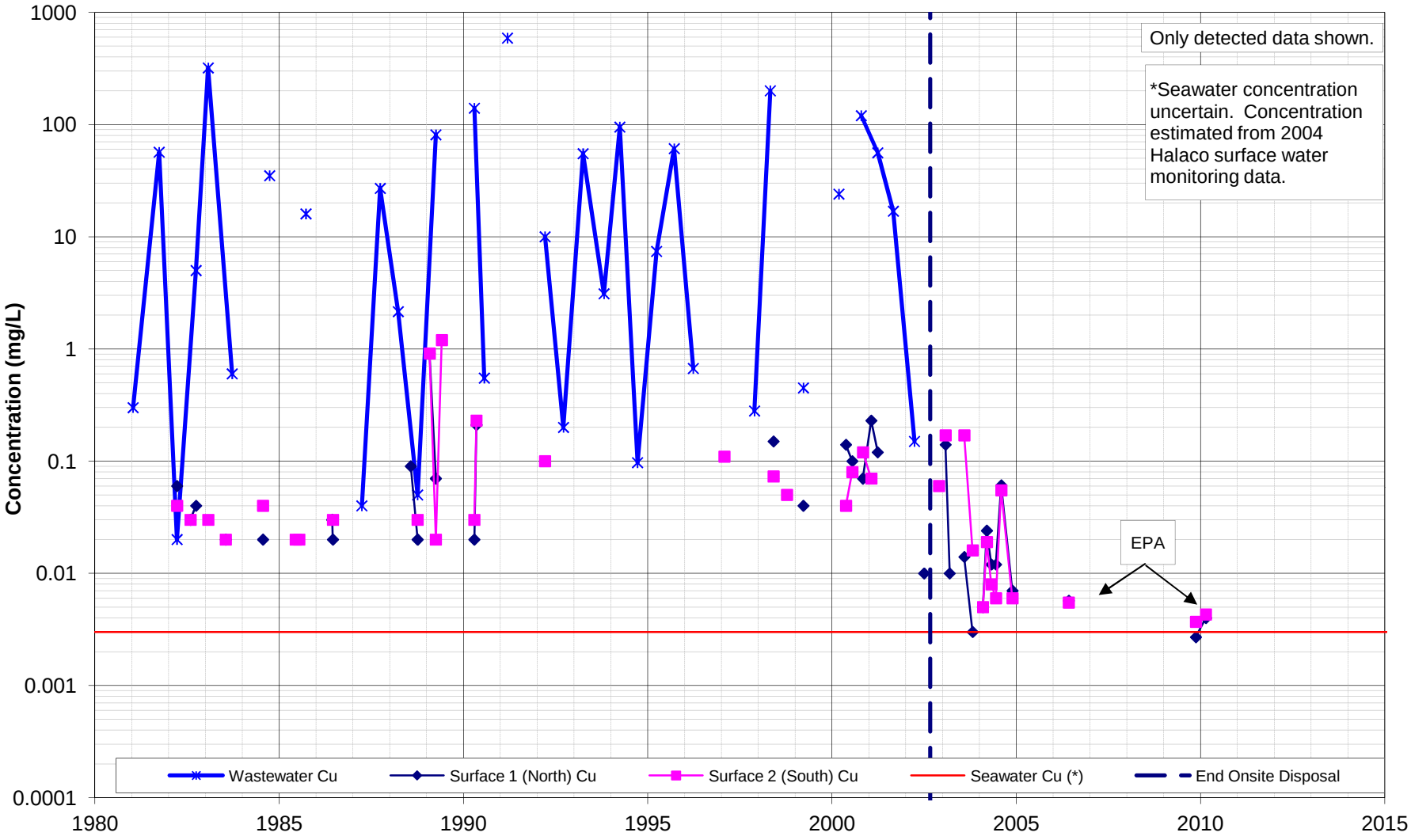


Figure K-5
OID Surface Water - Zinc
Long-term Monitoring

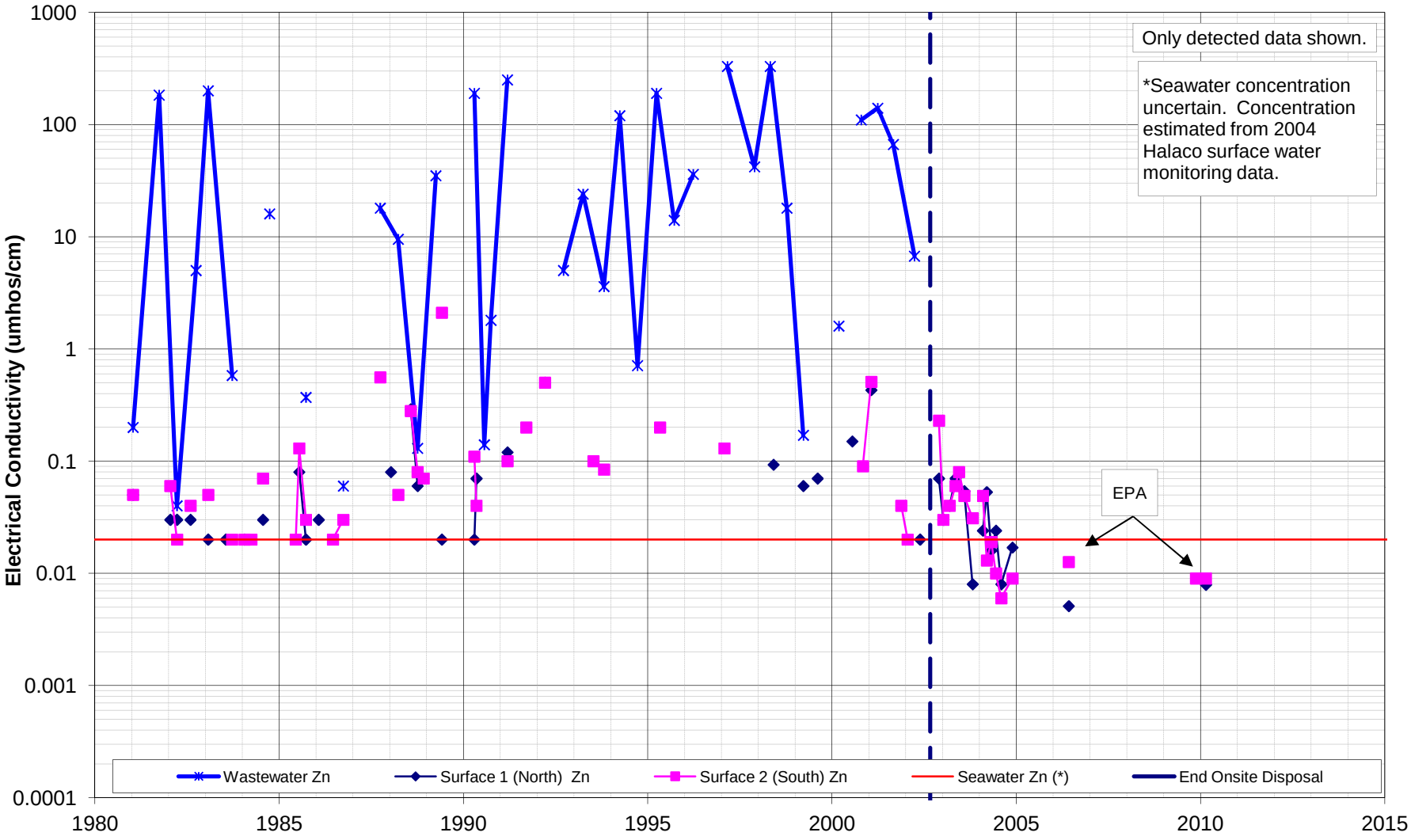
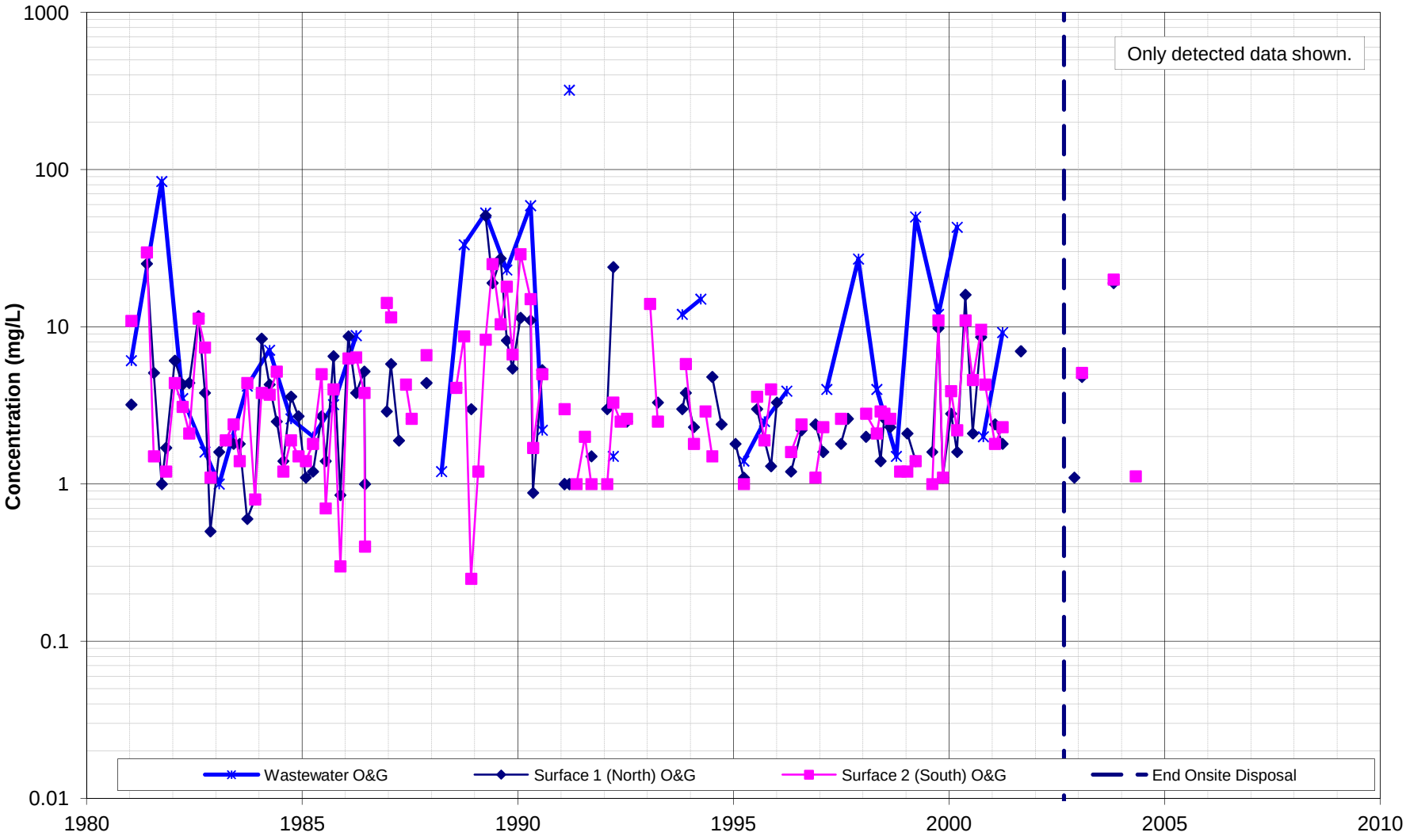


Figure K-6
OID Surface Water - Oil & Grease
Long-term Monitoring



Attachment L
Time Series Concentration Charts for Groundwater, 1980 – 2010

Figure L-1
Groundwater - pH
Long-term Monitoring

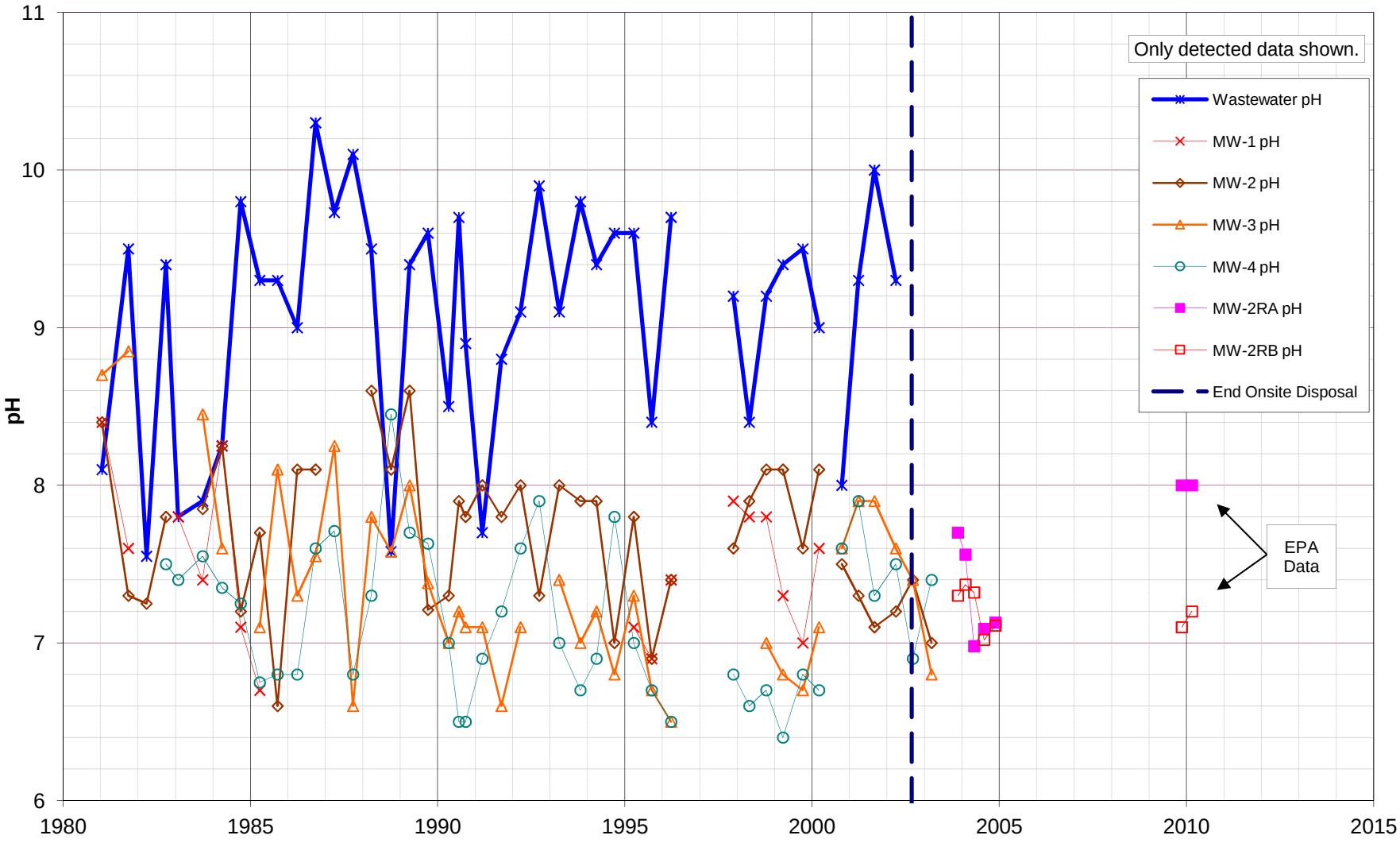


Figure L-2
Groundwater - Magnesium
Long-term Monitoring

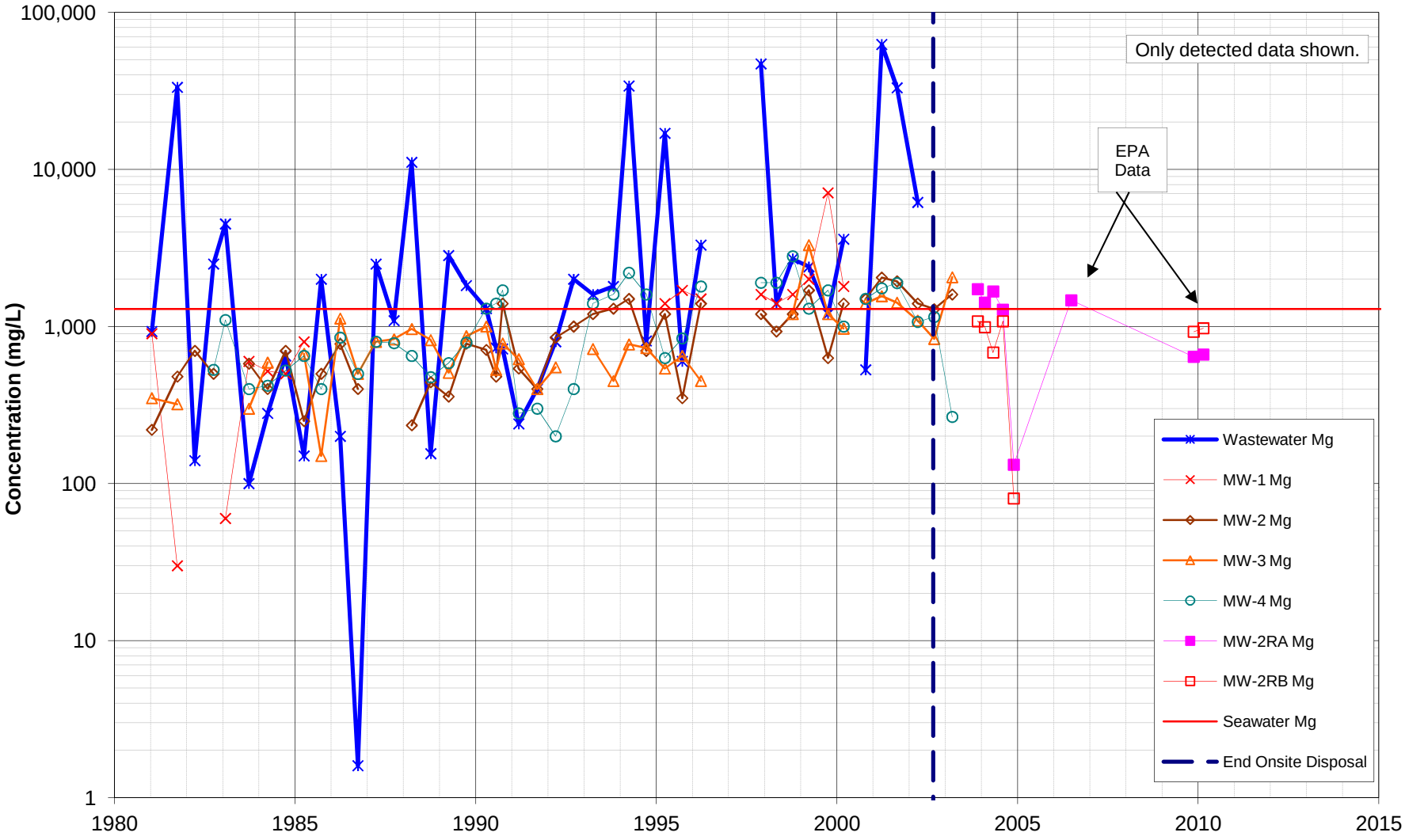


Figure L-3
Groundwater - Aluminum
Long-term Monitoring

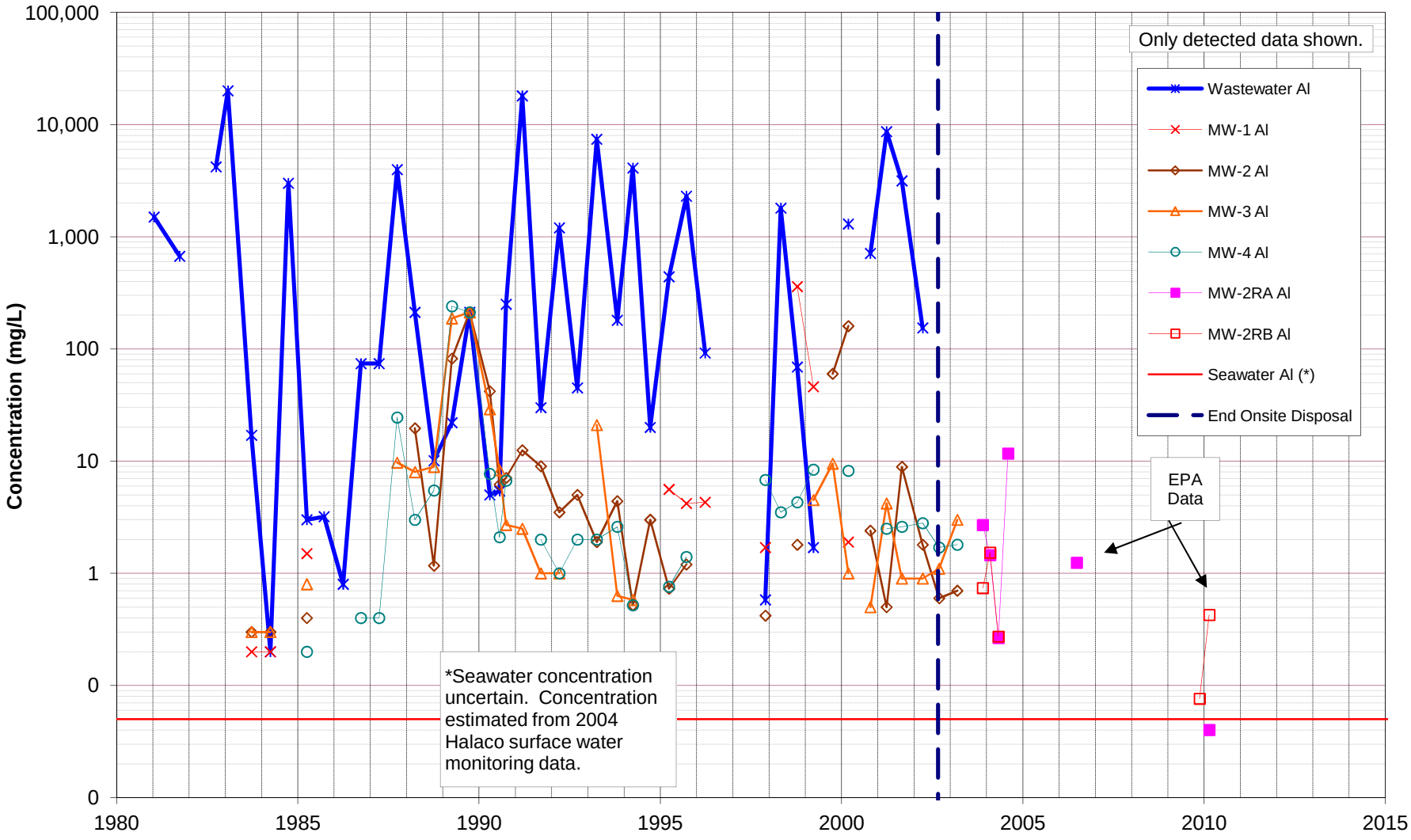


Figure L-4
Groundwater - Copper
Long-term Monitoring

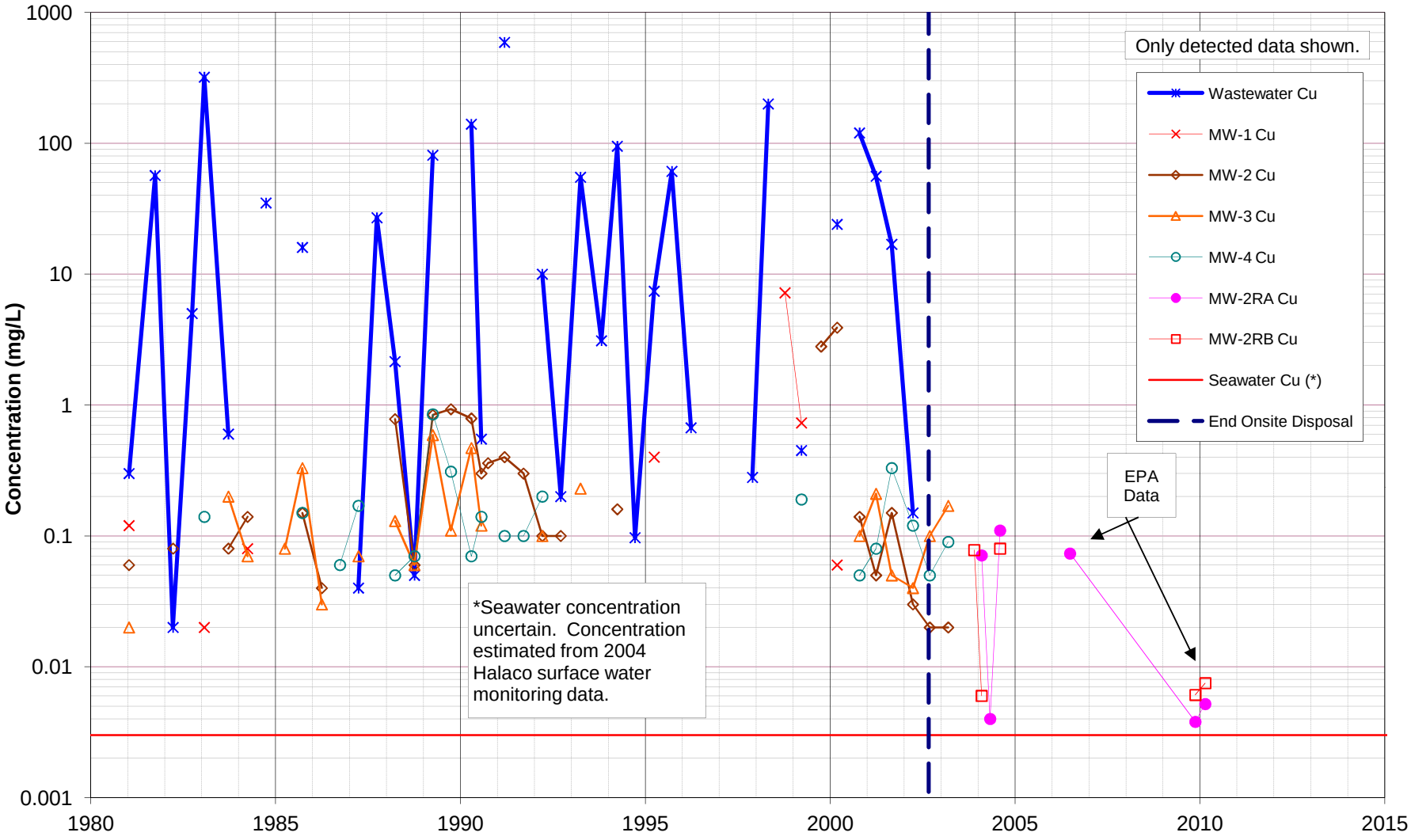


Figure L-5
Groundwater - Zinc
Long-term Monitoring

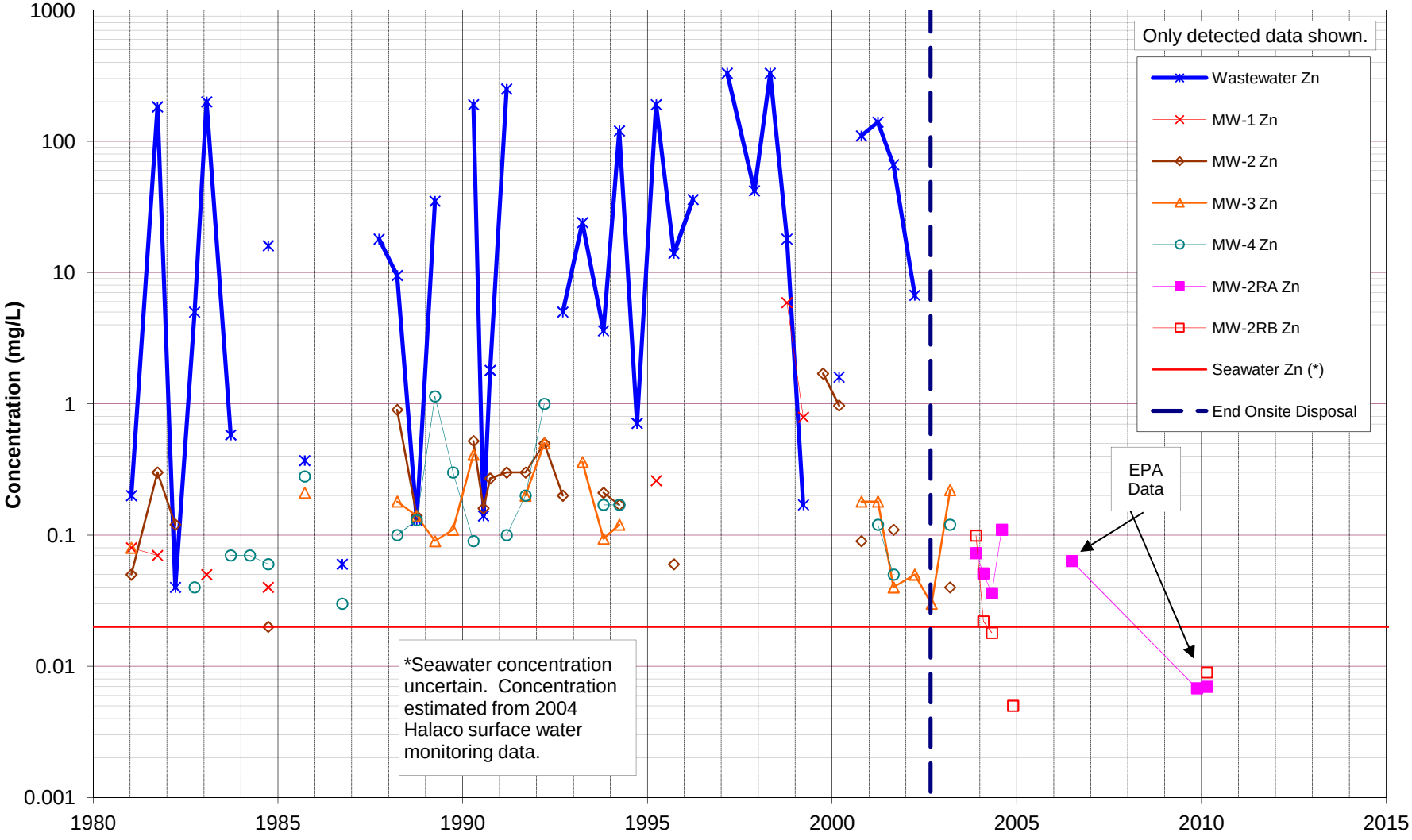
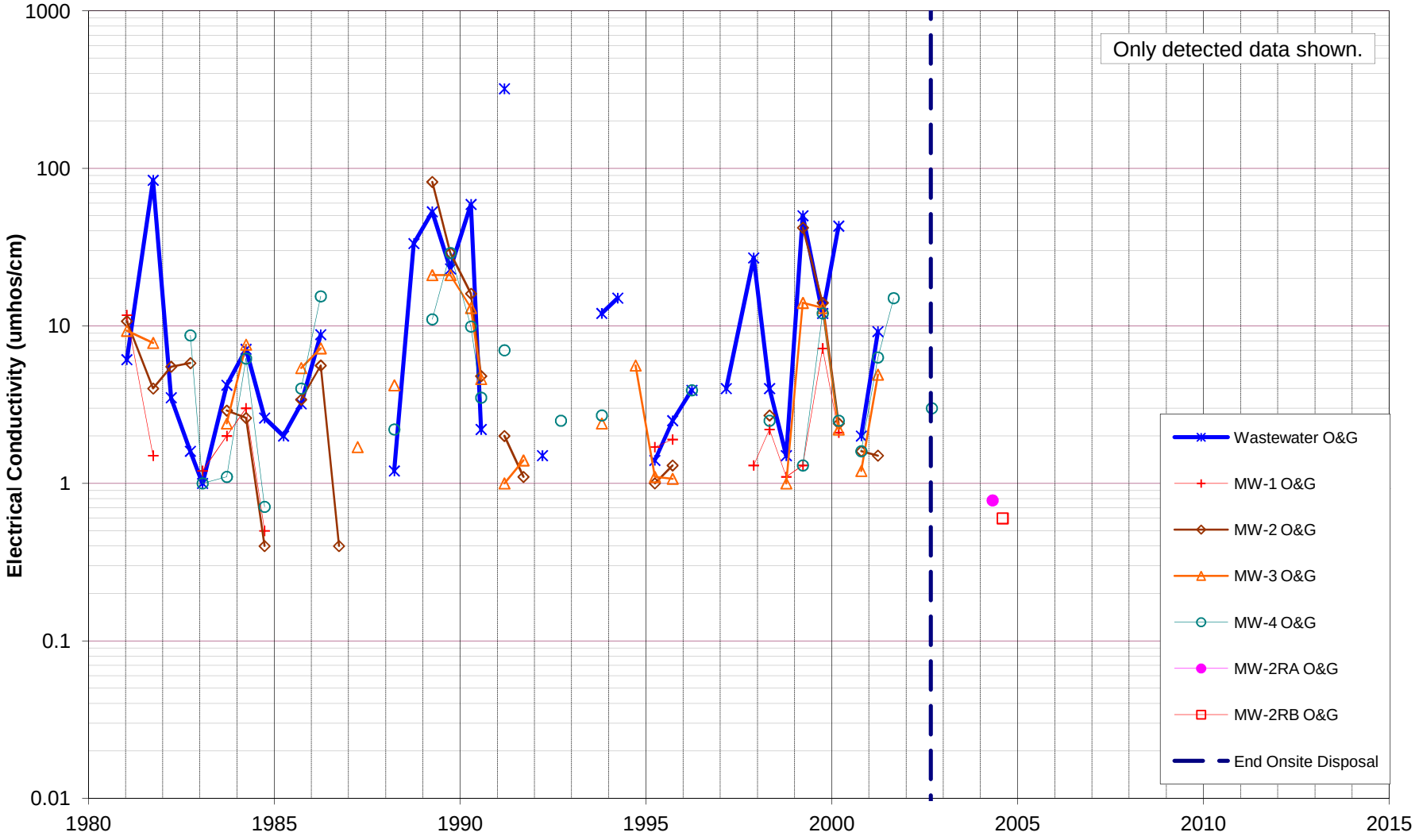


Figure L-6
Groundwater - Oil & Grease
Long-term Monitoring



Attachment M
Time-series Concentration Charts for Groundwater, 2003 – 2010

Figure M-1
Groundwater - Electrical Conductivity
Post Onsite Discharge Monitoring

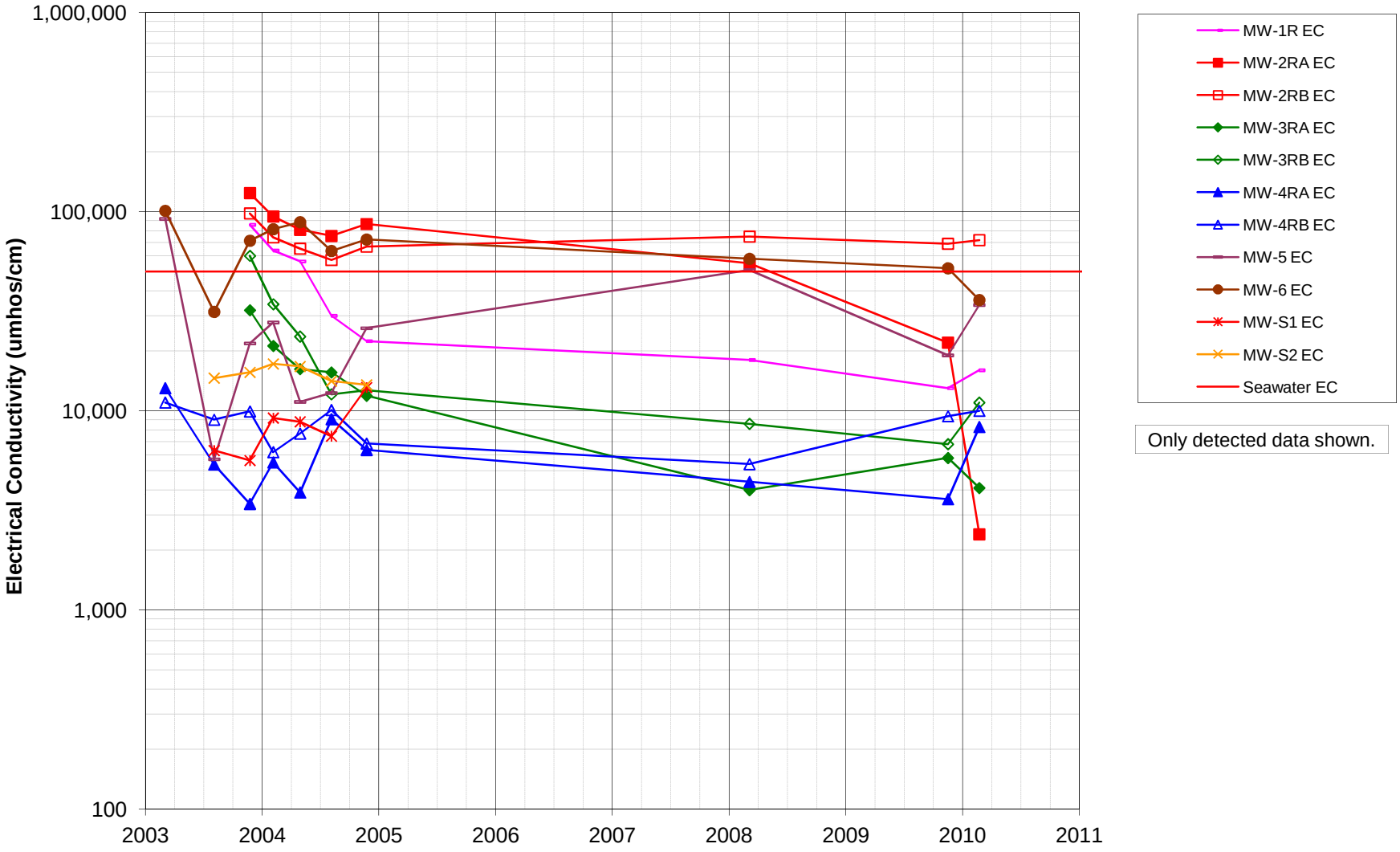


Figure M-2
Groundwater - Magnesium
Post Onsite Discharge Monitoring

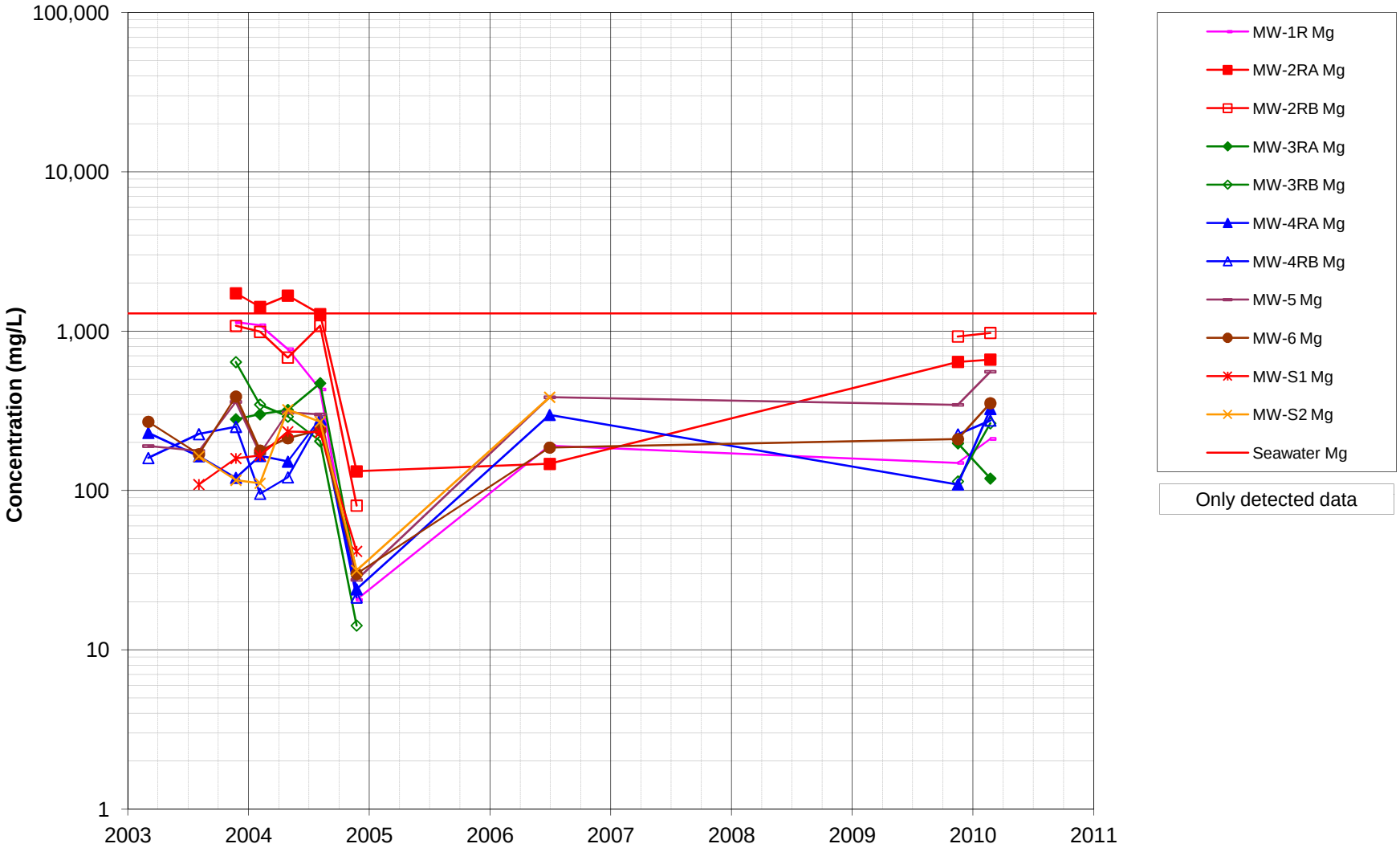


Figure M-3
Groundwater - Potassium
Post Onsite Discharge Monitoring

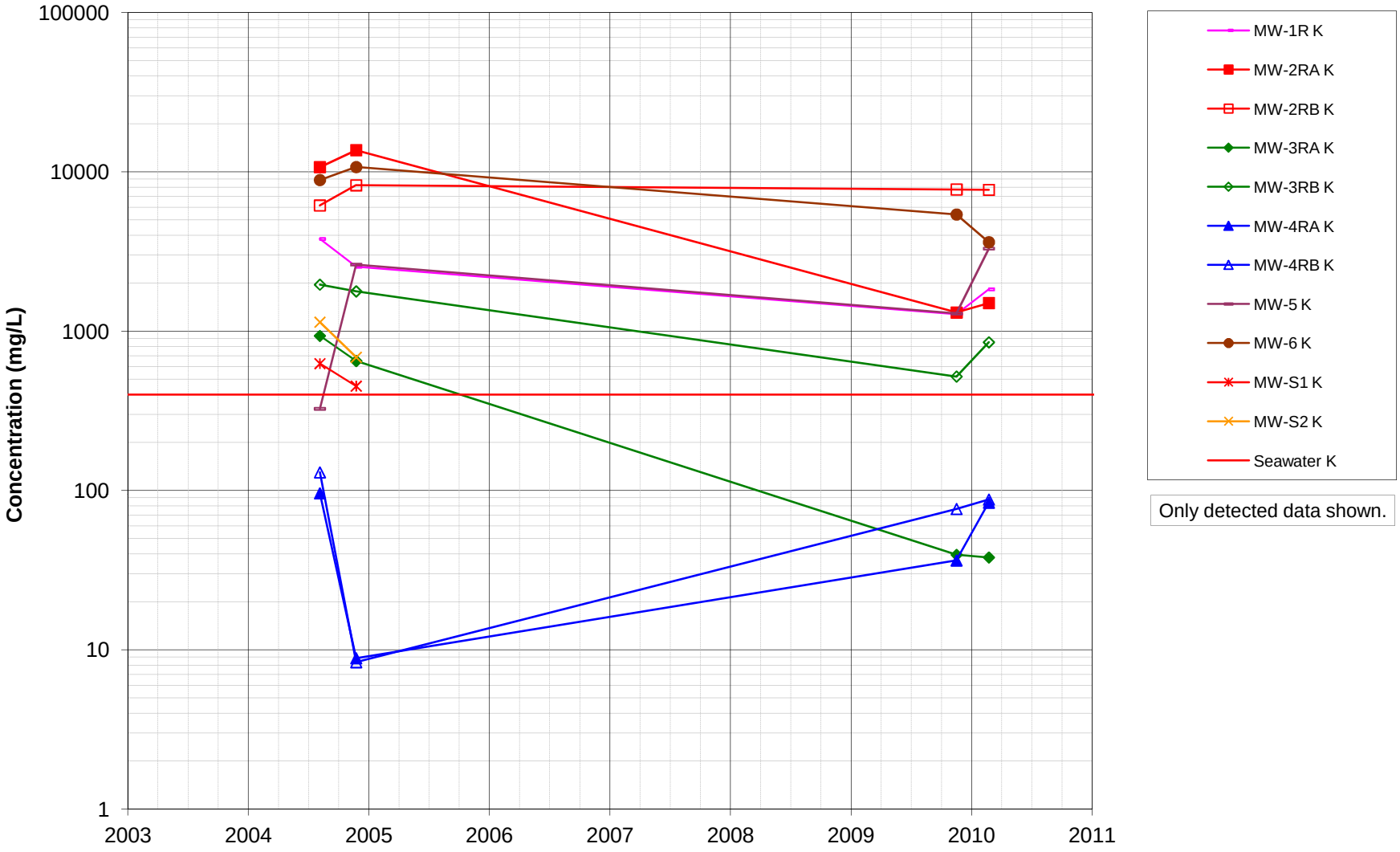
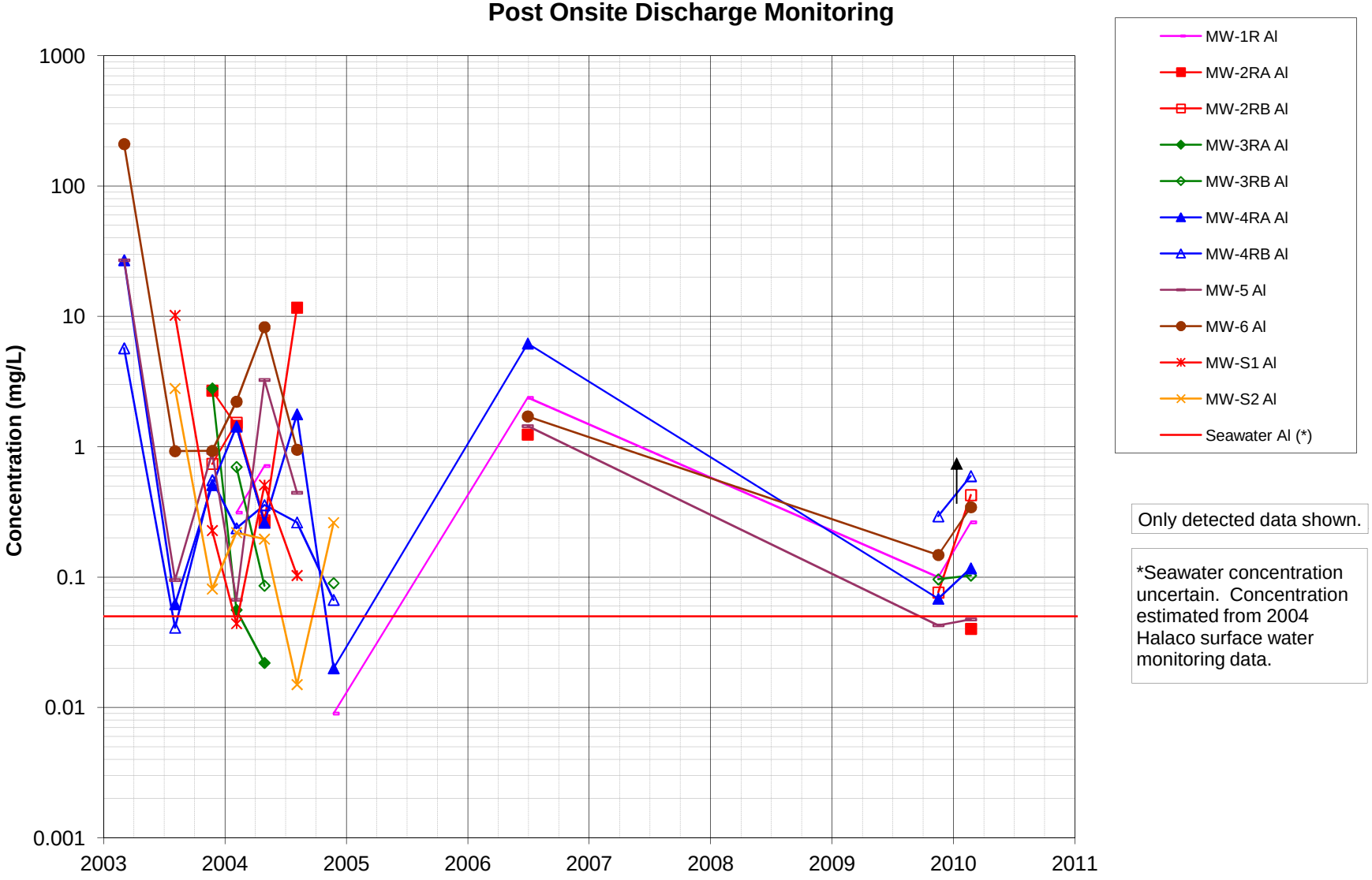


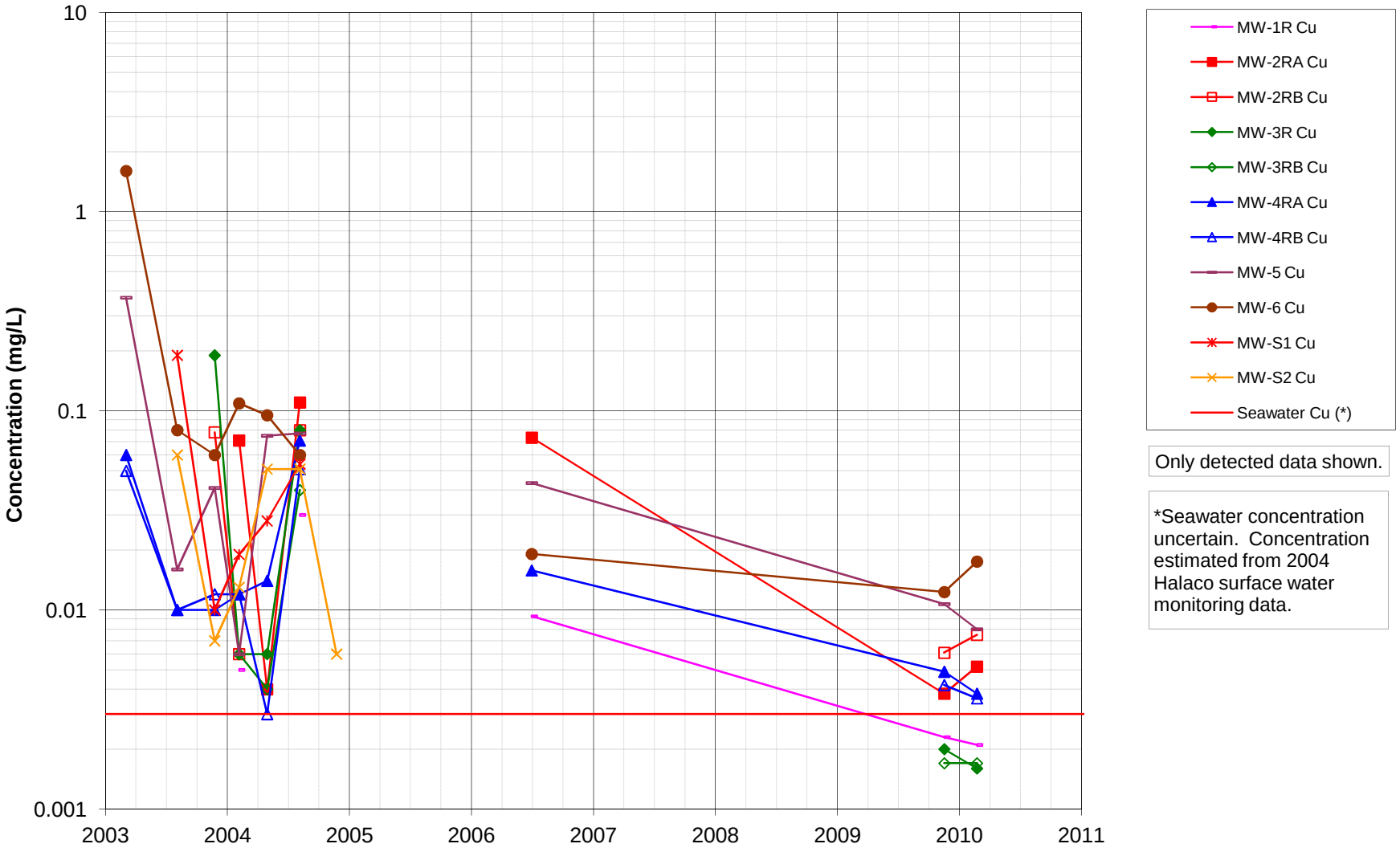
Figure M-4
Groundwater - Aluminum
Post Onsite Discharge Monitoring



Only detected data shown.

*Seawater concentration uncertain. Concentration estimated from 2004 Halaco surface water monitoring data.

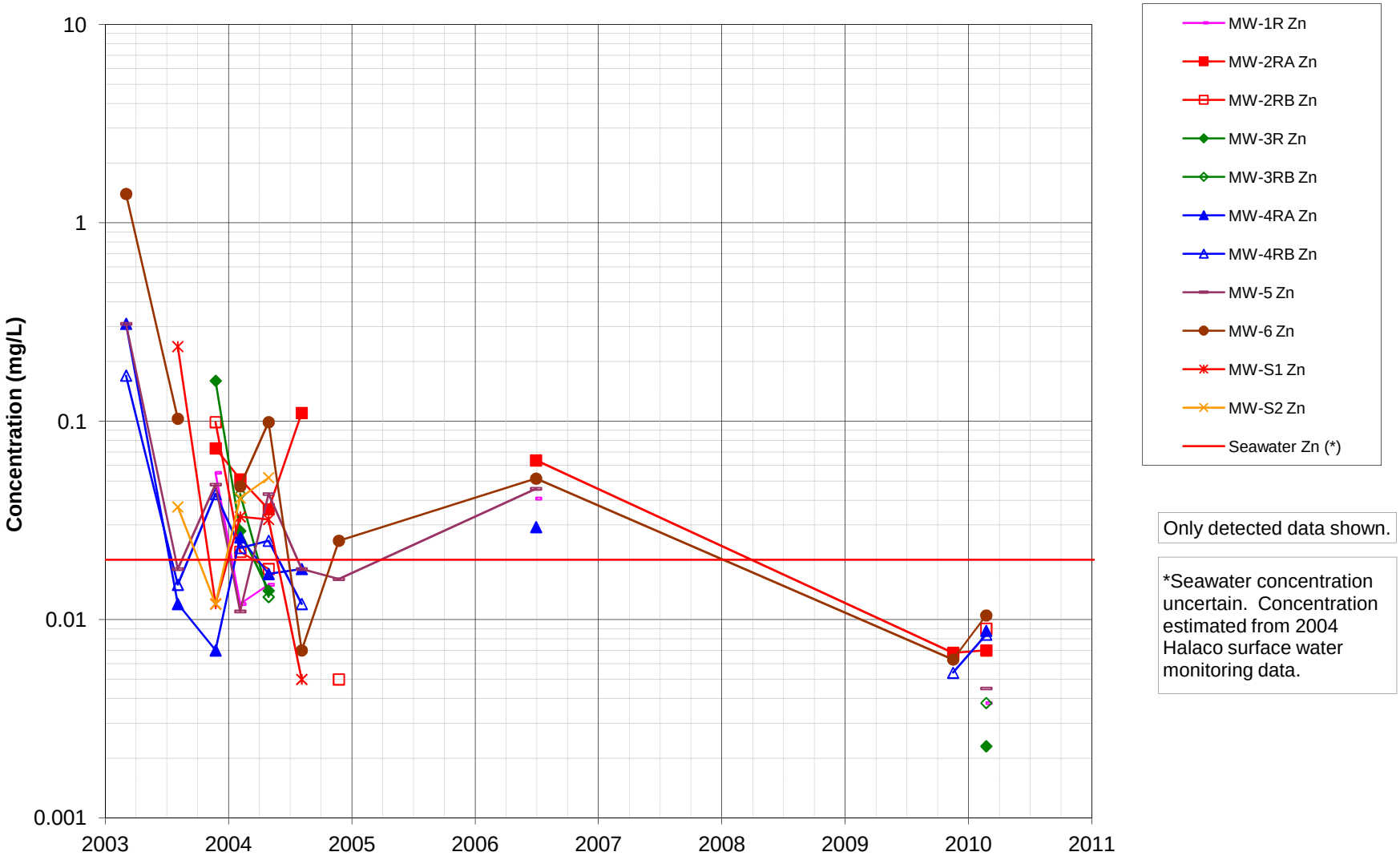
Figure M-5
Groundwater - Copper
Post Onsite Discharge Monitoring



Only detected data shown.

*Seawater concentration uncertain. Concentration estimated from 2004 Halaco surface water monitoring data.

Figure M-6
Groundwater - Zinc
Post Onsite Discharge Monitoring



Only detected data shown.

*Seawater concentration uncertain. Concentration estimated from 2004 Halaco surface water monitoring data.