Table A1-3
OU-1 (Site 18): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum

Item	Station Identification				
	Well Cluster				
	18_BGMW19A	18_BGMW19B	18_BGMW19C	18_BGMW19D	18_BGMW19E
Survey Location--Northing Survey Location--Easting	554010.36 1543142.28	554014.84 1543132.76	554026.33 1543133.53	554015.77 1543122.91	554021.50 1543141.97
Ground Surface Elev. (ft above MSL[a]) Measuring Point Elev. (ft above MSL[a])	231.98 232.61	232.03 232.69	232.05 232.79	231.85 232.54	232.26 232.91
Measuring Point Location	Top of sounding tube	Top of sounding tube	Top of sounding tube	Top of sounding tube	Top of sounding tube
Type of Surface Completion	Above ground	Above ground	Above ground	Above ground	Above ground
Casing Diameter and Material	5-inch dia. Sch. 80 PVC	5-inch dia. Sch. 80 PVC	5-inch dia. Sch. 80 PVC	5-inch dia. Sch. 80 PVC	4-inch dia. Sch. 40 PVC
Screen Diameter and Material	5-inch dia. Sch.80 20-slot SS	5-inch dia. Sch. 80 20-slot SS	5-inch dia. Sch. 80 20-slot SS	5-inch dia. Sch. 80 20-slot SS	4-inch dia. Sch. 40 20-slot SS
Screen Interval (ft bgs[b])	448-468	400-420	257-277	150-170	98-138
Length of Drop Pipe (ft bgs[b])	447	390	256	165	137
Make and Model of Installed Pump	Grundfos 10E-11	Grundfos 10E-11	Grundfos 10E-11	Grundfos 10E-11	Grundfos Rediflow 2
Date of Pumping Test	Not tested	Not tested	24 Sep 92	25 Sep 92	Not tested
Date of Water Quality Sampling	22 Dec 92	17 Dec 92	24 Sep 92	25 Sep 92	12 Nov 92

Table A1-3
OU-1 (Site 18): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum

Item	Station Identification		
	18_BGMW22	18_BGMW23	18_BGMW24
Survey Location--Northing Survey Location--Easting	552893.63 1554660.64	545693.80 1542183.27	554408.10 1562254.72
Ground Surface Elev. (ft above MSL[a]) Measuring Point Elev. (ft above MSL[a])	425.66 426.36	189.54 190.22	617.49 618.13
Measuring Point Location	Top of sounding tube	Top of sounding tube	Top of sounding tube
Type of Surface Completion	Above ground	Above ground	Above ground
Casing Diameter and Material	5-inch dia. Sch. 80 PVC	4-inch dia. Sch. 40 PVC	4-inch dia. Sch. 40 PVC
Screen Diameter and Material	5-inch dia. 20-slot SS	4-inch dia. 20-slot SS	4-inch dia. 20-slot SS
Screen Interval (ft bgs[b])	247-287	64-104	51-71
Length of Drop Pipe (ft bgs[b])	285	94	63
Make and Model of Installed Pump	Grundfos 10E-11	Grundfos 10E-11	Grundfos Rediflow 2
Date of Pumping Test	24 Aug 92	Not tested	23 Oct 92
Date of Water Quality Sampling	09 Dec 92	10 Dec 92	12 Nov 92

[a]Mean sea level
[b]Below ground surface
SS = Stainless Steel

Table A1-4
Field Parameters During Well Development
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number with which the Parameters are Associated	Field pH	Field Electrical Conductivity (µmhos/cm @ 25°C)	Temperature (°C)
18_BGMW01A	S1452139	6.90	1925	21.5
18_BGMW01B	S1452236	7.56	1050	22.2
18_BGMW01C	S1452238	7.26	1100	24.6
18_BGMW01D	S1452240	7.32	1200	24.4
18_BGMW01E	S1452382	7.07	1600	26.9
18_BGMW01E	S1452242	7.07	1600	26.9
18_BGMW02A	S1452225	7.46	800	24.8
18_BGMW02C	S1452246	7.33	800	25.0
18_BGMW02D	S1452248	7.11	990	22.9
18_BGMW03A	S1452251	6.89	1010	25.0
18_BGMW03B	S1452253	7.05	880	24.2
18_BGMW03B	S1452284	7.05	880	24.2
18_BGMW03C	S1452255	7.11	850	22.0
18_BGMW03E	S1452257	6.85	1290	23.3
18_BGMW04A	S1452231	7.03	1010	25.7
18_BGMW04B	S1452235	7.21	1130	25.5
18_BGMW05A	S1452259	7.34	5000	23.4
18_BGMW05B	S1452262	7.05	1040	26.0
18_BGMW05C	S1452263	7.18	1030	24.8
18_BGMW05C	S1452465	7.18	1030	24.8
18_BGMW05D	S1452265	6.93	1500	24.2
18_BGMW07	S1452277	6.90	1520	19.5
18_BGMW12	S1452301	6.91	2640	28.2
18_BGMW14	S1452303	7.04	1200	21.8
18_BGMW15	S1452305	7.62	2510	24.0
18_BGMW16	S1452307	7.36	1420	26.4
18_BGMW17	S1452309	7.39	1200	23.5

Table A1-4
Field Parameters During Well Development
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number with which the Parameters are Associated	Field pH	Field Electrical Conductivity (μmhos/cm @ 25°C)	Temperature (°C)
18_BGMW18	S1452311	7.31	1510	24.1
18_BGMW19A	S1452313	7.28	1100	25.0
18_BGMW19B	S1452315	6.92	1090	23.8
18_BGMW19C	S1452226	7.45	1750	26.3
19_BGMW19D	S1452229	7.05	2550	24.2
19_BGMW19E	S1452317	7.19	2410	23.0
19_BGMW22	S1452006	7.45	1300	23.8
19_BGMW23	S1452321	7.02	1200	21.3
19_BGMW24	S1452323	7.64	1090	22.4
02_UGMW25	S1452006	7.35	830	19.4
03_UGMW26	S1452027	7.38	1200	25.2
05_UGMW27	S1452039	7.38	1180	21.4
06_UGMW28	S1452045	6.68	2450	24.2
08_UGMW29	S1452061	7.33	1250	22.9
12_UGMW31	S1452077	6.81	1600	25.3
13_UGMW32	S1452083	6.78	2120	25.2
16_UGMW33	S1452097	7.28	920	24.8
19_UGMW35	S1452134	6.89	680	22.1
20_UGMW36	S1452125	7.29	2350	24.2
21_UGMW37	S1452128	6.98	1460	24.4
03_DBMW39	S1452016	7.69	1310	27.2
04_DBMW40	S1452029	6.91	1490	23.3
05_DBMW41	S1452036	7.24	1100	23.2
07_DBMW43	S1452036	7.14	1240	23.5
09_DBMW45	S1452391	6.95	1500	22.8
22_DBMW47	S1452407	7.01	2300	22.5
12_DBMW48	S1452074	7.01	2300	22.5

Table A1-4
Field Parameters During Well Development
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number with which the Parameters are Associated	Field pH	Field Electrical Conductivity (µmhos/cm @ 25°C)	Temperature (°C)
13_DBMW49	S1452078	6.88	2770	24.8
14_DBMW50	S1452084	6.90	2360	22.5
15_DBMW51	S1452088	6.80	7000	23.7
16_DBMW52	S1452090	7.36	2080	24.7
19_DBMW54	S1452114	6.92	1000	23.5
20_DBMW55	S1452118	7.39	2580	24.5
21_DBMW56	S1452126	6.69	1380	23.5
01_DBMW57	S1452000	7.58	1190	22.1
01_DMBW58	S1452001	7.32	560	21.1
02_DGMW59	S1452009	7.13	1200	23.2
02_DGMW60	S1452008	7.30	1290	22.2
02_DGMW61	S1452007	7.41	800	20.9
04_UGMW63	S1452018	7.06	1420	22.9
03_DGMW64	S1452019	7.27	1200	24.9
03_DGMW65X	S1452020	7.74	1330	27.0
04_DGMW66	S1452028	7.21	1080	23.5
05_DGMW67	S1452035	7.45	1300	21.3
05_DGMW68	S1453032	6.93	1090	23.5
06_DGMW69	S1452091	6.91	1580	24.1
07_DBMW70	S1452047	6.88	1690	24.4
07_DGMW71	S1452048	7.14	1320	22.8
07_DGMW72	S1452049	6.90	1450	25.0
08_DGMW73	S1452055	7.01	1460	22.7
08_DGMW74	S1452056	6.89	1330	24.0
09_DGMW75	S1452063	6.91	1900	22.0
10_DGMW77	S1452069	7.06	1280	24.4
13_DGMW78	S1452079	7.10	3550	22.9

Table A1-4
Field Parameters During Well Development
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number with which the Parameters are Associated	Field pH	Field Electrical Conductivity (μmhos/cm @ 25°C)	Temperature (°C)
14_DGMW79	S1452085	6.7	2840	24.4
16_DGMW81	S1452040	7.21	2700	24.1
17_DMGW82	S1452099	7.60	1200	24.4
19_DGMW85	S1452115	7.10	1240	25.1
19_DGMW86	S1452110	7.05	1100	22.6
20_DGMW88	S1452119	6.84	1690	24.8
21_DGMW90	S1452457	6.89	1390	24.2
07_DGMW91	S1452117	7.13	1360	24.0
07_DGMW100	S1452327	6.94	1150	23.0
18_DGMW101	S1452330	6.88	1900	24.8
18_PS2	S1452237	6.77	3100	23.0
18_PS3	S1452339	7.39	1300	22.1
18_PS4	S1452341	7.25	1300	21.6
18_PS5	S1452343	7.01	1690	22.3
18_PS6	S1452346	6.64	1900	23.0
18_PS7	S1452347	7.32	1010	22,6
18_PS8	S1452349	6.84	1250	23.3
18_DW135	S1452477	7.04	2700	24.5
18-DW135	S1452478	7.04	2700	24.5
18_DW250	S1452479	7.51	1000	23.0
18_RW1	S1452351	7.4	1250	24.2
18_RW1	S1452389	7.4	1250	24.2
18_RW2	S1452352	7.47	1075	24.7

Table A1-5
Major Ion Concentrations in Groundwater
MCAS El Toro Phase I RI Technical Memorandum

Well ID	Screen Interval	Date	TDS	Cations (meq/L) (a)				Anions (meq/L) (b)				Cation Sum	Anion Sum	Cation Anion difference	Percent Error
				Ca	Mg	Na	K	SO_4	Cl	Alk	$N0_3/N0_2$ (as N)				
01_DGMW57	(63-83)	10-Dec-92	808	4.72	3.11	4.33	0.12	5.21	2.58	4.70	0.12	12.29	12.61	0.32	2.58
01_DGMW58	(57-77)	14-Dec-92	429	4.34	1.09	1.58	0.05	0.44	1.73	4.68	0.41	7.06	7.26	0.19	2.72
02_DGMW59	(69-89)	15-Dec-92	839	6.39	2.80	4.15	0.11	4.48	3.36	5.88	0.25	13.46	13.96	0.51	3.70
02_DGMW60	(80-100)	18-Nov-92	834	3.61	5.26	5.61	0.20	3.39	2.59	8.60	0.25	14.68	14.83	0.14	0.96
02_DGMW61	(80-100)	14-Dec-92	579	4.73	1.86	2.52	0.11	3.91	0.71	5.12	0.00	9.22	9.75	0.53	5.61
02_UGMW25	(55-75)	9-Dec-92	598	4.67	1.69	2.92	0.03	3.48	1.86	3.60	0.45	9.31	9.39	0.08	0.82
03_DBMW39	(230-270)	9-Oct-92	731	1.36	1.23	9.13	0.06	0.76	4.12	6.70	0.41	11.79	11.98	0.20	1.67
03_DGMW64	(245-285)	15-Jan-93	847	2.85	2.90	7.87	0.10	3.19	4.29	5.72	0.76	13.72	13.95	0.23	1.64
03_DGMW65X	(230-270)	18-Jan-93	750	2.58	2.25	7.31	0.10	1.91	4.09	5.76	0.57	12.23	12.32	0.09	0.76
03_UGMW26	(230-270)	1-Oct-92	762	3.22	2.54	5.78	0.05	2.29	2.93	5.42	1.09	11.60	11.74	0.14	1.18
04_DBMW40	(220-260)	3-Dec-92	940	3.92	4.19	7.87	0.11	2.56	4.20	8.76	0.91	16.08	16.44	0.36	2.19
04_DGMW66	(250-290)	20-Nov-92	730	4.12	2.52	4.87	0.07	2.33	3.61	5.20	0.47	11.58	11.61	0.03	0.26
04_UGMW63	(235-275)	24-Nov-92	993	6.69	5.53	3.37	0.08	2.56	4.51	7.72	0.84	15.66	15.64	0.02	0.16
05_DBMW41	(182-222)	16-Nov-92	790	4.95	2.39	4.31	0.07	4.04	2.43	4.66	0.64	11.73	11.77	0.04	0.36
05_DGMW67	(187-227)	30-Nov-92	934	6.54	3.02	5.57	0.05	5.91	2.74	5.92	0.49	15.18	15.07	0.11	0.71
05_DGMW68	(190-210)	17-Dec-92	905	5.79	2.77	5.31	0.09	5.62	2.85	5.00	0.58	13.95	14.05	0.10	0.71
05_UGMW27	(198-238)	3-Dec-92	844	6.04	2.71	4.70	0.05	5.27	2.38	5.32	0.58	13.50	13.55	0.05	0.39
06_DGMW69	(150-190)	2-Dec-92	1080	8.43	3.93	3.31	0.09	4.35	8.07	2.20	1.16	15.76	15.78	0.02	0.16
06_UGMW28	(140-180)	13-Nov-92	1890	13.17	6.00	4.74	0.18	6.91	15.26	2.72	1.34	24.10	26.23	2.13	8.46
07_DBMW100	(131-171)	8-Dec-92	-	5.19	2.71	3.35	0.07	-	-	-	0.67	-	-	-	-
07_DBMW43	(150-190)	1-Dec-92	880	6.09	2.75	3.05	0.09	3.00	5.22	2.52	1.06	11.98	11.79	0.19	1.56
07_DBMW70	(125-165)	8-Dec-92	1210	9.03	4.61	3.59	0.06	6.64	7.53	2.52	1.22	17.30	17.91	0.61	3.46
07_DGMW71	(115-155)	15-Dec-92	937	6.94	2.92	3.70	0.07	3.62	6.12	3.64	1.10	13.63	14.48	0.86	6.09
07_DGMW72	(110-150)	19-Nov-92	1120	6.79	3.31	3.86	0.06	2.33	6.80	4.18	1.06	14.02	14.36	0.34	2.43
07_DGMW91	(110-150)	18-Dec-92	913	7.29	3.38	3.25	0.06	3.50	5.41	4.00	1.26	13.98	14.18	0.19	1.36
08_DGMW73	(90-130)	2-Dec-92	942	5.99	2.76	7.09	0.06	1.45	4.57	8.94	1.10	15.90	16.05	0.15	0.95
08_DGMW74	(90-130)	16-Nov-92	804	4.78	2.14	6.00	0.05	1.66	5.33	5.32	0.90	12.97	13.21	0.24	1.82
08_UGMW29	(95-135)	8-Dec-92	847	4.89	2.53	4.74	0.11	2.07	6.91	2.64	0.84	12.26	12.46	0.19	1.54
09_DBMW45	(117-157)	10-Dec-92	1090	8.63	3.70	3.17	0.06	4.81	5.70	3.78	1.36	15.56	15.65	0.09	0.58
09_DGMW75	(114-154)	1-Dec-92	1370	10.78	4.84	5.04	0.06	8.81	7.70	3.12	1.68	20.73	21.31	0.58	2.76
10_DGMW77	(130-170)	17-Nov-92	1030	7.88	3.40	3.07	0.06	4.52	5.30	3.78	1.13	14.42	14.73	0.31	2.14
12_DBMW48	(95-135)	17-Nov-92	1800	15.77	6.50	4.78	0.08	11.43	11.31	3.26	1.63	27.12	27.63	0.51	1.86
12_UGMW31	(105-145)	8-Oct-92	1100	8.83	4.17	3.35	0.06	5.48	5.95	3.76	1.61	16.42	16.79	0.37	2.24
13_DBMW49	(142-182)	16-Nov-92	2050	14.47	9.05	6.96	0.12	13.55	9.76	7.96	0.84	30.60	32.11	1.51	4.83

Table A1-5
Major Ion Concentrations in Groundwater
MCAS El Toro Phase I RI Technical Memorandum

Well ID	Screen Interval	Date	TDS	Cations (meq/L) (a)				Anions (meq/L) (b)				Cation Sum	Anion Sum	Cation Anion difference	Percent Error
				Ca	Mg	Na	K	SO_4	Cl	Alk	$N0_3/N0_2$ (as N)				
13_DGMW78	(127-167)	23-Nov-92	2910	19.11	16.37	7.70	0.12	21.65	14.72	5.46	2.05	43.29	43.88	0.59	1.36
13_UGMW32	(144-184)	28-Oct-92	1540	10.08	7.93	4.34	0.11	10.64	5.19	7.24	0.70	22.46	23.77	1.31	5.67
14_DBMW50	(120-160)	2-Dec-92	1920	13.72	8.39	6.05	0.11	13.95	8.57	4.92	1.58	28.27	29.03	0.76	2.64
14_DGMW79	(118-158)	20-Nov-92	2330	15.32	10.44	7.48	0.12	18.88	8.83	6.56	0.78	33.36	35.05	1.69	4.93
15_DBMW51	(125-165)	4-Dec-92	5260	43.36	28.87	10.61	0.18	30.61	44.27	5.04	4.53	83.03	84.44	1.42	1.70
16_DBMW52	(182-222)	4-Nov-92	1360	7.04	8.72	5.61	0.12	8.49	8.60	3.50	1.59	21.49	22.19	0.70	3.20
16_DGMW81	(176-216)	11-Dec-92	2040	12.03	9.21	7.22	0.14	13.74	11.62	3.24	1.79	28.59	30.39	1.80	6.10
16_UGMW33	(180-220)	17-Dec-92	639	3.26	3.08	3.86	0.09	4.18	0.55	5.30	0.37	10.28	10.41	0.12	1.18
17_DGMW82	(235-255)	8-Feb-93	817	4.18	2.66	5.39	0.15	6.56	2.85	3.10	0.06	12.38	12.57	0.19	1.51
18_BGMP06	(105-115)	1-Oct-92	1180	4.62	5.43	6.61	0.09	8.14	4.91	3.34	0.85	16.75	17.24	0.49	2.89
18_BGMP06	(168-178)	6-Oct-92	1140	5.59	4.27	6.87	0.10	6.77	6.43	3.60	0.66	16.83	17.45	0.63	3.66
18_BGMP06	(295-305)	7-Oct-92	925	4.00	3.33	6.31	0.09	5.77	5.87	2.72	0.34	13.73	14.69	0.97	6.80
18_BGMP06	(380-390)	7-Oct-92	700	4.55	2.27	3.82	0.08	3.79	2.18	4.92	0.06	10.72	10.95	0.23	2.13
18_BGMP06	(445-455)	8-Oct-92	687	4.41	2.30	3.97	0.08	3.62	2.63	4.44	0.20	10.76	10.89	0.13	1.17
18_BGMP08	(61-71)	12-Oct-92	1810	14.12	5.25	8.22	0.09	7.79	9.31	6.70	3.96	27.68	27.75	0.08	0.28
18_BGMP08	(126-136)	13-Oct-92	822	4.06	1.78	6.31	0.08	3.46	4.48	2.90	1.56	12.22	12.40	0.18	1.49
18_BGMP08	(297-307)	15-Oct-92	776	3.61	1.56	6.39	0.07	3.73	3.47	3.52	0.76	11.64	11.47	0.17	1.47
18_BGMP08	(439-449)	17-Oct-92	894	4.22	2.10	7.05	0.08	4.41	5.87	2.96	0.41	13.45	13.65	0.20	1.49
18_BGMP09	(59-69)	19-Oct-92	1490	8.83	3.64	9.26	0.09	7.99	5.36	5.36	4.30	21.83	23.01	1.18	5.25
18_BGMP09	(133-143)	20-Oct-92	894	5.59	2.17	5.91	0.08	3.64	5.98	4.32	0.71	13.75	14.65	0.90	6.33
18_BGMP09	(222-232)	21-Oct-92	817	3.79	1.42	6.87	0.07	4.06	3.72	4.26	0.64	12.15	12.68	0.52	4.22
18_BGMP09	(268-278)	22-Oct-92	755	2.56	1.58	7.96	0.10	4.37	3.75	4.06	0.02	12.21	12.21	0.00	0.01
18_BGMP09	(374-384)	23-Oct-92	958	1.31	0.91	11.96	0.08	4.81	5.98	3.08	0.60	14.27	14.47	0.20	1.41
18_BGMP09	(453-463)	23-Oct-92	964	1.72	0.97	12.05	0.10	5.60	7.08	2.88	0.00	14.84	15.56	0.72	4.76
18_BGMP10	(218-228)	20-Jan-93	1160	6.64	4.21	7.18	0.10	12.51	6.91	5.64	0.00	18.12	25.07	6.94	32.15
18_BGMP10	(429-439)	21-Jan-93	1180	6.64	4.19	7.74	0.11	9.85	5.53	5.34	0.00	18.68	20.72	2.04	10.36
18_BGMP10	(563-573)	22-Jan-93	587	2.96	1.84	4.65	0.07	3.98	1.86	4.52	0.00	9.53	10.36	0.83	8.36
18_BGMP10	(752-762)	23-Jan-93	1150	6.24	3.95	6.87	0.10	8.12	4.46	5.32	0.06	17.15	17.96	0.81	4.59
18_BGMP10	(886-896)	25-Jan-93	1160	5.49	3.50	6.48	0.10	9.45	5.27	5.52	0.03	15.57	20.28	4.71	26.28
18_BGMP10	(1001-1011)	20-Jan-93	1190	6.69	4.90	7.52	0.10	9.04	5.30	5.10	0.04	19.21	19.47	0.26	1.36
18_BGMW01A	(466-486)	11-Dec-92	1400	1.61	1.60	16.57	0.17	6.62	9.87	1.84	0.00	19.95	18.33	1.61	8.43
18_BGMW01B	(396-416)	14-Dec-92	702	2.62	1.79	5.96	0.09	4.00	2.96	3.96	0.11	10.46	11.03	0.57	5.34
18_BGMW01C	(330-350)	16-Dec-92	767	4.25	2.48	4.39	0.07	3.21	2.49	4.72	1.33	11.19	11.74	0.55	4.80
18_BGMW01D	(242-262)	9-Dec-92	864	5.84	4.41	3.82	0.08	4.23	4.29	5.64	0.58	14.15	14.73	0.59	4.06

Table A1-5
Major Ion Concentrations in Groundwater
MCAS El Toro Phase I RI Technical Memorandum

Well ID	Screen Interval	Date	TDS	Cations (meq/L) (a)				Anions (meq/L) (b)				Cation Sum	Anion Sum	Cation Anion difference	Percent Error
				Ca	Mg	Na	K	SO_4	Cl	Alk	$N0_3/N0_2$ (as N)				
18_BGMW01E	(205-225)	27-Oct-92	872	4.72	4.93	5.61	0.10	1.28	4.99	8.28	1.23	15.36	15.78	0.42	2.70
18_BGMW02A	(462-482)	21-Dec-92	522	2.59	1.88	4.24	0.15	3.54	2.16	3.36	0.00	8.87	9.06	0.19	2.10
18_BGMW02C	(358-378)	22-Dec-92	561	3.57	1.82	3.77	0.09	2.96	2.00	4.12	0.12	9.25	9.19	0.06	0.61
18_BGMW02D	(294-314)	18-Dec-92	696	4.40	2.04	3.65	0.09	3.89	3.02	3.44	0.19	10.18	10.54	0.36	3.44
18_BGMW02E	(193-233)	21-Sep-92	847	5.44	2.73	4.74	0.09	4.89	3.69	3.64	0.61	13.00	12.84	0.16	1.26
18_BGMW03A	(370-390)	29-Oct-92	662	3.79	1.92	4.35	0.06	2.56	3.38	3.48	0.90	10.12	10.32	0.20	2.00
18_BGMW03B	(280-300)	28-Oct-92	589	3.57	1.77	3.74	0.06	2.19	3.07	3.60	0.46	9.14	9.32	0.17	1.86
18_BGMW03C	(222-242)	17-Dec-92	654	4.20	2.01	3.49	0.06	2.42	3.55	3.24	0.60	9.77	9.80	0.03	0.33
18_BGMW03E	(124-164)	17-Dec-92	928	6.74	2.85	3.60	0.18	3.04	6.71	2.76	1.01	13.37	13.52	0.14	1.07
18_BGMW04A	(286-306)	30-Sep-92	670	3.84	1.68	4.44	0.06	2.58	3.10	3.96	0.28	10.01	9.93	0.08	0.80
18_BGMW04B	(190-210)	29-Sep-92	718	4.29	1.88	4.25	0.06	1.60	5.16	3.04	0.00	10.48	9.81	0.67	6.57
18_BGMW05A	(462-482)	15-Dec-92	3160	8.78	7.66	34.71	0.24	8.72	44.56	1.50	0.00	51.38	54.78	3.40	6.41
18_BGMW05B	(321-341)	11-Nov-92	725	4.22	1.42	5.26	0.07	2.66	3.98	3.68	0.66	10.97	10.98	0.01	0.12
18_BGMW05C	(225-245)	10-Nov-92	725	4.55	1.50	4.91	0.07	3.10	3.64	3.58	1.33	11.03	11.65	0.62	5.48
18_BGMW05D	(83-133)	3-Nov-92	675	5.94	2.57	6.05	0.06	2.85	3.53	2.84	0.67	14.61	9.89	4.72	38.56
18_BGMW07	(25-65)	9-Dec-92	1070	7.44	3.49	6.74	0.11	4.71	7.11	5.88	0.22	17.78	17.91	0.13	0.74
18_BGMW101	(90-130)	13-Nov-92	1470	10.33	4.52	6.83	0.07	9.10	6.06	6.28	1.16	21.75	22.60	0.85	3.81
18_BGMW12	(165-205)	9-Nov-92	1900	9.48	11.51	6.83	0.15	19.15	6.37	4.54	1.06	27.97	31.13	3.16	10.69
18_BGMW14	(75-115)	20-Oct-92	819	5.89	2.22	4.39	0.03	3.04	4.60	4.40	0.00	12.54	12.04	0.50	4.07
18_BGMW15	(175-215)	30-Oct-92	1490	13.92	7.42	6.61	0.13	17.38	8.04	2.82	0.00	28.08	28.24	0.16	0.56
18_BGMW16	(223-263)	23-Oct-92	1010	5.39	4.35	5.18	0.08	7.66	2.82	4.22	0.00	14.99	14.70	0.29	1.98
18_BGMW17	(215-255)	22-Oct-92	891	5.99	2.88	4.61	0.07	4.48	3.53	4.50	0.00	13.54	12.50	1.04	8.00
18_BGMW18	(140-180)	10-Nov-92	1040	4.92	5.16	6.52	0.11	6.39	3.58	5.72	1.63	16.71	17.32	0.61	3.61
18_BGMW19A	(448-468)	22-Dec-92	799	4.83	2.70	4.65	0.09	5.12	2.52	4.86	0.12	12.27	12.62	0.35	2.80
18_BGMW19B	(400-420)	17-Dec-92	750	4.65	2.55	4.44	0.09	4.31	2.56	4.60	0.38	11.72	11.85	0.13	1.07
18_BGMW19C	(257-277)	24-Sep-92	1150	6.79	4.35	6.13	0.15	6.87	5.64	4.40	0.97	17.41	17.88	0.47	2.65
18_BGMW19D	(150-170)	25-Sep-92	2060	11.33	8.88	8.26	0.08	13.12	4.82	5.72	4.76	28.55	28.42	0.13	0.47
18_BGMW19E	(98-138)	12-Nov-92	1940	9.83	7.34	9.96	0.13	14.22	5.33	6.20	3.83	27.27	29.58	2.31	8.12
18_BGMW22	(247-287)	9-Dec-92	842	2.85	3.07	7.87	0.07	5.10	2.67	7.80	0.13	13.86	15.70	1.84	12.44
18_BGMW23	(64-104)	10-Dec-92	983	5.14	2.11	6.39	0.06	4.12	4.82	3.04	1.86	13.71	13.84	0.13	0.97
18_BGMW24	(51-71)	12-Nov-92	731	3.77	3.51	4.05	0.14	5.23	1.59	4.08	0.62	11.47	11.51	0.04	0.34
18_DW135	(115-135)	22-Dec-92	2120	11.43	9.79	9.18	0.06	15.39	11.53	3.76	1.91	30.45	32.59	2.13	6.76
18_DW250	(215-250)	21-Dec-92	702	4.53	2.15	3.99	0.06	3.35	3.05	4.04	0.42	10.74	10.86	0.12	1.15
18_DW350	(310-350)	11-Jan-93	708	4.29	2.29	3.98	0.07	3.62	2.46	4.56	0.23	10.63	10.88	0.24	2.26

Table A1-5
Major Ion Concentrations in Groundwater
MCAS El Toro Phase I RI Technical Memorandum

Well ID	Screen Interval	Date	TDS	Cations (meq/L) (a)				Anions (meq/L) (b)				Cation Sum	Anion Sum	Cation Anion difference	Percent Error
				Ca	Mg	Na	K	SO_4	Cl	Alk	$N0_3/N0_2$ (as N)				
18_DW450	(420-450)	12-Jan-93	660	4.35	2.25	3.79	0.05	3.21	2.03	4.60	0.50	10.44	10.34	0.10	0.99
18_DW540	(490-540)	13-Jan-93	662	4.20	2.25	3.98	0.06	3.29	2.42	4.60	0.52	10.49	10.83	0.33	3.14
18_MW10	(105-115)	26-Feb-90	1090	2.15	0.76	13.44	0.14	6.56	3.75	4.57	0.00	16.48	14.88	1.60	10.19
18_MW10	(200-210)	22-Feb-90	774	6.94	0.01	4.74	0.15	6.41	1.13	5.05	0.00	11.84	12.59	0.75	6.14
18_MW10	(325-335)	22-Feb-90	808	3.39	2.96	5.83	0.09	5.23	1.66	4.85	0.00	12.27	11.74	0.53	4.41
18_PS1	(102-122)	22-Jan-89	1950	18.96	8.22	6.09	0.15	9.99	19.49	3.18	0.00	33.43	32.66	0.77	2.32
18_PS2	(103-133)	15-Dec-92	2550	16.82	11.02	9.22	0.07	21.03	11.76	5.12	2.68	37.13	40.59	3.46	8.90
18_PS3	(102-122)	10-Dec-92	893	5.14	2.29	6.57	0.05	2.27	5.27	5.60	0.89	14.06	14.03	0.03	0.20
18_PS4	(98-118)	11-Dec-92	1130	6.74	2.80	6.00	0.06	1.79	9.17	3.64	0.84	15.60	15.44	0.16	1.01
18_PS5	(106-126)	16-Dec-92	1390	10.88	4.50	3.39	0.05	6.62	6.20	4.38	0.38	18.81	17.58	1.23	6.78
18_PS6	(130-150)	15-Dec-92	1630	12.52	5.51	5.96	0.07	9.58	10.46	3.20	2.01	24.06	25.25	1.19	4.82
18_PS7	(106-126)	16-Dec-92	766	3.73	1.62	6.18	0.04	2.42	2.24	5.32	1.78	11.57	11.75	0.18	1.52
18_PS8	(125-145)	14-Dec-92	877	6.29	2.76	4.74	0.05	2.23	5.95	5.00	1.02	13.84	14.20	0.36	2.59
18_RW1	(430-470)	14-Dec-92	829	4.48	1.84	7.05	0.07	4.41	4.74	4.28	0.23	13.44	13.66	0.22	1.65
18_RW2	(270-310)	22-Dec-92	666	4.09	1.32	4.87	0.07	2.56	3.53	3.84	0.95	10.35	10.88	0.52	4.93
19_DBMW54	(141-181)	18-Dec-92	763	5.09	2.57	3.09	0.06	3.85	4.00	2.60	0.87	10.82	11.33	0.51	4.58
19_DGMW85	(143-183)	16-Dec-92	823	5.69	2.92	3.64	0.09	4.06	4.85	2.76	0.91	12.34	12.58	0.24	1.94
19_DGMW86	(158-198)	17-Dec-92	729	5.59	3.13	3.24	0.11	3.25	3.21	4.84	0.85	12.07	12.15	0.08	0.67
19_UGMW35	(148-185)	8-Dec-92	650	4.74	2.37	2.35	0.08	3.08	3.33	2.68	0.67	9.53	9.76	0.23	2.36
20_DBMW55	(187-227)	9-Dec-92	1900	13.72	10.53	5.00	0.15	17.78	8.71	3.04	1.10	29.40	30.63	1.23	4.10
20_DGMW88	(185-225)	4-Nov-92	1260	8.68	6.71	3.31	0.09	10.89	4.96	3.80	0.67	18.80	20.32	1.52	7.79
20_UGMW36	(183-223)	28-Oct-92	1780	10.38	8.08	5.83	0.12	11.64	9.48	2.64	1.38	24.40	25.14	0.74	2.97
21_DBMW56	(92-132)	18-Nov-92	1080	8.03	3.73	3.41	0.06	4.79	5.30	4.04	1.62	15.22	15.75	0.53	3.42
21_DGMW90	(95-135)	20-Nov-92	1120	8.03	3.84	3.51	0.07	11.83	13.17	3.80	1.68	15.46	30.47	15.02	65.40
21_UGMW37	(90-130)	13-Nov-92	964	7.19	3.24	3.61	0.07	3.98	5.08	4.24	1.38	14.11	14.67	0.57	3.93
22_DBMW47	(116-156)	29-Sep-92	1130	9.33	4.15	3.60	0.06	5.48	6.43	3.80	1.33	17.15	17.04	0.11	0.63

(a) Cations: Calcium (Ca), Magnesium (Mg), Sodium (Na), Potassium (K)
(b) Anions: Sulfate (SO_4), Chloride (Cl), Alkalinity (Alk) ($CaCO_3$+ HCO_3), Nitrate/Nitrite as Nitrogen (NO_3/NO_2 [as N])

Table A1-6
Groundwater Hydrochemical Facies Beneath and Surrounding MCAS El Toro
MCAS El Toro Phase I RI Technical Memorandum

Parameter	Facies 1	Intermediate Facies	Facies 2	Facies 3
Depth Interval	Less than 200 feet	Top of the groundwater body to as much as 300 ft bgs	Top of the groundwater body to greater than 1,000 ft bgs	In the semiconsolidated low-permeability sediments underlying the alluvial aquifer
Total Dissolved Solids (TDS)	1500-3100	650-1500	500-1500	1500-2200
Dominant Cations	Ca	Ca, Mg	Na, Ca	Na
Dominant Anions	SO_4, Cl	SO_4, Cl	HCO_3, Cl	Cl, SO_4
Nitrate (as N) (mg/L)	14-38	9-23	ND-23	ND-7.7
TCE through January 1993 (μg/L)	ND-18	ND-2,000	ND-89	ND

Sources: Modified, using new information from the MCAS El Toro Phase I RI, from Herndon and Reilly (1991) and Herndon (1990)

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
18_BGMP06	(105-115)	Nitrate/Nitrite-N	mg/l	11.9	10	1
		Sulfate	mg/l	391	250	3
		Total Dissolved Solids	mg/l	1180	500	3
		Selenium	ug/l	26.8	10	1
18_BGMP06	(168-178)	Selenium	ug/l	29.4	10	1
		Sulfate	mg/l	325	250	3
		Total Dissolved Solids	mg/l	1,140	500	3
18_BGMP06	(295-305)	Selenium	ug/l	23.6	10	1
		Sulfate	mg/l	277	250	3
		Total Dissolved Solids	mg/l	925	500	3
18_BGMP06	(380-390)	Total Dissolved Solids	mg/l	700	500	3
18_BGMP06	(445-455)	Selenium	ug/l	10.5	10	1
		Total Dissolved Solids	mg/l	687	500	3
18_BGMP08	(61-71)	Aluminum	ug/l	108	50	3
		Manganese	ug/l	313	50	3
		Selenium	ug/l	10	10	1
		Chloride	mg/l	330	250	3
		Nitrate/Nitrite-N	mg/l	55.5	10	1
		Sulfate	mg/l	374	250	3
		Total Dissolved Solids	mg/l	1,810	500	3
18_BGMP08	(126-136)	Nitrate/Nitrite-N	mg/l	21.9	10	1
		Total Dissolved Solids	mg/l	822	500	3
18_BGMP08	(297-307)	Nitrate/Nitrite-N	mg/l	10.59	10	1
		Total Dissolved Solids	mg/l	776	500	3
18_BGMP08	(439-449)	Manganese	ug/l	59.4	50	3
		Total Dissolved Solids	mg/l	894	500	3
18_BGMP09	(59-69)	Nitrate/Nitrite-N	mg/l	60.2	10	1

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
		Sulfate	mg/l	384	250	3
		Total Dissolved Solids	mg/l	1,490	500	3
		Aluminum	ug/l	59.9	50	3
		Manganese	ug/l	57	50	3
18_BGMP09	(133-143)	Total Dissolved Solids	mg/l	894	500	3
18_BGMP09	(222-232)	Total Dissolved Solids	mg/l	817	500	3
18_BGMP09	(268-278)	Total Dissolved Solids	mg/l	755	500	3
18_BGMP09	(374-384)	Total Dissolved Solids	mg/l	958	500	3
		Aluminum	ug/l	55.2	50	3
18_BGMP09	(453-463)	Chloride	mg/l	251	250	3
		Sulfate	mg/l	269	250	3
		Total Dissolved Solids	mg/l	964	500	3
18_BGMP10	(218-228)	Sulfate	mg/l	601	250	3
		Total Dissolved Solids	mg/l	1160	500	3
		Manganese	ug/l	202	50	3
18_BGMP10	(429-439)	Sulfate	mg/l	473	250	3
		Total Dissolved Solids	mg/l	1,180	500	3
		Manganese	ug/l	163	50	3
18_BGMP10	(563-573)	Total Dissolved Solids	mg/l	587	500	3
		Manganese	ug/l	64.8	50	3
18_BGMP10	(752-762)	Sulfate	mg/l	390	250	3
		Total Dissolved Solids	mg/l	1,150	500	3
		Manganese	ug/l	119	50	3
18_BGMP10	(886-896)	Sulfate	mg/l	454	250	3
		Total Dissolved Solids	mg/l	1,160	500	3
		Manganese	ug/l	101	50	3
18_BGMP10	(1001-1011)	Sulfate	mg/l	434	250	3

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
		Total Dissolved Solids	mg/l	1,190	500	3
		Manganese	ug/l	51.6	50	3
		Selenium	ug/l	12.8	10	1
18_BGMW01A	(466-486)	Chloride	mg/l	350	250	3
		Sulfate	mg/l	318	250	3
		Total Dissolved Solids	mg/l	1,400	500	3
		Aluminum	ug/l	832	50	3
		Iron	ug/l	2,280	300	3
		Manganese	ug/l	235	50	3
18_BGMW01B	(396-416)	Total Dissolved Solids	mg/l	702	500	3
		Manganese	ug/l	96.3	50	3
18_BGMW01C	(330-350)	Nitrate/Nitrite-N	mg/l	18.6	10	1
		Total Dissolved Solids	mg/l	767	500	3
		Cadmium	ug/l	7.4	5	2
		Selenium	ug/l	17.4	10	1
18_BGMW01D	(242-262)	Cadmium	ug/l	6.2	5	2
		Manganese	ug/l	90.7	50	3
		Selenium	ug/l	14.4	10	1
		Total Dissolved Solids	mg/l	864	500	3
18_BGMW01E	(205-225)	Selenium	ug/l	17.5	10	1
		Nitrate/Nitrite-N	mg/l	17.2	10	1
		Total Dissolved Solids	mg/l	872	500	3
		Benzene	ug/l	270	1	1
18_BGMW02A	(462-482)	Total Dissolved Solids	mg/l	522	500	3
		Manganese	ug/l	129	50	3
18_BGMW02C	(358-378)	Total Dissolved Solids	mg/l	561	500	3
		Manganese	ug/l	99.8	50	3

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
18_BGMW02D	(294-314)	Total Dissolved Solids	mg/l	696	500	3
		Manganese	ug/l	103	50	3
18_BGMW02E	(193-233)	Manganese	ug/l	65	50	3
		Selenium	ug/l	13.3	10	1
		Total Dissolved Solids	mg/l	847	500	3
18_BGMW03A	(370-390)	Selenium	ug/l	13.7	10	1
		Nitrate/Nitrite-N	mg/l	12.6	10	1
		Total Dissolved Solids	mg/l	662	500	3
18_BGMW03B	(280-300)	Total Dissolved Solids	mg/l	589	500	3
		Selenium	ug/l	11.2	10	1
18_BGMW03C	(222-242)	Selenium	ug/l	39	10	1
		Total Dissolved Solids	mg/l	654	500	3
18_BGMW03E	(124-164)	Carbon Tetrachloride	ug/l	1	0.5	1
		Trichloroethylene	ug/l	370	5	2
		Nitrate/Nitrite-N	mg/l	14.1	10	1
		Total Dissolved Solids	mg/l	928	500	3
		Selenium	ug/l	41.9	10	1
18_BGMW04A	(286-306)	Total Dissolved Solids	mg/l	670	500	3
18_BGMW04B	(190-210)	Tetrachloroethene	ug/l	11	5	2
		Trichloroethylene	ug/l	14	5	2
		Total Dissolved Solids	mg/l	718	500	3
		Diethylphthalate	ug/l	10	4	1
18_BGMW05A	(462-482)	Chloride	mg/l	1580	250	3
		Sulfate	mg/l	419	250	3
		Total Dissolved Solids	mg/l	3160	500	3
		Manganese	ug/l	423	50	3
		Selenium	ug/l	35.5	10	1

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
18_BGMW05B	(321-341)	Selenium	ug/l	11.7	10	1
		Total Dissolved Solids	mg/l	725	500	3
18_BGMW05C	(225-245)	Selenium	ug/l	12.3	10	1
		Nitrate/Nitrite-N	mg/l	18.7	10	1
		Total Dissolved Solids	mg/l	725	500	3
18_BGMW05D	(83-133)	Cadmium	ug/l	118	5	2
		Total Dissolved Solids	mg/l	675	500	3
		Tetrachloroethene	ug/l	30	5	2
		Trichloroethylene	ug/l	39	5	2
18_BGMW07	(25-65)	Manganese	ug/l	706	50	3
		Chloride	mg/l	252	250	3
		Total Dissolved Solids	mg/l	1070	500	3
18_BGMW12	(165-205)	Manganese	ug/l	163	50	3
		Selenium	ug/l	108	10	1
		Nitrate/Nitrite-N	mg/l	14.9	10	1
		Sulfate	mg/l	920	250	3
		Total Dissolved Solids	mg/l	1900	500	3
18_BGMW14	(75-115)	Total Dissolved Solids	mg/l	819	500	3
18_BGMW15	(175-215)	Manganese	ug/l	175	50	3
		Selenium	ug/l	82.1	10	1
		Chloride	mg/l	285	250	3
		Sulfate	mg/l	835	250	3
		Total Dissolved Solids	mg/l	1490	500	3
18_BGMW16	(223-263)	Selenium	ug/l	30.8	10	1
		Sulfate	mg/l	368	250	3
		Total Dissolved Solids	mg/l	1010	500	3
18_BGMW17	(215-255)	Total Dissolved Solids	mg/l	891	500	3

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
		Selenium	ug/l	10.3	10	1
18_BGMW18	(140-180)	Selenium	ug/l	11.9	10	1
		Nitrate/Nitrite-N	mg/l	22.8	10	1
		Sulfate	mg/l	307	250	3
		Total Dissolved Solids	mg/l	1040	500	3
18_BGMW19A	(448-468)	Total Dissolved Solids	mg/l	799	500	3
18_BGMW19B	(400-420)	Total Dissolved Solids	mg/l	750	500	3
		Arsenic	ug/l	122	50	2
		Manganese	ug/l	64.9	50	3
18_BGMW19C	(257-277)	Selenium	ug/l	53.6	10	1
		Nitrate/Nitrite-N	mg/l	13.6	10	1
		Sulfate	mg/l	330	250	3
		Total Dissolved Solids	mg/l	1150	500	3
18_BGMW19D	(150-170)	Selenium	ug/l	24.8	10	1
		Nitrate/Nitrite-N	mg/l	66.7	10	1
		Sulfate	mg/l	630	250	3
		Total Dissolved Solids	mg/l	2060	500	3
18_BGMW19E	(98-138)	Selenium	ug/l	18.6	10	1
		Nitrate/Nitrite-N	mg/l	53.6	10	1
		Sulfate	mg/l	683	250	3
		Total Dissolved Solids	mg/l	1940	500	3
		Aldrin	ug/l	0.06	0.05	4
		Dieldrin	ug/l	0.14	0.05	4
		Heptachlor	ug/l	0.07	0.01	1
18_BGMW22	(247-287)	Total Dissolved Solids	mg/l	842	500	3
18_BGMW23	(64-104)	Nitrate/Nitrite-N	mg/l	26	10	1
		Total Dissolved Solids	mg/l	983	500	3

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
18_BGMW24	(51-71)	Selenium	ug/l	34.2	10	1
		Sulfate	mg/l	251	250	3
		Total Dissolved Solids	mg/l	731	500	3
18_BGMW101	(90-130)	Selenium	ug/l	25.7	10	1
		Nitrate/Nitrite-N	mg/l	16.2	10	1
		Sulfate	mg/l	437	250	3
		Total Dissolved Solids	mg/l	1470	500	3
		Trichloroethylene	ug/l	29	5	2
18_DW135	(115-135)	Chloride	mg/l	409	250	3
		Nitrate/Nitrite-N	mg/l	26.7	10	1
		Sulfate	mg/l	739	250	3
		Total Dissolved Solids	mg/l	2120	500	3
		Selenium	ug/l	147	10	1
		Carbon Tetrachloride	ug/l	17	0.5	1
18_DW250	(215-250)	Total Dissolved Solids	mg/l	702	500	3
		Selenium	ug/l	17.9	10	1
		Carbon Tetrachloride	ug/l	7	0.5	1
18_DW350	(310-350)	Manganese	ug/l	52.3	50	3
		Selenium	ug/l	10.2	10	1
		Total Dissolved Solids	mg/l	708	500	3
18_DW450	(420-450)	Iron	ug/l	323	300	3
		Manganese	ug/l	68.7	50	3
		Selenium	ug/l	11.3	10	1
		Total Dissolved Solids	mg/l	660	500	3
18_DW540	(490-540)	Total Dissolved Solids	mg/l	662	500	3
		Aluminum	ug/l	187	50	3
		Iron	ug/l	385	300	3

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
		Manganese	ug/l	117	50	3
18_PS2	(103-133)	Chloride	mg/l	417	250	3
		Nitrate/Nitrite-N	mg/l	37.6	10	1
		Sulfate	mg/l	1010	250	3
		Total Dissolved Solids	mg/l	2550	500	3
		Selenium	ug/l	138	10	1
18_PS3	(102-122)	Tetrachloroethene	ug/l	58	5	2
		Trichloroethylene	ug/l	56	5	2
		Nitrate/Nitrite-N	mg/l	12.4	10	1
		Total Dissolved Solids	mg/l	893	500	3
18_PS4	(98-118)	Tetrachloroethene	ug/l	43	5	2
		Trichloroethylene	ug/l	34	5	2
		Chloride	mg/l	325	250	3
		Nitrate/Nitrite-N	mg/l	11.8	10	1
		Total Dissolved Solids	mg/l	1130	500	3
18_PS5	(106-126)	Sulfate	mg/l	318	250	3
		Total Dissolved Solids	mg/l	1390	500	3
		Selenium	ug/l	23.2	10	1
18_PS6	(130-150)	Chloride	mg/l	371	250	3
		Nitrate/Nitrite-N	mg/l	28.2	10	1
		Sulfate	mg/l	460	250	3
		Total Dissolved Solids	mg/l	1630	500	3
		Selenium	ug/l	136	10	1
		Carbon Tetrachloride	ug/l	1	0.5	1
18_PS7	(106-126)	Nitrate/Nitrite-N	mg/l	24.9	10	1
		Total Dissolved Solids	mg/l	766	500	3
		Selenium	ug/l	34.7	10	1

Table A1-7
OU-1 (Site 18): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
18_PS8	(125-145)	Carbon Tetrachloride	ug/l	3	0.5	1
		Trichloroethylene	ug/l	82	5	2
		Nitrate/Nitrite-N	mg/l	14.3	10	1
		Total Dissolved Solids	mg/l	877	500	3
18_RW1	(430-470)	Total Dissolved Solids	mg/l	829	500	3
18_RW2	(270-310)	Nitrate/Nitrite-N	mg/l	13.3	10	1
		Total Dissolved Solids	mg/l	666	500	3
		Selenium	ug/l	19.3	10	1

[a]California Department of Toxic Substances Control
[b]Screen interval (feet below ground surface)
[c]The most stringent federal/state drinking water standard was applied.In the presence of both an EPA MCL and a California MCL, the most stringent MCL is represented. If neither an EPA or California MCL is listed, the California DTSC action level was applied.
[d]Regulatory Code:

1 = EPA Primary MCL: Federally enforceable drinking water standard established for the health effects of contaminants
2 = California MCL: Health-based drinking water standard enforceable at the state level
3 = EPA Secondary MCL: Nonenforceable standard based on aesthetic qualities of taste, color, and odor (Includes chloride, iron, manganese, sulfate, and TDS)
4 = DTSC Action Level: Nonenforceable levels at which DTSC strongly urges water purveyors to take corrective action to reduce the level of contamination in the water they supply (Action levels cease to exist when state MCLs are promulgated.)

Table A1-8
Gross Alpha and Beta Particle Activity - All Sites (OU-1,2,3)
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
01_DGMW57	S1452000	5.8 ± 2.1	12.2 ± 0.34
01_DGMW58	S1452001	5.9 ± 0.5	8 ± 0.2
02_UGMW25	S1452006	7.8 ± 0.6	5.2 ± 0.16
02_DGMW59	S1452009	16.3 ± 1	14.1 ± 0.3
02_DGMW60	S1452008	20.9 ± 4.6	10.8 ± 2.1
02_DGMW61	S1452007	6.5 ± 0.48	8.9 ± 0.22
03_UGMW26	S1452027	14.2 ± 2.1	10.9 ± 0.7
03_DBMW39	S1452016	15.9 ± 2.3	10.3 ± 0.7
03_DGMW64	S1452019	14.3 ± 1	13.1 ± 0.4
03_DGMW65X	S1452020	8.6 ± 0.7	8.8 ± 0.2
04_UGMW63[a]	S1452018	14 ± 3	11.3 ± 1.5
05_DBMW41	S1452036	9 ± 2.9	6.3 ± 6.3
05_DBMW41	S1452386[b]	9.4 ± 2.8	5 ± 1.6
05_DGMW67	S1452035	24.9 ± 3	53 ± 9.6
05_DGMW67	S1452393[b]	15 ± 2.8	7.7 ± 5.7
05_DGMW68	S1453032	7 ± ?	13.6 ± ?
07_DGMW71	S1452048	6.3 ± 0.68	11.5 ± 0.3
09_DBMW45	S1452065	9.6 ± 0.86	11.2 ± 0.4
09_DBMW45	S1452391[b]	8.3 ± ?	9.9 ± ?
19_DGMW85	S1452065	12.8 ± 1	15.9 ± 0.2
19_DGMW85	S14152391[b]	0.8 ± 0.1	5.8 ± 0.4
22_DBMW47	S1452068	5.8 ± 0.5	Not Reported

[a] Originally a downgradient well for Site 3.
[b] Blind duplicate of the sample immediately above.

Table A1-9
Contaminants of Concern as Listed in the Work Plan
MCAS El Toro Phase I RI Technical Memorandum

Contaminant, CAS Number	Regulatory Value (µg/L)	Detection Value (µg/L)[a]	Orange County Data, 43 samples			Phase I RI Data (150 samples)		
			Number of Detects[b]	Maximum Value (µg/L)	Well with the highest value	Number of Detects	Maximum Value (µg/L)	Well with the Highest Value
Acetone, 67-64-1		2	NR[c]	--	--	5	15[d]	18_BGMW01E
Benzene, 71-43-2	1	1	NR	--	--	10	730	13_UGMW32
Carbon tetrachloride, 67-66-3	0.5	1	0	--	--	24	19	14_DBMW50
Chlorobenzene, 108-90-7	30	1	1	0.5	MCAS-1 (545)	NONE	--	--
Chloroform, 67-66-3	100	1	6	1.2	MCAS-5	37	12[e]	14_DGMW79
1,1-Dichloroethane, 75-34-3	5	1	NR	--	--	2	0.9J[f]	02_DGMW60
1,1-Dichloroethene, 75-34-4	6	1	NR	--	--	7	8.0	08_DGMW79
cis-1,2-Dichloroethylene, 156-59-2		1	4	5.4	MCAS-7 (354)	2	0.9J	02_DGMW60
trans-1,2-Dichloroethylene, 156-60-5								
Ethyl benzene, 100-41-4		1	3	0.9	MCAS-7 (1104)	2	2.0	13_DGMW78 18_BGMP10@ 1001 feet
Methyl ethyl ketone (2-Butanone), 78-93-3		2	NR	--	--	1	1.0J	05_BGMW05D
Tetrachloroethylene (PCE), 127-18-4	5	1	2	0.7	MCAS-3 (165)	28	58	18_PS3
Toluene, 108-88-55-6	1,000	1	1	0.9	MCAS-7 (1104)	19	15	18_BGMW5A
1,1,1-Trichloroethane (TCA), 75-55-6	200	1	0	--	--	1	0.4J	06_DGMW69
1,1,2-Trichloroethane, 79-00-5	32	1	NR	--	--	4	2	02_DGMW60 08_DGMW73
Trichloroethylene (TCE), 79-01-6	5	1	21	25.0	MCAS-7 (444)	52	2,000	09_DGMW45
Xylenes, 1330-20-7	1750	1	NR	--	--	15	58	13_UGMW32 18_BGMW01E

[a] Detection limit known for MCAS El Toro analyses only
[b] Includes groundwater samples reported by Orange County Water District since July 1992.
[c] NR indicates Not Reported.
[d] Acetone, a demonstrated lab contaminant, had a maximum concentration of 37 µg/L in trip blanks.
[e] Higher values were detected in potable water used for drilling.
[f] J indicates that the value is estimated.

Table A1-10
Total Fuel Hydrocarbons (TFH) Detected in Groundwater and Potable Water
All Sites (OU-1,2,3)
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number	Screen Interval (ft bgs)	TFH - Gasoline (µg/L)[a]	TFH - Diesel (µg/L)[b]	Discussion
04_DBMW40	S1452029	220-260	77.7	769	
07_DBMW70	S1452047	125-165	ND	2,660	
09_DBMW45	S1452065 S1452391	117-157	85.0 250	ND ND	
13_UGMW32	S1452083	144-184	1,690	308	
13_DBMW49	S1452068	142-182	58.9	ND	
13_DGMW78	S1452079	127-167	138	436	
15_DBMW51	S1452088	125-165	348	3,370	
22_DBMW47	S1452068	116-156	58.9	ND	
18_BGMW01E	S1452242 S1452382	205-245	925 1,080	2,030 1,840	
18_BGMW01A	S1452139	466-486	ND	2,260	TFH-diesel potentially introduced during drilling
18_BGMP08	S1452285	61-71	ND	266	TFH-diesel potentially introduced during drilling
18_BGMP09	S1452295 S1452287 S1452289	133-143 375-385 453-563	71.6 ND ND	ND 403 1,760	TFH-diesel potentially introduced during drilling
18_BGMP10	S1452496 S1452494 S1452492	218-228 429-239 563-573	ND ND ND	844 421 636	TFH-diesel potentially introduced during drilling
18_DW350	S1452480	310-350	ND	943	
18_DW450	S1452481	420-450	ND	416	
18_DW540	S1452482	490-540	ND	537	
00_RIG9	S1452369	Not applicable	ND	1,010	Sample from water tank with Rig 9
00_HYD103	S1452476	Not applicable	ND	4,110	Sample of end of hose into water tank on rig drilling Well 18_BGMW103

a ND=Not detected; detection limit for TFH-gasoline is 50 µg/L
b ND=Not detected; detection limit for TFH-diesel is 250 µg/L

Table A1-11
SVOCs Detected in Groundwaters and Potable Water All Sites (OU-1,2,3)
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number	Depth (ft bgs)	Compound (µg/L)				
			Benzyl Butyl Phthalate	Bis(2-Ethyl-Hexyl Phthalate	Diethyl Phthalate	Dimethyl Phthalate	Phenol
03_DGMW65X	S1452020	230-270		2.0 J[a]			
06_UGMW28	S1452045	140-170	3.0 J				
06_DGMW69	S1452091	150-190					14.0
10_DGMW77	S1452069	130-170	19				
13_UGMW32	S1452083	144-184		26			
18_BGMW01A	S1452139	466-486		7 J			
18_BGMW01D	S1452240	242-262		2 J			
18_BGMW01E	S1452242	205-225		19			
18_BGMW15	S1452305	175-215			3 J		
18_BGMW19B	S1452315	400-420		14			
18_BGMW19C	S1452227	257-277		3 J			
18_BGMW22	S1452319	247-287		3 J			
18_BGMP10	S1452498	886-896		2 J			
18_DW250	S1452479	215-250		17		220	
18_DW350	S1452480	310-250				220	
18_DW450	S1452481	420-450				130	
18_DW540	S1452482	490-540				120	
00_HY-S03	S1452215	Not applica ble		22			
00_RIG9	S1452369	Not applica ble	4.0 J				

[a] J indicates that this is an estimated value and should be used with caution.

Table A1-12
Pesticides Detected in Groundwaters and Potable Water All Sites (OU-1,2,3)
MCAS El Toro Phase I RI Technical Memo

Station Identification	Sample Number	Depth (ft bgs)	Compound (µg/L)					
			BHC-Gamma (Lindane)	Heptachlor	4,4'-DDT	Dieldrin	Aldrin	Endosulfan Sulfate
Groundwater								
03_DGMW64	S1452019	245-285	0.05	0.07	0.11	0.11		
18_BGMW01E	S1452242	205-277	0.01					
18_BGMW19C	S1452226	257-225			01 J[a]			
18_BGMW19E	S1452317	98-138	0.06	0.07	0.14	0.14	0.06	
18_PS7	S1452347	106-126						0.003
18_BGMW01E	S1452382	205-225	0.01					
Potable Water								
00_HY-S03	S1452376	NA[b]						0.03
00_HYD103	S1452476	NA				0.07		

[a] J indicates that this is an estimated value and should be used with caution.
[b] NA indicates Not Applicable.

Table A1-13
Herbicides Detected in Groundwaters and Potable Water All Sites (OU-1,2,3)
MCAS El Toro Phase I RI Technical Memorandum

Station Identification	Sample Number	Depth (ft bgs)	Compound (µg/L)									
			2,4,5-T	Dalapon	2,4,5-Trichloro-phenoxy Proprionic Acid	2,4-DB	Dicamba	Dichloro-prop	2,4 Dichloro-phenoxy Acetic Acid	MCPA	MCPP	Dinoseb
Groundwater												
03_DGMW65	S1452020	230-270		2.20								
04_UGMW63	S1452018	235-275	0.94									
05_DGMW67	S1452035	187-227	0.69									
12_UGMW31	S1452077	105-145		2.46 J[a]	2.67	2.88 J	4.39	6.41	8.56	3,490	3,530	
18_BGMW05D	S1452265	83-133	2.51					1.01				
18_BGMP08	S1452333	126-136									288	
18_BGMP09	S1452295	133-143		1.75								
18_BGMW16	S1452378	223-263										0.42
18_BGMW101	S1452330	90-130						0.67				
18_RW1	S1452389	430-470	11.40									
Potable Water												
00_HY-S03	S1452031	NA[b]		0.81								
00_HY-S03	S1452213	NA		5.29								
00_HY-S03	S1452215	NA		4.90								
00_RIG20	S1452405	NA	0.71									

[a] J indicates that this is an estimated value and should be used with caution.
[b] NA indicates Not Applicable.

Table A1 - 14

Summary of Detected Analytes and Minimum / Maximum Concentrations in Groundwater for All Sites

MCAS El Toro Phase I RI Technical Memorandum

ANALYTE BY GROUP	Units	Number of Samples	Number of Times Detected	Number Exceeding Regulatory Limits	Minimum Detected Conc.(a)	DVF(b	Well with Minimum Detected Conc.	Maximum Detected Conc.(a)	DVF(b)	Well with Maximum Detected Conc.	Detection Limit	Regulatory Level(c)	Regulatory Code(d)
GENERAL CHEMISTRY													
ALKALINITY AS CACO3	MG/L	139	139	NA	75		18_BGMW05A	447		08_DGMW73	1	NA	NA
BICARBONATE	MG/L	137	137	NA	92		18_BGMW05A	545		08_DGMW73	1	NA	NA
CARBONATE	MG/L	131	130	NA	0		18_BGMW03C	286		03_DGMW64	0	NA	NA
CHLORIDE	MG/L	140	140	27	19.5		16_UGMW33	1580		18_BGMW05A	0.13	250	3
CYANIDE	UG/L	141	8	NA	3	U	-	5.5	B	07_DGMW72	3	NA	NA
NITRATE/NITRITE-N	MG/L	137	129	70	0.05	U	-	66.7		18_BGMW19D	0.05	10	1
SULFATE	MG/L	140	139	55	21.1		01_DGMW58	1470		15_DBMW51	36.4	250	3
TOTAL DISSOLVED SOLIDS	MG/L	140	140	139	429		01_DGMW58	5260		15_DBMW51	3	500	3
METALS													
ALUMINUM	UG/L	142	30	12	22.2	U	-	832		18_BGMW01A	22.2	50	3
ANTIMONY	UG/L	142	62	NA	10.7	U	-	40.7	b	15_DBMW51	17.2	NA	NA
ARSENIC	UG/L	142	93	1	0.7	b	18_BGMP09	122		18_BGMW19B	1	50	2
BARIUM	UG/L	142	142	0	3.6	b	18_BGMW01A	199	b	18_BGMW07	0.6	2000	2
BERYLLIUM	UG/L	142	9	NA	0.24	U	-	0.94	b	18_BGMW05B	0.2	NA	NA
CADMIUM	UG/L	142	36	7	1.2	U	-	118		18_BGMW05D	2.7	5	2
CALCIUM	UG/L	142	142	NA	26300		18_BGMP09	869000		15_DBMW51	11.5	NA	NA
CHROMIUM	UG/L	142	8	0	2.9	U	-	12.7		18_BGMW01A	1.9	50	1
COBALT	UG/L	142	7	NA	1.7	U	-	14.4	b	06_DGMW69	1.7	NA	NA
COPPER	UG/L	142	44	0	0.9	U	-	19.8	b	18_PS4	1.8	1300	2
IRON	UG/L	142	58	4	1.3	U	-	2280		18_BGMW01A	41.4	300	3
LEAD	UG/L	142	1	0	0.3	U	-	1.7	b	18_BGMW02C	1.4	15	2
MAGNESIUM	UG/L	142	142	NA	11100		18_BGMP09	351000		15_DBMW51	48.5	NA	NA
MANGANESE	UG/L	142	137	53	0.8	U	-	1800		13_DGMW78	1.6	50	3
MERCURY	UG/L	142	17	0	0.07	U	-	0.48		18_DW135	0.17	2	2
NICKEL	UG/L	142	79	NA	5.3	U	-	866		06_DGMW69	10.7	NA	NA
POTASSIUM	UG/L	142	142	NA	1280	b	02_UGMW25	9320		18_BGMW05A	601.5	NA	NA
SELENIUM	UG/L	142	116	76	0.5	U	-	152		13_DGMW78	2.1	10	1
SILVER	UG/L	142	15	0	1.5	U	-	3.9	b	19_DGMW85	1.5	50	1
SODIUM	UG/L	142	142	NA	36400		01_DGMW58	798000		18_BGMW05A	36.1	NA	NA
THALLIUM	UG/L	142	8	NA	0.7	U	-	1.2	J	18_BGMW101	1.6	NA	NA
VANADIUM	UG/L	142	134	NA	1.9	U	-	44.9	b	03_DBMW39	1.3	NA	NA
ZINC	UG/L	142	85	0	2.2	U	-	289		18_BGMP10	7.6	5000	2
VOLATILE ORGANIC COMPOUNDS													
1,1,1-TRICHLOROETHANE	UG/L	185	1	0	0.4	J	06_DGMW69	0.4	J	06_DGMW69	1	200	2
1,1,2-TRICHLOROETHANE	UG/L	185	3	0	0.5	J	18_BGMW05D	2		08_DGMW73	1	32	1
1,1-DICHLOROETHENE	UG/L	185	8	NA	0.4	J	18_PS3	8		08_DGMW73	1	NA	NA

Table A1 - 14

Summary of Detected Analytes and Minimum / Maximum Concentrations in Groundwater for All Sites

MCAS El Toro Phase I RI Technical Memorandum

ANALYTE BY GROUP	Units	Number of Samples	Number of Times Detected	Number Exceeding Regulatory Limits	Minimum Detected Conc.(a)	DVF(b	Well with Minimum Detected Conc.	Maximum Detected Conc.(a)	DVF(b)	Well with Maximum Detected Conc.	Detection Limit	Regulatory Level(c)	Regulatory Code(d)
1,2-DICHLOROETHANE	UG/L	185	2	2	0.5	J	09_DBMW45	0.9	J	02_DGMW60	1	0.5	1
1,2-DICHLOROETHENE (TOTAL)	UG/L	185	7	NA	1		18_BGMW04B	8		02_DGMW60	1	NA	NA
1,2-DICHLOROPROPANE	UG/L	185	3	0	1	U	-	4		18_BGMW18	1	5	2
2-BUTANONE	UG/L	185	1	NA	1	J	18_BGMW05D	1	J	18_BGMW05D	2	NA	NA
2-HEXANONE	UG/L	185	2	NA	1	J	18_DW540	7		04_DBMW40	2	NA	NA
4-METHYL-2-PENTANONE	UG/L	185	1	NA	0.6	J	19_DGMW85	0.6	J	19_DGMW85	2	NA	NA
ACETONE	UG/L	185	5	NA	2	U	-	51		18_BGMW02A	2	NA	NA
BENZENE	UG/L	185	10	7	0.3	J	08_DGMW73	730	D	13_UGMW32	1	1	1
BROMODICHLOROMETHANE	UG/L	185	10	0	0.5	J	18_BGMW03A	11		18_BGMW02A	1	100	2
BROMOFORM	UG/L	185	1	0	1	U	-	2		18_BGMW02A	1	100	2
CARBON DISULFIDE	UG/L	185	8	NA	0.5	J	18_BGMW14	8		18_BGMW05A	1	NA	NA
CARBON TETRACHLORIDE	UG/L	185	24	23	0.3	J	07_DBMW43	19		14_DBMW50	1	0.5	1
CHLORODIBROMOMETHANE	UG/L	185	9	0	0.5	J	18_BGMW02C	11		18_BGMW02A	1	100	2
CHLOROFORM	UG/L	185	40	0	0.4	J	12_UGMW31	12		14_DGMW79	1	100	2
CHLOROMETHANE (METHYL CHLORIDE)	UG/L	185	44	NA	0.4	J	08_DGMW73	20		18_BGMP06	2	NA	NA
ETHYLBENZENE	UG/L	185	2	NA	1	U	-	2		13_DGMW78	1	NA	NA
METHYLENE CHLORIDE	UG/L	184	16	0	0.5	J	18_BGMW05A	2		04_UGMW63	1	40	4
STYRENE	UG/L	185	2	0	0.6	J	18_BGMP10	1		18_BGMP10	1	100	2
TETRACHLOROETHENE	UG/L	185	33	16	0.5	J	18_BGMP08	58		18_PS3	1	5	2
TOLUENE	UG/L	185	19	0	0.5	J	18_BGMW01B	15		18_BGMW05A	1	1000	2
TRICHLOROETHYLENE	UG/L	185	52	23	0.3	J	18_MW8	2000	D	09_DBMW45	1	5	2
XYLENE (TOTAL)	UG/L	185	15	NA	0.8	J	03_DGMW65X	58		18_BGMW01E	1	NA	NA
SEMIVOLATILE ORGANIC COMPOUNDS													
2,4,5-TRICHLOROPHENOL	UG/L	141	1	NA	25	U	-	25	J	18_BGMW04B	25	NA	NA
2,4,6-TRICHLOROPHENOL	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
2,4-DINITROPHENOL	UG/L	141	1	NA	25	U	-	25	J	18_BGMW04B	25	NA	NA
2,4-DINITROTOLUENE	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
2,6-DINITROTOLUENE	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
2-CHLORONAPHTHALENE	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
2-NITROANILINE	UG/L	141	1	NA	25	U	-	25	J	18_BGMW04B	25	NA	NA
3-NITROANILINE	UG/L	141	1	NA	25	U	-	25	J	18_BGMW04B	25	NA	NA
4-CHLOROPHENYL PHENYL ETHER	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
4-NITROANILINE	UG/L	141	1	NA	25	U	-	25	J	18_BGMW04B	25	NA	NA
4-NITROPHENOL	UG/L	141	1	NA	25	U	-	25	J	18_BGMW04B	25	NA	NA
ACENAPHTHENE	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
BENZYL BUTYL PHTHALATE	UG/L	141	2	NA	3	J	06_UGMW28	19		10_DGMW77	10	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	141	10	NA	2	J	18_BGMW01D	26		13_UGMW32	10	NA	NA

Table A1 - 14

Summary of Detected Analytes and Minimum / Maximum Concentrations in Groundwater for All Sites

MCAS El Toro Phase I RI Technical Memorandum

ANALYTE BY GROUP	Units	Number of Samples	Number of Times Detected	Number Exceeding Regulatory Limits	Minimum Detected Conc.(a)	DVF(b	Well with Minimum Detected Conc.	Maximum Detected Conc.(a)	DVF(b)	Well with Maximum Detected Conc.	Detection Limit	Regulatory Level(c)	Regulatory Code(d)
DIBENZOFURAN	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
DIETHYL PHTHALATE	UG/L	141	2	1	3	J	18_BGMW15	10	J	18_BGMW04B	10	4	2
DIMETHYL PHTHALATE	UG/L	141	5	NA	10	U	-	220		18_DW350	10	NA	NA
FLUORENE	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
HEXACHLOROBUTADIENE	UG/L	141	1	NA	10	U	-	10	J	18_BGMW04B	10	NA	NA
PHENOL	UG/L	141	1	1	10	U	-	14		06_DGMW69	10	5	4
PESTICIDES AND PCBs													
4,4'-DDT	UG/L	140	3	NA	0.01	J	18_BGMW19C	0.14		18_BGMW19E	0.1	NA	NA
ALDRIN	UG/L	140	1	1	0.05	U	-	0.06		18_BGMW19E	0.1	0.05	4
BHC-GAMMA(LINDANE)	UG/L	140	4	NA	0.01		18_BGMW01E	0.06		18_BGMW19E	0.1	NA	NA
DIELDRIN	UG/L	140	2	2	0.1	U	-	0.14		18_BGMW19E	0.1	0.05	4
ENDOSULFAN SULFATE	UG/L	140	1	NA	0		18_PS7	0		18_PS7	0.1	NA	NA
HEPTACHLOR	UG/L	140	2	2	0.05	U	-	0.07		03_DGMW64	0.1	0.01	1
HERBICIDES													
2,4 DICHLOROPHENOXY ACETIC ACID	UG/L	87	1	0	0.5	U	-	8.56		12_UGMW31	0.5	70	2
2,4,5-T	UG/L	87	4	NA	0.25	U	-	11.4		18_RW1	0.2	NA	NA
2,4,5-TP (SILVEX)	UG/L	87	1	NA	0.25	U	-	2.67		12_UGMW31	0.2	NA	NA
2,4-DB	UG/L	87	1	NA	0.5	U	-	2.88	J	12_UGMW31	0.5	NA	NA
DALAPON	UG/L	87	3	NA	0.5	U	-	2.46	J	12_UGMW31	0.5	NA	NA
DICAMBA	UG/L	87	1	NA	0.5	U	-	4.39		12_UGMW31	0.5	NA	NA
DICHLOROPROP	UG/L	87	3	NA	0.5	U	-	6.41		12_UGMW31	0.5	NA	NA
DINOSEB	UG/L	87	1	NA	0.25	U	-	0.42		18_BGMW16	0.2	NA	NA
MCPA	UG/L	87	1	NA	250	U	-	3490		12_UGMW31	250	NA	NA
MCPP	UG/L	87	2	NA	250	U	-	3530		12_UGMW31	250	NA	NA
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)													
TFH DIESEL	UG/L	141	17	NA	250	U	-	3370		15_DBMW51	250	NA	NA
TFH GASOLINE	UG/L	141	11	NA	50	U	-	1690		13_UGMW32	50	NA	NA
GROSS ALPHA AND BETA													
GROSS ALPHA	PCI/L	20	20	5	0.8		19_DGMW85	24.9		05_DGMW67	2.8	15	2
GROSS BETA	PCI/L	20	20	1	5.2		02_UGMW25	53		05_DGMW67	5.7	50	2

(a) If the analyte concentration is below the detection limit and is not an estimated value, then the value given is the detection limit.
(b) A definition of each data validation flag (DVF) is provided in Table C-1.
(c) The given concentration represents the California MCL, the EPA primary MCL, the EPA secondary MCL, or the California DTSC Action Level, whichever is most stringent.

(d) Regulatory Codes are:
1 = California MCL
2 = EPA primary MCL
3 = EPA secondary MCL
4 = California DTSC Action Level

Table A1-15
Federal and State Drinking Water Standards for Chemicals Detected in Groundwater
MCAS El Toro Phase I RI Technical Memorandum

Chemical	Safe Drinking Water Act		California MCL	California Action Level
	MCL	MCLG		
Nitrite (as Ni)	1,000	1,000	--	--
Total Nitrate plus nitrite (as N)	10,000	10,000	--	--
Selenium	50	50	10	--
Silver	100[S]	--	50	--
Sulfate	250[S]	--	--	--
TDS	500[S]	--	--	--
Thallium	2[a]	0.5[a]	--	--
Uranium	20[c]	--	--	--
Zinc	5,000[S]	--	--	--
Radionuclides (pCi/l)				
gross alpha	15	--	15	--
gross beta	--	--	50	--

All concentrations in µg/l, except radionuclides, which are in pCi/L; chloride and sulfate, which are in mg/L.
-- Criteria not established.
[a]Effective 1/17/94.
[b]EPA action level; Maximum Contaminant Level (MCL) expired 12/07/92.
[c]Proposed.
[S] EPA Secondary MCL

References:
Safe Drinking Water Act: 40 CFR 141, July 1992.
California MCL: California Drinking Water Quality Standards, Environmental Reporter, 7-31-92.
California Action Level: Region 9 EPA Drinking Water Standards and Health Advisory Table. July, 1992.

Table A1-16
OU-1 (Site 18): Summary of MCAS El Toro RI/FS and RFA Sites: Evaluation of Potential for Contributing to Regional Groundwater Contamination
MCAS El Toro Phase I RI Technical Memorandum

Site (OU)	Designation	Possible Contaminant Contribution to the Groundwater	Opinion[a]	Discussion
1 (OU-3)	EOD Range	None suspected	No	Change in groundwater quality between wells 01_DGMW57 and 01_DGMW58 and water-level data indicate a hydrogeologic barrier.
2 (OU-2)	Magazine Road Landfill	VOCs	Yes	Site 2 appears to be contributoring to a newly-defined groundwater plume on Station.
3 (OU-2)	Original Landfill	VOCs	Inconclusive	The landfill at Site 3 does not appear to be contributing to groundwater contamination. The RFA incinerator site may be contributing.
4 (OU-3)	Ferrocene Spill Area	Benzene, other VOCs, TFH-diesel	Inconclusive	Contaminants believed to be related to on-going operations at Tank Farm 5.
5 (OU-2)	Perimeter Road Landfill	None suspected	No	Contaminants in groundwater beneath this site appear to be migrating from Site 2.
6 (OU-3)	Drop Tank Drainage Area No. 1	None suspected	No	Changes in groundwater quality appear to be unrelated to activities at MCAS El Toro.
7 (OU-2)	Drop Tank Drainage Area No. 2	VOCs	Yes	Suspected general source area (along with Sites 8, 9, 10, and 22) of concentrations of TCE and PCE. Exact locations unknown between upgradient and downgradient wells.
8 (OU-3)	DRMO Storage	VOCs	Inconclusive	Suspected source of VOCs is in this area, as defined by the groundwater concentrations. Exact locations are unknown, and may be northeast of Site 8 beneath the motor pool area.
9 (OU-3)	Crash Crew Pit 1	VOCs	Yes	Highest values of TCE on Station. No TCEs in the soil samples. Source of groundwater "hotspot" unknown, but probably just upgradient in Sites 9 or 10.
10 (OU-2)	Petroleum Disposal Area	VOCs	Yes	General source area (along with Sites 7, 8, 9, 11, and 22) of concentrations of TCE and PCE.
11 (OU-3)	Transformer Storage Area	PCBs	No	No wells at Site 11. No PCBs in any groundwater sample. VOCs from the general Sites 7, 8, 9, 10, and 22 source areas.
12 (OU-3)	Sludge Drying Beds	VOCs, metals	No	VOCs appear to be from sources upgradient, not from sources at Site 12. Herbicides in the upgradient well are probably not from sludge operations.
13 (OU-3)	Oil Change Area	Benzene, hydrocarbons	Inconclusive	Cross-gradient well has highest values; source of contamination most likely Tank Farm 2, adjacent to Site 13.
14 (OU-3)	Battery Acid Disposal Area	None suspected	No	Minor VOCs appear to be from upgradient contamination.

Table A1-16
OU-1 (Site 18): Summary of MCAS El Toro RI/FS and RFA Sites: Evaluation of Potential for Contributing to Regional Groundwater Contamination
MCAS El Toro Phase I RI Technical Memorandum

Site (OU)	Designation	Possible Contaminant Contribution to the Groundwater	Opinion[a]	Discussion
15 (OU-3)	Suspended Fuel Tanks	Benzene	No	Unknown source of contaminants. Tank Farm 2, near Site 13, is a possible source.
16 (OU-3)	Crash Crew Pit No. 2	None Detected	No	Change in groundwater quality appears to be from natural sources.
17 (OU-3)	Communication Station Landfill	None Detected	Inconclusive	Only one well at Site 17. General chemistry and changes in quality because of the landfill unknown.
18-Surface	Surface Water and Sediment	Minor sources of contaminants	Inconclusive	The washes, both above and below ground, may provide a conduit for transport of contaminants in an oblique direction from the regional groundwater hydraulic gradient.
19 (OU-3)	Aircraft Expeditionary Refueling (ACER) Site	VOCs	Inconclusive	Low levels detected that may have a local source. Study inconclusive.
20 (OU-3)	Hobby Shop	Trace of TCE	Inconclusive	General chemistry changes are regional. Trace of TCE is inconclusive; additional groundwater sampling needed.
21 (OU-3)	Waste Management Group Building 320	VOCs	No	Groundwater changes appear to be from regional changes or upgradient VOCs.
22 (OU-3)	Tactical Air Fuel Dispensing System	VOCs	Yes	Possible general source area (along with Sites 7, 8, 9, and 10) of concentrations of TCE and PCE.
RFA Sites with TCE or PCE in Soil Samples (See Section 5)				
SWMW/AOC 194 and 113	Incinerator Site, west of RI/FS Site 3	TCE and PCE	Inconclusive	Only RFA site recommended for inclusion in Phase 2 of the RI/FS
SWMW/AOC 181 and 264	Upgradient from RI/FS Site 19	PCE	Inconclusive	All PCE below the CRDL of 10 μg/kg
SWMW/AOC 188	Oil/water separator at Agua Chinon Wash	TCE and PCE	Inconclusive	TCE and PCE is from angle boring similar to those drilled during the RI/FS. RFA borings are closer to the oil/water separator.
SWMW/AOC 76	RI/FS Site 7	TCE	Inconclusive	TCE is from soil near Well 07_DBMW71, where TCE was detected in soil at 110 and 120 feet bgs.
SWMW/AOC 198 and 250	Motor pool, downgradient from RI/FS Site 7	PCE	Inconclusive	PCE from soils in the vicinity of RI/FS Sites 7, 9, 10, and 22.
SWMW/AOC 145	Downgradient from RI/FS Site 22	PCE	Inconclusive	PCE from soils in the vicinity of RI/FS Sites 7, 9, 10, and 22.
SWMW/AOC 223	Near Site 22	PCE	Inconclusive	PCE from soils in the vicinity of RI/FS Sites 7, 9, 10, and 22.

[a] Opinion as to whether or not the site contributes to OU-1 groundwater contamination.

Appendix A2

Nature and Extent of Contamination: OU-1 (Site 18)
Surface Water, Sediments, and Angle Borings

Appendix A2
NATURE AND EXTENT OF CONTAMINATION:
OU-1 (SITE 18) - REGIONAL GROUNDWATER CONTAMINATION
SURFACE WATER, SEDIMENTS, AND ANGLE BORINGS

This discussion of Site A2 is supplemented by the figures and data tables listed below. The figure is on page A2-3, and the tables are grouped at the end of this Appendix A2. Field headspace values for soils at this site are presented in Table BA1-10, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure A2-1: Locations of Surface Water, Sediments, and Angle Boring Supplies

Table A2-1: Types of Samples and Chemical Analyses
Table A2-2: Summary of Field Parameters for Surface Water Samples
Table A2-3: Summary of Detected Chemicals in Surface Runoff Samples
Table A2-4: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil Samples
Table A2-5: Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

A2.1 Background and Purpose

Surface water, sediments, and wash subsurface soils (angle borings) were investigated at Site 18 for three primary reasons: to assess the existence and degree of contamination in the three media, to establish water and sediment quality entering MCAS El Toro from upstream sources, and to assess these media as a transport pathway for contaminants. Section A2.3 presents and evaluates the results of the field sampling investigation. A summary of results, conclusions, and transport pathways is presented in Section 6.2 of the main document.

A2.2 Drainage Channel Configuration

Surface drainage near MCAS El Toro generally flows southwest, following the slope of the land perpendicular to the trend of the Santa Ana Mountains. Several washes originate in the hills northeast of the Station and flow through or adjacent to the Station en route to San Diego Creek. Off-Station drainage from the hills and upgradient

irrigated farmlands combines with on-Station runoff generated from the Station's extensive paved surfaces, then flows through four main drainage channels (Figure A2-1). These drainage channels are continuous with natural washes that originate in the Santa Ana Mountains: Borrego Canyon, Marshburn Channel, Agua Chinon, and Bee Canyon.

The southernmost of these washes, the Borrego Canyon Wash, flows along the southeast boundary of MCAS El Toro. The wash is unlined in the Santa Ana Mountains; downstream of Irvine Boulevard, it is lined. Borrego Canyon Wash crosses the Station's southern corner and joins Agua Chinon Wash about 1/4-mile from the Station's boundary. Borrego, Agua Chinon, and Bee Canyon washes are culverted after exiting the Station, until near where they join San Diego Creek.

Agua Chinon and the Bee Canyon Washes cross the central portion of the Station and receive runoff mainly through storm drains (designated "_CB" in Figure A2-1). Through most of their pathways across MCAS El Toro, their flow is contained in culverts. Both washes are unlined along several hundred feet at the southwest edge of the Station. Agua Chinon Wash flows into San Diego Creek just east of the intersection of the San Diego and Laguna Beach Freeways, about 1 mile downstream of its confluence with Borrego Canyon Wash. Bee Canyon Wash flows into San Diego Creek just northeast of the same intersection, about 1,500 feet north of Agua Chinon Wash.

Marshburn Channel is a lined drainage channel that runs along the northwestern boundary of MCAS El Toro and receives runoff from the western part of the Station. This channel flows into San Diego Creek about 3/4-mile northwest of Bee Canyon Wash. San Diego Creek flows into Upper Newport Bay about 7 miles downstream from its intersection with Marshburn Channel.

A2.3 Field Investigation

Samples were collected from 11 surface-water (runoff) and 11 stream sediment sample locations; and 10 angle borings were drilled and sampled beneath washes.

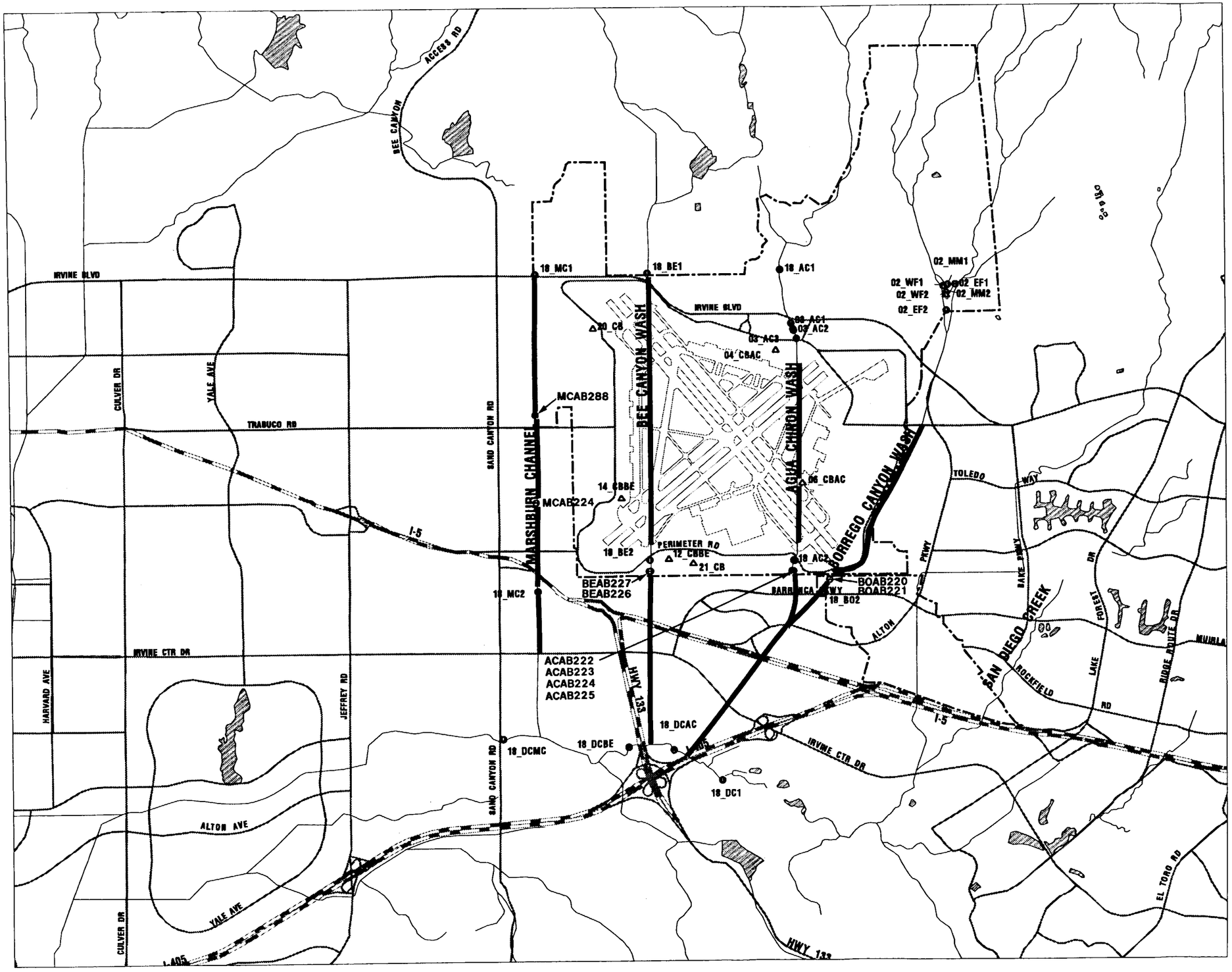

FIGURE A2-1

LOCATIONS OF SURFACE WATER SEDIMENT, AND ANGLE BORING SAMPLES

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

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A2.3.1 Surface Water and Sediments

To characterize the surface water and wash sediments in the study area, 35 surface water and 26 sediment samples were collected. Surface water and sediments were collected at 11 Site 18 locations. These sites are identified by the "18_" prefix in Figure A2-1.

Surface water and sediment samples were collected from two locations each on Marshburn Channel, Bee Canyon Channel, and Agua Chinon Wash and a single location on Borrego Canyon Wash. Samples were collected immediately upstream and downstream of the Station along each wash. The upstream sample on Borrego Canyon Wash is part of the Site 2 investigation (see Appendix B2) and is not discussed here. Samples were also collected from San Diego Creek at four locations: upstream and downstream of the Agua Chinon Wash, downstream of the Bee Canyon Wash, and downstream of Marshburn Channel. Samples upstream of the Station were used to assess potential sources of contaminant above the Station and establish the water and sediment quality entering the Station. Samples collected downstream were used to provide an indication of contaminants leaving the facility and, in conjunction with upstream samples, aid in assessing whether facility activities are affecting the washes.

Surface water samples were collected during three storm events: two rounds of samples were collected in March 1992, and one round was collected in December 1992. Field investigation methods for surface water and sediment sample collection are presented in Section 2.

Surface water and sediment sample numbers, station IDs, sample depths (for sediment samples), and analytes are presented in Table A2-1. Unfiltered surface water samples were sent to a laboratory for metals analysis. Samples were analyzed for dissolved metals and total metals. Samples used for dissolved metals analysis were filtered and preserved in the laboratory. The surface water's high suspended sediment content prevented field filtering of samples. Surface water samples were analyzed for general chemistry, VOCs, SVOCs,

pesticides/PCBs, TRPH, and TFH (gasoline and diesel). Parameters collected in the field include pH, electrical conductivity, and temperature. Flow rates were estimated in the field by approximating the wash's cross-sectional area and flow velocity.

Sediment samples were collected at the 0- to 6-inch depth and the 18- to 24-inch depth in washes. Based on headspace analysis and visual indications, an additional sample may have been collected at depths of 4 feet at four locations. Twenty-six sediment samples were collected at 11 sites. A list of analytes for each group of analyses is provided in Appendix C.

A2.3.2 Angle Borings

To characterize the subsurface soils beneath the washes, 10 angle borings were drilled and sampled. The borings (shown in Figure A2-1) were drilled at a 30-degree angle from vertical to collect samples of wash subsurface soils. Samples were collected at intervals of 10 feet to a total distance along the borehole of 60 feet. Sixty-six samples were collected and analyzed for the list of parameters presented in Table A2-1. The angle borings at Agua Chinon Wash and Bee Canyon Wash were positioned upstream of oil-water separators installed where the washes leave the Station.

A2.4 Surface Water and Sediments

A2.4.1 Field Sampling Results

Three surface water samples and a minimum of two sediment samples (at 0 to 6 inches and 18 to 24 inches) were collected at each sampling station. Additional 4-foot-deep sediment samples were collected at Stations 18_MC1, 18_AC1, 18_BE1, and 18_DCBE.

Surface Water Flow. Surface water flow was estimated to assess the degree of runoff associated with each storm event. Flow rates were estimated by physically or visually approximating the cross-sectional area of the flow stream

and multiplying it by the estimated surface flow velocity. The flow estimates are tabulated in Table A2-2. Generally, the magnitude of the first and third storm flows are similar, with a smaller runoff observed during the second storm. Larger storms are a stronger mechanism for sediment transport, though surface water contaminant concentrations are often diluted. The later storms in a series, as with the second storm event, are expected to have lower surface water chemical concentrations because previous storms (25 days prior) have already "washed" much of the surface contamination. The December 1992 storm event was the first major runoff event of the season.

General Chemistry. The general chemistry of the water was evaluated through Stiff-type diagrams to determine general water characteristics (see Appendix J). Calcium sulfate is the surface water type at 18_MC1, 18_BE2, and 18_BO2. At 18_BE1, the water is calcium-sodium sulfate and at 18_MC2 it is sodium sulfate. In Agua Chinon Wash, the water is calcium bicarbonate. San Diego Creek water types are sodium chloride at 18_DC1, sodium sulfate at 18_DCAC, calcium-sodium bicarbonate at 18_DCBE.

Field Parameters. Field measured pH, temperature, and electrical conductivity are presented in Table A2-2. The pH readings ranged from 6.8 to 8.7. Ranges between 6 and 9 are not unusual for stormwater. Temperatures ranged from 12.3°C in December to 24°C in March. The range for electrical conductivity, a measure of dissolved salts, was 72 to 1,090 micromhos per centimeter at 25°C. This range is also considered normal for runoff.

A2.4.2 Analytical Results

In general, the surface water contained a limited variety of contaminant compounds at relatively low concentrations. Stream sediment concentrations are slightly higher than surface water concentrations although the overall concentrations are still considered low. Contaminant values detected in the surface water were scattered, with no single station or wash exhibiting a consistent trend. Sediment data exhibit some trends in pesticides and acetone.

For both compounds, higher concentrations were detected upstream of the station than downstream.

To facilitate analysis, surface water and sediment, analytical results are presented in six groups of analytes: VOCs, SVOCs, total fuel hydrocarbons, pesticides/PCBs and herbicides, general chemistry, and metals.

Table A2-1 lists the types of analytes and chemical analyses requested for all samples of surface water, sediments, and angle borings at OU-1.

Detected contaminants are listed (by sampling medium) in Tables A2-3 through A2-5 and summarized in the following sections. Of note, selected VOC and SVOC contaminants are typically found in laboratory blanks: acetone, methylene chloride, bis(2-ethylhexyl)phthalate, and toluene. Laboratory and validation flags are included in each table to help qualify data.

Petroleum Hydrocarbons. Low concentrations of TFH-diesel were detected in the surface waters of Bee Canyon Wash (Table A2-3). Detected concentrations at 18_BE2 are 0.3 mg/L. No TRPH or TFH-gasoline was detected.

TRPH and TFH-gasoline were detected in the sediment samples (see Table A2-4). Low concentrations of TRPH or TFH-gasoline (14 to 15 mg/L and 0.06 to 0.2 mg/L, respectively) were detected in every stream but Borrego Canyon Wash. Of note is a concentration of 16.1 mg/L of 18_AC2. No TFH-diesel was detected in the sediments.

VOCs. Six VOC compounds (acetone, methylene chloride, 1,1,1-trichloroethane, 2-butanone, chloroform, and toluene) were detected in the surface water samples (Table A2-3). Of note, higher concentrations for 2-butanone (13 μg/L), 1,1,1,-trichloroethane (10 μg/L), and chloroform (46 μg/L) were detected at 18_AC2, 18_DCMC and 18_MC1, respectively. Most other detections occurred at 18_MC1, and were low, below 7 μg/L.

Three VOC contaminants were detected in the wash sediments: acetone, methylene chloride, and 2-butanone (see Table A2-4). Of note, acetone, with concentrations ranging from 14 to 66 μg/kg, was detected in all washes except Borrego Canyon Wash. Higher concentrations (ranging from 16 to 66 μg/kg) were detected upstream of the Station on Marshburn, Bee Canyon, and Agua Chinon Washes. Lower concentrations were detected in those washes downstream of the Station. This indicates that acetone-contaminated sediments potentially are being washed down from upstream. Acetone was detected in the surface water, but only at 18_DC1 and 18_DCMC and at low concentrations (4 and 5 μg/L, respectively). (Acetone, methylene chloride, and 2-butanone are demonstrated laboratory contaminants, and they were detected in laboratory blanks.

SVOCs. Three SVOCs compounds, 4-nitrophenol, benzyl butylphthalate, and bis(2-ethylhexyl)phthalate, were detected in the surface water. No SVOCs compounds were detected in the sediments above the contract-required detection limit (CRDL). Bis(2-ethylhexyl)phthalate was detected at 18_AC2 at concentrations of 11 to 24 μg/L. All other concentrations in the surface water are low, ranging from 3 to 5 μg/L. All three SVOCs were detected at Station 18_AC2. Two compounds were detected below the CRDL in the sediment: 4-methylphenol and bis(2-ethylhexyl)phthalate. 4-Methylphenol, at concentrations ranging from 220 to 250 μg/kg, was detected only in San Diego Creek (18_DCBE and 18_DCMC). Bis(2-ethylhexyl)phthalate, at a concentration of 270 μg/kg, was detected at 18_BE2.

Pesticides and Herbicides. Several pesticides were detected in the surface water and sediment. Of note, 4,4'-DDE, 4,4'-DDT, BHC-delta, and endosulfan sulfate were found in both media. Other pesticides, BHC-beta, and gamma chlordane, are detected only in surface water. Pesticide concentrations in the sediments are generally higher upstream of the Station (particularly 18_MC1 and 18_BE1) than downstream of the Station (18_MC2 and 18_BE2). Specifically notable is 4,4'-DDE; concentrations of 34 to 107 μg/kg were detected at 18_MC1 (upstream Marshburn Channel), with lower concentrations (9 to 47 μg/kg) detected immediately downstream of the Station at 18_MC2. In contrast,

pesticide concentrations in the surface water are low, ranging from 0.004 (gamma chlordane) to 0.135 μg/kg (BHC-beta), and no trends were identified from the scattered data. PCBs were not detected.

Herbicides were detected in the sediment but not in the surface water. Herbicides were detected primarily just downstream of the Station (18_MC2 and 18_BE2), with concentrations ranging from 54 μg/kg to 436 μg/kg (dichloroprop).

Metals. No significant concentrations of metals were detected.

General Chemistry. General chemistry analyses were conducted only for the surface water. Selected inorganic parameters were evaluated: nitrates, sulfates, and total dissolved solids (TDS). The concentrations of these inorganics were compared to federal drinking water standards to determine their significance.

A2.5 Angle Borings

A2.5.1 Field Sampling Results

An organic vapor analyzer (OVA) was used to assess the soil vapor headspace of samples collected from angle borings. The OVA readings of 40 ppmv or greater are noted here.

Angle borings on Agua Chinon Wash, 18_ACAB224 and 18_ACAB225, had the highest readings. Boring 18_ACAB224 had readings of 1,000; 110; and 100 ppmv at down-hole depths of 20 feet, 30 feet, and 40 feet, respectively (vertical depths of 17, 26, and 35 feet). Boring 18_ACAB225 had readings of 500, 1,000, and 100 ppmv at the same respective depths. The remaining two angle borings on Agua Chinon Wash had lower readings at similar depths (18_ACAB222, 40 ppmv at 60 feet; down-hole and 18_ACAB223, 32 ppm at 40 feet down-hole). All other readings on other washes were below 35 ppm.

A2.5.2 Subsurface Lithology Beneath Washes

The subsurface geology consists of sands to silty sands intermixed with layers of clays. The angle borings on Borrego Canyon Wash and Marshburn Channel (18_BOAB220 and 18_BOAB221; and 18_MCAB228 and 18_MCAB229, respectively) have the highest amount of most clays, with fat and lean clays and clayey sands comprising the upper 35 feet of depth. The four angle borings on Agua Chinon Wash and two borings on Bee Canyon Wash (18_ACAB222, 18_ACAB223, 18_ACAB224, and 18_ACAB225; and 18_BEAB226 and 18_BEAB227, respectively) indicate that soils are predominantly sands, ranging from poorly graded to silty sands. Of note, particularly in Agua Chinon Wash, high contaminant concentrations (particularly of petroleum hydrocarbons) were detected above and in a layer of sandy clays or silty sands 20 to 40 feet down-hole.

A2.5.3 Analytical Results

Chemical concentrations in the subsurface soils in the angle borings are significantly higher than in either surface water or wash sediments. TFH was the most significant contaminant detected, with concentrations of 131,000 mg/kg of TFH-gasoline detected in Station 18_ACAB223 and 2,270 mg/kg of TFH-diesel detected at 18_ACAB224. Acetone was detected at all washes at concentrations ranging from 9 to 99 μg/kg. A peak acetone concentration of 530 μg/kg was detected at 18_ACAB224. SVOCs detections were isolated in angle borings at Bee Canyon Wash, with peak concentrations of 2-methylnaphthalene and naphthalene of 4,300 and 640 μg/kg, respectively.

Detected contaminants are summarized in Table A2-5 in the following sections.

Petroleum Hydrocarbons. Significant concentrations of both TRPH and TFH were found in Agua Chinon Wash (18_ACAB223, 18_ACAB224, 18_ACAB225, and 18_ACAB226), at depths ranging from 20 to 40 feet down-hole. Of note, is TFH-gasoline with concentrations up to 131,000 mg/kg. Other petroleum hydrocarbons detected beneath the wash are TFH-diesel (15,300 mg/kg) and

TRPH (5,873 mg/kg) at similar depths. Bee Canyon Wash (18_BEAB226) also contains TFH-gasoline and TFH-diesel at 1,260 mg/kg and 1,560 mg/kg, respectively, at a 30-foot depth down-hole.

VOCs. Four VOCs were detected in the angle borings: acetone, methylene chloride, 2-butanone, and toluene. Of note is acetone, which was detected in all washes. As emphasized earlier, acetone, methylene chloride, and 2-butanone are demonstrated laboratory contaminants. In Agua Chinon, acetone concentrations of up to 530 μg/kg were detected at 20 feet down-hole. Toluene was detected at a low concentration of 3 μg/kg in Marshburn Channel.

SVOCs. Six SVOCs were detected: 2-methylnaphthalene, benzyl butylphthalate, bis(2-ethylhexyl)phthalate, dibenzofuran, naphthalene, and phenanthrene. Two SVOC compounds, 2-methylnaphthalene and naphthalene, were detected above sample detection limits at a depth of greater than 26 feet in Bee Canyon Wash, with concentrations ranging from 2,600 to 4,300 μg/kg and from 860 to 1,800 μg/kg, respectively.

Pesticides and PCBs. Four pesticides, 4,4'-DDE, 4,4'-DDT, PCB-1260, and alpha and gamma chlordane were detected above sample detection limits. Of note, PCB-1260 at 39 μg/kg was detected at Station 18_BEAB226 at a depth of 30 feet down-hole. Also of note, 4,4'-DDE, 4,4'-DDT, and 4,4'-DDD were detected at a depth of 5 feet at concentrations of 514, 527, and 757 μg/kg, respectively, in Marshburn Channel (18_MCAB229).

Metals. No significant concentrations of metals were detected.

A2.6 Summary and Conclusions

A2.6.1 Potential Contaminant Migration Pathways

The surface water runoff and sediments contain a limited number of contaminants, at relatively low concentrations. Surface water runoff is a potential pathway for contaminant migration, with contaminants being transported as

suspended sediments or dissolved in the liquid phase. Surface water, infiltrating through the wash subsurface soils, may leach contaminants out of the soils and transport them to the groundwater. Previous investigations have concluded that the unlined portions of Marshburn Channel, Bee Canyon Wash, Agua Chinon Wash, and Borrego Canyon Wash (shown in Figure A2-1) are locations where contaminated water may have percolated through the vadose zone to groundwater (JMM, 1989; JMM, 1990; Work Plan; SAP). Extensive culverting and lining of the creeks have limited infiltration areas (see Figure A2-1 and Subsection A2.1.2).

Cracks and joints in the concrete channels or culverts are also potential pathways, as contaminated water may leak water to the subsurface. Angle borings detected high contaminants in every wash, but particularly high concentrations of hydrocarbons and acetone were found at Agua Chinon Wash (18_ACAB223-225), of SVOCs at Bee Canyon Wash (18_BEAB226-227), and of pesticides at Marshburn Channel (18_MCAB228-229).

A2.6.2 Summary of Contamination in Surface Water, Sediments, and Angle Borings

The detected contaminant levels in both the surface water and sediments are considered low. At these concentrations, it is unlikely that these media are contributing significantly to the groundwater contamination. Higher concentrations detected in the angle borings in the soils beneath the washes are believed to have a greater potential than surface sediments for contributing to groundwater contamination. Contaminants detected in the angle boring soils suggest active downward transport by infiltrating water.

Surface water may be important in contaminant transport. Selected compounds, such as pesticides, have been found at higher concentrations upstream of the Station, indicating that those contaminants may be coming from upstream. Agricultural activities, particularly upstream of Marshburn Channel and Bee Canyon Wash monitoring stations (18_MC1 and 18_BE1, respectively) are potentially a source of the pesticides. Agricultural activities occurring on-Station

are potential sources of herbicides and pesticides. Herbicides in the sediments were detected only just downstream of the Station.

Contamination in the surface water and sediments, particularly in pesticides, was detected more often in Marshburn Channel than in other washes. This channel is along the northwest border of MCAS El Toro and is potentially subject to contamination from both on- and off-Station. In the angle borings, higher contamination was detected in the borings taken at Agua Chinon Wash and Bee Canyon Wash than at other locations. In particular, concentrations of petroleum hydrocarbons (TFH-gasoline up to 131,000 mg/kg) and acetone (530 μg/kg) detected at Agua Chinon Wash and 2-methylnaphthalene (4,300 μg/kg) and naphthalene (1,800 μg/kg) at Bee Canyon Wash could be more significant sources of contamination.

Although various contaminants (mostly petroleum hydrocarbons) were detected in surface water and sediment samples, in particular angle borings, it does not appear that they are contributing to the regional groundwater VOC contamination (OU-1).

Table A2-1
OU-1 (Site 18): Types of Samples and Chemical Analyses
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Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Surface Water															
Agua Chinon Wash															
	18_AC1	S1450051	0	X	X	X	X	X	X	X	X	X			
	18_AC2	ETSW0008	0	X	X	X	X	X	X	X		X			
	18_AC2	ETSW0009	0	X	X	X	X	X	X	X		X			
	18_AC2	ETSW0030	0	X	X	X	X	X	X	X	X	X			
	18_AC2	ETSW0031	0	X	X	X	X	X	X	X	X	X			
	18_AC2	S1450049	0	X	X	X	X	X	X	X	X	X			
Bee Canyon Wash															
	18_BE1	S1450054	0	X	X	X	X	X	X	X	X	X			
	18_BE1	S1450056	0	X	X	X	X	X	X	X	X	X			
	18_BE2	ETSW0006	0	X	X	X	X	X	X	X		X			
	18_BE2	ETSW0007	0	X	X	X	X	X	X	X		X			
	18_BE2	ETSW0028	0	X	X	X	X	X	X	X	X	X			
	18_BE2	ETSW0029	0	X	X	X	X	X	X	X	X	X			
	18_BE2	S1450055	0	X	X	X	X	X	X	X	X	X			
Marshburn Channel															
	18_MC1	ETSW0015	0	X	X	X	X	X	X	X		X			
	18_MC1	ETSW0037	0	X	X	X	X	X	X	X	X	X			
	18_MC1	ETSW0038	0	X	X	X	X	X	X	X	X	X			
	18_MC1	S1450058	0	X	X	X	X	X	X	X	X	X			
	18_MC2	ETSW0005	0	X	X	X	X	X	X	X		X			
	18_MC2	ETSW0027	0	X	X	X	X	X	X	X	X	X			
	18_MC2	S1450060	0	X	X	X	X	X	X	X	X	X			
Borrego Canyon Wash															
	18_B02	ETSW0010	0	X	X	X	X	X	X	X		X			
	18_B02	ETSW0001	0	X	X	X	X	X	X	X	X	X			
	18_B02	S1450053	0	X	X	X	X	X	X	X	X	X			
San Diego Creek															
	18_DC1	ETSW0004	0	X	X	X	X	X	X	X		X			
	18_DC1	ETSW0026	0	X	X	X	X	X	X	X	X	X			

Table A2-1
OU-1 (Site 18): Types of Samples and Chemical Analyses
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Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
	18_DC1	S1450057	0	X	X	X	X	X	X	X	X	X			
	18_DCAC	ETSW0003	0	X	X	X	X	X	X	X		X			
	18_DCAC	ETSW0025	0	X	X	X	X	X	X	X	X	X			
	18_DCAC	S1450050	0	X	X	X	X	X	X	X	X	X			
	18_DCBE	ETSW0002	0	X	X	X	X	X	X	X	X	X			
	18_DCBE	ETSW0024	0	X	X	X	X	X	X	X	X	X			
	18_DCBE	S1450048	0	X	X	X	X	X	X	X	X	X			
	18_DCMC	ETSW0001	0	X	X	X	X	X	X	X		X			
	18_DCMC	ETSW0023	0	X	X	X	X	X	X	X	X	X			
	18_DCMC	S1450059	0	X	X	X	X	X	X	X	X	X			
Sediments															
Agua Chinon Wash															
	18-AC1	S1451041	0	X	X	X	X	X	X	X					
	18-AC1	S1451042	2	X	X	X	X	X	X	X					
	18-AC1	S1451043	4	X	X	X	X	X	X	X					
	18-AC2	S1451050	0	X	X	X	X	X	X	X					
	18-AC2	S1451051	2	X	X	X	X	X	X	X					
Bee Canyon Wash															
	18-BE1	S1451038	0	X	X	X	X	X	X	X					
	18-BE1	S1451039	2	X	X	X	X	X	X	X					
	18-BE1	S1451040	4	X	X	X	X	X	X	X					
	18-BE2	S1451047	0	X	X	X	X	X	X	X					
	18-BE2	S1451048	2	X	X	X	X	X	X	X					
Marshburn Channel															
	18-MC1	S1451035	0	X	X	X	X	X	X	X					
	18-MC1	S1451036	2	X	X	X	X	X	X	X					
	18-MC1	S1451037	4	X	X	X	X	X	X	X					
	18-MC2	S1451044	0	X	X	X	X	X	X	X					
	18-MC2	S1451045	2	X	X	X	X	X	X	X					
Borrego Canyon Wash															
	18-BO2	S1451053	0	X	X	X	X	X	X	X					

Table A2-1
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Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
	18-DC1	S1451065	0	X	X	X	X	X	X	X					
	18-DC1	S1451066	2	X	X	X	X	X	X	X					
	18_DC1	S1451069	2	X	X	X	X	X	X	X					
	18-DCAC	S1451062	0	X	X	X	X	X	X	X					
	18_DCAC	S1451063	2	X	X	X	X	X	X	X					
	18-DCBE	S1451059	0	X	X	X	X	X	X	X					
	18-DCBE	S1451060	2	X	X	X	X	X	X	X					
	18-DCBE	S1451061	4	X	X	X	X	X	X	X					
	18-DCMC	S1451056	0	X	X	X	X	X	X	X					
	18-DCMC	S1451057	2	X	X	X	X	X	X	X					
Angle Borings															
Agua Chinon Wash															
	18_ACAB222	S1456416	10	X	X	X		X	X	X					
	18_ACAB222	S1456417	20	X	X	X		X	X	X					
	18_ACAB222	S1456418	30	X	X	X		X	X	X					
	18_ACAB222	S1456418D	30	X	X	X		X	X	X					
	18_ACAB222	S1456419	40	X	X	X		X	X	X					
	18_ACAB222	S1456420	50	X	X	X		X	X	X					
	18_ACAB222	S1456421	60	X	X	X		X	X	X					
	18_ACAB222	S1456592	10	X	X	X		X	X	X					
	18_ACAB223	S1456593	20	X	X	X		X	X	X					
	18_ACAB223	S1456594	30	X	X	X		X	X	X					
	18_ACAB223	S1456595	40	X	X	X		X	X	X					
	18_ACAB223	S1456956	50	X	X	X		X	X	X					
	18_ACAB223	S1456597	60	X	X	X		X	X	X					
	18_ACAB224	S1456584	10	X	X	X		X	X	X					
	18_ACAB224	S1456585	20	X	X	X		X	X	X					
	18_ACAB224	S1456586	30	X	X	X		X	X	X					
	18_ACAB224	S1456587	40	X	X	X		X	X	X					
	18_ACAB224	S1456588	50	X	X	X		X	X	X					
	18_ACAB224	S1456589	60	X	X	X		X	X	X					

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Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
	18_ACAB225	S1456416	10	X	X	X		X	X	X					
	18_ACAB225	S1456668	20	X	X	X		X	X	X					
	18_ACAB225	S1456689	30	X	X	X		X	X	X					
	18_ACAB225	S1456674	30	X	X	X		X	X	X					
	18_ACAB225	S1456670	40	X	X	X		X	X	X					
	18_ACAB225	S1456671	50	X	X	X		X	X	X					
	18_ACAB225	S1456672	60	X	X	X		X	X	X					
Bee Canyon Wash															
	18_BEAB226	S1456616	10	X	X	X		X	X	X					
	18_BEAB226	S1456617	20	X	X	X		X	X	X					
	18_BEAB226	S1456618	30	X	X	X		X	X	X					
	18_BEAB226	S1456619	40	X	X	X		X	X	X					
	18_BEAB226	S1456620	50	X	X	X		X	X	X					
	18_BEAB226	S1456622	60	X	X	X		X	X	X					
	18_BEAB227	S1456601	10	X	X	X		X	X	X					
	18_BEAB227	S1456602	20	X	X	X		X	X	X					
	18_BEAB227	S1456603	30	X	X	X		X	X	X					
	18_BEAB227	S1456604	40	X	X	X		X	X	X					
	18_BEAB227	S1456605	50	X	X	X		X	X	X					
	18_BEAB227	S1456606	50	X	X	X		X	X	X					
	18_BEAB227	S1456607	60	X	X	X		X	X	X					
Marshburn Channel															
	18_MCAB228	S1456509	10	X	X	X		X	X	X					
	18_MCAB228	S1456510	20	X	X	X		X	X	X					
	18_MCAB228	S1456511	30	X	X	X		X	X	X					
	18_MCAB228	S1456512	40	X	X	X		X	X	X					
	18_MCAB228	S1456708	40	X	X	X		X	X	X					
	18_MCAB228	S1456513	50	X	X	X		X	X	X					
	18_MCAB228	S1456514	60	X	X	X		X	X	X					
	18_MCAB229	S1456503	10	X	X	X		X	X	X					
	18_MCAB229	S1456504	20	X	X	X		X	X	X					

Table A2-1
OU-1 (Site 18): Types of Samples and Chemical Analyses
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Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
	18_MCAB229	S1456505	30	X	X	X		X	X	X					
	18_MCAB229	S1456701	30	X	X	X		X	X	X					
	18_MCAB229	S1456506	40	X	X	X		X	X	X					
	18_MCAB229	S1456507	50	X	X	X		X	X	X					
	18_MCAB229	S1456508	60	X	X	X		X	X	X					
Borrego Canyon Wash															
	18_BOAB220	S1456431	10	X	X	X		X	X	X					
	18_BOAB220	S1456432	20	X	X	X		X	X	X					
	18_BOAB220	S1456433	30	X	X	X		X	X	X					
	18_BOAB220	S1456678	30	X	X	X		X	X	X					
	18_BOAB220	S1456434	40	X	X	X		X	X	X					
	18_BOAB220	S1456435	50	X	X	X		X	X	X					
	18_BOAB220	S1456436	60	X	X	X		X	X	X					
	18_BOAB221	S145670101	10	X	X	X		X	X	X					
	18_BOAB221	S1456702	20	X	X	X		X	X	X					
	18_BOAB221	S1456703	30	X	X	X		X	X	X					
	18_BOAB221	S145670801	40	X	X	X		X	X	X					
	18_BOAB221	S1456705	50	X	X	X		X	X	X					
	18_BOAB221	S1456706	60	X	X	X		X	X	X					

[a]VOCs = Volatile Organic Compounds; Semi-VOCs = Semivolatile Organic Compounds; PCBs = Polychlorinated Biphenyls; TPH = Total Recoverable Petroleum Hydrocarbons; TFH = Total Fuel Hydrocarbons; TCN = Total Cyanide; TOC = Total Organic Carbon.
[b]Duplicate

Table A2-2
Site 18 (OU-1) Summary of Field Parameters for Surface Water Samples
MCAS El Toro Phase I RI Technical Memorandum

Station ID	Sample # ETSW00__	Physical Parameters pH	Temp. C	Cond. umhos/cm	Flow cfs	Comments
Event 1 Data - March 2, 1992						
18_DCMC	1	8.45	14.3	260	223	Foam on water.
18-DCBE	2	8.39	15.2	230	128	
18_DCAC	3	8.67	15.7	210	270	
18_DC1	4	6.95	15.7	390		
18_MC2	5	7.75	18.0	700	25	
18_BE2	6	7.70	15.3	72	54	Oily sheen, kerosene smell
18_AC2	8	8.54	15.5	128		
18_BO2	10	8.40	15.9	165		
18_MC1	15	6.82	14.2	1090	10	
18_BE1						
18_AC1						
Event 2 Data - March 27, 1992						
18_DCMC	23	7.87	16.3	750		
18-DCBE	24	8.30	19.3	500		
18_DCAC	25	7.70		800		
18_DC1	26	7.94	18.1	825		
18_MC2	27	8.16	16.9	395	70	Very turbid.
18_BE2	28	7.95	19.8	150	3	Very turbid.
18_AC2	30	8.30	19.0	101		
18_BO2	32	7.95	24.0	282	3	
18_MC1	37	8.00	19.0	880	4	
18_BE1						
18_AC1						
Event 3 Data - December 7, 1992						
18_DCMC	S1450059	8.42	13.0	200	3400	
18-DCBE	S1450048	8.02	13.0	230	1000	
18_DCAC	S1450050				400	
18_DC1	S1450057	7.43	13.5	320		
18_MC2	S1450060	7.87	13.5	330	23	
18_BE2	S1450055	8.05	12.9	97	130	
18_AC2	S1450049	7.94	13.5	62	160	Strong petroleum odor.
18_BO2	S1450053	8.33	12.5	382	16	
18_MC1	S1450058	8.66	12.3	340	40	
18_BE1	S1450056	8.21	12.8	254	13	
18_AC1	S1450051	8.29	13.1	242	5	

Table A2-3

OU- 1 (Site18): Summary of Detected Chemicals in Surface Runoff Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	18_AC1 S1450051	DVF(a)	18_AC1R ETSW0022	DVF(a)	18_AC2 ETSW0008	DVF(a)	18_AC2 ETSW0009	DVF(a)	18_AC2 ETSW0030	DVF(a)	18_AC2 ETSW0031	DVF(a)	18_AC2 S1450049	DVF(a)	18_AC2 S1450052	DVF(a)
GENERAL CHEMISTRY																	
ALKALINITY AS CACO3	MG/L	62		1		46		42		-		-		28		30	
BICARBONATE	MG/L	76		1		56		51		-		-		34		36	
CARBONATE	MG/L	-		-		-		-		-		-		-		-	
CHLORIDE	MG/L	16.8		0.013		5.95		22		-		-		3.74		3.62	
SULFATE	MG/L	53.1		0.021		21.9		22		-		-		11.8		12	
TOTAL DISSOLVED SOLIDS	MG/L	455		3		127		123		-		-		133		144	
NITRATE/NITRITE-N	MG/L	4.76		-		-		-		-		-		0.93		0.96	
METALS																	
ALUMINUM	UG/L	431		-		-		-		116	U	120	U	182	b	444	
ARSENIC	UG/L	3	b	-		-		-		1.6	U	2	U	2	U	1	U
BARIUM	UG/L	113	b	-		-		-		63.2	b	76.8	b	20.6	b	64.9	b
CADMIUM	UG/L	4	b	-		-		-		2.4	b	2.2	b	3.6	b	3	U
CALCIUM	UG/L	27100		-		-		-		8950		8880		9860		10400	
CHROMIUM	UG/L	2.9	U	-		-		-		3.2	U	3.2	U	2.9	U	2.9	U
COPPER	UG/L	15.4	b	-		-		-		6.8	U	7.4	U	8	b	14.6	b
IRON	UG/L	369		-		-		-		116	U	123	U	179		262	
LEAD	UG/L	1.4	U	-		-		-		2.6	b	2.8	b	1.4	U	1.4	U
MAGNESIUM	UG/L	7610		-		-		-		1550	b	1520	b	2220	b	2320	b
MANGANESE	UG/L	14.6	b	-		-		-		3	b	3	b	2.7	b	4	b
MERCURY	UG/L	0.13	U	-		-		-		0.1	U	0.1	U	0.12	U	0.17	U
NICKEL	UG/L	5.3	U	-		-		-		9.3	U	9.3	U	5.3	U	5.3	U
POTASSIUM	UG/L	4100	b	-		-		-		2240	b	2050	b	3470	b	3050	b
SODIUM	UG/L	19100		-		-		-		5480		5540		5330		6470	
VANADIUM	UG/L	10.5	b	-		-		-		3.3	U	4.2	U	3.2	b	2.9	b
ZINC	UG/L	26.4		-		-		-		44		47.9		13.3	b	30.6	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/L	1	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U
CARBON TETRACHLORIDE	UG/L	1	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U
ACETONE	UG/L	2	U	10	U	19	U	20	U	32	U	25	U	2	U	2	U
CHLOROFORM	UG/L	1	U	8	J	10	U	10	U	10	U	10	U	1	U	1	U
CHLOROMETHANE (METHYL CHLORI	UG/L	3		10	U	10	U	10	U	10	U	10	U	0.6	J	2	J
2-BUTANONE	UG/L	2	U	10	U	10	U	13		10	U	10	U	2	U	2	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	4	J	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	3	J	10	U	10	U	10	U	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	10	U	24		11		10	U	10	U	10	U	10	U
4-NITROPHENOL	UG/L	25	U	25	U	25	U	25	U	5	J	25	U	25	U	25	U
PESTICIDES AND PCBs																	
4,4'-DDE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
GAMMA-CHLORDANE	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
BHC-DELTA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
4,4'-DDT	UG/L	0.014		0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
BHC-BETA	UG/L	0.05	U	0.05	U	0.086	P	0.135		0.05	U	0.05	U	0.05	U	0.05	U
ENDOSULFAN SULFATE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	UG/L	457		-		-		-		-		-		250	U	250	U

Table A2-3

OU- 1 (Site18): Summary of Detected Chemicals in Surface Runoff Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	18_BE1 S1450054	DVF(a)	18_BE2 ETSW0006	DVF(a)	18_BE2 ETSW0007	DVF(a)	18_BE2 ETSW0028	DVF(a)	18_BE2 ETSW0029	DVF(a)	18_BE2 S1450055	DVF(a)	18_BE2 S1450056	DVF(a)	18_BO2 ETSW0010	DVF(a)
GENERAL CHEMISTRY																	
ALKALINITY AS CACO3	MG/L	90		-		29		-		-		25		30		34	
BICARBONATE	MG/L	109		-		35		-		-		30		36		41	
CARBONATE	MG/L	-		-		-		-		-		-		-		-	
CHLORIDE	MG/L	40.4		-		1.86		-		-		3.34		4.26		11	
SULFATE	MG/L	123		-		6.54		-		-		11		13.6		26	
TOTAL DISSOLVED SOLIDS	MG/L	405		-		67		-		-		160		190		167	
NITRATE/NITRITE-N	MG/L	4.33		-		-		-		-		0.87		1.01		-	
METALS																	
ALUMINUM	UG/L	661		-		-		77.6	U	55.9	U	438		876		-	
ARSENIC	UG/L	8.3	b	-		-		3.1	U	3.3	U	1.7	b	2.1	b	-	
BARIUM	UG/L	111	b	-		-		106	b	80.5	b	66.1	b	77.8	b	-	
CADMIUM	UG/L	3	U	-		-		1.6	U	1.6	U	3	U	3	U	-	
CALCIUM	UG/L	23200		-		-		19800		19800		8150		8490		-	
CHROMIUM	UG/L	6	b	-		-		3.2	U	3.2	U	2.9	U	2.9	U	-	
COPPER	UG/L	11.4	b	-		-		590		5.3	U	10.6	b	8.9	b	-	
IRON	UG/L	564		-		-		91.3	U	41	U	435		645		-	
LEAD	UG/L	1.4	U	-		-		0.8	b	1	b	1.4	U	1.4	U	-	
MAGNESIUM	UG/L	7870		-		-		3690	b	3700	b	1990	b	2440	b	-	
MANGANESE	UG/L	18.9		-		-		2.1	b	0.9	U	5.8	b	8.6	b	-	
MERCURY	UG/L	0.1	U	-		-		0.1	U	0.1	U	0.15	U	0.11	U	-	
NICKEL	UG/L	8.4	b	-		-		9.3	U	9.3	U	7.5	b	5.3	U	-	
POTASSIUM	UG/L	6370		-		-		2400	b	2290	b	3970	b	5270		-	
SODIUM	UG/L	25700		-		-		12900		12800		5210		6530		-	
VANADIUM	UG/L	8.6	b	-		-		13.4	b	12.9	b	2.9	b	5.7	b	-	
ZINC	UG/L	23.1		-		-		248		5.2	U	26.4		24.2		-	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/L	1	U	10	U	10	U	-		-		1	U	1	U	10	U
CARBON TETRACHLORIDE	UG/L	1	U	10	U	10	U	-		-		1	U	1		10	U
ACETONE	UG/L	2	U	23	U	21	U	-		-		2	U	5		20	U
CHLOROFORM	UG/L	1	U	10	U	10	U	-		-		1	U	1	U	10	U
CHLOROMETHANE (METHYL CHLORI	UG/L	4		10	U	10	U	-		-		2	U	2	U	10	U
2-BUTANONE	UG/L	2	U	10	U	10	U	-		-		2	U	2	U	10	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	3	J	3	J	10	U	10	U	10	U	11		10	U
4-NITROPHENOL	UG/L	25	U	25	U	25	U	5	J	25	U	25	U	25	U	25	U
PESTICIDES AND PCBs																	
4,4'-DDE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
GAMMA-CHLORDANE	UG/L	0.015		0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
BHC-DELTA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
4,4'-DDT	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
BHC-BETA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
ENDOSULFAN SULFATE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	UG/L	250	U	-		-		-		-		319		250	U	-	

Table A2-3

OU- 1 (Site18): Summary of Detected Chemicals in Surface Runoff Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	18_BO2 ETSW0032	DVF(a)	18_BO2 S1450053	DVF(a)	18_DC1 ETSW0004	DVF(a)	18_DC1 ETSW0026	DVF(a)	18_DC1 S1450057	DVF(a)	18_DCAC ETSW0003	DVF(a)	18_DCAC ETSW0025	DVF(a)	18_DCAC S1450050	DVF(a)
GENERAL CHEMISTRY																	
ALKALINITY AS CACO3	MG/L	-		63		64		-		48		56		-		51	
BICARBONATE	MG/L	-		77		78		-		58		68		-		62	
CARBONATE	MG/L	-		-		-		-		-		-		-		-	
CHLORIDE	MG/L	-		32.6		24.5		-		60.9		22.9		-		25.3	
SULFATE	MG/L	-		112		32.7		-		70		31.1		-		85.3	
TOTAL DISSOLVED SOLIDS	MG/L	-		429		255		-		458		244		-		391	
NITRATE/NITRITE-N	MG/L	-		2.86		-		-		1.6		-		-		2.79	
METALS																	
ALUMINUM	UG/L	90.8	U	240		-		36.6	U	492		-		54.2	U	221	
ARSENIC	UG/L	3	U	4.1	U	-		4.1	b	2.3	b	-		4.3	b	2.7	b
BARIUM	UG/L	89.1	b	92.7	b	-		131	b	88	b	-		142	b	96.4	b
CADMIUM	UG/L	1.6	U	3.2	b	-		1.6	U	3	U	-		1.6	U	3	U
CALCIUM	UG/L	26100		39300		-		71300		30100		-		68900		32400	
CHROMIUM	UG/L	3.2	U	2.9	U	-		3.2	U	2.9	U	-		3.2	U	2.9	U
COPPER	UG/L	9.8	U	6.3	b	-		3.4	U	6.9	b	-		3.4	U	7.7	b
IRON	UG/L	82.8	b	244		-		28.2	U	558		-		37.8	U	234	
LEAD	UG/L	1.9	b	1.4	U	-		0.9	b	1.4	U	-		0.9	b	1.4	U
MAGNESIUM	UG/L	6470		8710		-		21500		8610		-		20300		7270	
MANGANESE	UG/L	8.6	b	8.7	b	-		152		30.1		-		127		6.6	b
MERCURY	UG/L	0.1	U	0.12	U	-		0.1	U	0.15	U	-		0.1	U	0.16	U
NICKEL	UG/L	11.3	b	5.3	U	-		11.3	b	5.3	U	-		13.1	b	11.4	b
POTASSIUM	UG/L	3160	b	3900	b	-		3510	b	4310	b	-		3550	b	3780	b
SODIUM	UG/L	27800		34500		-		90400		42500		-		85300		28200	
VANADIUM	UG/L	8.8	b	6.7	b	-		7.9	b	5.5	b	-		8.4	b	6.5	b
ZINC	UG/L	71.2		20.1		-		18.1	b	24.1		-		19	b	22.7	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/L	10	U	1	U	10	U	10	U	1	U	10	U	10	U	1	U
CARBON TETRACHLORIDE	UG/L	10	U	1	U	10	U	10	U	1	U	10	U	10	U	1	U
ACETONE	UG/L	50	U	2	U	15	U	10	U	4		22	U	27	U	2	U
CHLOROFORM	UG/L	10	U	1	U	10	U	10	U	1	U	10	U	10	U	1	U
CHLOROMETHANE (METHYL CHLORI	UG/L	10	U	2	J	10	U	10	U	2	U	10	U	10	U	0.7	J
2-BUTANONE	UG/L	10	U	2	U	10	U	10	U	2	U	12	U	10	U	2	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-NITROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U
PESTICIDES AND PCBs																	
4,4'-DDE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
GAMMA-CHLORDANE	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
BHC-DELTA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
4,4'-DDT	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
BHC-BETA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
ENDOSULFAN SULFATE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	UG/L	-		250	U	-		-		250	U	-		-		250	U

Table A2-3

OU- 1 (Site18): Summary of Detected Chemicals in Surface Runoff Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	18_DCBE ETSW0002	DVF(a)	18_DCBE ETSW0024	DVF(a)	18_DCBE S1450048	DVF(a)	18_DCMC ETSW0001	DVF(a)	18_DCMC ETSW0023	DVF(a)	18_DCMC S1450059	DVF(a)	18_MC1 ETSW0015	DVF(a)	18_MC1 ETSW0037	DVF(a)
GENERAL CHEMISTRY																	
ALKALINITY AS CACO3	MG/L	62		-		76		45		-		48		22		-	
BICARBONATE	MG/L	76		-		93		55		-		58		27		-	
CARBONATE	MG/L	-		-		-		-		-		-		-		-	
CHLORIDE	MG/L	29		-		28.5		36.2		-		23.6		68.5		-	
SULFATE	MG/L	39.7		-		51.5		75.2		-		55.2		184		-	
TOTAL DISSOLVED SOLIDS	MG/L	242		-		344		386		-		423		682		-	
NITRATE/NITRITE-N	MG/L	-		-		1.71		-		-		1.82		-		-	
METALS																	
ALUMINUM	UG/L	-		48.9	U	349		-		-		672		-		772	
ARSENIC	UG/L	-		3	U	2.6	U	-		-		3.6	U	-		6.5	
BARIUM	UG/L	-		106	b	68.9	b	-		-		99.6	b	-		174	b
CADMIUM	UG/L	-		1.6	U	3	U	-		-		3	U	-		1.6	U
CALCIUM	UG/L	-		36000		22300		-		-		22200		-		68300	
CHROMIUM	UG/L	-		9.8	U	2.9	U	-		-		2.9	U	-		3.2	U
COPPER	UG/L	-		4.5	U	4.9	b	-		-		7.1	b	-		20.8	b
IRON	UG/L	-		70.5	U	394		-		-		538		-		417	
LEAD	UG/L	-		1.3	b	1.4	U	-		-		1.4	U	-		6.7	
MAGNESIUM	UG/L	-		10200		5470		-		-		5980		-		25000	
MANGANESE	UG/L	-		27.8		13.8	b	-		-		6.9	b	-		232	
MERCURY	UG/L	-		0.1	U	0.15	U	-		-		0.11	U	-		0.1	U
NICKEL	UG/L	-		21.7	b	5.3	U	-		-		5.3	U	-		9.3	U
POTASSIUM	UG/L	-		2490	b	2970	b	-		-		2950	b	-		21200	
SODIUM	UG/L	-		42800		24300		-		-		22500		-		69200	
VANADIUM	UG/L	-		5.3	U	4	b	-		-		5.2	b	-		9.2	b
ZINC	UG/L	-		22.87		17.6	b	-		-		19.9	b	-		63	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/L	10	U	10	U	1	U	10	U	10	U	1	U	10	U	10	U
CARBON TETRACHLORIDE	UG/L	10	U	10	U	1	U	10	U	10	U	1	U	10	U	10	U
ACETONE	UG/L	72	U	26	U	2	U	15	U	21	U	5		16	U	15	U
CHLOROFORM	UG/L	10	U	10	U	1	U	10	U	10	U	1	U	10	U	10	U
CHLOROMETHANE (METHYL CHLORI	UG/L	10	U	10	U	0.7	J	10	U	10	U	1	J	10	U	10	U
2-BUTANONE	UG/L	10	U	14	U	2	U	10	U	10	U	2	U	10	U	10	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	3	J	10	U	10	U	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-NITROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U
PESTICIDES AND PCBs																	
4,4'-DDE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
GAMMA-CHLORDANE	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
BHC-DELTA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
4,4'-DDT	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.119	
BHC-BETA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
ENDOSULFAN SULFATE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.112	P	0.1	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	UG/L	-		-		250	U	-		-		500	U	-		-	

Table A2-3

OU- 1 (Site18): Summary of Detected Chemicals in Surface Runoff Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	18_MC1 ETSW0038	DVF(a)	18_MC1 S1450058	DVF(a)	18_MC1R ETSW0016	DVF(a)	18_MC2 ETSW0005	DVF(a)	18_MC2 ETSW0027	DVF(a)	18_MC2 S1450060	DVF(a)				
GENERAL CHEMISTRY																	
ALKALINITY AS CACO3	MG/L	-		40		2		27		-		38					
BICARBONATE	MG/L	-		48		2		33		-		46					
CARBONATE	MG/L	-		-		-		-		-		-					
CHLORIDE	MG/L	-		25.2		0.013		53.6		-		24.8					
SULFATE	MG/L	-		93		0.021		138		-		89.4					
TOTAL DISSOLVED SOLIDS	MG/L	-		364		3		576		-		358					
NITRATE/NITRITE-N	MG/L	-		6.34		-		-		-		6.21					
METALS																	
ALUMINUM	UG/L	12.5	U	447		-		-		45	U	251					
ARSENIC	UG/L	1.2	U	3.9	b	-		-		4.3	b	5.7	U				
BARIUM	UG/L	16.1	U	102	b	-		-		115	b	76.9	b				
CADMIUM	UG/L	1.6	U	3	U	-		-		1.6	U	3	U				
CALCIUM	UG/L	165	U	31300		-		-		58700		29500					
CHROMIUM	UG/L	3.2	U	2.9	U	-		-		3.2	U	2.9	U				
COPPER	UG/L	0.9	U	23.2	b	-		-		6.8	U	14.3	b				
IRON	UG/L	18.8	U	723		-		-		34.5	U	327					
LEAD	UG/L	0.7	U	1.4	U	-		-		0.7	U	1.4	U				
MAGNESIUM	UG/L	16.9	U	11000		-		-		21200		10700					
MANGANESE	UG/L	0.9	U	27.1		-		-		17.5		54.8					
MERCURY	UG/L	0.1	U	0.08	U	-		-		0.1	U	0.93					
NICKEL	UG/L	9.3	U	5.3	U	-		-		9.3	U	5.3	U				
POTASSIUM	UG/L	250	U	9210		-		-		6900		11700					
SODIUM	UG/L	503	b	26200		-		-		725100		26600					
VANADIUM	UG/L	1.2	U	3.4	b	-		-		6.3	U	4.2	b				
ZINC	UG/L	15.5	b	36.6		-		-		8.2	U	38.1					
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/L	10	U	0.7	J	10	U	10	U	10	U	1	U				
CARBON TETRACHLORIDE	UG/L	10	U	1	U	10	U	10	U	10	U	1	U				
ACETONE	UG/L	18	U	7		11	U	17	U	24	U	2	U				
CHLOROFORM	UG/L	46		1	U	8	J	10	U	10	U	1	U				
CHLOROMETHANE (METHYL CHLORI	UG/L	10	U	2	J	10	U	10	U	10	U	2	U				
2-BUTANONE	UG/L	10	U	2	U	10	U	10	U	10	U	2	U				
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U				
BENZYL BUTYL PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U				
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	10	U	10	U	10	U	10	U	10	U				
4-NITROPHENOL	UG/L	25	U	25	U	25	U	25	U	25	U	25	U				
PESTICIDES AND PCBs																	
4,4'-DDE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.034					
GAMMA-CHLORDANE	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.004					
BHC-DELTA	UG/L	0.05	U	0.05	U	0.05	U	0.051	P	0.05	U	0.05	U				
4,4'-DDT	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U				
BHC-BETA	UG/L	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U				
ENDOSULFAN SULFATE	UG/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U				
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	UG/L	-		250	U	-		-		-		250	U				

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Table A2-4

OU- 1 (Site18): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_AC1 S1451041 (0)	DVF(a)	18_AC1 S1451042 (2)	DVF(a)	18_AC1 S1451043 (4)	DVF(a)	18_AC2 S1451050 (0)	DVF(a)	18_AC2 S1451051 (2)	DVF(a)	18_BE1 S1451038 (0)	DVF(a)	18_BE1 S1451039 (2)	DVF(a)	18_BE1 S1451040 (4)	DVF(a)
METALS																	
SILVER	MG/KG	0.44	U	0.43	U	0.45	U	0.53	U	0.58	U	0.47	U	0.98	b	0.51	U
ALUMINUM	MG/KG	1810		2020		3840		1510		1280		1670		13100		5910	
ARSENIC	MG/KG	0.39	b	0.37	b	1.1	b	0.84	b	1	b	1.3	b	5.9		3.9	
BARIUM	MG/KG	22.8	b	72.8		94.9		21.6	b	37.4	b	36.8	b	190		92.6	
BERYLLIUM	MG/KG	0.1	U	0.1	U	0.52	U	0.13	U	0.14	U	0.11	U	0.62	b	0.37	U
CALCIUM	MG/KG	1320		2560		1760		2080		1860		4980		7590		4190	
CADMIUM	MG/KG	0.25	U	0.95	b	0.61	b	0.32	b	0.33	U	0.42	b	3.5		1.9	
COBALT	MG/KG	1.2	U	1.2	U	2.1	b	1.6	b	1.6	U	1.3	U	6.2	b	5.2	b
CHROMIUM	MG/KG	2.7		10.2		4.3		2.5	b	2.1	b	2.2		17.5		7.1	
COPPER	MG/KG	0.95	b	4	b	3.3	b	1.9	b	3.5	b	2	b	15.9		7.8	
IRON	MG/KG	2550		4700		5500		2440		2650		2630		20200		9680	
MERCURY	MG/KG	0.04	U	0.04	U	0.04	U	0.23		0.26		0.04	U	0.12	U	0.04	U
POTASSIUM	MG/KG	686	b	592	U	1170		691	b	523	b	653	U	5690		3210	
MAGNESIUM	MG/KG	969	b	1380		1580		920	b	867	b	932	b	7890		4140	
MANGANESE	MG/KG	65.5		124		127		51.3		64.6		64.5		380		238	
SODIUM	MG/KG	124	b	153	b	171	b	173	U	251	b	161	b	443	b	322	b
NICKEL	MG/KG	2.1	b	6.1	b	5.7	b	1.9	U	2.2	b	1.7	U	19.9		10.1	
LEAD	MG/KG	0.95		0.72		1.1		1.4		4.6		2.3		12.1		3	
ANTIMONY	MG/KG	2.5	U	2.5	U	2.6	U	3.1	U	3.3	U	2.7	U	3.2	U	3	U
SELENIUM	MG/KG	0.1	U	0.1	U	0.15	U	0.13	U	0.14	U	0.11	U	0.37	b	0.47	U
THALLIUM	MG/KG	0.15	U	0.14	U	0.15	U	0.18	U	0.19	U	0.16	U	0.21	U	0.42	b
VANADIUM	MG/KG	8.2	b	10.8		15.4		6	b	7.3	b	8.1	b	48.2		23.9	
ZINC	MG/KG	12.8		13.4		15.5		13.1		12.7		11.1		88		37.8	
VOLATILE ORGANIC COMPOUNDS																	
ACETONE	UG/KG	18		29		44		12	U	11	U	29		29		66	
METHYLENE CHLORIDE	UG/KG	33	U	53	B	45	U	19	U	11	U	47	B	35	U	51	U
2-BUTANONE	UG/KG	10	U	10	U	11	U	12	U	11	U	11	U	12	U	12	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
4-METHYLPHENOL	UG/KG	680	U	690	U	690	U	820	U	750	U	740	U	780	U	800	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	680	U	690	U	690	U	820	U	750	U	740	U	780	U	800	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.35	U	4.95	U	-	UJR	4.08	U	3.73	U	3.64	U	3.9	U	-	UJR
BHC-DELTA	UG/KG	1.73	U	2.55	U	-	UJR	2.1	U	1.92	U	1.87	U	2.01	U	-	UJR
4,4'-DDT	UG/KG	3.35	U	4.95	U	-	UJR	4.08	U	3.73	U	3.64	U	33.5		-	UJR
4,4'-DDE	UG/KG	3.35	U	4.95	U	-	UJR	4.08	U	3.73	U	3.64	U	118	D	-	UJR
HERBICIDES																	
DICHLOROPROP	UG/KG	102	UJ	104	UJ	-		124	UJ	113	U	109	U	116	U	-	
DALAPON	UG/KG	50.8	U	52.2	U	-		62.1	U	56.6	U	54.6	U	58	U	-	
2,4,5-TP (SILVEX)	UG/KG	25.4	U	26.1	U	-		31	U	28.3	U	27.3	U	29	U	-	
2,4-DB	UG/KG	107		52.2	U	-		62.1	U	56.6	U	54.6	U	58	U	-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.051	U	0.052	U	0.053	U	0.062	U	16.1		0.056	U	0.059	U	0.061	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Table A2-4

OU- 1 (Site18): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_BE2 S1451047 (0)	DVF(a)	18_BE2 S1451048 (2)	DVF(a)	18_BO2 S1451053 (0)	DVF(a)	18_DC1 S1451065 (0)	DVF(a)	18_DC1 S1451066 (2)	DVF(a)	18_DC1 S1451069 (2)	DVF(a)	18_DCAC S1451062 (0)	DVF(a)	18_DCAC S1451063 (2)	DVF(a)
METALS																	
SILVER	MG/KG	0.53	U	0.5	U	0.52	U	0.58	U	0.56	U	-		0.57	U	0.58	U
ALUMINUM	MG/KG	1920		1310		1020		742		824		-		1390		1610	
ARSENIC	MG/KG	2.6		1.4	b	0.57	U	0.33	U	0.32	U	-		1.1	b	0.6	U
BARIUM	MG/KG	30.6	b	25	b	13.6	b	8.5	b	11.1	b	-		25.4	b	16.4	b
BERYLLIUM	MG/KG	0.13	U	0.12	U	0.12	U	0.22	U	0.21	U	-		0.14	U	0.14	U
CALCIUM	MG/KG	3210		2890		1230	b	973	b	722	b	-		2470		1470	
CADMIUM	MG/KG	0.64	b	0.35	b	0.3	U	0.35	b	0.32	U	-		0.33	U	0.33	U
COBALT	MG/KG	1.9	b	1.9	b	1.4	U	1.6	U	1.5	U	-		1.8	b	1.6	U
CHROMIUM	MG/KG	2.8		2.7		1.6	b	1.9	b	2.1	b	-		1.7	b	1.8	b
COPPER	MG/KG	6.8		1.8	b	1.5	U	1.4	b	1.4	b	-		1.4	b	1.1	b
IRON	MG/KG	3420		2290		1720		1380		1470		-		2300		2230	
MERCURY	MG/KG	0.22		0.19		0.16		0.29		0.31		-		0.35		0.04	U
POTASSIUM	MG/KG	809	b	505	b	343	b	254	b	318	b	-		502	b	475	b
MAGNESIUM	MG/KG	1160	b	715	b	500	b	378	b	310	b	-		691	b	648	b
MANGANESE	MG/KG	52.7		47.8		62.8		58.2		39.9		-		180		58.2	
SODIUM	MG/KG	177	U	148	U	134	U	308	b	249	b	-		290	b	237	b
NICKEL	MG/KG	2.2	b	2	b	1.9	U	2.1	U	2	U	-		2.1	U	2.2	b
LEAD	MG/KG	5		0.98		1.1		0.96		0.82		-		0.98		1.5	
ANTIMONY	MG/KG	3	U	2.9	U	3	U	3.3	U	3.2	U	-		3.3	U	3.3	U
SELENIUM	MG/KG	0.13	U	0.12	U	0.12	U	0.14	U	0.13	U	-		0.14	U	0.14	U
THALLIUM	MG/KG	0.18	U	0.17	U	0.17	U	0.19	U	0.19	U	-		0.19	U	0.19	U
VANADIUM	MG/KG	8.6	b	5.9	b	4.7	b	4	b	3.6	b	-		5.6	b	6.3	b
ZINC	MG/KG	26.1		12		10.9		9.3		9.6		-		14.3		9.9	
VOLATILE ORGANIC COMPOUNDS																	
ACETONE	UG/KG	12	U	12	U	12	U	13	J	13	U	9	J	12	J	13	U
METHYLENE CHLORIDE	UG/KG	12	U	12	U	12	U	7	U	7	U	7	U	8	U	7	U
2-BUTANONE	UG/KG	12	U	12	U	12	U	14	U	13	U	13	U	13	U	13	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
4-METHYLPHENOL	UG/KG	800	U	790	U	800	U	890	U	850	U	840	U	880	U	830	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	270	J	790	U	800	U	890	U	850	U	840	U	880	U	830	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.98	U	3.94	U	3.95	U	4.44	U	4.25	U	4.22	U	4.4	U	4.12	U
BHC-DELTA	UG/KG	2.05	U	2.03	U	2.04	U	2.29	U	2.19	U	2.17	U	2.27	U	2.12	U
4,4'-DDT	UG/KG	3.98	U	3.94	U	3.95	U	4.44	U	4.25	U	4.22	U	4.4	U	4.12	U
4,4'-DDE	UG/KG	3.98	U	3.94	U	3.95	U	4.44	U	4.25	U	4.22	U	4.4	U	4.12	U
HERBICIDES																	
DICHLOROPROP	UG/KG	121	U	436		121	U	220		346		127	U	132	U	126	U
DALAPON	UG/KG	60.6	U	59.9	U	60.7	U	67.3	U	64.5	U	63.6	U	360		63.1	U
2,4,5-TP (SILVEX)	UG/KG	30.3	U	29.9	U	30.4	U	33.7	U	32.2	U	31.8	U	33.1	U	31.5	U
2,4-DB	UG/KG	60.6	U	59.9	U	60.7	U	67.3	U	64.5	U	63.6	U	66.1	U	63.1	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.061	U	0.06	U	0.061	U	0.068	U	0.065	U	0.064	U	0.067	U	0.063	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Table A2-4

OU- 1 (Site18): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_DCBE S1451059 (0)	DVF(a)	18_DCBE S145107001 (0)	DVF(a)	18_DCBE S1451060 (2)	DVF(a)	18_DCBE S1451061 (4)	DVF(a)	18_DCMC S1451056 (0)	DVF(a)	18_DCMC S1451057 (0)	DVF(a)	18_DCMC S1451070 (0)	DVF(a)	18_MC1 S1451035 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.44	U	0.58	U	0.46	U	0.46	U	0.59	U	0.53	b	0.56	U	0.57	U
ALUMINUM	MG/KG	7260		1070		7700		4320		1420		7480		1740		3270	
ARSENIC	MG/KG	1.5	b	0.78	b	2.5		1	b	1.5	b	1.2	b	0.83	b	1.3	b
BARIUM	MG/KG	68.4		30.9	b	85.5		62.7		19.3	b	92		19	b	30.4	b
BERYLLIUM	MG/KG	0.38	U	0.14	U	0.45	U	0.35	U	0.14	U	0.39	U	0.13	U	0.13	U
CALCIUM	MG/KG	5420		1940		6130		2740		3700		4060		3240		2570	
CADMIUM	MG/KG	1	b	0.33	U	1.2		0.89	b	0.34	U	1.3		0.32	U	0.53	b
COBALT	MG/KG	4.1	b	1.8	b	4.1	b	3.3	b	2.2	b	5.8	b	2.9	b	1.6	U
CHROMIUM	MG/KG	8.2		1.8	b	9.3		5.9		2.5	b	8.6		3		2.9	
COPPER	MG/KG	6.5		1.3	b	6.8		4.3	b	2.4	b	8.4		2.6	b	6.1	b
IRON	MG/KG	8960		1730		10100		6090		2610		9350		2830		7060	
MERCURY	MG/KG	0.09	U	0.04	U	0.04	U	0.03	U	0.25		0.2		0.21		0.08	U
POTASSIUM	MG/KG	1780		370	b	2110		1350		587	b	2480		666	b	923	b
MAGNESIUM	MG/KG	3000		556	b	3340		2180		1290	b	2950		1130	b	1310	b
MANGANESE	MG/KG	149		147		176		121		150		200		138		122	
SODIUM	MG/KG	243	b	266	b	341	b	319	b	560	b	269	b	530	b	255	b
NICKEL	MG/KG	4.9	b	2.1	U	5.8	b	3.8	b	3.3	b	7.7	b	2.1	U	2.1	U
LEAD	MG/KG	3.1		1.6		4.1		2.2		1.3		1.9		2.9		2.2	
ANTIMONY	MG/KG	3	b	3.4	U	2.6	U	2.7	U	3.4	U	3.2	b	3.2	U	3.3	U
SELENIUM	MG/KG	0.1	U	0.14	U	0.12	b	0.11	U	0.14	U	0.12	U	0.13	U	0.13	U
THALLIUM	MG/KG	0.15	U	0.19	U	0.28	b	0.15	U	0.2	U	0.17	U	0.19	U	0.19	U
VANADIUM	MG/KG	21.8		4.5	b	24.1		14.6		6.4	b	20.4		7.1	b	11.3	b
ZINC	MG/KG	30.7		13.9		31.3		20.4		15.1		30.1		15.9		32.7	
VOLATILE ORGANIC COMPOUNDS																	
ACETONE	UG/KG	13	U	13	U	33	U	11	U	13	U	12	U	13	U	16	
METHYLENE CHLORIDE	UG/KG	11	U	13	U	14	U	11	U	13	U	12	U	9	U	25	U
2-BUTANONE	UG/KG	11	U	13	U	3	J	11	U	13	U	12	U	13	U	13	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
4-METHYLPHENOL	UG/KG	710	U	220	J	900	U	720	U	250	J	820	U	220	J	890	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	710	U	840	U	900	U	720	U	850	U	820	U	840	U	890	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.49	UJ	4.17	U	4.5	UJ	3.56	UJ	4.23	U	4.06	U	4.17	U	13.3	
BHC-DELTA	UG/KG	1.8	UJ	2.15	U	2.32	UJ	1.84	UJ	2.18	U	2.09	U	2.15	U	10.3	
4,4'-DDT	UG/KG	2.67	J	4.17	U	4.5	UJ	3.56	UJ	4.23	U	4.06	U	4.17	U	17.7	
4,4'-DDE	UG/KG	3.49	UJ	4.17	U	4.5	UJ	3.56	UJ	4.23	U	4.06	U	4.17	U	97	D
HERBICIDES																	
DICHLOROPROP	UG/KG	-		126	U	-		-		129	U	124	U	126	U	132	U
DALAPON	UG/KG	-		63.2	U	-		-		64.4	U	61.9	U	63.2	U	66.2	U
2,4,5-TP (SILVEX)	UG/KG	-		31.6	U	-		-		32.2	U	30.9	U	31.6	U	33.1	U
2,4-DB	UG/KG	-		63.2	U	-		-		64.4	U	61.9	U	63.2	U	66.2	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.065		0.063	U	0.066	U	0.139		0.064	U	0.062	U	0.063	U	0.079	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	14		20	U

Table A2-4

OU- 1 (Site18): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_MC1 S1451036 (2)	DVF(a)	18_MC1 S1451037 (4)	DVF(a)	18_MC2 S1451044 (0)	DVF(a)	18_MC2 S1451045 (2)	DVF(a)	18_SD133 S1451068 (0)	DVF(a)
METALS											
SILVER	MG/KG	0.59	U	0.51	U	0.6	U	0.49	U	0.53	U
ALUMINUM	MG/KG	1830		8500		6720		3150		851	
ARSENIC	MG/KG	4.4		4.7		3.7		2.4		0.76	b
BARIUM	MG/KG	12.1	b	128		65.9		39.8	b	21	b
BERYLLIUM	MG/KG	0.14	U	0.61	U	0.14	U	0.12	U	0.13	U
CALCIUM	MG/KG	1960		4870		4480		2380		911	b
CADMIUM	MG/KG	0.34	U	1.7		0.78	b	0.44	b	0.3	U
COBALT	MG/KG	1.6	U	5.5	b	4.7	b	2.3	b	2.1	b
CHROMIUM	MG/KG	4.2		10.4		8.5		5.4		1.3	b
COPPER	MG/KG	2.7	b	11.5		12.4		5.6	b	1.7	b
IRON	MG/KG	5280		13100		9920		5840		1480	
MERCURY	MG/KG	0.06	U	0.05	U	0.45		0.22		0.16	
POTASSIUM	MG/KG	539	U	4340		2280		960	b	272	U
MAGNESIUM	MG/KG	1050	b	5880		3220		1780		384	b
MANGANESE	MG/KG	79.5		267		221		116		44.9	
SODIUM	MG/KG	202	b	338	b	332	b	178	U	125	U
NICKEL	MG/KG	4.7	b	9.6	b	5.1	b	6.1	b	1.9	U
LEAD	MG/KG	2		3.7		6.1		3.6		0.91	
ANTIMONY	MG/KG	3.4	U	2.9	U	3.5	U	2.8	U	3.1	U
SELENIUM	MG/KG	0.14	U	0.18	U	0.22	b	0.12	U	0.13	U
THALLIUM	MG/KG	0.2	U	0.31	b	0.2	U	0.16	U	0.18	U
VANADIUM	MG/KG	7.2	b	32.8		22.6		13.9		4.2	b
ZINC	MG/KG	19.5		48.8		41.1		21.6		8.8	
VOLATILE ORGANIC COMPOUNDS											
ACETONE	UG/KG	14		26		13	U	12	U	12	U
METHYLENE CHLORIDE	UG/KG	47	B	13	U	48	B	37	U	12	U
2-BUTANONE	UG/KG	13	U	12	U	13	U	12	U	12	U
SEMIVOLATILE ORGANIC COMPOUNDS											
4-METHYLPHENOL	UG/KG	890	U	760	U	880	U	770	U	610	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	890	U	760	U	880	U	770	U	610	U
PESTICIDES AND PCBs											
ENDOSULFAN SULFATE	UG/KG	4.46	U	-	UJR	4.37	U	3.81	U	4	U
BHC-DELTA	UG/KG	4.23		-	UJR	2.25	U	1.96	U	2.06	U
4,4'-DDT	UG/KG	9.64		-	UJR	51.6		56		4	U
4,4'-DDE	UG/KG	33.5		-	UJR	47.2		9.19		4	U
HERBICIDES											
DICHLOROPROP	UG/KG	132	U	-		280		481	N	121	U
DALAPON	UG/KG	66.2	U	-		65.7	U	58.4	U	60.7	U
2,4,5-TP (SILVEX)	UG/KG	33.1	U	-		32.9	U	54.1		30.3	U
2,4-DB	UG/KG	66.2	U	-		75.9		58.4	U	60.7	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)											
TFH GASOLINE	MG/KG	0.067	U	0.213		0.066	U	0.059	U	0.061	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)											
TRPH	MG/KG	20	U	20	U	15		132		20	U

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_ACAB222 S1456416 (10)	DVF(a)	18_ACAB222 S1456417 (20)	DVF(a)	18_ACAB222 S1456418 (30)	DVF(a)	18_ACAB222 S1456418D (30)	DVF(a)	18_ACAB222 S1456419 (40)	DVF(a)	18_ACAB222 S1456420 (50)	DVF(a)	18_ACAB222 S1456421 (60)	DVF(a)	18_ACAB223 S1456592 (10)	DVF(a)
METALS																	
SILVER	MG/KG	0.45	UJ	0.5	UJ	0.47	UJ	0.48	UJ	0.49	UJ	0.47	UJ	0.5	UJ	0.46	U
ALUMINUM	MG/KG	10900		6490		3190		5920		10700		5620		6070		6660	
ARSENIC	MG/KG	4.5		1.7	b	1.1	b	2.6		1.6	b	2.5		3.7		0.91	b
BARIUM	MG/KG	81.5		49.7		47.1		54.8		101		61.7		85.5		45.5	
BERYLLIUM	MG/KG	0.37	b	0.24	b	0.24	b	0.23	b	0.41	b	0.22	b	0.36	b	0.17	b
CALCIUM	MG/KG	10100		2220		1580		2500		4020		3020		8140		1210	
CADMIUM	MG/KG	1.1		0.66	b	0.84	b	0.9	b	1.1	b	1	b	4.2		1	b
COBALT	MG/KG	3.9	b	1.9	b	2	b	2.4	b	4.1	b	2.4	b	3.5	b	1.7	b
CHROMIUM	MG/KG	12.9		5.7		4.3		13.9		12		5.8		10.1		11.2	
COPPER	MG/KG	9.4		4.6	b	3.3	b	6.3		8		4.6	b	6.2		2.5	b
IRON	MG/KG	12000		7380		4880		9300		12500		7090		9230		6000	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.04	U
POTASSIUM	MG/KG	2050		1200		903	b	1240		2720		1770		1980		1300	
MAGNESIUM	MG/KG	3950		1860		1430		2160		4230		2460		3310		1750	
MANGANESE	MG/KG	206		69.8		143		163		165		161		172		177	
SODIUM	MG/KG	406	b	235	b	210	b	283	b	332	b	257	b	461	b	408	b
NICKEL	MG/KG	7.8	b	5	b	4.1	b	7.4	b	8	b	4.4	b	11.4		6.7	b
LEAD	MG/KG	4.5		1.6		1.1		2.6		3.6		1.4		1.9		2.6	
ANTIMONY	MG/KG	2.8	U	2.9	U	2.7	U	2.8	U	2.8	U	2.7	U	2.9	U	2.6	U
SELENIUM	MG/KG	0.13	b	0.12	U	0.11	U	0.11	U	0.12	U	0.11	U	0.12	U	0.11	U
THALLIUM	MG/KG	0.15	U	0.17	U	0.16	U	0.16	U	0.16	b	0.16	U	0.17	UJ	0.17	U
VANADIUM	MG/KG	26		16.6		10.6	b	18.3		29.5		17.3		28.7		12.1	
ZINC	MG/KG	36.5		18.9		13.8		26.2		37.4		21.9		29.4		17.9	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	11	U	11	U	11	U	12	U	11	U	11	U	12	U	11	U
ACETONE	UG/KG	11	U	12	U	12	U	12	U	12	U	11	U	12	U	11	U
METHYLENE CHLORIDE	UG/KG	11	U	11	U	11	U	12	U	11	U	11	U	12	U	28	U
TOLUENE	UG/KG	11	U	11	U	11	U	12	U	11	U	11	U	12	U	11	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/KG	740	U	750	U	740	U	790	U	750	U	740	U	760	U	720	U
BENZYL BUTYL PHTHALATE	UG/KG	740	U	750	U	740	U	740	U	750	U	740	U	760	U	720	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	740	U	750	U	740	U	790	U	750	U	740	U	760	U	720	U
DIBENZOFURAN	UG/KG	740	U	750	U	740	U	790	U	750	U	740	U	760	U	720	U
NAPHTHALENE	UG/KG	740	U	750	U	740	U	790	U	750	U	740	U	760	U	720	U
PHENANTHRENE	UG/KG	740	U	750	U	740	U	790	U	750	U	740	U	760	U	720	U
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.94	U	1.94	U	1.89	U	2.01	U	1.91	U	1.87	U	1.96	U	1.88	U
GAMMA-CHLORDANE	UG/KG	1.94	U	1.94	U	1.89	U	2.01	U	1.91	U	1.87	U	1.96	U	1.88	U
4,4'-DDD	UG/KG	3.76	U	3.77	U	3.67	U	3.89	U	3.71	U	3.63	U	3.81	U	3.65	U
4,4'-DDE	UG/KG	3.76	U	3.77	U	3.67	U	3.89	U	3.71	U	3.63	U	3.81	U	3.65	U
4,4'-DDT	UG/KG	3.76	U	3.77	U	3.67	U	3.89	U	3.71	U	3.63	U	3.81	U	3.65	U
ENDRIN KETONE	UG/KG	3.76	U	3.77	U	3.67	U	3.89	U	3.71	U	3.63	U	3.81	U	3.65	U
ENDRIN	UG/KG	3.76	U	3.77	U	3.67	U	3.89	U	3.71	U	3.63	U	3.81	U	3.65	U
ENDOSULFAN SULFATE	UG/KG	3.76	U	3.77	U	3.67	U	3.89	U	3.71	U	3.63	U	3.81	U	3.65	
PCB-1260	UG/KG	37.6	U	37.7	U	36.7	U	38.9	U	37.1	U	36.3	U	38.1	U	36.5	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.9	U	14.2	U	14	U	14.8	U	14	U	14	U	2270		13.5	U
TFH GASOLINE	MG/KG	0.056	U	0.057	U	0.056	U	0.06	U	0.057	U	0.056	U	114		0.055	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_ACAB223 S1456593 (20)	DVF(a)	18_ACAB223 S1456594 (30)	DVF(a)	18_ACAB223 S1456595 (40)	DVF(a)	18_ACAB223 S1456596 (50)	DVF(a)	18_ACAB223 S1456597 (60)	DVF(a)	18_ACAB224 S1456584 (10)	DVF(a)	18_ACAB224 S1456585 (20)	DVF(a)	18_ACAB224 S1456586 (30)	DVF(a)
METALS																	
SILVER	MG/KG	0.48	U	0.48	U	0.53	U	0.44	U	0.45	U	0.47	UJ	0.52	UJ	0.49	UJ
ALUMINUM	MG/KG	3470		12000		12500		2540		1640		6660		9700		7190	J
ARSENIC	MG/KG	0.39	b	2	b	1.1	b	1.1	b	1.5	b	2.8		2.5		2.2	J
BARIUM	MG/KG	38.9	b	105		113		25.9	b	25	b	45.4		154		80.4	J
BERYLLIUM	MG/KG	0.11	U	0.54	b	0.62	b	0.1	U	0.11	U	0.22	b	0.51	b	0.42	J
CALCIUM	MG/KG	1300		4520		9750		1700		1710		1770		4750		3650	J
CADMIUM	MG/KG	0.5	b	1.4		1.6		0.44	b	1.1		0.3	b	1.3		2	UJ
COBALT	MG/KG	1.3	U	3.4	b	5.7	b	1.2	U	1.2	U	2	b	4.6	b	4.2	J
CHROMIUM	MG/KG	4.3		14.7		10.2		3.1		3.1		7.9		13.5		10.7	J
COPPER	MG/KG	1.5	b	8.4		7.3		0.51	b	0.99	b	3.8	b	8.4		9.8	J
IRON	MG/KG	4380		14900		13500		3310		2520		8220		14600		10400	J
MERCURY	MG/KG	0.09	U	0.09	U	0.05	U	0.03	U	0.12	U	0.03	U	0.03	U	0.03	UJ
POTASSIUM	MG/KG	819	b	3240		3890		894	b	570	U	1270		2770		2040	J
MAGNESIUM	MG/KG	1390		4760		6190		1160		692	b	2330		4770		3250	J
MANGANESE	MG/KG	58.1		138		194		70.7		47.4		53.1		224		192	J
SODIUM	MG/KG	187	b	558	b	875	b	161	b	209	b	435	b	432	b	354	J
NICKEL	MG/KG	4.7	b	12.4		12.9		1.9	b	3.5	b	2.6	b	10.5		12.5	J
LEAD	MG/KG	1.5		2.2		2.5		0.79		0.9		2.4		2.2		2.2	J
ANTIMONY	MG/KG	2.8	U	2.8	U	3.1	U	2.5	U	2.6	U	2.7	U	3	U	2.8	UJ
SELENIUM	MG/KG	0.11	U	0.11	U	0.13	U	0.1	U	0.11	U	0.11	U	0.12	U	0.14	J
THALLIUM	MG/KG	0.16	U	0.23	U	0.2	U	0.15	U	0.15	U	0.16	UJ	0.17	J	0.16	UJ
VANADIUM	MG/KG	10.5	b	37.6		30.2		8.8	b	7.2	b	19.8		33.6		26.8	J
ZINC	MG/KG	16.8		48.5		51.2		13.3		10.6		18.9		40		32.2	J
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	56	U	11	U	12	U	10	U	11	U	11	U	58	U	24	J
ACETONE	UG/KG	42	JB	11	U	12	U	12		13		11	U	530	B	99	B
METHYLENE CHLORIDE	UG/KG	37	U	17	U	21		11	U	17	U	11	U	54	JB	110	U
TOLUENE	UG/KG	56	U	11	U	12	U	10	U	11	U	11	U	58	U	57	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/KG	22000	U	750	U	820	U	690	U	730	U	750	U	23000	U	750	UJ
BENZYL BUTYL PHTHALATE	UG/KG	22000	U	240	J	820	U	690	U	730	U	750	U	23000	U	750	UJ
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	22000	U	750	U	820	U	690	U	730	U	750	U	23000	U	750	UJ
DIBENZOFURAN	UG/KG	22000	U	750	U	820	U	690	U	730	U	750	U	23000	U	750	UJ
NAPHTHALENE	UG/KG	22000	U	750	U	820	U	690	U	730	U	750	U	23000	U	750	UJ
PHENANTHRENE	UG/KG	22000	U	750	U	820	U	690	U	730	U	750	U	23000	U	750	UJ
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.92	U	1.96	U	2.12	U	1.81	U	1.9	U	1.91	U	1.96	U	1.92	U
GAMMA-CHLORDANE	UG/KG	1.92	U	1.96	U	2.12	U	1.81	U	1.9	U	1.91	U	1.96	U	1.92	U
4,4'-DDD	UG/KG	3.74	U	3.8	U	4.12	U	3.51	U	3.69	U	3.71	U	3.81	U	3.73	U
4,4'-DDE	UG/KG	3.74	U	3.8	U	4.12	U	3.51	U	3.69	U	3.71	U	3.81	U	3.73	U
4,4'-DDT	UG/KG	3.74	U	3.8	U	4.12	U	3.51	U	3.69	U	3.71	U	3.81	U	3.73	U
ENDRIN KETONE	UG/KG	3.74	U	3.8	U	4.12	U	3.51	U	3.69	U	3.71	U	3.81	U	3.73	U
ENDRIN	UG/KG	3.74	U	3.8	U	4.12	U	3.51	U	3.69	U	3.71	U	3.81	U	3.73	U
ENDOSULFAN SULFATE	UG/KG	3.74	U	3.8	U	4.12	U	3.51	U	3.69	U	3.71	U	3.81	U	3.73	U
PCB-1260	UG/KG	37.4	U	38	U	41.2	U	35.1	U	36.9	U	37.1	U	38.1	U	37.3	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	15300		14.1	U	15.5	U	13	U	13.7	U	14.2	U	2270		14	U
TFH GASOLINE	MG/KG	131000		0.059		0.092		0.097		0.055	U	0.057	U	114		0.057	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	5873		20	U	20	U	20	U	20	U	20	U	909		20	U

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_ACAB224 S1456587 (40)	DVF(a)	18_ACAB224 S1456588 (60)	DVF(a)	18_ACAB224 S1456589 (60)	DVF(a)	18_ACAB225 S1456668 (10)	DVF(a)	18_ACAB225 S1456669 (20)	DVF(a)	18_ACAB225 S1456670 (30)	DVF(a)	18_ACAB225 S1456674 (30)	DVF(a)	18_ACAB225 S1456671 (40)	DVF(a)
METALS																	
SILVER	MG/KG	0.5	UJ	0.45	UJ	0.48	UJ	0.48	U	0.48	U	0.49	U	0.5	U	0.5	U
ALUMINUM	MG/KG	7650	J	1580	J	1030	J	12000		6030		7660		6810		10700	
ARSENIC	MG/KG	1.6	J	2.1	J	0.48	J	3.3		1.6	b	2.8		2.1	b	5.5	
BARIUM	MG/KG	96.7	J	20.8	J	16.5	J	126		37.1	b	103		63.6		93.7	
BERYLLIUM	MG/KG	0.23	J	0.17	J	0.12	UJ	0.56	U	0.27	U	0.44	U	0.33	U	0.57	U
CALCIUM	MG/KG	4610	J	1230	J	973	J	5010		1680		3790		2350		4780	
CADMIUM	MG/KG	0.66	UJ	0.32	UJ	0.28	UJ	0.62	b	0.37	b	1.2		0.55	b	1.7	
COBALT	MG/KG	3.7	J	1.2	UJ	1.4	J	5.3	b	2.4	b	4.2	b	4.8	b	4.6	b
CHROMIUM	MG/KG	7	J	2.3	J	1.3	J	12		5.1		9.8		11.4		13.4	
COPPER	MG/KG	5.6	J	2.3	J	1.9	UJ	6.8		4.1	b	5.9		6.4		8.9	
IRON	MG/KG	9120	J	2340	J	1640	J	12900		5340		12400		8510		14600	
MERCURY	MG/KG	0.03	UJ	0.03	UJ	0.03	UJ	0.04	U	0.03	U	0.03	U	0.03	U	0.03	b
POTASSIUM	MG/KG	2030	J	526	J	327	J	1610		912	b	2260		1300		2160	
MAGNESIUM	MG/KG	3450	J	732	J	516	J	4390		1400		3620		2230		3980	
MANGANESE	MG/KG	163	J	59.8	J	31.2	J	198		53.6		136		89.1		219	
SODIUM	MG/KG	310	J	159	J	186	J	580	b	184	b	312	b	263	b	322	b
NICKEL	MG/KG	5.9	J	1.7	UJ	1.8	UJ	9.2		4.6	U	6.6	U	7.6	U	12.3	
LEAD	MG/KG	1.5	J	0.88	J	0.72	J	3.5		1.7		2.5		3		4.4	
ANTIMONY	MG/KG	2.9	UJ	2.6	UJ	2.8	UJ	2.8	U	2.8	U	2.6	U	2.9	U	2.9	U
SELENIUM	MG/KG	0.12	UJ	0.11	UJ	0.12	UJ	0.11	U	0.11	U	0.12	U	0.12	U	0.12	U
THALLIUM	MG/KG	0.17	UJ	0.15	J	0.16	UJ	0.21	b	0.16	U	0.26	b	0.17	U	0.31	b
VANADIUM	MG/KG	20.6	J	6.3	J	5	J	32		12.6		30		19		37.1	
ZINC	MG/KG	27.3	J	7.4	J	5.3	J	30.8		15.1		34.2		24.7		38.1	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	4	J	11	Y	11	U	11	U	11	U	12	U	11	U	12	U
ACETONE	UG/KG	21	U	68	U	11	U	11	U	11	U	36	U	36	U	48	U
METHYLENE CHLORIDE	UG/KG	49	U	58	U	58	U	22	U	25	U	28	U	30	U	27	U
TOLUENE	UG/KG	12	U	11	U	11	U	11	U	11	U	12	U	11	U	12	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/KG	760	UJ	740	UJ	740	UJ	740	U	750	U	760	U	750	U	780	U
BENZYL BUTYL PHTHALATE	UG/KG	760	UJ	740	UJ	740	UJ	740	U	750	U	760	U	750	U	780	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	760	UJ	740	UJ	740	UJ	740	U	750	U	760	U	170	J	780	U
DIBENZOFURAN	UG/KG	760	UJ	740	UJ	740	UJ	740	U	750	U	760	U	750	U	780	U
NAPHTHALENE	UG/KG	760	UJ	740	UJ	740	UJ	740	U	750	U	760	U	750	U	780	U
PHENANTHRENE	UG/KG	760	UJ	740	UJ	740	UJ	740	U	750	U	760	U	750	U	780	U
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	2.01	U	1.91	U	1.89	U	1.9	U	1.97	U	1.98	U	1.92	U	1.98	U
GAMMA-CHLORDANE	UG/KG	2.01	U	1.91	U	1.89	U	1.9	U	1.97	U	1.98	U	1.92	U	1.98	U
4,4'-DDD	UG/KG	3.9	U	3.71	U	3.67	U	3.69	U	6.86		3.85	U	3.73	U	3.85	U
4,4'-DDE	UG/KG	3.9	U	3.71	U	3.67	U	3.69	U	3.82	U	3.85	U	3.73	U	3.85	U
4,4'-DDT	UG/KG	3.9	U	3.71	U	3.67	U	3.69	U	3.82	U	3.85	U	3.73	U	3.85	U
ENDRIN KETONE	UG/KG	3.9	U	3.71	U	3.67	U	3.69	U	3.82	U	3.85	U	3.73	U	3.85	U
ENDRIN	UG/KG	3.9	U	3.71	U	3.67	U	3.69	U	3.82	U	3.85	U	3.73	U	3.85	U
ENDOSULFAN SULFATE	UG/KG	3.9	U	3.71	U	3.67	U	3.69	U	3.82	U	3.85	U	3.73	U	3.85	U
PCB-1260	UG/KG	39	U	37.1	U	36.7	U	36.9	U	38.2	U	38.5	U	37.3	U	38.5	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	14.8	U	14	U	13.9	U	13.9	U	15.2		14.1	U	14.1	U	14.8	U
TFH GASOLINE	MG/KG	0.059	U	0.056	U	0.056	U	0.117		125		0.058	U	0.057	U	0.059	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	34		27		20	U	20	U	26		20	U	20	U

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_ACAB225 S1456672 (50)	DVF(a)	18_ACAB225 S1456673 (60)	DVF(a)	18_BEAB226 S1456616 (10)	DVF(a)	18_BEAB226 S1456617 (20)	DVF(a)	18_BEAB226 S1456618 (30)	DVF(a)	18_BEAB226 S1456619 (30)	DVF(a)	18_BEAB226 S1456620 (40)	DVF(a)	18_BEAB226 S1456622 (60)	DVF(a)
METALS																	
SILVER	MG/KG	0.52	U	0.44	U	0.52	U	0.46	b	0.46	U	0.47	U	0.5	U	0.57	b
ALUMINUM	MG/KG	9670		2350		19100		3430		5250		7120		12300		26300	
ARSENIC	MG/KG	3.7		3.6		3.3		1	b	1	b	1.5	b	1.4	b	4.8	
BARIUM	MG/KG	157		43.1		182		122		49		61.9		344		323	
BERYLLIUM	MG/KG	0.61	b	0.19	U	0.63	U	0.14	U	0.21	U	0.21	U	0.67	U	0.64	U
CALCIUM	MG/KG	6350		3320		14600		4340		1800		2280		3670		26300	
CADMIUM	MG/KG	3.5		0.63	b	1.5		0.56	b	0.62	b	0.99	b	0.86	b	2.4	
COBALT	MG/KG	4.7	b	1.2	U	9.5	b	2	b	3	b	2.9	b	4.4	b	13.4	
CHROMIUM	MG/KG	11.6		7.9		16.5		3.6		5.3		6.7		15		24.9	
COPPER	MG/KG	9		2	b	12.4		2.7	b	3.6	b	5.3	b	3.9	b	15.2	
IRON	MG/KG	13000		4780		22600		5050		6810		8350		13400		34100	
MERCURY	MG/KG	0.07	U	0.05	U	0.23		0.16		0.3		0.33		0.39		0.47	
POTASSIUM	MG/KG	2390		732	b	6190		1240		1360		1450		1220		6940	
MAGNESIUM	MG/KG	4330		1370		11000		2230		2190		2910		3360		13800	
MANGANESE	MG/KG	660		70.1		342		116		102		117		170		505	
SODIUM	MG/KG	496	b	430	b	332	b	158	U	153	b	195	U	236	b	469	b
NICKEL	MG/KG	16.8		4	U	9.6	b	4.7	b	6.1	b	9.4		8.2	b	16.5	
LEAD	MG/KG	3.5		1.5		2.7		1.3		1.6		2.3		3.6		4.1	
ANTIMONY	MG/KG	3	U	2.6	U	3	U	2.6	U	2.7	U	2.7	U	2.9	U	3.1	U
SELENIUM	MG/KG	0.12	U	0.21	b	0.12	U	0.11	U	0.11	U	0.11	U	0.12	U	0.13	U
THALLIUM	MG/KG	0.3	b	0.15	U	0.35	b	0.15	U	0.15	U	0.18	b	0.17	U	0.63	b
VANADIUM	MG/KG	31.8		10.7		58.9		15.2		17.1		21.2		30.4		84	
ZINC	MG/KG	46.4		13.4		69.1		18.2		21.5		25.9		28.6		103	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	12	U	11	U	11	U	11	U	55	U	55	U	12	U	12	U
ACETONE	UG/KG	76	U	71	U	17		11	U	85		91		14		12	U
METHYLENE CHLORIDE	UG/KG	32	U	16	U	64	U	4	U	36	U	18	U	21	U	18	U
TOLUENE	UG/KG	12	U	11	U	3	J	11	U	55	U	55	U	12	U	12	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/KG	800	U	700	U	740	U	720	U	2600		4300		780	U	800	U
BENZYL BUTYL PHTHALATE	UG/KG	800	U	700	U	740	U	720	U	720	U	720	U	780	U	800	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	800	U	700	U	740	U	720	U	720	U	720	U	780	U	800	U
DIBENZOFURAN	UG/KG	800	U	700	U	740	U	720	U	720	U	180	J	780	U	800	U
NAPHTHALENE	UG/KG	800	U	700	U	740	U	720	U	860		1800		780	U	800	U
PHENANTHRENE	UG/KG	800	U	700	U	740	U	720	U	320	J	640	J	780	U	800	U
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	2.02	U	1.81	U	1.88	U	9.67		3.45		3.77		2	U	2.03	UJ
GAMMA-CHLORDANE	UG/KG	2.02	U	1.81	U	1.88	U	11.1		2.71		3.74		2	U	2.03	UJ
4,4'-DDD	UG/KG	3.92	U	3.51	U	3.86	U	3.6	U	15.5		13.5		3.88	U	3.94	UJ
4,4'-DDE	UG/KG	3.92	U	3.51	U	3.86	U	3.6	U	3.64	U	3.65	U	3.88	U	3.94	UJ
4,4'-DDT	UG/KG	3.92	U	3.98		3.86	U	3.6	U	3.64	U	3.65	U	3.88	U	3.94	UJ
ENDRIN KETONE	UG/KG	3.92	U	3.51	U	3.86	U	3.6	U	3.64	U	3.65	U	3.88	U	3.94	UJ
ENDRIN	UG/KG	3.92	U	3.51	U	3.86	U	3.6	U	3.64	U	3.65	U	3.88	U	3.94	UJ
ENDOSULFAN SULFATE	UG/KG	3.92	U	3.51	U	3.86	U	3.6	U	3.64	U	3.65	U	3.88	U	3.94	UJ
PCB-1260	UG/KG	39.2	U	35.1	U	36.6	U	36	U	39.4	p	37.6	p	38.8	U	39.4	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	15.2	U	16.7	U	14.1	U	13.5	U	750		1560		14.7	U	15	U
TFH GASOLINE	MG/KG	0.06	U	0.053	U	0.056	U	0.054	U	719		1260		0.059	U	0.06	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	-		38		91		435		497		20	U	20	U

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_BEAB227 S1456601 (10)	DVF(a)	18_BEAB227 S1456602 (20)	DVF(a)	18_BEAB227 S1456603 (30)	DVF(a)	18_BEAB227 S1456604 (40)	DVF(a)	18_BEAB227 S1456605 (50)	DVF(a)	18_BEAB227 S1456606 (50)	DVF(a)	18_BEAB227 S1456607 (60)	DVF(a)	18_BOAB221 S145670101 (10)	DVF(a)
METALS																	
SILVER	MG/KG	0.51	b	0.43	U	0.46	U	0.48	U	0.5	U	0.5	U	0.51	U	0.47	U
ALUMINUM	MG/KG	14200		2020		4720		11200		17300		11900		15300		3530	
ARSENIC	MG/KG	4.1		1.1	b	2.7		3.2		4.3		3.7		5.1		1.4	U
BARIUM	MG/KG	177		66.1		47.4		112		126		188		135		33.5	b
BERYLLIUM	MG/KG	0.39	U	0.1	U	0.12	U	0.62	U	0.45	U	0.34	U	0.37	U	0.13	b
CALCIUM	MG/KG	8620		4840		2440		3320		4950		3570		13700		1210	
CADMIUM	MG/KG	1.1	b	0.38	b	0.38	b	0.61	b	1.4		1.4		2.2		0.53	b
COBALT	MG/KG	8.7	b	1.6	b	3.5	b	5.9	b	7.5	b	7.1	b	9	b	2.8	b
CHROMIUM	MG/KG	13.8		2.2		5.4		10.4		19.2		19.3		16.1		4.5	
COPPER	MG/KG	9.9		2.1	b	3.7	b	4.6	b	9.9		11.8		15.3		3.7	b
IRON	MG/KG	18800		3160		6500		12500		21400		17600		21900		4580	
MERCURY	MG/KG	0.18		0.15		0.18		0.17		0.18		0.23		0.26		0.08	U
POTASSIUM	MG/KG	5310		788	b	1320		2300		3760		3460		5340		909	b
MAGNESIUM	MG/KG	9390		1520		2100		4740		7220		5560		6590		1250	
MANGANESE	MG/KG	306		66.6		138		108		309		353		366		165	
SODIUM	MG/KG	233	b	121	U	145	U	201	U	247	b	237	b	321	b	139	b
NICKEL	MG/KG	11.1		3.6	b	5	b	9.1	b	14.7		12.7		13		5.2	U
LEAD	MG/KG	3.5		0.58	b	1.7		3.3		4.3		4.2		4.4		1.4	
ANTIMONY	MG/KG	4.6	b	2.5	U	2.8	U	2.8	U	2.9	U	2.9	U	2.9	U	2.7	U
SELENIUM	MG/KG	0.12	U	0.1	U	0.12	U	0.11	U	0.12	U	0.12	U	0.12	U	0.11	U
THALLIUM	MG/KG	0.21	b	0.14	U	0.16	U	0.16	U	0.19	b	0.24	b	0.24	b	0.16	U
VANADIUM	MG/KG	45.6		8.6	b	14.8		29.2		50.7		39.2		58		10.8	b
ZINC	MG/KG	61.3		13.1		20.8		34.3		55.2		51.3		63.2		16.3	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	12	U	10	U	12	U	12	U	12	U	12	U	12	U	11	U
ACETONE	UG/KG	12	U	10	U	12	U	12	U	12	U	12	U	12	U	11	U
METHYLENE CHLORIDE	UG/KG	12	U	10	U	12	U	12	U	12	U	12	U	12	U	11	U
TOLUENE	UG/KG	12	U	10	U	12	U	12	U	12	U	12	U	12	U	11	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/KG	780	U	680	U	770	U	760	U	780	U	790	U	760	U	740	U
BENZYL BUTYL PHTHALATE	UG/KG	780	U	680	U	770	U	760	U	780	U	790	U	760	U	740	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	780	U	680	U	770	U	760	U	780	U	790	U	760	U	740	U
DIBENZOFURAN	UG/KG	780	U	680	U	770	U	760	U	780	U	790	U	760	U	740	U
NAPHTHALENE	UG/KG	780	U	680	U	770	U	760	U	780	U	790	U	760	U	740	U
PHENANTHRENE	UG/KG	780	U	680	U	770	U	760	U	780	U	790	U	760	U	740	U
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.99	UR	1.75	U	2.01	U	1.95	U	1.96	U	2.04	U	1.93	U	1.92	UJ
GAMMA-CHLORDANE	UG/KG	1.99	UR	1.75	U	2.01	U	1.95	U	1.96	U	2.04	U	1.93	U	1.92	UJ
4,4'-DDD	UG/KG	3.96	UR	3.4	U	3.9	U	3.78	U	3.81	U	3.96	U	3.75	U	3.73	UJ
4,4'-DDE	UG/KG	3.96	UR	3.4	U	3.9	U	3.78	U	3.81	U	3.96	U	3.75	U	3.73	UJ
4,4'-DDT	UG/KG	3.96	UR	3.4	U	3.9	U	3.78	U	3.81	U	3.96	U	3.75	U	3.73	UJ
ENDRIN KETONE	UG/KG	3.96	UR	3.4	U	3.9	U	3.78	U	3.81	U	3.96	U	3.75	U	3.73	UJ
ENDRIN	UG/KG	3.96	UR	3.4	U	3.9	U	3.78	U	3.81	U	3.96	U	3.75	U	3.73	UJ
ENDOSULFAN SULFATE	UG/KG	3.96	UR	3.4	U	3.9	U	3.78	U	3.81	U	3.96	U	3.75	U	3.73	UJ
PCB-1260	UG/KG	38.6	UR	34	U	39	U	37.8	U	38.1	U	39.6	U	37.5	U	37.3	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	14.8	U	12.9	U	14.6	U	14.2	U	14.5	U	15.2	U	14.6	U	14	U
TFH GASOLINE	MG/KG	0.059	U	0.052	U	0.059	U	0.058	U	0.059	U	0.06	U	0.058	U	0.056	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_BOAB221 S1456707 (10)	DVF(a)	18_BOAB221 S145670201 (20)	DVF(a)	18_BOAB221 S1456703 (30)	DVF(a)	18_BOAB221 S145670601 (30)	DVF(a)	18_BOAB221 S1456704 (40)	DVF(a)	18_BOAB221 S1456705 (50)	DVF(a)	18_BOAB221 S1456706 (60)	DVF(a)	18_MCAB228 S1456609 (10)	DVF(a)
METALS																	
SILVER	MG/KG	0.48	U	0.51	U	0.56	U	0.46	U	0.55	U	0.5	U	0.49	U	0.52	U
ALUMINUM	MG/KG	3700		9690		8840		4010		10000		4170		5600		20500	
ARSENIC	MG/KG	0.76	U	3.4		5.2		1.7	U	9.5		2.1	b	2.8		2	b
BARIUM	MG/KG	33.1	b	78.2		110		38.1	b	111		36.8	b	60.9		255	
BERYLLIUM	MG/KG	0.11	U	0.39	b	0.43	b	0.13	b	0.54	b	0.27	b	0.48	b	0.74	b
CALCIUM	MG/KG	1730		2650		4360		2680		3970		1820		3530		15000	
CADMIUM	MG/KG	0.34	b	0.79	b	1.7		0.65	b	1.6		0.88	b	1.1	b	1.3	
COBALT	MG/KG	1.3	U	3.8	b	5.2	b	2.7	b	7.6	b	2.8	b	3.1	b	8.2	b
CHROMIUM	MG/KG	3.4		11.6		12		16.3		14.7		5.2		6.6		17.8	
COPPER	MG/KG	2.2	b	7.1		8.4		5.1	b	13.7		4.3	b	4.6	b	12.3	U
IRON	MG/KG	4650		11500		13400		5750		19300		6130		7580		24300	
MERCURY	MG/KG	0.03	U	0.07	U	0.1	U	0.03	U	0.06	U	0.03	U	0.04	U	0.03	U
POTASSIUM	MG/KG	1190		2050		2500		1170		3040		1160	b	1500		6500	
MAGNESIUM	MG/KG	1530		3110		4300		1620		4740		1580		2330		11800	
MANGANESE	MG/KG	63		135		243		105		369		111		145		340	
SODIUM	MG/KG	244	b	286	b	586	b	228	b	380	b	197	b	240	b	1660	
NICKEL	MG/KG	4.3	U	7.8	U	21		7.9	U	14.6		6.3	U	6.6	U	9.6	b
LEAD	MG/KG	1.5		2.1		2.8		6.2		6.5		2.1		4.5		3.2	
ANTIMONY	MG/KG	2.8	U	2.9	U	3.2	U	2.6	U	3.2	U	2.9	U	2.8	U	3	U
SELENIUM	MG/KG	0.11	U	0.12	U	0.13	U	0.11	U	0.13	U	0.12	U	0.12	U	0.12	U
THALLIUM	MG/KG	0.16	U	0.17	U	0.19	U	0.15	U	0.21	b	0.17	U	0.16	U	0.2	b
VANADIUM	MG/KG	11	b	26.4		28		13.2		40.6		14.4		18.9		57.7	
ZINC	MG/KG	16		32.7		36.6		48.1		61.1		19.2		22.6		70.3	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	10	U	12	U	13	U	13	U	12	U	12	U	11	U	11	U
ACETONE	UG/KG	10	U	12	U	5	J	13	U	12	U	12	U	11	U	11	U
METHYLENE CHLORIDE	UG/KG	12	U	12	U	13	U	12	U	12	U	15	U	13	U	11	U
TOLUENE	UG/KG	10	U	12	U	13	U	13	U	12	U	12	U	11	U	11	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/KG	690	U	780	U	880	U	850	U	780	U	780	U	750	U	730	U
BENZYL BUTYL PHTHALATE	UG/KG	690	U	780	U	880	U	850	U	780	U	780	U	750	U	730	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	690	U	780	U	880	U	850	U	780	U	780	U	750	U	730	U
DIBENZOFURAN	UG/KG	690	U	780	U	880	U	850	U	780	U	780	U	750	U	730	U
NAPHTHALENE	UG/KG	690	U	780	U	880	U	850	U	780	U	780	U	750	U	730	U
PHENANTHRENE	UG/KG	690	U	780	U	880	U	850	U	780	U	780	U	750	U	730	U
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.78	UJ	1.99	UJ	2.28	UJ	2.16	U	1.99	UJ	2.01	UJ	1.91	UJ	1.86	UJ
GAMMA-CHLORDANE	UG/KG	1.78	UJ	1.99	UJ	2.28	UJ	2.16	U	1.99	UJ	2.01	UJ	1.91	UJ	1.86	UJ
4,4'-DDD	UG/KG	3.45	UJ	3.86	UJ	4.43	UJ	4.19	U	3.87	UJ	3.9	UJ	3.7	UJ	3.61	UJ
4,4'-DDE	UG/KG	3.45	UJ	3.86	UJ	4.43	UJ	4.19	U	3.87	UJ	3.9	UJ	3.7	UJ	3.61	UJ
4,4'-DDT	UG/KG	3.45	UJ	3.86	UJ	4.43	UJ	4.19	U	3.87	UJ	3.9	UJ	3.7	UJ	3.61	UJ
ENDRIN KETONE	UG/KG	3.45	UJ	3.86	UJ	4.43	UJ	4.19	U	3.87	UJ	3.9	UJ	3.7	UJ	3.61	UJ
ENDRIN	UG/KG	3.45	UJ	3.86	UJ	4.43	UJ	4.19	U	3.87	UJ	3.9	UJ	3.7	UJ	3.61	UJ
ENDOSULFAN SULFATE	UG/KG	3.45	UJ	3.86	UJ	4.43	UJ	4.19	U	3.87	UJ	3.9	UJ	3.7	UJ	3.61	UJ
PCB-1260	UG/KG	34.5	UJ	38.6	UJ	44.3	UJ	41.9	U	38.7	UJ	39	UJ	37	UJ	36.1	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.1	U	14.7	U	16.6	U	16	U	14.6	U	14.8	U	14.1	U	73.1	
TFH GASOLINE	MG/KG	0.052	U	0.059	U	0.067	U	0.064	U	0.059	U	0.059	U	0.057	U	0.055	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	31		20	U	20	U	20	U	20	U	20	U

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_MCAB228 S1456510 (20)	DVF(s)	18_MCAB228 S1456511 (30)	DVF(s)	18_MCAB228 S1456512 (40)	DVF(s)	18_MCAB228 S1456708 (40)	DVF(s)	18_MCAB228 S1456513 (50)	DVF(s)	18_MCAB228 S1456514 (60)	DVF(s)	18_MCAB229 S1456503 (10)	DVF(s)	18_MCAB229 S1456504 (20)	DVF(s)
METALS																	
SILVER	MG/KG	0.51	U	0.45	U	0.54	U	0.54	U	0.44	U	0.47	U	0.43	U	0.52	U
ALUMINUM	MG/KG	13500		3490		13900		13200		2920		9510		1010		19300	
ARSENIC	MG/KG	3.1		1.4	b	4		3.7		0.89	U	1.2	b	0.71	b	4.7	
BARIUM	MG/KG	177		68.4		196		198		21.1	b	53.5		11.4	b	228	
BERYLLIUM	MG/KG	0.45	b	0.11	U	0.83	b	0.63	b	0.1	U	0.26	b	0.1	U	0.8	b
CALCIUM	MG/KG	10800		6210		9690		12200		665	b	2080		1320		13400	
CADMIUM	MG/KG	1.3		0.56	b	1.6		2.2		0.28	b	0.65	b	0.24	U	1.7	
COBALT	MG/KG	5.7	b	1.6	b	7.3	b	7.4	b	1.2	U	4.4	b	1.2	U	7.5	b
CHROMIUM	MG/KG	14.2		6		16		15.7		2.7		9.2		2.4		19.5	
COPPER	MG/KG	9.8	U	4.7	U	13.7	U	13.3		2	U	5.2	U	1.4	b	12.3	
IRON	MG/KG	18700		5370		20300		19300		3500		11300		2010		24400	
MERCURY	MG/KG	0.03	U	0.03	U	0.04	U	0.04	U	0.03	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	4740		1180		5160		4600		633	b	2550		375	b	6350	
MAGNESIUM	MG/KG	9120		2360		8940		8500		814	b	3300		595	b	11600	
MANGANESE	MG/KG	298		101		312		295		103		184		64.9		349	
SODIUM	MG/KG	1500		544	b	1560		1580		297	b	555	b	167	b	490	b
NICKEL	MG/KG	9.2	b	3.9	b	14.6		16.7		1.6	U	6.9	b	1.6	U	12.4	
LEAD	MG/KG	2.4		1.3		3.5		3.2		0.9		2.2		4.3		3.2	
ANTIMONY	MG/KG	2.9	U	2.6	U	3.1	U	3.1	U	2.5	U	2.7	U	2.5	U	3	U
SELENIUM	MG/KG	0.13	b	0.11	U	0.13	U	0.18	b	0.1	U	0.11	U	0.1	U	0.12	U
THALLIUM	MG/KG	0.29	b	0.15	U	0.34	b	0.31	b	0.15	U	0.16	U	0.14	U	0.34	b
VANADIUM	MG/KG	50.2		15.7		52.9		52.1		8.6	b	28.1		5.2	b	65.4	
ZINC	MG/KG	56.3		19.3		64.9		61.2		9.9		30.3		8		70.5	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	12	U	11	U	13	U	12	U	11	U	11	U	12	U	13	U
ACETONE	UG/KG	4	J	11	U	13	U	12	U	11	U	8	J	12	U	26	U
METHYLENE CHLORIDE	UG/KG	12	U	11	U	13	U	12	U	11	U	11	U	12	U	13	U
TOLUENE	UG/KG	12	U	11	U	13	U	12	U	11	U	11	U	12	U	13	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
2-METHYLNAPHTHALENE	UG/KG	780	U	720	UJ	860	U	820	U	700	U	740	U	770	U	840	U
BENZYL BUTYL PHTHALATE	UG/KG	780	U	720	UJ	860	U	820	U	700	U	740	U	770	U	840	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	780	U	720	UJ	860	U	820	U	700	U	740	U	770	U	840	U
DIBENZOFURAN	UG/KG	780	U	720	UJ	860	U	820	U	700	U	740	U	770	U	840	U
NAPHTHALENE	UG/KG	780	U	720	UJ	860	U	820	U	700	U	740	U	770	U	840	U
PHENANTHRENE	UG/KG	780	U	720	UJ	860	U	820	U	700	U	740	U	770	U	840	U
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.99	UJ	1.84	UJ	2.2	UJ	2.08	UJ	1.77	UJ	1.89	UJ	9.82	UJ	2.15	UJ
GAMMA-CHLORDANE	UG/KG	1.99	UJ	1.84	UJ	2.2	UJ	2.08	UJ	1.77	UJ	1.89	UJ	9.82	UJ	2.15	UJ
4,4'-DDD	UG/KG	3.86	UJ	3.58	UJ	4.26	UJ	4.04	UJ	8.26	J	3.66	UJ	757	PCJ	4.17	UJ
4,4'-DDE	UG/KG	9.35	J	3.58	UJ	4.26	UJ	4.04	UJ	33.7	J	3.66	UJ	514	J	4.17	UJ
4,4'-DDT	UG/KG	7.09	J	3.58	UJ	4.26	UJ	4.04	UJ	27.6	J	3.66	UJ	527	CJ	4.17	UJ
ENDRIN KETONE	UG/KG	3.86	UJ	3.58	UJ	4.26	UJ	4.04	UJ	3.44	UJ	3.66	UJ	0.626	J	4.17	UJ
ENDRIN	UG/KG	3.86	UJ	3.58	UJ	4.26	UJ	4.04	UJ	3.44	UJ	3.66	UJ	28.9	J	4.17	UJ
ENDOSULFAN SULFATE	UG/KG	3.86	UJ	3.58	UJ	4.26	UJ	4.04	UJ	3.44	UJ	3.66	UJ	24.4	J	4.17	UJ
PCB-1260	UG/KG	38.6	UJ	35.8	UJ	42.6	UJ	40.4	UJ	34.4	UJ	36.6	UJ	191	UJ	41.7	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	14.6	U	13.5	U	16.2	U	15.6	U	13	U	13.7	U	14.6	U	16	U
TFH GASOLINE	MG/KG	0.059	U	0.054	U	0.065	U	0.062	U	0.053	U	0.056	U	0.058	U	0.064	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Table A2-5

OU - 1 (Site18): Summary of Detected Chemicals in Vadose Zone (Subsurface) Soil Samples (Angle Borings)

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	18_MCAB229 S1456505 (30)	DVF(a)	18_MCAB229 S1456701 (30)	DVF(a)	18_MCAB229 S1456506 (40)	DVF(a)	18_MCAB229 S1456507 (50)	DVF(a)	18_MCAB229 S1456508 (60)	DVF(a)
METALS											
SILVER	MG/KG	0.45	U	0.5	U	0.5	U	0.45	U	0.47	U
ALUMINUM	MG/KG	3580		11800		15200		4260		7560	
ARSENIC	MG/KG	1.9	b	3.3		4.7		1.9	b	2.3	
BARIUM	MG/KG	83.8		177		146		63.2		74.4	
BERYLLIUM	MG/KG	0.24	b	0.47	b	0.6	b	0.18	b	0.43	b
CALCIUM	MG/KG	5700		9650		12700		4380		1690	
CADMIUM	MG/KG	0.73	b	1.2		1.8		0.51	b	0.5	b
COBALT	MG/KG	2.1	b	5.8	b	4.9	b	2.4	b	2	b
CHROMIUM	MG/KG	5.4		14		14.8		9.2		13.4	
COPPER	MG/KG	4.5	b	10.2		9.4		4.5	b	6.2	
IRON	MG/KG	5990		16700		17300		6860		10500	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	1580		4260		3760		1380		1870	
MAGNESIUM	MG/KG	2640		7440		7700		2310		2430	
MANGANESE	MG/KG	117		271		256		125		184	
SODIUM	MG/KG	233	b	388	b	447	b	424	b	365	b
NICKEL	MG/KG	5.5	b	9.2	b	10.5		4.2	b	6.3	b
LEAD	MG/KG	0.9		2.3		2.8		1.5		2.8	
ANTIMONY	MG/KG	2.6	U	2.9	U	2.9	U	2.6	U	2.7	U
SELENIUM	MG/KG	0.11	U	0.12	U	0.12	U	0.11	U	0.11	U
THALLIUM	MG/KG	0.15	U	0.21	b	0.21	b	0.15	U	0.16	U
VANADIUM	MG/KG	17.8		44.6		49.4		15.3		21.3	
ZINC	MG/KG	19.6		51.6		49.7		19.3		24.7	
VOLATILE ORGANIC COMPOUNDS											
2-BUTANONE	UG/KG	11	U	11	U	12	U	11	U	11	U
ACETONE	UG/KG	11	U	11	U	12	U	11	U	5	J
METHYLENE CHLORIDE	UG/KG	11	U	11	U	12	U	11	U	11	U
TOLUENE	UG/KG	11	U	11	U	12	U	11	U	11	U
SEMIVOLATILE ORGANIC COMPOUNDS											
2-METHYLNAPHTHALENE	UG/KG	700	U	740	U	800	U	720	UJ	750	U
BENZYL BUTYL PHTHALATE	UG/KG	700	U	740	U	800	U	720	UJ	750	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	700	U	740	U	800	U	720	UJ	750	U
DIBENZOFURAN	UG/KG	700	U	740	U	800	U	720	UJ	750	U
NAPHTHALENE	UG/KG	700	U	740	U	800	U	720	UJ	750	U
PHENANTHRENE	UG/KG	700	U	740	U	800	U	720	UJ	750	U
PESTICIDES AND PCBs											
ALPHA-CHLORDANE	UG/KG	1.79	UJ	1.91	UJ	2.07	UJ	1.84	UJ	1.91	UJ
GAMMA-CHLORDANE	UG/KG	1.79	UJ	1.91	UJ	2.07	UJ	1.84	UJ	1.91	UJ
4,4'-DDD	UG/KG	3.48	UJ	3.7	UJ	4.03	UJ	3.57	UJ	3.71	UJ
4,4'-DDE	UG/KG	3.48	UJ	3.7	UJ	4.03	UJ	3.57	UJ	3.71	UJ
4,4'-DDT	UG/KG	3.48	UJ	3.7	UJ	4.03	UJ	3.57	UJ	3.71	UJ
ENDRIN KETONE	UG/KG	3.48	UJ	3.7	UJ	4.03	UJ	3.57	UJ	3.71	UJ
ENDRIN	UG/KG	3.48	UJ	3.7	UJ	4.03	UJ	3.57	UJ	3.71	UJ
ENDOSULFAN SULFATE	UG/KG	3.48	UJ	3.7	UJ	4.03	UJ	3.57	UJ	3.71	UJ
PCB-1260	UG/KG	34.8	UJ	37	UJ	40.3	UJ	35.7	UJ	37.1	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)											
TFH DIESEL	MG/KG	13.1	U	13.8	U	15.1	U	13.4	U	14.2	U
TFH GASOLINE	MG/KG	0.053	U	0.056	U	0.061	U	0.054	U	0.057	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)											
TRPH	MG/KG	20	U	20	U	29		23		20	U

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Appendix A3

Nature and Extent of Contamination: OU-1 (Site 18)
Background Soils

Appendix A3
BACKGROUND SOILS

This discussion of background soils is supplemented by the figures and data tables listed below. The figure is on page A3-3, and the tables are grouped at the end of this Appendix A3. Field headspace values for soils at this site are presented in Attachment 1 to this Appendix.

Figure A3-1: (Site Map)
Table A3-1: Background Soils: Type of Samples and Chemical Analyses
Table A3-2: Summary of Detected Chemicals in Background Surface/Near-Surface Soil Samples

A3.1 Purpose

Background soils were sampled and analyzed to establish the background concentrations of metals, pesticides, and herbicides for on-Station soils. This information is needed to evaluate whether on-Station concentrations of these chemicals have resulted from on-Station activities, rather than from the routine agricultural and residential application that is typical for off-Station soils.

A3.2 Methodology

Two groups of off-Station background shallow soil samples were collected. Samples in the first group (from 11 shallow soil borings) were analyzed for Target Analyte List (TAL) metals, as planned in the *SAP*. Samples in the second group (from 21 shallow soil borings) were analyzed for pesticides/PCBs and herbicides, as specified in the *SAP Amendment*. These background soil sampling locations were within 2 miles of the Station, and are shown on Figure A3-1.

The sampling locations for the first group of background samples (analyzed for metals) were selected randomly, and with the help of aerial photographs, from areas where human impact has been minimal. The sampling locations for the second group (analyzed for pesticides/PCBs and herbicides) were also selected randomly, with about

one-third of the locations distributed in agricultural areas, one-third in commercial areas, and one-third in residential areas.

For both groups, samples were collected at two depths: 0 to 6 inches and 18 to 24 inches. (The field methods for sample collection are described in Subsection 2.2.4.)

A field change resulted in two samples, located in the Bee Canyon Landfill, not being collected. No sample was collected at 00_BGA112 because the Landfill did not grant access to its property. No sample was collected at 00_BGN134 because the Landfill location did not meet the criterion that the sampling location be in an area of minimal human impact. (In the aerial photographs used to select locations, the landfill had not been observed to encompass the planned sampling locations.)

Twenty-three shallow soil samples (including 2 duplicates) were analyzed for metals, and 47 samples were analyzed for pesticides/PCBs and herbicides. Table A3-1 presents the types of samples and analyses.

A3.3 Analytical Results

The analytical results for the background soil samples are presented in Table A3-2. Statistical analysis and discussion of the results are being deferred until the Data Quality Objectives (DQOs) for MCAS El Toro have been developed.

Table A3-1
Background Soils: Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum

Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Surface Water and Sediments (NONE COLLECTED)															
Surface and Near-Surface Soils															
Agri. Area	00_BGA134	S1454589	0			X	X								
Agri. Area	00_BGA134	S1454590	2			X	X								
Agri. Area	00_BGA134	S1454602[b]	2			X	X								
Agri. Area	00_BGA156	S1454591	0			X	X								
Agri. Area	00_BGA156	S1454592	2			X	X								
Agri. Area	00_BGA178	S1454593	0			X	X								
Agri. Area	00_BGA178	S1454594	2			X	X								
Agri. Area	00_BGA212	S1454587	0			X	X								
Agri. Area	00_BGA212	S1454588	2			X	X								
Agri. Area	00_BGA234	S1454597	0			X	X								
Agri. Area	00_BGA234	S1454598	2			X	X								
Agri. Area	00_BGA234	S1454601[b]	2			X	X								
Agri. Area	00_BGA312	S1454599	0			X	X								
Agri. Area	00_BGA312	S1454600	2			X	X								
Com. Area	00_BGC212	S1454604	0			X	X								
Com. Area	00_BGC212	S1454605	2			X	X								
Com. Area	00_BGC212	S1454618[b]	2			X	X								
Com. Area	00_BGC312	S1454606	0			X	X								
Com. Area	00_BGC312	S1454607	2			X	X								
Com. Area	00_BGC334	S1454608	0			X	X								
Com. Area	00_BGC334	S1454609	2			X	X								
Com. Area	00_BGC356	S1454610	0			X	X								
Com. Area	00_BGC356	S1454611	2			X	X								
Com. Area	00_BGC378	S1454612	0			X	X								
Com. Area	00_BGC478	S1454613	2			X	X								
Com. Area	00_BGC412	S1454614	0			X	X								
Com. Area	00_BGC412	S1454615	2			X	X								
Com. Area	00_BGC434	S1454616	0			X	X								
Com. Area	00_BGC434	S1454617	2			X	X								

Table A3-1
Background Soils: Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum

Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Min. Impact	00_BGN111	S1456665	0							X					
Min. Impact	00_BGN111	S14566775	2							X					
Min. Impact	00_BGN112	S1456655	0							X					
Min. Impact	00_BGN112	S14566656	2							X					
Min. Impact	00_BGN134	S14566786	0							X					
Min. Impact	00_BGN134	S14566787	2							X					
Min. Impact	00_BGN156	S14566659	0							X					
Min. Impact	00_BGN156	S14566660	2							X					
Min. Impact	00_BGN156	S14566771[b]	2							X					
Min. Impact	00_BGN178	S1456661	0							X					
Min. Impact	00_BGN178	S1456662	2							X					
Min. Impact	00_BGN1910	S1456663	0							X					
Min. Impact	00_BGN1910	S1456664	2							X					
Min. Impact	00_BGN2910	S1456784	0							X					
Min. Impact	00_BGN2910	S1456785	2							X					
Min. Impact	00_BGN212	S1456776	0							X					
Min. Impact	00_BGN212	S1456777	2							X					
Min. Impact	00_BGN234	S1456778	0							X					
Min. Impact	00_BGN234	S1456779	2							X					
Min. Impact	00_BGN256	S1456780	0							X					
Min. Impact	00_BGN256	S1456773	2							X					
Min. Impact	00_BGN256	S1456781	2							X					
Min. Impact	00_BGN278	S1456782	0							X					
Min. Impact	00_BGN278	S1456783	2							X					
Res. Area	00_BGR112	S1454620	0			X	X								
Res. Area	00_BGR112	S1454621	2			X	X								
Res. Area	00_BGR134	S1454622	0			X	X								
Res. Area	00_BGR134	S1454623	2			X	X								
Res. Area	00_BGR312	S1454624	0			X	X								
Res. Area	00_BGR312	S1454636[b]	0			X	X								
Res. Area	00_BGR312	S1454625	2			X	X								

Table A3-1
Background Soils: Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum

Location/ Stratum	Station Identi-fication	Sample Identi-cation	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Res. Area	00_BGR334	S1454626	0			X	X								
Res. Area	00_BGR334	S1454627	2			X	X								
Res. Area	00_BGR356	S1454628	0			X	X								
Res. Area	00_BGR356	S1454629	2			X	X								
Res. Area	00_BGR356	S1454637[b]	2			X	X								
Res. Area	00_BGR378	S1454630	0			X	X								
Res. Area	00_BGR378	S1454631	2			X	X								
Res. Area	00_BGR390	S1454632	0			X	X								
Res. Area	00_BGR390	S1454633	2			X	X								
Res. Area	00_BGR412	S1454634	0			X	X								
Res. Area	00_BGR412	S1454635	2			X	X								
Vadose Zone Soils NONE COLLECTED															
Groundwater NONE COLLECTED															

[a] VOCs = Volatile Organic Compounds; Semi-VOCs = Semivolatile Organic Compounds; PCBs = Polychlorinated Biphenyls; TPH = Total Recoverable Petroleum Hydrocarbons; TFH = Total Fuel Hydrocarbons; CN = Total Cyanide; TOC = Total Organic Carbon.

[b] Duplicate

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGA134 S1454589 (0)	DVF(a)	00_BGA134 S1454590 (2)	DVF(a)	00_BGA134 S1454602 (2)	DVF(a)	00_BGA156 S1454591 (0)	DVF(a)	00_BGA156 S1454592 (2)	DVF(a)	00_BGA178 S1454593 (0)	DVF(a)	00_BGA178 S1454594 (2)	DVF(a)	00_BGA212 S1454587 (0)	DVF(a)
METALS																	
SILVER	MG/KG	-		-		-		-		-		-		-		-	
ALUMINUM	MG/KG	-		-		-		-		-		-		-		-	
ARSENIC	MG/KG	-		-		-		-		-		-		-		-	
BARIUM	MG/KG	-		-		-		-		-		-		-		-	
BERYLLIUM	MG/KG	-		-		-		-		-		-		-		-	
CALCIUM	MG/KG	-		-		-		-		-		-		-		-	
CADMIUM	MG/KG	-		-		-		-		-		-		-		-	
COBALT	MG/KG	-		-		-		-		-		-		-		-	
CHROMIUM	MG/KG	-		-		-		-		-		-		-		-	
COPPER	MG/KG	-		-		-		-		-		-		-		-	
IRON	MG/KG	-		-		-		-		-		-		-		-	
MERCURY	MG/KG	-		-		-		-		-		-		-		-	
POTASSIUM	MG/KG	-		-		-		-		-		-		-		-	
MAGNESIUM	MG/KG	-		-		-		-		-		-		-		-	
MANGANESE	MG/KG	-		-		-		-		-		-		-		-	
SODIUM	MG/KG	-		-		-		-		-		-		-		-	
NICKEL	MG/KG	-		-		-		-		-		-		-		-	
LEAD	MG/KG	-		-		-		-		-		-		-		-	
ANTIMONY	MG/KG	-		-		-		-		-		-		-		-	
SELENIUM	MG/KG	-		-		-		-		-		-		-		-	
THALLIUM	MG/KG	-		-		-		-		-		-		-		-	
VANADIUM	MG/KG	-		-		-		-		-		-		-		-	
ZINC	MG/KG	-		-		-		-		-		-		-		-	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.89	U	2.05	U	2.01	U	1.92	U	1.93	U	1.88	U	1.92	U	1.96	U
GAMMA-CHLORDANE	UG/KG	1.89	UJ	2.05	UJ	2.01	UJ	1.92	UJ	1.93	UJ	1.88	UJ	1.92	UJ	2.84	
4,4'-DDD	UG/KG	3.67	U	3.97	U	3.9	U	3.72	U	3.74	U	3.66	U	3.72	U	45.1	
4,4'-DDE	UG/KG	3.67	U	3.97	U	3.9	U	3.72	U	3.74	U	3.66	U	3.72	U	233	
4,4'-DDT	UG/KG	3.67	UJ	3.97	UJ	3.9	UJ	3.72	UJ	3.74	UJ	3.66	UJ	3.72	UJ	272	
DIELDRIN	UG/KG	3.67	UJ	3.97	UJ	3.9	UJ	3.72	UJ	3.74	UJ	3.66	UJ	3.72	UJ	118	
ENDRIN ALDEHYDE	UG/KG	3.67	U	3.97	U	3.9	U	3.72	U	3.74	U	3.66	U	3.72	U	41.7	
ENDRIN	UG/KG	3.67	UJ	3.97	UJ	3.9	UJ	3.72	UJ	3.74	UJ	3.66	UJ	3.72	UJ	19.9	
ENDOSULFAN SULFATE	UG/KG	3.67	U	3.97	U	3.9	U	3.72	U	3.74	U	3.66	U	3.72	U	3.81	U
ENDOSULFAN I	UG/KG	1.89	U	2.05	U	2.01	U	1.92	U	1.93	U	1.88	U	1.92	U	1.96	U
ENDOSULFAN II	UG/KG	3.67	U	3.97	U	3.9	U	3.72	U	3.74	U	3.66	U	3.72	U	10.6	
METHOXYCHLOR	UG/KG	18.9	U	20.5	U	20.1	U	19.2	U	19.3	U	18.8	U	19.2	U	19.6	U
HERBICIDES																	
MCPA	UG/KG	27700	U	30000	U	29500	U	27900	U	28400	U	27500	U	28000	U	28500	U
DICHLOROPROP	UG/KG	111	U	120	U	118	U	112	U	114	U	110	U	112	U	114	U

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGA212 S1454588 (2)	DVF(a)	00_BGA234 S1454597 (0)	DVF(a)	00_BGA234 S1454598 (2)	DVF(a)	00_BGA234 S1454601 (2)	DVF(a)	00_BGA312 S1454599 (0)	DVF(a)	00_BGA312 S1454600 (2)	DVF(a)	00_BGC212 S1454604 (0)	DVF(a)	00_BGC212 S1454605 (2)	DVF(a)
METALS																	
SILVER	MG/KG	-		-		-		-		-		-		-		-	
ALUMINUM	MG/KG	-		-		-		-		-		-		-		-	
ARSENIC	MG/KG	-		-		-		-		-		-		-		-	
BARIUM	MG/KG	-		-		-		-		-		-		-		-	
BERYLLIUM	MG/KG	-		-		-		-		-		-		-		-	
CALCIUM	MG/KG	-		-		-		-		-		-		-		-	
CADMIUM	MG/KG	-		-		-		-		-		-		-		-	
COBALT	MG/KG	-		-		-		-		-		-		-		-	
CHROMIUM	MG/KG	-		-		-		-		-		-		-		-	
COPPER	MG/KG	-		-		-		-		-		-		-		-	
IRON	MG/KG	-		-		-		-		-		-		-		-	
MERCURY	MG/KG	-		-		-		-		-		-		-		-	
POTASSIUM	MG/KG	-		-		-		-		-		-		-		-	
MAGNESIUM	MG/KG	-		-		-		-		-		-		-		-	
MANGANESE	MG/KG	-		-		-		-		-		-		-		-	
SODIUM	MG/KG	-		-		-		-		-		-		-		-	
NICKEL	MG/KG	-		-		-		-		-		-		-		-	
LEAD	MG/KG	-		-		-		-		-		-		-		-	
ANTIMONY	MG/KG	-		-		-		-		-		-		-		-	
SELENIUM	MG/KG	-		-		-		-		-		-		-		-	
THALLIUM	MG/KG	-		-		-		-		-		-		-		-	
VANADIUM	MG/KG	-		-		-		-		-		-		-		-	
ZINC	MG/KG	-		-		-		-		-		-		-		-	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	2.13	U	3.01		1.94	U	2.14	U	2.01	U	2	U	1.98	U	1.85	U
GAMMA-CHLORDANE	UG/KG	1.46		2.49		1.94	U	2.14	U	2.01	U	2	U	1.98	U	1.85	U
4,4'-DDD	UG/KG	1.5		4.58	U	3.77	U	4.16	U	58.6		18.6		3.84	U	3.59	U
4,4'-DDE	UG/KG	17.3		4.58	U	3.77	U	4.16	U	158		126		3.84	U	3.59	U
4,4'-DDT	UG/KG	34.2		18.4		3.77	U	4.16	U	208	J	255	J	3.84	U	3.59	U
DIELDRIN	UG/KG	6.6		4.58	U	3.77	U	4.16	U	3.9	U	3.87	U	3.84	U	3.59	U
ENDRIN ALDEHYDE	UG/KG	4.13	U	4.58	U	3.77	U	4.16	U	3.9	U	3.87	U	3.84	U	3.59	U
ENDRIN	UG/KG	1.01		4.58	U	3.77	U	4.16	U	3.9	U	3.87	U	3.84	U	3.59	U
ENDOSULFAN SULFATE	UG/KG	4.13	U	4.58	U	3.77	U	4.16	U	4.21		3.44		3.84	U	3.59	U
ENDOSULFAN I	UG/KG	2.13	U	2.36	U	1.94	U	2.14	U	0.144		0.179		1.98	U	1.85	U
ENDOSULFAN II	UG/KG	4.13	U	4.58	U	3.77	U	4.16	U	3.9	U	3.87	U	3.84	U	3.59	U
METHOXYCHLOR	UG/KG	21.3	U	23.6	U	19.4	U	21.4	U	20.1	U	20	U	19.8	U	18.5	U
HERBICIDES																	
MCPA	UG/KG	31200	U	16800	U	73400	U	127000		29700	U	29300	U	29000	U	26900	U
DICHLOROPROP	UG/KG	125	U	138	U	113	U	125	U	119	U	117	U	116	U	108	U

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGC212 S1454418 (2)	DVF(a)	00_BGC312 S1454606 (0)	DVF(a)	00_BGC312 S1454607 (2)	DVF(a)	00_BGC334 S1454608 (0)	DVF(a)	00_BGC334 S1454609 (2)	DVF(a)	00_BGC356 S1454610 (0)	DVF(a)	00_BGC356 S1454611 (2)	DVF(a)	00_BGC378 S1454612 (0)	DVF(a)
METALS																	
SILVER	MG/KG	-		-		-		-		-		-		-		-	
ALUMINUM	MG/KG	-		-		-		-		-		-		-		-	
ARSENIC	MG/KG	-		-		-		-		-		-		-		-	
BARIUM	MG/KG	-		-		-		-		-		-		-		-	
BERYLLIUM	MG/KG	-		-		-		-		-		-		-		-	
CALCIUM	MG/KG	-		-		-		-		-		-		-		-	
CADMIUM	MG/KG	-		-		-		-		-		-		-		-	
COBALT	MG/KG	-		-		-		-		-		-		-		-	
CHROMIUM	MG/KG	-		-		-		-		-		-		-		-	
COPPER	MG/KG	-		-		-		-		-		-		-		-	
IRON	MG/KG	-		-		-		-		-		-		-		-	
MERCURY	MG/KG	-		-		-		-		-		-		-		-	
POTASSIUM	MG/KG	-		-		-		-		-		-		-		-	
MAGNESIUM	MG/KG	-		-		-		-		-		-		-		-	
MANGANESE	MG/KG	-		-		-		-		-		-		-		-	
SODIUM	MG/KG	-		-		-		-		-		-		-		-	
NICKEL	MG/KG	-		-		-		-		-		-		-		-	
LEAD	MG/KG	-		-		-		-		-		-		-		-	
ANTIMONY	MG/KG	-		-		-		-		-		-		-		-	
SELENIUM	MG/KG	-		-		-		-		-		-		-		-	
THALLIUM	MG/KG	-		-		-		-		-		-		-		-	
VANADIUM	MG/KG	-		-		-		-		-		-		-		-	
ZINC	MG/KG	-		-		-		-		-		-		-		-	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.84	U	1.98	U	1.89	U	1.99	U	1.9	U	1.97	U	1.92	U	1.97	U
GAMMA-CHLORDANE	UG/KG	1.84	U	1.98	UJ	1.89	UJ	1.99	U	1.9	U	1.97	U	1.92	U	1.97	UJ
4,4'-DDD	UG/KG	3.58	U	3.84	U	3.68	U	6.43		5.17		22.6		3.73	U	3.82	UJ
4,4'-DDE	UG/KG	3.58	U	3.84	U	3.68	U	89.9		7.99		57.9		3.73	U	3.82	U
4,4'-DDT	UG/KG	3.58	U	3.84	UJ	3.68	UJ	97.6		3.69	U	52.2	J	3.73	U	3.82	U
DIELDRIN	UG/KG	3.58	U	3.84	U	3.68	U	6.21		3.69	U	3.82	U	3.73	U	3.82	U
ENDRIN ALDEHYDE	UG/KG	3.58	U	3.84	U	3.68	U	3.87	U	3.69	U	3.82	U	3.73	U	3.82	U
ENDRIN	UG/KG	3.58	U	3.84	U	3.68	U	3.87	U	3.69	U	3.82	U	3.73	U	3.82	U
ENDOSULFAN SULFATE	UG/KG	3.58	U	3.84	U	3.68	U	3.87	U	3.69	U	3.82	U	3.73	U	3.82	U
ENDOSULFAN I	UG/KG	1.84	U	1.98	U	1.89	U	1.99	U	1.9	U	1.97	U	1.92	U	1.97	U
ENDOSULFAN II	UG/KG	3.58	U	3.84	U	3.68	U	3.87	U	3.69	U	3.82	U	3.73	U	3.82	U
METHOXYCHLOR	UG/KG	18.4	U	17.5		18.9	U	19.9	U	19	U	19.7	U	19.2	U	19.7	U
HERBICIDES																	
MCPA	UG/KG	27000	U	29300	U	28400	U	29200	U	27800	U	28800	U	28500	U	27900	U
DICHLOROPROP	UG/KG	108	U	117	U	113	U	117	U	111	U	115	U	114	U	112	U

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGC378 S1454613 (2)	DVF(a)	00_BGC412 S1454614 (0)	DVF(a)	00_BGC412 S1454615 (2)	DVF(a)	00_BGC434 S1454616 (0)	DVF(a)	00_BGC434 S1454617 (2)	DVF(a)	00_BGN111 S1456665 (0)	DVF(a)	00_BGN111 S1456775 (2)	DVF(a)	00_BGN112 S1456656 (0)	DVF(a)
METALS																	
SILVER	MG/KG	-		-		-		-		-		0.44	U	0.44	U	0.44	U
ALUMINUM	MG/KG	-		-		-		-		-		4210		6630		9930	
ARSENIC	MG/KG	-		-		-		-		-		0.86	b	0.74	b	2.8	
BARIUM	MG/KG	-		-		-		-		-		40.1	b	35.2	b	63.4	
BERYLLIUM	MG/KG	-		-		-		-		-		0.37	U	0.36	U	0.35	b
CALCIUM	MG/KG	-		-		-		-		-		3220		2450		2000	
CADMIUM	MG/KG	-		-		-		-		-		0.65	b	0.25	U	0.75	b
COBALT	MG/KG	-		-		-		-		-		2.3	b	1.7	b	5.2	b
CHROMIUM	MG/KG	-		-		-		-		-		6.2		7.1		12.4	
COPPER	MG/KG	-		-		-		-		-		4.1	b	1.6	b	6.6	
IRON	MG/KG	-		-		-		-		-		3980		3580		12300	
MERCURY	MG/KG	-		-		-		-		-		0.05	U	0.03	U	0.41	
POTASSIUM	MG/KG	-		-		-		-		-		852	b	276	b	3110	
MAGNESIUM	MG/KG	-		-		-		-		-		1580		2500		3810	
MANGANESE	MG/KG	-		-		-		-		-		92.9		126		251	
SODIUM	MG/KG	-		-		-		-		-		181	b	203	b	224	b
NICKEL	MG/KG	-		-		-		-		-		5.3	b	4.6	b	5.7	b
LEAD	MG/KG	-		-		-		-		-		10.8		1.9		8.6	
ANTIMONY	MG/KG	-		-		-		-		-		2.5	U	2.6	U	2.5	U
SELENIUM	MG/KG	-		-		-		-		-		0.1	U	0.11	U	0.13	b
THALLIUM	MG/KG	-		-		-		-		-		0.15	U	0.15	U	0.19	b
VANADIUM	MG/KG	-		-		-		-		-		11		14.1		39.2	
ZINC	MG/KG	-		-		-		-		-		17.9		8.4		37.6	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.9	U	2.01	U	1.96	U	2.1	U	2.04	U	-		-		-	
GAMMA-CHLORDANE	UG/KG	1.9	UJ	2.01	U	1.96	U	2.1	UJ	2.04	UJ	-		-		-	
4,4'-DDD	UG/KG	3.68	UJ	6.19		3.81	U	4.07	UJ	3.97	UJ	-		-		-	
4,4'-DDE	UG/KG	3.68	U	5.62		3.81	U	4.07	U	3.97	U	-		-		-	
4,4'-DDT	UG/KG	3.68	U	31		3.81	U	4.07	U	3.97	U	-		-		-	
DIELDRIN	UG/KG	3.68	U	3.9	U	3.81	U	4.07	UJ	3.97	UJ	-		-		-	
ENDRIN ALDEHYDE	UG/KG	3.68	U	3.9	U	3.81	U	4.07	U	3.97	U	-		-		-	
ENDRIN	UG/KG	3.68	U	3.9	U	3.81	U	4.07	UJ	3.97	UJ	-		-		-	
ENDOSULFAN SULFATE	UG/KG	3.68	U	3.9	U	3.81	U	4.07	U	3.97	U	-		-		-	
ENDOSULFAN I	UG/KG	1.9	U	2.01	U	1.96	U	2.1	U	2.04	U	-		-		-	
ENDOSULFAN II	UG/KG	3.68	U	3.9	U	3.81	U	4.07	U	3.97	U	-		-		-	
METHOXYCHLOR	UG/KG	19	U	20.1	U	19.6	U	21	U	20.4	U	-		-		-	
HERBICIDES																	
MCPA	UG/KG	27300	U	29600	U	28900	U	30500	U	30100	U	-		-		-	
DICHLOROPROP	UG/KG	109	U	116	U	116	U	122	U	120	U	-		-		-	

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGN112 S1456656 (2)	DVF(a)	00_BGN134 S1456786 (0)	DVF(a)	00_BGN134 S1456787 (2)	DVF(a)	00_BGN156 S1456659 (0)	DVF(a)	00_BGN156 S1456660 (2)	DVF(a)	00_BGN156 S1456771 (2)	DVF(a)	00_BGN178 S1456661 (0)	DVF(a)	00_BGN178 S1456662 (2)	DVF(a)
METALS																	
SILVER	MG/KG	0.46	U	0.46	U	0.45	U	0.44	U	0.45	U	0.45	U	0.46	U	0.44	U
ALUMINUM	MG/KG	14000		7730		11200		6870		10500		10700		7970		6190	
ARSENIC	MG/KG	4.7		1.6	b	2.5		2.4		2.1	b	2	b	0.46	b	0.65	b
BARIUM	MG/KG	90.5		90.3		124		105		109		108		59.7		57.5	
BERYLLIUM	MG/KG	0.62	b	0.49	U	0.44	U	0.53	b	0.53	b	0.39	b	0.24	b	0.24	b
CALCIUM	MG/KG	2560		3430		4230		6150		5070		4830		4550		5810	
CADMIUM	MG/KG	0.84	b	2.6		1.5		1.3		1.2		1.6		0.38	b	0.43	b
COBALT	MG/KG	6.5	b	9.7	b	5	b	4.3	b	4.2	b	4.1	b	4	b	3.6	b
CHROMIUM	MG/KG	25.5		9.2		16		8		10.5		11.4		6.7		5.3	
COPPER	MG/KG	7.1		6.5		9.5		11.1		9		9.3		5.6		5.1	b
IRON	MG/KG	17400		10900		16300		9360		11600		12500		9640		8410	
MERCURY	MG/KG	0.03	U	0.04	U	0.04	U	0.09		0.03	U	0.09		0.04	b	0.03	U
POTASSIUM	MG/KG	3780		2990		2910		3290		2990		2870		2670		2020	
MAGNESIUM	MG/KG	6610		3160		4940		3270		3930		4030		3700		3290	
MANGANESE	MG/KG	236		574		195		276		272		264		185		174	
SODIUM	MG/KG	506	b	241	b	277	b	204	b	230	b	206	b	225	b	197	b
NICKEL	MG/KG	10.6		57.9		14.5		8	b	7.4	b	10.1		3.4	b	3	b
LEAD	MG/KG	2.9		4.9		1.9		22.4		2.3		2.1		4.9		1.6	
ANTIMONY	MG/KG	2.7	U	2.6	U	2.6	U	2.5	U	2.6	U	2.6	U	2.6	U	2.5	U
SELENIUM	MG/KG	0.22	b	0.11	U	0.21	b	0.1	U	0.11	U	0.11	U	0.16	b	0.1	U
THALLIUM	MG/KG	0.2	b	0.22	b	0.24	b	0.15	U	0.15	U	0.15	b	0.22	b	0.15	U
VANADIUM	MG/KG	65.4		26.5		44.8		20.8		25.7		26.8		24.4		21.5	
ZINC	MG/KG	48		41.7		46		45.4		35.3		35.1		32.1		25.4	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	-		-		-		-		-		-		-		-	
GAMMA-CHLORDANE	UG/KG	-		-		-		-		-		-		-		-	
4,4'-DDD	UG/KG	-		-		-		-		-		-		-		-	
4,4'-DDE	UG/KG	-		-		-		-		-		-		-		-	
4,4'-DDT	UG/KG	-		-		-		-		-		-		-		-	
DIELDRIN	UG/KG	-		-		-		-		-		-		-		-	
ENDRIN ALDEHYDE	UG/KG	-		-		-		-		-		-		-		-	
ENDRIN	UG/KG	-		-		-		-		-		-		-		-	
ENDOSULFAN SULFATE	UG/KG	-		-		-		-		-		-		-		-	
ENDOSULFAN I	UG/KG	-		-		-		-		-		-		-		-	
ENDOSULFAN II	UG/KG	-		-		-		-		-		-		-		-	
METHOXYCHLOR	UG/KG	-		-		-		-		-		-		-		-	
HERBICIDES																	
MCPA	UG/KG	-		-		-		-		-		-		-		-	
DICHLOROPROP	UG/KG	-		-		-		-		-		-		-		-	

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGN1910 S1456663 (0)	DVF(a)	00_BGN1910 S1456664 (2)	DVF(a)	00_BGN2910 S1456784 (0)	DVF(a)	00_BGN2910 S1456785 (2)	DVF(a)	00_BGN212 S1456776 (0)	DVF(a)	00_BGN212 S1456777 (2)	DVF(a)	00_BGN234 S1456778 (0)	DVF(a)	00_BGN234 S1456779 (2)	DVF(a)
METALS																	
SILVER	MG/KG	0.65	b	0.53	b	0.43	UJ	0.44	UJ	0.43	UJ	0.46	UJ	0.46	UJ	0.44	UJ
ALUMINUM	MG/KG	15300		12900		3270		3550		2640		3320		6250		6880	
ARSENIC	MG/KG	7.4		8.5		0.14	U	0.15	U	0.29	b	0.15	U	0.98	b	1.2	b
BARIUM	MG/KG	153		172		31.8	b	22.8	b	36	b	25.9	b	57.6		54.4	
BERYLLIUM	MG/KG	0.79	b	0.66	b	0.6	b	0.26	b	0.26	b	0.2	b	0.11	U	0.23	b
CALCIUM	MG/KG	55100		67600		2530		3060		2040		2250		1500		1530	
CADMIUM	MG/KG	10.6		11.4		0.25	U	0.25	U	0.25	U	0.26	U	0.65	b	0.46	b
COBALT	MG/KG	5.2	b	6	b	1.2	U	1.2	U	1.2	U	1.3	U	2	b	2.5	b
CHROMIUM	MG/KG	55		43.7		3.1	U	2.5	U	2.7	U	2.1	b	10.2		7.6	
COPPER	MG/KG	36.2		37.9		1.1	J	0.36	J	2	J	0.72	J	5.6		4.1	b
IRON	MG/KG	18500		17700		2310		2260		2310		1880		7540		8090	
MERCURY	MG/KG	0.11		0.12		0.03	U	0.03	U	0.03	b	0.03	U	0.04	b	0.03	U
POTASSIUM	MG/KG	6230		4880		891	b	435	b	890	b	353	b	2070		1350	
MAGNESIUM	MG/KG	13600		7630		944	b	969	b	1300		1440		2150		2170	
MANGANESE	MG/KG	263		241		49.6		49.6		49.3		13.9		171		97.4	
SODIUM	MG/KG	419	b	450	b	115	b	150	b	146	b	167	b	199	b	261	b
NICKEL	MG/KG	64.3		71.1		1.6	U	1.6	U	1.8	b	1.6	b	5.6	b	3.5	b
LEAD	MG/KG	12.4		4.8		1.6		0.67		6.3		1.1		17.6		2.2	
ANTIMONY	MG/KG	4.5	b	3	U	2.5	U	2.6	U	2.5	U	2.6	U	2.6	U	2.5	U
SELENIUM	MG/KG	0.37	b	0.32	b	0.1	U	0.11	U	0.1	U	0.13	U	0.11	U	0.1	U
THALLIUM	MG/KG	0.53	b	0.42	b	0.29	U	0.19	U	0.27	U	0.15	U	0.15	U	0.39	U
VANADIUM	MG/KG	134		117		5.4	b	6.1	b	5.1	b	5.4	b	16.9		19.2	
ZINC	MG/KG	99.5		97.9		10.8		9.6		12.9		6.2		26.7		19.2	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	-		-		-		-		-		-		-		-	
GAMMA-CHLORDANE	UG/KG	-		-		-		-		-		-		-		-	
4,4'-DDD	UG/KG	-		-		-		-		-		-		-		-	
4,4'-DDE	UG/KG	-		-		-		-		-		-		-		-	
4,4'-DDT	UG/KG	-		-		-		-		-		-		-		-	
DIELDRIN	UG/KG	-		-		-		-		-		-		-		-	
ENDRIN ALDEHYDE	UG/KG	-		-		-		-		-		-		-		-	
ENDRIN	UG/KG	-		-		-		-		-		-		-		-	
ENDOSULFAN SULFATE	UG/KG	-		-		-		-		-		-		-		-	
ENDOSULFAN I	UG/KG	-		-		-		-		-		-		-		-	
ENDOSULFAN II	UG/KG	-		-		-		-		-		-		-		-	
METHOXYCHLOR	UG/KG	-		-		-		-		-		-		-		-	
HERBICIDES																	
MCPA	UG/KG	-		-		-		-		-		-		-		-	
DICHLOROPROP	UG/KG	-		-		-		-		-		-		-		-	

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGN256 S1456780 (0)	DVF(a)	00_BGN256 S1456773 (2)	DVF(a)	00_BGN256 S1456781 (2)	DVF(a)	00_BGN278 S1456782 (0)	DVF(a)	00_BGN278 S1456783 (2)	DVF(a)	00_BGR112 S1454620 (0)	DVF(a)	00_BGR112 S1454621 (2)	DVF(a)	00_BGR134 S1454622 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.44	UJ	0.45	UJ	0.45	UJ	0.45	UJ	0.46	UJ	-		-		-	
ALUMINUM	MG/KG	4960		4740		3870		5250		4710		-		-		-	
ARSENIC	MG/KG	0.65	b	0.71	b	0.91	b	1.2	b	1.1	b	-		-		-	
BARIUM	MG/KG	43.9		45		42.6	b	62.2		54.2		-		-		-	
BERYLLIUM	MG/KG	0.26	b	0.26	b	0.27	b	0.24	b	0.11	b	-		-		-	
CALCIUM	MG/KG	5020		4810		4680		3330		2280		-		-		-	
CADMIUM	MG/KG	0.38	b	0.26	U	0.26	U	1.1	b	0.73	b	-		-		-	
COBALT	MG/KG	1.2	U	1.3	U	1.3	U	2.8	b	1.9	b	-		-		-	
CHROMIUM	MG/KG	4.5	U	4.5	U	4	U	6.5		5.8	U	-		-		-	
COPPER	MG/KG	4.3	b	1.6	J	1.4	J	4.7	b	3.2	b	-		-		-	
IRON	MG/KG	3890		3300		2790		7140		6310		-		-		-	
MERCURY	MG/KG	0.07		0.03	U	0.03	U	0.03	b	0.03	U	-		-		-	
POTASSIUM	MG/KG	1470		522	b	451	b	2250		1170		-		-		-	
MAGNESIUM	MG/KG	1580		1330		1140		2130		1920		-		-		-	
MANGANESE	MG/KG	105		64.3		59.8		150		118		-		-		-	
SODIUM	MG/KG	167	b	138	b	108	b	185	b	165	b	-		-		-	
NICKEL	MG/KG	3.4	b	2.2	b	1.7	U	6.4	b	5.3	b	-		-		-	
LEAD	MG/KG	10.6		1.4		1.1		10		1.4		-		-		-	
ANTIMONY	MG/KG	2.5	U	2.6	U	2.6	U	2.6	U	2.6	U	-		-		-	
SELENIUM	MG/KG	0.16	U	0.11	U	0.11	U	0.12	U	0.15	U	-		-		-	
THALLIUM	MG/KG	0.34	U	0.15	U	0.32	U	0.32	U	0.39	U	-		-		-	
VANADIUM	MG/KG	8.1	b	8.2	b	7.2	b	15.6		13.3		-		-		-	
ZINC	MG/KG	21.8		11.4		10.7		28.6		19.4		-		-		-	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	-		-		-		-		-		2	U	2.05	U	2.18	U
GAMMA-CHLORDANE	UG/KG	-		-		-		-		-		2	UJ	2.05	UJ	2.18	UJ
4,4'-DDD	UG/KG	-		-		-		-		-		3.89	UJ	3.98	UJ	4.24	UJ
4,4'-DDE	UG/KG	-		-		-		-		-		3.89	U	3.98	U	4.24	U
4,4'-DDT	UG/KG	-		-		-		-		-		3.89	U	3.98	U	4.24	U
DIELDRIN	UG/KG	-		-		-		-		-		3.89	UJ	3.98	UJ	4.24	UJ
ENDRIN ALDEHYDE	UG/KG	-		-		-		-		-		3.89	U	3.98	U	4.24	U
ENDRIN	UG/KG	-		-		-		-		-		3.89	UJ	3.98	UJ	4.24	UJ
ENDOSULFAN SULFATE	UG/KG	-		-		-		-		-		3.89	U	3.98	U	4.24	U
ENDOSULFAN I	UG/KG	-		-		-		-		-		2	U	2.05	U	2.18	U
ENDOSULFAN II	UG/KG	-		-		-		-		-		3.89	U	3.98	U	4.24	U
METHOXYCHLOR	UG/KG	-		-		-		-		-		20	U	20.5	U	21.8	U
HERBICIDES																	
MCPA	UG/KG	-		-		-		-		-		29800	U	30500	U	32200	U
DICHLOROPROP	UG/KG	-		-		-		-		-		119	U	122	U	129	U

Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGR134 S1454623 (0)	DVF(a)	00_BGR312 S1454624 (0)	DVF(a)	00_BGR312 S1454636 (0)	DVF(a)	00_BGR312 S1454625 (2)	DVF(a)	00_BGR334 S1454626 (0)	DVF(a)	00_BGR334 S1454627 (2)	DVF(a)	00_BGR356 S1454628 (0)	DVF(a)	00_BGR356 S1454629 (2)	DVF(a)
METALS																	
SILVER	MG/KG	-		-		-		-		-		-		-		-	
ALUMINUM	MG/KG	-		-		-		-		-		-		-		-	
ARSENIC	MG/KG	-		-		-		-		-		-		-		-	
BARIUM	MG/KG	-		-		-		-		-		-		-		-	
BERYLLIUM	MG/KG	-		-		-		-		-		-		-		-	
CALCIUM	MG/KG	-		-		-		-		-		-		-		-	
CADMIUM	MG/KG	-		-		-		-		-		-		-		-	
COBALT	MG/KG	-		-		-		-		-		-		-		-	
CHROMIUM	MG/KG	-		-		-		-		-		-		-		-	
COPPER	MG/KG	-		-		-		-		-		-		-		-	
IRON	MG/KG	-		-		-		-		-		-		-		-	
MERCURY	MG/KG	-		-		-		-		-		-		-		-	
POTASSIUM	MG/KG	-		-		-		-		-		-		-		-	
MAGNESIUM	MG/KG	-		-		-		-		-		-		-		-	
MANGANESE	MG/KG	-		-		-		-		-		-		-		-	
SODIUM	MG/KG	-		-		-		-		-		-		-		-	
NICKEL	MG/KG	-		-		-		-		-		-		-		-	
LEAD	MG/KG	-		-		-		-		-		-		-		-	
ANTIMONY	MG/KG	-		-		-		-		-		-		-		-	
SELENIUM	MG/KG	-		-		-		-		-		-		-		-	
THALLIUM	MG/KG	-		-		-		-		-		-		-		-	
VANADIUM	MG/KG	-		-		-		-		-		-		-		-	
ZINC	MG/KG	-		-		-		-		-		-		-		-	
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	2.04	U	2.11	U	2.06	U	1.92	U	2.18	U	1.98	U	2	U	17.7	
GAMMA-CHLORDANE	UG/KG	2.04	UJ	2.11	UJ	2.06	UJ	1.92	UJ	2.18	UJ	1.98	UJ	2	UJ	18	J
4,4'-DDD	UG/KG	3.97	UJ	4.1	U	3.99	UJ	3.73	UJ	4.24	UJ	3.84	UJ	3.87	UJ	4.1	UJ
4,4'-DDE	UG/KG	3.97	U	4.1	U	3.99	U	3.73	U	4.24	U	3.84	U	3.87	U	4.1	U
4,4'-DDT	UG/KG	3.97	U	4.1	UJ	3.99	UJ	3.73	UJ	4.24	U	3.84	U	3.87	U	4.1	U
DIELDRIN	UG/KG	3.97	UJ	4.1	U	3.99	U	3.73	U	4.24	UJ	3.84	UJ	3.87	U	4.1	U
ENDRIN ALDEHYDE	UG/KG	3.97	U	4.1	U	3.99	U	3.73	U	4.24	U	3.84	U	3.87	U	4.1	U
ENDRIN	UG/KG	3.97	UJ	4.1	U	3.99	U	3.73	U	4.24	UJ	3.84	UJ	3.87	U	4.1	U
ENDOSULFAN SULFATE	UG/KG	3.97	U	4.1	U	3.99	U	3.73	U	4.24	U	3.84	U	3.87	U	4.1	U
ENDOSULFAN I	UG/KG	2.04	U	2.11	U	2.06	U	1.92	U	2.18	U	1.98	U	2	U	2.11	U
ENDOSULFAN II	UG/KG	3.97	U	4.1	U	3.99	U	3.73	U	4.24	U	3.84	U	3.87	U	4.1	U
METHOXYCHLOR	UG/KG	20.4	U	21.1	U	29.4		19.2	U	21.8	U	19.8	U	20	U	21.1	U
HERBICIDES																	
MCPA	UG/KG	30300	U	31100	U	30400	U	28300	U	32200	U	28900	U	28500	U	29700	U
DICHLOROPROP	UG/KG	121	U	124	U	122	U	113	U	129	U	115	U	114	U	119	U

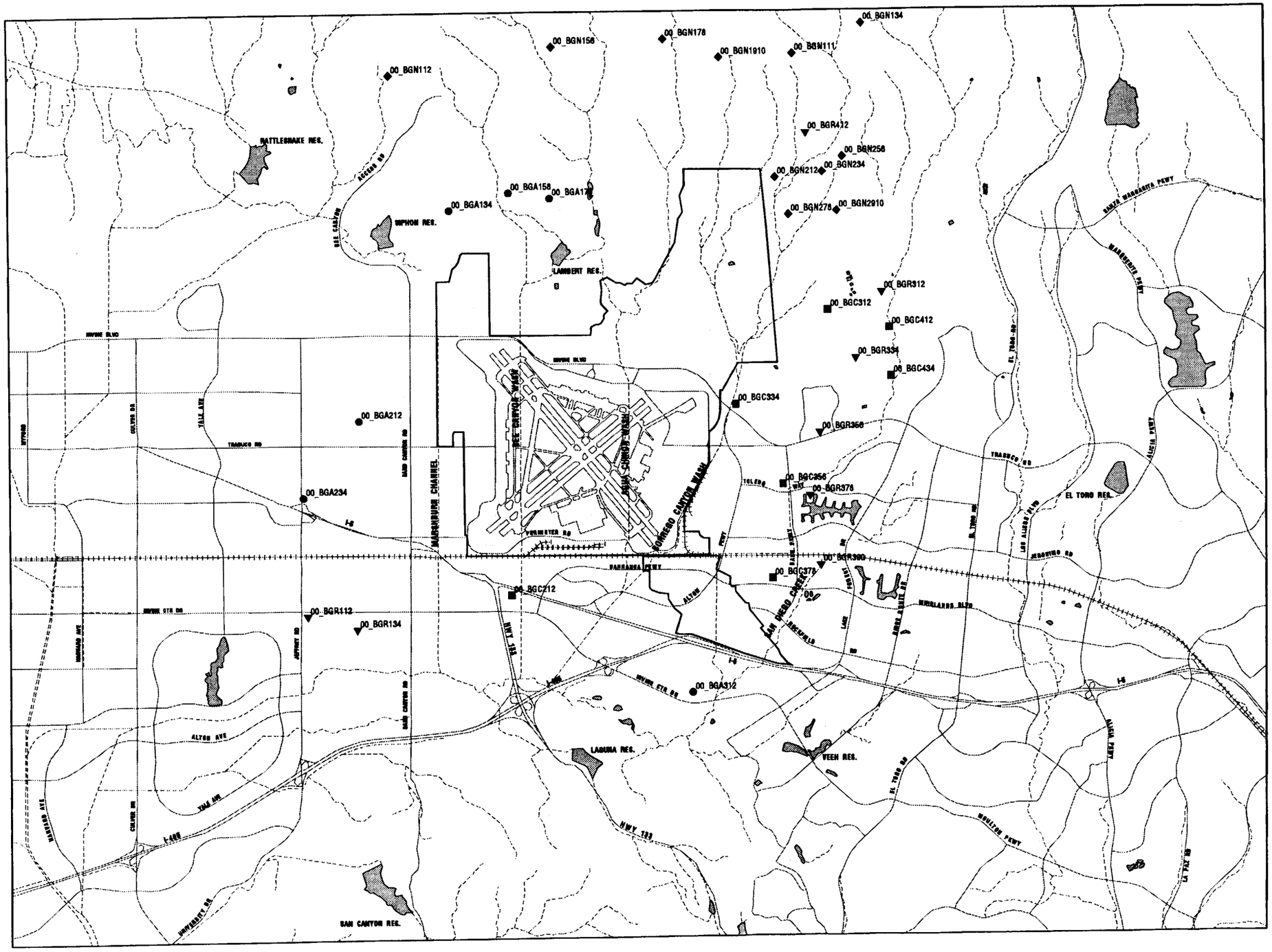
Table A3-2

Site 0 (OU- 0): Summary of Detected Chemicals in Background Surface/Near Surface Soil Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	00_BGR356 S1454637 (2)	DVF(a)	00_BGR378 S1454630 (0)	DVF(a)	00_BGR378 S1454631 (2)	DVF(a)	00_BGR390 S1454632 (0)	DVF(a)	00_BGR390 S1454633 (2)	DVF(a)	00_BGR412 S1454634 (0)	DVF(a)	00_BGR412 S1454635 (2)	DVF(a)		
METALS																	
SILVER	MG/KG	-		-		-		-		-		-		-			
ALUMINUM	MG/KG	-		-		-		-		-		-		-			
ARSENIC	MG/KG	-		-		-		-		-		-		-			
BARIUM	MG/KG	-		-		-		-		-		-		-			
BERYLLIUM	MG/KG	-		-		-		-		-		-		-			
CALCIUM	MG/KG	-		-		-		-		-		-		-			
CADMIUM	MG/KG	-		-		-		-		-		-		-			
COBALT	MG/KG	-		-		-		-		-		-		-			
CHROMIUM	MG/KG	-		-		-		-		-		-		-			
COPPER	MG/KG	-		-		-		-		-		-		-			
IRON	MG/KG	-		-		-		-		-		-		-			
MERCURY	MG/KG	-		-		-		-		-		-		-			
POTASSIUM	MG/KG	-		-		-		-		-		-		-			
MAGNESIUM	MG/KG	-		-		-		-		-		-		-			
MANGANESE	MG/KG	-		-		-		-		-		-		-			
SODIUM	MG/KG	-		-		-		-		-		-		-			
NICKEL	MG/KG	-		-		-		-		-		-		-			
LEAD	MG/KG	-		-		-		-		-		-		-			
ANTIMONY	MG/KG	-		-		-		-		-		-		-			
SELENIUM	MG/KG	-		-		-		-		-		-		-			
THALLIUM	MG/KG	-		-		-		-		-		-		-			
VANADIUM	MG/KG	-		-		-		-		-		-		-			
ZINC	MG/KG	-		-		-		-		-		-		-			
PESTICIDES AND PCBs																	
ALPHA-CHLORDANE	UG/KG	1.94	U	1.94	U	1.91	U	2.02	U	1.97	U	2.03	U	1.98	U		
GAMMA-CHLORDANE	UG/KG	1.94	UJ	1.94	UJ	1.91	UJ	2.02	UJ	1.97	UJ	2.03	UJ	1.98	UJ		
4,4'-DDD	UG/KG	3.77	UJ	3.76	UJ	3.71	UJ	3.92	UJ	3.83	UJ	3.93	UJ	3.85	UJ		
4,4'-DDE	UG/KG	3.77	U	6.15		3.71	U	3.92	U	3.83	U	3.93	U	3.85	U		
4,4'-DDT	UG/KG	3.77	U	5.21		3.71	U	3.92	U	3.83	U	3.93	U	3.85	U		
DIELDRIN	UG/KG	3.77	U	3.76	U	28.8		3.92	U	3.83	U	3.93	U	3.85	U		
ENDRIN ALDEHYDE	UG/KG	3.77	U	3.76	U	3.71	U	3.92	U	3.83	U	3.93	U	3.85	U		
ENDRIN	UG/KG	3.77	U	3.76	U	3.71	U	3.92	U	3.83	U	3.93	U	3.85	U		
ENDOSULFAN SULFATE	UG/KG	3.77	U	3.76	U	3.71	U	3.92	U	3.83	U	3.93	U	3.85	U		
ENDOSULFAN I	UG/KG	1.94	U	1.94	U	1.91	U	2.02	U	1.97	U	2.03	U	1.98	U		
ENDOSULFAN II	UG/KG	3.77	U	3.76	U	3.71	U	3.92	U	3.83	U	3.93	U	3.85	U		
METHOXYCHLOR	UG/KG	19.4	U	19.4	U	19.1	U	20.2	U	19.7	U	20.3	U	19.8	U		
HERBICIDES																	
MCPA	UG/KG	27800	U	27600	U	28400	U	29200	U	28000	U	28800	U	28800	U		
DICHLOROPROP	UG/KG	111	U	141		114	U	117	U	112	U	115	U	115	U		

(a) A definition of each data validation flag (DVF) is provided in Table B-1.



FEATURES:

- MCAS EL TORO
- LAKE OR RESERVOIR
- ROAD
- RAILROAD
- AIRFIELD
- WASH OR STREAM
- ● SAMPLE IN AGRICULTURAL AREA, ANALYZED FOR PESTICIDES AND HERBICIDES
- ■ SAMPLE IN COMMERCIAL AREA, ANALYZED FOR PESTICIDES AND HERBICIDES
- ▼ SAMPLE IN RESIDENTIAL AREA, ANALYZED FOR PESTICIDES AND HERBICIDES
- ◆ SAMPLE IN AREA OF MINIMAL HUMAN IMPACT, ANALYZED FOR METALS

N

0 2500 5000 10000

SCALE IN FEET

FIGURE A3-1

LOCATIONS OF OFF-STATION BACKGROUND SOIL SAMPLES

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

Appendix B

NATURE AND EXTENT OF CONTAMINATION: OU-2 AND OU-3 SITES

B1	Site 1 (OU-3)—Explosive Ordnance Disposal (EOD) Range
B2	Site 2 (OU-2)—Magazine Road Landfill
B3	Site 3 (OU-2)—Original Landfill
B4	Site 4 (OU-3)—Ferrocene Spill Area
B5	Site 5 (OU-2)—Perimeter Road Landfill
B6	Site 6 (OU-3)—Drop Tank Drainage Area No. 1
B7	Site 7 (OU-3)—Drop Tank Drainage Area No. 2
B8	Site 8 (OU-3)—DRMO Storage Yard
B9	Site 9 (OU-3)—Crash Crew Pit No. 1
B10	Site 10 (OU-2)—Petroleum Disposal Area
B11	Site 11 (OU-3)—Transformer Storage Area
B12	Site 12 (OU-3)—Sludge Drying Beds
B13	Site 13 (OU-3)—Oil Change Area
B14	Site 14 (OU-3)—Battery Acid Disposal Area
B15	Site 15 (OU-3)—Suspended Fuel Tanks
B16	Site 16 (OU-3)—Crash Crew Pit No. 2
B17	Site 17 (OU-2)—Communication Station Landfill
(B18)	(For Site 18, Refer to Appendix A, OU-1).
B19	Site 19 (OU-3)—Aircraft Expeditionary Refueling (ACER) Site
B20	Site 20 (OU-3)—Hobby Shop
B21	Site 21 (OU-3)—Materials Management Group, Building 320
B22	Site 22 (OU-3)—Tactical Air Fuel Dispensing System

Appendix B

NATURE AND EXTENT OF CONTAMINATION: OU-2 AND OU-3

This appendix presents a full discussion, with supporting figures and data tables, of the nature and extent of contamination detected at each of the 21 sites within Operable Units (OUs) 2 and 3 during the Phase I Remedial Investigation at MCAS El Toro (Station). (OU-1 and its Site 18 are discussed in Appendix A.)

B.1 OU-2 and OU-3 Sites

The number of each "subappendix" corresponds with the number of the site discussed; e.g., Appendix B1 discusses Site 1.

OU-2 comprises five sites:

Site 2 - Magazine Road Landfill
Site 3 - Original Landfill
Site 5 - Perimeter Road Landfill
Site 10 - Petroleum Disposal Area
Site 17 - Communication Station Landfill

OU-3 comprises the remaining 16 sites:

Site 1 - Explosive Ordnance Disposal Range
Site 4 - Ferrocene Spill Area
Site 6 - Drop Tank Drainage Area No. 1
Site 7 - Drop Tank Drainage Area No. 2
Site 8 - DRMO Storage Yard
Site 9 - Crash Crew Pit No. 1
Site 11 - Transformer Storage Area
Site 12 - Sludge Drying Beds
Site 13 - Oil Change Area
Site 14 - Battery Acid Disposal Area
Site 15 - Suspended Fuel Tanks
Site 16 - Crash Crew Pit No. 2
Site 19 - Aircraft Expeditionary Refueling (ACER) Site
Site 20 - Hobby Shop
Site 21 - Materials Management Group, Building 320
Site 22 - Tactical Air Fuel Dispensing System

B.2 Organization of Appendixes B1 through B22

The information in each of the following appendixes is organized as follows:

- Site description (physical and functional), with site map and geologic cross section (See Figure B-1 for locations of cross section lines)

- Suspected types of waste and contaminants

- Phase I RI field investigation activities, by sampling medium:
  Surface water runoff and sediment (Site 2 and 3 only)
  Surface and near-surface (shallow) soil (less than 4 feet deep)
  Vadose zone (subsurface) soil (greater than 5 feet deep)
  Groundwater

- For each type of sampling medium:

  Description and location(s) of samples collected

  Results of laboratory analyses to detect chemicals in samples, by type:

  Hydrocarbons: TRPH (total recoverable petroleum hydrocarbons), TFH-diesel (total fuel hydrocarbons, diesel), and TFH-gasoline (total fuel hydrocarbons, gasoline)

  Volatile organic compounds (VOCs), e.g. TCE (trichloroethylene) and PCE (tetrachloroethylene)

  Semivolatile organic compounds (SVOCs)

  Pesticides, polychlorinated biphenyls (PCBs), and herbicides

  Metals and cyanide (TCN)

  Dioxins and furans (if any)

  General chemistry

  Total organic carbon (TOC)

  Gross alpha and beta particle activity (if any)

- Potential pathways for contaminants (if any) to migrate (to groundwater)

- Summary and conclusions, including potential impact on regional groundwater

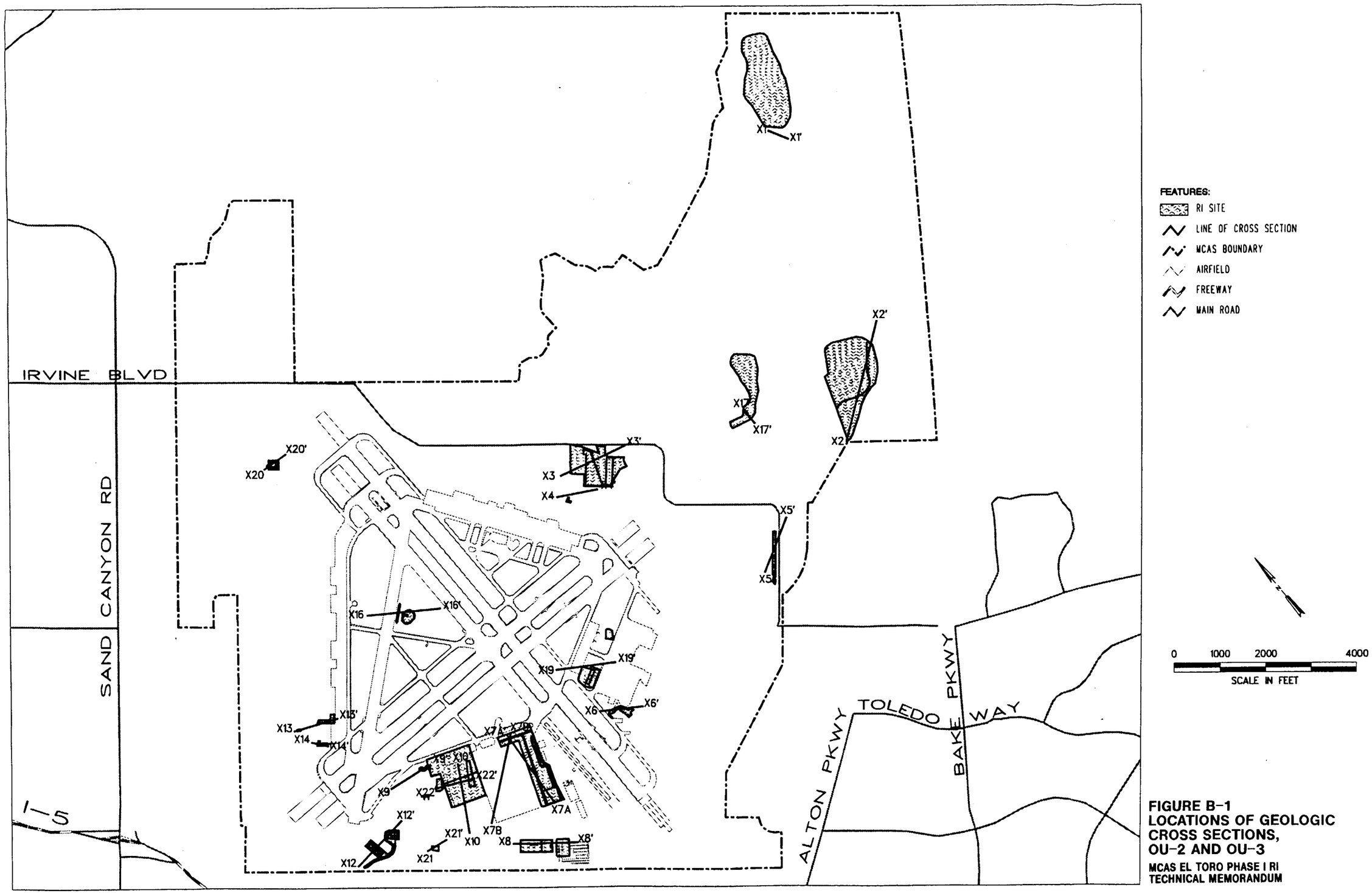


FIGURE B-1
LOCATIONS OF GEOLOGIC CROSS SECTIONS, OU-2 AND OU-3
MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

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B.3 Figures and Data Tables

Each subappendix contains a site map, a geologic cross-section of the site (except for Site 11), and any other pertinent graphics. Figure B-1 (next page) shows the locations of all the cross-sections. Tables at the end of each subappendix present the types of chemical analyses performed (by sample), well construction information, hydraulic parameters, and analytical results (by sampling medium).

B.4 Field Investigation Activities

In general, the types of field investigation activities at each site were:

- Drilling shallow boreholes and collecting surface and near-surface soil samples
- Drilling a deep borehole (greater than 25 feet) and collecting soil samples at various depths
- Completing a borehole as a monitoring well after drilling to groundwater depth, and collecting groundwater samples
- Drilling angle borings under areas inaccessible by vertical drilling and collecting soil samples
- Collecting samples of surface water runoff during rainstorms
- Collecting samples of sediment

(Not all activities were carried out at each site.)

B.5 Soil Vapor Headspace Concentrations

Soil vapor headspace concentrations were measured for soil samples taken during drilling of monitoring wells or deep borings or and during surface and near-surface soil sampling. A known quantity of the sampled soil was placed into a Zip-lock Baggie, and after the sample had equilibrated for approximately one half hour, the headspace concentration was measured with a total organic vapor analyzer to test for the presence of volatile organic compounds in soil. The resulting headspace values are presented in Attachment 1 to this appendix.

B.6 Comparison Criteria for Environmental Samples

Analyses of groundwater were compared to Federal and California State drinking water standards. The standards are the EPA Primary Maximum Contaminant Level (MCL), the California MCL, the EPA Secondary MCL, and the California EPA - Department of Toxic Substances Control (DTSC) Action Levels. A brief description of these standards is summarized below:

EPA Primary MCL	Federally enforceable drinking water standard established for the health effects of contaminants
EPA Secondary MCL	Nonenforceable standard based on aesthetic qualities of taste, color, and odor (includes chloride, sulfate, TDS, iron, and manganese)
California MCL	Health-based drinking water standard enforceable at the State level
DTSC Action Level	Nonenforceable levels at which DTSC strongly urges water purveyors to take corrective action to reduce the level of contamination in the water they supply. Action levels cease to exist when state MCLs are promulgated.

The most stringent federal/state standard was applied. In the presence of both an EPA MCL and a California MCL, the most stringent MCL was used. If neither an EPA or California MCL was available, the California State Action Level was used.

Concentrations of Total Recoverable Petroleum Hydrocarbons (TRPH), Total Fuel Hydrocarbons (TFH) - gasoline, and TFH-diesel in soils were compared to California Leaking Underground Fuel Tank (LUFT) standards.

B.7 Laboratory Contaminants

Concentrations of contaminants below the laboratory contract-required detection limit (CRDL) are generally considered estimated concentrations. These data usually appear in the database and the summary tables used in this report with a "J" flag. Acetone, methylene chloride, and 2-butanone are commonly occurring laboratory contaminants that were detected in many environmental samples in low concentrations. The presence

of these chemicals in the environmental samples should be considered tentative, and the concentrations approximate.

B.8 Site Data in Other Appendixes

The following other appendixes to this Technical Memorandum contain additional detailed data and supporting information about the sampling activities and analytical results at the OU-2 and OU-3 Phase I RI sites:

Appendix C:	Minimum/Maximum Concentrations and Tentaitvely Identified Compounds
Appendix D:	Bar Concentration Plots for Detected Chemicals
Appendix E:	Monitoring Well Completion Information
Appendix F:	Aquifer Test Analysis
Appendix G:	Westbay Well Reports
Appendix H:	Risk Assessment Documentation
Appendix I:	Hydrographs
Appendix J:	Stiff-type Piper Diagrams
Appendix K:	Geologic Logs of Borings

B.9 Sampling Stations

All samples collected from one sampling location (station) have the same station identification (ID). Each station ID includes the site number and the function and/or location of the station within the site, according to the following code:

Site: The first two digits (followed by an underscore) designate the site number; e.g., "07_" = Site 7. This Appendix B covers OU-2 and OU-3 sites, and so includes Sites 1-7 and 19-22.

Site 18 ("18_" sampling stations are part of the OU-1 regional groundwater contamination investigation, and as such are discussed in Appendixes A1 and A2. Off-Station background (soils) sampling stations have been arbitrarily designated Site 0 ("00_"), and are discussed in Appendix A3.

Function/Location: The remaining characters (alone or in combination) designate the function and/or location within the site of the sampling station:

25B	=	25-foot boring
AB	=	60-foot-long, 30-degree angle boring
AC	=	Agua Chinon Wash
BE	=	Bee Canyon Wash
BG	=	Background (off-Station) soil sample ("00_" and "18_" sites): BGA =Agricultural Area, PCBs, and pesticides/herbicides BGC =Commercial Area, PCBs, and pesticides/herbicides BGN =Metals
BGR	=	Residential Area, PCBs, and pesticides/herbicides
BO	=	Borrego Canyon Wash
CB	=	Catch Basin
DB	=	Deep Boring into or adjacent to the source of suspected site contamination
DC	=	San Diego Creek
DD	=	Drainage ditch
DG	=	Location Downgradient from suspected site contamination
EF	=	East Fork of Borrego Canyon Wash
FB	=	Fuel Bladder
GN	=	Sample within the general boundaries of a site
HY	=	Fire Hydrant (at given site or well; no survey point)
LF	=	Landfill
MC	=	Marshburn Channel
MM	=	Manmade channel
MP	=	Multiport (Westbay) well completion
MW	=	Monitoring Well
NP	=	Edge of the New Pavement
OP	=	Edge of the Old Pavement
PCB	=	Polychlorinated Biphenyl (PCB)
PT	=	Pit or trench area
R	=	Rinsate or equipment blank (no survey point)
RE	=	Refuse area
RIG	=	Well drilling rig (and number); no survey point
S	=	Soil or sediment sample associated with other identifier
SA	=	Stained Area
SL	=	Sludge drying area or sludge storage area
ST	=	Storage area
T	=	Trip blank (no survey point)
UG	=	Location Upgradient from suspected site contamination
WF	=	West Fork of Borrego Canyon Wash
X	=	Extra location (may or may not have a survey point)

B.10 Samples

B.10.1 Sample Identification Codes

Each Phase I RI sample is identified by a unique 8-character sample ID: **S145xxxx**.

"S" indicates that this is a sample number.

"145" indicates Contract Task Order (CTO) 145, the MCASEI Toro RI/FS.

"xxxx" indicates the sample medium:

0001-0099 = Surface water runoff (ETSW prefix for Rounds 1 & 2)
1000-1999 = Sediment
2000-3999 = Groundwater
4000-5999 = Surface/near-surface (shallow) soil ($\leq$4 feet)
6000-7900 = Vadose zone (subsurface) soil (>5 feet)
8000-8999 = Wastewater
9000-9999 = Waste soils

B.10.2 Sample Depth

To determine the vertical location (depth in feet bgs) of a sample, refer to:

Table A1-2 (for OU-1/Site 18 groundwater samples)
Table A2-1 (for OU-1/Site 18) (Surface water and sediment samples)
Table A3-1 (for OU-1/Site 0 background soil samples)
Tables B1-1 through B22-1 (for OU-2 and OU-3, Sites 1-17 and 18-22)

Only upper depths are given, except for groundwater samples, where the upper depth and lower depth indicate the top and bottom, respectively, of the screened interval.

B.11.3 Sample Analysis and Data

Units of Measurement:

ug/L	=	Micrograms per liter
mg/L	=	Milligrams per liter
ug/kg	=	Micrograms per kilogram (ppb)
mg/kg	=	Milligrams per kilogram (ppm)
mg/kgw	=	Milligrams per kilogram by weight
pCi/L	=	PicoCuries per liter
ppmv	=	Parts per million by volume
ng/g	=	Nanograms per gram (ppb)

Data Source (Analytical Laboratory or OCWD):

S3	=	Maxwell Labs, Inc., S-Cubed Division P. O. Box 1620 La Jolla, CA 92038
CH2	=	CH2M HILL Quality Analytical Laboratory 5090 Caterpillar Road Redding, CA 96003
ENS	=	Enseco, Inc.
OCD	=	Orange County Water District (Laboratory not necessarily indicated.)

Data Validation Flags:

b (Inorganics) Reported value was less than the contract-required detection limit (CRDL), but greater or equal to the instrument detection limit (IDL).

J (Organics) Reported value was less than the CRDL but less than the IDL.

D Analysis is from a diluted sample.

U Value is less than the IDL or was not detected.

UJ Analyte was undetected, but analysis could be a false negative.

Appendix B1

Nature and Extent of Contamination:
Site 1 (OU-3) — Explosive Ordnance Disposal (EOD) Range

Appendix B1

NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION: SITE 1 (OU-3) - EXPLOSIVE ORDNANCE DISPOSAL (EOD) RANGE

This discussion of Site 1 is supplemented by the figures and data tables listed below. The figures begin on page B1-3, and the tables are grouped at the end of this Appendix B1. Field headspace values for soils at this site are presented in Table BA1-1, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B1-1: (Site Map)
Figure B1-2: Geologic Cross Section
Figure B1-3: SCS Soils Map
Figure B1-4: Geology Map

Table B1-1: Types of Samples and Chemical Analyses
Table B1-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil
Table B1-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples
Table B1-4: Well Construction Details
Table B1-5: Summary of Hydraulic Parameters
Table B1-6: Summary of Detected Chemicals in Groundwater Samples
Table B1-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B1.1 Site Description

Site 1 (OU-3), the Explosive Ordnance Disposal (EOD) Range, is located in the extreme northeast portion of MCAS El Toro, in the foothills of the Santa Ana Mountains. The site consists of one stratum, the general EOD Range.

It is not known how long this site has been used for EOD operations. Trench activities and staining were first observed in 1952, with most of the initial activities occurring in the extreme southern portion of the site. Post-1952 activities occurred north of the original trench activity (*SAP Amendment*). The site is normally used for the detonation and disposal of small munitions (flares and small ordnance). In 1982, about 2,000 gallons of sulfur trioxide chlorosulfonic acid (FS smoke) were disposed of in trenches in the northern part of the site. The disposal method was to partially bury the

drums and rupture them with a small explosive charge. Brown and Caldwell (1986) estimated that as much as 75 percent (1,500 gallons) may have remained after the explosion. There are also unsubstantiated reports that a portion of the site was used to dispose of low-level radioactive material.

It is unknown whether undetonated explosives or drums are still present at the EOD range, buried beneath the soil. At present, munitions are exploded in shallow trenches, which are continually being filled with soil and re-excavated. During this process, and during disking at the site, the soil is thoroughly mixed and former site features are obliterated.

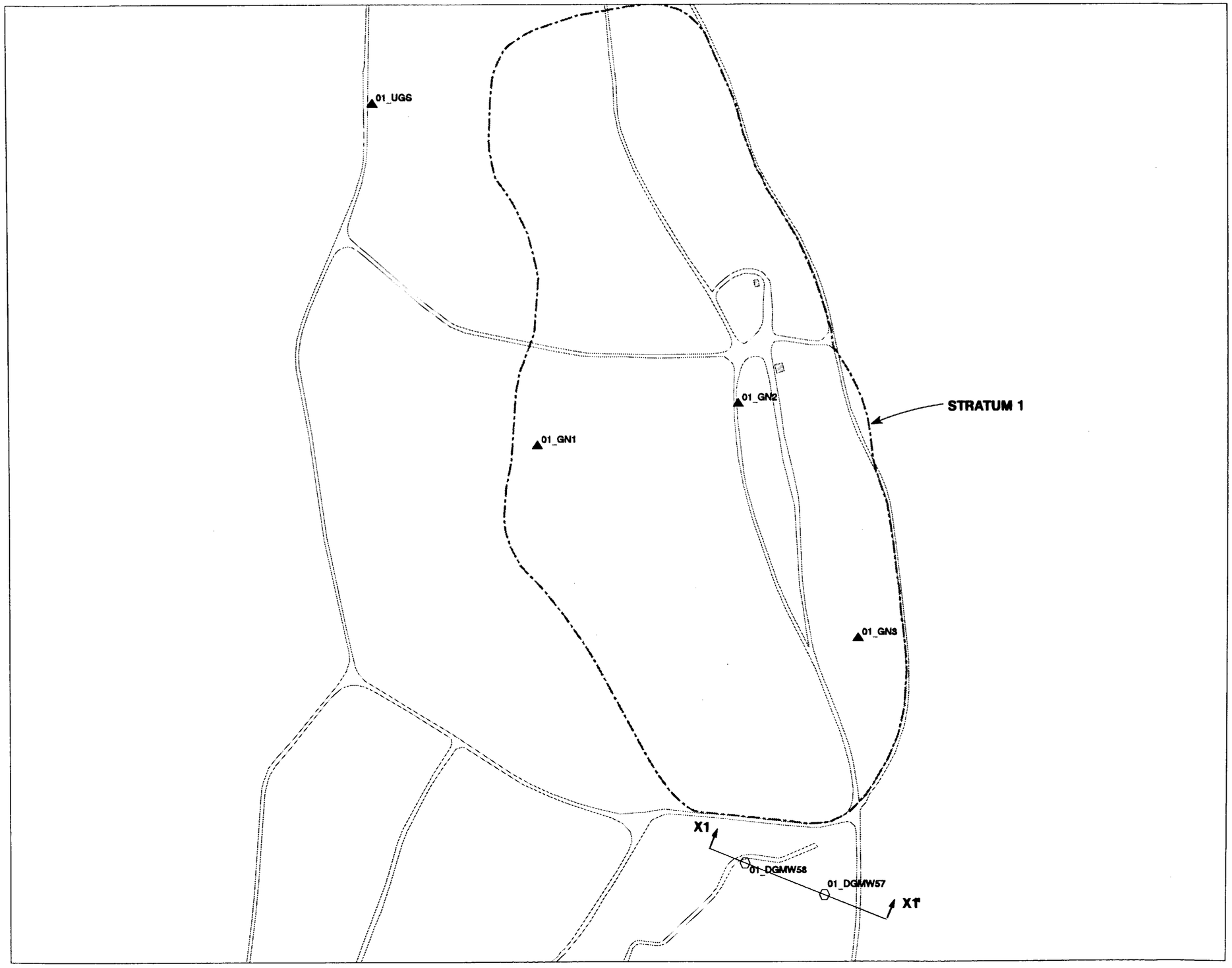
B1.2 Suspected Waste Types and Contaminants

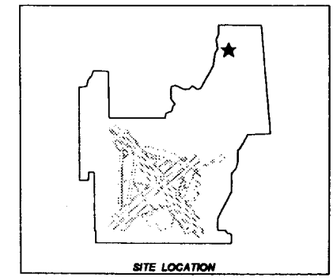
The suspected types of contaminants from the above operations are metals and nitrated toluenes from explosive ordnance disposal, sulfates and acidic wastes from the FS smoke disposal operations, and radioactive isotopes from the alleged low-level radioactive materials disposal. FS smoke is a water-reactive compound that degrades to an acidic material on contact with water. Because of the potential danger of explosion, no drilling or hand auguring was conducted on the EOD Range.

B1.3 Field Investigation

The field investigation at Site 1 consisted of drilling and sampling two downgradient monitoring wells (01_DGMW57 and 01_DGMW58) and collecting four at-surface soil samples (01_UG, 01_GN1, 01_GN2, and 01_GN3). Because of the retention pond berm immediately upgradient from the site, the permeable soil, and the obliteration of the natural drainageway through disking, surface water is not expected to be a significant contaminant pathway. Therefore, no surface water or drainage sediment samples were collected.

Several changes were made to the number of sample locations at Site 1 from the original *SAP*, as documented in the *SAP Amendment*. The number of groundwater wells was reduced from three to two, and the number of surface soil samples was reduced from eight to four. Several changes from the *SAP Amendment* were made in the field.





FEATURES:

- BUILDING OR PAD
- MONITORING WELL
- DEEP, 25-FOOT, OR ANGLE BORING
- SEDIMENT SAMPLE
- SURFACE WATER AND SEDIMENT SAMPLE
- SURFACE AND NEAR-SURFACE SOIL SAMPLE
- ROAD
- STRATUM BOUNDARY
- WASH OR STREAM
- LINE OF GEOLOGIC CROSS-SECTION
- END OF LINE OF CROSS-SECTION
- LINE OF CROSS-SECTION EXTENDS BEYOND AREA SHOWN

0 100 200 400

SCALE IN FEET

FIGURE B1-1

SITE 1 (OU-3): EXPLOSIVE ORDNANCE DISPOSAL RANGE

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

PAGE NUMBER B1-4

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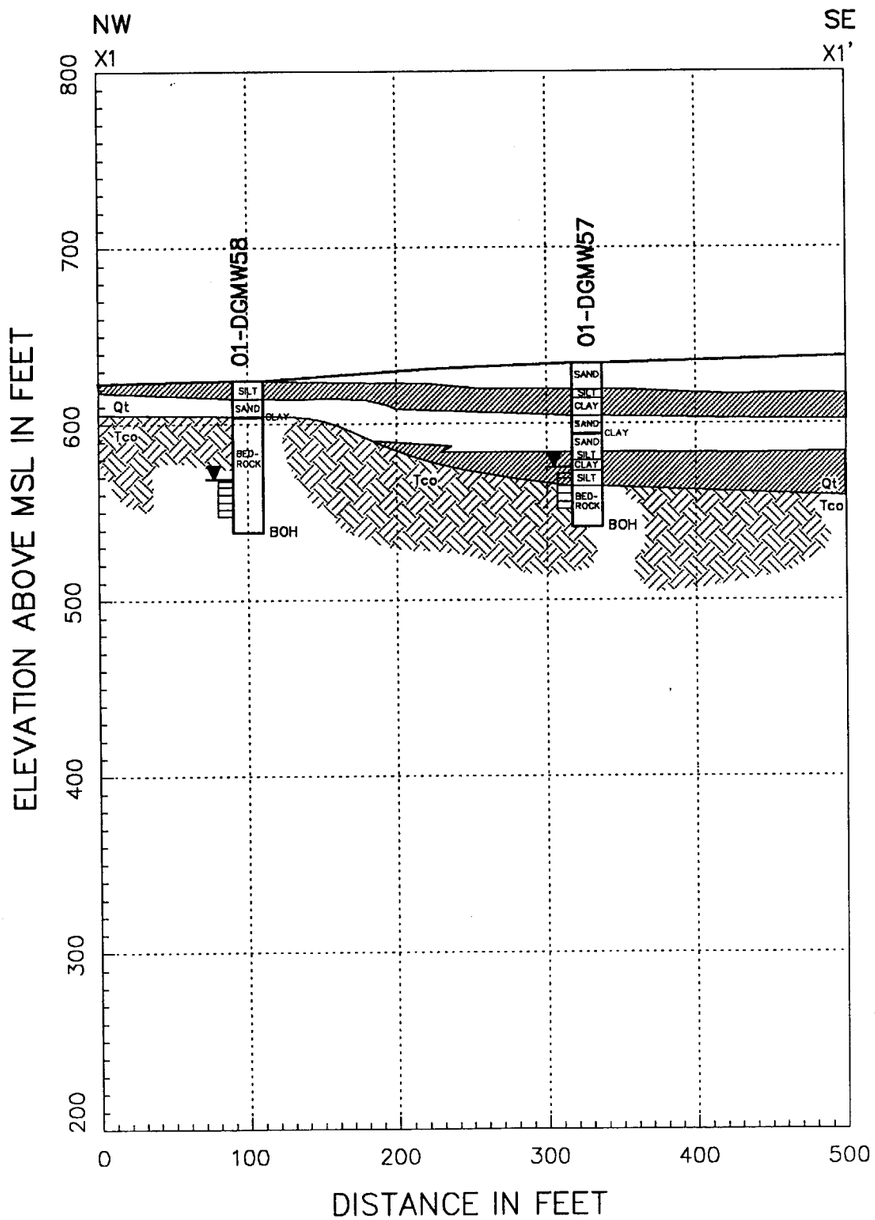
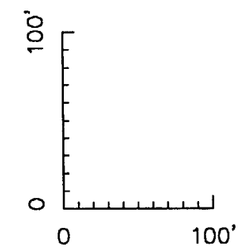


HORIZ. SCALE: 1"=100'
VERT. SCALE: 20% EXAGGERATION



LEGEND

- UNCONSOLIDATED PERMEABLE SEDIMENTS
- UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS
- SEMICONSOLIDATED LOW-PERMEABILITY SEDIMENTS
- Qt — QUATERNARY, TERRACE DEPOSITS
- Tco — TERTIARY, CAPISTRANO FM., OSO MEMBER
- BOH — BOTTOM OF HOLE
- WELL SCREEN INTERVAL
- WATER LEVEL ELEVATION, DECEMBER 1992

FIGURE B1-2
SITE 1 (OU-3)
GEOLOGIC CROSS SECTION X1-X1'
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

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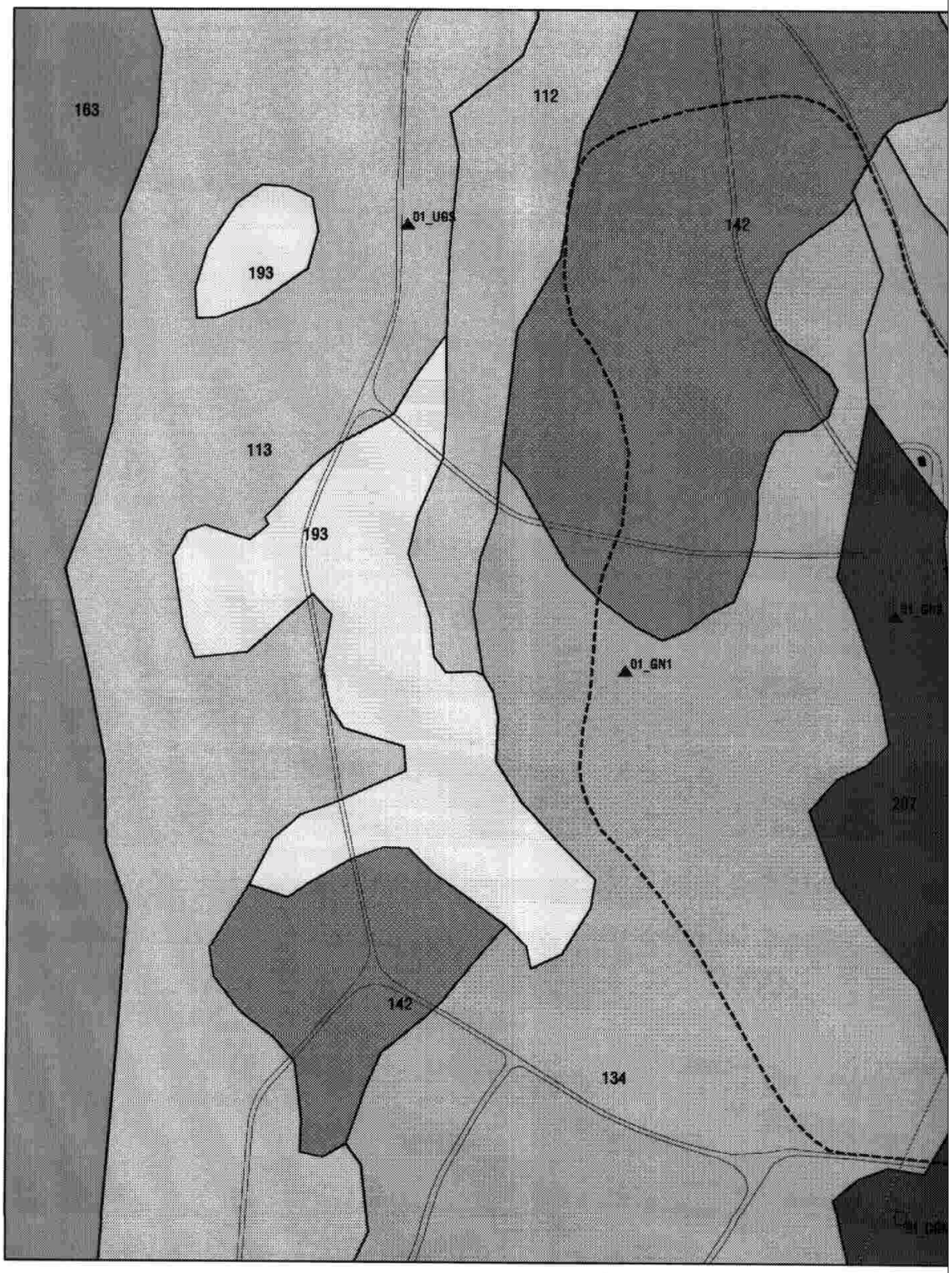
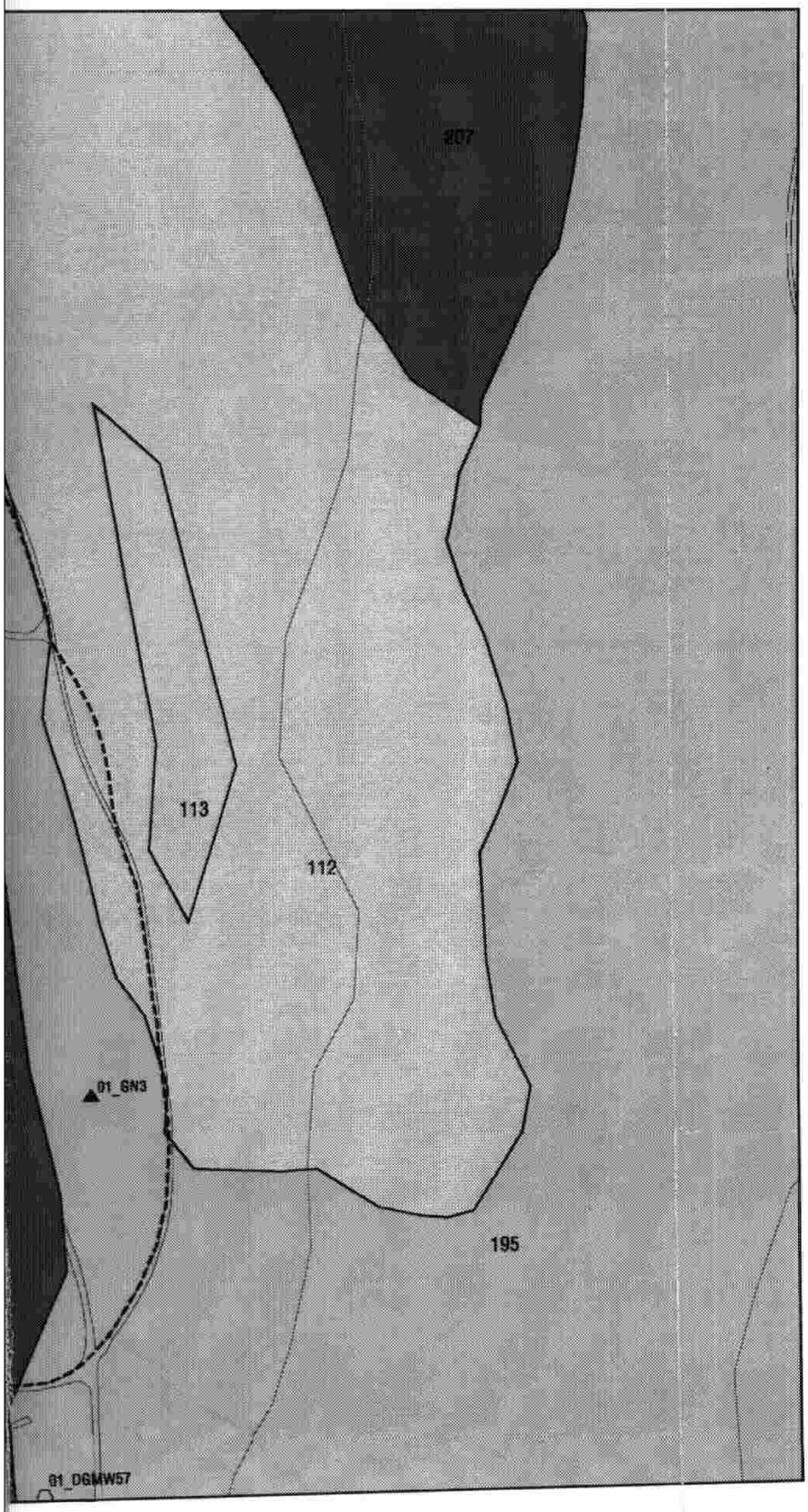

163
112
01_UG5
142
193
113
193
01_GN2
01_GN1
207
142
134



FEATURES:

- 112 - BALCOM
- 113 - BALCOM
- 134 - CALLEGUAS
- 142 - CIENEBA
- 163 - METZ
- 193 - SAN ANDREAS
- 195 - SAN EMIGDIO
- 207 - SORRENTO
- BUILDINGS
- SITE BOUNDARY
- ROAD
- WASH OR STREAM
- MONITORING WELL
- DEEP, 25-FOOT, OR ANGLE BORING
- SEDIMENT SAMPLE
- SURFACE WATER AND SEDIMENT SAMPLE
- SURFACE AND NEAR-SURFACE SOIL SAMPLE

SOURCE: SCS, 1978

N

0 100 200 400

SCALE IN FEET

FIGURE B1-3

SITE 1 (OU-3): SCS SOILS MAP

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

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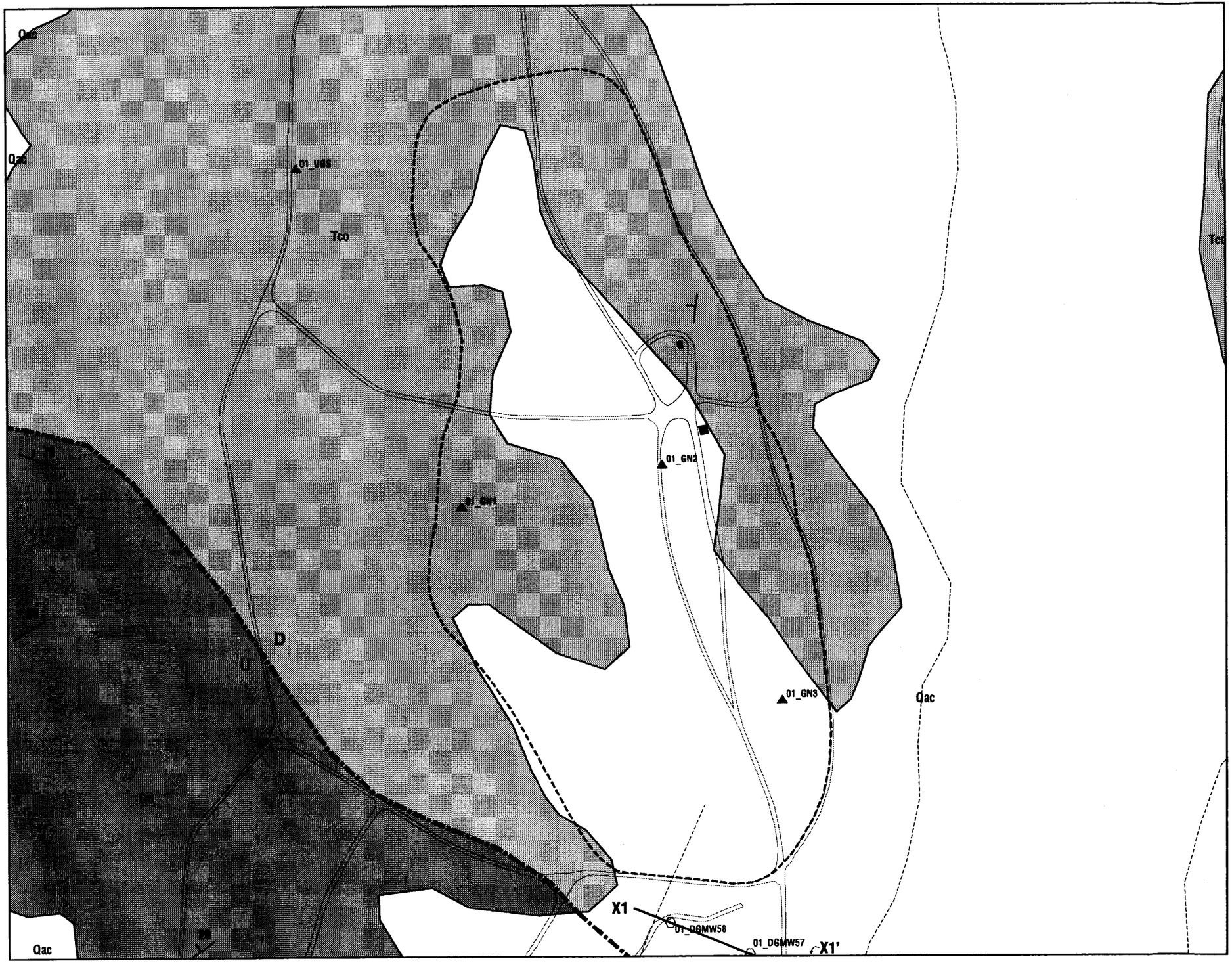

FEATURES:

- Qac - ALLUVIUM AND COLLUVIUM
- Tco - CAPISTRANO FORMATION OSO MEMBER
- Tm - MONTEREY FORMATION
- BUILDING
- SITE BOUNDARY
- FAULT
- GEOLOGIC CROSS SECTION
- ROAD
- WASH OR STREAM
- MONITORING WELL
- DEEP, 25-FOOT, OR ANGLE BORING
- SEDIMENT SAMPLE
- SURFACE WATER AND SEDIMENT SAMPLE
- SURFACE AND NEAR-SURFACE SOIL SAMPLE
- STRIKE AND DIP
- U UPTHROWN SIDE OF VAULT
- D DOWNTHROWN SIDE OF VAULT

SOURCE: CA. DIVISION OF MINES AND GEOLOGY, 1981

N

0 100 200 400

SCALE IN FEET

FIGURE B1-4

SITE 1 (OU-3): GEOLOGY MAP

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

PAGE NUMBER B1-10

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Pesticides and PCBs were added to the analytical suite for the surface and near-surface soil samples within the EOD range strata. TFH-gasoline, TFH-diesel, and TRPH were analyzed (in addition to metals) for the upgradient surface soil sample, 01_UGS.

B1.3.1 Surface Water and Sediment

(Surface water or sediment samples were not collected at this site.)

B1.3.2 Surface and Near-Surface Soils

Four surface soil stations were sampled at the surface only (0 feet). One sample was collected in the upgradient area, and the other three were collected in the EOD Range stratum. (No samples were collected between 2 and 4 feet because of the potential risk of encountering buried explosives).

B1.3.3 Vadose Zone Soils (Soil Borings)

(Soil borings were not drilled at Site 1 because of the potential risk of encountering buried explosives).

B1.3.4 Groundwater Monitoring Wells

Two downgradient wells were sampled for soil and groundwater. Soil samples collected were analyzed from 01_DGMW57 for the 40- and 70-foot samples and from 01_DGMW58 for the 30- and 60-foot samples. A duplicate sample was also analyzed from 01_DGMW58 at 60 feet. A total of five soil samples were analyzed. The two wells are outside the suspected boundaries of the ordnance disposal activities. One aquifer test (a slug test) was conducted on 01_DGMW57. Each well was sampled once for groundwater, for a total of two samples.

B1.4 Surface Water and Sediments

(Surface water or sediment samples were not collected at this site.)

B1.5 Surface and Near-Surface Soils

B1.5.1 Description of Surface and Near-Surface Soil Samples

Figure B1-3 presents the SCS soils map for Site 1. The surface soils at Site 1 include Balcom, Calleguas, Cieneba, San Emigdio, and Sorrento Series. These soils are well drained to somewhat excessively drained, clayey to sandy loam, and range in thickness from 0.5 to 6 feet. The percolation rate for these soil series ranges from 0.2 to 6.0 inches per hour, and the available water capacity rate is from 0.12 to 0.21 inch/inch. Most soils are in hydrologic Group B, indicating that even when saturated, they continue to absorb water moderately.

B1.5.2 Analytical Results and Soil Vapor Headspace Values

A total of four at-surface samples were collected: three from the EOD Range stratum, and one from upgradient surface soil. The analytical results are summarized in Table B1-2. Headspace results are in Attachment 1.

B1.5.2.1 Upgradient Area

The one sample collected upgradient of Site 1 (at 01_UGS) was analyzed for total fuel hydrocarbons-volatiles (TFH-gasoline), total fuel hydrocarbons-diesel (TFH-diesel), total recoverable petroleum hydrocarbons (TRPH), and metals. In the 01_UGS sample, TFH-gasoline was detected at 0.219 mg/kg, and TFH-diesel was detected at 61.6 mg/kg. TRPH was not detected. The analytical results for metals are presented in Table 1-2.

B1.5.2.2 EOD Range Stratum

Three samples were analyzed from the general area. EOD Range soil samples contain low levels of fuel hydrocarbons (TFH-gasoline and TFH-diesel). Low concentrations of VOCs were detected; SVOCs, pesticides, PCBs, dioxins, and furans were not detected.

Estimated VOCs are carbon tetrachloride at 2 μg/kg (estimated from the 01_GN1 sample) and toluene at 6 μg/kg (estimated in 01_GN1 and 01_GN3). The sample results for SVOCs, pesticides, and PCBs are all below the detection limit.

In two of the stratum surface soil samples, 01-GN1 and 01-GN3, TFH-gasoline was detected at 0.079 mg/kg and 0.069 mg/kg, respectively. TFH-diesel was detected in all three of the general area surface soil samples (01_GN1 at 21.5 mg/kg, 01_GN2 at 21.3 mg/kg, and 01_GN3 at 19.4 mg/kg. TRPH was detected in all three of the general area surface soil samples, 01_GN1 at 129 mg/kg, 01_GN2 at 110 mg/kg, and 01_GN3 at 147 mg/kg.

The results for metals are in Table B1-2, as are results for ammonia, total Kjeldahl nitrate (TKN), and nitrate/nitrite. Nitrate as N ranges from 1 mg/kg to 2 mg/kg; ammonia-N ranges from 6 mg/kg to 10 mg/kg; and total TKN ranges from 359 mg/kg to 874 mg/kg. Dioxins and furans were not detected.

B1.6 Vadose Zone Soils

B1.6.1 Description of Subsurface Soil Samples

Subsurface soils were collected for lithologic information, which is summarized in the soil boring logs (Appendix K). Two samples from 01_DGMW57 at depths of 40 and 70 feet were analyzed. Three samples from 01_DGMW58 were analyzed, one from a depth of 30 and two samples (including one duplicate) from a depth of 60 feet.

B1.6.2 Subsurface Geology

Site 1 lies within a small basin in the foothills of the Santa Ana Mountains. The regional stratigraphy consists of Holocene surficial stream channel deposits that conformably overlay Tertiary marine semiconsolidated rocks of the Niguel and Capistrano Formations and the consolidated rocks of the Monterey Formation. The bedrock in the area of Site 1 appears to be faulted and folded, based on the orientation of the strike and dip symbols and the presence of mapped faults

(CDMG, 1981). A mapped fault is approximately 100 feet west of the two monitoring wells (See Figure B1-4, Geology Map).

The soil boring logs of 01_DGMW57 and 01_DGMW58 supply the only subsurface lithologic information for the site (Appendix K). Figure B1-2 is a northwest-southeast cross section through the area downgradient of the site. Both borings appear to have penetrated the alluvial unconsolidated deposits and entered the semiconsolidated bedrock. The soil from both borings consists of thick 10- to 20-foot strata of predominantly fine-grained silts and clays interbedded with 10- to 20-foot silty sand to well graded sand. Based on the boring logs, the semi-consolidated bedrock is first observed at 40 feet at 01_DGMW58 and at 70 feet at 01_DGMW57. The bedrock appears to slope from the northwest toward the southeast.

B1.6.3 Analytical Results

The analytical results show that no organic chemicals (except minor concentrations of VOCs), were detected in the subsurface samples collected from 01_DGMW57 and 01_DGMW58. Both of these wells are downgradient and outside the site. The lack of organic chemicals in the vadose zone in the region of these wells is consistent with their location outside of the suspected sources.

Volatile Organic Compounds (VOCs). The one VOC value that was estimated (for 2-butanone) is below the CRDL. At 01-DGMW57, 2-butanone in the 40-foot sample is estimated at 4 μg/kg, and in the 70-foot sample, at 2 μg/kg. At 01-DGMW58, 2-butanone is estimated in the 60-foot sample at 3 μg/kg and in the 60-foot duplicate samples at 4 μg/kg. 2-Butanone is a demonstrated lab contaminant. The maximum detected concentration of 2-butanone in the trip blanks was 33 μg/L.

Semivolatile Organic Compounds (SVOCs). Semivolatile compounds were not detected.

Pesticides and Polychlorinated Biphenyls (PCBs). Pesticides and PCBS were not detected.

Hydrocarbons (TRPH, TFH). TFH-gasoline, TFH-diesel, and TRPH were not detected.

Metals. Metals values are presented in Table B1-3.

Total Organic Carbon (TOC). At 01_DGMW57 at 70 feet, TOC was detected at 104 mg/kgw.

B1.6.4 Soil Vapor Headspace Concentrations

Surface and subsurface soils were qualitatively scanned in the field for organic compound vapors by headspace. The headspace was measured using an HNu photo-ionization detector (PID) or an OVA flame ionization detector (FID). Headspace results are in Attachment 1 to Appendix B. For surface soils the comparison between headspace results and organic chemical analytical results is difficult to make; no apparent correlation can be seen.

The subsurface soil sample headspace measurements are contoured and plotted on the cross section created between 01_DGMW57 and 01_DGMW58 (Figure B1-2), Geologic Cross Section. The headspace measurements correlate well with the slope of the interpreted bedrock, and also with a sand unit. No apparent correlation can be seen between the headspace measurements and the analytical data.

B1.7 Groundwater

B1.7.1 Site-Specific Hydrogeology

The depth to groundwater at Site 1 is about 60 feet. Water level data from the two Site 1 wells (01_DGMW57 and 01_DGMW58) and the nearby Site 18 (18_BGMW24) were collected during five depth-to-water measurement rounds (see

Subsection 2.2.6.2). The groundwater gradient is approximately 0.05. The direction of groundwater flow is due west to slightly southwest at Site 1 (see Figures 3-4 a/b/c). Water-level elevations at 18_BGMW24 during this measurement period (September 1992 to February 1993) show a constant increase. A mapped fault occurs some 100 feet west of the wells; its influence on the site's flow system is unclear.

A slug test was conducted on 01_DGMW57 on 2 November 1992. The slug test analysis resulted in a calculated hydraulic conductivity of 1.2 ft/day. Values for a storage coefficient or for a leakance factor were not obtainable from the slug test data. Table B1-5 presents hydraulic parameters, and Appendix F (Aquifer Test Analysis), the aquifer test and analysis details.

The average linear groundwater velocity is calculated to be about 0.3 ft/day, based on a hydraulic gradient of 0.05 ft/day, a hydraulic conductivity of 1.2 ft/day, and an estimated effective porosity of 20 percent.

B1.7.2 Analytical Results

Table B1-6 summarizes the analytical results for groundwater samples. No organic chemicals were detected in the groundwater, except methylene chloride. Gross alpha and gross beta particles were detected in the groundwater, but below levels of concern.

Volatile Organic Compounds (VOCs). Methylene chloride is estimated in both groundwater samples at 0.7 μg/l.

Semivolatile Organic Compounds (SVOCs). SVOCs were not detected.

Pesticides and Polychlorinated Biphenyls (PCBs). Pesticides and PCBs were not detected.

Hydrocarbons (TRPH, TFH). TRPH, TFH-gasoline, and TFH-diesel were not detected.

Metals and Cyanide. Metals results are summarized in Table B1-6. No total cyanide was detected.

General Chemistry. The inorganic chemistry analyses of the groundwater show TDS values that range from 429 to 808 mg/L. The water quality at Well 01-DGMW58 appears to be an equal mix of the principal cations and anions; the groundwater from Well 01_DGMW58 is a calcium bicarbonate water (see Piper diagram in Appendix J). Nitrate was detected at 5.77 mg/l in a sample collected from 01-DGMW58. This value is slightly elevated for natural waters, but below MCL.

Gross Alpha and Beta Particle Activity. Gross alpha and beta particles are reported in picoCuries and include sample-unique confidence ranges. The gross alpha results are 5.8±0.58 for 01_DGMW57, and 5.9±0.5 for 01_DGMW58. The gross beta results are 12.2±0.34 for 01_DGMW57 and 8±0.2 for 01_DGMW58.

B1.7.3 Comparison with Drinking Water Standards

Table B1-7 presents analyte concentrations in groundwater exceeding regulatory standards or DTSC Action Levels. None of the inorganic or organic chemical results exceeded mandatory maximum contaminate levels for drinking water.

B1.8 Potential Contaminant Migration Pathways

The primary route of contaminant transport at the site is most likely to be through infiltration of infrequent rainwater in the coarse soil to groundwater. However, the extent of potential downward subsurface migration of the chemicals seen in the surface soils cannot be addressed, based on the information gathered. Further, surface water runoff and sediment transport are not considered significant contaminant pathways at Site 1.

B1.9 Summary and Conclusions

The surface and near-surface soil samples in the upgradient area and the EOD Range stratum show contamination in the form of fuel hydrocarbons; two samples also show

trace amounts of carbon tetrachloride and toluene. The ranges of fuel hydrocarbon values are TFH-gasoline from nondetect (0.05 mg/kg) to 0.22 mg/kg; TFH-diesel from 19.4 mg/kg to 61.6 mg/kg; and TRPH from nondetect (20 mg/kg) to 147 mg/kg.

The vadose zone soil samples from the downgradient monitoring wells (01_DGMW57 and 01_DGMW58) did not indicate contamination, except for trace levels of a VOC, (2-butanone up to 4 μg/kg). 2-Butanone is a demonstrated lab contaminant. The maximum detected concentration of 2-butanone in the trip blanks is 33 μg/L. The groundwater samples from the monitoring wells also show no contamination. The groundwater does not appear to have been affected by the soil contamination. Site 1 does not appear to be a potential source of regional groundwater VOC contamination (OU-1).

Table B1-1
Site 1 (OU-3): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum

Location/ Stratum	Station Identi-fication	Sample Identi-fication	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	Genl. Chem-istry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Surface Water and Sediments (Not sampled)															
Surface and Near-Surface Soils															
Up Gradient	01_UGS	S1454007	0					X	X	X					
EOD Range	01_GN1	S1454004	0	X	X			X	X	X		X[c]		X	
	01_GN2	S1454000	0	X	X			X	X	X		X[c]		X	
	01_GN3	S1454006	0	X	X			X	X	X		X[c]		X	
Vadose Zone Soils															
	01_DGMW57	S1456006	40	X	X			X	X	X					
	01_DGMW57	S1456000	70	X									X		
	01_DGMW58	S1456007	30	X	X			X	X	X					
	01_DGMW58	S1456001	60	X									X		
	01_DGMW58	S1457103[b]	60	X									X		
Groundwater															
	01_DGMW57	S1452000	63-83	X	X	X		X	X	X	X	X[d]	X		X
	01_DGMW58	S1452001	57-77	X	X	X		X	X	X	X	X[d]	X		X

[a] VOCs = Volatile Organic Compounds; Semi-VOCs = Semivolatile Organic Compounds; PCBs = Polychlorinated Biphenyls; TPH = Total Recoverable Petroleum Hydrocarbons; TFH = Total Fuel Hydrocarbons; CN = Total Cyanide; TOC = Total Organic Carbon.

[b] Duplicate

[c] Ammonia-N, total Kjeldahl nitrogen, Nitrate/Nitrite-N, Nitrite-N

[d] Chloride, suflate, carbonate, bicarbonate, nitrate/nitrite, total dissolved solids.

NA = Not applicable.

Table B1-2

Site 1 (OU- 3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	01_GN1 S1454004 (0)	DVF(a)	01_GN2 S1454000 (0)	DVF(a)	01_GN3 S1454006 (0)	DVF(a)	01_UGS S1454007 (0)	DVF(a)
GENERAL CHEMISTRY									
MOISTURE	MG/KG	-		-		3.5		-	
AMMONIA-N	MG/KG	6.45	J	5.94	J	9.75	J	-	
TOTAL KJELDAHL NITROGEN (TKN)	MG/KG	874		359		679		-	
NITRATE AS N	MG/KG	1.53		0.649		0.712		-	
METALS									
ALUMINUM	MG/KG	7490		3370		5530		5560	
BARIUM	MG/KG	35.3	b	30.3	b	41.4	b	27.7	b
CALCIUM	MG/KG	6910		2330		4140		7290	
COBALT	MG/KG	1.6	b	1.7	b	3.1	b	1.2	U
CHROMIUM	MG/KG	3.9		2.2		4		3.2	
COPPER	MG/KG	2.9	b	4.3	b	2.6	b	2.3	b
IRON	MG/KG	4230		2230		4150		2950	
MERCURY	MG/KG	0.03	U	0.05	b	0.03	U	0.03	U
POTASSIUM	MG/KG	779	b	506	b	882	b	597	b
MAGNESIUM	MG/KG	1770		787	b	1790		1270	
MANGANESE	MG/KG	85		48.8		82.1		48.5	
SODIUM	MG/KG	198	b	111	b	165	b	151	b
LEAD	MG/KG	5.5		7		6.9		2	
SELENIUM	MG/KG	0.11	b	0.1	U	0.1	U	0.83	b
VANADIUM	MG/KG	8.7	b	4.6	b	9.8	b	7.1	b
ZINC	MG/KG	17.2		16.4		15.8		11.1	
VOLATILE ORGANIC COMPOUNDS									
TOLUENE	UG/KG	6	J	10	U	6	J	-	
CARBON TETRACHLORIDE	UG/KG	2	J	10	U	10	U	-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)									
TFH DIESEL	MG/KG	21.5		21.3		19.4		61.6	
TFH GASOLINE	MG/KG	0.079		0.05	U	0.069		0.219	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)									
TRPH	MG/KG	129		110		147		20	U

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Table B1-3

Site 1 (OU- 3): Summary of Detected Chemicals in the Vadose Zone (Subsurface) Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	01_DGMW57 S1456006 (40)	DVF(a)	01_DGMW57 S1456000 (70)	DVF(a)	01_DGMW58 S1456007 (30)	DVF(a)	01_DGMW58 S1456001 (60)	DVF(a)	01_DGMW58 S1457103 (60)	DVF(a)
GENERAL CHEMISTRY											
TOTAL ORGANIC CARBON	MG/KGW	-		104		-		100	U	100	U
METALS											
ALUMINUM	MG/KG	5950		-		4160		-		-	
ARSENIC	MG/KG	2.7		-		3.4		-		-	
BARIUM	MG/KG	80.3		-		36.3	b	-		-	
CALCIUM	MG/KG	10300		-		8650		-		-	
CADMIUM	MG/KG	1.8		-		1.4		-		-	
COBALT	MG/KG	3.4	b	-		2.2	b	-		-	
CHROMIUM	MG/KG	10.8		-		8.2		-		-	
COPPER	MG/KG	6.6		-		3.5	b	-		-	
IRON	MG/KG	8840		-		6410		-		-	
POTASSIUM	MG/KG	2020		-		820	b	-		-	
MAGNESIUM	MG/KG	5040		-		1750		-		-	
MANGANESE	MG/KG	165		-		95.9		-		-	
SODIUM	MG/KG	235	b	-		226	b	-		-	
NICKEL	MG/KG	12.8		-		9.7		-		-	
LEAD	MG/KG	2.4		-		1.6		-		-	
VANADIUM	MG/KG	20.7		-		15.7		-		-	
ZINC	MG/KG	30.7		-		27.2		-		-	
VOLATILE ORGANIC COMPOUNDS											
2-BUTANONE	UG/KG	4	J	2	J	12	U	3	J	4	J

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Table B1-4
Site 1 (OU-3): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum

Sheet 1 of 1

Item	Station Identification	
	01_DGMW57	01_DGMW58
Survey Location--Northing Survey Location--Easting	555113.29 1562183.76	555304.87 1562082.50
Ground Surface Elev. (ft above MSL[a]) Measuring Point Elev. (ft above MSL[a])	630.34 631.04	621.94 621.94
Measuring Point Location	Top of casing	Top of casing
Type of Surface Completion	Above ground	Above ground
Casing Diameter and Material	4" Sch. 40 PVC	4" Sch. 40 PVC
Screen Diameter and Material	4" Sch. 40 0.02"-slot SS[c]	4" Sch. 40 0.02"-slot SS[c]
Screen Interval (ft bgs[b])	63-83	57-77
Length of Drop Pipe (ft bgs[b])	81	75
Make/Model of Installed Pump	Grundfos Rediflow 2 2"-dia. subm.	Grundfos Rediflow 2 2"-dia. subm.
Date of Pumping Test	Slug tested 2 Nov 92	Not tested
Date of Water Quality Sampling	10 Dec 92	16 Aug 92

[a]Mean sea level
[b]Below ground surface
[c]SS = Stainless Steel.

Table B1-5
Site 1 (OU-2): Summary of Hydraulic Parameters
MCAS El Toro Phase I RE Technical Memorandum

Sheet 1 of 1

Well Identification	Type of Test	Analysis Method	Trans-missivity (ft^2/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient[a]	Leakance Factor[a]
01_DBMW57	Slug	Bouwer and Rice (1976) and Bouwer (1981)	24	1.2	NA	NA

[a]NA=Not applicable
Source: Table F-2 (Appendix F)

Table B1-6

Site 1 (OU- 3): Summary of Detected Chemicals in Groundwater Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SCREEN INTERVAL ANALYTE BY GROUP	REG.CODE(b)	REG.LEVEL(c)	UNITS	01_DGMW57 S1452000 (63-83)	DVF(a)	01_DGMW58 S1452001 (57-77)	DVF(a)
GENERAL CHEMISTRY							
BICARBONATE	NA	NA	MG/L	287		285	
CARBONATE	NA	NA	MG/L	-		-	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	808		429	
ALKALINITY AS CACO3	NA	NA	MG/L	235		234	
CHLORIDE	3	250	MG/L	91.6		61.2	
SULFATE	3	250	MG/L	250		21.1	
NITRATE/NITRITE-N	1	10	MG/L	1.66		5.77	
METALS							
SODIUM	NA	NA	UG/L	99600		36400	
NICKEL	NA	NA	UG/L	12.6	b	110	
ARSENIC	2	50	UG/L	0.7	b	1.4	b
BARIUM	2	2000	UG/L	18.2	b	16.8	b
CALCIUM	NA	NA	UG/L	94600		87000	
VANADIUM	NA	NA	UG/L	4.3	b	9.1	b
CADMIUM	2	5	UG/L	1.2	U	1.9	b
COPPER	2	1300	UG/L	1.4	b	0.96	b
SELENIUM	1	10	UG/L	7.7		2.7	U
POTASSIUM	NA	NA	UG/L	4860	b	2040	b
MAGNESIUM	NA	NA	UG/L	37800		13200	
MANGANESE	3	50	UG/L	74.7		45.4	
SILVER	1	50	UG/L	2.1	U	2.3	b
VOLATILE ORGANIC COMPOUNDS							
CHLOROMETHANE (METHYL CHLORIDE)	NA	NA	UG/L	0.7	J	0.7	J
GROSS ALPHA AND BETA							
GROSS ALPHA	2	15	PCI/L	5.8		5.9	
GROSS BETA	2	50	PCI/L	12.2		8.0	

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

(b) Regulatory Codes are:

1 = California MCL
2 = EPA primary MCL
3 = EPA secondary MCL
4 = California DTSC Action Level

(c) The given concentration represents the California MCL, the EPA primary MCL, the EPA secondary MCL, or the California DTSC Action Level, whichever is most stringent.

Table B1-7
Site 1 (OU-3): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
01_DGMW57	(63-83)	Sulfate	mg/L	250	250	3
		Total Dissolved Solids	mg/L	808	500	3
		Manganese	µg/L	74.7	50	3

[a]California Department of Toxic Substances Control
[b]Screen interval (feet below ground surface)
[c]The most stringent federal/state drinking water standard was applied. In the presence of both an EPA MCL and a California MCL, the most stringent MCL is represented. If neither an EPA or California MCL is listed, the California DTSC action level was applied.
[d]Regulatory Code

1=EPA Primary MCL:	Federally enforceable drinking water standard established for the health effects of contaminants
2=California MCL:	Health-based drinking water standard enforceable at the state level.
3=EPA Secondary MCL:	Nonenforceable standard based on aesthetic qualities of taste, color, and odor (includes chloride, iron, manganese, sulfate, and TDS).
4=DTSC Action Level:	Nonenforceable levels at which DTSC strongly urges water purveyors to take corrective action to reduce the level of contamination in the water they supply (Action levels cease to exist when state MCLs are promulgated.)

Appendix B2

Nature and Extent of Contamination: Site 2 (OU-2) — Magazine Road Landfill

Appendix B2

NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION: SITE 2 (OU-2) - MAGAZINE ROAD LANDFILL

This discussion of Site 2 is supplemented by the figures and data tables listed below. The figures begin on page B2-3, and the tables are grouped at the end of this Appendix B2. Field headspace values for soils at this site are presented in Table BA1-3, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B2-1: (Site Map)
Figure B2-2: Geologic Cross Section
Figure B2-3: SCS Soils Map
Figure B2-4: Geology Map
Figure B2-5 Hydrograph

Table B2-0: Summary of Detected Chemicals in Surface Runoff Samples
Table B2-1: Types of Samples and Chemical Analyses
Table B2-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil
Table B2-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples
Table B2-4: Well Construction Details
Table B2-5: Summary of Hydraulic Parameters
Table B2-6: Summary of Detected Chemicals in Groundwater Samples
Table B2-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B2.1 Site Description

Site 2, the Magazine Road Landfill, occupies about 22 acres between Borrego Canyon Wash and one of its tributaries, in an area that was originally used as a gravel borrow pit. The Magazine Road Landfill was used from the late 1950s until about 1980. During the 1970s, all solid wastes from MCAS El Toro and some wastes from MCAS Tustin were disposed of at this landfill. Previous reports estimate that between 800,000 and 1,000,000 cubic yards of waste were placed in the landfill during its operational life, based on the assumed dimensions of the borrow pit. The remains of this pit are still visible as a depression at the upper end of a man-made drainage channel that bisects the site. The site has two statistical strata:

- Stratum 1: The area within the landfill boundaries
- Stratum 2: The remaining area of stained and disturbed soil

B2.2 Suspected Waste Types and Contaminants

The suspected types of waste consist of construction debris, municipal wastes, batteries, waste oils, hydraulic fluids, paint residues, transformers, and waste solvents. Unlike earlier landfills, wastes placed in this landfill were not burned for volume reduction (Brown and Caldwell, 1986), but were placed in the old borrow pit, which was back-filled in a series of lifts.

A wide variety of organic and inorganic contaminants could be present: methylene chloride, chloroform, benzene, TCE, and PCE were detected in landfill gas samples in concentrations above the minimum detection limits required for the California Air Resources Board as part of a Solid Waste Assessment Test (SWAT) investigation (Strata, 1990). The samples also contained methane at 2.45 percent.

B2.3 Field Investigation

The field investigation consisted of drilling and sampling one upgradient monitoring well, one deep boring (not completed as a monitoring well), and three downgradient wells, and collecting samples from five at-surface and three sets of shallow soil boring samples from four surface water runoff locations, and from sediment samples at six locations.

Changes were made in the site boundaries and the number of sampling locations from those specified in the original *SAP* and these changes were documented in the *SAP Amendment.* The boundaries were extended further east and south (beyond the dirt road and along Magazine Road), on the basis of historical aerial photographs. The deep boring was not converted to a monitoring well (as had been planned in the *SAP*), reducing the number of wells from five to four. Three near-surface shallow soil borings were added.

X2'
02_UGS
02_UGMW25
STRATUM 1
02_LF1
02_SA1
02_LF2
02_LF3
02_S&DB200
02_SA2
02_MM1
02_EF1
02_WF1
02_DGMW61
02_MM2
02_DGMW59
02_SA3
02_WF2
STRATUM 2
02_DGMW60
02_EF2
X2

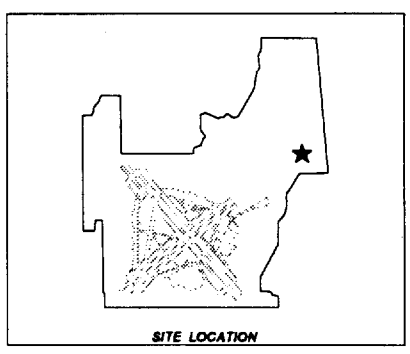
FIGURE B2-1

SITE 2 (OU-2): MAGAZINE ROAD LANDFILL

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

FEATURES:

- BUILDING OR PAD
- MONITORING WELL
- DEEP, 25-FOOT, OR ANGLE BORING
- SEDIMENT SAMPLE
- SURFACE WATER AND SEDIMENT SAMPLE
- SURFACE AND NEAR-SURFACE SOIL SAMPLE
- ROAD
- STRATUM BOUNDARY
- WASH OR STREAM
- LINE OF GEOLOGIC CROSS-SECTION
- END OF LINE OF CROSS-SECTION
- LINE OF CROSS-SECTION EXTENDS BEYOND AREA SHOWN



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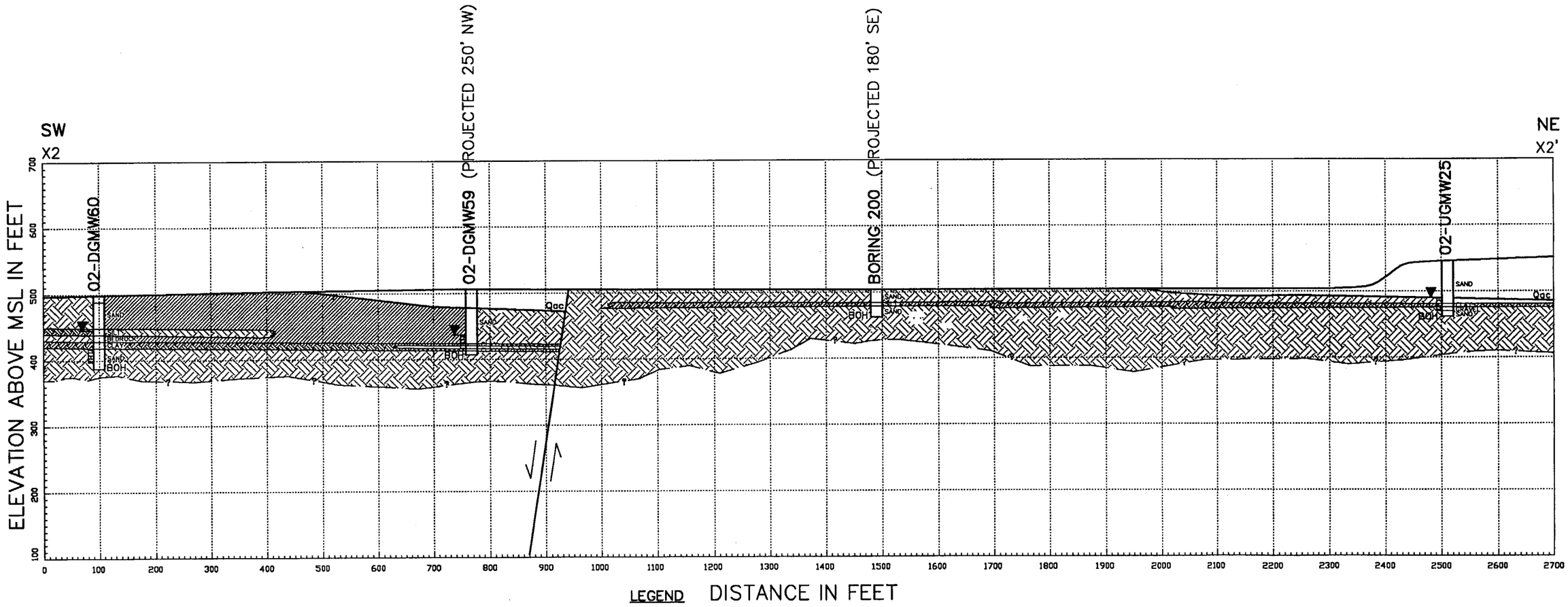

LEGEND

HORIZ. SCALE: 1"=180'
VERT. SCALE: 20% EXAGGERATION

180'
0
0
180'

UNCONSOLIDATED PERMEABLE SEDIMENTS

UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS: SILT OR SILTSTONE

SEMICONSOLIDATED LOW-PERMEABILITY SEDIMENTS: SAND OR SANDSTONE

WELL SCREEN INTERVAL

Qac QUATERNARY, ALUVIUM & COLLUVIUM

BOH BOTTOM OF HOLE

WATER LEVEL ELEVATION, DECEMBER 1992

NORMAL FAULT

FIGURE B2-2
SITE 2 (OU-2)
GEOLOGIC CROSS SECTION X2-X2'
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

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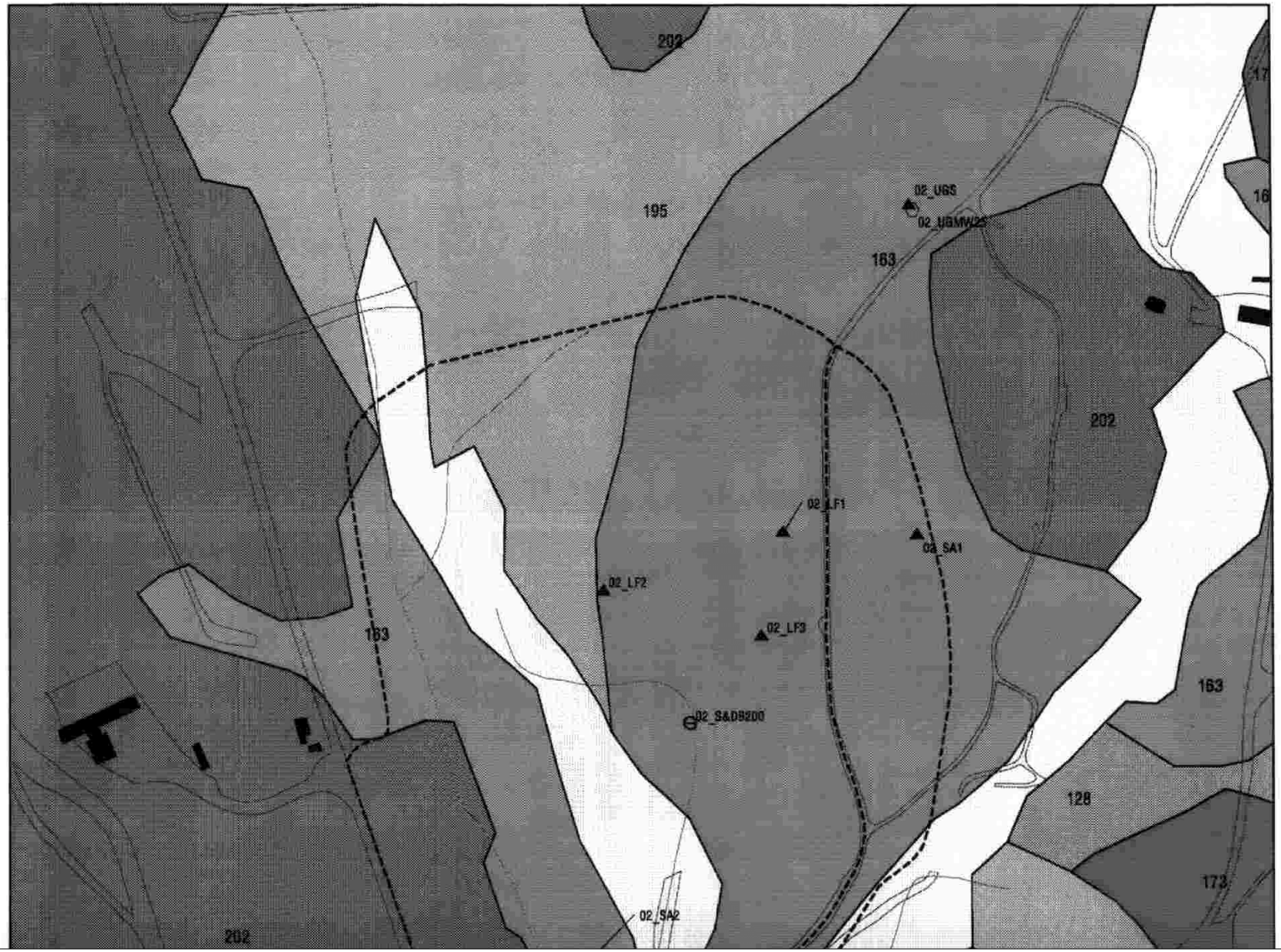
202
195
02_UGS
02_UGMW25
163
202
02_LF1
02_SA1
02_LF2
02_LF3
163
02_S&DB200
163
128
173
02_SA2
202

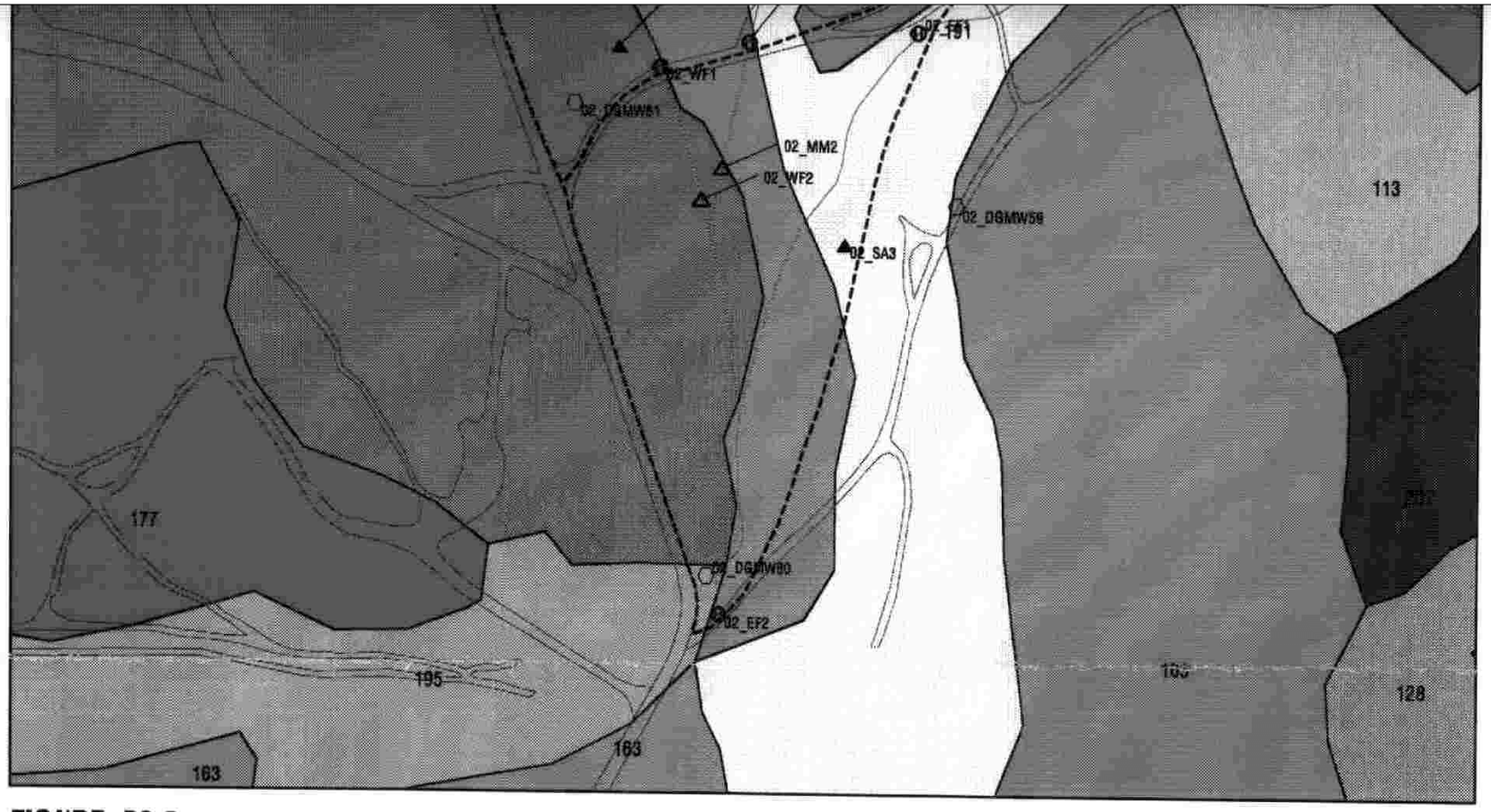

FIGURE B2-3

SITE 2 (OU-2): SCS SOILS MAP

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

SOURCE: SCS, 1978

FEATURES:

- 112 - BALCOM
- 128 - BOSANKO
- 163 - METZ
- 173 - MYFORD
- 175 - MYFORD
- 177 - MYFORD
- 191 - RIVERWASH
- 195 - SAN EMIGDIO
- 202 - SOPER
- 207 - SORRENTO
- BUILDING

- SITE BOUNDARY
- ROAD
- WASH OR STREAM
- MONITORING WELL
- DEEP, 25-FOOT, OR ANGLE BORING
- SEDIMENT SAMPLE
- SURFACE WATER AND SEDIMENT SAMPLE
- SURFACE AND NEAR-SURFACE SOIL SAMPLE

N

0 100 200 400

SCALE IN FEET

PAGE NUMBER B2-8

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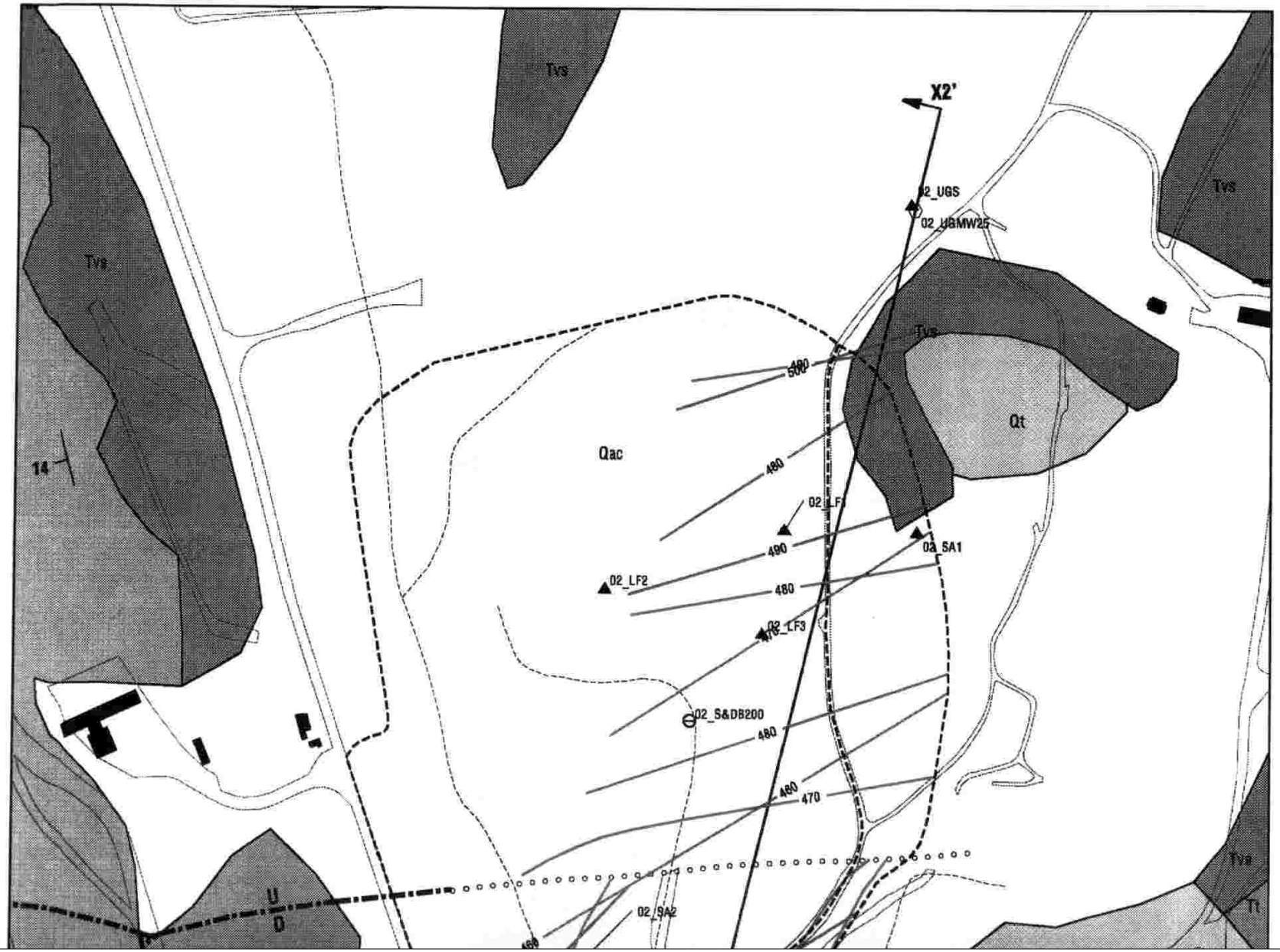
X2'
Tvs
Tvs
Tvs
Tvs
Tvs
Tt
Qt
Qac
14
02_UGS
02_UBMW25
02_LF1
02_LF2
02_LF3
02_SA1
02_SA2
02_S&DB200
480
500
480
490
480
470
480
480
470
U
D

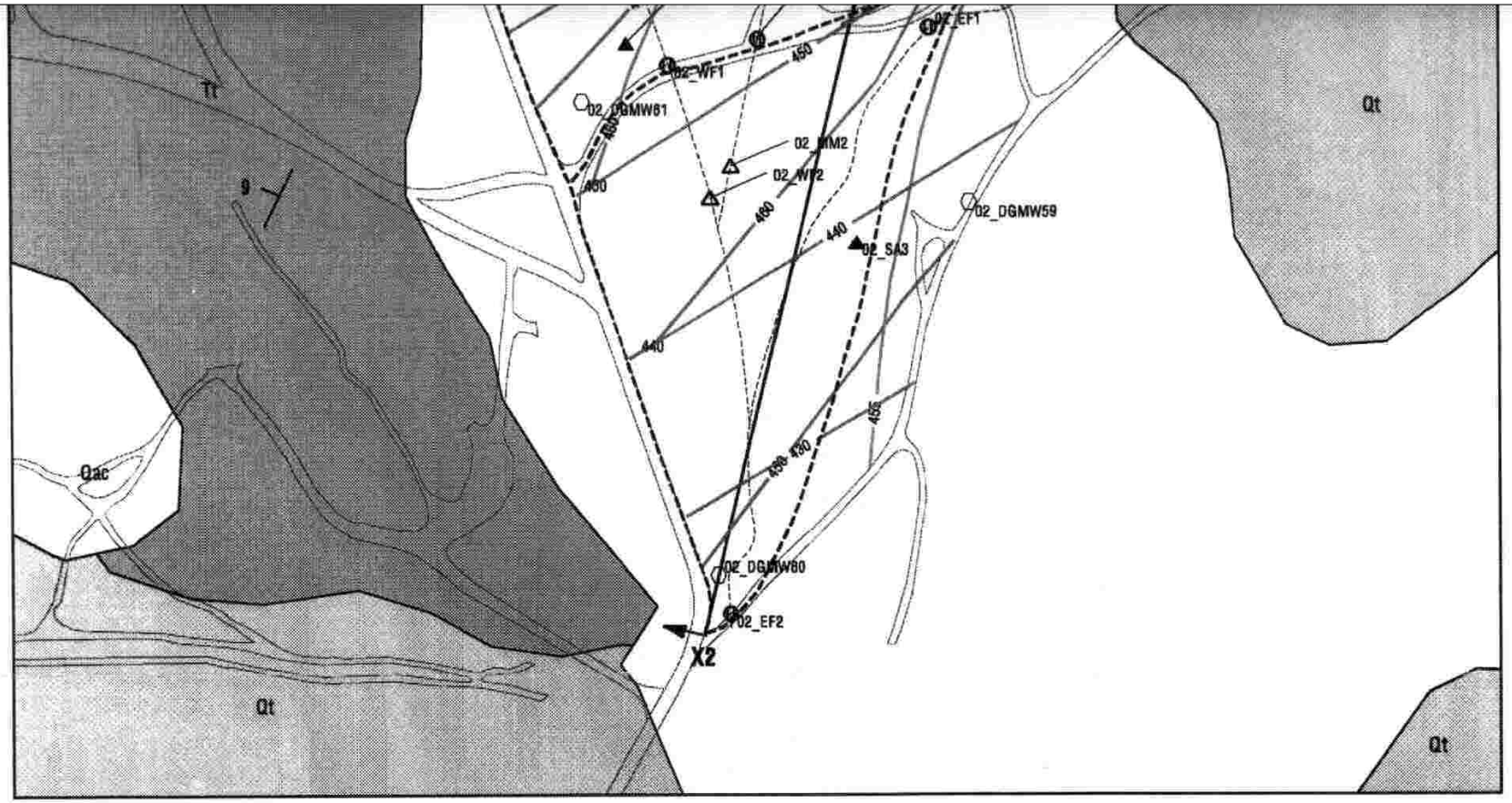

FIGURE B2-4

SITE 2 (OU-2): GEOLOGY MAP

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

SOURCE: CA. DIVISION OF MINES AND GEOLOGY, 1961

FEATURES:

- Qac - ALLUVIUM AND COLLUVIUM
- Qt - NONMARINE TERRACE DEPOSITS
- Tl - TOPANGA FORMATION
- Tvs - VAQUEROS/SESPE FORMATION
- BUILDING
- PIEZOMETRIC ELEVATION - 2/25/93
- PIEZOMETRIC ELEVATION - 1/21/93
- PIEZOMETRIC ELEVATION - 12/2/92
- SITE BOUNDARY
- FAULT
- CONCEALED FAULT
- GEOLOGIC CROSS SECTION
- ROAD
- WASH OR STREAM
- MONITORING WELL
- DEEP, 25-FOOT, OR ANGLE BORING
- SEDIMENT SAMPLE
- SURFACE WATER AND SEDIMENT SAMPLE
- SURFACE AND NEAR-SURFACE SOIL SAMPLE
- STRIKE AND DIP
- D DOWNTHROWN SIDE OF FAULT
- U UPTHROWN SIDE OF FAULT

N

0 100 200 400

SCALE IN FEET

PAGE NUMBER B2-10

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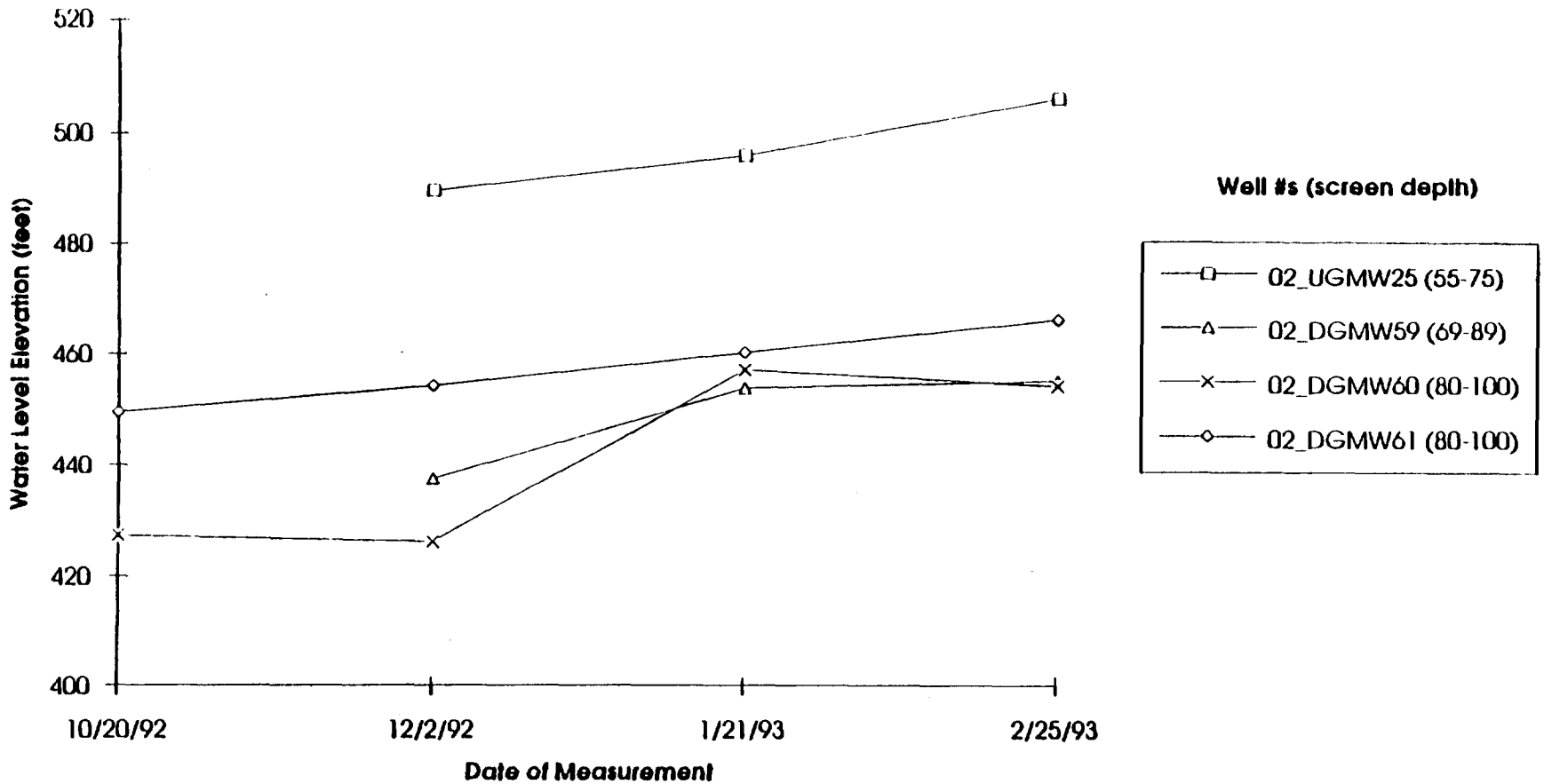

FIGURE B2-5
SITE 2 (OU-2): HYDROGRAPH
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

PAGE NUMBER B2-12

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During field operations, the location of Well 02_DGMW60 was moved to the north, across the east fork of Borrego Canyon Wash. This change was made because of access considerations. The new location was considered appropriate because field information indicated that regional groundwater flow was more northerly than originally believed.

B2.3.1 Surface Water and Sediment

Surface water samples were collected only during the third of the three Station-wide surface water runoff sampling events. Samples were collected from four locations during this runoff event: (02_WF1, 02_MM1, 02_EF1, and 02_EF2). (During the first two sampling events, there was insufficient stream flow to collect samples.)

Sediment samples were collected from six locations, four of which are identical to the surface water sampling locations; the two additional stations are 02_WF2 and 02_MM2. Fourteen samples were collected at the six locations, at depths of 0 and 2 feet below ground surface (bgs) at all locations and at 4 feet bgs at 02_EF2 and 02_MM1.

The sediment and surface water runoff samples were analyzed for VOCs, SVOCs, herbicides, pesticides, PCBs, TRPH, TFH, and metals. Some samples were also analyzed for cyanide, and surface water runoff samples were also analyzed for general chemistry.

The washes and drainage channels are incised into the landfill, creating a potential for leachate to be produced during or after a storm event and flow into the washes. Surface water samples were collected during the rain event to make an initial evaluation as to whether surface water is a potential transport pathway for contaminants. The rationale for performing sediment sampling at this site is similar to that for surface water sampling: surface water moving through or adjacent to potential sources of contamination may carry contamination downstream that is adsorbed onto sediments in drainage courses.

B2.3.2 Surface and Near-Surface Soils

Samples were collected at eight locations. One surface soil sample was collected at each of five sampling stations: 02_UGS, 02_S&DB200, 02_LF1, 02_LF2, and 02_LF3. Two sets of surface and near-surface soil samples were collected at 02_SA1 and 02_SA2 (at 0 and 2 feet bgs) and three samples were collected at 02_SA3 (at 0, 2, and 4 feet bgs).

The samples were analyzed for VOCs, SVOCs, pesticides, metals, PCBs, TRPH, TFH, and general chemistry. Samples from Stratum 1 were also analyzed for herbicides. The surface sample associated with the deep boring at 02_S&DB200 was also analyzed for dioxins and furans.

B2.3.3 Vadose Zone Soils (Soil Borings)

Eight lithologic samples were collected from deep boring 02_S&DB200 at depths of 5, 10, 15, 20, 25, 35, and 40 feet bgs. The samples were analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, TRPH, TFH, and metals. In addition, the 5-foot sample was analyzed for dioxins and furans.

B2.3.4 Groundwater Monitoring Wells

One upgradient well (02_UGMW25) and three downgradient wells (02_DGMW59, 02_DGMW60, and 02_DGMW61) were installed. Two soil samples were collected from the upgradient well, and three each from the downgradient wells. Samples were collected from depths of 50 and 60 feet at 02_UGMW25; 48, 62, and 78 feet at 02_DGMW59; and 30, 60, and 80 feet in well 02_DGMW61. One groundwater sample was collected from each well, and a slug test was performed at each well.

B2.4 Surface Water and Sediments

B2.4.1 Description of Surface Water and Sediment Samples

The site is incised by the man-made channel and by two forks (east and west) of the Borrego Canyon Wash (Figure B2-1, site map). Sampling stations 02_WF1 and 02_WF2 are on the west fork, and 02_MM1 and 02_MM2 are on the man-made channel, through the center of the landfill. The man-made channel flows into the west fork, which merges with the east fork. Station 02_WF2 is just downstream of where the man-made channel discharges to the west fork. All surface water and sediment sampling locations are within these three drainages. Stations 02_WF1 and 02_MM1 are at the downstream side of Stratum 1; the others are in Stratum 2.

Field parameters and streamflow data for the surface water runoff samples are summarized below. The recorded pH values are higher than would be expected. The stream discharges (flows) are only rough estimates.

Surface Water Runoff Field Data

Station ID	pH	Electrical Conductivity (μmhos/cm)	Temperature (°C)	Stream Flow (cubic feet per second [cfs])
02_WF1	11.8	220	11.8	60
02_MM1	10.9	85	13.1	0.03
02_EF1	10.5	230	12.0	260
02_EF2	9.6	160	11.8	240

B2.4.2 Analytical Results

VOCs are the only compounds detected in both sediment and surface water runoff samples. All other types of analytes, TFH-gasoline, TPH-diesel, TRPH, SVOCs, herbicides, pesticides, and gross alpha and beta activity were detected

only in surface water runoff samples. See Tables B2-0 and B2-2 for summaries of detected chemicals.

Surface water geochemistry was assessed using Stiff and Piper diagrams, Plate J-1 and Appendix J. All locations have calcium-sulfate-type water.

Hydrocarbons were detected at one location along each of the three drainages:

- TFH-diesel was detected at 0.408 mg/kg in the surface water runoff at the upgradient sample in the man-made channel (02_MM1).
- THF-gasoline was detected at 0.064 mg/kg at the 2-foot-deep sediment sample at 02_WF2.
- TRPH was detected in sediment at 4 feet bgs in the main channel of the Borrego Canyon Wash (02_EF2), and in a duplicate sample, at 0.153 and 4,555 mg/kg, respectively.

Acetone and methylene chloride were detected in both surface water and sediment samples. Methylene chloride contamination, which was detected in most of the laboratory blanks, may be attributable to laboratory contamination. In addition, benzene, carbon tetrachloride, toluene, and TCE were detected only in sediment samples. VOC detections are:

- Acetone, which is often a component of landfill leachate, was detected in both the surface sediment sample and the surface water sample at 02_EF1, at 21 and 6 μg/kg, respectively. Acetone is a demonstrated lab contaminant. The maximum detected concentration of acetone in the trip blanks is 37 μg/L.
- Carbon tetrachloride and methylene chloride were detected at 11 μg/kg and 92 μg/kg, respectively, in the surface sediment sample at 02_MM2. Methylene chloride is a demonstrated lab contaminant. The maximum detected concentration of methylene chlorine in the trip blanks was 42 μg/L.
- Benzene, methylene chloride, toluene, and TCE were detected in sediment samples at 02_WF2, all at concentrations below the CRDL.

Benzyl butyl phthalate is the only SVOC detected above the CRDL. It was detected at 4 feet bgs in sediment samples at 02_MM1 at a value of 1200 μg/kg.

Bis(2-ethylhexyl)phthalate was detected at concentrations below the CRDL in sediment samples at 02_MM1 and 02_MM2.

Pesticides were detected in sediment samples at the downstream locations of both the west fork and man-made channel (02_WF2 and 02_MM2). Herbicides were detected in sediment at 02_WF2. Pesticide and herbicide data are:

- Three pesticides were detected at the surface sediment sample at 02_MM2: alpha-chlordane, gamma-chlordane, and 4,4'-DDT. 4,4'-DDT was also detected at the sediment sample at 02_WF2.
- Two herbicides were detected 2 feet bgs in the sediment sample at 02_WF2: 2,4-DB and (MCPP). The concentration of MCPP is 140,000 μg/kg.

Table B2-3 presents detected metals in surface water runoff and sediment samples. Gross alpha and beta activity was detected in all of the surface water runoff samples. Gross alpha particle activity ranges from 5.4 to 8.6 pCi/L, and gross beta activity ranges from 14.3 to 127.0 pCi/L.

In summary, the majority of contamination in the washes is in Stratum 1 and the man-made channel. TFH-diesel and SVOCs are the only detected compounds in Stratum 1 (02_MM1). No contamination was detected in the upstream west fork (02_WF1) samples (Stratum 1). TRPH and acetone were detected in east fork samples (at 02_EF1 and 02_EF2, respectively). The rest of the contaminants (THF-gasoline, VOCs, SVOCs, pesticides, and herbicides) were detected at either the downstream man-made channel station (02_MM2) or the downstream west fork station (02_WF2), downstream of the confluence with the man-made channel.

B2.5 Surface and Near-Surface Soils

B2.5.1 Description of Surface and Near-Surface Soil Samples

The surface soils at Site 2 are the San Emigdio, Metz, Soper series, and Riverwash. Riverwash is a catchall term for areas of active sediment movement along streams. The areal distribution of the soils is displayed in Figure 2-3 Soils

Map. The hydrologic group and soil depth are summarized below. Also included for the near-surface soils are the USDA texture and the range of the percolation rate and moisture-holding capacity. The Metz series soils are classified as Hydrologic Group A, soils which tend to absorb and hold water (rather than allow it to run off), even when saturated. Group B soils are moderately permeable when saturated, and Group C soils tend to produce runoff when saturated.

Soil Survey
(Wachtell, 1978)

Soil Series	Soil Depth (in)	USDA Texture of Surface Soils	Hydrologic Group	Percolation Rate (in/hr)	Available Water Capacity (in/hr)
Metz	63	Loamy sand	A	6 - 20	0.07 - 0.11
San Emigdio	61	Fine sandy loam	B	2 - 6	0.12 - 0.17
Soper	29	Gravelly loam	C	0.6 - 2.0	0.13 - 0.18
Riverwash	-	-	-	-	-

Surface and near-surface soils (to 4 feet bgs) were sampled by stratum, at three locations in each. Three surface soil samples were collected from Stratum 1, and both surface and near-surface soil samples were collected at three locations in Stratum 2. In addition, surface soil samples were collected at the upgradient well and at the deep boring (Figure B2-1, site map).

B2.5.2 Analytical Results and Soil Vapor Headspace Values

Compounds detected in surface and near-surface soil samples include VOCs, SVOCs, pesticides, herbicides, THF-gasoline, and TFH-diesel (see Table B2-2). Except at surface soil sample location 02_LF3, where the OVA headspace value was 10.0 ppmv, no headspace values over 1.0 ppmv were reported. (See Attachment 1, Field Headspace Values.) Several VOCs and THF-gasoline were detected at 02_LF3.

B2.5.2.1 Upgradient Area

One surface soil sample was collected at 02_UGS, where THF-gasoline was detected at 0.290 mg/kg (Table B2-2). No other petroleum hydrocarbons were detected.

B2.5.2.2 Stratum 1: Landfill Area

Four surface soil samples were collected in Stratum 1 (at 02_LF1, 02_LF2, 02_LF3, and 02_S&DB200). Chemicals detected include five VOCs (2-butanone, 2-hexanone, 4-methyl-2-pentanone, ethyl benzene, and xylene), two herbicides (dalapon and MCPP), and TFH-gasoline. A summary of detected compounds follows:

- TFH-gasoline was detected in all of the surface samples except at 02_S&DB200; concentrations range from 0.311 to 0.734 mg/kg.
- Toluene was detected in all samples at concentrations of up to 15 μg/kg.
- Several VOCs were detected only at the surface sample at 02_LF3. Detected compounds include 2-hexanone (17 μg/kg) and ethylbenzene and xylene, both estimated at 6 μg/kg.
- Two herbicides, dalapon and MCPP, were detected. The concentration of MCPP at surface boring 02_S&DB200 is 48,700 μg/kg. Dalapon concentrations are 50.8 and 81.5 μg/kg at 02_LF1 and 02_S&DB200, respectively.
- Mercury was detected at 02 LF3 (0.57 mg/kg).
- No pesticides, PCBs, TFH-diesel, TRPH, or SVOCs were detected.

In summary, toluene was detected at all sampling locations, and TFH-gasoline was detected at all locations except 02_S&DB200. Three VOCs (ethylbenzene, xylene, and 2-hexanone) were detected only at 02_LF3. Herbicides were detected only at 02_LF1 and 02_S&DB200.

B2.5.3.3 Stratum 2: Stained Area

Surface and near-surface soil samples were collected from three locations: 02_SA1, 02_SA2, and 02_SA3. Detected chemicals were VOCs, SVOCs, TFH-diesel, gas, herbicides, and pesticides. Results of note follow:

- TFH-gasoline, which was detected at all locations and depths, ranges from 0.088 to 0.958 mg/kg (less than 100 mg/kg).
- TFH-diesel, which was detected at all depths in boring 02_SA3, ranges from 30.9 to 97.5 mg/kg (less than 1,000 mg/kg).
- The acetone concentration in boring 02_SA3 at the surface is 32 μg/kg. Acetone is a demonstrated lab contaminant. The maximum detected concentration of acetone in the trip blanks is 37 μg/L.
- Toluene was detected at the surface at all stations, at 10 and 12 μg/kg at borings 02_SA1 and 02_SA2, respectively.
- Dichloroprop, an herbicide, has a concentration of 507 μg/kg at the surface of 02_SA2.
- Four pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and aldrin) were detected at 02_SA3 at concentrations below the CRDL.
- Two SVOCs were detected in the 2-foot sample at 02_SA2: bis(2-ehtylenxyl)phthalate (4200 μg/kg) and benzyl butyl phthalate (150 μg/kg, estimated). SVOCs were not detected in the other Stratum 2 samples.
- No PCBs were detected.

In summary, toluene and TFH-gasoline were detected at all sampling locations, and TFH-diesel, acetone, and pesticides were detected at only at 02_SA3.

B2.6 Vadose Zone Soils

B2.6.1 Description of Subsurface Soil Samples

An upgradient well, a deep boring drilled into the man-made channel, and three downgradient wells were drilled.

B2.6.2 Subsurface Geology

Boring logs (Appendix K) indicate that lithic materials include sand, sand with gravel, silty sand, sandy silt, and silty sand with gravel. Some silt and fat clay were also encountered at 02_DGMW59. The areal geology includes Quaternary alluvium and colluvium, Quaternary nonmarine terrace deposits, the Tertiary Topanga Formation, and the Tertiary Vaqueros/Sespe Formations (Figure B2-4, Geology Map). The geology consists primarily of stream-deposited alluvium deposited on top of Quaternary and Tertiary semiconsolidated sandstone and siltstone (bedrock) (Figure B2-2, Geologic Cross Section). The bedrock crops out near the boundaries of the site and was encountered at shallow depths in wells and the deep boring.

In addition, a northwest trending, south-side-down fault has been mapped through a portion of the site. On the basis of lithologic correlations and water elevation differences, it has been inferred that the fault, concealed by alluvium, continues southeastward across the southwest end of the landfill stratum.

B2.6.3 Analytical Results

Vadose zone contamination appears to be limited. There are a few isolated detections of herbicides, VOCs, and one SVOC, as shown in Table B2-3.

Volatile Organic Compounds (VOCs). Toluene and acetone are the only VOCs detected. At 60 feet at 02_UGMW25, the concentration of acetone is 90 μg/kg. Acetone is a demonstrated lab contaminant. The maximum detected concentration of acetone in the trip blanks is 37 μg/L. Toluene was detected below the CRDL at 35 feet in boring 02_S&DB200 and at 70 feet in well 02_DGMW60.

Semivolatile Organic Compounds (SVOCs). Bis(2-ethylhexyl)phthalate was detected below the CRDL in 02_DGMW59 at 48 feet.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. At 02_UGMW25 at 50 feet, two herbicides (2,4-DB and MCPA) were detected at 198 and 225,000 μg/kg, respectively. In boring 02_S&DB200 at 15 feet, dalapon was detected at a value of 82.7 μg/kg.

Hydrocarbons (TRPH, TFH). No hydrocarbons were detected.

Metals and Cyanide. Metals concentration are presented in Table 2-3. (Vadose zone samples were not analyzed for cyanide.)

Total Organic Carbon (TOC). At wells 02_DGMW60 and 02-DGMW61 within the screen interval, TOC was detected at concentrations of 103 and 191 (164 for duplicate) mg/kgw, respectively.

Dioxins and Furans. Dixons and furans were not detected.

B2.6.4 Soil Vapor Headspace Concentrations

Significant concentrations of organic vapors were detected in headspace samples at 02_S&DB200 and 02_DGMW59 (Figure B2-2, Geologic Cross Section). Organic vapor concentrations as high as 1,000 ppmv were detected near the bottom of 02_S&DB200 (Attachment 1, Field Headspace Values). However, laboratory VOC and SVOC data do not correlate with headspace data. No VOCs or SVOCs were detected above the CRDLs in the deep boring or wells.

B2.7 Groundwater

B2.7.1 Site-Specific Hydrogeology

Table B2-5 (Well Construction Details) summarizes well construction, pump installation, and water quality sampling data.

Between October 1992 and February 1993, measured depths to groundwater ranged between approximately 40 and 74 feet bgs (Figures 3-4a/b/c). The water levels rose in all Site 2 wells, likely because of precipitation (Figure B2-5, Hydrograph); the levels increased about 16 feet at 02_UGMW25 and about 29 feet at 02_DGMW60. This water level rise suggests that the area around this site may be a recharge area.

The water elevation at 02_UGMW25 is significantly higher than the elevation at the three downgradient wells. The inferred fault (see Subsection B2.6.2) between 02_UGMW25 and the downgradient wells may restrict downgradient flow; that is, the fault gouge may act as a low-permeability zone that effectively "ponds" water in the landfill stratum behind the fault. Further, gradient and flow direction differences between Stratum 1 (upgradient of the fault) and Stratum 2 (downgradient) suggest that the fault has a notable impact on groundwater flow at Site 2.

Water elevation contours for December 1992, January 1993, and February 1993 are plotted on the site map (Figure B2-1). During December, groundwater flowed to the south-southwest at a gradient of 0.04 foot per foot across the entire site. During January and February, groundwater flow upgradient of the fault area (Stratum 1) was similar to the December flow; to the south-southwest at a gradient of 0.03 foot per foot. Flow in the downgradient area (Stratum 2) was significantly different during January and February: 0.01 foot per foot to the southeast and 0.02 foot per foot to the south-southeast, respectively. That is, the direction of flow in Stratum 2 changed to a more easterly flow path in January and February. This change is possibly related to pumping in the groundwater basin (Figure B2-1, site map). Because only one well is upgradient of the fault (02_UGMW25), flow directions and gradients in Stratum 1 are used only qualitatively.

Flow directions and gradients may equalize across the fault zone during periods of low recharge (no rain or surface water flow) and/or low discharge (no pumping), as during December 1992. Flow direction and gradient differences would conversely be accentuated during recharge (a rise in water levels at

02_UGMW25) and/or pumping in the basin (lower water levels in the downgradient wells).

More easterly groundwater flow directions may be related to pumping at three downgradient Los Alamitos Water District irrigation wells (Wells 1, 2, and 3) (telephone conversation, OCWD, 5 April 1993). Well 1, located about 0.8 miles south of Site 2 at the northeast corner of Trabuco Road and Bake Parkway, pumps at 500 gallons per minute. Wells 2 and 3, located about 2 miles southeast of Site 2 near Lake Forest Drive and Cañada Road, each pump at about 250 gallons per minute. Wells 2 and 3 may be outside the basin boundary.

Hydraulic parameters are summarized in Table B2-5 (Summary of Hydraulic Parameters). Transmissivities for the 20-foot screen intervals range from 7.6 to 91 ft^2/day. Hydraulic conductivities range from 0.38 to 4.7 feet/day.

Hydraulic conductivities in the downgradient wells range from 0.38 to 1.7 feet/day. Gradients in the downgradient portion of the site range from 0.01 to 0.04 foot per foot. Using the lower gradient and lower hydraulic conductivity (0.38 foot/day) in Table B2-5 and an assumed porosity of 0.2, the movement of groundwater would be at 0.019 foot per day. Using the higher hydraulic conductivity of 1.7 feet/day (02_DGMW25), the higher gradient of 0.04, and the same in assumed porosity, the movement would be 0.34 foot/day. A decrease in porosity would increase this range of rates, and an increase in porosity would decrease this range.

B2.7.2 Analytical Results

A summary of detected chemicals in groundwater samples is presented in Table B2-6. Seven VOCs and gross alpha and beta activity were detected. No hydrocarbons, SVOCs, pesticides, PCBs, dioxins, or furans were detected.

Volatile Organic Compounds (VOCs). Seven VOCs were detected: TCE, PCE, 1,2-dichloroethane (1,2-DCA), 1,2-dichloroethene (1,2-DCE), and chloroform.

Three VOCs (1,2-DCA, PCE, and TCE) were detected at concentrations that exceed drinking water standards. 1,2-DCA was detected only at 02_DGMW60, at 0.9 μg/L estimated. PCE was detected in wells 02_DGMW60 and 02_DGMW61 at concentrations of 8 and 2 μg/L, respectively. TCE was also detected in wells 02_DGMW60 and 02_DGMW61 at concentrations of 82 and 1 μg/L, respectively.

Semivolatile Organic Compounds (SVOCs). No SVOCs were detected.

Pesticides and Polychlorinated Biphenyls (PCBs), and Herbicides. No pesticides, herbicides, or PCBs were detected.

Hydrocarbons (TRPH, TFH). No hydrocarbons were detected.

Metals and Cyanide. Metal results are in Table 2-6. No cyanide was detected.

General Chemistry. Detected field values for pH, electrical conductivity, and temperature at the wells were:

Field Values of pH, Electrical Conductivity, and Temperature

Station ID	pH	Electrical Conductivity (μmhos/cm) @ 25°C	Temperature (°C)
02_UGMW25	7.35	830	19.4
02_DGMW59	7.13	1200	23.2
02_DGMW60	7.30	1290	22.2
02_DGMW61	7.41	800	20.9

Water types have been assessed using the Stiff and Piper chemical diagrams provided in Appendix J. A chemical's water type is determined by the major cation and anions dissolved in water. Upgradient well 02_UGMW25 and downgradient wells 02_DGMW59 and 02_DGMW61 have calcium-bicarbonate-type

water. Well 02_DGMW60, the furthest downgradient well, is a sodium-magnesium-bicarbonate groundwater.

The two wells that are furthest downgradient (02_DGMW59 and 02_DGMW60) have the highest total dissolved solids (TDS) values (839 and 834, respectively). Groundwater from wells 02_DGMW25 and 02_DGMW61 has TDS values of 598 and 579, respectively.

Dioxins and Furans. (Dioxins and furans were not analyzed.)

Gross Alpha and Beta Particle Activity. Gross alpha and beta activity was detected in all four wells. The gross alpha activity standard of 15 pci/L was exceeded in 2 samples: 20.9 pCi/L for groundwater from 02_DGMW60 and 16.3 pCi/L for groundwater from 02_DGMW59.

B2.7.3 Comparison with Drinking Water Standards

Table 2-7 presents the analyte concentrations in groundwater exceeding regulatory standards of DTSC action levels.

Three VOCs (1,2-DCA, TCE, and PCE) were detected at concentrations above state or federal MCLs at 02_DGMW60. The detected concentrations of 1,2-DCA and PCE (0.9 and 8 μg/L, respectively), are less than double their respective MCLs. The concentration of TCE (82 μg/k), however, is more than 15 times the federal MCL. No other organic compounds were detected at concentrations above standards.

B2.8 Potential Contaminant Migration Pathways

High-permeability sediments in surface water drainages are potential contaminant migration pathways. Contaminated landfill leachate sediment and/or shallow soils may be leached or eroded into surface water runoff drainages. Surface water contamination may exist as suspended sediment, or contaminants may become dissolved in the water.

Very limited contamination was detected in surface water runoff samples; however, the potential for contaminant migration in surface water exists because sediment and shallow soil contamination exists across the site.

Site 2 is an apparent source of VOC groundwater contamination. The higher-permeability stream and wash sediments provide a permeable groundwater flow pathway for downward contaminant movement during recharge events. The landfill is uncapped and unlined; leachate can migrate directly through the base of the landfill to groundwater. In addition, the semiconsolidated bedrock sediments are able to transmit water at 0.019 to 0.34 feet per day. The water table is generally in the deeper, semiconsolidated basement rocks during most of the year. During precipitation and/or runoff events, groundwater may also leach contaminants downward through more permeable semiconsolidated bedrock sediments to the shallow aquifer. The fault that likely extends across the downgradient end of the landfill stratum may restrict groundwater flow from the stratum.

B2.9 Summary and Conclusions

A summary of contamination (by medium) follows. As discussed earlier, groundwater contamination at the site exists and the potential for surface water runoff contamination exists. Shallow soil contamination exists in both strata at Site 2. Low levels of toluene (up to 15 μg/kg) and TFH-gasoline (up to 958 μg/kg) were detected across the site. Low levels of VOCs are scattered across the site: acetone in the stained area, and 2-butanone and 2-hexanone in the landfill stratum. Acetone is a demonstrated lab contaminant. The maximum detected concentration of acetone in the trip blanks is 37 μg/L. 2-Butanone is a demonstrated lab contaminant. The maximum detected concentration of 2-butanone in the trip blanks was 33 μg/L. In addition, several herbicides were detected in the landfill stratum.

The majority of sediment and surface water runoff contamination is in the man-made channel and the stained area stratum. TFH-gasoline, TFH-diesel, VOCs, SVOCs, pesticides, and herbicides were detected in either the man-made channel (02_MM1 and 02_MM2) or in the wash west of the fork ,just downstream of its confluence with the

man-made channel. TRPH and acetone were detected in the east fork (Main Borrego Canyon Wash). With the exception of the east fork, contamination is likely the result of landfill contaminants leaching and/or eroding into the man-made channel that runs through the center of the site.

With the exception of elevated OVA headspace concentrations at 02_S&DB200 and 02_DGMW59, detected contamination in vadose zone samples is limited. There are a few isolated detections of VOCs (toluene and acetone) and pesticides (2,4-DB and MCPA).

The site is potentially a source of contamination to surface water runoff by VOCs, SVOCs, TFH-gasoline and TFH-diesel, pesticides, herbicides, and gross alpha and beta particle activity, as indicated by the contamination of surface water runoff, sediment, and shallow soil.

Site 2 is an apparent source of groundwater VOC contamination (TCE, PCE, and 1,2-DCA) and should be considered as a potential contributor to the regional VOC contamination. On the basis of regional contaminant concentration contour maps, Site 2 may be the source of TCE and PCE groundwater contamination observed at Sites 5, 6, and 19 (refer to Figures A1-4a, A1-4b, and A1-4c, in Appendix A1). In time, the VOCs detected at Site 2 may move further downgradient.

Table B2-1
Site 2 (OU-2): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum

Sheet 1 of 3

Location/ Stratum	Station Identi-fication	Sample Identi-fication	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Surface Water and Sediments (First 4 samples listed are surface water.)															
East fork/stain area	02_EF1	S1450043	NA	X	X	X	X	X	X	X	X	X			
East fork/stain area	02_EF2	S1450040	NA	X	X	X	X	X	X	X	X	X			
Man-made channel/ landfill	02_MM1	S1450042	NA	X	X	X	X	X	X	X		X			
West fork/ landfill	02_WF1	S1450044	NA	X	X	X	X	X	X	X		X			
West fork/ landfill	02_WF1	S1451007	0	X	X	X		X	X	X	X				
West fork/ landfill	02_WF1	S1451009	2	X	X	X		X	X	X	X				
West fork/stain area	02_WF2	S1451005	0	X	X	X		X	X	X	X				
West fork/stain area	02_WF2	S1451000	2	X	X	X		X	X	X	X				
East fork/stain area	02_EF1	S1451014	0	X	X	X	X	X	X	X					
East fork/stain area	02_EF1	S1451015	2	X	X	X	X	X	X	X					
East fork/stain area	02_EF2	S1451001	0	X	X	X	X	X	X	X					
East fork/stain area	02_EF2	S1451008	2	X	X	X	X	X	X	X					
East fork/stain area	02_EF2	S1451017	4	X	X	X		X	X	X					
East fork/stain area	02_EF2	S1451078[b]	4	X	X	X		X	X	X					
Man-made channel landfill	02_MM1	S1451003	0	X	X	X	X	X	X	X					
Man-made channel landfill	02_MM1	S1451013	2	X	X	X	X	X	X	X					
Man-made channel landfill	02_MM1	S1451012	4	X	X	X		X	X	X					
Man-made channel/stain area	02_MM2	S1451010	0	X	X	X	X	X	X	X					
Man-made channel/stain area	02_MM2	S1451016	2	X	X	X	X	X	X	X					

Table B2-1
Site 2 (OU-2): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum

Sheet 2 of 3

Location/ Stratum	Station Identi- fication	Sample Identi- fication	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Surface and Near-Surface Soils															
Upgradient	02_UGS	S1454480	0				X	X	X	X		X			
Upgradient	02_UGS	S1454502[b]	0				X	X	X	X		X			
Landfill	02_LF1	S1454009	0	X	X	X	X	X	X	X		X			
Landfill	02_LF2	S1454011	0	X	X	X	X	X	X	X		X			
Landfill	02_LF3	S1454010	0	X	X	X	X	X	X	X		X			
Landfill	02_S&DB200	S1454012	0	X	X	X	X	X	X	X		X		X	
Stain area	02_SA1	S1454467	0	X	X	X		X	X	X		X			
Stain area	02_SA1	S1454470	2	X	X	X		X	X	X		X			
Stain area	02_SA2	S1454480	0	X	X	X		X	X	X		X			
Stain area	02_SA2	S1454485	2	X	X	X		X	X	X		X			
Stain area	02_SA3	S1454466	0	X	X	X		X	X	X		X			
Stain area	02_SA3	S1454492[b]	0	X	X	X		X	X	X		X			
Stain area	02_SA3	S1454496	2	X	X	X			X	X		X			
Stain area	02_SA3	S1454499	4	X	X	X			X	X		X			
Vadose Zone Soils															
Upgradient	02_UGMW25	S1456027	50	X	X	X	X	X	X	X					
Upgradient	02_UGMW25	S1456013	60	X										X	
Downgradient	02_DGMW59	S1456014	48	X	X									X	
Downgradient	02_DGMW59	S1457163	62	X	X	X		X	X	X				X	
Downgradient	02_DGMW59	S1456010	48	X	X										
Downgradient	02_DGMW59	S1456028	78										X		
Downgradient	02_DGMW60	S1456015	40	X	X										
Downgradient	02_DGMW60	S1456025	70	X	X	X		X	X	X					
Downgradient	02_DGMW60	S1457148[b]	70	X	X	X		X	X	X					
Downgradient	02_DGMW60	S1456011	80										X		
Downgradient	02_DGMW61	S1456012	30	X	X										
Downgradient	02_DGMW61	S1456016	60	X	X	X		X	X	X					
Downgradient	02_DGMW61	S1456026	80	X									X		
Downgradient	02_DGMW61	S1457143[b]	80	X									X		
Landfill	02_S&DB200	S1456024	5	X	X	X	X	X	X	X				X	
Landfill	02_S&DB200	S1456029	10	X	X	X	X	X	X	X					
Landfill	02_S&DB200	S1456018RX[b]	10	X	X	X	X	X	X	X					
Landfill	02_S&DB200	S1456019	15	X	X	X	X	X	X	X					

Table B2-1
Site 2 (OU-2): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum

Sheet 3 of 3

Location/ Stratum	Station Identi-fication	Sample Identi-fication	Sample Depth (ft)	Groups of Analytes Requested[a]											
				VOCs	Semi-VOCs	Pesti-cides/ PCBs	Herbi-cides	TPH	TFH	Metals	CN	General Chemistry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
Landfill	02_S&DB200	S1456020	20	X	X	X	X	X	X	X					
Landfill	02_S&DB200	S1456022	25	X	X	X	X	X	X	X					
Landfill	02_S&DB200	S1456021	35	X	X	X	X	X	X	X					
Landfill	02_S&DB200	S1456023	40	X	X	X	X	X	X	X					
Groundwater															
Upgradient	02_UGMW25	S1452006	NA	X	X	X		X	X	X	X	X			X
Downgradient	02_DGMW59	S1452009	NA	X	X	X	X	X	X	X	X	X			X
Downgradient	02_DGMW60	S1452008	NA	X	X	X		X	X	X	X	X			X
Downgradient	02_DGMW61	S1452007	NA	X	X	X		X	X	X	X	X			X

[a] VOCs = Volatile Organic Compounds; Semi-VOCs = Semivolatile Organic Compounds; PCBs = Polychlorinated Biphenyls; TPH = Total Recoverable Petroleum Hydrocarbons; TFH = Total Fuel Hydrocarbons; CN = Total Cyanide; TOC = Total Organic Carbon.

[b] Duplicate

Table B2-0

Site 2 (OU- 2): Summary of Detected Chemicals in Surface Runoff Samples

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STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	02_EF1 S1450043	DVF(a)	02_EF2 S1450040	DVF(a)	02_MM1 S1450042	DVF(a)	02_WF1 S1450044	DVF(a)
GENERAL CHEMISTRY									
CARBONATE	MG/L	-		-		-		-	
BICARBONATE	MG/L	57		66		4		66	
ALKALINITY AS CACO3	MG/L	47		54		4		54	
TOTAL DISSOLVED SOLIDS	MG/L	299		307		8		320	
CHLORIDE	MG/L	15.3		12.9		2.34		13.3	
NITRATE/NITRITE-N	MG/L	0.73		0.88		1.15		0.79	
SULFATE	MG/L	73.1		49.4		0.997		86.2	
METALS									
CALCIUM	UG/L	26500		21200		453	U	32700	
ALUMINUM	UG/L	301		401		39.4	U	364	
BARIUM	UG/L	111	b	105	b	33.2	b	106	b
ARSENIC	UG/L	1.7	b	2	b	1.5	U	1.6	b
COPPER	UG/L	5.7	b	7.1	b	2.3	U	9.4	b
IRON	UG/L	326		372		30.4	U	309	
POTASSIUM	UG/L	1740	b	2400	b	677	U	3210	b
MAGNESIUM	UG/L	5290		4340	b	90.3	b	7030	
MANGANESE	UG/L	4.1	b	5.1	b	1.2	b	3.7	b
ZINC	UG/L	13.5	b	15.6	b	15.6	b	20.4	
SODIUM	UG/L	20900		16100		4310	U	17200	
NICKEL	UG/L	6.3	b	6.7	b	5.3	U	6.3	b
SELENIUM	UG/L	2.1	U	2.1	U	2.1	U	2.3	b
THALLIUM	UG/L	1.6	U	1.8	b	1.6	U	1.6	U
VANADIUM	UG/L	5.5	b	8	b	2.6	U	7.6	b
VOLATILE ORGANIC COMPOUNDS									
ACETONE	UG/L	6		2	U	20	U	2	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)									
TFH DIESEL	UG/L	250	U	250	U	408		250	U
GROSS ALPHA AND BETA									
GROSS ALPHA	PCI/L	5.9		8.6		7.7		5.4	
GROSS BETA	PCI/L	127		25.6		14.3		39.2	

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Table B2-2

Site 2 (OU- 2): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	02_EF1 S1451014 (0)	DVF(a)	02_EF1 S1451015 (2)	DVF(a)	02_EF2 S1451001 (0)	DVF(a)	02_EF2 S1451008 (2)	DVF(a)	02_EF2 S1451017 (4)	DVF(a)	02_EF2 S1451078 (4)	DVF(a)	02_LF1 S1454009 (0)	DVF(a)	02_LF2 S1454011 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.43	U	0.43	U	0.42	U	0.43	U	0.44	U	0.44	U	0.3	U	0.3	U
ALUMINUM	MG/KG	997		1040		965		695		880		1510		3230		3840	
ARSENIC	MG/KG	0.55	b	0.63	b	0.62	b	2.4		0.41	b	0.58	b	1.4	b	2.2	
BARIUM	MG/KG	16.2	b	24.5	b	16.9	b	9	b	15.1	b	15.4	b	38.2	b	49.9	
BERYLLIUM	MG/KG	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.29	U	0.3	U
CALCIUM	MG/KG	1100		5120		1270		987	b	880	b	1150		1780		2870	
CADMIUM	MG/KG	0.25	U	0.36	b	0.24	U	0.25	U	0.33	b	0.29	b	0.68	b	0.8	b
COBALT	MG/KG	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.9	b	2.5	b
CHROMIUM	MG/KG	1.5	b	3.5		0.84	b	2.6		1.4	b	2.2		3.7		4.6	
COPPER	MG/KG	0.19	b	0.18	U	0.49	b	1.1	b	1.5	b	1.7	b	3.6	b	4.4	b
IRON	MG/KG	1540		1390		1620		1280		1530		2170		4800		5640	
MERCURY	MG/KG	0.04	U	0.06	U	0.05	U	0.06	U	0.06	U	0.08	U	0.57		0.04	U
POTASSIUM	MG/KG	430	U	400	U	441	U	329	U	368	b	422	b	1040		1280	
MAGNESIUM	MG/KG	521	b	502	b	549	b	387	b	498	b	820	b	1470		1910	
MANGANESE	MG/KG	32.1		30.6		47		40.6		37.2		40.3		93.8		144	
SODIUM	MG/KG	115	b	164	b	117	b	101	b	138	b	128	b	219	U	244	U
NICKEL	MG/KG	1.9	b	2	b	1.5	U	2.3	b	1.6	U	2.9	b	2.6	b	3.3	b
LEAD	MG/KG	0.78		0.73		0.62		2		0.87		0.79		2.5		3.6	
ANTIMONY	MG/KG	2.5	U	2.5	U	2.4	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
SELENIUM	MG/KG	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.42	U	0.42	U
THALLIUM	MG/KG	0.14	U	0.14	U	0.14	U	0.14	U	0.15	U	0.15	U	0.32	U	0.32	U
VANADIUM	MG/KG	3.9	b	4.2	b	3.7	b	3.4	b	4	b	5	b	12.2		13.6	
ZINC	MG/KG	8.2		9.5		7.5		7.3		6.7		9.7		18.9		21.2	
VOLATILE ORGANIC COMPOUNDS																	
ETHYLBENZENE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	10	U
4-METHYL-2-PENTANONE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	5	J
TOLUENE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	4	J	9	J
XYLENE (TOTAL)	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	10	U
CARBON TETRACHLORIDE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	10	U
2-HEXANONE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	10	U
ACETONE	UG/KG	21		4	J	5	J	12	U	10	U	11	U	10	U	10	U
BENZENE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	10	U
METHYLENE CHLORIDE	UG/KG	34	U	13	U	11	U	29	U	12	U	11	U	10	U	10	U
2-BUTANONE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	10	U
TRICHLOROETHYLENE	UG/KG	10	U	10	U	10	U	10	U	10	U	11	U	10	U	10	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	670	U	670	U	660	U	680	U	690	U	710	U	660	U	660	U
BENZYL BUTYL PHTHALATE	UG/KG	670	U	670	U	660	U	680	U	690	U	710	U	660	U	660	U
PESTICIDES AND PCBs																	
ALDRIN	UG/KG	1.73	U	1.7	U	1.72	U	1.74	U	-	UJR	-	UJR	1.72	UJ	1.71	UJ
4,4'-DDT	UG/KG	3.35	U	3.3	U	3.34	U	3.37	U	-	UJR	-	UJR	3.34	UJ	3.32	UJ
ALPHA-CHLORDANE	UG/KG	1.73	U	1.7	U	1.72	U	1.74	U	-	UJR	-	JR	1.72	UJ	1.71	UJ
GAMMA-CHLORDANE	UG/KG	1.73	U	1.7	U	1.72	U	1.74	U	-	JR	-	JR	1.72	UJ	1.71	UJ
4,4'-DDD	UG/KG	3.35	U	3.3	U	3.34	U	3.37	U	-	UJR	-	UJR	3.34	UJ	3.32	UJ
4,4'-DDE	UG/KG	3.35	U	3.3	U	3.34	U	3.37	U	-	UJR	-	UJR	3.34	UJ	3.32	UJ
HERBICIDES																	
DICHLOROPROP	UG/KG	98.6	UJ	99.2	U	100	U	97.6	U	-		-		101	U	101	U
DALAPON	UG/KG	49.3	U	49.6	U	50.2	U	48.8	U	-		-		50.8		50.4	U
MCPP	UG/KG	24700	U	24800	U	25100	U	24400	U	-		-		25300	U	25200	U
2,4-DB	UG/KG	49.3	U	49.6	U	50.2	U	48.8	U	-		-		50.6	U	50.4	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	12.6	U	12.6	U	12.5	U	12.7	U	13	UJ	13.4	UJ	12.6	U	12.5	U
TFH GASOLINE	MG/KG	0.051	U	0.051	U	0.05	U	0.051	U	0.052	U	0.054	U	0.734		0.396	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	153		4555		20	U	20	U

Table B2-2

Site 2 (OU- 2): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	02_LF3 S1454010 (0)	DVF(a)	02_MM1 S1451003 (0)	DVF(a)	02_MM1 S1451013 (2)	DVF(a)	02_MM1 S1451012 (4)	DVF(a)	02_MM2 S1451010 (0)	DVF(a)	02_MM2 S1451016 (2)	DVF(a)	02_S&DB200 S1454012 (0)	DVF(a)	02_SA1 S1454467 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.76	b	0.42	U	0.52	U	0.47	U	0.43	U	0.46	U	0.63	b	0.3	U
ALUMINUM	MG/KG	3610		2160		15400		8620		4870		9510		5820		8170	
ARSENIC	MG/KG	2.1		0.87	b	3.5		2.3		1.3	b	2.7		2.1		2.2	
BARIUM	MG/KG	62.3		28.3	b	176		88.1		57.3		108		64.9		83.2	
BERYLLIUM	MG/KG	0.25	U	0.1	U	0.76	b	0.4	U	0.15	b	0.3	b	0.34	U	0.45	U
CALCIUM	MG/KG	8050		2430		19500		4900		3290		4870		4480		2290	
CADMIUM	MG/KG	1	b	0.5	b	1.7		1.2		0.66	b	1.3		0.55	U	0.55	U
COBALT	MG/KG	2.8	b	1.2	U	7	b	3.7	b	2.4	b	3.6	b	3.5	b	4.5	b
CHROMIUM	MG/KG	7.8		2.7		12.5		8.3		4.6		8.9		6.2		11.1	
COPPER	MG/KG	15.8		1.8	b	9		6.2		3.8	b	7.9		6.3		7.8	
IRON	MG/KG	6210		3090		18600		10600		6060		11400		7860		9290	
MERCURY	MG/KG	0.04	U	0.06	U	0.04	U	0.06	U	0.03	U	0.04	U	0.05	U	0.05	U
POTASSIUM	MG/KG	1460		865	b	4940		2890		1820		2770		2050		1980	
MAGNESIUM	MG/KG	2170		1170		10800		4920		2210		4310		3270		2560	
MANGANESE	MG/KG	202		59.4		294		190		114		205		146		191	
SODIUM	MG/KG	248	U	142	b	353	b	237	b	176	b	209	b	268	U	301	U
NICKEL	MG/KG	5.9	b	3.9	b	9	b	8	b	4	b	8	b	3.7	b	6	b
LEAD	MG/KG	28.3		3.3		4.3		2.1		3.6		14.6		7.5		8	
ANTIMONY	MG/KG	2.5	U	2.4	U	3	U	2.7	U	2.5	U	2.6	U	2.5	U	2.5	U
SELENIUM	MG/KG	4.2	U	0.1	U	0.12	U	0.11	U	0.1	U	0.11	U	0.42	U	0.42	U
THALLIUM	MG/KG	0.32	U	0.14	U	0.35	U	0.25	b	0.2	U	0.28	U	0.32	U	0.32	U
VANADIUM	MG/KG	13.9		7.4	b	44.9		26.5		14.1		25.4		19.4		20.1	
ZINC	MG/KG	51.5		17		60.7		35.3		25.6		48.5		32.3		41.2	
VOLATILE ORGANIC COMPOUNDS																	
ETHYLBENZENE	UG/KG	6	J	10	U	12	U	11	U	10	U	10	U	10	U	10	U
4-METHYL-2-PENTANONE	UG/KG	10	U	10	U	12	U	11	U	10	U	10	U	10	U	10	U
TOLUENE	UG/KG	12		10	U	12	U	11	U	3	J	10	U	15		10	
XYLENE (TOTAL)	UG/KG	6	J	10	U	12	U	11	U	10	U	10	U	10	U	10	U
CARBON TETRACHLORIDE	UG/KG	10	U	10	U	12	U	11	U	11		10	U	10	U	10	U
2-HEXANONE	UG/KG	17		10	U	12	U	11	U	10	U	10	U	10	U	10	U
ACETONE	UG/KG	31	U	10	U	12	U	11	U	26	U	10	U	19	U	10	U
BENZENE	UG/KG	10	U	10	U	12	U	11	U	10	U	10	U	10	U	10	U
METHYLENE CHLORIDE	UG/KG	10	U	27	U	33	U	16	U	92	B	28	U	10	U	10	U
2-BUTANONE	UG/KG	11	U	10	U	12	U	11	U	10	U	10	U	10	U	4	J
TRICHLOROETHYLENE	UG/KG	10	U	10	U	12	U	11	U	10	U	10	U	10	U	10	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	660	U	670	U	350	J	740	U	200	J	670	U	660	U	660	U
BENZYL BUTYL PHTHALATE	UG/KG	660	U	670	U	790	U	1200		670	U	670	U	660	U	660	U
PESTICIDES AND PCBs																	
ALDRIN	UG/KG	1.71	UJ	1.72	U	2.04	U	-	UJR	1.72	U	1.7	U	1.7	UJ	1.72	UJ
4,4'-DDT	UG/KG	3.32	UJ	3.35	U	3.96	U	-	UJR	4.82		3.31	U	3.31	UJ	3.34	UJ
ALPHA-CHLORDANE	UG/KG	1.71	UJ	1.72	U	2.04	U	-	UJR	2.4		1.7	U	1.7	UJ	1.72	UJ
GAMMA-CHLORDANE	UG/KG	1.71	UJ	1.72	U	2.04	U	-	UJR	2.35		1.73		1.7	UJ	1.72	UJ
4,4'-DDD	UG/KG	3.32	UJ	3.35	U	3.96	U	-	UJR	3.34	U	3.31	U	3.31	UJ	3.34	UJ
4,4'-DDE	UG/KG	3.32	UJ	3.35	U	3.96	U	-	UJR	3.34	U	3.31	U	3.31	UJ	3.34	UJ
HERBICIDES																	
DICHLOROPROP	UG/KG	101	U	102	U	119	U	-		99.1	U	99.1	U	101	U	102	U
DALAPON	UG/KG	50.4	U	50.8	U	59.3	U	-		49.6	U	49.5	U	81.5		50.8	U
MCPP	UG/KG	25200	U	25400	U	29700	U	-		24800	U	24800	U	48700		25400	U
2,4-DB	UG/KG	50.4	U	50.8	U	59.3	U	-		49.6	U	49.5	U	50.3	U	50.8	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	12.6	U	12.6	U	14.8	U	14	UJ	12.7	U	12.6	U	12.4	U	12.6	U
TFH GASOLINE	MG/KG	0.311		0.051	U	0.06	U	0.056	U	0.051	U	0.051	U	0.05	U	0.347	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Table B2-2

Site 2 (OU- 2): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	02_SA1 S1454470 (2)	DVF(a)	02_SA2 S1454480 (0)	DVF(a)	02_SA2 S1454485 (2)	DVF(a)	02_SA3 S1454486 (0)	DVF(a)	02_SA3 S1454492 (0)	DVF(a)	02_SA3 S1454496 (2)	DVF(a)	02_SA3 S1454499 (4)	DVF(a)	02_UGS S1454008 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.32	U	0.3	U	0.31	U	0.58	b	0.3	U	0.57	b	0.31	U	0.3	U
ALUMINUM	MG/KG	10800		8150		5120		4110		4270		10700		10000		2720	
ARSENIC	MG/KG	5.1		3.3		1.7	b	1.3	b	1.4	b	3.5		3.4		1.1	b
BARIUM	MG/KG	108		102		59.1		40.8		43.3		109		108		34.8	b
BERYLLIUM	MG/KG	0.55	U	0.45	U	0.32	U	0.19	b	0.2	b	0.48	b	0.37	b	0.19	U
CALCIUM	MG/KG	2840		5160		4050		2100		2150		10100		9630		1800	
CADMIUM	MG/KG	0.58	U	2		0.85	b	0.55	U	0.55	U	0.59	U	0.58	U	0.55	U
COBALT	MG/KG	6.8	b	4.3	b	3	b	2.7	b	2.9	b	5.5	b	4.9	b	1.7	b
CHROMIUM	MG/KG	15.7		10		6.1		4.6		4.3		9.9		9.1		3.2	
COPPER	MG/KG	5	b	8.7		5.3		3.5	b	3.2	b	6.3		5.1	b	2.9	b
IRON	MG/KG	12100		11400		7180		5170		5360		12200		10900		4030	
MERCURY	MG/KG	0.05	U	0.2	U	0.05	U	0.01	U	0.01	U	0.01	U	0.01	U	0.04	U
POTASSIUM	MG/KG	1460		3560		1950		1900		1850		3360		2860		1250	
MAGNESIUM	MG/KG	3570		3840		2700		1660		1750		5740		5090		1330	
MANGANESE	MG/KG	364		204		127		98.2		104		185		175		79.7	
SODIUM	MG/KG	617	b	241	U	238	U	381	U	212	U	270	U	279	U	185	U
NICKEL	MG/KG	11.4		10.3		6.5	b	3.5	b	2.9	b	8.4	b	5.4	b	2.5	b
LEAD	MG/KG	5		9		2.1		8.4		7.8		5.9		3.4		3	
ANTIMONY	MG/KG	2.6	U	2.5	U	2.6	U	2.5	U	2.5	U	2.7	U	2.6	U	2.5	U
SELENIUM	MG/KG	0.44	U	0.42	U	0.43	U	4.2	U	0.42	U	4.5	U	0.44	U	0.42	U
THALLIUM	MG/KG	0.34	U	0.32	U	0.33	U	0.32	U	0.32	U	0.34	U	0.33	U	0.32	U
VANADIUM	MG/KG	29		28		17.8		12.5		12.7		30.4		27.8		9.7	b
ZINC	MG/KG	30.7		44.8		27		22.4		21		39.4		35.3		17.7	
VOLATILE ORGANIC COMPOUNDS																	
ETHYLBENZENE	UG/KG	11	U	10	U	10	U	10	U	10	U	11	U	11	U	-	
4-METHYL-2-PENTANONE	UG/KG	11	U	10	U	10	U	10	U	10	U	11	U	11	U	-	
TOLUENE	UG/KG	11	U	12		10	U	6	J	4	J	11	U	11	U	-	
XYLENE (TOTAL)	UG/KG	11	U	10	U	10	U	10	U	10	U	11	U	11	U	-	
CARBON TETRACHLORIDE	UG/KG	11	U	10	U	10	U	10	U	10	U	11	U	11	U	-	
2-HEXANONE	UG/KG	11	U	10	U	10	U	10	U	10	U	11	U	11	U	-	
ACETONE	UG/KG	11	U	17	U	10	U	10	U	32		11	U	11	U	-	
BENZENE	UG/KG	11	U	10	U	10	U	10	U	10	U	11	U	11	U	-	
METHYLENE CHLORIDE	UG/KG	11	U	21	U	10	U	12	U	14	U	11	U	11	U	-	
2-BUTANONE	UG/KG	3	J	10	U	4	J	10	U	10	U	11	U	11	U	-	
TRICHLOROETHYLENE	UG/KG	11	U	10	U	10	U	10	U	10	U	11	U	11	U	-	
SEMIVOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	690	U	670	U	4200		670	U	670	U	700	U	710	U	-	
BENZYL BUTYL PHTHALATE	UG/KG	690	U	670	U	150	J	670	U	670	U	700	U	710	U	-	
PESTICIDES AND PCBs																	
ALDRIN	UG/KG	1.81	UJ	1.72	UJ	1.74	UJ	1.71	UJ	3.01	J	1.78	UJ	2.92	J	-	
4,4'-DDT	UG/KG	3.51	UJ	3.34	UJ	3.38	UJ	5.58	J	18.2	J	4.66	J	4.46	J	-	
ALPHA-CHLORDANE	UG/KG	1.81	UJ	1.72	UJ	1.74	UJ	1.71	UJ	1.72	UJ	1.78	UJ	1.81	UJ	-	
GAMMA-CHLORDANE	UG/KG	1.81	UJ	1.72	UJ	1.74	UJ	1.71	UJ	1.72	UJ	1.78	UJ	1.81	UJ	-	
4,4'-DDD	UG/KG	3.51	UJ	3.34	UJ	3.38	UJ	3.33	UJ	0.839	J	3.46	UJ	3.52	UJ	-	
4,4'-DDE	UG/KG	3.51	UJ	3.34	UJ	3.38	UJ	1.63	J	4.45	J	1.15	J	1.21	J	-	
HERBICIDES																	
DICHLOROPROP	UG/KG	107	U	507		102	UJ	-		-		-		-		101	U
DALAPON	UG/KG	53.3	U	50.7	U	51.1	UJ	-		-		-		-		50.4	U
MCPP	UG/KG	26600	U	25400	U	25500	UJ	-		-		-		-		25200	U
2,4-DB	UG/KG	53.3	U	50.7	U	51.1	UJ	-		-		-		-		50.4	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.3	U	12.6	U	12.9	U	54.2		88.7		30.9		97.5		12.6	U
TFH GASOLINE	MG/KG	0.088		0.11		0.089		0.956		0.9		0.843		0.958		0.29	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U

Table B2-2

Site 2 (OU- 2): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	02_UGS S1454602 (2)	DVF(a)	02_WF1 S1451007 (0)	DVF(a)	02_WF1 S1451009 (2)	DVF(a)	02_WF2 S1451006 (0)	DVF(a)	02_WF2 S1451000 (2)	DVF(a)
METALS											
SILVER	MG/KG	0.31	U	0.42	U	0.44	U	0.42	U	0.43	U
ALUMINUM	MG/KG	4240		638		1540		973		1840	
ARSENIC	MG/KG	1.9	b	0.5	b	1	b	0.7	b	0.71	b
BARIUM	MG/KG	54.2		22	b	22.1	b	62.3		34	b
BERYLLIUM	MG/KG	0.29	U	0.1	U	0.1	U	0.1	U	0.1	U
CALCIUM	MG/KG	2520		976	b	2650		1110		1910	
CADMIUM	MG/KG	0.57	U	0.54	b	0.7	b	0.31	b	0.52	b
COBALT	MG/KG	2.8	b	1.2	U	1.2	U	1.2	U	1.2	U
CHROMIUM	MG/KG	5		1.1	b	5.1		5.7		2.8	
COPPER	MG/KG	4.3	b	0.18	U	1	b	0.18	U	0.99	b
IRON	MG/KG	6030		1230		2690		1550		2600	
MERCURY	MG/KG	0.04	U	0.03	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	1500		286	U	662	U	330	U	741	b
MAGNESIUM	MG/KG	1960		308	b	1000	b	421	b	969	b
MANGANESE	MG/KG	116		35.7		52.7		88.9		69.5	
SODIUM	MG/KG	208	U	121	b	169	b	172	b	131	b
NICKEL	MG/KG	5.1	b	3.3	b	5.5	b	2.1	b	5.2	b
LEAD	MG/KG	2.8		0.66		5.2		0.66		1.4	
ANTIMONY	MG/KG	2.6	U	2.4	U	2.5	U	3.9	b	2.5	U
SELENIUM	MG/KG	0.43	U	0.1	U	0.25	b	0.1	U	0.1	U
THALLIUM	MG/KG	0.33	U	0.14	U	0.15	U	0.14	U	0.14	U
VANADIUM	MG/KG	14.7		3.9	b	7	b	4.7	b	7.3	b
ZINC	MG/KG	22.2		6		14.9		6.7		13.4	
VOLATILE ORGANIC COMPOUNDS											
ETHYLBENZENE	UG/KG	-		11	U	10	U	10	U	11	U
4-METHYL-2-PENTANONE	UG/KG	-		11	U	10	U	10	U	11	U
TOLUENE	UG/KG	-		11	U	10	U	4	J	11	U
XYLENE (TOTAL)	UG/KG	-		11	U	10	U	10	U	11	U
CARBON TETRACHLORIDE	UG/KG	-		11	U	10	U	10	U	11	U
2-HEXANONE	UG/KG	-		11	U	10	U	10	U	11	U
ACETONE	UG/KG	-		6	J	10	U	10	U	11	U
BENZENE	UG/KG	-		11	U	10	U	4	J	11	U
METHYLENE CHLORIDE	UG/KG	-		12	U	15	U	17	U	12	U
2-BUTANONE	UG/KG	-		11	U	10	U	10	U	11	U
TRICHLOROETHYLENE	UG/KG	-		11	U	10	U	3	J	11	U
SEMIVOLATILE ORGANIC COMPOUNDS											
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	-		740	U	690	U	670	U	720	U
BENZYL BUTYL PHTHALATE	UG/KG	-		740	U	690	U	670	U	720	U
PESTICIDES AND PCBs											
ALDRIN	UG/KG	-		1.92	U	1.82	U	1.71	U	1.88	U
4,4'-DDT	UG/KG	-		3.72	U	3.52	U	3.33	U	5.04	
ALPHA-CHLORDANE	UG/KG	-		1.92	U	1.82	U	1.71	U	1.88	U
GAMMA-CHLORDANE	UG/KG	-		1.92	U	1.82	U	1.71	U	1.88	U
4,4'-DDD	UG/KG	-		3.72	U	3.52	U	3.33	U	3.65	U
4,4'-DDE	UG/KG	-		3.72	U	3.52	U	3.33	U	3.65	U
HERBICIDES											
DICHLOROPROP	UG/KG	105	U	112	UJ	104	UJ	101	U	108	UJ
DALAPON	UG/KG	52.3	U	55.9	U	52	U	50.5	U	54.1	U
MCPP	UG/KG	26200	U	28000	U	26000	U	25200	U	140000	
2,4-DB	UG/KG	52.3	U	55.9	U	52	U	50.5	U	455	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)											
TFH DIESEL	MG/KG	13	U	14.1	U	13	U	12.5	U	13.6	U
TFH GASOLINE	MG/KG	0.052	U	0.056	U	0.053	U	0.051	U	0.064	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)											
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Table B2-3

Site 2 (OU- 2): Summary of Detected Chemicals in the Vadose Zone (Subsurface) Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	02_DGMW59 S1456010 (48)	DVF(a)	02_DGMW59 S1457163 (48)	DVF(a)	02_DGMW59 S1456014 (62)	DVF(a)	02_DGMW60 S1456015 (40)	DVF(a)	02_DGMW60 S1456025 (70)	DVF(a)	02_DGMW60 S1457148 (70)	DVF(a)	02_DGMW60 S1456011 (80)	DVF(a)	02_DGMW61 S1456012 (30)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		103		-	
METALS																	
SILVER	MG/KG	-		-		0.44	U	-		2.6		2.9		-		-	
ALUMINUM	MG/KG	-		-		1940		-		24900		34600		-		-	
ARSENIC	MG/KG	-		-		0.77	b	-		1	b	1.8	b	-		-	
BARIUM	MG/KG	-		-		58.4		-		139		146		-		-	
BERYLLIUM	MG/KG	-		-		0.1	U	-		1.5		2.1		-		-	
CALCIUM	MG/KG	-		-		2340		-		5330		5990		-		-	
CADMIUM	MG/KG	-		-		0.37	b	-		1.3		1.8		-		-	
COBALT	MG/KG	-		-		1.2	U	-		14.3		11.1	b	-		-	
CHROMIUM	MG/KG	-		-		2.6		-		32.1		43.3		-		-	
COPPER	MG/KG	-		-		1.8	b	-		22		19.1		-		-	
IRON	MG/KG	-		-		2810		-		33800		50400		-		-	
POTASSIUM	MG/KG	-		-		689	b	-		12200		15300		-		-	
MAGNESIUM	MG/KG	-		-		1020	b	-		18500		21100		-		-	
MANGANESE	MG/KG	-		-		65		-		483		331		-		-	
SODIUM	MG/KG	-		-		143	b	-		602	b	593	b	-		-	
NICKEL	MG/KG	-		-		1.7	b	-		20.3		19.6		-		-	
LEAD	MG/KG	-		-		0.79		-		4.7		7.8		-		-	
ANTIMONY	MG/KG	-		-		2.5	U	-		3.1	U	3	U	-		-	
SELENIUM	MG/KG	-		-		0.1	UJ	-		0.13	U	0.13	U	-		-	
THALLIUM	MG/KG	-		-		0.15	UJ	-		0.71	b	0.78	b	-		-	
VANADIUM	MG/KG	-		-		8.2	b	-		72.6		60.2		-		-	
ZINC	MG/KG	-		-		9.6		-		109		112		-		-	
VOLATILE ORGANIC COMPOUNDS															-		
TOLUENE	UG/KG	10	U	10	U	10	U	11	U	4	J	5	J	-		10	U
ACETONE	UG/KG	22	U	12	U	10	U	14	U	39	U	72	B	-		33	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	360	J	670	U	670	U	720	U	810	U	820	U	-		670	U
HERBICIDES																	
DALAPON	UG/KG	-		-		-		-		-		-		-		-	
MCPA	UG/KG	-		-		-		-		-		-		-		-	
2,4-DB	UG/KG	-		-		-		-		-		-		-		-	

Table B2-3

Site 2 (OU- 2): Summary of Detected Chemicals in the Vadose Zone (Subsurface) Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	02_DGMW61 S1456016 (60)	DVF(a)	02_DGMW61 S1456026 (80)	DVF(a)	02_DGMW61 S1457143 (80)	DVF(a)	02_S&DB200 S1456024 (5)	DVF(a)	02_S&DB200 S1456018 (10)	DVF(a)	02_S&DB200 S1456029 (10)	DVF(a)	02_S&DB200 S1456019 (15)	DVF(a)	02_S&DB200 S1456020 (20)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		191		164		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.51	U	-		-		0.43	U	0.49	U	0.45	U	0.45	U	0.47	U
ALUMINUM	MG/KG	7810		-		-		900		10100		5530		8580		3640	
ARSENIC	MG/KG	1.5	b	-		-		0.63	b	3.4		1.7	b	3.6		1.2	b
BARIUM	MG/KG	150		-		-		13.3	b	135		65.2		103		57	
BERYLLIUM	MG/KG	0.27	b	-		-		0.23	U	0.53	U	0.26	U	0.55	U	0.42	U
CALCIUM	MG/KG	4520		-		-		1530		7790		6060		9700		4330	
CADMIUM	MG/KG	0.56	b	-		-		0.25	U	1	b	0.59	b	0.84	b	0.55	b
COBALT	MG/KG	3.3	b	-		-		1.2	U	5.2	b	3.3	b	5.6	b	2.1	b
CHROMIUM	MG/KG	12.3		-		-		0.76	U	8.6		4.7		7.5		3.8	U
COPPER	MG/KG	6.2		-		-		1.2	U	6.9		3.6	b	6.8		3.2	b
IRON	MG/KG	10500		-		-		1350		12800		7780		12000		5650	
POTASSIUM	MG/KG	2500		-		-		321	b	3360		2270		3210		1630	
MAGNESIUM	MG/KG	4180		-		-		640	b	5690		3440		5410		2410	
MANGANESE	MG/KG	111		-		-		35.4		268		162		221		136	
SODIUM	MG/KG	313	b	-		-		165	b	284	b	210	b	261	b	183	b
NICKEL	MG/KG	5.3	b	-		-		1.6	U	5.6	b	2.9	b	3.9	b	3.3	b
LEAD	MG/KG	2.4		-		-		0.39	b	2.8		1.6		3		1.2	
ANTIMONY	MG/KG	2.9	U	-		-		2.5	U	2.8	U	2.6	U	3.1	b	2.7	U
SELENIUM	MG/KG	1.3		-		-		0.1	U	0.12	U	0.11	U	0.11	U	0.11	U
THALLIUM	MG/KG	0.24	J	-		-		0.14	U	0.16	U	0.21	U	0.32	U	0.16	U
VANADIUM	MG/KG	20.1		-		-		3.5	b	30.1		18.4		26.3		12.8	
ZINC	MG/KG	32.7		-		-		4.8	U	38.6		24.3		38.1		18.7	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	12	U	13	U	12	U	10	U	11	U	11	U	10	U	10	U
ACETONE	UG/KG	54	U	36	U	42	U	16	U	11	U	11	U	10	U	10	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	800	U	-		-		670	U	730	U	740	U	680	U	690	U
HERBICIDES																	
DALAPON	UG/KG	-		-		-		50.9	U	54.8	U	55.8	U	82.7		51.6	U
MCPA	UG/KG	-		-		-		25400	U	27400	U	27900	U	25800	U	25800	U
2,4-DB	UG/KG	-		-		-		50.9	U	54.8	U	55.8	U	51.6	U	51.6	U

Table B2-3

Site 2 (OU- 2): Summary of Detected Chemicals in the Vadose Zone (Subsurface) Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	02_S&DB200 S1456022 (25)	DVF(a)	02_S&DB200 S1456021 (35)	DVF(a)	02_S&DB200 S1456023 (40)	DVF(a)	02_UGMW25 S1456027 (50)	DVF(a)	02_UGMW25 S1456013 (60)	DVF(a)
GENERAL CHEMISTRY											
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-	
METALS											
SILVER	MG/KG	0.44	U	0.49	U	0.49	U	0.44	UJ	-	
ALUMINUM	MG/KG	3050		4440		3250		1460		-	
ARSENIC	MG/KG	1.2	b	0.98	U	0.51	U	1.4	b	-	
BARIUM	MG/KG	47.7		44	b	77.9		22.5	b	-	
BERYLLIUM	MG/KG	0.34	U	0.44	U	0.44	U	0.16	b	-	
CALCIUM	MG/KG	8940		4740		3970		2610		-	
CADMIUM	MG/KG	0.3	b	0.52	b	0.5	b	0.42	b	-	
COBALT	MG/KG	1.2	U	2.2	b	1.9	b	1.5	b	-	
CHROMIUM	MG/KG	2.9	U	4		3.2		10.5		-	
COPPER	MG/KG	2.4	b	3.6	b	2.3	b	5.7		-	
IRON	MG/KG	4350		6320		3900		2760		-	
POTASSIUM	MG/KG	1000	b	1390		1010	b	525	b	-	
MAGNESIUM	MG/KG	1610		2290		1540		916	b	-	
MANGANESE	MG/KG	92.3		82.2		63.3		65		-	
SODIUM	MG/KG	193	b	196	b	169	b	159	b	-	
NICKEL	MG/KG	1.9	b	2.6	b	3	b	1.6	U	-	
LEAD	MG/KG	1.4		1.4		0.94		0.71		-	
ANTIMONY	MG/KG	2.6	U	2.8	U	2.8	U	2.5	U	-	
SELENIUM	MG/KG	0.11	U	0.12	U	0.12	U	0.1	U	-	
THALLIUM	MG/KG	0.15	U	0.3	b	0.19	b	0.15	b	-	
VANADIUM	MG/KG	11.3		13.5		10.3	b	5.9	b	-	
ZINC	MG/KG	12.3		17.4		12.9		9.8		-	
VOLATILE ORGANIC COMPOUNDS											
TOLUENE	UG/KG	10	U	7	J	12	U	10	U	11	U
ACETONE	UG/KG	10	U	13	U	12	U	16	U	90	
SEMIVOLATILE ORGANIC COMPOUNDS											
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	680	U	850	U	760	U	680	U	-	
HERBICIDES											
DALAPON	UG/KG	51.6	U	63.9	UJ	58.9	UJ	51.9	U	52.6	U
MCPA	UG/KG	25800	U	31900	UJ	29400	UJ	225000		26400	U
2,4-DB	UG/KG	51.6	U	63.9	UJ	58.9	UJ	198		52.6	U

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

Table B2-4
Site 2 (OU-2): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum

Item	Station Identification			
	02_UGMW25	02_DGMW59	02_DGMW60	02_DGMW61
Survey Location--Northing Survey Location--Easting	550652 1560979	549432 1559706	549246 1559020	549955 1559340
Ground Surface Elevation (ft above MSL[a]) Measuring Point Elevation (ft above MSL[a])	545.7 546.36	506.19 506.91	498.61 499.28	514.25 514.85
Measuring Point Location	Top of casing	Top of casing	Top of casing	Top of casing
Type of Surface Completion	Above ground	Above ground	Above ground	Above ground
Casing Diameter and Material	4" Sch. 40 PVC	4" Sch. 40 PVC	4" Sch. 40 PVC	4" Sch. 40 PVC
Screen Diameter and Material	4" 20-slot SS	4" 20-slot SS	4" 20-slot SS	4" 20-slot SS
Screen Interval (ft bgs[b])	55 to 75	69 to 89	80 to 100	80 to 100
Length of Drop Pipe (ft bgs[b])	72	85	98	98
Make and Model of Installed Pump	2"	2"	2"	2"
Date of Pumping Test	11/18/92	11/12/92	10/22/92	11/13/92
Date of Water Quality Sampling	12/9/92	12/15/92	11/18/92	12/14/92

[a]Mean sea level
[b]Below ground surface
SS = Stainless Steel

Table B2-5
Site 2 (OU-2): Summary of Hydraulic Parameters
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	Type of Test	Analysis Method	Trans-missivity (ft^2/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient	Leakance Factor
02_UGMW25	Slug	Bouwer and Rice, 1976.	91	4.7	NA	NA
02_UGMW59	Slug	Bouwer and Rice, 1976.	35	1.7	NA	NA
02_UGMW60	Slug	Bouwer and Rice, 1976; Cooper, Broedehoeft, and Papadopulos, 1967.	14	0.52	2 E-04	NA
02_UGMW61	Slug	Bouwer and Rice, 1976; Cooper, Broedehoeft, and Papadopulos, 1967.	7.6	0.38	9 E-05	NA

NA = Not applicable.
Source: Table F-2 (Appendix F)

Table B2-6

Site 2 (OU- 2): Summary of Detected Chemicals in Groundwater Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SCREEN INTERVAL ANALYTE BY GROUP	REG.CODE(b)	REG.LEVEL(c)	UNITS	02_DGMW59 S1452009 (69-89)	DVF(a)	02_DGMW60 S1452008 (80-100)	DVF(a)	02_DGMW61 S1452007 (80-100)	DVF(a)	02_UGMW25 S1452006 (55-75)	DVF(a)
GENERAL CHEMISTRY											
ALKALINITY AS CACO3	NA	NA	MG/L	294		430		256		180	
CARBONATE	NA	NA	MG/L	-		-		-		-	
BICARBONATE	NA	NA	MG/L	358		525		291		220	
CHLORIDE	3	250	MG/L	119		91.7		25.3		66	
SULFATE	3	250	MG/L	215		163		188		167	
NITRATE/NITRITE-N	1	10	MG/L	3.53		3.45		0.05	U	6.29	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	839		834		579		598	
METALS											
SILVER	1	50	UG/L	2.2	b	2.1	U	2.1	U	2.1	U
ALUMINUM	3	50	UG/L	672		31	U	31	UJ	31	U
ARSENIC	2	50	UG/L	1.8	b	0.7	U	0.7	b	4.7	b
BARIUM	2	2000	UG/L	49.9	b	59.8	b	40.3	b	34.4	b
BERYLLIUM	NA	NA	UG/L	0.5	U	0.5	UJ	0.5	UJ	0.64	b
CALCIUM	NA	NA	UG/L	128000		72400		94800		93500	
COPPER	2	1300	UG/L	2.5	b	4.1	b	0.9	U	1.6	J
IRON	3	300	UG/L	895		57.1	b	4.1	U	275	
POTASSIUM	NA	NA	UG/L	4360	b	7740		4390	b	1280	b
MAGNESIUM	NA	NA	UG/L	34100		64000		22600		20600	
MANGANESE	3	50	UG/L	239		24.1		115		70.6	
SODIUM	NA	NA	UG/L	95500		129000		57900		67100	
NICKEL	NA	NA	UG/L	10.2	J	7.7	U	7.7	U	7.7	U
SELENIUM	1	10	UG/L	1.9	U	8	b	4.4	U	1.5	UJ
VANADIUM	NA	NA	UG/L	8.3	b	7	b	4.8	b	15	b
ZINC	2	5000	UG/L	34.4		6.6	b	2.2	U	15.8	b
VOLATILE ORGANIC COMPOUNDS											
1,2-DICHLOROETHANE	1	0.5	UG/L	1	U	0.9	J	1	U	1	U
TETRACHLOROETHENE	2	5	UG/L	1	U	8		2		1	U
TRICHLOROETHYLENE	2	5	UG/L	0.6	J	82	D	1		0.9	J
CHLOROFORM	2	100	UG/L	1	U	6		1	U	1	U
1,2-DICHLOROETHENE (TOTAL)	NA	NA	UG/L	1	U	8		1	U	1	U
GROSS ALPHA AND BETA											
GROSS ALPHA	2	15	PCI/L	16.3		20.9		6.5		7.8	
GROSS BETA	2	50	PCI/L	14.1		10.8		8.9		5.2	

(a) A definition of each data validation flag (DVF) is provided in Table B-1.

(b) Regulatory Codes are:

1 = California MCL
2 = EPA primary MCL
3 = EPA secondary MCL
4 = California DTSC Action Level

(c) The given concentration represents the California MCL, the EPA primary MCL, the EPA secondary MCL, or the California DTSC Action Level, whichever is most stringent.

Table B2-7
Site 2 (OU-2): Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC[a] Action Levels
MCAS El Toro Phase I RI Technical Memorandum

Well Identification	SI (ft bgs)[b]	Analyte	Units	Concen-tration	Regula-tory Level[c]	Regula-tory Code[d]
02_DGMW60	(80-100)	Total Dissolved Solids	MG/L	834	500	3
		1,2-Dichloroethane	µg/L	0.9	0.5	2
		Tetrachloroethene	µg/L	8	5	1
		Gross Alpha	PCI/L	20.9	15	1
		Trichloroethylene	µg/L	82	5	1
02_UGMW25	(55-75)	Manganese	µg/L	70.6	50	3
		Total Dissolved Solids	MG/L	598	500	3
02_DGMW59	(69-89)	Total Dissolved Solids	MG/L	839	500	3
		Aluminum	µg/L	672	50	3
		Iron	µg/L	895	300	3
		Manganese	µg/L	239	50	3
		Gross Alpha	PCI/L	16.3	15	1
02_DGMW61	(80-100)	Total Dissolved Solids	MG/L	579	500	3
		Manganese	µg/L	115	50	3

[a]California Department of Toxic Substances Control
[b]Screen interval (feet below ground surface)
[c]the most stringent federal/state drinking water standard was applied. In the presence of both an EPA MCL and a California MCL, the most stringent MCL is prepresented. If neither an EPA or California MCL is listed, the California DTSC action level was applied.
[d]Regulatory Code

1=EPA Primary MCL:	Federally enforceable drinking water standard established for the effects of contaminants
2=California MCL:	Health-based drinking water standard enforceable at the state level
3=EPA Secondary MCL:	Nonenforceable standard based on aesthetic qualities of taste, color, and odor (Includes chloride, iron, manganese, sulfate, and TDS)
4=DTSC Action Level:	Nonenforceable levels at which DTSC strongly urges water purveyors to take corrective action to reduce the level of contamination in the water they supply (Action levels cease to exist when state MCLs are promulgated.)

Appendix B3

Nature and Extent of Contamination: Site 3 (OU-2) — Original Landfill

Appendix B3
NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION: SITE 3 (OU-2) - ORIGINAL LANDFILL

This discussion of Site 3 is supplemented by the figures and data tables listed below. The figures begin on page B3-3, and the tables are grouped at the end of this Appendix B3. Field headspace values for soils at this site are presented in Table BA1-3, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B3-1:	(Site Map)
Figure B3-2:	Geologic Cross Section
Table B3-0:	Summary of Detected Chemicals in Surface Runoff Samples
Table B3-1:	Types of Samples and Chemical Analyses
Table B3-2:	Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil
Table B3-3:	Summary of Detected Chemcials in Vadose Zone (Subsurface Samples
Table B3-4:	Well Construction Details
Table B3-5:	Summary of Hydraulic Parameters
Table B3-6:	Summary of Detected Chemicals in Groundwater Samples
Table B3-7:	Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B3.1 Site Description

Site 3, the Original Landfill, is located between Perimeter Road and North Marine Way along the Agua Chinon Wash. The landfill comprises six separate pits and trenches, covering a 20-acre area. The Waste Staging Area for the RI/FS is located within the boundaries of Site 3. For investigative purposes, the entire site is defined as a single stratum. Surface sampling locations within the stratum were statistically located following the *SAP*. Other sampling locations were selected based on suspect areas where contamination was believed to be most probable; these locations generally coincide with the locations of wells or deep borings.

This landfill was reportedly used from 1943 to 1955 as a cut-and-fill facility in conjunction with burning to reduce waste volume. It was estimated that between 163,500 and 243,000 cubic yards of material were placed in this landfill during its

operational period, based upon assumed dimensions of the trenches and pits (Brown and Caldwell, 1986).

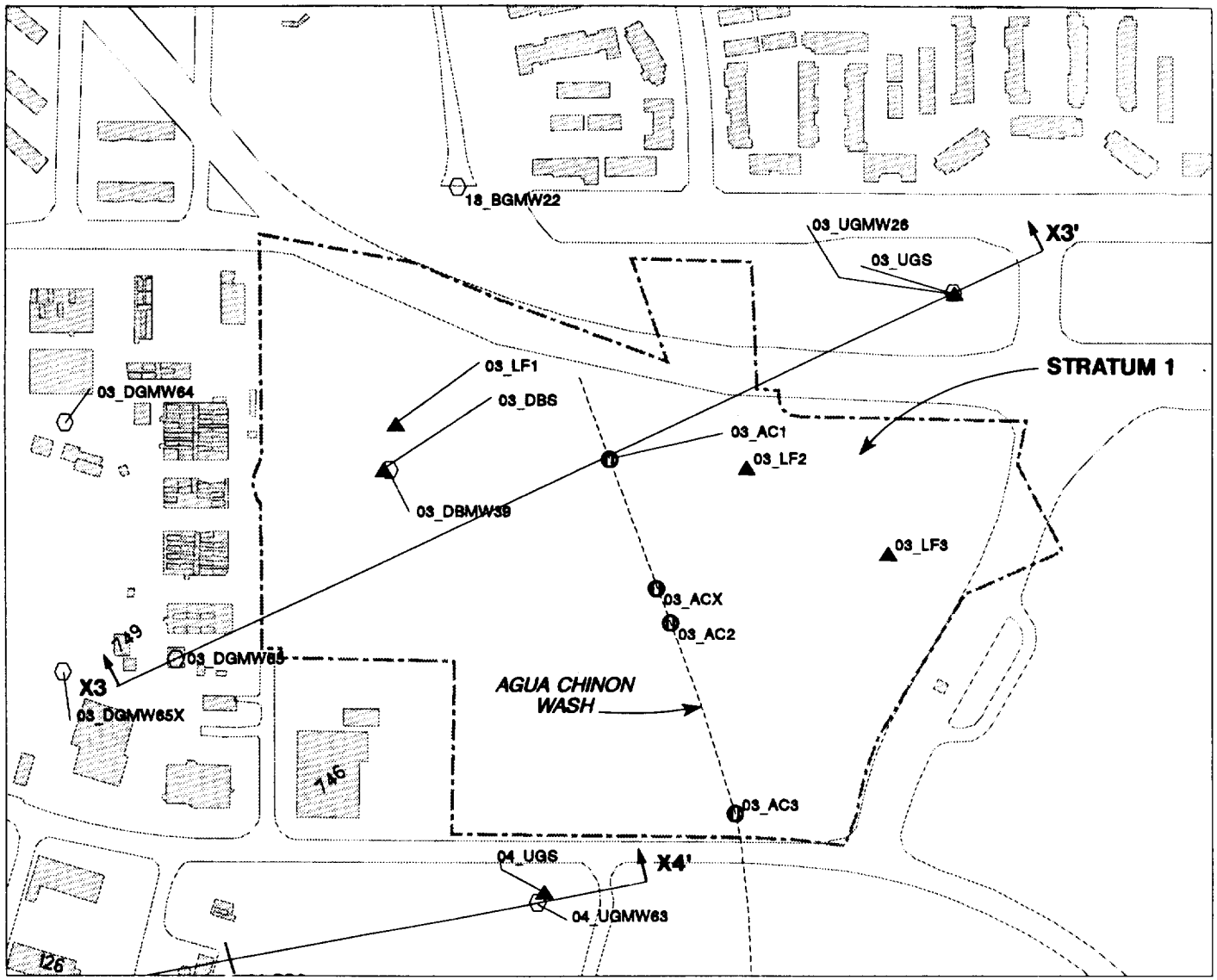
B3.2 Suspected Waste Types and Contaminants

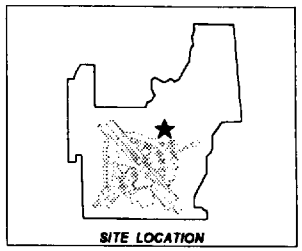
Reportedly, any wastes generated at the facility may have been disposed of in the Original Landfill. Wastes that could potentially be found in this landfill include metals, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily wastes, municipal solid wastes, and various inert solid wastes. The buried wastes probably consist of ash and other combustion wastes, as standard practice was to burn the waste before burial to reduce its volume. Site 3 is a possible source of VOC contamination.

B3.3 Field Investigation

The field investigation at Site 3 consisted of drilling and collecting vadose zone samples from one upgradient monitoring well, one deep boring completed as a monitoring well, and two downgradient monitoring wells; collecting surface and near-surface soil samples from five locations; and collecting sediment samples from three locations in Agua Chinon Wash. Surface water samples were collected at three stations at identical locations as the sediment samples, and one sample was collected from discharge emptying into the wash from a drain pipe. Groundwater samples were collected from four monitoring wells following development. Surface runoff samples were collected during two separate storm events.

Modifications to the *SAP* are documented in the *SAP Amendment*. Changes included extending the site boundaries and relocating the upgradient well and deep boring. The boundaries were extended further north and east (towards and partially across Irvine Boulevard), south (across the entrance road from Gate No. 2), and west (towards North Marine Way). The upgradient well was relocated northeast across Irvine Boulevard. The deep boring was relocated between the trenches that had been found during the geophysical survey.





FEATURES:

- BUILDING OR PAD
- MONITORING WELL
- DEEP, 25-FOOT, OR ANGLE BORING
- SEDIMENT SAMPLE
- SURFACE WATER AND SEDIMENT SAMPLE
- SURFACE AND NEAR-SURFACE SOIL SAMPLE
- ROAD
- STRATUM BOUNDARY
- WASH OR STREAM
- LINE OF GEOLOGIC CROSS-SECTION
- END OF LINE OF CROSS-SECTION
- LINE OF CROSS-SECTION EXTENDS BEYOND AREA SHOWN

0 100 200 400

SCALE IN FEET

FIGURE B3-1

SITE 3 (OU-2): ORIGINAL LANDFILL

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

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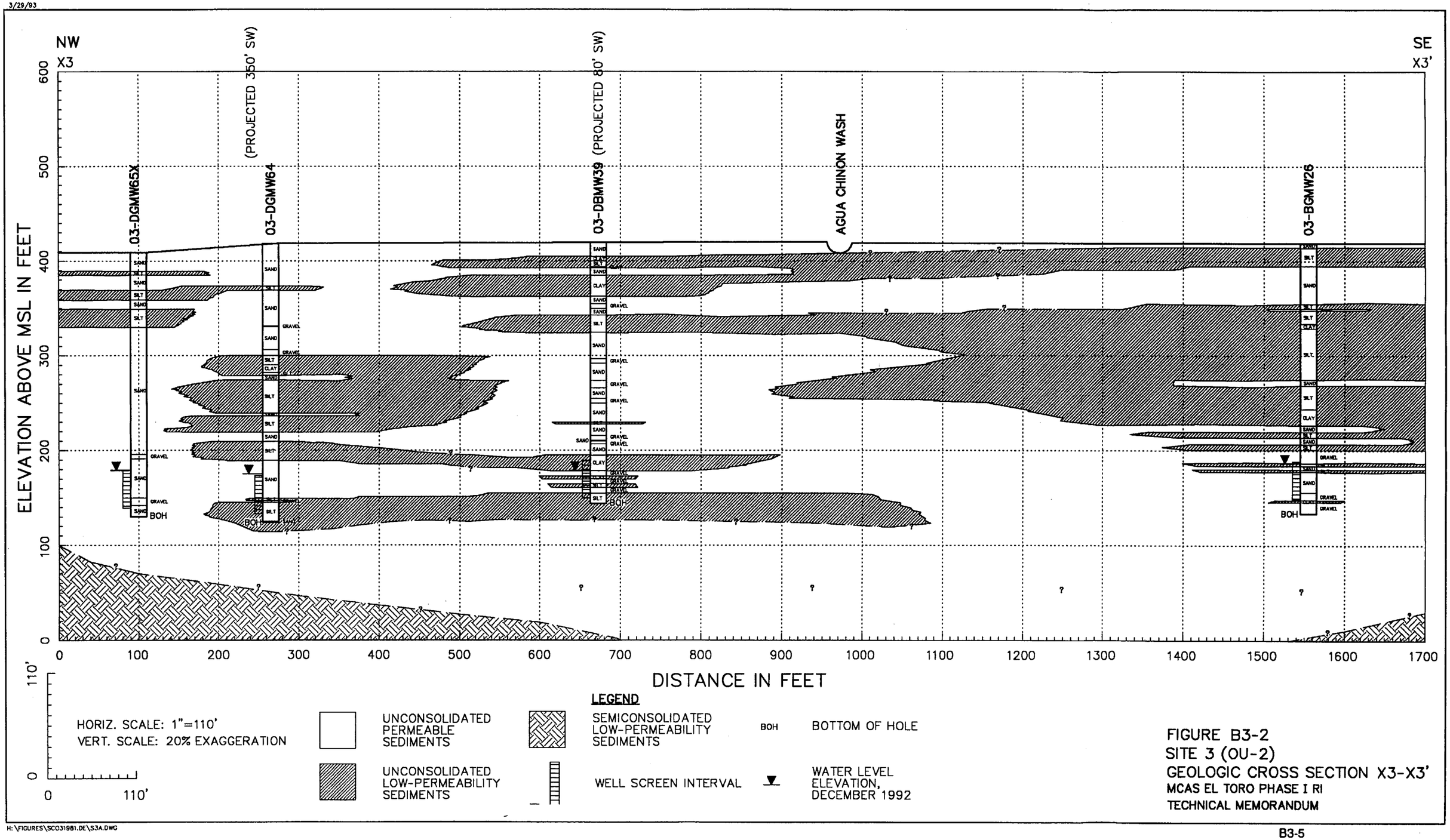

FIGURE B3-2
SITE 3 (OU-2)
GEOLOGIC CROSS SECTION X3-X3'
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

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Field deviations from the *SAP* and the *SAP Amendment* included relocating the downgradient monitoring well. The borehole for proposed well 03_DGMW65 collapsed during construction and was abandoned; the downgradient well, 03_DGMW65X, was relocated to the west. Vadose zone samples were collected from 03_DGMW65, and groundwater samples were collected from 03_DGMW65X. The locations of the monitoring wells, including both the abandoned well and the replacement well, are shown in Figure B3-1.

B3.3.1 Surface Water and Sediment

Surface water was collected during two rain events to evaluate whether the water carried by the wash is a potential transport pathway for contaminants. Agua Chinon Wash is incised about 10 feet into the landfill. As a result, storm runoff from surrounding areas and direct precipitation may come in contact with landfill contents, potentially creating leachate which may be transported off-Station.

Surface water samples were collected from runoff during two of three storm events that occurred during RI activities. They were collected along Agua Chinon Wash at locations 03_AC1, 03_AC2, and 03_AC3. Water was also observed entering the wash through a drain pipe during RI activities. A water sample was collected from the drain pipe located at 03_ACX on 15 September 1992 and analyzed for VOCs. Five surface water samples and one drainage water sample were collected. The surface water and drainage samples were analyzed for the parameters summarized in Table B3-1.

Two surface water samples were collected at sampling locations 03_AC2 and 03_AC3 during the first storm event (2 March 1992). The flow rate along the wash near 03_AC3 was approximately 12 cfs. In addition, a visible hydrocarbon sheen was noted during sampling activities at 03_AC3. (Samples were not collected during the second storm). Three samples, designated 03_AC1, 03_AC2, and 03_AC3, were collected during a third storm event (12 December 1992). At the time of collection, the surface water flow rate at the three sample locations was estimated to be 15 cfs, 10 cfs, and 10 cfs, respectively.

Sediment is carried down the wash during storms and periods of high flow. Sediment samples were collected at three points in and along Agua Chinon Wash (03_AC1, 03_AC2, and 03_AC3) to evaluate whether sediment transport is a contaminant pathway. A total of seven sediment samples were collected between the ground surface and a depth of 4 feet.

B3.3.2 Surface and Near-Surface Soils

Six surface soil samples, including one duplicate, were collected from five locations, as shown in Figure B3-1. Two (including one duplicate) upgradient surface samples were collected from 03_UGS; two samples were collected near deep boring 03_DBS, and one sample was collected from each of the following locations: 03_LF1, 03_LF2, and 03_LF3.

The upgradient samples were analyzed for herbicides, TFH (diesel and gasoline), TRPH, and metals. Samples collected from 03_LF1, 03_LF2, 03_LF3, and 03_DBS were analyzed for TFH (diesel and gasoline), TRPH, metals, pesticides, VOCs, and SVOCs. In addition, the 03_DBS sample was analyzed for dioxins and furans.

B3.3.3 Vadose Zone Soils

One deep boring, 03_DBMW39, was drilled to a depth of 276 feet bgs and was completed as a monitoring well. Samples from the boring were collected at 5-foot intervals from 5 to 25 feet bgs, and at 35, 45, 215, and 235 feet bgs. Vadose zone soil samples were collected during the construction of monitoring wells 03_UGMW26 and 03_DGMW64, which were drilled to depths of 285 and 290 feet bgs, respectively. Four samples were collected at depths of 185, 225, 227, and 265 feet bgs from boring 03_DGMW65, which was drilled to 275 feet and then abandoned. Two samples were collected from the upgradient location (03_UGMW26) at depths of 85 and 255 feet bgs, and five samples were collected from downgradient location 03_DGMW64 at depths of 40 (plus a duplicate), 200 (plus a duplicate), and 248 feet bgs.

B3.3.4 Groundwater Monitoring Wells

Four groundwater monitoring wells were installed at Site 3. One well was installed upgradient of the Original Landfill (03_UGMW26), one well was drilled as a deep boring through the landfill and completed as a shallow monitoring well (03_DBMW39), and two wells were installed downgradient of the landfill (03_DGMW64 and 03_DGMW65X). As previously stated, well 03_DGMW65X was constructed to replace proposed well 03_DGMW65, which was abandoned as a boring. One groundwater sample was collected from each completed well.

Aquifer tests were performed on all four monitoring wells installed at Site 3. Pump tests were performed on wells 03_UGMW26 and 03_DBMW39 and slug tests were performed on wells 03_DGMW64 and 03_DGMW65X. The results and analyses are summarized in Table B3-5, and described in detail in Appendix F.

B3.4 Surface Water and Sediments

B3.4.1 Description of Surface Water and Sediment Samples

Agua Chinon Wash is an open channel that cuts across Site 3. Channel flow is south to southwest, and enters a culvert at the southern border of Site 3. Five surface water samples were collected during two storm events at three locations along the wash. In addition, a water sample was collected from a drain pipe that was discovered discharging water into the wash during the rain storms. Sediment samples were collected from three points in and along Agua Chinon Wash. Six sediment samples were collected from depths ranging from 0 to 4 feet.

B3.4.2 Analytical Results

Surface water runoff samples were tested for general water chemistry, hydrocarbons, VOCs, SVOCs, pesticides, herbicides, PCBs, metals, cyanide, and TOC. The discharge water sample collected at the drain pipe was analyzed for VOCs. A summary of chemicals detected in the surface runoff and discharge samples is provided as Table B3-O.

Sediment samples were collected from 0-, 2- and 4-foot depths. Four-foot samples were collected in accordance with the results of a field test for hydrocarbons based on headspace readings with an HNu monitor; the headspace reading for the sample collected at the 03_AC2 at 2 feet was 3.5 ppm. Sediment samples were analyzed for hydrocarbons, VOCs, SVOCs, pesticides, herbicides, PCBs, and metals. A summary of chemicals detected in sediment samples and surface and near-surface soil samples is provided in Table B3-2.

General Chemistry. Values for pH, electrical conductivity, temperature, and TDS were recorded at each sample location. Field pH values ranged from 7.87 to 8.02; electrical conductivity ranged from 163 to 171 μmhos/cm; temperature ranged from 12.0 to 12.2 degrees Centigrade; and TDS ranged from 376 to 527 mg/L.

The distribution of the major ions for surface water samples is presented as Stiff-type and Piper diagrams (Appendix J). The surface runoff water types at the sample locations were:

- Calcium:magnesium/bicarbonate:sulfate at 03_AC1
- Sodium/sulfate at 03_AC2
- Calcium/bicarbonate at 03_AC3

Hydrocarbons. TFH (diesel and gasoline) and TRPH are below the CRDL for all surface water samples.

Sediment samples collected at 03_AC1 contain TRPH below the California LUFT action levels; TFH (diesel and gasoline) are below the CRDL. Sediment samples collected at 03_AC2 contain TFH (diesel and gasoline) and TRPH at concentrations below the California LUFT action levels. Sediment samples collected at location 03_AC3 contain TFH-gasoline below the California LUFT levels; TFH-diesel and TRPH were below the CRDL.

Volatile Organic Compounds (VOCs). Two VOCs were detected in surface water samples collected from Agua Chinon Wash and three VOCs were detected in the discharge water sample collected from the drain pipe. Acetone was detected in

runoff samples from 03_AC1 and 03_AC3 and methyl chloride was detected in all three runoff samples (03_AC1, 03_AC2, and 03_AC3). Acetone and is a demonstrated laboratory contaminant; the maximum detected concentration of acetone in the trip blanks was 37 μg/L.

The discharge water sample collected at the drain pipe contained carbon disulfide (1.0 μg/L), 2-butanone (2.0 μg/L), and acetone (39.0 μg/L). Acetone was also detected in the blank for this sample. 2-Butanone is a demonstrated laboratory contaminant, and was detected at a maximum concentration of 33 μg/L in the trip blanks. Chlorodibromomethane was below the CRDL at an estimated concentration of 0.5 μg/L.

Toluene and 2-hexanone were below the CRDLs in the surface sediments at 03_AC1. Acetone was detected at 210 μg/kg at 2 feet bgs at 03_AC1, and in the rinsate sample collected from this location. Acetone is a demonstrated laboratory contaminant with a maximum detected concentration of 37 μg/L in the trip blanks. All other VOCs are below the CRDL.

Semivolatile Organic Compounds (SVOCs). SVOC bis(2-ethylhexel)phthalate was detected at a concentration of 15.0 μg/L in the surface water sample collected at 03_AC2. All SVOCs are below the CRDL for sediment samples.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. One pesticide, gamma-chlordane, was detected at a concentration of 0.01 μg/L in the surface water sample collected at 03_AC1. Herbicides and PCBs were below the CRDL in all surface and water samples. Three pesticides occur in low concentrations (less than 10 μg/kg) in sediment samples collected from 03_AC3: 4-4'-DDD (2 ft bgs), 4-4'-DDE (0 and 2 ft bgs), and 4-4'DDT (0 and 2 ft bgs). Herbicides and PCBs are below the CRDL in all sediment samples.

Metals and Cyanide. Detected metals in the surface water samples are provided in Table B3-0. Metals were not analyzed for in the discharge water sample collected at the drain pipe (03_ACX). Cyanide was detected at a concentration of 3.10 μg/L in the surface runoff sample collected at 03_AC2.

Total Organic Carbon (TOC). (Surface water runoff and sediment samples were not analyzed for TOC.)

B3.5 Surface and Near-Surface Soils

B3.5.1 Description of Surface and Near-Surface Soil Samples

The surface soils at Site 3 are Metz loamy sand with a 0 to 2 percent slope. The soil extends for a depth of greater than 60 inches. The permeability rate for Metz loamy sand ranges from 6 to 20 inches per hour. The moisture-holding capacity is from 0.07 to 0.11 inch per inch. This soil unit is classified as Hydrologic Group A, which tends to absorb and hold water (rather than allowing it to run off), even when the soil is saturated. Portions of Site 3 may have different surface soils or properties due to the excavation and covering of the landfill. The sediments in the wash are unconsolidated and are considered loose and highly permeable.

B3.5.2 Analytical Results and Soil Vapor Headspace Values

Surface and near-surface soil samples were sampled in the field with an organic vapor analyzer (OVA). With the exception of location 03_LF3, which had a headspace reading of 2.8 ppm, all surface and near-surface soil samples at Site 3 had headspace readings of 1.0 ppm or less. A complete listing of headspace readings is provided in Attachment 1 to Appendix B, Field Headspace Values.

B3.5.2.1 Upgradient Area

Two surface samples (including one duplicate) were collected from upgradient location 03_UGS and analyzed for TRPH, TFH, herbicides, and metals. TFH-diesel and TFH-gasoline were detected below the California LUFT action levels (100 mg/kg) in the surface sample at 03_UGS; concentrations were 12.5 and 0.127 mg/kg, respectively. Concentrations in the duplicate sample were similar (Table B3-2). Herbicide 2,4,5-TP occurred at a concentration of 49.6 μg/kg in the surface soil sample at 03_UGS. This herbicide was not detected in the duplicate sample. TRPH is below the CRDL and concentrations of metals are consistent

with background screening levels. VOCs, SVOCs, dioxins and furans were not analyzed.

B3.5.2.2 Stratum 1: The Landfill

Four surface samples were collected within Stratum 1. TFH-diesel, TFH-gasoline, and TRPH were detected in surface/near-surface samples collected from 03_DBS and 03_LF1 at concentrations below the California LUFT action levels (100 mg/kg) (Table B3-2). Toluene occurred below the CRDL in samples collected from 03_LF1, 03_LF3, and 03_DBS. (Acetone also occurred below the CRDL at 03_DBS (acetone is a demonstrated laboratory contaminant).

Detected metals are listed by analyte for each sampling location in Table B3-2. 4-DDE and 4,4-DDT occurred below the CRDL in the surface sample at 03_LF3. 4,4-DDT is also below the CRDL in the surface sample at 03_LF1. One dioxin, octachlorodibenzo-p-dioxin, was detected at a concentration of 1 ng/g in the surface soil sample at 03_DBS.

B3.6 Vadose Zone Soils

B3.6.1 Description of Subsurface Soil Samples

Subsurface samples were collected during the construction of one deep boring (later completed as shallow monitoring well 03_DBMW39); monitoring wells 03_UGMW26 and 03_DGMW64; and abandoned boring 03_DGMW65. The borings and wells were drilled to depths ranging from 275 to 290 feet bgs. Nine subsurface soil samples were collected at the deep boring. Three, five and four vadose zone samples were collected at 03_UGMW26, 03_DGMW64 and 03_DGMW65, respectively.

B3.6.2 Subsurface Geology

Site 3 overlies approximately 300-400 feet of unconsolidated Quaternary sediments, which in turn overlie semiconsolidated bedrock of the Irvine Area

Groundwater Basin (Figure 3-2, Elevation Map). Detailed regional geology is presented in Section 1 Bedrock Contour.

Based on boring logs (Appendix K), lithologic materials are generally a wide variation of interbedded clays, silts, sands, and gravel. Coarser-grained sediments appear to occur in long lenses, channels, or with thin beds of sands and gravels at various depths. A northwest-southeast geologic cross section through Site 3 is provided as Figure B3-2.

B3.6.3 Analytical Results

A summary of analytes detected in the vadose zone samples is provided for each sample in Table B3-3.

B3.6.3.1 Volatile Organic Compounds (VOCs). Toluene was detected below the CRDL in the 5- and 10-foot samples from 03_DBMW39 and in the 248-foot sample from 03_DGMW64. Methylene chloride was detected in samples from 03_DGMW39 (at 14 to 32 μg/kg) and 03_UGMW26 (at 50 μg/kg). Acetone was detected at 03_DBMW39 (at 14 to 17 μg/kg) and was below the CRDL at 03_DGMW65. Methylene chloride and acetone are demonstrated lab contaminants. The maximum detected concentration of methylene chloride and acetone in the trip blanks are 42 and 37 μg/L, respectively.

B3.6.3.2 Semivolatile Organic Compounds (SVOCs). SVOCs were not detected.

B3.6.3.3 Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. Pesticides and PCBs were not detected.

One herbicide, MCPP, was detected in the 35- and 215-foot samples collected at 03_DBMW39 and in the 255-foot sample from 03_UGMW26. Herbicides 2,4,5-TP and 2,4,5-T were below the CDRL at 03_DGMW65 in the samples collected from 185 and 226 feet bgs, respectively.