

B3.6.3.4 Hydrocarbons. TFH-gasoline occurs at a concentration of 0.132 mg/kg at 15 feet bgs at 03_DBMW39. TFH-diesel and TRPH were below the CRDL in all subsurface soil samples.

Metals and Cyanide. Twenty metals were detected in the soil samples collected at Site 3. A complete list of detected metals and their concentrations is provided for each sample in Table B3-3. (Vadose zone samples were not analyzed for cyanide.)

B3.6.3.6 General Chemistry

Total Organic Carbon (TOC). One sample, 03_DBMW39 (235 feet bgs), was analyzed for total organic carbon. The TOC concentration at this location was 209 mg/kg.

B3.6.4 Soil Vapor Headspace Concentrations

All field values of soil vapor headspace in the vadose zone were less than 5 ppm, with nearly all less than 1 ppm. A complete listing of headspace readings is provided in Attachment 1 to Appendix B, Field Headspace Values.

B3.7 Groundwater

B3.7.1 Site-Specific Hydrogeology

Groundwater elevation measurements were collected during seven events (October 1992 through February 1993). Seasonal water level fluctuations are represented as a hydrograph for each well in (Appendix I). In general, water levels varied by a few tenths of a foot per month. The water level elevation in the northeastern section of the site is generally higher than in the rest of the site, declining by about 10 feet across the site towards the northwest.

The regional groundwater flow direction in the region of Site 3 is approximately northwest as shown in Figures 3-4a/b/b. The horizontal groundwater gradient calculated from the regional groundwater flow map is approximately 0.008 ft/ft.

Aquifer tests were performed on all four monitoring wells installed at Site 3. Information on each well, including screen setting and surface elevations, are provided in Table B3-4, Well Construction Data. Pump tests were performed on 03_UGMW26 and 03_DBMW39 and slug tests were performed on wells 03_DGMW64 and 03_DGMW65X. Site 3 hydraulic parameters are summarized in Table B2-5, and Appendix F presents details of the aquifer tests and analyses. Aquifer test results indicate the transmissivity ranges from 55 to 390 ft²/day and hydraulic conductivity ranges from 1.9 to 10.3 ft/day. Storage coefficients and leakance factors could not be determined from the aquifer test data.

The average linear velocity of groundwater was calculated to be 0.08 ft/day using the lower hydraulic conductivity of 1.9 ft/day (at 03_DBMW39), the hydraulic gradient of 0.008 ft/ft, and an assumed effective porosity of 20 percent. Using the higher hydraulic conductivity of 10.3 ft/day (at 03_UGMW26), the average linear velocity of groundwater is calculated to be 0.4 ft/day.

B3.7.2 Analytical Results

Groundwater analyses included: general water chemistry, hydrocarbons, VOCs, SVOCs, pesticides, herbicides, PCBs, metals, and gross alpha/beta particle activity. A summary of the analyses results are given by analyte group and sample location in Table B3-6.

Volatile Organic Compounds (VOCs). VOCs detected in groundwater samples include chloroform and methyl chloride. Chloroform was detected in well 03_DGMW65 at a concentration of 1.0 µg/L. Methyl chloride was detected at a concentration of 3.0 µg/L in well 03_DBMW39. Methylene chloride and xylene were found to occur below the CRDL in well 03_DGMW65. Methylene chloride is a demonstrated laboratory contaminant.

Semivolatile Organic Compounds (SVOCs). Bis(2-ethylhexyl)phthalate occurs below the CRDL in well 03_DGMW65X at a concentration of 2.0 mg/L.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. The pesticides dieldrin, heptachlor, 4,4'-DDT, and BHC-gamma were detected at the downgradient monitoring well 03_DGMW64. Dieldrin occurs at a concentration of 0.11 $\mu\text{g/L}$, which exceeds the California DTSC action level set at the detection limit of 0.05 $\mu\text{g/L}$. Heptachlor was detected at a concentration of 0.068 $\mu\text{g/L}$, approximately seven times its California MCL of 0.01 $\mu\text{g/L}$. Concentrations of 4,4'-DDT and BHC-gamma are 0.11 and 0.05 $\mu\text{g/L}$, respectively. Dalapon, an herbicide, was detected at a concentration of 2.2 $\mu\text{g/L}$ at 03_DGMW65.

Hydrocarbons. TRPH and TFH (diesel and gasoline) were not detected in groundwater samples.

Metals and Cyanide. Selenium was detected above its MCL of 10 $\mu\text{g/L}$ in Wells 03_UGMW26, 03_DGMW64, and 03_DGMW65X, at concentrations of 13.3 $\mu\text{g/L}$, 17.4 $\mu\text{g/L}$, and 14.7 $\mu\text{g/L}$, respectively. Cyanide was not detected in groundwater samples.

General Chemistry. The groundwater at Site 3 had field values for pH, electrical conductivity, and temperature of around 7.6, 1,250 $\mu\text{mhos/cm}$ (at 25 degrees C), and 23 degrees C, respectively.

The distribution of the major ions for groundwater at Site 3 is presented as Stiff-type and Piper diagrams. Stiff diagrams for all wells are displayed as Plates J-1 and J-2. A Piper diagram (Appendix J) indicates the groundwater type in the vicinity of Site 3. Groundwater at Site 3 is a sodium-bicarbonate type. TDS ranges from 731 to 847 mg/L.

Nitrate/nitrite (as N) concentrations of 15.3 mg/L and 10.6 mg/L in upgradient well 03_MW26 and downgradient well 03_MW64, respectively, are above the California MCL of 10 mg/L. Table B3-6 lists the detected analytes for each well.

Dioxins and Furans. (Groundwater samples were not analyzed for dioxins and furans.)

Gross Alpha and Beta Particle Activity. Gross alpha and beta particle activity were detected in all four wells. The EPA MCL of 15 pCi/L for gross alpha was exceeded in the groundwater sample collected from well 03_DBMW39 (15.9 pCi/L). Gross beta particle activity was detected below the Federal MCL and ranged from 18.6 to 13.1 pCi/L.

B3.7.3 Comparison with Drinking Water Standards

Analytes exceeding regulatory levels includes nitrate/nitrite (as N), selenium, dieldrin, and heptachlor. Table B3-7 lists the analytes detected at concentrations that exceed either the Federal MCL, California MCL, or California DTSC action levels.

B3.8 Potential Contamination Migration Pathways

The RI sampling addressed the following potential contamination migration pathways:

- The high permeability sediments in the Agua Chinon Wash may aid in vertical transport of contaminants through the vadose zone to the groundwater
- Contaminated landfill leachate sediment and/or shallow soils may be leached or eroded into surface runoff drainages
- Landfill leachate may potentially migrate through the base of the landfill into the groundwater
- Contaminated surface water may be transported offsite via Agua Chinon Wash during periods of runoff from precipitation

B3.9 Summary and Conclusions

Contaminants detected in the sediment samples along Agua Chinon Wash include low levels of hydrocarbons (TFH [diesel and gasoline] and TRPH), and pesticides (4,4-DDE

4,4-DDD and 4,4-DDT). Detected surface and near-surface soil contamination includes one dioxin, octachlorodibenzo-p-dioxins, at a concentration of 1 ng/g.

Detected subsurface contamination includes: VOCs, acetone and methylene chloride, both of which are demonstrated laboratory contaminants; herbicides MCP, 2,4,5-T, and 2,4,5-TP; and hydrocarbon TFH-gasoline (below the California LUFT action level).

Groundwater contamination includes one VOC (methyl chloride), pesticides (dieldrin and heptachlor), and one herbicide (dalapon). The California MCL was exceeded for heptachlor, and dieldrin exceeds the California DTSC action levels.

In general, contamination at Site 3 is low and is not considered to be a source of regional contamination. Potential pathways include surface runoff along Agua Chino Wash, and localized pesticide and herbicide contamination in deep soils that may be contributing to the presence of these compounds in the groundwater.

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Table B3-0

Site 3 (OU- 2): Summary of Detected Chemicals Surface Runoff Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	03_AC1 S1450045 DVF(a)	03_AC2 ETSW0018 DVF(a)	03_AC2 S1450046 DVF(a)	03_AC3 ETSW0019 DVF(a)	03_AC3 S1450047 DVF(a)	03_ACX S1450062 DVF(a)
GENERAL CHEMISTRY							
ALKALINITY AS CaCO3	MG/L	58	108	38	32	52	-
BICARBONATE	MG/L	70	132	46	39	63	-
CARBONATE	MG/L	-	-	-	-	-	-
CHLORIDE	MG/L	8.85	70.2	6.77	5.09	9.37	-
SULFATE	MG/L	50.9	207	32.4	12.3	37.7	-
TOTAL DISSOLVED SOLIDS	MG/L	376	527	296	42	361	-
CYANIDE	UG/L	3	U	3.1	B	3	U
NITRATE/NITRITE-N	MG/L	3.24	-	2.31	-	3.3	-
PH	MG/L	6.88	-	6.93	-	6.94	-
METALS							
POTASSIUM	UG/L	3660	b	2250	b	3250	b
MAGNESIUM	UG/L	7240	-	4510	b	6100	-
MANGANESE	UG/L	6.6	b	5.4	b	5.3	b
SODIUM	UG/L	13300	-	9680	-	13100	-
CALCIUM	UG/L	24600	-	16700	-	21100	-
NICKEL	UG/L	9.9	b	5.3	U	9.7	b
LEAD	UG/L	1.4	b	1.4	U	1.4	U
VANADIUM	UG/L	6.5	b	6.1	b	7.2	b
ZINC	UG/L	33.6	-	26.8	-	30	-
COPPER	UG/L	13.2	b	10.9	b	14	b
IRON	UG/L	414	-	438	-	528	-
BARIUM	UG/L	123	b	97	b	110	b
ARSENIC	UG/L	2	b	1.4	b	1.8	b
ALUMINUM	UG/L	510	-	519	-	635	-
ALUMINUM			73.6	B	-	-	-
ARSENIC			3.4	B	-	-	-
BARIUM			158	B	-	-	-
CADMIUM			76.4	-	-	-	-
CALCIUM			56500	-	-	-	-
CHROMIUM			7.2	B	-	-	-
COPPER			15.1	B	-	-	-
IRON			22.2	BE	-	-	-
LEAD			1.3	B	-	-	-
MAGNESIUM			21800	-	-	-	-
MANGANESE			14.5	B	-	-	-
NICKEL			9.4	B	-	-	-
POTASSIUM			3750	B	-	-	-

Table B3-0

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STATION ID SAMPLE NUMBER ANALYTE BY GROUP	UNITS	03_AC1 S1450045	DVF(a)	03_AC2 ETSW0018	DVF(a)	03_AC2 S1450046	DVF(a)	03_AC3 ETSW0019	DVF(a)	03_AC3 S1450047	DVF(a)	03_ACX S1450062	DVF(a)
SELENIUM		-		1.3	BW	-		-		-		-	
SODIUM		-		74300		-		-		-		-	
VANADIUM		-		4.2	B	-		-		-		-	
ZINC		-		39.4		-		-		-		-	
VOLATILE ORGANIC COMPOUNDS													
CHLORODIBROMOMETHANE	UG/L	1	U	10	U	1	U	10	U	1	U	0.5	J
ACETONE	UG/L	5		16	U	2	U	21	U	3		39	B
CHLOROMETHANE (METHYL CHLORIDE)	UG/L	2		10	U	1	J	10	U	3		2	U
CARBON DISULFIDE	UG/L	1	U	10	U	1	U	10	U	1	U	1	
2-BUTANONE	UG/L	2	U	10	U	2	U	10	U	2	U	2	
SEMIVOLATILE ORGANIC COMPOUNDS													
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10	U	15		10	U	10	U	10	U	-	
PESTICIDES AND PCBs													
GAMMA-CHLORDANE	UG/L	0.01		0.05	U	0.05	U	-		0.05	U	-	
(a) A definition of each data validation flag (DVF) is provided in Table B-1.													

**Table B3-1
Site 3 (OU-2): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Location/ Stratum	Station Identifi- cation	Sample Identifi- cation	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															
Agua Chinon Wash	03_AC1	ESTW0018 ^C	0	X	X	X	X	X	X	X		X			
		S1451023	0	X	X	X	X	X	X	X					
		S1451024	2	X	X	X	X	X	X	X	X				
		S1450039	0	X	X	X	X	X	X	X	X	X			
		S1450045 ^C	0	X	X	X	X	X	X	X	X		X		
Agua Chinon Wash	03_AC2	S1451025	0	X	X	X	X	X	X	X	X				
		S1451020	2	X	X	X	X	X	X	X					
		S1451019	4	X	X	X		X	X	X					
		S1450046 ^C	0	X	X	X	X	X	X	X	X	X	X		
Agua Chinon Wash	03_AC3	ESTW0019 ^C	0	X	X	X	X	X	X			X			
		S1451022	0	X	X	X	X	X	X	X					
		S1451021	2	X	X	X	X	X	X	X	X	X			
		S1450047 ^C	0	X	X	X	X	X	X	X			X		
Drain Pipe	03_ACX	S1451062 ^C	0	X											
Surface and Near-Surface Soils															
Stratum 1	03_UGS	S1454013	0				X	X	X	X					
		S1454399	0				X	X	X	X					
	03_LF3	S1454016	0	X	X	X	X	X	X	X					
	03_LF2	S1454015	0	X	X	X	X	X	X	X					
	03_LF1	S1454014	0	X	X	X	X	X	X	X					
	03_DBS	S1454017	0	X	X	X	X	X	X	X				X	
Vadose Zone Soils															
	03_UGMW26	S1456051	85 255	X	X		X								
		S1456040													
		S1456035													
	03_DBMW39	S1456041	5	X	X	X	X	X	X	X					
		S1456042	10	X	X	X	X	X	X	X					
		S1456043	15	X	X	X	X	X	X	X					
		S1456052	20	X	X	X	X	X	X	X				X	
		S1456044	25	X	X	X	X	X	X	X					
		S1456045	35	X	X	X	X	X	X	X					
		S1456046	45	X	X	X	X	X	X	X					
		S1456053	215	X	X	X	X	X	X	X					
		S1456031	235	X									X		
	03_DGMW65	S1456039	185	X	X		X								
		S1456050	225	X	X	X	X	X	X	X					
		S145670301	227	X	X	X	X	X	X	X					
		S1456034	265	X			X								

**Table B3-1
Site 3 (OU-2): 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
	03_DGMW64	S1456038	40	X	X										
		S1457153	40	X	X										
		S1456049	200	X	X	X	X	X	X	X	X				
		S1457152	200	X	X	X	X	X	X	X	X				
		S1456033	248	X	X										
Groundwater															
	03_UGMW26	S1452027	230-270	X	X	X	X	X	X	X	X	X			X
	03_DBMW39	S1452016	230-270	X	X	X	X	X	X	X	X	X	X		X
	03_DGMW65	S1452020	230-270	X	X	X	X	X	X	X	X	X			X
	03_DGMW64	S1452019	245-285	X	X	X	X	X	X	X	X	X			X
<p>^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.</p> <p>^b Duplicate of previous sample.</p> <p>^c Surface water sample</p>															

Table B3-2

Site 3 (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	03_AC1 S1481023 (0)	DVF(a)	03_AC1 S1481024 (2)	DVF(a)	03_AC2 S1481026 (0)	DVF(a)	03_AC2 S1481029 (2)	DVF(a)	03_AC2 S1481019 (4)	DVF(a)	03_AC3 S1481022 (0)	DVF(a)	03_AC3 S1481021 (2)	DVF(a)	03_DBS S1484017 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.42	U	0.48	U	0.43	U	0.45	U	0.48	U	0.42	U	0.43	U	0.69	b
ALUMINUM	MG/KG	2110		12900		1700		2110		4820		2020		1970		9540	
ARSENIC	MG/KG	0.95	b	2.2	b	0.55	b	0.82	b	1.4	b	0.58	b	0.51	b	4.2	
BARIUM	MG/KG	86.6		198		38.6	b	40.2	b	92.8		62		29.4	b	87.5	
BERYLLIUM	MG/KG	0.1	U	0.47	b	0.1	U	0.11	U	0.23	U	0.1	UJ	0.1	UJ	0.48	b
CALCIUM	MG/KG	2110		3090		2100		1130		1910		2680		1790		5410	
CADMIUM	MG/KG	0.35	b	0.55	b	2.1		1.4		1.1	b	0.24	UJ	0.24	UJ	2	
COBALT	MG/KG	1.4	b	4.1	b	1.2	U	1.3	b	2.6	b	1.2	U	1.2	b	6.6	b
CHROMIUM	MG/KG	3.6		13.5		3.3		8.6		7		3		3.5		14.5	
COPPER	MG/KG	3.2	b	8.7		3.3	b	5.3	b	4.1	b	2.2	b	2	b	22.6	
IRON	MG/KG	3040		14700		2840		3240		6850		4280		2850		19000	
MERCURY	MG/KG	0.03	U	0.06	U	0.04	U	0.04	U	0.05	U	0.03	U	0.03	U	0.1	U
POTASSIUM	MG/KG	817	b	2490		537	b	941	b	1280		860	b	594	b	2570	
MAGNESIUM	MG/KG	1100		4950		881	b	1230		2090		1010		988	b	4140	
MANGANESE	MG/KG	128		145		76.3		57.7		95.8		117		51		217	
SODIUM	MG/KG	163	b	258	b	180	b	238	b	244	b	109	b	121	b	303	b
NICKEL	MG/KG	3.1	b	6.1	b	1.8	b	3	b	4.3	b	2.9	b	1.9	b	13.7	
LEAD	MG/KG	1.7		2.6		4.8		5.2		3.2		2.1		2		32.5	
THALLIUM	MG/KG	0.14	U	0.16	U	0.14	U	0.15	U	0.15	U	0.14	U	0.14	U	0.18	b
VANADIUM	MG/KG	9.9	b	37.1		7.8	b	6.4	b	17.8		11.7		7.5	b	34.4	
ZINC	MG/KG	18.5		37.8		14.4		20.7		21.5		12.7		10.9		104	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	9	J	11	U	10	U	11	U	11	U	10	U	10	U	9	J
2-HEXANONE	UG/KG	6	J	11	U	10	U	11	U	11	U	10	U	10	U	10	U
ACETONE	UG/KG	500	U	210	B	16	U	16	U	11	U	10	U	10	U	3	J
METHYLENE CHLORIDE	UG/KG	220	DU	54	U	86	U	120	U	11	U	10	U	10	U	15	U
2-BUTANONE	UG/KG	50	DU	11	U	10	U	11	U	11	U	10	U	10	U	10	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	680	UJ	740	UJ	1400	J	760	UJ	490	J	870	U	680	U	870	U
PESTICIDES AND PCBs																	
4,4'-DDT	UG/KG	3.33	U	3.67	U	3.37	U	3.78	U	-	LUR	7		9.64		209	PCJ
4,4'-DDD	UG/KG	3.33	U	3.67	U	3.37	U	3.78	U	-	LUR	3.31	U	3.83		293	CJ
4,4'-DDE	UG/KG	3.33	U	3.67	U	3.37	U	3.78	U	-	LUR	4.46		3.47		47.7	J
DIOXINS AND FURANS																	
OCTACHLORODIBENZO-P-DIOXINS	NGG	-		-		-		-		-		-		-		1	
HERBICIDES																	
2,4,5-TP (SILVEX)	UG/KG	24.6	U	281	U	24.9	U	28	U	-		-		-		25.2	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	12.4	U	13.9	U	79.9		20.8		13.5	UJ	12.6	U	12.6	U	14.3	
TFH GASOLINE	MG/KG	0.05	U	0.056	U	0.76		5.71		1.31		0.242		0.051	U	0.19	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	87		20	U	223		212		20	U	14	U	20	U	99	

Table B3-2

Site 3 (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	03_LF1 S1484014 (0)	DVF(a)	03_LF2 S1484015 (0)	DVF(a)	03_LF3 S1484016 (0)	DVF(a)	03_UGS S1484013 (0)	DVF(a)	03_UGS S1484399 (0)	DVF(a)							
METALS																		
SILVER	MG/KG	0.43	U	0.44	U	0.52	b	0.43	U	0.43	U							
ALUMINUM	MG/KG	6650		8290		13000		4910		8550								
ARSENIC	MG/KG	3.7		2.3		2.9		3.5		2.7								
BARIUM	MG/KG	99.5		111		145		79.3		108								
BERYLLIUM	MG/KG	0.33	b	0.39	b	0.49	b	0.29	U	0.44	U							
CALCIUM	MG/KG	4740		5810		5440		4300		5220								
CADMIUM	MG/KG	3.2		0.7	b	0.93	b	0.41	b	0.75	b							
COBALT	MG/KG	4.7	b	4.7	b	5.1	b	2.9	b	4.5	b							
CHROMIUM	MG/KG	16.9		7.8		12.4		4.9		7.9								
COPPER	MG/KG	13.8		5.2	b	13.9		4.6	b	6.4								
IRON	MG/KG	11100		12000		17700		7260		11300								
MERCURY	MG/KG	0.1	U	0.45		0.85		0.04	U	0.03	U							
POTASSIUM	MG/KG	2360		3410		3960		2780		3460								
MAGNESIUM	MG/KG	3500		4550		5770		3190		4390								
MANGANESE	MG/KG	159		199		224		140		189								
SODIUM	MG/KG	325	b	191	b	282	b	189	b	183	b							
NICKEL	MG/KG	8.5	U	4.7	U	7	U	3.2	U	4.1	U							
LEAD	MG/KG	78.9		4.2		25		10.9		11								
THALLIUM	MG/KG	0.14	U	0.19	b	0.31	b	0.22	b	0.28	b							
VANADIUM	MG/KG	25.6		28.1		35		16.3		26.7								
ZINC	MG/KG	102		40.8		46.8		33.3		42.4								
VOLATILE ORGANIC COMPOUNDS																		
TOLUENE	UG/KG	2	J	10	U	4	J	-		-								
2-HEXANONE	UG/KG	10	U	10	U	11	U	-		-								
ACETONE	UG/KG	10	U	10	U	11	U	-		-								
METHYLENE CHLORIDE	UG/KG	10	U	14	U	11	U	-		-								
2-BUTANONE	UG/KG	10	U	10	U	11	U	-		-								
SEMI-VOLATILE ORGANIC COMPOUNDS																		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	660	U	680	U	710	U	-		-								
PESTICIDES AND PCBs																		
4,4'-DDT	UG/KG	147	J	3.38	UJ	10.5	J	-		-								
4,4'-DDD	UG/KG	16.7	UJ	3.38	UJ	3.54	UJ	-		-								
4,4'-DDE	UG/KG	16.7	UJ	3.38	UJ	10.2	J	-		-								
DIOXINS AND FURANS																		
OCTACHLORODIBENZO-P-DIOXINS	NG/G	-		-		-		-		-								
HERBICIDES																		
2,4,5-TP (SILVEX)	UG/KG	24.9	UJ	25.5	UJ	26.5	UJ	49.6		25.1	U							
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																		
TFH DIESEL	MG/KG	13.8		12.9	U	13.4	U	12.5		12.4								
TFH GASOLINE	MG/KG	13.8		0.051	U	0.062		0.127		0.1								
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																		
TRPH	MG/KG	202		20	U	20	U	20	U	20	U							

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

Table B3-3

Site 3 (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	03_DBMW39 S1456041 (5)	DVF(a)	03_DBMW39 S1456042 (10)	DVF(a)	03_DBMW39 S1456043 (15)	DVF(a)	03_DBMW39 S1456052 (20)	DVF(a)	03_DBMW39 S1456044 (25)	DVF(a)	03_DBMW39 S1456045 (35)	DVF(a)	03_DBMW39 S1456046 (45)	DVF(a)	03_DBMW39 S1456053 (215)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
METALS																	
ALUMINUM	MG/KG	5400		4250		10200		-		2520		4010		10100		12100	
ARSENIC	MG/KG	1.1	b	1.2	b	1.9	b	-		0.87	b	1.2	b	3.8		6.2	
BARIUM	MG/KG	67.2		68.9		192		-		83.2		86.4		155		154	
BERYLLIUM	MG/KG	0.1	UJ	0.1	UJ	0.22	J	-		0.11	UJ	0.1	UJ	0.25	J	0.21	b
CALCIUM	MG/KG	3980		2200		4300		-		2270		1710		10500		7930	
CADMIUM	MG/KG	0.45	J	0.32	J	0.35	J	-		0.27	J	0.25	UJ	0.96	J	3.2	
COBALT	MG/KG	2.8	b	2.5	b	4.9	b	-		1.7	b	2.3	b	6.3	b	6.5	b
CHROMIUM	MG/KG	6.2		4.9		11.9		-		3.8		4.7		11.8		17.4	
COPPER	MG/KG	3.5	b	3.9	b	5.8	b	-		2.1	b	3	b	7.8		12.9	
IRON	MG/KG	7800		6910		14100		-		4190		6350		15900		21900	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	-		0.03	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	2120		2120		2390		-		1120		1800		4840		4290	
MAGNESIUM	MG/KG	3000		2590		5980		-		1540		2350		7190		6960	
MANGANESE	MG/KG	142		139		137		-		90.8		158		288		318	
SODIUM	MG/KG	153	b	511	b	1340		-		313	b	304	b	687	b	1080	b
NICKEL	MG/KG	3.8	b	1.6	U	4.6	b	-		1.8	b	3.1	b	9.4		26.8	
LEAD	MG/KG	0.64		0.96		2.8		-		0.41	b	0.83		4.7		3	
SELENIUM	MG/KG	0.12	b	0.1	U	0.12	U	-		0.11	U	0.1	U	0.11	U	0.12	U
THALLIUM	MG/KG	0.14	U	0.15	U	0.19	b	-		0.15	U	0.14	U	0.16	b	0.4	U
VANADIUM	MG/KG	19.1		15.5		34.6		-		11.4		17.4		41.9		48.1	
ZINC	MG/KG	21.9		21.6		36.3		-		12.4		18.2		49.7		62	
VOLATILE ORGANIC COMPOUNDS																	
METHYLENE CHLORIDE	UG/KG	11	U	11	U	13	U	12	U	11	U	11	U	12	U	12	U
ACETONE	UG/KG	11	U	11	U	17		12	U	11	U	11	U	12	U	14	
TOLUENE	UG/KG	3	J	7	J	13	U	12	U	11	U	11	U	12	U	12	U
HERBICIDES																	
MCP	UG/KG	27200	U	26900	U	30700	U	30600	U	26900	U	59100		29500	U	82700	
2,4,5-TP (SILVEX)	UG/KG	27.2	U	26.9	U	30.7	U	30.6	U	26.9	U	28.1	U	29.5	U	27.7	U
2,4,5-T	UG/KG	27.2	U	26.9	U	30.7	U	30.6	U	26.9	U	28.1	U	29.5	U	27.7	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.055	U	0.054	U	0.063	U	0.062	U	0.054	U	0.132		0.06	U	0.058	U

Table B3-3

Site 3 (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	03_DGMW39 S1456031 (238)	DVF(a)	03_DGMW64 S1456038 (40)	DVF(a)	03_DGMW64 S1457153 (40)	DVF(a)	03_DGMW64 S1456049 (200)	DVF(a)	03_DGMW64 S1457152 (200)	DVF(a)	03_DGMW64 S1456033 (248)	DVF(a)	03_DGMW65 S1456039 (185)	DVF(a)	03_DGMW66 S1456060 (225)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	209		-		-		-		-		-		-		-	
METALS																	
ALUMINUM	MG/KG	-		-		-		13300		9990		-		-		-	
ARSENIC	MG/KG	-		-		-		5.3		3.4		-		-		11900	
BARIUM	MG/KG	-		-		-		126		142		-		-		10.6	
BERYLLIUM	MG/KG	-		-		-		0.75	b	0.49	U	-		-		138	
CALCIUM	MG/KG	-		-		-		47400		9870		-		-		4380	b
CADMIUM	MG/KG	-		-		-		7		1.8		-		-		1.6	
COBALT	MG/KG	-		-		-		7.2	b	3	b	-		-		8.3	b
CHROMIUM	MG/KG	-		-		-		21.2		16.7		-		-		18.6	
COPPER	MG/KG	-		-		-		13.2		12.3		-		-		18	
IRON	MG/KG	-		-		-		18900		12700		-		-		21700	
MERCURY	MG/KG	-		-		-		0.11		0.07		-		-		0.06	U
POTASSIUM	MG/KG	-		-		-		3840		2420		-		-		3350	
MAGNESIUM	MG/KG	-		-		-		6940		4380		-		-		5420	
MANGANESE	MG/KG	-		-		-		346		183		-		-		271	
SODIUM	MG/KG	-		-		-		627	b	488	b	-		-		425	b
NICKEL	MG/KG	-		-		-		28.4		13.7		-		-		16.9	
LEAD	MG/KG	-		-		-		2.4		1.6		-		-		8.1	
SELENIUM	MG/KG	-		-		-		0.12	U	0.11	b	-		-		0.13	U
THALLIUM	MG/KG	-		-		-		0.49	b	0.41	b	-		-		0.37	b
VANADIUM	MG/KG	-		-		-		64.9		39.5		-		-		44.4	
ZINC	MG/KG	-		-		-		54.9		38.3		-		-		67	
VOLATILE ORGANIC COMPOUNDS																	
METHYLENE CHLORIDE	UG/KG	32	B	12	U	12	U	11	U	12	U	12	U	14	U	32	U
ACETONE	UG/KG	18		39	U	78	B	11	U	17	U	12	U	11	U	11	J
TOLUENE	UG/KG	12	U	12	U	12	U	11	U	12	U	3	J	11	U	12	U
HERBICIDES																	
MCPP	UG/KG	-		-		-		27000	UJ	28800	UJ	-		26200	UJ	30100	UJ
2,4,5-TP (SILVEX)	UG/KG	-		-		-		27	UJ	28.8	UJ	-		81.3	J	30.1	UJ
2,4,5-T	UG/KG	-		-		-		27	UJ	28.8	UJ	-		26.2	UJ	41.8	J
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	-		-		-		0.055	U	0.056	U	-		-		0.06	U

Table B3-3

Site 3 (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	03_DGMW68 S148670301 (227)	DVF(a)	03_DGMW68 S1486034 (265)	DVF(a)	03_UGMW26 S1486040 (88)	DVF(a)	03_UGMW26 S1486038 (255)	DVF(a)										
GENERAL CHEMISTRY																			
TOTAL ORGANIC CARBON	MG/KG	-		-		-		100	U										
METALS																			
ALUMINUM	MG/KG	854		-		-		-											
ARSENIC	MG/KG	1.3	b	-		-		-											
BARIUM	MG/KG	21.4	b	-		-		-											
BERYLLIUM	MG/KG	0.11	U	-		-		-											
CALCIUM	MG/KG	934	b	-		-		-											
CADMIUM	MG/KG	0.35	b	-		-		-											
COBALT	MG/KG	1.3	U	-		-		-											
CHROMIUM	MG/KG	1.8	b	-		-		-											
COPPER	MG/KG	1.8	b	-		-		-											
IRON	MG/KG	1530		-		-		-											
MERCURY	MG/KG	0.03	U	-		-		-											
POTASSIUM	MG/KG	323	b	-		-		-											
MAGNESIUM	MG/KG	520	b	-		-		-											
MANGANESE	MG/KG	35.8		-		-		-											
SODIUM	MG/KG	157	b	-		-		-											
NICKEL	MG/KG	2.2	b	-		-		-											
LEAD	MG/KG	0.5	b	-		-		-											
SELENIUM	MG/KG	0.11	U	-		-		-											
THALLIUM	MG/KG	0.16	U	-		-		-											
VANADIUM	MG/KG	4.8	b	-		-		-											
ZINC	MG/KG	6.8		-		-		-											
VOLATILE ORGANIC COMPOUNDS																			
METHYLENE CHLORIDE	UG/KG	32		29	U	50	B	-											
ACETONE	UG/KG	11	U	12	U	11	U	-											
TOLUENE	UG/KG	11	U	12	U	11	U	-											
HERBICIDES																			
MCPP	UG/KG	27900	U	29100	UJ	27400	U	35000											
2,4,5-TP (SILVEX)	UG/KG	27.9	U	29.1	UJ	27.4	U	30.3	U										
2,4,5-T	UG/KG	27.9	U	29.1	UJ	27.4	U	30.3	U										
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																			
TFH GASOLINE	MG/KG	0.058	U	-		-		-											

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

Table B3-4
Site 3 (OU-3): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum

Item	Station Identification			
	03_DBMW39	03_DGMW64	03_DGMW65X	03_UGMW26
Survey Location--Northing	N552636.93	N553006.71	N552722.85	N552288.07
Survey Location--Easting	E1554306.52	E1553984.71	E1553736.42	E1555125.64
Ground Surface Elev. (ft above MSL ^a)	419.43	418.71	409.08	419.48
Measuring Point Elev. (ft above MSL ^a)	419.66	418.28	411.9	420.05
Measuring Point Location	Top of well casing	Top of well casing	Top of well casing	Top of well casing
Type of Surface Completion	Above ground	Below 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
Screen Diameter and Material	5-inch dia. 20-slot SS	5-inch dia. 20-slot SS	5-inch dia. 20-slot SS	5-inch dia. 20-slot SS
Screen Interval (ft bgs ^b)	230-270	245-285	230-270	230-270
Length of Drop Pipe (ft bgs ^b)	265	280	268	265
Make and Model of Installed Pump	Grundfos - 5 gallon per minute (3/4 hp)	Grundfos Rediflow 2	Grundfos Rediflow 2	Grundfos - 5 gallon per minute (3/4 hp)
Date of Pumping Test	9 Oct 92	11 Nov 92	10 Nov 92	9 Oct 92
Date of Water Quality Sampling	9 Oct 92	15 Nov 92	18 Jan 93	9 Oct 92
^a Mean sea level ^b Below ground surface SS=Stainless Steel				

**Table B3-5
Site 3 (OU-2): Summary of Hydraulic Parameters
MCAS El Toro Phase I RI Technical Memorandum**

Well Identification	Type of Test	Analysis Method	Transmissivity (ft²/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient^a	Leakance Factor^a
03_UGMW26	Pumping	Cooper-Jacob (1946)	390	10.3	NA	NA
03_DBMW39	Pumping	Cooper-Jacob (1946)	55	1.9	NA	NA
03_UGMW63	Pumping	Theis-Recovery (1935)	160	4.0	NA	NA
03_DGMW64	Slug	Cooper, Bredehoeft, and Papadopulos (1967)	120	3.0	NA	NA
03_DGMW65X	Slug	Bouwer and Rice (1976) and Bouwer (1981)	230	6.5	NA	NA

^aNA = Not applicable.

Source: Table F-2 (Appendix F)

Table B3-6

Site 3 (OU- 2): Summary of Detected Chemicals in Groundwater Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SCREEN INTERVAL	REG.CODE(b)	REG.LEVEL(c)	UNITS	03_DBMW39 S1452016 (230-270)	DVF(a)	03_DGMW64 S1452019 (245-285)	DVF(a)	03_DGMW65X S1452020 (230-270)	DVF(a)	03_UGMW26 S1452027 (230-270)	DVF(a)
ANALYTE BY GROUP	REG.CODE(b)	REG.LEVEL(c)	UNITS								
GENERAL CHEMISTRY											
SULFATE	3	250	MG/L	36.4	U	153		91.6		110	
ALKALINITY AS CaCO3	NA	NA	MG/L	335		288		288		271	
CARBONATE	NA	NA	MG/L	-		288		-		-	
BICARBONATE	NA	NA	MG/L	409		288		288		331	
CHLORIDE	3	250	MG/L	146		152		145		104	
NITRATE/NITRITE-N	1	10	MG/L	5.73		10.8		7.95		15.3	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	731		847		750		782	
METALS											
ALUMINUM	3	50	UG/L	31	U	31	U	47.5	b	31	UJ
ARSENIC	2	50	UG/L	10.7		3.1	b	2.8	b	8	b
BARIUM	2	2000	UG/L	82.9	b	35.9	b	46.4	b	120	b
CALCIUM	NA	NA	UG/L	27300		57100		51700		64500	
CADMIUM	2	5	UG/L	1.2	U	1.6	b	3	b	1.2	U
COBALT	NA	NA	UG/L	5.8	U	5.8	U	6	b	5.8	U
COPPER	2	1300	UG/L	0.9	U	6.2	b	4.3	b	2.7	U
POTASSIUM	NA	NA	UG/L	2520	b	3790	b	3850	b	2110	b
MAGNESIUM	NA	NA	UG/L	14900		35300		27300		30900	
MANGANESE	3	50	UG/L	9.9	b	181		238		20	
SODIUM	NA	NA	UG/L	210000		181000		168000		133000	
NICKEL	NA	NA	UG/L	40.2		96.4		166		28.5	J
SELENIUM	1	10	UG/L	6.8		17.4		14.7		13.3	
VANADIUM	NA	NA	UG/L	44.9	b	18.1	b	13.8	b	29.7	b
VOLATILE ORGANIC COMPOUNDS											
CHLOROMETHANE (METHYL CHLORIDE)	NA	NA	UG/L	3		2	U	2	U	2	U
METHYLENE CHLORIDE	4	40	UG/L	1	U	1	U	0.5	J	1	U
XYLENE (TOTAL)	NA	NA	UG/L	1	U	1	U	0.8	J	1	U
CHLOROFORM	2	100	UG/L	0.6	J	1	U	1		1	U
SEMI-VOLATILE ORGANIC COMPOUNDS											
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	UG/L	10	U	10	U	2	J	10	U
PESTICIDES AND PCBs											
4,4'-DDT	NA	NA	UG/L	0.1	U	0.108		0.1	U	0.1	UJ
BHC-GAMMA(LINDANE)	NA	NA	UG/L	0.05	U	0.053		0.05	U	0.05	UJ
DIELDRIN	4	0.05	UG/L	0.1	U	0.113		0.1	U	0.1	UJ
HEPTACHLOR	1	0.01	UG/L	0.05	U	0.068		0.05	U	0.05	UJ
HERBICIDES											
DALAPON	NA	NA	UG/L	1.67	UJ	0.5	U	2.2		0.5	U
GROSS ALPHA AND BETA											
GROSS ALPHA	2	15	PCI/L	15.9		14.3		8.8		14.2	
GROSS BETA	2	50	PCI/L	10.3		13.1		8.8		10.9	

(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 B3-7
Site 3 (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	Concentration	Regulatory Level ^c	Regulatory Code ^d
03_DBMW39	(230-270)	Total Dissolved Solids	mg/L	731	500	3
		Gross Alpha	PCI/L	15.9	15	1
03_UGMW26	(230-270)	Nitrate/Nitrite-N	mg/L	15.3	10	2
		Total Dissolved Solids	mg/L	762	500	3
		Selenium	µg/L	13.3	10	2
03_DGMW64	(245-285)	Nitrate/Nitrate-N	mg/L	10.6	10	1
		Total Dissolved Solids	mg/L	847	500	3
		Manganese	µg/L	161	50	3
		Selenium	µg/L	17.4	10	2
		Dieldrin	µg/L	0.11	0.05	4
		Heptachlor	µg/L	0.07	0.01	2
03_DGMW65	(230-270)	Total Dissolved Solids	mg/L	750	500	3
		Manganese	µg/L	238	50	3
		Selenium	µg/L	14.7	10	2

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 B4

**Nature and Extent of Contamination:
Site 4 (OU-3) — Ferrocene Spill Area**

Appendix B4
NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION:
SITE 4 (OU-3) - FERROCENE SPILL AREA

This discussion of Site 4 is supplemented by the figures and data tables listed below. The figures begin on page B4-3, and the tables are grouped at the end of this Appendix B4. Field headspace values for soils at this site are presented in Table BA1-4, in Attachment 1 to Appendix B (directly following Appendix B22).

- Figure B4-1: (Site Map)
- Figure B4-2: Geologic Cross Section

- Table B4-1: Types of Samples and Chemical Analyses
- Table B4-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil
- Table B4-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples
- Table B4-4: Well Construction Details
- Table B4-5: Summary of Hydraulic Parameters
- Table B4-6: Summary of Detected Chemicals in Groundwater Samples
- Table B4-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B4.1 Site Description

Site 4 (OU-3), the Ferrocene Spill Area, is southeast of Building 658, an engine testing facility. The site is in the northeast portion of MCAS El Toro, on 9th Street, and is about 400 feet west of Site 3 (Original Landfill).

In August 1983, a 500-gallon tank was being washed when the contents reportedly overflowed onto the ground (Brown and Caldwell, 1986). The rinse water, containing about 5 gallons of ferrocene and hydrocarbon carrier solution, drained into a ditch southwest of the spill. The ditch flows to a catch basin that discharges to Agua Chinon Wash.

The 1987 MCAS El Toro Oil and Hazardous Substance Spill Prevention Control and Countermeasure Plan documented an oily discharge from Building 658, which was

confirmed by field visits during RI scoping. The California Regional Water Quality Control Board (RWQCB) put the facility on its list of possible TCE sources because Building 658 is used for engine testing.

Site 4 is considered to contain two strata: the drainage ditch that leads from the ferrocene spill area to a catch basin on the east side of the site; and the stained area that encompasses the oily discharge on the southeast side of Building 658.

B4.2 Suspected Waste Types and Contaminants

Ferrocene is a patented chemical with the chemical formula of $C_{10}H_{10}Fe$; it is used as an antiknock additive for gasoline and as a catalyst. At atmospheric temperature and pressure, the compound is an orange crystalline solid with the odor of camphor. The compound is volatile in steam but is practically insoluble in water. It is soluble in alcohol, ether, or benzene.

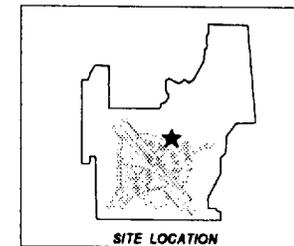
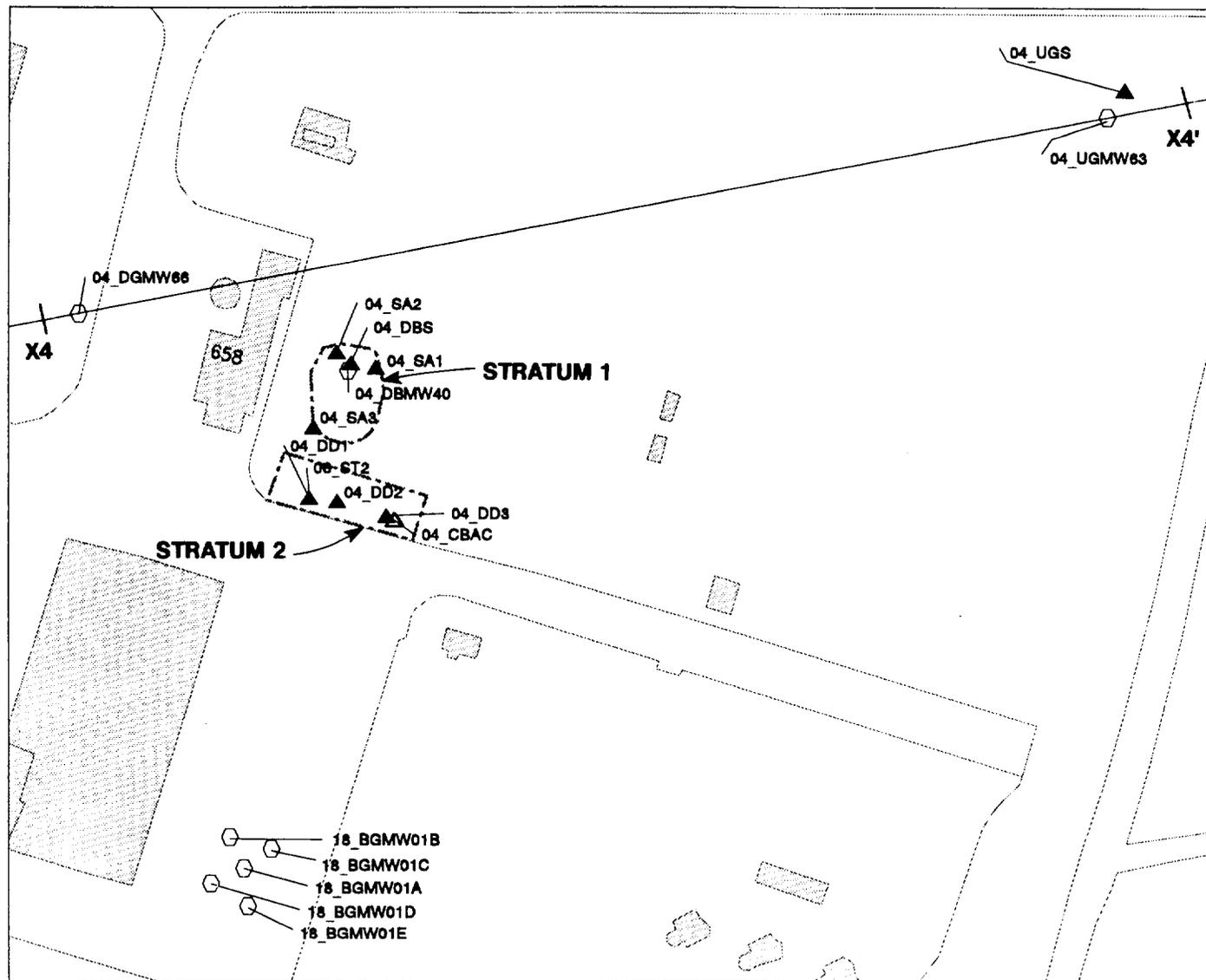
Other suspected contaminants at Site 4 include hydrocarbon carrier solution, hydrocarbons from the engine test facility, and the VOCs and SVOCs associated with fuels.

B4.3 Field Investigation

The field investigation at Site 4 entailed drilling and sampling one upgradient monitoring well (initially considered a downgradient well for Site 3), one deep boring completed as a monitoring well, and one downgradient well. Surface and near-surface soil samples and a sediment sample were also collected. The sampling stations, depths of sampling, and types of analyses requested are included in Table B4-1.

The boundary defined in the *SAP* for Site 4 was modified, as documented in the *SAP Amendment*, from a single bounded site to include two sampling strata:

- Stratum 1: The Stained Area (SA)
- Stratum 2: Drainage Ditch (DD)



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

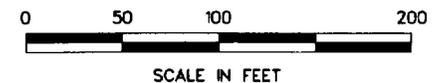
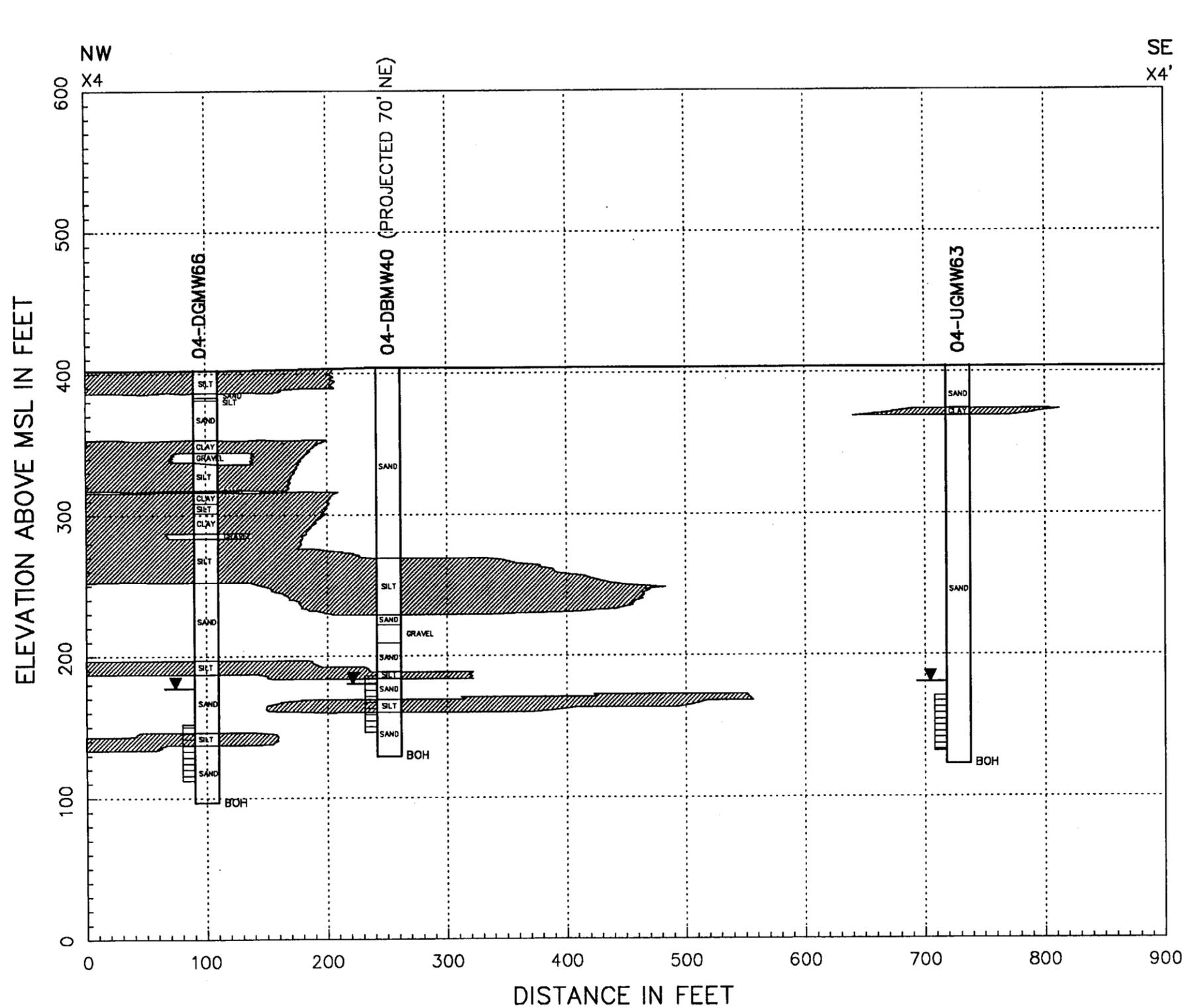


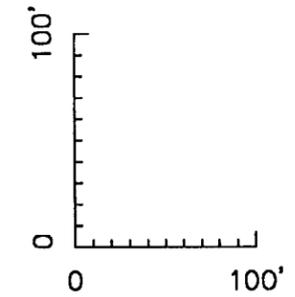
FIGURE B4-1
SITE 4 (OU-3): FERROCENE SPILL AREA
MCA6 EL TORO PHASE I RI TECHNICAL MEMORANDUM

PAGE NUMBER B4-4

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



LEGEND

- UNCONSOLIDATED PERMEABLE SEDIMENTS
- UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS
- BOH
- WELL SCREEN INTERVAL
- WATER LEVEL ELEVATION, DECEMBER 1992

FIGURE B4-2
 SITE 4 (OU-3)
 GEOLOGIC CROSS SECTION X4-X4'
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

PAGE NUMBER B4-6

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The location of Downgradient Well 04_DGMW66 was moved to the northwest to reflect improved understanding of the groundwater flow.

Sediment, surface soils, and lithologic samples from the borings were tested for organic compound vapors using an HNu photo-ionization detector or a flame ionization detector (FID).

B4.3.1 Surface Water and Sediment

One catch basin sediment sample from Station 04_CBAC was collected for analysis. No surface water samples were collected at this site.

B4.3.2 Surface and Near-Surface Soils

Soil samples at the surface and at 2 feet below ground surface (bgs) were collected near the upgradient monitoring well (04_UGMW63) and at the surface near the deep boring completed as a monitoring well (04_DBMW40). The latter soil sample is within Stratum 1, the Stained Area. Nine additional surface and near-surface samples were collected from this stratum: three samples at the surface, three samples at 2 feet bgs, and three samples at 4 feet bgs. These three locations, 04_SA1 through 04_SA3, are shown in Figure 4-1. Nine samples were also collected from Stratum 2, the Drainage Ditch. Samples were collected at the surface and at 2 and 4 feet bgs at three locations, 04_DD1 through 04_DD3.

B4.3.3 Vadose Zone Soils (Soil Borings)

One deep boring was completed in Stratum 1 (04_DBMW40), and eight samples were collected for analyses. One lithologic sample was collected in each well boring below the groundwater surface and tested for VOCs and total organic carbon (TOC).

B4.3.4 Groundwater Monitoring Wells

An upgradient well, a deep boring (into Stratum 1) completed as a monitoring well, and a downgradient well were drilled and sampled.

Four-hour pumping tests were run on Wells 04_UGMW63 and 04_DGMW66; during the test at 04_DGMW66, water levels were also monitored in Well 04_DBMW40. No effects of pumping were seen in the observation well.

Water quality samples were collected from Wells 04_DGMW66 and 04_UGMW63 during the pumping tests. The water quality sample from 04_DBMW40 was collected with a dedicated pump. The VOC sample from Well 04_DGMW66 was lost in shipping, so a second sample was collected for VOC analysis only using the dedicated pump.

B4.4 Surface Water and Sediments

One sediment sample was collected from Site 4.

B4.4.1 Description of Sediment Sample

The sediment sample (04_CBAC) is from a catch basin that receives surface water runoff from the drainage ditch and discharges it into a culvert that connects to the Aqua Chinon Wash aqueduct beneath the Station.

B4.4.2 Analytical Results

No SVOCs, pesticides, or hydrocarbons were detected in the sediment sample (Table B4-2). A small amount (11 mg/kg) of acetone was detected in the sample, but acetone was also found in field blanks. The sample was not analyzed for herbicides, dioxins, or furans. No soil vapor headspace readings were recorded for the sediment sample.

B4.5 Surface and Near-Surface Soils

B4.5.1 Description of Surface and Near-Surface Soil Samples

The surface soil at Site 4 is Metz loamy sand with 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 0.7 to 0.11 inches per inch. This soil unit is classified as Hydrologic Group A, which tends to absorb and hold water (rather than allow it to run off), even when the soil is saturated.

B4.5.2 Analytical Results and Soil Vapor Headspace Values

Surface and near-surface soils were sampled by stratum within the site, using headspace values as a screening tool to identify locations for collection of 4-foot soil samples after collection of samples at 0 and 2 feet. A single surface sample was collected near Well 04_DBMW40 and analyzed for the same constituents as the stratum samples. In addition, one upgradient surface sample was collected for analysis of metals and hydrocarbons.

Soils were collected from the two strata and an area near Upgradient Well 04_UGMW63. The surface soil samples near the deep boring 04_DBMW40 are in Stratum 1. No specific test for ferrocene was made, but laboratory analyses for hydrocarbons and hydrocarbon components were conducted.

B4.5.2.1 Upgradient Area

The upgradient soil sample, 04_UGS, was tested for metals and hydrocarbons. No total recoverable petroleum hydrocarbons (TRPH), TFH-diesel or TFH-gasoline was detected. Detected metals are included in Table B4-2.

B4.5.2.2 Stratum 1: Stain Area

The Stained Area is represented by 10 surface and near-surface samples. Almost all samples had headspace values as measured using an HNu photo-ionization detector at the time of collection (Attachment 1 to Appendix B). The samples were analyzed for VOCs, SVOCs, pesticides, PCBs, hydrocarbons, metals, and nitrate species.

The metals values detected are presented in Table B4-2. No SVOCs were detected. Endosulfan I, 4,4'-DDD, and 4,4'-DDT were detected in the surface sample next to the deep boring (Station 04_DBS). Also detected was 4,4'-DDT at 04_SA2 at 4 feet. No other pesticides or PCBs were detected in the stratum. Acetone was detected in several samples; acetone is a demonstrated laboratory contaminant, and its maximum detected concentration in the trip blanks is 37 µg/L.

Toluene and gasoline were detected on the surface at Station 04_SA3. The gasoline value was detected close to the detection limit. TFH-diesel was detected at 56.8 mg/kg in sample 04_DBS. Ammonia was detected between 1 and 2 mg/kg in all samples. Total Kjeldahl nitrogen (TKN) at 84 mg/kg was detected in the surface sample at 04_SA1.

B4.5.2.3 Stratum 2: Drainage Ditch

The Drainage Ditch is represented by nine surface and near-surface soil samples. Almost all samples had headspace values as measured using an HNu photo-ionization detector at the time of collection (Attachment 1 to Appendix B). The soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, hydrocarbons, metals, and nitrate species. The metals values are presented in Table B4-2.

TFH-diesel was detected at 04_DD2 at a value of 16,400 mg/kg on the surface at 04_DD1 and a value of 865 mg/kg on the surface. Other samples contained

lesser amounts of diesel. The surface sample at Station 04_DD1 contained minor amounts of toluene and total xylenes. SVOCs in the sample, found only in trace amounts, included benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzyl butyl phthalate, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, phenol, and pyrene. Naphthalene at 23,000 $\mu\text{g}/\text{kg}$ was detected. The compound 2-methylnaphthalene, at 2,900 $\mu\text{g}/\text{kg}$, three times the CRDL, was detected. The surface sample at Station 04_DD1 also contained detectable amounts of toluene, total xylenes, and gasoline. Acetone was detected in several samples; acetone is a demonstrated laboratory contaminant.

Eight different pesticides were also detected at estimated values in the surface sample at 04_DD1. These pesticides were not detected in the 2- and 4-foot samples at 04_DD1. A small amount of 4,4'-DDT was detected at 4 feet at Station 04_DD3. All pesticide values have been marked by the data validators as "estimated" or "undetected and estimated."

Ammonia was detected in all samples except 04_DD1 at 2 feet, with concentrations ranging from 0.7 to 4 mg/kg. Total Kjeldahl nitrogen was not detected.

The possible mixture of chemicals in the surface sample at 04_DD1 indicates that the upper reach of the Drainage Ditch stratum may have been a disposal area for chemicals.

B.4.5.2.4 Soil Vapor Headspace Concentrations

With the exception of the surface samples at 04_DD1 and 04_DD2, all surface soil samples had soil vapor headspace values of less than 3 ppm. Surface samples at 04_DD1 and 04-DD2 had readings of 68 and 750 ppm, respectively. Headspace values are presented in Attachment 1 to Appendix B.

B4.6 Vadose Zone Soils

The vadose zone investigation encompassed soils from 5 feet below the surface to the top of the potentiometric surface. Depth to water is 230 to 240 feet bgs. The Site 4 deep boring (04_DBMW40) at the location of suspected contamination was sampled (using a drive sampler) every 5 feet for the first 25 feet, then at lesser intervals until groundwater was intercepted. Lithologic drive samples from upgradient and downgradient monitoring wells were used for describing the rock units, but only one sample from each well, located within 30 feet of the water table, was submitted to the laboratory for analysis.

B4.6.1 Description of Subsurface Soil Samples

The upgradient well (04_UGMW63) was originally placed as a downgradient well for Site 3, as well as an upgradient well for Site 4. The deep boring, with samples collected at 5-foot intervals from 5 to 25 feet bgs, was placed in the center of the ferrocene spill area. The downgradient well (04_DGMW66) was moved north about 50 feet during the field work to place it more nearly down the potentiometric gradient from the spill area. The depth to the top of the potentiometric surface in this area is about 230 to 240 feet. Wells were completed using 5-inch-nominal-diameter Schedule 80 PVC casing, 40 feet of 20-slot stainless steel screen, and a 5-foot stainless steel sump. The wells have above ground surface completions. Well completion and dedicated pump information is in Table B4-4.

B4.6.2 Subsurface Geology

Lithology characterized at Site 4 is variable, including interbedded clays to gravels. (See individual well logs in Appendix K.) This area of the Station is underlain by the ancestral Agua Chinon Wash, which appears to have been a major flow channel during Recent geologic history. Thus, coarser-grained sediments appear at various depths. No trend could be observed. Overbank flow, with finer-grained sediments, provide horizontal variations in hydraulic

conductivity. The sediments in the center of the site reflect the relatively coarse-grained material that moved along this wash during periods of high stream flow. Figure B4-2 is a cross section through the site, drawn approximately parallel to the groundwater gradient in the area. Figure B4-1 shows the location of the cross section.

B4.6.3 Analytical Results

Subsurface lithologic samples were tested for VOCs, SVOCs, pesticides, PCBs, metals, and petroleum hydrocarbons (Table B4-1). Table B4-3 summarizes the analytes that were detected.

Hydrocarbons (TRPH, TFH). The gasoline fraction of the total petroleum hydrocarbons (TFH-gasoline) was detected at 45 feet, 55 feet, and 215 feet below the surface in Well 04_DBMW40 (at 0.08 mg/kg to 0.83 mg/kg); the amounts decreased with depth. TFH-gasoline was not detected in the 5-, 10-, 15-, and 20-foot samples of Well 04_DBMW40. The only other detection of TFH-gasoline was in Well 04_DGMW66 at 215 feet below the surface at concentrations less than 1 mg/kg. No TFH-diesel was detected in any vadose zone samples.

TRPH was detected at one location, 04_DBMW40, at 55 feet at a concentration of 249 mg/kg.

Volatile Organic Compounds (VOCs). Toluene was detected in trace amounts in the screen interval (230 feet bgs) in soil collected at a depth corresponding to the screen interval at Well 04_UGMW63.

Semivolatile Organic Compounds (SVOCs). Bis(2-ethylhexyl)phthalate was noted at about one-third of the CRDL at 175 and 230 feet bgs in Well 04_UGMW63. The trace amount of this compound was the only SVOC detected.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. No pesticides or PCBs were detected in any vadose zone samples. The samples were not analyzed for herbicides.

Metals. Thirteen vadose and screen zone lithologic samples were tested for metals. Metals values are presented in Table B4-3.

Total Organic Carbon (TOC). Screen interval samples were analyzed for TOC in all three monitoring wells. TOC was detected in 04_UGMW63 (103 mg/kg) and 04_DGMW66 (169 mg/kg); TOC was below the detection limit of 100 mg/kg in Well 04_DBMW.

B4.6.4 Soil Vapor Headspace Concentrations

All field values of soil vapor headspace were less than 3 parts per million as measured by volume (ppmv) in all wells. No significant pattern of values was detected in any well.

B4.7 Groundwater

The elevation of the potentiometric surface and the construction of the three wells through Site 4 is shown in Figure B4-2. Depth to groundwater is approximately 230 to 240 feet bgs. Table B4-4 summarizes well construction, pump installation, and date of water-quality sampling. Regional groundwater flow direction is generally to the northwest.

B4.7.1 Site-Specific Hydrogeology

Two 4-hour pumping tests were completed at Site 4. Estimated transmissivity (40-foot screens) and hydraulic conductivities are in Table B4-5. No storativity or leakance factor was calculated for this site. The average groundwater gradient is approximately 0.008 ft/ft, or about 44 feet per mile in the vicinity of Site 4.

At the lower hydraulic conductivity (4.0 feet per day), with a gradient of 0.008, and an assumed effective porosity of 0.3, the average linear velocity of groundwater would be at the rate of 0.11 feet per day. Using the higher hydraulic conductivity rate of 11.3 feet per day (Well 04_UGMW63), the average linear velocity would be 0.30 feet per day.

B4.7.2 Analytical Results

Groundwater in the three wells was tested for general water chemistry, hydrocarbons, VOCs, SVOCs, pesticides, PCBs, and metals. The groundwater sample from Well 04_UGMW63 (originally considered a downgradient well for Site 3) was also analyzed for herbicides and gross alpha and beta particle activity. Table B4-6 lists the detected constituents and compounds.

General Chemistry. Field values for pH, electrical conductivity, and temperature for Upgradient Well 04_UGMW63 were 7.06, 1,420 micromhos per centimeter ($\mu\text{mho/cm}$) at 25°C, and 22.9°C, respectively. Field values for pH, electrical conductivity, and temperature for Well 04_DBMW40 were 6.91, 1,490 $\mu\text{mho/cm}$ at 25°C, and 23.3°C, respectively. Field values for pH, electrical conductivity, and temperature for downgradient Well 04_DBMW66 were 7.21, 1,080 $\mu\text{mhos/cm}$ at 25°C, and 23.5°C, respectively.

The anion/cation balance for each of the three water samples is within 5 percent. The total dissolved solids (TDS) decreases downgradient from about 1,000 mg/L to about 730 mg/L. Nitrate was above the MCL in the upgradient well and the deep boring well, but decreased to less than 10 mg/L at the downgradient well.

Hydrocarbons (TRPH, TFH). Both TFH-gasoline and TFH-diesel were detected in groundwater from Well 04_DBMW40 drilled into the stain area. TFH-gasoline in Well 04_DBMW40 was 769 $\mu\text{g/L}$; TFH-diesel was 77.7 $\mu\text{g/L}$. No hydrocarbons were detected in water from the upgradient or downgradient wells.

Volatile Organic Compounds (VOCs). The only regulated VOC detected in groundwater at Site 4 was benzene, at 3 $\mu\text{g/L}$ in Upgradient Well 04_UGMW63. Methylene chloride was detected in Well 04_UGMW63 (2 $\mu\text{g/L}$), and 2-hexanone was detected in 04_DBMW40 (7 $\mu\text{g/L}$).

Semivolatile Organic Compounds (SVOCs). No SVOCs were detected in groundwater from any Site 4 wells.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. No pesticides or PCBs were detected at any well. The herbicide 2,4,5-T was detected at a value of 0.943 $\mu\text{g/L}$ in the sample from Well 04_UGMW63.

Metals and Cyanide. Metal values, with two exceptions, are below maximum contaminant levels (MCLs). Selenium, with an MCL of 10 $\mu\text{g/L}$, occurs in groundwater from Wells 04_DBMW40 and 04_DGMW66 at values of 14 and 13.6, respectively. Manganese was detected at 337 $\mu\text{g/L}$ in Upgradient Well 04_UGMW63.

Gross Alpha and Beta Particle Activity. Gross alpha and beta were tested in groundwater from Well 04_UGMW63 because the well was originally to function as a downgradient well for Site 3. Values for both items were below regulatory concentrations.

B4.7.3 Comparison with Drinking Water Standards

Table B4-7 presents the analyte concentrations in groundwater exceeding regulatory standards. General groundwater quality is better downgradient, with less total dissolved solids. Benzene, manganese, and selenium are above MCLs.

B4.8 Potential Contaminant Migration Pathways

During surface water runoff from precipitation or when the area around the engine test facility is washed down (either on purpose or inadvertently), the runoff and any excess sediment are collected in the catch basin at the south corner of the site (Figure B4-1). This sediment is ultimately transported to Aqua Chinon Wash. Runoff from the site leaves the area along the drainage ditch, flows through the catch basin, and then into Agua Chinon Wash. The mixed collection of VOCs, pesticides, and hydrocarbons in the surface soil at 04_DD1 may move into surface water through this route.

Only a minor indication of soil contamination (primarily hydrocarbons) was found at depths greater than 4 feet bgs. However, the surface soil (Metz loamy sand) is one of the most permeable on the Station, and allows for a high absorption of precipitation. The stratigraphy at depth in this area is complex, with gravel and sand interbedded with clays, allowing percolation into the groundwater.

B4.9 Summary and Conclusions

Vertical percolation of contaminants in the vicinity of the wells is possible as evidenced by the benzene, TFH-gasoline, and TFH-diesel detected in groundwater. Groundwater in Well 18_BGMW01E (see Figure B4-1) also contains benzene. Tank Farm 5 is south of Site 4, and refueling tanker trucks use the area; groundwater contamination is most likely related to ongoing activities there. Site 4 does not appear to be a contributor to the regional groundwater contamination (OU-1).

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**Table B4-1
Site 4 (OU-3): Types of Samples and Chemical Analyses
MCAS EI 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
Sediment Samples															
Catch basin	04_CBAC	S1451027	0	X	X			X	X	X					
Surface and Near-surface Soils															
Upgradient Surface Soil	04_UGS	S1454018	0					X	X	X					
		S1454019	2					X	X	X					
Deep Boring Surface Soil	04_DBS	S1454021	0	X	X	X		X	X	X		N1 ^c			
Stain Area Stratum	04_SA1	S1454031	0	X	X	X		X	X	X		N2 ^d			
		S1454032	2	X	X	X		X	X	X		N1			
		S1454033	4	X	X	X		X	X	X		N1			
	04_SA2	S1454034	0	X	X	X		X	X	X		N2			
		S1454035	2	X	X	X		X	X	X		N1			
		S1454036	4	X	X	X		X	X	X		N1			
	04_SA3	S1454037	0	X	X	X		X	X	X		N1			
		S1454038	2	X	X	X		X	X	X		N1			
		S1454039	4	X	X	X		X	X	X		N1			
Drain Ditch Stratum	04_DD1	S1454022	0	X	X	X		X	X	X		N1			
		S1454023	2	X	X	X		X	X	X		N1			
		S1454024	4	X	X	X		X	X	X		N1			
	04_DD2	S1454025	0	X	X	X		X	X	X		N1			
		S1454026	2	X	X	X		X	X	X		N1			
		S1454027	4	X	X	X		X	X	X		N1			
	04_DD3	S1454028	0	X	X	X		X	X	X		N1			
		S1454029	2	X	X	X		X	X	X		N1			
		S1454030	4	X	X	X		X	X	X		N1			
Vadose Zone Soils															
Upgradient Well 63	04_UGMW63	S1457144	174	X	X			X	X	X					
		S1457145	230	X	X	X		X	X	X			X		
		S1456037	230	X	X	X		X	X	X					
Deep Boring Completed as a Well	04_DBMW40	S1456056	5	X	X			X	X	X					
		S1456057	10	X	X			X	X	X					
		S1456058	15	X	X			X	X	X					
		S1456059	20	X	X			X	X	X					
		S1456060	25	X	X			X	X	X					
		S1456061	45	X	X			X	X	X					
		S1456753	55	X	X			X	X	X					
		S1456063	215	X	X			X	X	X					
S1456054	235	X										X			

**Table B4-1
Site 4 (OU-3): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Location/ Stratum	Station Identifi- cation	Sample Identifi- cation	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
Down Gradient Well	04_DGMW66	S1456055	215	X	X			X	X	X					
		S1457065	215	X	X			X	X	X					
		S1456064	255	X									X		
Groundwater															
Up Gradient Well	04_UGMW63	S1452018	335-275	X	X	X	X	X	X	X	X	X			X
Deep Boring Completed as a Well	04_DBMW40	S1452029	220-260	X	X	X		X	X	X	X	X			
Down Gradient Well	04_DGMW66	S1452456	250-290	X											
		S1452028	250-290		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

^cN1=Nitrate Species Only: Nitrate and NH3

^dN2=Nitrate Species Only: Nitrate, NH3, and TKN

Table B4-2

Site 4 (OU- 3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCA9 El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	04_CBAC S1451027 (0)	DVF(a)	04_DB5 S1454021 (0)	DVF(a)	04_DD1 S1454022 (0)	DVF(a)	04_DD1 S1454023 (2)	DVF(a)	04_DD1 S1454024 (4)	DVF(a)	04_DD2 S1454025 (0)	DVF(a)	04_DD2 S1454026 (2)	DVF(a)	04_DD2 S1454027 (4)	DVF(a)
GENERAL CHEMISTRY																	
AMMONIA-N	MG/KG	-		0.539	U	1.95		-		0.074		3.99		0.087		1.31	
NITRATE/NITRITE-N	MG/KG	-		-		-		0.993		-		-		-		-	
TOTAL KJELDAHL NITROGEN (TKN)	MG/KG	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.02	b	0.48	b	0.52	U	0.5	U	0.52	U	1.3	b	0.99	b	0.5	U
ALUMINIUM	MG/KG	4150		8800		8670		7890		11900		11200		8910		7670	
ARSENIC	MG/KG	3.5		4.5		4.2		2.1	b	3.9		5.7		4.7		3.9	
BARIUM	MG/KG	68.8		121		87.7		125		161		171		133		127	
BERYLLIUM	MG/KG	0.12	U	0.34	b	0.12	U	0.38	b	0.44	b	0.43	b	0.3	b	0.31	b
CALCIUM	MG/KG	2810		5940		3320		5360		9260		5850		4450		5800	
CADMIUM	MG/KG	4.9		0.87	b	8.7		0.86	b	0.93	b	22.8		4.5		0.86	b
COBALT	MG/KG	6.4	b	4.9	b	5.9	b	3.5	b	6.1	b	8.9	b	5.7	b	4.4	b
CHROMIUM	MG/KG	20.8		9.2		85.1		8.5		11.1		35.4		16.8		8.1	
COPPER	MG/KG	49.4		9.1		20.8		6.8		8.4		28.4		11.6		6.9	
IRON	MG/KG	27500		12600		15400		11500		15800		17900		13300		11100	
MERCURY	MG/KG	0.12		0.03	U	0.84		0.05	U	0.03	U	0.58		0.08	U	0.03	U
POTASSIUM	MG/KG	1800		4230		2260		3600		4290		4420		4100		3890	
MAGNESIUM	MG/KG	2580		5350		3850		4790		6570		6620		5380		4880	
MANGANESE	MG/KG	224		217		142		210		259		370		233		221	
SODIUM	MG/KG	481	b	368	b	430	b	384	b	458	b	683	b	371	b	383	b
NICKEL	MG/KG	22.1		4.5	U	18.8		6.3	U	8.3	U	17.8		9.2	b	4	U
LEAD	MG/KG	258		13.6		224		4.5		4.1		86.4		43.1		6.9	
ANTIMONY	MG/KG	3.5	b	2.8	U	3	U	2.9	U	3	U	3.4	U	2.8	U	2.9	U
THALLIUM	MG/KG	0.17	U	0.2	b	0.17	U	0.17	b	0.17	b	0.19	U	0.16	U	0.17	U
VANADIUM	MG/KG	17.2		29.2		29		27.3		37.4		38.3		30.6		26.4	
ZINC	MG/KG	126		48.7		294		42.9		48.8		529		102		39.4	
VOLATILE ORGANIC COMPOUNDS																	
XYLENE (TOTAL)	UG/KG	12	U	11	U	100		12	U	12	U	11	U	11	U	12	U
TOLUENE	UG/KG	12	U	2	J	27		12	U	12	U	11	U	11	U	12	U
ACETONE	UG/KG	11	J	9	J	4	J	12	U	24		11	U	11	U	13	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
NAPHTHALENE	UG/KG	810	U	710	U	23000		770	U	780	J	740	U	730	U	790	U
2-METHYLNAPHTHALENE	UG/KG	810	U	710	U	2900		770	U	810	U	740	U	730	U	790	U
BENZO(K)FLUORANTHENE	UG/KG	810	U	710	UJ	270	J	770	U	810	U	740	U	730	U	790	U
BENZO(A)PYRENE	UG/KG	810	U	710	UJ	220	J	770	U	810	U	740	U	730	U	790	U
BENZYL BUTYL PHTHALATE	UG/KG	810	U	710	U	890	U	770	U	810	U	740	U	730	U	790	U
CHRYSENE	UG/KG	810	U	710	U	220	J	770	U	810	U	740	U	730	U	790	U
PYRENE	UG/KG	810	U	710	U	210	J	770	U	810	U	740	U	730	U	790	U
FLUORANTHENE	UG/KG	810	U	710	U	190	J	770	U	810	U	740	U	730	U	790	U
BENZO(B)FLUORANTHENE	UG/KG	810	U	710	UJ	240	J	770	U	810	U	740	U	730	U	790	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	810	U	710	U	380	J	770	U	810	U	740	U	730	U	790	U
PHENOL	UG/KG	810	U	710	U	270	J	770	U	810	U	740	U	730	U	790	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	-		3.52	UJ	4.48	UJ	3.98	UJ	4.02	UJ	3.72	UJ	3.63	UJ	3.95	UJ
ENDOSULFAN I	UG/KG	-		0.783	J	2.3	UJ	2.05	UJ	2.07	UJ	1.92	UJ	1.87	UJ	2.03	UJ
ENDRIN KETONE	UG/KG	-		3.52	UJ	3.42	J	3.98	UJ	4.02	UJ	3.72	UJ	7	J	3.95	UJ
METHOXYCHLOR	UG/KG	-		18.1	UJ	23	UJ	20.5	UJ	20.7	UJ	19.2	UJ	18.7	UJ	20.3	UJ
ENDRIN ALDEHYDE	UG/KG	-		3.52	UJ	5.16	J	3.98	UJ	4.02	UJ	3.72	UJ	8.76	J	3.95	UJ
GAMMA-CHLORDANE	UG/KG	-		1.81	UJ	8.11	J	2.95	UJ	2.07	UJ	1.92	UJ	1.81	J	2.03	UJ
4,4'-DDD	UG/KG	-		11.4	J	42.4	J	3.98	UJ	4.02	UJ	6.29	J	30.9	J	3.95	UJ
ALPHA-CHLORDANE	UG/KG	-		1.81	UJ	4.88	J	2.95	UJ	2.07	UJ	1.92	UJ	1.87	UJ	2.03	UJ
DIELDRIN	UG/KG	-		3.52	UJ	32.8	J	3.98	UJ	4.02	UJ	3.72	UJ	3.63	UJ	3.95	UJ
BHC-DELTA	UG/KG	-		1.81	UJ	2.47	J	2.95	UJ	2.07	UJ	1.92	UJ	1.87	UJ	2.03	UJ
4,4'-DDT	UG/KG	-		1.41	J	4.48	UJ	3.98	UJ	4.02	UJ	17.8	J	20.2	J	3.74	J
4,4'-DDE	UG/KG	-		3.52	UJ	6.28	J	3.98	UJ	4.02	UJ	5.18	J	7.5	J	3.95	UJ
ENDOSULFAN II	UG/KG	-		3.52	UJ	14.1	J	3.98	UJ	4.02	UJ	3.72	UJ	12	J	3.95	UJ
ENDRIN	UG/KG	-		3.52	UJ	13	J	3.98	UJ	4.02	UJ	3.78	J	12.5	J	3.95	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	15.1	U	58.8		18400		103		25.2		865		58.2		14.9	U
TFH GASOLINE	MG/KG	0.082	U	0.054	U	3.11		0.947		2.34		1.52		0.055	U	0.208	

Table B4-2

Site 4 (OU-3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

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STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT,BGS) ANALYTE BY GROUP	UNITS	04_DD3 S1484028 (0)	DVF(a)	04_DD3 S1484393 (0)	DVF(a)	04_DD3 S1484029 (2)	DVF(a)	04_DD3 S1484030 (4)	DVF(a)	04_SA1 S1484031 (0)	DVF(a)	04_SA1 S1484032 (2)	DVF(a)	04_SA1 S1484033 (4)	DVF(a)	04_SA2 S1484034 (0)	DVF(a)
GENERAL CHEMISTRY																	
AMMONIA-N	MG/KG	1.35		2.35		1.37		1.17		1.41		1.39		1.83		1.99	
NITRATE/NITRITE-N	MG/KG	-		-		-		-		-		-		-		-	
TOTAL KJELDAHL NITROGEN (TKN)	MG/KG	-		-		-		-		84		-		-		140	
METALS																	
SILVER	MG/KG	0.46	U	0.56	b	0.46	U	0.52	U	0.46	U	0.47	U	0.57	U	0.48	U
ALUMINUM	MG/KG	4880		8830		8220		8970		8920		7470		22100		6320	
ARSENIC	MG/KG	8.2		3.9		7.5		3.6		3.4		1.7	b	6.7		2.1	b
BARIUM	MG/KG	76.9		90.9		117		129		152		125		223		89.6	
BERYLLIUM	MG/KG	0.24	b	0.3	b	0.37	b	0.33	b	0.49	U	0.3	U	0.91	b	0.31	U
CALCIUM	MG/KG	2790		3100		3620		3540		6630		5970		9550		2990	
CADMIUM	MG/KG	0.71	b	2.5		0.71	b	0.74	b	0.66	b	0.62	b	1.5		1.2	
COBALT	MG/KG	3.2	b	4	b	4.6	b	4	b	5.3	b	3.4	b	9.7	b	3.3	b
CHROMIUM	MG/KG	8.3		13.1		9.5		9.4		9.7		7.6		22.3		20.9	
COPPER	MG/KG	8.1		9.2		7.1		8.1	b	7.5		5.8		14		10.1	
IRON	MG/KG	7720		11300		11600		12200		12800		10700		25800		10500	
MERCURY	MG/KG	0.25		0.15		0.04	U	0.04	U	0.03	U	0.03	U	0.04	U	0.04	U
POTASSIUM	MG/KG	2150		2810		3600		3450		4230		3450		6890		3570	
MAGNESIUM	MG/KG	3050		4390		5080		4760		5730		4760		11800		3820	
MANGANESE	MG/KG	135		198		221		211		217		202		387		181	
SODIUM	MG/KG	325	b	541	b	426	b	313	b	448	b	366	b	749	b	356	b
NICKEL	MG/KG	5	U	8	U	5.1	U	4.8	U	7.5	U	5.8	U	12.8	U	7.9	U
LEAD	MG/KG	14.8		39.3		7.8		5.8		9.1		2.3		3.7		33.4	
ANTIMONY	MG/KG	2.6	U	2.8	U	2.8	U	3	U	2.7	U	2.7	U	3.3	U	2.8	U
THALLIUM	MG/KG	0.15	U	0.16	U	0.16	U	0.17	U	0.16	U	0.22	b	0.19	U	0.21	b
VANADIUM	MG/KG	18.4		25.5		25.9		27.7		30.8		24.2		59.4		23.2	
ZINC	MG/KG	39.9		124		42.6		39.4		47		36.5		75.7		57.9	
VOLATILE ORGANIC COMPOUNDS																	
XYLENE (TOTAL)	UG/KG	11	U	11	U	11	U	12	U	11	U	11	U	13	U	11	U
TOLUENE	UG/KG	11	U	11	U	11	U	12	U	11	U	11	U	11	J	11	U
ACETONE	UG/KG	11	U	11	U	11	U	12	U	11	U	11	U	12	J	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
NAPHTHALENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
2-METHYLNAPHTHALENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
BENZO(K)FLUORANTHENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
BENZO(A)PYRENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
BENZYL BUTYL PHTHALATE	UG/KG	170	J	760	U	750	U	770	U	750	U	730	U	830	U	710	U
CHRYSENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
PYRENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
FLUORANTHENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
BENZO(B)FLUORANTHENE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
PHENOL	UG/KG	740	U	760	U	750	U	770	U	750	U	730	U	830	U	710	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	0.926	J	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.6	U
ENDOSULFAN I	UG/KG	1.9	UJ	9.68	UJ	1.91	UJ	1.99	UJ	1.93	U	1.9	U	2.14	UJ	1.85	U
ENDRIN KETONE	UG/KG	0.524	J	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.9	U
METHOXYCHLOR	UG/KG	3.26	J	98.8	UJ	3.06	J	19.9	UJ	19.3	U	19	U	21.4	UJ	18.5	U
ENDRIN ALDEHYDE	UG/KG	3.67	J	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.8	U
GAMMA-CHLORDANE	UG/KG	0.302	J	9.68	UJ	1.91	UJ	1.99	UJ	1.93	U	1.9	U	2.14	UJ	1.85	U
4,4'-DDD	UG/KG	4.59	J	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.8	U
ALPHA-CHLORDANE	UG/KG	1.9	UJ	9.68	UJ	1.91	UJ	1.99	UJ	1.93	U	1.9	U	2.14	UJ	1.85	U
DIELDRIN	UG/KG	3.7	UJ	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.8	U
BHC-DELTA	UG/KG	1.9	UJ	9.68	UJ	1.91	UJ	1.99	UJ	1.93	U	1.9	U	2.14	UJ	1.85	U
4,4'-DDT	UG/KG	56.2	J	19.5	J	3.71	UJ	6.91	J	3.74	U	3.88	U	4.15	UJ	3.6	U
4,4'-DDE	UG/KG	15.8	J	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.6	U
ENDOSULFAN II	UG/KG	3.7	UJ	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.8	U
ENDRIN	UG/KG	3.7	UJ	18.8	UJ	3.71	UJ	3.87	UJ	3.74	U	3.88	U	4.15	UJ	3.8	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	32.4		14.3	U	14.1	U	14.8	U	14.1	U	13.9	U	15.7	U	13.3	U
TFH GASOLINE	MG/KG	0.073		0.069		0.057	U	0.058	U	0.056	U	0.056	U	0.063	U	0.054	U

Table B4-2

Site 4 (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.BQS) ANALYTE BY GROUP	UNITS	04_SA2 S1454035 (2)	DVF(a)	04_SA2 S1454035 (4)	DVF(a)	04_SA3 S1454037 (8)	DVF(a)	04_SA3 S1454038 (2)	DVF(a)	04_SA3 S1454039 (4)	DVF(a)	04_UGS S1454018 (0)	DVF(a)	04_UGS S1454019 (2)	DVF(a)
GENERAL CHEMISTRY															
AMMONIA-N	MG/KG	1.28		4.61		36		1.02		1.54		-		-	
NITRATE/NITRITE-N	MG/KG	-		-		-		-		-		-		-	
TOTAL KJELDAHL NITROGEN (TKN)	MG/KG	-		-		-		-		-		-		-	
METALS															
SILVER	MG/KG	0.51	b	0.43	U	0.44	U	0.58	b	0.52	U	0.5	b	0.44	U
ALUMINUM	MG/KG	8990		2490		7350		12300		29000		8440		6360	
ARSENIC	MG/KG	1.8	b	0.9	U	6.4		1.8	b	4.6		2.2		1.2	b
BARIUM	MG/KG	135		40.5	b	113		141		218		112		93.3	
BERYLLIUM	MG/KG	0.45	U	0.12	b	0.33	U	0.5	U	1	b	0.34	b	0.25	b
CALCIUM	MG/KG	6800		2940		5740		6450		10900		3880		4980	
CADMIUM	MG/KG	0.89	b	0.36	b	1.2		0.81	b	1.7		0.89	b	0.42	b
COBALT	MG/KG	5.3	b	1.5	b	4.5	b	4.7	b	10.3	b	4.3	b	3.6	b
CHROMIUM	MG/KG	8.8		9.5		10.9		10.1		21.3		9.3		8.2	
COPPER	MG/KG	6		2.4	b	8.3		7		18.2		8.8		4.9	U
IRON	MG/KG	13100		3830		11000		14500		30000		11100		8450	
MERCURY	MG/KG	0.03	U	0.03	U	0.08	U	0.03	U	0.04	U	0.03	U	0.03	U
POTASSIUM	MG/KG	4070		921	b	3710		3880		8250		3340		2360	
MAGNESIUM	MG/KG	5510		1530		4600		6090		14800		3950		3250	
MANGANESE	MG/KG	224		86.4		208		234		402		198		164	
SODIUM	MG/KG	233	b	175	b	243	b	269	b	1790		199	b	200	b
NICKEL	MG/KG	9.3		4	U	7.5	U	7.4	U	14.5		6.8	b	3.6	b
LEAD	MG/KG	1.5		0.96		16.5		3.6		8		17.2		2.5	
ANTIMONY	MG/KG	2.5	U	2.5	U	2.5	U	3.3	b	3	U	2.5	U	2.6	U
THALLIUM	MG/KG	0.21	b	0.14	U	0.21	b	0.15	U	0.27	b	0.14	U	0.15	U
VANADIUM	MG/KG	30.1		9.5	b	26		33.8		67		26.3		20.3	
ZINC	MG/KG	41.4		13.3		57.9		42.3		89.7		45.5		27.7	
VOLATILE ORGANIC COMPOUNDS															
XYLENE (TOTAL)	UG/KG	10	U	10	U	10	U	10	U	12	U	-		-	
TOLUENE	UG/KG	10	U	10	U	17		2	J	12	J	-		-	
ACETONE	UG/KG	10	U	10	U	10	U	10	U	6	J	-		-	
SEMI-VOLATILE ORGANIC COMPOUNDS															
NAPHTHALENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
2-METHYLNAPHTHALENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
BENZO(K)FLUORANTHENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
BENZO(A)PYRENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
BENZYL BUTYL PHTHALATE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
CHRYSENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
PYRENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
FLUORANTHENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
BENZO(B)FLUORANTHENE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
PHENOL	UG/KG	690	U	690	U	690	U	690	U	810	U	-		-	
PESTICIDES AND PCBs															
ENDOSULFAN SULFATE	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
ENDOSULFAN I	UG/KG	1.75	U	1.73	UJ	1.76	U	1.8	U	2.1	UJ	-		-	
ENDRIN KETONE	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
METHOXYCHLOR	UG/KG	17.5	U	17.3	UJ	17.6	U	18	U	21	UJ	-		-	
ENDRIN ALDEHYDE	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
GAMMA-CHLORDANE	UG/KG	1.75	U	1.73	UJ	1.76	U	1.8	U	2.1	UJ	-		-	
4,4'-DDD	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
ALPHA-CHLORDANE	UG/KG	1.75	U	1.73	UJ	1.76	U	1.8	U	2.1	UJ	-		-	
DIELDRIN	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
BHC-DELTA	UG/KG	1.75	U	1.73	UJ	1.76	U	1.8	U	2.1	UJ	-		-	
4,4'-DDT	UG/KG	3.4	U	0.449	J	3.41	U	3.49	U	4.07	UJ	-		-	
4,4'-DDE	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
ENDOSULFAN II	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
ENDRIN	UG/KG	3.4	U	3.36	UJ	3.41	U	3.49	U	4.07	UJ	-		-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)															
TFH DIESEL	MG/KG	12.9	U	12.7	U	13		13.1	U	15.3	U	12.7	U	12.9	U
TFH GASOLINE	MG/KG	0.052	U	0.051	U	0.054		0.052	U	0.062	U	0.051	U	0.052	U

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

Table B4-3

Site 4 (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	04_DBMW40 S1456056 (5)	DVF(a)	04_DBMW40 S1456057 (10)	DVF(a)	04_DBMW40 S1456058 (15)	DVF(a)	04_DBMW40 S1456059 (20)	DVF(a)	04_DBMW40 S1456060 (25)	DVF(a)	04_DBMW40 S1456061 (45)	DVF(a)	04_DBMW40 S1456062 (55)	DVF(a)	04_DBMW40 S1456753 (55)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
ALUMINUM	MG/KG	10900		9280		8500		7350		3850		9670		4260		5840	
ARSENIC	MG/KG	2.3		2.6		1.8	U	1.8	U	1.9	U	2	U	2.1	U	1.8	U
BARIUM	MG/KG	213		140		99.6		156		85.2		140		97.9		107	
BERYLLIUM	MG/KG	0.33	b	0.28	b	0.22	b	0.3	b	0.12	b	0.46	U	0.35	U	0.29	U
CALCIUM	MG/KG	6800		6220		8740		5700		3690		2270		2110		2320	
CADMIUM	MG/KG	0.61	U	0.6	U	0.6	U	0.75	b	0.57	U	0.88	b	0.62	b	0.61	b
COBALT	MG/KG	5.8	b	6.1	b	4	b	5.1	b	2.2	b	5.1	b	2.6	b	2.8	b
CHROMIUM	MG/KG	9.4		9.3		7		7.7		4.1		10		6.6		9	
COPPER	MG/KG	5.7		5.3	b	3.4	b	4.1	b	3.7	b	5.5	b	4.2	b	4.7	b
IRON	MG/KG	14100		13000		10100		11100		5520		12500		6730		8210	
MERCURY	MG/KG	0.19		0.17		0.22		0.17		0.18		0.03	U	0.03	U	0.06	U
POTASSIUM	MG/KG	3960		3360		3030		3180		1470		3060		1560		1760	
MAGNESIUM	MG/KG	5870		5330		4350		4960		2380		3710		2290		2710	
MANGANESE	MG/KG	250		230		216		195		116		180		137		163	
SODIUM	MG/KG	554	b	874	b	518	U	589	b	353	b	347	b	446	b	452	b
NICKEL	MG/KG	6.7	b	5.8	b	4.6	b	5	b	2.2	U	4.5	b	3.6	b	5	b
LEAD	MG/KG	2.8		1.9		1.7		1.4		1.6		3.2		1.4		1.2	
SELENIUM	MG/KG	4.7	U	4.7	BWNJ	4.6	U	4.6	U	0.43	U	0.11	U	0.15	b	0.12	U
THALLIUM	MG/KG	0.35	U	0.35	U	0.35	U	0.35	U	0.33	U	0.2	b	0.15	U	0.16	b
VANADIUM	MG/KG	33.5		36.7		25.9		29.8		15.6		30.4		16.2		24.6	
ZINC	MG/KG	41.9		41.4		30.9		34.8		17		31.4		20.6		24.5	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	11	U	11	U	11	U	11	U	11	U	11	U	12	U
ACETONE	UG/KG	11	U	12	U	11	U	11	U	11	U	11	U	8	J	5	J
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	730	U	720	U	720	U	740	UJ	730	U	740	U	750	U	800	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.055	U	0.055	U	0.054	U	0.056	U	0.055	U	0.829		0.159		0.187	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	249		20	U

Table B4-3

Site 4 (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	04_D8MW40 S1456063 (216)	DVF(a)	04_D8MW40 S1456054 (235)	DVF(a)	04_D8MW40 S1456754 (238)	DVF(a)	04_DGMW66 S1456055 (216)	DVF(a)	04_DGMW66 S1457065 (215)	DVF(a)	04_DGMW66 S1456064 (255)	DVF(a)	04_LGMW63 S1456032 (176)	DVF(a)	04_LGMW63 S1457144 (176)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		169		-		-	
METALS																	
ALUMINUM	MG/KG	6100		-		-		7830		9090		-		-		-	
ARSENIC	MG/KG	6.1		-		-		3.5		3.9		-		-		-	
BARIUM	MG/KG	84.7		-		-		69.9		78.7		-		-		-	
BERYLLIUM	MG/KG	0.41	U	-		-		0.44	U	0.5	U	-		-		-	
CALCIUM	MG/KG	6970		-		-		4090		5330		-		-		-	
CADMIUM	MG/KG	1.8		-		-		4.5		4.5		-		-		-	
COBALT	MG/KG	4.3	b	-		-		6.2	b	6.6	b	-		-		-	
CHROMIUM	MG/KG	8.4		-		-		11.1		12.8		-		-		-	
COPPER	MG/KG	7.1		-		-		12.2		13.4		-		-		-	
IRON	MG/KG	10300		-		-		14000		16200		-		-		-	
MERCURY	MG/KG	0.03	U	-		-		0.03	U	0.03	U	-		-		-	
POTASSIUM	MG/KG	2370		-		-		3200		3800		-		-		-	
MAGNESIUM	MG/KG	3450		-		-		4540		5480		-		-		-	
MANGANESE	MG/KG	151		-		-		394		386		-		-		-	
SODIUM	MG/KG	379	b	-		-		333	b	356	b	-		-		-	
NICKEL	MG/KG	10.7		-		-		29.2		27.4		-		-		-	
LEAD	MG/KG	1.9		-		-		2.7		3.2		-		-		-	
SELENIUM	MG/KG	0.13	b	-		-		0.19	b	0.2	b	-		-		-	
THALLIUM	MG/KG	0.16	U	-		-		0.28	U	0.33	U	-		-		-	
VANADIUM	MG/KG	27.7		-		-		31.1		37.3		-		-		-	
ZINC	MG/KG	29		-		-		45.2		48.7		-		-		-	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	12	U	10	U	10	U								
ACETONE	UG/KG	11	U	12	U	10	J	12	U	15	U	12	U	14	U	15	U
SEMIVOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	750	U	-		-		770	U	800	U	-		250	J	250	J
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.085		-		-		0.256		0.512		-		-		-	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	-		-		20	U	20	U	-		-		-	

Table B4-3

Site 4 (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	04 UGMW63 S1456037 (230)	DVF(a)	04 UGMW63 S1457146 (230)	DVF(a)													
GENERAL CHEMISTRY																		
TOTAL ORGANIC CARBON	MG/KGW	-		103														
METALS																		
ALUMINUM	MG/KG	2380		3130														
ARSENIC	MG/KG	2.2	b	3.8														
BARIUM	MG/KG	49.3		78.1														
BERYLLIUM	MG/KG	0.17	U	0.19	U													
CALCIUM	MG/KG	2030		2480														
CADMIUM	MG/KG	1.1	b	1.3														
COBALT	MG/KG	1.6	b	2.3	b													
CHROMIUM	MG/KG	9.7		15.2														
COPPER	MG/KG	8.9		7.1														
IRON	MG/KG	6840		7400														
MERCURY	MG/KG	0.04	U	0.07	U													
POTASSIUM	MG/KG	696	b	1070														
MAGNESIUM	MG/KG	1200		1730														
MANGANESE	MG/KG	90.4		135														
SODIUM	MG/KG	236	b	326	b													
NICKEL	MG/KG	10.4		12.7														
LEAD	MG/KG	28.3		2														
SELENIUM	MG/KG	0.12	U	0.11	U													
THALLIUM	MG/KG	0.17	U	0.15	U													
VANADIUM	MG/KG	12.7		21.6														
ZINC	MG/KG	13.3		19.1														
VOLATILE ORGANIC COMPOUNDS																		
TOLUENE	UG/KG	3	J	11	U													
ACETONE	UG/KG	19		13														
SEMIVOLATILE ORGANIC COMPOUNDS																		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	180	J	730	U													
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																		
TFH GASOLINE	MG/KG	0.056	U	0.056	U													
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																		
TRPH	MG/KG	20	U	20	U													

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

**Table B4-4
Site 4 (OU-3): Well Construction Details
MCAS EI Toro Phase I RI Technical Memorandum**

Item	Station Identification		
	04_UGMW63	04-DBMW40	04_DGMW66
Survey Location--Northing	551997.22	552188.62	552307.80
Survey Location--Easting	1554049.71	1553604.52	1553504.02
Ground Surface Elevation (ft above MSL ^a)	403.44	400.64	401.77
Measuring Point Elevation (ft above MSL ^a)	404.11	400.04	401.10
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" Schedule 80 PVC	5" Schedule 80 PVC	5" Schedule 80 PVC
Screen Diameter and Material	5" diameter 20-slot SS ^c	5" diameter 20-slot SS ^c	5" diameter 20-slot SS ^c
Screen Interval (ft bgs ^b)	235-275	220-260	250-290
Length of Drop Pipe (ft bgs ^b)	262	252	252
Make and Model of Installed Pump	Grundfos - 5 gallon per minute (3/4 hp)	Grundfos 10E-11 (3/4 hp)	Grundfos 10E-11 (3/4 hp)
Date of Pumping Test	24 November 1992	Not tested	20 November 1992
Date of Water Quality Sampling	24 November 1992	4 December 1992	20 November 1992

^aMean sea level
^bBelow ground surface
^cSS = Stainless Steel

**Table B4-5
Site 4 (OU-3): Summary of Hydraulic Parameters
MCAS EI Toro Phase I RI Technical Memorandum**

Well Identification	Type of Test	Analysis Method	Transmissivity (ft²/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient^a	Leakance Factor^a
04_UGMW63	Pumping	Theiss (1935): Recovery Data	450	11.3	Not applicable	Not applicable
04_DGMW66	Pumping	Theiss (1935): Recovery Data	160	4.0	Not applicable	Not applicable

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

Table B4-6

Site 4 (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	04_DBMW40 S1452029 (220-260)	DVF(a)	04_DGMW66 S1452028 (250-290)	DVF(a)	04_DGMW66 S1452456 (250-290)	DVF(a)	04_UGMW63 S1452018 (235-275)	DVF(a)
GENERAL CHEMISTRY											
ALKALINITY AS CaCO3	NA	NA	MG/L	438		260		-		386	
CARBONATE	NA	NA	MG/L	-		-		-		-	
BICARBONATE	NA	NA	MG/L	535		316		-		470	
CHLORIDE	3	250	MG/L	149		128		-		160	
SULFATE	3	250	MG/L	123		112		-		123	
NITRATE/NITRITE-N	1	10	MG/L	12.8		6.52		-		11.8	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	940		730		-		993	
METALS											
ALUMINUM	3	50	UG/L	69	b	31	U	-		31.3	b
ARSENIC	2	50	UG/L	2.7	b	2.8	b	-		0.9	b
BARIUM	2	2000	UG/L	57.6	b	41.1	b	-		76.8	b
CALCIUM	NA	NA	UG/L	78500		82500		-		134000	
CADMIUM	2	5	UG/L	1.2	U	2.3	b	-		1.2	U
IRON	3	300	UG/L	34.1	b	36.5	U	-		142	
MERCURY	2	2	UG/L	0.13	b	0.1	U	-		0.1	U
POTASSIUM	NA	NA	UG/L	4110	b	2830	b	-		3140	b
MAGNESIUM	NA	NA	UG/L	50900		30600		-		67200	
MANGANESE	3	50	UG/L	11.7	b	16.8		-		337	
SODIUM	NA	NA	UG/L	181000		112000		-		77400	
NICKEL	NA	NA	UG/L	39.4	b	107		-		17.1	b
ANTIMONY	NA	NA	UG/L	12.1	U	12.1	U	-		14.7	J
SELENIUM	1	10	UG/L	13.6	b	14	J	-		8.2	b
VANADIUM	NA	NA	UG/L	20.1	b	21.2	b	-		20.1	b
VOLATILE ORGANIC COMPOUNDS											
2-HEXANONE	NA	NA	UG/L	7		-		2	U	2	U
BENZENE	1	1	UG/L	1	U	-		1	U	3	
METHYLENE CHLORIDE	4	40	UG/L	1	U	-		1	U	2	
HERBICIDES											
2,4,5-T	NA	NA	UG/L	-		-		-		0.943	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)											
TFH DIESEL	NA	NA	UG/L	769		250	U	-		250	U
TFH GASOLINE	NA	NA	UG/L	77.7		50	U	-		50	U
GROSS ALPHA AND BETA											
GROSS BETA	2	50	PC/L	-		-		-		11.3	

(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 B4-7
Site 4 (OU-3): Analyte Concentrations in Groundwater
Exceeding Regulatory Standards or DTSC^a Action Levels
MCAS EI Toro Phase I RI Technical Memorandum**

Well Identification	SI (ft bgs) ^b	Analyte	Units	Concentration	Regulatory Level ^c	Regulatory Code ^d
04_DGMW66	(250-290)	Selenium	µg/L	14	10	2
		Total Dissolved Solids	mg/L	730	500	3
04_DBMW40	(220-260)	Aluminum	µg/L	69	50	3
		Selenium	µg/L	13.6	10	1
		Nitrate/Nitrite-N	mg/L	12.8	10	2
		Total Dissolved Solids	mg/L	940	500	3
04_UGMW63	(235-275)	Benzene	µg/L	3	1	2
		Manganese	µg/L	337	50	3
		Nitrate/Nitrite-N	mg/L	11.8	10	1
		Total Dissolved Solids	mg/L	993	500	3

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 Aluminum, 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 B5

**Nature and Extent of Contamination:
Site 5 (OU-2) — Perimeter Road Landfill**

Appendix B5
NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION
SITE 5 (OU-2) - PERIMETER ROAD LANDFILL

This discussion of Site 5 is supplemented by the figures and data tables listed below. The figures begin on page B5-3, and the tables are grouped at the end of this Appendix B5. Field headspace values for soils at this site are presented in Table BA1-5, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B5-1:	(Site Map)
Figure B5-2:	Geologic Cross Section
Table B5-1:	Types of Samples and Chemical Analyses
Table B5-2:	Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil
Table B5-3:	Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples
Table B5-4:	Well Construction Details
Table B5-5:	Summary of Hydraulic Parameters
Table B5-6:	Summary of Detected Chemicals in Groundwater Samples
Table B5-7:	Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B5.1 Site Description

The Perimeter Road Landfill is located in the southeast quadrant of MCAS El Toro, north of Gate 3 along the Station boundary. The Borrego Canyon Wash drainage channel is about 800 feet east-southeast of the landfill. The facility was active from 1955, after operations at the Original Landfill (Site 3) were phased out, until the late 1960s, when the Magazine Road Landfill (Site 2) was activated. According to aerial photography, the landfill operated as a cut-and-fill facility, using a trench about 1,200 feet long, 60 feet wide, and 20 feet deep. Typically, wastes were burned at the landfill to reduce volume. Previous reports have estimated waste volumes between 50,000 and 60,000 cubic yards (Brown and Caldwell, 1986).

A geophysical survey performed as part of Solid Waste Assessment Tests (SWATs) indicated that landfill activities extended further to the north and south of the trench shown in the aerial photographs. Consequently, the site boundaries were extended

along Perimeter Road to encompass the larger area of trenching (*SAP Amendment*). The landfill boundaries include two smaller trenches that are noncontiguous with the main trench.

There is only one stratum for the landfill. This determination was made on the basis of available site history information, as augmented by aerial photography and geophysical survey findings. Because of construction of the on-Station Waste Storage Facility (WSF) on top of the landfill, the stratum includes only areas within the boundaries of the landfill but outside the WSF.

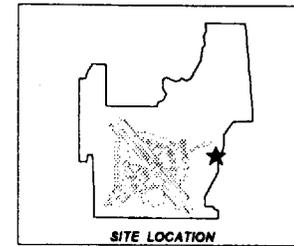
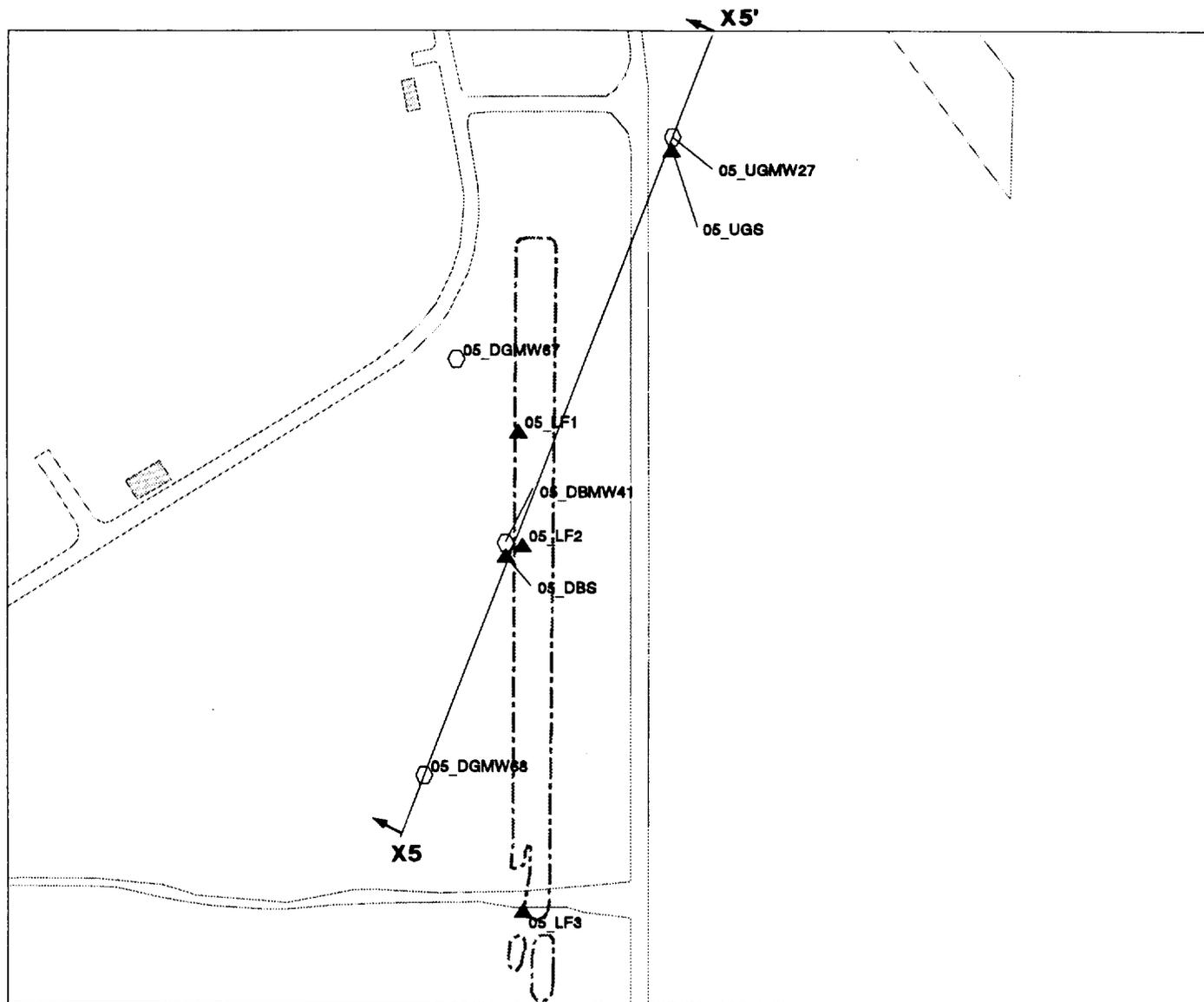
B5.2 Suspected Waste Types and Contaminants

Almost any type of waste generated by the Station may have been disposed of at the Perimeter Road Landfill, including burnable trash, municipal solid waste, fuels, oils, solvents, scrap metals, paint residues, and other miscellaneous materials (Brown and Caldwell, 1986). Therefore, the landfill was designated an operable Unit 2 (OU-2) site as a suspected source of the regional VOC contamination.

B5.3 Field Investigation

The field investigation included the collection of surface soil samples and the installation of four monitoring wells. One of the four wells was a deep boring drilled to determine the vertical extent of contamination in the vadose zone. This boring/well was located outside of the landfill proper, to avoid drilling in refuse, but immediately downgradient of the landfill trench. Five surface soil samples, 17 vadose zone soil samples, and four groundwater samples were collected. Surface water and sediment samples were not taken because surface drainage is not considered a significant migration pathway at the site. Table B5-1 lists the samples collected by station identification (ID) number, sample ID number, depth of sample, and analyses requested for each sample.

Surface soil samples and lithologic samples collected during drilling of the deep boring and monitoring well boreholes were tested for soil vapors using either an HNu photo-ionization detector, or a flame ionization detector, (OVA). The headspace values recorded in the field are listed in Attachment 1 of this appendix.



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

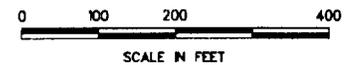


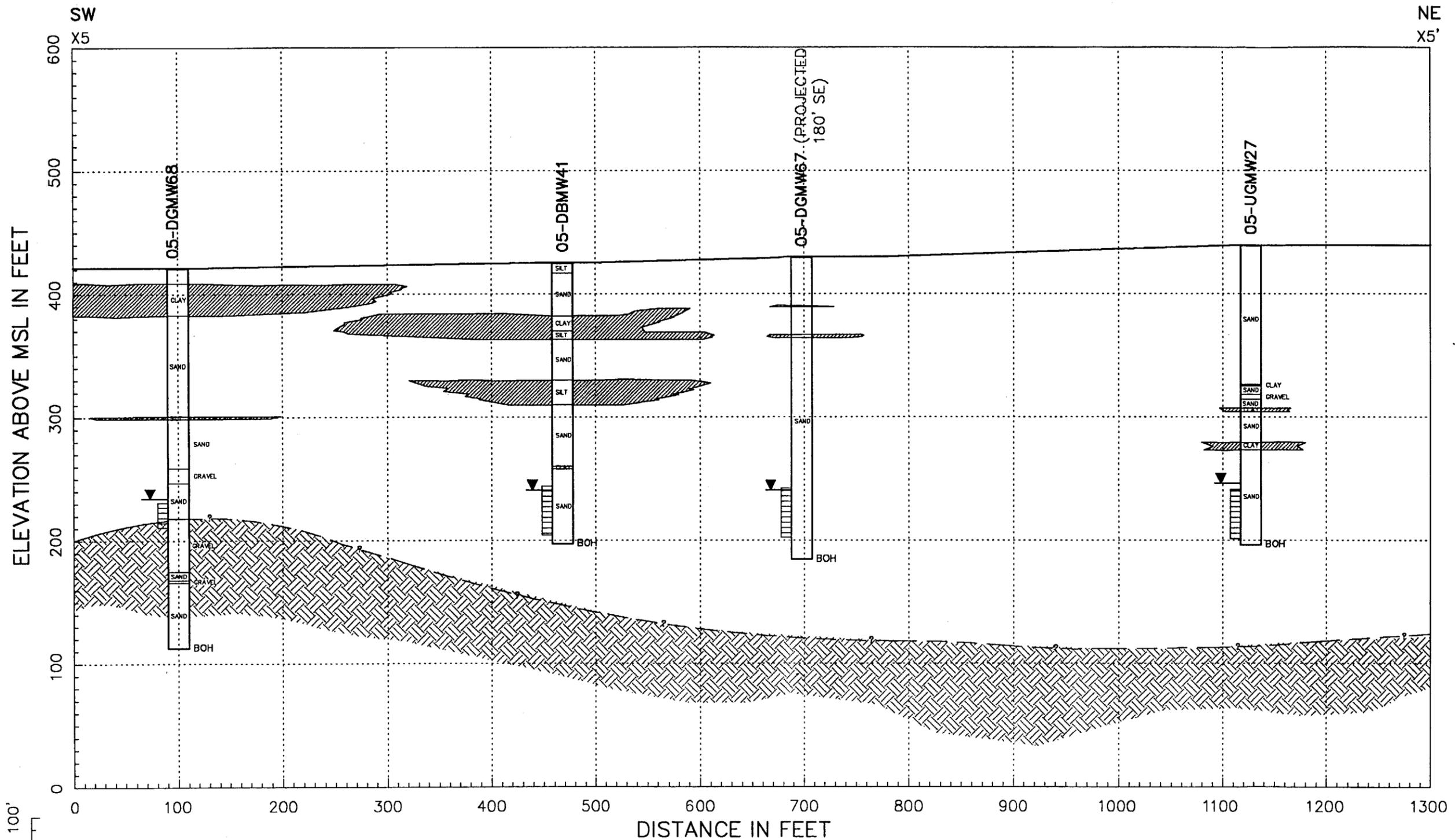
FIGURE B5-1

SITE 5 (OU-2): PERIMETER ROAD LANDFILL

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

PAGE NUMBER B5-4

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

- LEGEND**
- UNCONSOLIDATED PERMEABLE SEDIMENTS
 - SEMICONSOLIDATED LOW-PERMEABILITY SEDIMENTS
 - UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS
 - BOH BOTTOM OF HOLE
 - WELL SCREEN INTERVAL
 - WATER LEVEL ELEVATION, DECEMBER 1992

FIGURE B5-2
 SITE 5 (OU-2)
 GEOLOGIC CROSS SECTION X5-X5'
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

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B5.3.1 Surface Water and Sediments

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

B5.3.2 Surface and Near-Surface Soils

Surface soil samples were collected at five locations. The three sampling stations associated with the landfill stratum (05_LF1 to 05_LF3) were located in a statistically random fashion. The other two surface sampling locations were near the upgradient monitoring well (05_UGS) and near the deep boring completed as a monitoring well (05_DBS).

B5.3.3 Vadose Zone Soils (Soil Borings)

Twenty soil samples from the vadose zone were recovered while drilling the deep boring and the boreholes of the monitoring wells.

B5.3.4 Groundwater Monitoring Wells

Four groundwater monitoring wells were constructed: one upgradient well (05_UGMW27), two downgradient wells (05_DGMW67 and 05_DGMW68), and one deep boring completed as a monitoring well (05_DBMW41). Each of these wells was screened in the shallowest water-bearing zone encountered during drilling. Aquifer tests were performed on the two downgradient monitoring wells to determine aquifer characteristics. A 240-minute pumping test was conducted at Well 05_DGMW67, and two slug tests were conducted at Well 05_DGMW68. The results of the aquifer testing are discussed in greater detail in Section 3 (Aquifer Parameters) and Appendix F (Aquifer Test Analysis). Groundwater was sampled from each of the four monitoring wells.

B5.4 Surface Water and Sediments

Surface water and sediment samples were not collected at this site.

B5.5 Surface and Near-Surface Soils

B5.5.1 Description of Surface and Near-Surface Soil Samples

The surface soils at the Perimeter Road Landfill are classified as Sorrento loam, with 0 to 2 percent slopes (Wachtell, 1978). In the upper 72 inches, the percolation rate for this soil mapping unit ranges from 0.6 to 2.0 inches per hour (in/hr), and the available water capacity ranges from 0.16 to 0.21 in/in. The hydrologic group is B, indicating moderate infiltration, even when the soil is saturated.

B5.5.2 Analytical Results and Soil Vapor Headspace Values

Soil vapor headspace values are presented in Attachment 1. All soil vapor headspace values were less than 1 ppmv. Table B5-2 presents the detected chemicals in surface and near-surface soils.

B5.5.2.1 Upgradient Area

No organic compounds (VOCs, SVOCs, or herbicides) except 2,4,5-trichlorophenoxy propionic acid (2,4,5-TP), were detected in the surface soil samples from the upgradient area. 2,4,5-TP, an herbicide, was detected at 55.6 $\mu\text{g}/\text{kg}$. This location is immediately adjacent to an agricultural field. TRPH was detected at 23 and 28 mg/kg in duplicate samples collected from the surface (05_UGS).

B5.5.2.2 Perimeter Road Landfill Stratum.

The pesticide 4,4-DDT was detected at 239 $\mu\text{g}/\text{kg}$ at the surface at the southwestern end of the landfill (05_LF3) and at 3.52P $\mu\text{g}/\text{kg}$ at mid-site (05_LF1). The pesticide methoxychlor was detected at 05_LF1 with 122 $\mu\text{g}/\text{kg}$. TRPH at 05_LF3 was detected at 877 mg/kg. TFH-gasoline analyses showed levels of 0.083 mg/kg at the center of the landfill (05_LF2). Toluene was detected at an

estimated value of 4 $\mu\text{g}/\text{kg}$ in surface soil samples from the north and center of the landfill (05_LF2 and 05_LF1).

B5.6 Vadose Zone Soils

B5.6.1 Description of Subsurface Soil Samples

Soil samples were collected in the vadose zone from the deep boring and from the boreholes of the three monitoring wells. For the deep boring, samples were collected for chemical analysis every 5 feet to a depth of 25 feet, then at 65, 85, and 145 feet. For the monitoring wells, one sample from the capillary fringe zone (between the water table and 30 feet above the water table) was collected for chemical analysis based on headspace values and visual observations. An additional sample collected in the vadose zone was analyzed if any of the samples showed positive headspace values; the sample was selected on the basis of headspace values and visual observations. A sample was also recovered in the screen interval for total organic carbon (TOC) and VOC analysis.

B5.6.2 Subsurface Geology

The lithology at the site, as interpreted from boring logs, consists of discontinuous layers or lenses of clay, silt, sandy silt, silty sand and sand. The materials encountered in the northern part were mostly sand with some thin clay layers or lenses. When drilling at 05_DGMW68, the southernmost well at the site, low-permeability, semiconsolidated to consolidated material was encountered at about 200 feet; this is interpreted as bedrock. The bedrock, probably a conglomerate with sand or sandstone, was encountered before the anticipated bottom of this well. The southern half of the site subsurface is mostly sand with significant layers of clay or silt. Figure B5-2 presents a north-south interpretive cross section of the site. The location of the cross section is shown in Figure B5-1.

B5.6.3 Analytical Results

Table B5-3 presents the detected chemicals in the vadose zone.

Volatile Organic Compounds (VOCs). Acetone (at low levels) was the only VOC detected. Acetone was detected at 5_DGMW68 at 182 feet at 8 to 10 $\mu\text{g}/\text{kg}$ and at 203 feet at 7 $\mu\text{g}/\text{kg}$. These concentrations are estimated values below the CRDL. Acetone is a demonstrated laboratory contaminant. The maximum detected concentration of acetone in the trip blanks is 37 $\mu\text{g}/\text{L}$. No TCE or PCE was detected.

Semivolatile Organic Compounds (SVOCs). Bis(2-ethylhexyl)phthalate was detected in the upgradient monitoring well (05_UGMW27) at 430 $\mu\text{g}/\text{kg}$ in the 114-foot sample. This estimated value is below the CRDL.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. Two vadose zone samples, the 5-foot and the 10-foot samples of 05_DBMW41, showed the pesticide 4,4-DDT at 7.2 $\mu\text{g}/\text{kg}$. No PCBs were detected. The herbicide MCPP was detected in 05_DBMW41 in samples from 10, 20, and 25 feet at concentrations ranging from 11,000 to 261,000 $\mu\text{g}/\text{kg}$.

Hydrocarbons (TRPH, TFH). At 185 feet in 05_DGMW67, TFH-diesel was detected at 21.8 mg/kg and TRPH at 76 mg/kg . TFH-diesel was also detected in the associated rinsate at 0.465 mg/L .

Metals. Metals concentrations are presented in Table B5-3.

Total Organic Carbon (TOC). In one of the downgradient monitoring wells (05_DGMW68), TOC was detected at 127 mg/kg . TOC was below the CRDL of 100 mg/kg in the other wells.

B5.6.4 Soil Vapor Headspace Concentrations

The headspace values were low; no measured values exceeded 6.0 ppmv. There was little correlation with laboratory results.

B5.7 Groundwater

B5.7.1 Site-Specific Hydrogeology

The investigation for the Perimeter Road Landfill used four groundwater monitoring wells: one upgradient well (05_UGMW27), two downgradient monitoring wells (05_DGMW67 and 05_DGMW68), and one deep boring completed as a monitoring well (05_DBMW41). The potentiometric surface and the lithologic descriptions of the four monitoring wells are also shown in Figure B5-2. Depth to groundwater is about 200 feet. Table B5-4 summarizes monitoring well construction, pump installation, and water-quality sampling data. The results of the aquifer testing in two of the wells show a wide range in aquifer characteristics. At 05_DGMW67, the transmissivity is 1670 feet²/day and k is 44.1 feet/day, while 05_DGMW68 shows a transmissivity of 68 feet²/day and k of 3.4 feet/day (Table B5-5). These values are consistent with the heterogeneity inferred in the cross section and the fact that 05_DGMW68 is partially screened in the bedrock (Figure B5-2).

Examination of water levels during late 1992 and early 1993 shows little change in gradient with time. At 05_UGMW27 the measured water level is about 15 feet higher in elevation than that at 05_DGMW68. These wells are not parallel to the groundwater flow direction, so a gradient was not calculated from them. Assuming a regional gradient of 0.013 and a porosity, $\eta=0.3$, the average linear groundwater velocity could range from 0.15 to 1.92 feet/day.

B5.7.2 Analytical Results

Groundwater quality is displayed by the detected chemicals listed in Table B5-6.

Volatile Organic Compounds (VOCs). Methyl chloride was detected at 05_DBMW41 and 05_DGMW67, with values ranging from 2.0 $\mu\text{g/L}$ to 0.5 $\mu\text{g/L}$, respectively. Methylene chloride was detected in 05_DGMW68 at 0.5 $\mu\text{g/L}$ and benzene was detected in 05_DGMW67 at 0.3 $\mu\text{g/L}$. 2-Butanone is a demonstrated laboratory contaminant. The maximum detected concentration of 2-butanone in the trip blanks was 33 $\mu\text{g/L}$. Tetrachloroethene (PCE) was detected in

05_DBMW41 and 05_UGMW27, at 0.8 $\mu\text{g/L}$ and 0.9 $\mu\text{g/L}$, respectively. TCE was detected in the sample from 05_UGMW27 at 0.6 $\mu\text{g/L}$. All the VOC detections are less than the CRDLs.

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

Pesticides and Polychlorinated Biphenyls (PCBs), and Herbicides. No pesticides and PCBs were detected. The herbicide 2-4-5-T was detected in 05_DGMW67 at 0.69 $\mu\text{g/L}$.

Hydrocarbons (TRPH, TFH). No TRPH or TFH was detected.

Metals and Cyanide. The sample from 05_DGMW67 has an aluminum value of 50.7. This value is less than the CRDL. The selenium in the 05_DGMW68 sample (8.5 $\mu\text{g/L}$) is possibly reflective of the basement rock mineralogy, as the screen for this well penetrates the underlying formation. The value is low when compared to selenium values in groundwater elsewhere beneath MCAS El Toro. Cyanide was not detected in the groundwater.

General Chemistry. The general water chemistry is relatively uniform across the site, with predominantly calcium and sodium cations and mostly bicarbonate and sulphate anions. Total dissolved solids (TDS) range in value from 790 mg/L (at 05_DBMW41) to 934 mg/L (at 05_DGMW67). During sampling, pH values ranged from 6.9 to 7.4. Piper diagrams are presented in Appendix J.

Dioxins and Furans. The samples were not analyzed for dioxins and furans.

Gross Alpha and Beta Particle Activity. Radiochemistry results are in Table B5-6. Analyses were performed for gross alpha samples from MW41, MW67, and MW68. The values, at 05_DGMW67, are 24.9 pCi/L for gross alpha and 53 pCi/L for gross beta. In a duplicate sample, the values were 15 and 7.7 pCi/L. At 05_DGMW41 and 05_DGMW68, the gross alpha results are 9 and 7 pCi/L, respectively, and the gross beta results are 6 and 14 pCi/L, respectively.

B5.7.3 Comparison to Drinking Water Standards

Table B5-7 presents analyte concentrations in groundwater exceeding regulatory standards or DSTC action levels. In one downgradient monitoring well (05_DGMW67), the gross alpha value of 24.9 pCi/L exceeds the EPA drinking water standard of 15 pCi/L and the gross beta of 53 pCi/L exceeds the EPA action level of 50 pCi/L. However, the duplicate samples for these wells are at or below the MCLs for gross alpha and beta.

As discussed in Appendix A, the groundwater facies change dramatically across MCAS El Toro. It is believed that the above inorganic exceedances represent background conditions and are not site-related.

B5.8 Potential Contaminant Migration Pathways

Surface water runoff from the Perimeter Road Landfill drains as nonchanneled flow until reaching Borrego Canyon Wash. Surface contaminants are petroleum products and herbicides. About half of the site subsurface profile shows some clay or silt-retarding layers, but vertical migration of contaminants is still possible.

B5.9 Summary and Conclusions

Low levels of TCE and PCE were detected in groundwater from the upgradient monitoring well and the deep boring monitoring well. The source may not be the Perimeter Road Landfill, as the detected chemicals are found in the upgradient well. The other VOCs are at very low levels and could be laboratory contaminants. No SVOCs appear to have migrated to the groundwater. Petroleum fuels are found in shallow and vadose zone soils.

It does not appear that Site 5 is a contributor to the regional VOC groundwater contamination (OU-1).

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**Table B5-1
Site 5 (OU-2): 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	General Chemistry	TOC	Dioxins/ Furans
Surface Water and Sediments (Not sampled.)														
NA														
Surface and Near-Surface Soils														
UG	5_UGMW27	S1456071	0	X	X		X	X			X			
1	5_LF1	S1454041	0	X	X	X	X	X			X			
1	5_LF2	S1454042	0	X	X	X	X	X			X			
1	5_LF3	S1454043	0	X	X	X	X	X			X			
	5_DBMW41	S1454044	0	X	X	X	X	X			X		X	
Vadose Zone Soils														
UG	5_UGMW27	S1456071	114	X	X									
	5_UGMW27	S1456080	175	X	X		X	X	X					
	5_UGMW27	S1456068	235	X								X		
	5_UGMW27	S1456066	126	X	X									
DG	5_DGMW67	S1456078 S1457099 ^b	185 185	X X	X X	X X		X X	X X	X X				
	5_DGMW68	S1456067	40	X	X									
	5_DGMW68	S1456079 S1457097 ^b	182 182	X X	X X	X X		X X	X X	X X				
	5_DGMW68	S1456070	203	X								X		
	5_DBMW41	S1456072	5	X	X	X	X	X	X	X				
	5_DBMW41	S1456073	10	X	X	X	X	X	X	X				
	5_DBMW41	S1456074	15	X	X	X	X	X	X	X				
	5_DBMW41	S1456081	20	X	X	X	X	X	X	X				
	5_DBMW41	S1456075	25	X	X	X	X	X	X	X				
	5_DBMW41	S1456067	65	X	X	X	X	X	X	X				
	5_DBMW41	S1456065	85	X								X		
	5_DBMW41	S1456076	145	X	X	X	X	X	X	X				
Groundwater														
UG	5_UGMW27	S1452039 S1452033 ^b	NA	X X	X	X		X	X	X	X	X		
	5_DBMW41	S1452036	NA	X	X	X	X	X	X	X	X	X		X

**Table B5-1
Site 5 (OU-2): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 2 of 2

Location/ Stratum	Station Identifi- cation	Sample Identifi- 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
DG	5_DGMW67	S1452035	NA	X	X	X		X	X	X	X	X			X
		S1452037		X			X							X	
		S1452393 ^b		X	X	X		X	X	X	X	X			X
	5_DGMW68	S1453032	NA	X	X	X	X	X	X	X	X	X			X

^aVOCs = 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 B5-2

Site 5 (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)	06_D88 S1464044 (0)	06_D88 S1464044 (0)	DVF(a)	06_D88 S1464583 (0)	06_D88 S1464583 (0)	DVF(a)	06_LF1 S1464041 (0)	06_LF1 S1464581 (0)	06_LF1 S1464581 (0)	DVF(a)	06_LF2 S1464042 (0)	06_LF2 S1464582 (0)	06_LF2 S1464582 (0)	DVF(a)	06_LF3 S1464043 (0)	06_LF3 S1464580 (0)	06_LF3 S1464580 (0)	DVF(a)
ANALYTE BY GROUP	UNITS																	
METALS																		
SILVER	MG/KG	0.43	U	-	-	-	0.5	b	-	-	0.43	U	-	-	0.43	b	-	-
ALUMINUM	MG/KG	5350	-	-	-	-	6550	-	-	-	8880	-	-	-	4750	-	-	-
ARSENIC	MG/KG	1.9	b	-	-	-	2	b	-	-	2.1	-	-	-	3.3	-	-	-
BARIUM	MG/KG	63.8	-	-	-	-	75.8	-	-	-	75.7	-	-	-	69.6	-	-	-
BERYLLIUM	MG/KG	0.23	b	-	-	-	0.22	b	-	-	0.22	b	-	-	0.23	b	-	-
CALCIUM	MG/KG	5420	-	-	-	-	12400	-	-	-	10400	-	-	-	5210	-	-	-
CADMIUM	MG/KG	1.2	-	-	-	-	1.2	-	-	-	1	-	-	-	1.2	-	-	-
COBALT	MG/KG	2.7	b	-	-	-	3.3	b	-	-	3.7	b	-	-	2.6	b	-	-
CHROMIUM	MG/KG	6	-	-	-	-	6.6	-	-	-	7.4	-	-	-	6.7	-	-	-
COPPER	MG/KG	6.5	-	-	-	-	8.6	-	-	-	6.2	-	-	-	17.3	-	-	-
IRON	MG/KG	7400	-	-	-	-	8700	-	-	-	8790	-	-	-	7180	-	-	-
MERCURY	MG/KG	0.05	b	-	-	-	0.03	U	-	-	0.03	U	-	-	0.05	b	-	-
POTASSIUM	MG/KG	1780	-	-	-	-	2360	-	-	-	2480	-	-	-	1800	-	-	-
MAGNESIUM	MG/KG	2710	-	-	-	-	3290	-	-	-	3820	-	-	-	2620	-	-	-
MANGANESE	MG/KG	146	-	-	-	-	161	-	-	-	166	-	-	-	152	-	-	-
SODIUM	MG/KG	203	b	-	-	-	210	b	-	-	182	b	-	-	256	b	-	-
NICKEL	MG/KG	7.7	b	-	-	-	5.6	b	-	-	7.2	b	-	-	6.4	b	-	-
LEAD	MG/KG	6.4	-	-	-	-	8.4	-	-	-	3.5	-	-	-	38.5	-	-	-
SELENIUM	MG/KG	0.1	U	-	-	-	0.1	U	-	-	0.1	U	-	-	0.1	U	-	-
THALLIUM	MG/KG	0.22	J	-	-	-	0.14	J	-	-	0.14	J	-	-	0.14	UJ	-	-
VANADIUM	MG/KG	17.5	-	-	-	-	19.7	-	-	-	23.3	-	-	-	17.5	-	-	-
ZINC	MG/KG	32.4	-	-	-	-	41.9	-	-	-	33.5	-	-	-	98	-	-	-
VOLATILE ORGANIC COMPOUNDS																		
TOLUENE	UG/KG	10	U	-	-	-	4	J	-	-	4	J	-	-	10	U	-	-
PESTICIDES AND PCBs																		
4,4'-DDT	UG/KG	3.34	U	-	-	-	3.52	-	-	-	3.34	U	-	-	239	-	-	-
METHOXYCHLOR	UG/KG	17.2	U	-	-	-	122	-	-	-	17.2	U	-	-	506	U	-	-
HERBICIDES																		
2,4,5-TP (SILVEX)	UG/KG	-	-	-	-	-	25.4	UJ	-	-	25.4	UJ	-	-	25.1	UJ	-	-
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																		
TFH GASOLINE	MG/KG	-	-	-	0.054	U	-	-	-	0.052	U	-	-	0.083	-	-	0.051	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																		
TRPH	MG/KG	20	U	-	-	-	20	U	-	-	20	U	-	-	677	-	-	-

Table B5-2

Site 5 (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	06_UGS 81484040 (0)	DVF(a)	05_UGS 81484402 (0)	DVF(a)														
METALS																			
SILVER	MG/KG	0.43	U	0.43	U														
ALUMINIUM	MG/KG	4990		6580															
ARSENIC	MG/KG	1.5	b	1.9	b														
BARIUM	MG/KG	61.3		67.3															
BERYLLIUM	MG/KG	0.28	U	0.27	U														
CALCIUM	MG/KG	2920		3080															
CADMIUM	MG/KG	0.96	b	0.99	b														
COBALT	MG/KG	2.4	b	1.8	b														
CHROMIUM	MG/KG	5.8		7															
COPPER	MG/KG	6.7		5.8															
IRON	MG/KG	7350		8550															
MERCURY	MG/KG	0.03	U	0.03	U														
POTASSIUM	MG/KG	1950		2110															
MAGNESIUM	MG/KG	2460		2750															
MANGANESE	MG/KG	138		148															
SODIUM	MG/KG	252	b	304	b														
NICKEL	MG/KG	6.4	U	6.1	U														
LEAD	MG/KG	2.7		2.6															
SELENIUM	MG/KG	0.1	U	0.1	b														
THALLIUM	MG/KG	0.14	b	0.15	b														
VANADIUM	MG/KG	18.2		21															
ZINC	MG/KG	27		29.3															
VOLATILE ORGANIC COMPOUNDS																			
TOLUENE	UG/KG	-		-															
PESTICIDES AND PCBs																			
4,4'-DDT	UG/KG	-		-															
METHOXYCHLOR	UG/KG	-		-															
HERBICIDES																			
2,4,5-TP (SILVEX)	UG/KG	25.3		55.6															
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																			
TFH GASOLINE	MG/KG	0.051	U	0.051	U														
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																			
TRPH	MG/KG	28		23															

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

Table B5-3

Site 5 (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	05_DBMW41 S1456072 (5)	DVF(a)	05_DBMW41 S1456073 (10)	DVF(a)	05_DBMW41 S1456074 (15)	DVF(a)	05_DBMW41 S1456081 (20)	DVF(a)	05_DBMW41 S1456075 (25)	DVF(a)	05_DBMW41 S1456077 (65)	DVF(a)	05_DBMW41 S1456065 (85)	DVF(a)	05_DBMW41 S1456076 (145)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		100	J	-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
IRON	MG/KG	12300		14300		9570		9240		2730		5280		-		-	3530
MAGNESIUM	MG/KG	4500		6500		4870		4000		1040	b	1280		-		-	1500
ALUMINIUM	MG/KG	10000		11200		7740		6510		1520		2880		-		-	2400
BARIUM	MG/KG	101		116		71.4		77.6		22.5	b	35.1	b	-		-	37.1
NICKEL	MG/KG	9.9		6.7	b	4.3	b	3.6	b	1.7	U	4.8	b	-		-	2.1
CALCIUM	MG/KG	5200		15400		7030		6110		2090		2130		-		-	4010
BERYLLIUM	MG/KG	0.15	J	0.28	J	0.22	J	0.16	J	0.11	UJ	0.11	UJ	-		-	0.1
ARSENIC	MG/KG	1.8	b	2.6		3.4		1.6	b	0.86	b	1.6	b	-		-	1.6
CADMIUM	MG/KG	1.5		1.3		0.75	J	0.88	J	0.26	UJ	1	J	-		-	0.25
MERCURY	MG/KG	0.03	U	0.03	U	0.03	b	0.03	U	0.03	U	0.06	U	-		-	0.03
ZINC	MG/KG	40.8		42.4		30		28.6		8.4		14.5		-		-	11.7
VANADIUM	MG/KG	26.4		36.5		25.8		22.8		6.5	b	14.4		-		-	6.9
SODIUM	MG/KG	208	b	250	b	207	b	210	b	184	b	304	b	-		-	305
CHROMIUM	MG/KG	10.9		10.6		7.2		7.5		2.2		4.3		-		-	3
LEAD	MG/KG	3.3		1.6		2.2		1.3		0.46	b	0.82		-		-	1.1
MANGANESE	MG/KG	216		227		177		182		45.4		91.4		-		-	78.6
COBALT	MG/KG	4.2	b	5	b	3.3	b	3.8	b	1.3	U	1.4	b	-		-	1.2
THALLIUM	MG/KG	0.17	b	0.16	b	0.15	U	0.15	U	0.15	U	0.15	U	-		-	0.15
SELENIUM	MG/KG	0.12	U	0.12	U	0.11	U	0.11	U	0.11	U	0.11	U	-		-	0.1
COPPER	MG/KG	10.4		7		5.2	b	4.8	b	2.3	b	3.5	b	-		-	2.2
POTASSIUM	MG/KG	3340		3690		2320		2390		572	b	1120		-		-	952
VOLATILE ORGANIC COMPOUNDS																	
ACETONE	UG/KG	12	U	12	U	12	U	10	U	12	U	11	U	12	U	13	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	790	U	770	U	810	U	680	U	770	U	730	U	-		-	860
PESTICIDES AND PCBs																	
4,4'-DDT	UG/KG	7.24		7.16	N	4.03	U	3.37	U	3.87	U	3.8	U	-		-	4.26
HERBICIDES																	
MCPP	UG/KG	29400	U	261000		30500	U	211000		111000		27100	U	-		-	32700
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	15	U	14.4	U	15.2	U	12.7	U	14.5	U	13.6	U	-		-	16.2
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	N	20	U	20	U	-		-	20

Table B5-3

Site 5 (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	05_DGMW67 S1456066 (126)	DVF(a)	06_DGMW67 S1456078 (185)	DVF(a)	06_DGMW67 S1457099 (185)	DVF(a)	06_DGMW67 S1456069 (216)	DVF(a)	06_DGMW68 S1456067 (40)	DVF(a)	05_DGMW68 S1456079 (182)	DVF(a)	05_DGMW68 S1457097 (182)	DVF(a)	05_DGMW68 S1456070 (203)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		100	U	-		-		-		-	
METALS																	
IRON	MG/KG	-		9900		9870		-		-		2260		4160		-	
MAGNESIUM	MG/KG	-		2960		2920		-		-		758	b	1420		-	
ALUMINIUM	MG/KG	-		7960		7790		-		-		2090		4030		-	
BARIUM	MG/KG	-		61.5		62.8		-		-		16	b	29.6	b	-	
NICKEL	MG/KG	-		8.8	b	8.8	b	-		-		1.9	U	8.3		-	
CALCIUM	MG/KG	-		2840		2870		-		-		1180		1890		-	
BERYLLIUM	MG/KG	-		0.46	U	0.46	U	-		-		0.27	U	0.28	U	-	
ARSENIC	MG/KG	-		1.8	b	1.3	b	-		-		0.87	b	1.4	b	-	
CADMIUM	MG/KG	-		0.69	U	0.86	U	-		-		0.33	b	0.27	U	-	
MERCURY	MG/KG	-		0.03	U	0.03	U	-		-		0.03	U	0.03	U	-	
ZINC	MG/KG	-		26.6		25.6		-		-		7.1		10.8		-	
VANADIUM	MG/KG	-		19.3		20.5		-		-		7	b	12.1		-	
SODIUM	MG/KG	-		264	b	336	b	-		-		215	b	294	b	-	
CHROMIUM	MG/KG	-		10		10.4		-		-		3.3		7.6		-	
LEAD	MG/KG	-		2.1		1.6		-		-		1.7		2		-	
MANGANESE	MG/KG	-		80.2		51.3		-		-		18.2		33.2		-	
COBALT	MG/KG	-		5.1	b	2.7	b	-		-		1.4	b	3.3	b	-	
THALLIUM	MG/KG	-		0.16	U	0.16	U	-		-		0.15	U	0.16	U	-	
SELENIUM	MG/KG	-		0.12	U	0.16	b	-		-		0.13	U	0.11	U	-	
COPPER	MG/KG	-		6.5		6.2		-		-		2	b	3.7	b	-	
POTASSIUM	MG/KG	-		2180		2110		-		-		578	b	949	b	-	
VOLATILE ORGANIC COMPOUNDS																	
ACETONE	UG/KG	10	U	27	U	22	U	-		18	U	10	J	8	J	7	J
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	670	U	750	U	750	U	-		730	U	710	U	660	U	-	
PESTICIDES AND PCBs																	
4,4'-DDT	UG/KG	-		3.78	UJ	3.77	UJ	-		-		3.54	U	3.39	U	-	
HERBICIDES																	
MCPP	UG/KG	-		-		-		-		-		-		-		-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	-		21.8		17.8		-		-		13.4	U	12.7	U	-	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	-		76		20	U	-		-		20	UJ	20	UJ	-	

Table B5-3

Site 5 (OU- 2): Summary of Detected Chemicals in the Vadose Zone (Subsurface) Samples

MCA5 El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	05 UGMW27 S1456071 (114) DVF(a)	05 UGMW27 S1456080 (175) DVF(a)	05 UGMW27 S1456088 (198) DVF(a)														
GENERAL CHEMISTRY																		
TOTAL ORGANIC CARBON	MG/KG	-	-	100	U													
TOTAL ORGANIC CARBON	MG/KGW	-	-	-														
METALS																		
IRON	MG/KG	-	8880	-														
MAGNESIUM	MG/KG	-	2540	-														
ALUMINIUM	MG/KG	-	8540	-														
BARIUM	MG/KG	-	53.3	-														
NICKEL	MG/KG	-	5.7	b														
CALCIUM	MG/KG	-	2570	-														
BERYLLIUM	MG/KG	-	0.19	U														
ARSENIC	MG/KG	-	1.3	b														
CADMIUM	MG/KG	-	0.46	b														
MERCURY	MG/KG	-	0.03	UJ														
ZINC	MG/KG	-	19.4	-														
VANADIUM	MG/KG	-	17.6	-														
SODIUM	MG/KG	-	307	b														
CHROMIUM	MG/KG	-	8.6	-														
LEAD	MG/KG	-	2.9	-														
MANGANESE	MG/KG	-	47.2	-														
COBALT	MG/KG	-	2.1	b														
THALLIUM	MG/KG	-	0.19	U														
SELENIUM	MG/KG	-	0.09	U														
COPPER	MG/KG	-	4.1	b														
POTASSIUM	MG/KG	-	1970	-														
VOLATILE ORGANIC COMPOUNDS																		
ACETONE	UG/KG	11	U	12	U	12	U											
SEMI-VOLATILE ORGANIC COMPOUNDS																		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	430	J	760	U	-												
PESTICIDES AND PCBs																		
4,4'-DDT	UG/KG	-		3.83	U	-												
HERBICIDES																		
MCPP	UG/KG	-		-		-												
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																		
TFH DIESEL	MG/KG	-		14.4	U	-												
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																		
TRPH	MG/KG	-		20	U	-												

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

**Table B5-4
Site 5 (OU-2): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 1 of 1

Item	Station Identification			
	5_UGMW27	5_DBMW41	5_DGMW67	5_DGMW68
Survey Location--Northing	548710	548409	548224	548224
Survey Location--Easting	1556748	1556162	1556284	1555843
Ground Surface Elevation (ft above MSL ^a)	437	424	428	417
Measuring Point Elevation (ft above MSL ^a)	438	425	429	417
Measuring Point Location	PVC sounding tube	PVC sounding tube	PVC sounding tube	PVC sounding tube
Type of Surface Completion	Above ground	Above ground	Above ground	Above ground
Casing Diameter and Material	5" sch. 80 PVC	4" sch. 40 PVC	5" sch. 80 PVC	4" sch. 40 PVC
Screen Diameter and Material	5" sch. 40 0.02"-slot SS	4" sch. 40 0.02"-slot SS	5" sch. 40 0.02"-slot SS	4" sch. 40 0.02"-slot SS
Screen Interval (ft bgs ^b)	198-238	182-222	177-227	190-210
Length of Drop Pipe (ft bgs ^b)	231	221	220	208
Make and Model of Installed Pump	Grundfos Rediflow 10E 4"-dia. subm.	Grundfos Rediflow 2 2"-dia. subm.	Grundfos Rediflow 10E 4"-dia. subm.	Grundfos Rediflow 2 2"-dia. subm.
Date of Pumping Test	Not tested	Not tested	30 Nov 92	Slug tested 5 Nov 92
Date of Water Quality Sampling	3 Dec 92	16 Nov 92	30 Nov 92	17 Dec 92
^a Mean sea level ^b Below ground surface				

**Table B5-5
Site 5 (OU-2): Summary of Hydraulic Parameters
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 1 of 1

Well Identification	Type of Test	Analysis Method	Transmissivity (ft²/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient^a	Leakance Factor^a
05_DGMW67	Pumping	Theis (1935); Recovery data	1670	44.1	NA	NA
04_DGMW68	Slug	Bouwer and Rice (1976); Bouwer (1989)	68	3.4	NA	NA

^aNA = Not applicable.

Source: Table F-2 (Appendix F)

Table B5-6
Site 5 (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	05_DBMW41 S1452036 (182-222)	DVF(a)	05_DBMW41 S1452386 (182-222)	DVF(a)	05_DGMW67 S1452035 (187-227)	DVF(a)	05_DGMW67 S1452393 (187-227)	DVF(a)	05_DGMW68 S1453032 (190-210)	DVF(a)	05_UGMW27 S1452039 (198-238)	DVF(a)
GENERAL CHEMISTRY															
ALKALINITY AS CaCO3	NA	NA	MG/L	228		233		296		296		250		266	
CARBONATE	NA	NA	MG/L	-		-		-		-		-		-	
BICARBONATE	NA	NA	MG/L	279		284		358		360		305		325	
CHLORIDE	3	250	MG/L	85.2		86.2		97.3		96.8		101		84.5	
SULFATE	3	250	MG/L	193		194		284		284		270		253	
NITRATE/NITRITE-N	1	10	MG/L	8.61		8.94		6.89		6.79		8.14		8.09	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	790		758		925		934		905		844	
METALS															
SILVER	1	50	UG/L	2.1	U	2.1	U	2.1	U	2.1	U	2.5	b	2.1	U
ALUMINUM	3	50	UG/L	31	U	31	U	50.7	b	38.9	b	31	UJ	31	U
ARSENIC	2	50	UG/L	1.4	b	1.4	b	2.3	b	2.6	b	1.6	b	4	b
BARIUM	2	2000	UG/L	22.6	b	22.5	b	69.6	b	88.5	b	29.2	b	45.2	b
CALCIUM	NA	NA	UG/L	99200		98900		131000		128000		116000		121000	
COPPER	2	1300	UG/L	0.9	U	0.9	U	0.9	U	0.9	U	1.2	b	1.2	J
IRON	3	300	UG/L	14.1	U	17.8	U	2.3	U	2.3	U	17.7	b	6.4	U
MERCURY	2	2	UG/L	0.1	U	0.1	U	0.18	b	0.21	b	0.1	U	0.1	U
POTASSIUM	NA	NA	UG/L	2830	b	2850	b	2090	b	1960	b	3350	b	1830	b
MAGNESIUM	NA	NA	UG/L	29100		28900		36700		36100		33700		33000	
MANGANESE	3	50	UG/L	6.5	b	6.5	b	2.3	b	1.5	b	20.6		2.3	b
SODIUM	NA	NA	UG/L	99100		96900		128000		127000		122000		108000	
NICKEL	NA	NA	UG/L	16	b	13.3	b	7.7	U	7.7	U	29.2	J	7.7	U
ANTIMONY	NA	NA	UG/L	12.1	U	12.1	U	12.1	UJ	12.1	UJ	20.6	b	12.1	U
SELENIUM	1	10	UG/L	8.4	b	8.2	b	6.3	b	6.4	b	8.5	U	9.8	b
VANADIUM	NA	NA	UG/L	10.5	b	12.2	b	14	b	13.2	b	13.6	b	13.1	b
VOLATILE ORGANIC COMPOUNDS															
TETRACHLOROETHENE	2	5	UG/L	0.8	J	0.8	J	1	U	1	U	1	U	0.9	J
BENZENE	1	1	UG/L	1	U	1	U	1	U	0.3	J	1	U	1	U
CHLOROMETHANE (METHYL CHLORID)	NA	NA	UG/L	2	J	2	U	0.7	J	0.5	J	2	U	2	U
METHYLENE CHLORIDE	4	40	UG/L	1	U	1	U	1	U	1	U	0.5	J	1	U
TRICHLOROETHYLENE	2	5	UG/L	1	U	1	U	1	U	1	U	1	U	0.6	J
HERBICIDES															
2,4,5-T	NA	NA	UG/L	0.25	U	0.25	U	0.685		0.25	U	0.25	U	-	
GROSS ALPHA AND BETA															
GROSS ALPHA	2	15	PCIL	9		9.4		24.9		15		7		-	
GROSS BETA	2	50	PCIL	6.3		5.9		53		7.7		13.6		-	

(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 B5-7
Site 5 (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	Concentration	Regulatory Level ^c	Regulatory Code ^d
05_DGMW67	(187-227)	Sulfate	mg/L	284	250	3
		Total Dissolved Solids	mg/L	934	500	3
		Gross Alpha	PCI/L	24.9	15	1
		Aluminum	µg/L	50.7	50	3
		Gross Beta	PCI/L	53	50	1
05_UGMW27	(198-238)	Sulfate	mg/L	253	250	3
		Total Dissolved Solids	mg/L	844	500	3
05_DBMW41	(182-222)	Total Dissolved Solids	mg/L	790	500	3
05_DGMW68	(190-210)	Sulfate	mg/L	270	250	3
		Total Dissolved Solids	mg/L	905	500	3

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 B6

**Nature and Extent of Contamination:
Site 6 (OU-3) — Drop Tank Drainage Area No. 1**

Appendix B6

NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION:

SITE 6 (OU-3) - DROP TANK DRAINAGE AREA NO. 1

This discussion of Site 6 is supplemented by the figures and data tables listed below. The figures begin on page B6-3, and the tables are grouped at the end of this Appendix B6. Field headspace values for soils at this site are presented in Table BA1-6, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B6-1: (Site Map)

Figure B6-2: Geologic Cross Section

Table B6-1: Types of Samples and Chemical Analyses

Table B6-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

Table B6-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples

Table B6-4: Well Construction Details

Table B6-5: Summary of Hydraulic Parameters

Table B6-6: Summary of Detected Chemicals in Groundwater Samples

Table B6-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B6.1 Site Description

Site 6, Drop Tank Drainage Area No. 1, consists of a concrete apron bordered by a grassy area located southwest of Building 727 in the southern quadrant of the Station as shown in Figure B6-1. From 1969 to 1983, aircraft drop tanks were routinely transported to this area where their remaining fuel would be drained. Residual JP-5 fuel in the tanks was washed out onto the concrete apron. The fuel and wash/rinse water drained off the west side of the concrete apron onto the adjacent grassy area. Surface runoff from the site generally flows through a small swale (located west of the tank drainage area) into a ditch that connects to a catch basin. The catch basin discharges into the Agua Chion Wash.

Historic aerial photographs show that drums were once stored in several areas at the site. These drums probably contained waste lubricant oils.

The site is subdivided into three strata. Stratum 1 includes the soil surrounding the concrete apron where tanks were drained; Stratum 2 includes the drainage ditch from the swale to the catch basin. Stratum 3 includes the former drum storage areas identified from aerial photographs.

B6.2 Suspected Waste Types and Contaminants

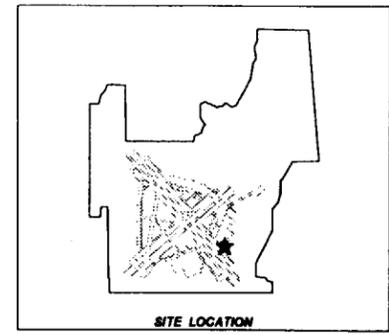
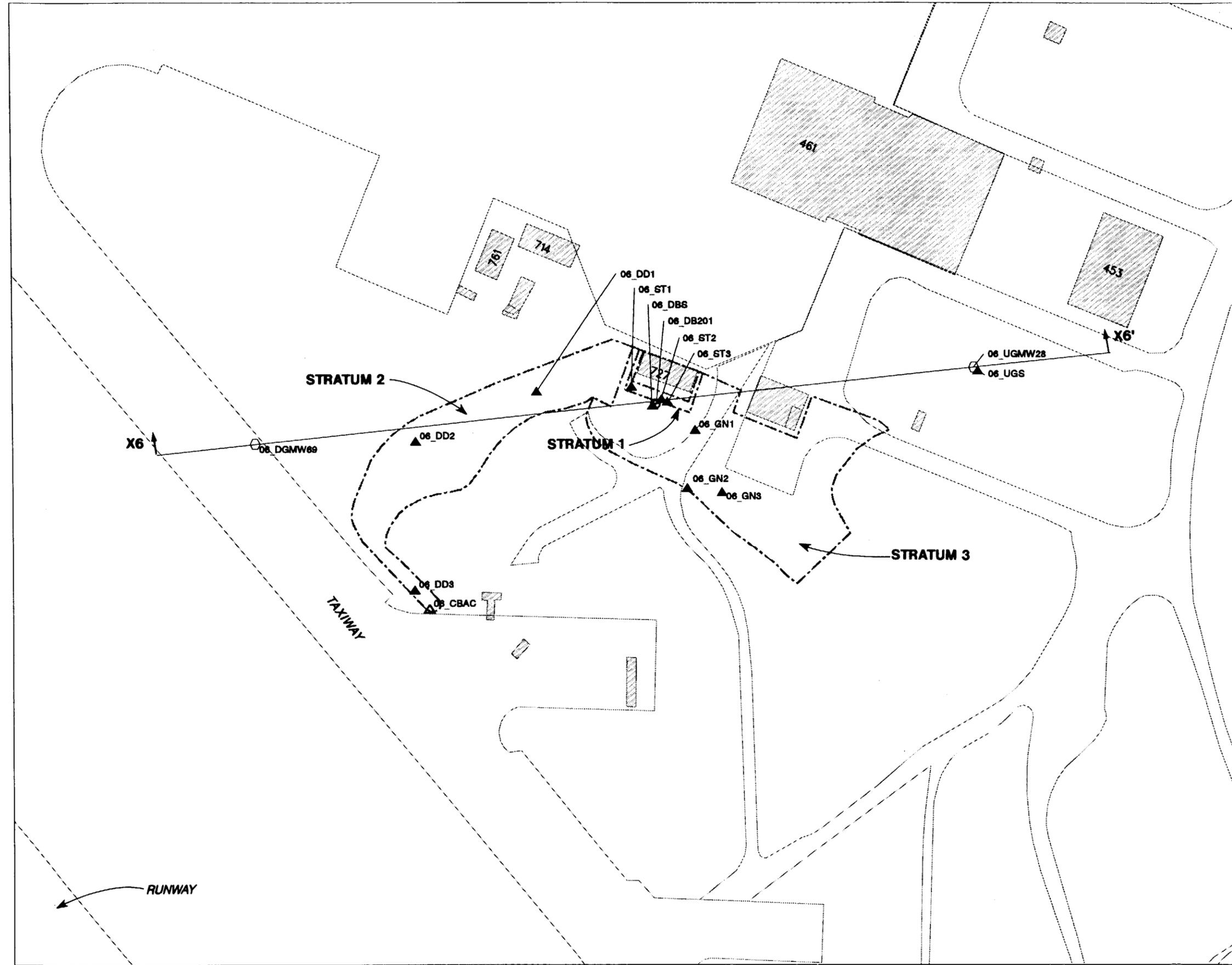
A review of available documents indicates the following potential contaminant releases:

- Between 1969 and 1983, an estimated 1,400 gallons of JP-5 fuel reportedly drained onto the grassy area surrounding the concrete apron (Stratum 1).
- Waste lubricant oils stored in drums reportedly spilled and leaked at the site.

B6.3 Field Investigation

The field investigation at Site 6 consisted of drilling and sampling one upgradient monitoring well, one deep boring, one downgradient well, and nine shallow borings, as shown in Figure B6-1. Three shallow borings were drilled at each stratum. The locations of each shallow boring was selected on the basis of the statistical method described in the *SAP*. Additional shallow samples were taken at the upgradient and deep boring locations. The shallow borings comprise samples collected from the ground surface, and 2 and 4 feet below ground surface (bgs). The deep boring was drilled in the grassy area adjacent to the concrete apron where spills reportedly occurred. The upgradient well was installed east of the site and the downgradient well was installed west of the site.

Changes were made from the *SAP* and documented by the *SAP Amendment*. The site boundaries were extended to include the drum storage area observed in the aerial photographs. Further, the upgradient well was relocated northeast of the drum storage area. The downgradient well was relocated away from the drainage area.



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

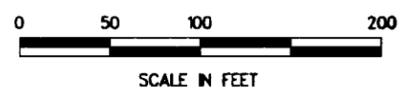
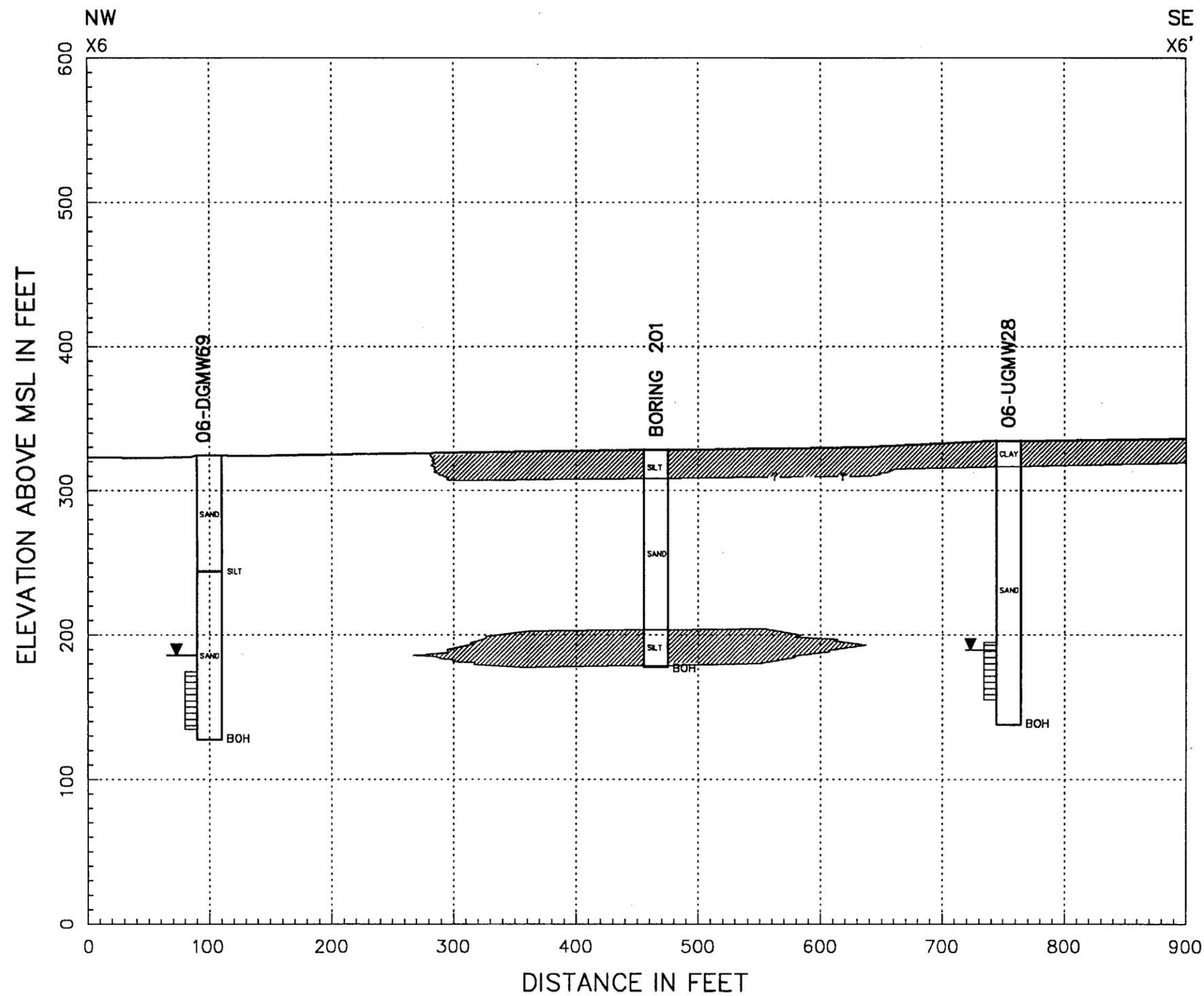


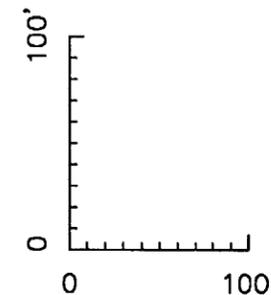
FIGURE B6-1
SITE 6 (OU-3): DROP TANK DRAINAGE AREA NO.1
MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

PAGE NUMBER B6-4

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



LEGEND

-  UNCONSOLIDATED PERMEABLE SEDIMENTS
-  UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS
-  BOTTOM OF HOLE
-  WELL SCREEN INTERVAL
-  WATER LEVEL ELEVATION, DECEMBER 1992

FIGURE B6-2
 SITE 6 (OU-3)
 GEOLOGIC CROSS SECTION X6-X6'
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

PAGE NUMBER B6-6

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The following sections summarize the number of samples collected and the analyses performed on the samples. A summary of the chemical analyses is presented in Table B6-1.

B6.3.1 **Surface Water and Sediment**

One sediment sample, designated 06_CBAC, was collected from the catch basin located along the runway, west of the site. The sediment sample was collected to evaluate possible contaminant transport to the basin from the drum drainage area via runoff. Contaminated runoff discharged to the catch basin may percolate into underlying soils, therefore providing a potential contaminant pathway to groundwater. The sediment sample was analyzed for VOCs, SVOCs, TRPH, TFH, and metals.

B6.3.2 **Surface and Near-Surface Soils**

A total of 25 surface and near-surface samples were collected from 11 locations. Three surface and near-surface soil sample locations are near the concrete apron (Stratum 1); three sample locations are in the drainage ditch between the concrete apron to the catch basin (Stratum 2); and three sample locations are located in the former drum storage areas (Stratum 3). Surface and near-surface soil samples were also collected at the deep boring and at upgradient Well 06_UGMW28.

B6.3.3 **Vadose Zone Soils (Soil Borings)**

One deep boring, located southwest of the drainage apron, was drilled to a total depth of 140 feet bgs. Samples were collected at 5-foot intervals to a depth of 25 feet. Below 25 feet, samples were collected at 10-foot intervals to the water table (140 feet). A total of 10 samples were selected from the deep boring analysis.

Vadose zone soil samples were collected while drilling the boreholes completed as wells. Drive samples were collected at 10-foot intervals to a depth of 60 feet, then at 20-foot intervals to the water table. Five of the soil samples collected from the boreholes analyzed. Two samples were selected from the upgradient well borehole and three samples were selected from the downgradient well borehole.

B6.3.4 Groundwater Monitoring Wells

Two monitoring wells were installed to assess groundwater quality in the vicinity of Site 6. Upgradient Well 06_UGMW28 is located northeast of the site. The well location was selected to be upgradient of potential sources of site contamination. Downgradient Well 06_DGMW69 is located northwest of Site 6. Well completion data are presented in Table B6-4.

One groundwater sample was collected from each well for chemical analyses.

B6.4 Surface Water and Sediments

B6.4.1 Description of Surface Water and Sediment Samples

One sediment sample, 06_CBAC, was collected at Site 6. The sample was taken at the end of the catch basin located along the runway on the west area of the site. Sample analyses included VOCs, SVOCs, pesticides/PCBs, TRPH, TFH, and metals. Surface water samples were not collected at Site 6.

B6.4.2 Analytical Results

The analytical results for chemicals detected in the sediment sample are provided in Table B6-2.

Petroleum hydrocarbons detected in sediment include TFH-gasoline (315 mg/kg), which is above the California LUFT action level, and TFH-diesel

(16.6 mg/kg) and TRPH (24 mg/kg), which are below the California LUFT action levels.

One VOC was detected above the CRDL: methylene chloride was detected at a concentration of 31 $\mu\text{g}/\text{kg}$. Methylene chloride was also detected in the trip blank associated with this sample. Toluene was detected below the CRDL (4 $\mu\text{g}/\text{kg}$, estimated).

Semivolatiles detected in the sediment are below the CRDL. Bis(2-ethylhexyl)phthalate was detected below the CRDL (550 $\mu\text{g}/\text{kg}$, estimated).

Metals concentrations are shown in Table B6-2.

B6.5 Surface and Near-Surface Soils

B6.5.1 Description of Surface and Near-Surface Soil Samples

Figure 1-5 illustrates soil types for the MCAS and vicinity. The surface soils at Site 6 are mapped as Sorrento loam, which are typical of an alluvial fan deposit. Slopes generally range from 0 to 2 percent. Permeability ranges from 0.6 to 2.0 inches per hour and the moisture holding capacity ranges from 0.16 to 0.21 inch of water per inches of soil (Wachtell, 1978). Sorrento loam at Site 6 is classified as Hydrologic Group B, which indicates that the soils maintain a moderate infiltration rate when wet.

Surface and near-surface soils (2-foot intervals from 0 to 4 feet below ground surface) were sampled by stratum. In addition, two upgradient surface samples were collected.

B6.5.2 Analytical Results and Soil Vapor Headspace Values

Analytical results are presented in Table B6-2. Soil samples collected at surface locations and within borings were field screened for organic vapors using a

photo-ionization detector (HNU) or a flame ionization detector (OVA). Organic vapor results are presented in Attachment 1 to Appendix B. Headspace readings were below 1.0 ppm for Stratum 1 and 2 and less than or equal to 1.0 ppm in Stratum 3.

B6.5.2.1 Upgradient Area

Soil samples were collected at the surface and at 2 feet at one location upgradient of Site 6, 06_UGS. The two soil samples were analyzed for TRPH, TFH, and metals.

The TRPH concentration detected in the surface sample, 1,041 mg/kg, exceeds the California LUFT action level. TFH-diesel was detected at low concentrations in the upgradient samples (0.005 to 37.7 mg/kg), and TFH-gasoline was detected below the CRDL. Metals concentrations are summarized in Table B6-2.

B6.5.2.2 Analytical Results: Stratum 1

Stratum 1 at Site 6 consists of the soil around the edge of the concrete apron where drop tank residual fuel drained. Seven soil samples, including one duplicate, were collected from three locations in Stratum 1 (06_ST1, 06_ST2, and 06_ST3). All samples were analyzed for VOCs, SVOCs, TRPH, TFH, and metals.

TRPH was detected in the surface soil samples collected at 06_ST3 and 06_ST2. The TRPH concentration at 06_ST3 is 1,297 mg/kg, which exceeds the California LUFT action level. The TRPH concentration at 06_ST2 is low (74 mg/kg). TFH-gasoline and TFH-diesel were detected at concentrations below action levels (<100 mg/kg) at 06_ST3. TFH was detected below CRDLs in the remaining samples.

Volatile organic compounds were found in low concentrations in the surface samples at the three sampling locations. The surface sample at 06_ST3 has acetone (16 µg/kg), carbon tetrachloride (4 µg/kg, estimated), and toluene

(7 µg/kg, estimated). The surface sample at 06_ST1 has carbon tetrachloride (4 µg/kg, estimated) and toluene (5 µg/kg, estimated). The surface sample at 06_ST2 has acetone (10 µg/kg, estimated). Acetone is a demonstrated laboratory contaminant; the maximum detected concentration of acetone in the trip blanks was 37 µg/L.

Semivolatile organics were detected in two of the three surface samples. The surface sample at 06_ST3 has bis(2-ethylhexyl)phthalate (1,100 µg/kg) and butyl benzyl phthalate (300 µg/kg, estimated). Bis(2-ethylhexyl)phthalate is also present in the surface sample at 06_ST1 (220 µg/kg, estimated).

Detected metals concentrations in Stratum 1 soil samples are presented in Table B6-2.

Concentrations of TRPH exceed 1,000 mg/kg (California LUFT criteria) in the surface soil sample at 06_ST3. Soil contamination by TRPH appears to be limited to surface soils in the vicinity of Stratum 1.

B6.5.3.3 Stratum 2

Stratum 2 at Site 6 consists of the drainage ditch area leading from the concrete apron to the catch basin. Eight samples, including one duplicate, were collected at four locations in Stratum 2 (06_DD1, 06_DD2, 06_DD3, 06_DBS), as shown in Figure 6. All samples were analyzed for VOCs, SVOCs, TRPH, TFH, and metals.

TRPH was detected in surface samples at 06_DD1 (458 mg/kg), 06_DD2 (220 mg/kg), and 06_DBS (71 mg/kg). These values are below the California LUFT action level. TFH-diesel and TFH-gasoline were also detected at concentrations below LUFT action levels. TFH-diesel was present in 06_DBS (31.9 mg/kg), 06_DD1 at 0 feet (37.6 mg/kg), and 06_DD3 at 2 feet (18.7 mg/kg). TFH-gasoline detected at Stratum 2 was either less than the CRDL or less than 1 mg/kg.

VOCs detected at Stratum 2 are below CRDLs except acetone in the surface sample at 06_DD2 (49 $\mu\text{g}/\text{kg}$). However, acetone was detected in the trip blank associated with this sample. Toluene and carbon tetrachloride were detected below CRDLs in the surface soil samples.

Semivolatile organics were detected in three of the eight samples collected at Stratum 2. The surface sample at 06_DBS had benzyl butyl phthalate (440 $\mu\text{g}/\text{kg}$) and bis(2-ethylhexyl)phthalate (280 $\mu\text{g}/\text{kg}$). The surface sample at 06_DD1 had fluoranthene (160 $\mu\text{g}/\text{kg}$) and pyrene (150 $\mu\text{g}/\text{kg}$). The surface sample at 06_DD2 had bis(2-ethylhexyl)phthalate (230 $\mu\text{g}/\text{kg}$). The SVOC concentrations are estimated below the CRDL.

Metals concentrations are presented in Table B6-2.

In summary, soil samples collected at Stratum 2 do not appear to indicate the presence of contamination by compounds tested in the laboratory. TRPH values are less than 1,000 mg/kg, TFH values are less than 100 mg/kg, and VOCs and SVOCs are less than CRDLs.

B6.5.3.4 Stratum 3

Stratum 3 consists of the former drum storage areas at Site 6. Eight samples, including one duplicate sample, were collected at three locations: 06_GN1, 06_GN2, and 06_GN3. All samples were analyzed for VOCs, SVOCs, TRPH, TFH, and metals.

TRPH was detected in the surface and 2-foot samples at 06_GN1 (124 and 84 mg/kg, respectively) and 06_GN3 (52 and 59 mg/kg, respectively). These concentrations are below LUFT action levels. TRPH at 06_GN1 and 06_GN3 are less than the CRDL.

TFH-diesel was detected in the surface sample at 06_GN3 (239 mg/kg) at a concentration exceeding the California LUFT action level. The 2-foot sample was

below the CRDL for TFH-diesel. TFH-diesel was detected at low levels in the surface and 2-foot samples at 06_GN1 (18.4 and 42.1 [duplicate 23.9] mg/kg, respectively), and in the 2-foot sample at 06_GN2 (15.1 mg/kg). TFH-gasoline was detected below 1 mg/kg in the Stratum 3 samples.

VOCs and SVOCs were detected below CRDLs in the Stratum 3 soil samples. Metals results are summarized in Table 6-2.

Soil contamination appears to occur at Stratum 3 surface in the vicinity of 06_GN3.

B6.6 Vadose Zone Soils

B6.6.1 Description of Subsurface Soil Samples

Vadose zone soil samples were collected while drilling one deep boring (06_DB201), one upgradient monitoring well (06_UGMW28), and one downgradient monitoring well (06_DGMW69). The deep boring was drilled to a depth of 140 feet. A total of 10 soil samples were selected and analyzed for VOCs, SVOCs, TPH, TFH, and metals. This boring was not completed as a well.

Two vadose zone samples were collected for chemical analysis from the borehole constructed as an upgradient monitoring well (128 and 148 feet) and three samples, including one duplicate sample, were collected from the downgradient monitoring well (120 feet [two samples] and 155 feet). The chemical analyses conducted on the soil samples from these boreholes are listed in Table B6-1.

B6.6.2 Subsurface Geology

Site 6 overlies approximately 300 feet of unconsolidated Quaternary alluvial deposits, which in turn overly semiconsolidated bedrock of the Irvine Area

Groundwater Basin, Figure 3-3. Detailed regional geology is presented in Figure 1-6.

Based on boring logs from the site (Appendix K), the subsurface lithology comprises predominantly silty sand to well-graded sand. Two interbedded 15-foot-thick semiimpermeable silt/clay beds were encountered during drilling. One of these low-permeability layers occurs in the upper 10 to 15 feet of both 06_UGMW28 and 06_DB201. The second low-permeability bed was identified at the bottom of 06_DB210 at a depth of 130 feet bgs. Figure B6-2, Geologic Cross Section, presents a generalized northwest to southeast cross section through Site 6.

B6.6.3 Analytical Results

The analytical results for the vadose zone soil samples are provided in Table B6-3. The vadose zone does not appear to have significant contamination. Contaminant concentrations are either low or below the CRDL for all analytes.

Hydrocarbons. Petroleum hydrocarbons detected in soil samples from 06_UGMW69 and 06_DB201 are below the CRDLs. TFH-gasoline was detected at a very low concentration (0.058 mg/kg) in the 120-foot soil sample from 06_DGMW69.

Volatile Organic Compounds (VOCs). In the upgradient monitoring well, acetone was detected in samples at 120 feet (30 $\mu\text{g}/\text{kg}$, and [duplicate] 31 $\mu\text{g}/\text{kg}$). Acetone is a demonstrated laboratory contaminant, and was detected at a maximum concentration of 37 $\mu\text{g}/\text{L}$ in the trip blanks.

One VOC, 2-hexanone, was detected in 06_DB201 (5 feet) at a concentration of 13 $\mu\text{g}/\text{kg}$. All other VOCs were below the CRDLs or not detected. Soil samples from the downgradient well were not analyzed for VOCs.

Semivolatile Organic Compounds (SVOCs). Semivolatiles were not detected in the vadose zone soil samples. Soil samples from the downgradient well were not analyzed for SVOCs.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. Subsurface soil samples were not analyzed for pesticides, PCBs or herbicides.

Metals. Metals concentrations detected in subsurface soil samples are presented in Table B6-3.

B6.6.4 Soil Vapor Headspace Concentrations

The headspace readings for the samples collected from Site 6 deep boring and monitoring well boreholes are summarized in Attachment 1. Headspace readings on the subsurface soil samples do not correlate with the laboratory test results on the soil or groundwater.

B6.7 Groundwater

B6.7.1 Site-Specific Hydrogeology

The potentiometric surface, well construction, and stratigraphy for Site 6 are presented in Figure B6-2, based on information from Well 06_DGMW69, Boring 06_DB201, and Well 06_UGMW28.

The depth to groundwater at Site 6 is approximately 140 feet bgs. Table B6-4, Well Construction Details, summarizes well construction, pump installation, and water quality sampling data. The well construction diagrams (Appendix E) show the well construction; soil boring logs are in Appendix K.

Groundwater elevation measurements were collected during several events (Figure 3-4a, b, and c). Hydrographs generated from these data are presented in Appendix I.

The direction and magnitude of groundwater flow in the vicinity of Site 6 is approximately northwest as shown in Figures 3-4a, b, and c. The horizontal groundwater gradient calculated from these flow maps is approximately 0.009 ft/ft.

A slug test was performed on Monitoring Well 06_DGMW69. The hydraulic conductivity calculated from data recorded during the slug test is 1.1 ft/day. Leakage factors cannot be estimated from slug test results. Table B6-5 provides a summary of hydraulic parameters calculated for Site 6. The data collected and method of analyses are described in Appendix F.

Assuming the hydraulic conductivity is 1.1 ft/day, the horizontal hydraulic gradient is 0.009 ft/ft, and the effective porosity is 0.2, the average linear velocity of groundwater can be estimated to be 0.05 ft/day.

B6.7.2 Analytical Results

The analytical results for Site 6 groundwater samples are provided in Table B6-6.

General Chemistry. Field pH, electrical conductivity and temperature at 06_UGMW28 are 6.68, 2,450 $\mu\text{mhos/cm}$ and 24.2°C, respectively. Similarly, field pH, electrical conductivity and temperature at 06_DGMW69 are 6.93, 1,090 $\mu\text{mhos/cm}$ and 23.5°C, respectively. Electrical conductivity varies across the site, decreasing by half in the downgradient well. TDS ranges from 1,080.0 mg/L to 1,890.0 mg/L.

High concentrations of chloride, nitrate/nitrite (as N), and TDS occur in Wells 06_UGMW28 and 06_DGMW69. High sulfate occurs in Well 06_DGMW69. The major ion distribution is presented in Stiff and Piper diagrams (Appendix J). Both the Stiff and Piper diagrams reflect the relative major ion content of groundwater for each well in meq/l. Groundwater chemistry at Site 6 is characterized predominantly by calcium-chloride groundwater type. Stiff diagrams are displayed for both regional and local wells in Appendix J.

Hydrocarbons (TRPH, TFH). Hydrocarbons were not detected.

Volatile Organic Compounds (VOCs). 1,1,1-TCA was detected at 0.4 $\mu\text{g/L}$, estimated, in groundwater collected downgradient at 06_DGMW69. Methyl chloride was detected at 2 $\mu\text{g/L}$, estimated, in the groundwater collected downgradient at 06_DGMW28. Both of these VOCs are below the CRDLs.

Semivolatile Organic Compounds (SVOCs). One SVOC was detected in the groundwater in the upgradient monitoring well below the CRDL: benzyl butyl phthalate (3 $\mu\text{g/L}$). One SVOC was detected in the groundwater in the downgradient monitoring well and is above the California DTCS action level of 5 $\mu\text{g/L}$: phenol (14 $\mu\text{g/L}$).

Pesticides, Polychlorinated Biphenyls (PCBs), Herbicides. Pesticides and PCBs were not detected. Groundwater samples were not analyzed for herbicides.

Metals. Results of detected metals are presented in Table B6-6.

B6.7.3 Comparison with Drinking Water Standards

Analytical results are compared to the most stringent of 3 drinking water criteria: federal MCL, California MCL, and California DTCS action levels. Concentrations of analytes that exceed the regulatory levels are presented in Table B6-7.

B6.8 Potential Contaminant Migration Pathways

Surface water is a potential contaminant migration pathway due to the drainage culvert located within the site boundary. This drainage culvert leads to Agua Chinon Wash, which feeds San Diego Creek. Contaminants could migrate through sediments to the vadose zone and groundwater.

B6.9 Conclusions

At Stratum 1, the surface soil sample at 06_ST3 has elevated levels of TRPH (>1,000 mg/kg) and bis(2-ethylhexyl)phthalate (1,100 µg/kg). These constituents are not detected above CRDLs in the 2-foot sample at 06_ST3, indicating that the affected soil is limited to the surface. The other samples at Stratum 1 do not have significant contaminant levels.

At Stratum 2, the soils do not appear to have elevated levels of contamination. TRPH values are less than 1,000 mg/kg, TFH values are less than 100 mg/kg, and VOCs and SVOCs are less than CRDLs or are at low concentrations.

At Stratum 3, the surface soil sample at 06_GN3 has an elevated concentration of TFH-diesel (239 mg/kg). It appears the affected soil is limited to the surface at 06_GN3.

The vadose zone does not appear to have significant contaminant concentrations.

The groundwater at Site 6 does not appear to have significant contaminant concentrations. Elevated levels of metals (above the primary drinking water criteria) are detected in the upgradient monitoring well (selenium) and downgradient monitoring well (cadmium and selenium). Phenol was detected above drinking water criteria in the downgradient monitoring well; phenol was not detected above the CRDL in any of the surface, shallow, or vadose zone soil samples collected at Site 6.

Groundwater in the downgradient well appears to have notable levels of TDS, sulfate, nitrate-nitrite (as N), and chloride concentration, whereas groundwater in the upgradient well has higher metals concentrations: manganese, selenium, and other metals. However, it does not appear that the Station has had any impact on the general water quality of the regional groundwater.

Site 6 does not appear to be contributing to the regional groundwater VOC contamination (OU-1).

**Table B6-1
Site 6 (OU-3): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Location/ Stratum	Station Identifi- cation	Sample Identifi- cation	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
Surface Water and Sediments														
	06_CBAC	S1451028	0	X	X			X	X	X				X
Surface and Near-Surface Soils														
Upgradient	06_UGS	S1454447	0					X	X	X				
		S1454550	2					X	X	X				
Stratum 1	06_ST1	S1454057	0	X	X			X	X	X				
		S1454058	2	X	X			X	X	X				
	06_ST2	S1454001	0	X	X			X	X	X				
		S1454468 S1454002	2 ^b 2	X X	X X			X X	X X	X X				
06_ST3	S1454045	0	X	X			X	X	X					
	S1454005	2	X	X			X	X	X					
Stratum 2	06_DD1	S1454054	0	X	X			X	X	X				
		S1454055	2	X	X			X	X	X				
	06_DD2	S1454051	0	X	X			X	X	X				
		S1454052	2	X	X			X	X	X				
06_DD3	S1454048	0	X	X			X	X	X					
	S1454469 S1454049	2 ^b 2	X X	X X			X X	X X	X X					
06_DBS	S1454060	0	X	X			X	X	X					
Stratum 3	06_GN1	S1454047	0	X	X			X	X	X				
		S1454530	2	X	X			X	X	X				
		S1454082	2 ^b	X	X			X	X	X				
06_GN2	S1454163	0	X	X			X	X	X					
	S1454164	2	X	X			X	X	X					
	S1454165	4	X	X			X	X	X					
06_GN3	S1454166	0	X	X			X	X	X					
	S1454167	2	X	X			X	X	X					
Vadose Zone Soils														
	06_UGMW28	S1456088	128	X	X			X	X	X				
		S1456089	148	X	X						X		X	
	06_DB201	S1456091	5	X	X			X	X	X				
		S1456090	10	X	X			X	X	X				
		S1457021	10 ^b	X	X			X	X	X				
		S1456095	15	X	X			X	X	X				
		S1456085	20	X	X			X	X	X				
		S1456087	25	X	X			X	X	X				
		S1456086	40	X	X			X	X	X				
		S1457022	40 ^b	X	X			X	X	X				
		S1456092	50	X	X			X	X	X				
S1456084	140	X	X			X	X	X						

**Table B6-1
Site 6 (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	Gen. Chem- istry	TOC	Dioxins/ Furans	Gross Alpha/ Beta	
	06_DGMW69	S1457095 S1456083 S1456093	120 120 ^b 155	X X	X X			X X	X X	X X				X		
Groundwater																
	06_UGMW28	S1452045	140-180	X	X	X		X	X	X		X				
	06_DGMW69	S1452091	150-190	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 B6-2

Site 6 (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	06_CBAC S1484028 (0)	DVF(a)	06_DBS S1484080 (0)	DVF(a)	06_DD1 S1484054 (0)	DVF(a)	06_DD1 S1484055 (2)	DVF(a)	06_DD2 S1484051 (0)	DVF(a)	06_DD2 S1484052 (2)	DVF(a)	06_DD3 S1484048 (0)	DVF(a)	06_DD3 S1484049 (2)	DVF(a)
METALS																	
SILVER	MG/KG	0.45	b	0.36	U	0.31	U	0.36	U	0.43	U	0.41	U	0.37	U	0.34	U
ALUMINUM	MG/KG	6930		6870		8300		18100		10800		16400		10200		14500	
ARSENIC	MG/KG	3.2		2.6		2.2		4.2		2.4		3.8		3		3.7	
BARIIUM	MG/KG	202		104		1280		167		103		153		149		134	
BERYLLIUM	MG/KG	0.2	U	0.45	b	0.43	b	0.83	b	0.48	b	0.81	b	0.45	b	0.75	b
CALCIUM	MG/KG	14700		5070		3930		6620		4800		6950		6110		6960	
CADMIUM	MG/KG	1.8		2.3		11.8		1.7		5.5		1.4		2.3		1.4	
COBALT	MG/KG	2.8	b	5.6	b	6.3	b	8.9	b	5.5	b	8.2	b	5.7	b	7.6	b
CHROMIUM	MG/KG	10.1		15.4		40.7		17.3		16.6		16.1		14.7		15.2	
COPPER	MG/KG	8.3		8.5		26.5		11.2		19.6		10.4		11.6		9.8	
IRON	MG/KG	8400		12100		11000		20800		12800		18700		12600		16800	
MERCURY	MG/KG	0.5	U	0.05	U	0.05	U	0.06	b	0.05	U	0.05	U	0.16		0.05	U
POTASSIUM	MG/KG	2530		3530		3100		4440		3780		4470		4010		3690	
MAGNESIUM	MG/KG	2950		3970		3510		7680		4320		7510		4240		6640	
MANGANESE	MG/KG	154		201		178		341		193		344		228		273	
SODIUM	MG/KG	149	U	286	U	284	U	544	U	289	U	498	U	280	U	413	U
NICKEL	MG/KG	10.7		9.1		11.7		15.9		9.7		15.1		13.2		15.5	
LEAD	MG/KG	36.9		32.6		117		5.8		58.2		10.5		34.4		5.6	
ANTIMONY	MG/KG	2.5	U	2.6	U	3	U	3	U	2.8	U	2.9	U	2.7	U	2.8	U
SELENIUM	MG/KG	0.1	U	0.44	U	0.43	U	0.5	U	0.43	U	0.49	U	0.45	U	0.47	U
THALLIUM	MG/KG	0.14	U	0.33	U	0.33	U	0.38	U	0.33	U	0.39	b	0.34	U	0.36	U
VANADIUM	MG/KG	21		30.4		26.6		46.9		31.5		44.2		31.3		43.8	
ZINC	MG/KG	102		108		286		82.7		106		65.8		82.1		60.8	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	4	J	2	J	5	J	11	U	10	J	11	U	8	J	11	U
CARBON TETRACHLORIDE	UG/KG	10	U	7	J	6	J	11	U	3	J	11	U	11	U	11	U
ACETONE	UG/KG	27	U	18	U	23	U	41	U	49	B	36	U	11	U	11	U
METHYLENE CHLORIDE	UG/KG	31	B	18	U	14	U	11	U	14	U	11	U	12	U	14	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	550	J	280	J	670	U	750	U	230	J	750	U	710	U	740	U
PYRENE	UG/KG	1100	U	680	U	150	J	750	U	680	U	750	U	710	U	740	U
FLUORANTHENE	UG/KG	1100	U	680	U	160	J	750	U	680	U	750	U	710	U	740	U
BENZYL BUTYL PHTHALATE	UG/KG	1100	U	440	J	670	U	750	U	680	U	750	U	710	U	740	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	16.6		31.9		37.6		14.1	U	12.9	U	14	U	13.3	U	16.7	
TFH GASOLINE	MG/KG	315		0.066		0.109		0.057	U	0.073		0.057	U	0.258		0.056	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	24		71		458		20	U	220		20	U	20	U	20	U

Table B6-2

Site 6 (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	06_DD3 S1464469 (2)	DVF(a)	06_GN1 S1464047 (0)	DVF(a)	06_GN1 S1464082 (2)	DVF(a)	06_GN1 S1464630 (2)	DVF(a)	06_GN2 S1464163 (0)	DVF(a)	06_GN2 S1464164 (2)	DVF(a)	06_GN2 S1464165 (4)	DVF(a)	06_GN3 S1464166 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.34	U	0.31	U	0.34	U	0.33	U	0.82	U	0.33	U	0.34	U	1.2	b
ALUMINUM	MG/KG	14800		6860		11700		13900		12000		15500		14800		8020	
ARSENIC	MG/KG	3.7		2.5		4		3.8		2.7		3.1		2.8		3.1	
BARIIUM	MG/KG	166		83		139		119		103		152		115		89.1	
BERYLLIUM	MG/KG	0.68	b	0.33	U	0.57	b	0.84	b	0.5	b	0.64	b	0.64	b	0.33	b
CALCIUM	MG/KG	7480		3770		5440		5500		4240		7270		4850		3520	
CADMIUM	MG/KG	1.1		0.57	U	1.1		1.9		1.8		0.81	U	1.1		3.1	
COBALT	MG/KG	7.7	b	4.8	U	7	b	7.5	b	6.3	b	7.5	b	6.8	b	10.6	
CHROMIUM	MG/KG	15.4		7.7		12.2		14.4		16.8		14.4		14.8		365	
COPPER	MG/KG	12.3		4.1	b	8.1		8.5		14.1		11.3		13.4		15.6	
IRON	MG/KG	16900		9550		15600		17300		13900		17500		15600		11700	
MERCURY	MG/KG	0.06	b	0.05	U	0.06	b	0.05	U	0.05	U	0.05	U	0.04	U	0.06	U
POTASSIUM	MG/KG	3680		2940		3630		4020		3970		4380		3520		3190	
MANGANESE	MG/KG	6790		3280		5690		6050		4610		7070		5750		3700	
MANGANESE	MG/KG	280		185		311		304		239		266		248		218	
SODIUM	MG/KG	412	U	294	U	351	U	362	U	328	U	421	U	411	U	225	b
NICKEL	MG/KG	13.4		8.1	b	13.3		12.2		11.2		9.4		11.9		14.5	
LEAD	MG/KG	6		6.6		5		8.5		47.7		8.3		4		1410	
ANTIMONY	MG/KG	2.8	U	5.3	b												
SELENIUM	MG/KG	0.47	U	0.43	U	0.47	U	0.47	U	0.44	U	0.47	U	0.48	U	0.1	U
THALLIUM	MG/KG	0.41	b	0.33	U	0.36	U	0.5	b	0.37	b	0.35	U	0.38	U	0.21	U
VANADIUM	MG/KG	43.1		23.8		39		43.5		33.3		43.3		39.4		25.5	
ZINC	MG/KG	59.5		39.8		51.6		57.2		130		57.8		53.1		227	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	10	U	11	U	11	U	4	J	11	U	11	U	3	J
CARBON TETRACHLORIDE	UG/KG	11	U	10	U	11	U	11	U	10	U	11	U	11	U	3	J
ACETONE	UG/KG	11	U	12	U	31	U	11	U	28	U	18	U	24	U	22	U
METHYLENE CHLORIDE	UG/KG	14	U	10	U	11	U	14	U	10	U	11	U	11	U	12	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	740	U	880	U	720	U	730	U	890	U	710	U	740	U	14000	B
PYRENE	UG/KG	740	U	880	U	720	U	730	U	890	U	710	U	740	U	880	U
FLUORANTHENE	UG/KG	740	U	880	U	720	U	730	U	890	U	710	U	740	U	880	U
BENZYL BUTYL PHTHALATE	UG/KG	740	U	880	U	720	U	730	U	890	U	710	U	740	U	880	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.7	U	18.4		42.1		23.9		12.9	U	15.1		13.8	U	239	
TFH GASOLINE	MG/KG	0.112		0.052	U	0.055	U	0.056	U	-		-		-		0.224	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	124		20	U	84		20	U	20	U	20	U	52	

Table B6-2

Site 6 (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	06_GN3 S1484167 (2)	DVF(a)	06_ST1 S1484057 (0)	DVF(a)	06_ST1 S1484058 (2)	DVF(a)	06_ST2 S1484001 (0)	DVF(a)	06_ST2 S1484002 (2)	DVF(a)	06_ST2 S1484488 (2)	DVF(a)	06_ST3 S1484045 (0)	DVF(a)	06_ST3 S1484005 (2)	DVF(a)
METALS																	
SILVER	MG/KG	0.47	U	0.31	U	0.34	U	0.32	U	0.46	U	0.34	U	0.32	U	0.34	U
ALUMINUM	MG/KG	5850		11300		15100		8380		13700		13200		10700		11800	
ARSENIC	MG/KG	2.3		3.2		3.9		3.1		3.3		2.9		3.2		3.9	
BARIUM	MG/KG	86.3		124		144		0.48	U	138		137		112		114	
BERYLLIUM	MG/KG	0.25	b	0.52	b	0.69	b	0.45	b	0.59	b	0.58	b	0.51	b	0.57	b
CALCIUM	MG/KG	2060		6410		5910		4860		5170		5210		3830		4870	
CADMIUM	MG/KG	0.87	b	2.7		1.2		1.3		1.2		1.1		4.4		1.3	
COBALT	MG/KG	4.4	b	6.1	b	7.8	b	5.4	b	7.5	b	6.7	b	6.5	b	6.5	b
CHROMIUM	MG/KG	11.5		16.1		15.7		12.2		15.1		14.4		20.9		13.1	
COPPER	MG/KG	7		11.8		9.4		7.8		11.3		8.7		10.4		7.7	
IRON	MG/KG	8740		13900		17400		11400		18300		18100		13300		15300	
MERCURY	MG/KG	0.03	U	0.04	U	0.05	U	0.06	b	0.06	b	0.2	U	0.2		0.08	b
POTASSIUM	MG/KG	2320		4160		4110		3510		4190		3920		3740		3840	
MAGNESIUM	MG/KG	2660		4680		6540		4080		5810		5880		4480		5480	
MANGANESE	MG/KG	241		249		302		159		292		280		197		249	
SODIUM	MG/KG	604	b	568	U	423	U	307	U	335	U	331	U	368	U	484	U
NICKEL	MG/KG	6.7	b	12		12.9		8.9		13.7		13.5		9.1		11.3	
LEAD	MG/KG	4.1		25.6		6.2		20.3		4.8		5.4		47.5		4.3	
ANTIMONY	MG/KG	2.7	U	2.8	U	2.9	U	2.8	U								
SELENIUM	MG/KG	0.11	U	0.44	U	0.48	U	0.12	U	0.47	U	0.47	U	0.44	U	0.48	U
THALLIUM	MG/KG	0.27	U	0.33	U	0.49	b	0.34	U	0.43	b	0.38	b	0.34	U	0.36	U
VANADIUM	MG/KG	20.4		36		45.9		28.7		43.7		42.9		34		41.5	
ZINC	MG/KG	27.6		112		56.2		64.2		51.8		52.1		92.4		47.9	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	5	J	11	U	11	U	12	U	11	U	7	J	11	U
CARBON TETRACHLORIDE	UG/KG	11	U	4	J	11	U	11	U	12	U	11	U	4	J	11	U
ACETONE	UG/KG	11	U	10	U	11	U	10	J	12	U	36	U	16		11	U
METHYLENE CHLORIDE	UG/KG	11	U	10	U	11	U	11	U	16	U	11	U	10	U	14	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	720	U	220	J	750	U	710	U	780	U	730	U	1100		720	U
PYRENE	UG/KG	720	U	680	U	750	U	710	U	780	U	730	U	680	U	720	U
FLUORANTHENE	UG/KG	720	U	680	U	750	U	710	U	780	U	730	U	680	U	720	U
BENZYL BUTYL PHTHALATE	UG/KG	720	U	680	U	750	U	710	U	780	U	730	U	300	J	720	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.8	U	12.8	U	14	U	13.3	U	14.6	U	13.8	U	59.6		15.1	
TFH GASOLINE	MG/KG	0.055	U	0.052	U	0.057	U	0.054	U	0.059	U	0.058	U	0.094		0.055	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	59		20	U	20	U	74		20	U	20	U	1297		20	U

Table B6-2

Site 6 (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	06_UQS 81454447 (0)	DVF(a)	06_UQS 81454550 (2)	DVF(a)															
METALS																				
SILVER	MG/KG	0.44	U	0.49	U															
ALUMINUM	MG/KG	4400		9280																
ARSENIC	MG/KG	1.8	b	2.7																
BARIUM	MG/KG	79.3		116																
BERYLLIUM	MG/KG	0.21	b	0.43	b															
CALCIUM	MG/KG	9810		4490																
CADMIUM	MG/KG	0.84	b	1.7																
COBALT	MG/KG	2.7	b	5.5	b															
CHROMIUM	MG/KG	5.5		10.8																
COPPER	MG/KG	4.7	b	8.8																
IRON	MG/KG	6840		12400																
MERCURY	MG/KG	0.03	U	0.03	U															
POTASSIUM	MG/KG	1490		3340																
MAGNESIUM	MG/KG	4050		4550																
MANGANESE	MG/KG	186		238																
SODIUM	MG/KG	273	b	298	b															
NICKEL	MG/KG	5.4	b	10.8																
LEAD	MG/KG	2.8		4.7																
ANTIMONY	MG/KG	2.5	U	2.8	U															
SELENIUM	MG/KG	1.1		0.12	U															
THALLIUM	MG/KG	0.15	U	0.23	b															
VANADIUM	MG/KG	18.4		29.7																
ZINC	MG/KG	22.9		43.2																
VOLATILE ORGANIC COMPOUNDS																				
TOLUENE	UG/KG	-		-																
CARBON TETRACHLORIDE	UG/KG	-		-																
ACETONE	UG/KG	-		-																
METHYLENE CHLORIDE	UG/KG	-		-																
SEMI-VOLATILE ORGANIC COMPOUNDS																				
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	-		-																
PYRENE	UG/KG	-		-																
FLUORANTHENE	UG/KG	-		-																
BENZYL BUTYL PHTHALATE	UG/KG	-		-																
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																				
TFH DIESEL	MG/KG	0.005		37.7																
TFH GASOLINE	MG/KG	0.052	U	0.058	U															
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																				
TRPH	MG/KG	1041		20	U															
(a) A definition of each data validation flag (DVF) is provided in Table B-1.																				

Table B6-3

Site 6 (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	06_DB201 S1456091 (5)	DVF(a)	06_DB201 S1456090 (10)	DVF(a)	06_DB201 S1457021 (10)	DVF(a)	06_DB201 S1456095 (15)	DVF(a)	06_DB201 S1456085 (20)	DVF(a)	06_DB201 S1456087 (25)	DVF(a)	06_DB201 S1456086 (40)	DVF(a)	06_DB201 S1457022 (40)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
METALS																	
ALUMINIUM	MG/KG	9780		14200		12300		5880		2200		5410		1880		1890	
ARSENIC	MG/KG	3.4		5.6		6.3		2.3	U	1.1	U	3.1		0.95	U	0.95	U
BARIUM	MG/KG	118		147		150		62		22.9	b	61.4		23.9	b	25.1	b
BERYLLIUM	MG/KG	0.51	U	0.78	U	1.1	b	0.81	U	0.36	U	0.21	U	0.41	U	0.36	U
CALCIUM	MG/KG	4870		16700		18500		2840		2000		3430		1070		1300	
CADMIUM	MG/KG	5.7		2		2		0.62	b	0.26	U	1	b	0.25	U	0.25	U
COBALT	MG/KG	5.5	b	7	b	6.9	b	2.7	b	1.7	b	2.4	b	1.6	b	1.4	b
CHROMIUM	MG/KG	39.2		14		14.8		6.8		2.6		6.7		3.1		5.4	
COPPER	MG/KG	17.7		12.4		11		4.4	b	2	b	8.2		2.1	b	2.2	b
IRON	MG/KG	13600		17600		16100		7300		3250		7060		2660		3020	
POTASSIUM	MG/KG	3740		3540		3110		1690		755	b	1480		516	b	681	b
MAGNESIUM	MG/KG	4700		8540		7440		2590		1140		2470		1010	b	864	b
MANGANESE	MG/KG	204		303		288		131		82.6		134		65.5		79.6	
SODIUM	MG/KG	307	b	875	b	783	b	437	b	350	b	484	b	246	b	276	b
NICKEL	MG/KG	9.9	b	11.6		14		4.4	b	3.9	b	8	b	1.8	b	2.2	b
LEAD	MG/KG	81.6		4		3.9		1.5		0.94	U	2.1		0.58	U	0.95	
ANTIMONY	MG/KG	3.3	b	3	U	3	U	2.7	U	2.6	U	2.6	U	2.5	U	2.5	U
SELENIUM	MG/KG	0.2	b	0.14	b	0.12	U	0.21	b	0.11	b	0.11	U	0.13	b	0.11	U
THALLIUM	MG/KG	0.27	b	0.3	b	0.32	b	0.18	b	0.15	U	0.15	U	0.15	U	0.15	U
VANADIUM	MG/KG	31.9		47.1		42.9		17.4		7.8	b	16.8		6.8	b	6	b
ZINC	MG/KG	135		57.9		54		23.2		11.7		23.2		11.8		10.9	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	6	J	5	J	3	J	3	J	10	U	10	U	10	U	10	U
XYLENE (TOTAL)	UG/KG	4	J	12	U	12	U	12	U	10	U	10	U	10	U	10	U
Z-HEXANONE	UG/KG	13		5	J	3	J	12	U	10	U	10	U	10	U	10	U
ACETONE	UG/KG	22	U	17	U	12	U	28	U	40	U	21	U	10	U	10	U
METHYLENE CHLORIDE	UG/KG	4	J	4	J	6	J	12	U	10	U	10	U	10	U	10	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.059	U	0.061	U	0.062	U	0.056	U	0.052	U	0.051	U	0.052	U	0.052	U

Table B6-3

Site 6 (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	06_DB201 S1456092 (60) DVF(a)	06_DB201 S1456094 (140) DVF(a)	06_DGMW69 S1456083 (120) DVF(a)	06_DGMW69 S1457095 (120) DVF(a)	06_DGMW69 S1456093 (158) DVF(a)	06_UGMW28 S1456088 (140) DVF(a)	06_UGMW28 S1456089 (148) DVF(a)	DVF(a)
GENERAL CHEMISTRY									
TOTAL ORGANIC CARBON	MG/KGW	-	-	-	-	104	-	100	U
METALS									
ALUMINUM	MG/KG	1250	12200	7770	1650	-	10400	-	
ARSENIC	MG/KG	0.62 U	6.3	3.4	0.72 b	-	4.9	-	
BARIUM	MG/KG	17.5 b	120	111	17.4 b	-	79.8	-	
BERYLLIUM	MG/KG	0.23 U	0.84 U	0.59 U	0.34 U	-	0.36 b	-	
CALCIUM	MG/KG	720 b	9040	10500	870 b	-	5510	-	
CADMIUM	MG/KG	0.25 U	4.1	1.7	0.78 b	-	1	b	-
COBALT	MG/KG	1.2 U	7.3 b	4.8 b	1.2 U	-	2.5 b	-	
CHROMIUM	MG/KG	2.3	16.9	9	11	-	13.7	-	
COPPER	MG/KG	1.4 b	13.3	11.2	2.8 b	-	9.9	-	
IRON	MG/KG	2090	19400	10800	3310	-	12600	-	
POTASSIUM	MG/KG	470 b	4280	2150	457 b	-	2670	-	
MAGNESIUM	MG/KG	533 b	5720	4650	558 b	-	3690	-	
MANGANESE	MG/KG	55.4	317	189	53.8	-	76.3	-	
SODIUM	MG/KG	156 b	512 b	668 b	190 b	-	323 b	-	
NICKEL	MG/KG	1.8 b	24.5	9 b	2.8 b	-	9.3 b	-	
LEAD	MG/KG	0.41 U	3.7	2.8	5.6	-	2.9	-	
ANTIMONY	MG/KG	2.5 U	3 U	2.8 U	2.5 U	-	2.9 U	-	
SELENIUM	MG/KG	0.1 U	0.18 b	0.11 U	0.1 U	-	0.15 b	-	
THALLIUM	MG/KG	0.15 U	0.32 b	0.18 U	0.14 U	-	0.26 b	-	
VANADIUM	MG/KG	4.7 b	47.9	26.7	7 b	-	34.7	-	
ZINC	MG/KG	7.1	60.3	43.3	8	-	37	-	
VOLATILE ORGANIC COMPOUNDS									
TOLUENE	UG/KG	11 U	12 U	10 U	10 U	-	12 U	12 U	
XYLENE (TOTAL)	UG/KG	11 U	12 U	10 U	10 U	-	12 U	12 U	
2-HEXANONE	UG/KG	11 U	12 U	10 U	10 U	-	12 U	12 U	
ACETONE	UG/KG	11 U	15 U	31	30	-	12 U	12 U	
METHYLENE CHLORIDE	UG/KG	11 U	12 U	35 U	27 U	-	12 U	16 U	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)									
TFH GASOLINE	MG/KG	0.053 U	0.058 U	0.051 U	0.058 U	-	0.058 U	-	

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

Table B6-4		
Site 6 (OU-3): Well Construction Details		
MCAS El Toro Phase I RI Technical Memorandum		
Item	Station Identification	
	06_UGMW28	06_DGMW69
Survey Location--Northing	N547789.43	N548198.00
Survey Location--Easting	E1551786.37	E1551191.75
Ground Surface Elevation (ft above MSL ^a)	335.07	324.45
Measuring Point Elevation (ft above MSL ^a)	334.90	324.33
Measuring Point Location	Top of well casing	Top of well casing
Type of Surface Completion	Below ground	Below ground
Casing Diameter and Material	4-inch dia. Sch. 40 PVC	4-inch dia. Sch. 40 PVC
Screen Diameter and Material	4-inch dia. 20-slot SS	4-inch dia. 20-slot SS
Screen Interval (ft bgs ^b)	140-180	150-190
Length of Drop Pipe (ft bgs ^b)	175	187
Make and Model of Installed Pump	Grundfos Rediflow 2	Grundfos Rediflow 2
Date of Pumping Test	None	5 Nov 92
Date of Water Quality Sampling	13 Nov 92	2 Dec 92
^a Mean sea level ^b Below ground surface SS=Stainless Steel		

**Table B6-5
Site 6 (OU-3): Summary of Hydraulic Parameters
MCAS El Toro Phase I RI Technical Memorandum**

Well Identification	Type of Test	Analysis Method	Transmissivity (ft ² /day)	Hydraulic Conductivity (ft/day)	Storage Coefficient ^a	Leakance Factor ^a
06_DGMW69	Slug	Bouwer and Rice (1976), and Bouwer (1989); Cooper, Bredenhoeft and Papadopoulos (1967)	44	1.1	2 E-04	NA

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

Table B6-6

Site 6 (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	06_DGMW69 S1452091 (150-190)	DVF(a)	06_UGMW28 S1452045 (140-180)	DVF(a)
GENERAL CHEMISTRY							
ALKALINITY AS CaCO3	NA	NA	MG/L	110		136	
CARBONATE	NA	NA	MG/L	-		-	
BICARBONATE	NA	NA	MG/L	134		166	
CHLORIDE	3	250	MG/L	286		541	
SULFATE	3	250	MG/L	209		332	
NITRATE/NITRITE-N	1	10	MG/L	16.3		18.8	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	1080		1890	
METALS							
ALUMINUM	3	50	UG/L	43.9	b	31	U
BARIUM	2	2000	UG/L	48	b	34.4	b
CALCIUM	NA	NA	UG/L	169000		264000	
CADMIUM	2	5	UG/L	15.3		5.2	U
COBALT	NA	NA	UG/L	14.4	b	5.8	U
IRON	3	300	UG/L	104		54.5	b
MERCURY	2	2	UG/L	0.13	b	0.1	U
POTASSIUM	NA	NA	UG/L	3350	b	7220	
MAGNESIUM	NA	NA	UG/L	47800		73000	
MANGANESE	3	50	UG/L	167		197	
SODIUM	NA	NA	UG/L	76000		109000	
NICKEL	NA	NA	UG/L	866		230	
ANTIMONY	NA	NA	UG/L	12.9	b	19.6	b
SELENIUM	1	10	UG/L	31.4		56.2	
VANADIUM	NA	NA	UG/L	5.7	b	5.4	b
ZINC	2	5000	UG/L	4.4	b	10.9	b
VOLATILE ORGANIC COMPOUNDS							
1,1,1-TRICHLOROETHANE	2	200	UG/L	0.4	J	1	U
CHLOROMETHANE (METHYL CHLORIDE)	NA	NA	UG/L	2	U	2	J
SEMIVOLATILE ORGANIC COMPOUNDS							
PHENOL	4	5	UG/L	14		10	U
BENZYL BUTYL PHTHALATE	NA	NA	UG/L	10	U	3	J

(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 B6-7
Site 6 (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	Concentration	Regulatory Level ^c	Regulatory Code ^d
06_UGMW28	(140-180)	Manganese	µg/L	197	50	3
		Selenium	µg/L	56.2	10	2
		Chloride	mg/L	541	250	3
		Nitrate/Nitrite-N	mg/L	18.8	10	2
		Sulfate	mg/L	332	250	3
		Total Dissolved Solids	mg/L	1890	500	3
06_DGMW69	(150-190)	Cadmium	µg/L	15.3	5	1
		Manganese	µg/L	167	50	3
		Selenium	µg/L	31.4	10	2
		Chloride	mg/L	286	250	3
		Nitrate/Nitrite-N	mg/L	16.3	10	2
		Total Dissolved Solids	mg/L	1080	500	3
		Phenol	µg/L	14	5	3

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 B7

**Nature and Extent of Contamination:
Site 7 (OU-3) — Drop Tank Drainage Area No. 2**

Appendix B7

NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION:

SITE 7 (OU-3) - DROP TANK DRAINAGE AREA NO. 2

This discussion of Site 7 is supplemented by the figures and data tables listed below. The figures begin on page B7-3, and the tables are grouped at the end of this Appendix B7. Field headspace values for soils at this site are presented in Table BA1-7, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B7-1: (Site Map)

Figure B7a-2: Geologic Cross Section

Figure B7b-2: Geologic Cross Section

Table B7-1: Types of Samples and Chemical Analyses

Table B7-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

Table B7-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples

Table B7-4: Well Construction Details

Table B7-5: Summary of Hydraulic Parameters

Table B7-6: Summary of Detected Chemicals in Groundwater Samples

Table B7-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B7.1 Site Description

As shown in Figure B7-1, Site 7 (Drop Tank Drainage Area No. 2) consists of two subareas (north and east of Hanger 295) and has five strata:

- Stratum 1: Storage area at the edge of the pavement north of Building 295 (where drop tanks were drained)
- Stratum 2: The former (old) edge of the pavement east of Buildings 295 and 296
- Stratum 3: The current (new) edge of the pavement east of Buildings 295 and 296
- Stratum 4: The drainage ditch east of the pavement
- Stratum 5: The open partially paved area south of Building 296

In the north area, drainage is to a catch basin that discharges into the Agua Chinon Wash. To the east of Buildings 295 and 296, drainage flows to a ditch, and then eventually joins the Agua Chinon Wash. In the north area, aircraft drop tanks were drained and washed from 1969 to 1983, with nearly 7,000 gallons of JP-5 and lubrication oil disposed of. In the east area, the hanger may have been sprayed with over 11,000 gallons of lubrication oil and nearly 4,000 gallons of JP-5 for dust control between 1972 and 1983; there also are numerous stained areas at the southern portion of the area (Brown and Caldwell, 1986).

B7.2 Suspected Waste Types and Contaminants

The types of waste at this site are lubrication oil, JP-5, and other petroleum waste. Suspected contaminants are VOCs, SVOCs, and hydrocarbons.

B7.3 Field Investigation

The field investigation consisted of:

- Drilling and sampling three deep borings completed as monitoring wells
- Drilling and sampling three downgradient wells
- Collecting surface and near-surface soil samples from 16 sampling stations

Several changes were made to the site boundary, the number and location of monitoring wells, and the number of surface soil samples from the original *SAP*, as documented by the *SAP Amendment*:

- The site boundary was expanded to the south of Building 296 to include the open area southeast of the hanger.
- The location of Monitoring Well 07_DGMW71 was moved from northwest of Building 295 to the northeast corner of Building 297 (to improve downgradient coverage).
- The location of Deep Boring/Monitoring Well 07_DBMW43 was moved from the current edge of the pavement to the former edge of the pavement east of Buildings 295 and 296.

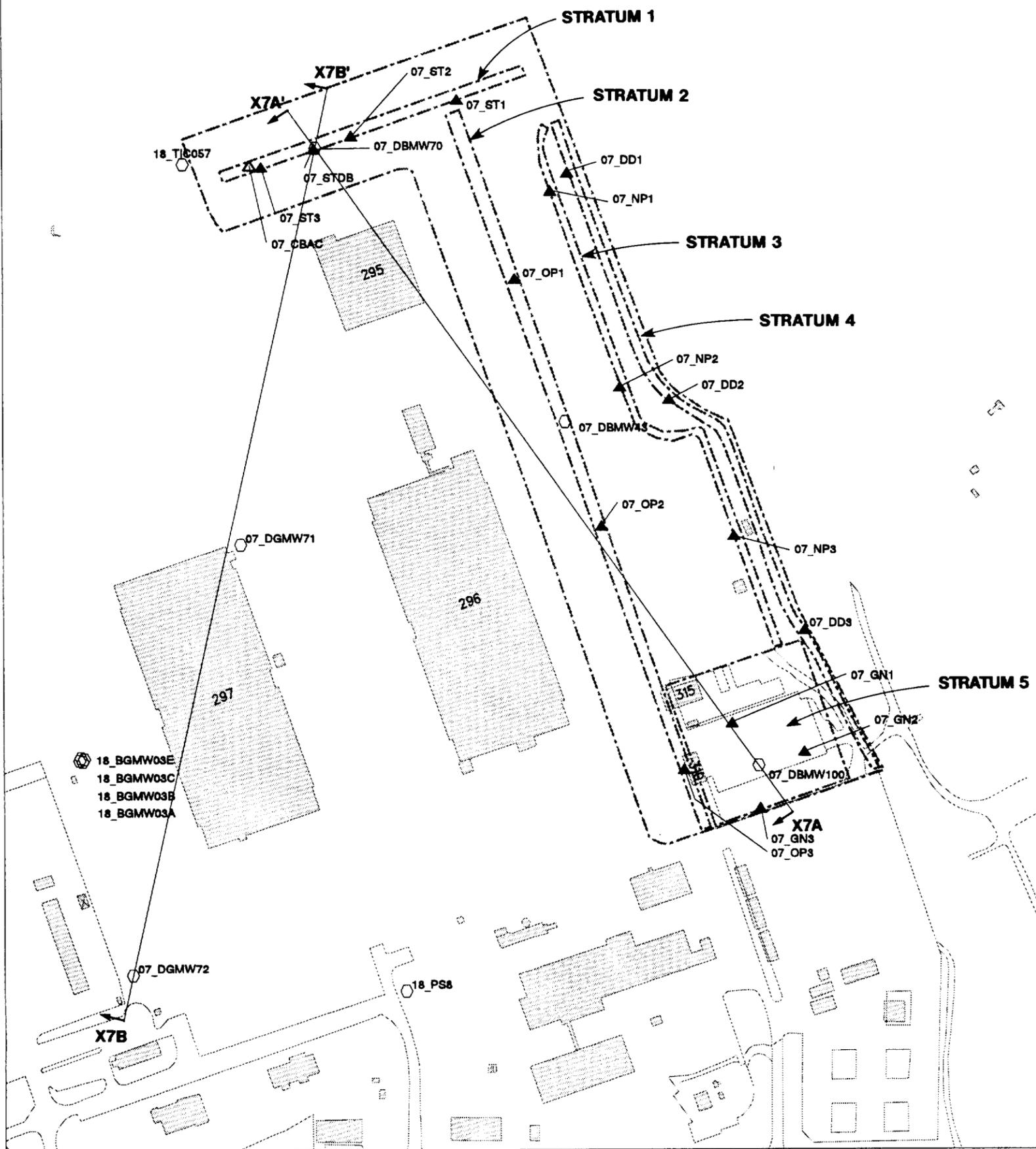
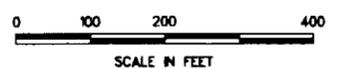
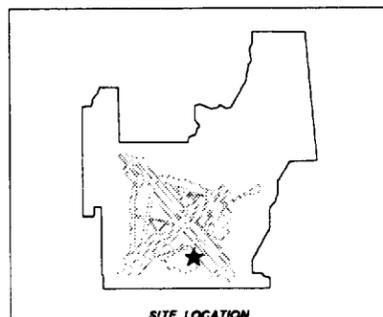


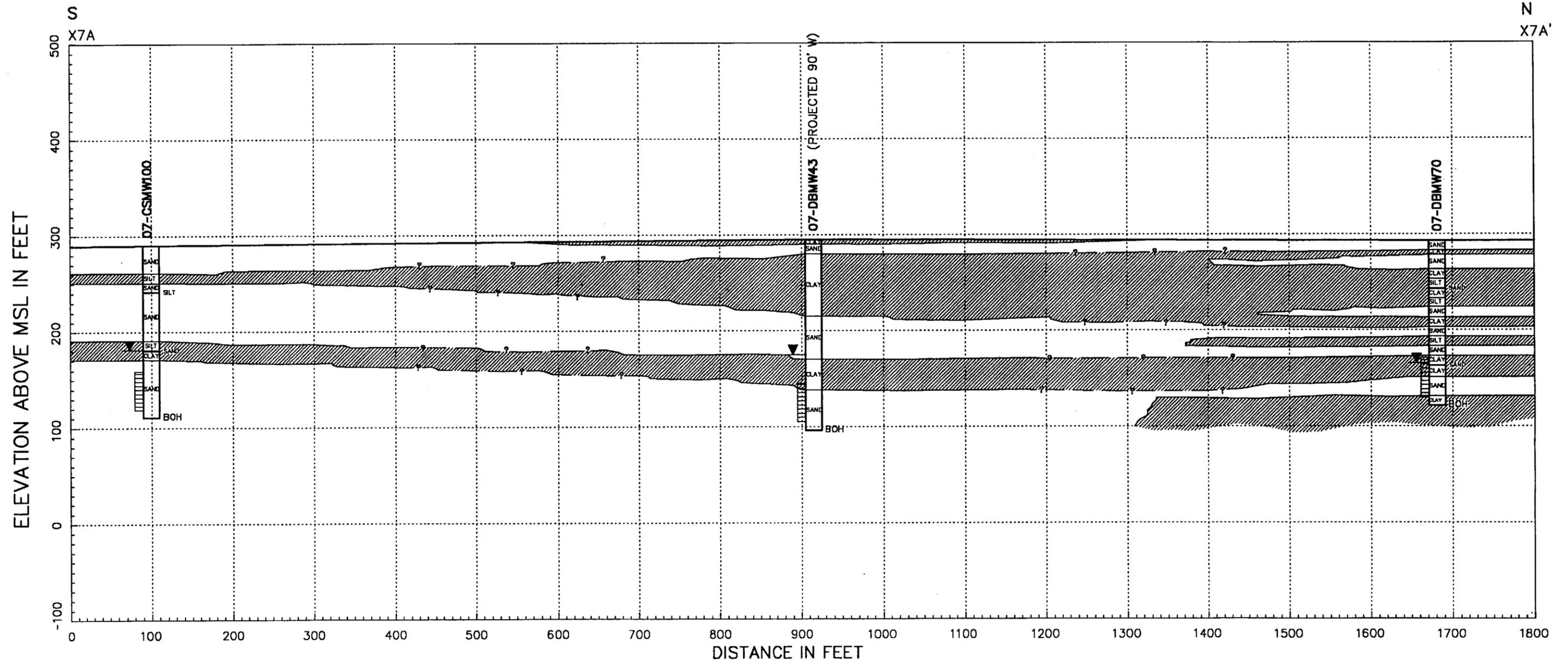
FIGURE B7-1
SITE 7 (OU-3): DROP TANK
DRAINAGE AREA NO. 2
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

- 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



PAGE NUMBER B7-4

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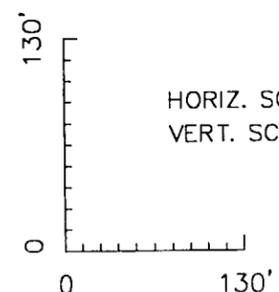
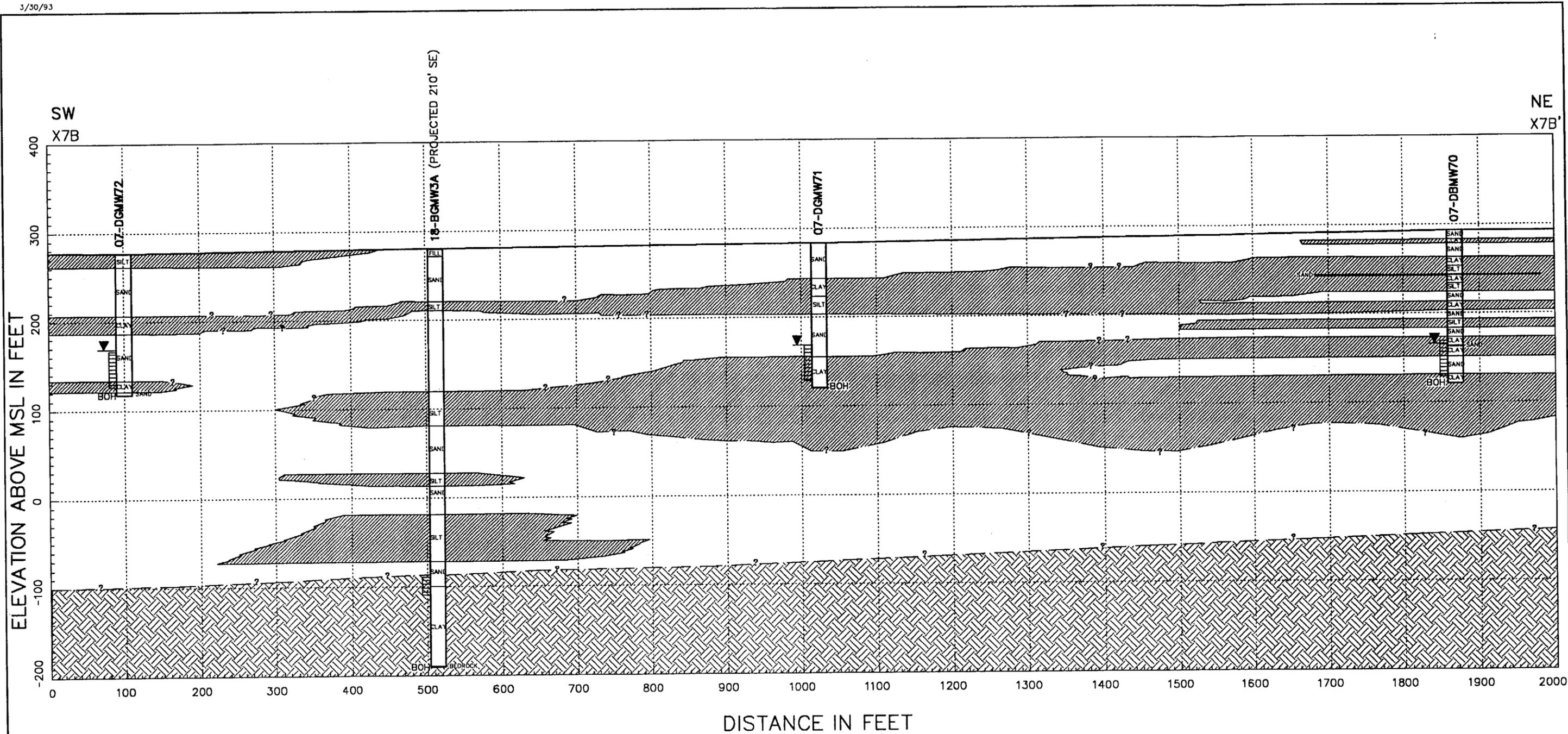
HORIZ. SCALE: 1"=120'
 VERT. SCALE: 20% EXAGGERATION

- 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 B7A-2
 SITE 7A (OU-3)
 GEOLOGIC CROSS SECTION X7A-X7A'
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

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HORIZ. SCALE: 1"=130'
 VERT. SCALE: 20% EXAGGERATION

LEGEND

-  UNCONSOLIDATED PERMEABLE SEDIMENTS
-  UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS
-  SEMICONSOLIDATED LOW-PERMEABILITY SEDIMENTS
-  BOTTOM OF HOLE
-  WELL SCREEN INTERVAL
-  WATER LEVEL ELEVATION, DECEMBER 1992

FIGURE B7B-2
 SITE 7B (OU-3)
 GEOLOGIC CROSS SECTION X7B-X7B'
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

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- The surface soil sample at Deep Boring/Monitoring Well 07_DBMW43 was eliminated because it would have required drilling through concrete.
- The shallow soil borings were randomly distributed through each of the five strata, with no change from the planned total number of samples.

In addition, field changes were made:

- A sediment sample was not collected from the catch basin north of Building 295 because the basin was inaccessible.
- The location of one monitoring well (07_DGMW91) was moved to the west of 07_DGMW72.
- One deep boring/monitoring well (07_DBMW100) was added at the southern edge of the site (to replace Well 30 at Site 10).

Table B7-1 summarizes the types of samples collected (as listed below) and the types of laboratory analyses performed.

B7.3.1 Surface Water and Sediment

(No surface water or sediment samples were collected at the site.)

B7.3.2 Surface and Near-Surface Soils

Surface and shallow soil samples were collected from 16 sampling stations. Three stations were located within each strata, and a surface station was located at 07_DBMW70.

- **Stratum 1:** Station 07_ST2 was sampled at depths of 0 and 2 feet; Stations 07_ST1 and 07_ST3 had samples collected at 0, 2, and 4 feet. A surface sample (STDB) associated with 07_DBMW70 was also collected, as well as a duplicate. A total of 10 samples were collected.
- **Stratum 2:** Stations 07_OP1 and 07_OP3 were both sampled at depths of 0, 2, and 4 feet, and a duplicate sample was collected at the surface of 07_OP3. Station 07_OP2 was sampled at only the 0- and 2-foot depths, bringing the total number of samples to nine.

- **Stratum 3:** Stations 07_NP1 and 07_NP2 were sampled at 0- and 2-foot depths, and 07_NP3 was sampled at depths of 0, 2, and 4 feet. Duplicate samples were collected for 07_NP2 (2-foot depth) and 07_NP3 (2-foot depth), making the total number of samples nine.
- **Stratum 4:** Samples were collected at the three stations (07_DD1, 07_DD2, 07_DD3) at depths of 0 and 2 feet. A duplicate sample was collected for 07_DD2 at the surface, bringing the total number of samples collected to seven.
- **Stratum 5:** Samples were collected from 07_GN1, 07_GN2, and 07_GN3 at depths of 0 and 2 feet. A duplicate sample was collected from 07_GN1 at the 2-foot depth, bringing the total number of samples to seven.

B7.3.3 Vadose Zone Soils (Soil Borings)

Three deep borings (vertical orientation) were drilled, then completed as Monitoring Wells 07_DBMW100, 07_DBMW43, and 07_DBMW70; the number of samples collected from each well is 11, 10, and 10, respectively.

Well 07_DBMW100 was sampled at 3, 8, 13, 18, 23, 28, 38, 109, and 128 feet; duplicate samples were collected at 28- and 38-foot depths. Well 07_DBMW43 was sampled at depths of 5, 10, 15, 20, 25, 50, 100, and 165 feet; duplicate samples were collected at 15- and 20-foot depths. Well 07_DBMW70 was sampled at 5, 10, 15, 20, 25, 40, 60, 100, and 130 feet; a duplicate sample was collected at 40 feet.

B7.3.4 Groundwater Monitoring Wells

Three deep borings completed as monitoring wells were sampled for groundwater: 07_DBMW100, 07_DBMW43, and 07_DBMW70. A duplicate sample was collected at 07_DBMW100. Slug tests were performed on 07_DBMW100 and 07_DBMW70; no aquifer tests were performed on 07_DBMW43.

One downgradient well was drilled (07_DGMW71), and two soil samples were collected (at 110 and 120 feet); no duplicate sample was collected. No aquifer test was performed on this well. A groundwater sample was collected from this well.

At Well 07_DGMW72 (outside the site boundary), soil samples were collected at 90 and 110 feet, and a duplicate sample was collected at the 90-foot depth. A pumping test was performed using two pumping rates: 19 gpm for 48 minutes, and 13.5 gpm for 155 minutes.

At Well 07_DGMW91 (west of 07_DGMW72), the boring was sampled for soil during drilling at depths of 110 and 120 feet. A slug test was performed on this well.

Thirty-two subsurface soil samples were collected at Wells 07_DBMW43, 07_DBMW70, and 07_DBMW100. Seven soil samples were collected at Wells 07_DGMW71, 07_DGMW72, and 07_DGMW91.

B7.4 Surface Water and Sediments

B7.4.1 Description of Surface Water and Sediment Samples

(No surface water or sediment samples were collected at this site.)

B7.5 Surface and Near-Surface Soils

B7.5.1 Description of Surface and Near-Surface Soil Samples

The soils of Site 7 are Omni Series, Section 206 - Sorrento loam, 0 to 2 percent slopes. The Omni Series is characterized by poorly drained soils on flood plains and in basins. These soils form in mixed alluvium. About 10 percent of the mapping unit includes areas of Sorrento clay loam; 3 percent, Sorrento sandy loam; 5 percent, soils that are noncalcareous throughout but are otherwise

similar to this Sorrento soils; 5 percent, Mocho loam, 0 to 2 percent slopes; and 3 percent, Bolsa silt loam, drained (Wachtell, 1978).

At depths of 0 to 12 inches, the soils have a permeability of 0.6 to 2.0 in./hr, an available water capacity of 0.16 to 0.21 in./hr, and a pH of 6.1 to 8.4 (Wachtell, 1978).

All surface and near-surface samples were analyzed for VOCs and SVOCs, pesticides, PCBs, TPH, TRPH, and metals.

B7.5.2 Analytical Results and Soil Vapor Headspace Values

B7.5.2.1 Upgradient Area

(Upgradient soil samples were not collected.)

B7.5.2.2 Stratum 1: Storage Area at North Edge of Concrete Pad

Ten surface and near-surface soil samples were collected for chemical analysis. Detected compounds were hydrocarbons, 2 VOCs, 10 SVOCs, 2 pesticides, and metals.

TRPH was detected in the surface samples at all sampling stations: 07_ST1 (942 mg/kg), 07_ST2 (3,329 mg/kg), 07_ST3 (3,188 mg/kg), and 07_STDB (3,060 mg/kg and 1314 [duplicate]). TRPH concentrations at Stations 07_ST2, 07_ST3, and 07_STDB are greater than 1,000 ppm (California LUFT).

TFH-diesel was detected at all sampling locations; in the surface samples, it was detected at 07_ST1 (28 mg/kg), 07_ST2 (686 mg/kg), 07_ST3 (21 mg/kg), and 07_STDB (50 and 54 mg/kg, original and duplicate samples). At 07_ST1, TFH-diesel was also detected at low levels in the 2-foot sample (18 mg/kg). All TFH-diesel concentrations at the surface are less than action levels.

TFH-gasoline was detected at low concentrations only. The maximum concentration was in the surface sample at 07_ST2 (2.68 mg/kg). The TFH-gasoline concentrations in the other samples at Stratum 1 were less than 1 mg/kg.

Two VOCs, acetone and methylene chloride, were detected. Acetone was detected at 07_ST1 at the surface (37 $\mu\text{g}/\text{kg}$) and at 2 feet (19 $\mu\text{g}/\text{kg}$), and at 07_ST3 at 4 feet (27 $\mu\text{g}/\text{kg}$). Acetone is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 37 $\mu\text{g}/\text{L}$. Methylene chloride was detected in only one sample, at 07_ST2 at 2 feet (14 $\mu\text{g}/\text{kg}$). Methylene chloride is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 42 $\mu\text{g}/\text{L}$. Benzene, carbon tetrachloride, and toluene were also identified below the CRDLs. Benzene was identified in the surface sample at 07_ST2 (9 $\mu\text{g}/\text{kg}$); carbon tetrachloride, in the surface samples at 07_ST1 (2 $\mu\text{g}/\text{kg}$) and 07_STDB (2 $\mu\text{g}/\text{kg}$); and toluene in all the surface samples at concentrations ranging from 3 to 9 $\mu\text{g}/\text{kg}$.

Various SVOCs were detected in the surface sample at 07_STDB:

- Benzo(a)anthracene (1,100 $\mu\text{g}/\text{kg}$)
- Benzo(a)pyrene (1,300 $\mu\text{g}/\text{kg}$)
- Benzo(b)fluoranthene (2,400 $\mu\text{g}/\text{kg}$)
- Benzo(k)fluoranthene (1,300 $\mu\text{g}/\text{kg}$)
- Chrysene (1,400 $\mu\text{g}/\text{kg}$)
- Dibenzo(a,h)anthracene (280 $\mu\text{g}/\text{kg}$, estimated)
- Fluoranthene (2,800 $\mu\text{g}/\text{kg}$)
- Indeno(1,2,3-cd)pyrene (800 $\mu\text{g}/\text{kg}$)
- Phenanthrene (1,400 $\mu\text{g}/\text{kg}$)
- Pyrene (2,500 $\mu\text{g}/\text{kg}$)
- Carbazole (320 $\mu\text{g}/\text{L}$, estimated)

In the duplicate sample collected at the surface at 07_STDB, concentrations for the compounds listed above are less than CRDLs.

At 07_ST3, various SVOCs were identified below the CRDLs in the surface sample. One SVOC, fluoranthene (1,500 $\mu\text{g}/\text{kg}$), was detected above the CRDL

at the surface sample at 07_ST3. SVOC compounds were not detected at 07_ST1 and 07_ST2.

Pesticides were detected only in the surface soil samples at 07_ST1, 07_ST3, and 07_STDB. At 07_ST1, 4,4'-DDE (38.7 µg/kg) 4,4'-DDD (163 µg/kg), and 4,4'-DDT (200 µg/kg) were detected; at 07_ST3, 4,4'-DDT (39.3 µg/kg) was detected; and, at 07_STDB, 4,4'-DDD (39.9 µg/kg) and 4,4'-DDT (65.1 µg/kg) were detected. PCBs were not detected at Stratum 1.

Metal results are presented in Table B7-2.

Maximum field headspace (OVA) concentrations were recorded from the surface samples at 07_ST2 (3.9 ppmv) and 07_ST3 (0.9 ppmv). These results correlate with the elevated hydrocarbon concentrations detected in the surface samples at 07_ST2 and 07_ST3.

In summary, TRPH, TFH-diesel, and TFH-gasoline were detected at all sampling stations. VOCs were detected at all sampling stations and SVOCs were detected at Stations 07_STDB and 07_ST3 only. Pesticides were detected at Stations 07_ST1, 07_ST3, and 07_STDB. PCBs were not detected.

B7.5.2.3 Stratum 2: Former Edge of Concrete Pavement

Nine soil samples from three sampling locations were collected in this stratum. Detected compounds were hydrocarbons and metals.

TRPH was detected in only one sample, the surface sample at 07_OP1 (94 mg/kg). Concentrations of TFH-diesel (17 to 43 mg/kg) were detected at 07_OP1 and 07_OP2. TFH-gasoline at 07_OP1 was less than 1 mg/kg and was not detected at the other stations. No VOCs, SVOCs, pesticides or PCBs were detected.

The maximum headspace reading was 1.8 ppmv, measured at 4 feet at 07_OP1. The other headspace readings were generally below 1 ppmv.

In summary, TRPH was detected at 07_OP1 only, TFH-diesel at 07_OP1 and 07_OP2, and TFH-gasoline at 07_OP1 only. VOCs, SVOCs, pesticides, and PCBs were not detected.

B7.5.2.4 Stratum 3: Current Edge of Concrete Pavement

Nine soil samples were collected from three sampling locations at this stratum. Detected compounds were hydrocarbons, 2 VOCs, 13 SVOCs, 4 pesticides, and metals.

TFH-diesel was detected in the surface (110 mg/kg) and 2-foot (20.8 mg/kg) samples at 07_NP2. TFH-gasoline was detected at 07_NP3 at concentrations less than 1 mg/kg and was not detected at the other stations. TRPH was not detected in any of the samples.

Two VOCs, toluene and acetone, were detected. Toluene was detected in the surface samples at 07_NP1 (13 µg/kg) and at 07_NP3 (10 µg/kg) and was also identified below the CRDL in three other samples (from 07_NP2 and 07_NP3). Acetone was identified below the CRDL in 6 samples from 07_NP1, 07NP2, and 07_NP3. Acetone is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 37 µg/L.

SVOCs were detected at two of the three sample locations, predominantly in the surface samples. Various SVOCs were detected in the surface sample at 07_NP1:

- Benzo(a)anthracene (1,300 µg/kg)
- Benzo(a)pyrene (1,800 µg/kg)
- Benzo(b)fluoranthene (2,800 µg/kg)
- Benzo(k)fluoranthene (1,200 µg/kg)
- Benzo(ghi)perylene (730 µg/kg)
- Chrysene (2,400 µg/kg)
- Fluoranthene (4,100 µg/kg)
- Indeno(1,2,3-cd)pyrene (1,500 µg/kg)
- Phenanthrene (1,300 µg/kg)
- Pyrene (3,400 µg/kg)

Bis(2-ethylhexyl)phthalate and dibenzo(a,h)anthracene were also identified below the CRDLs in the surface sample at 07_NP1. No SVOCs were detected in the 2-foot sample at 07_NP1. Several SVOCs were also detected at the surface sample at 07_NP2:

- Benzo(a)pyrene (740 $\mu\text{g}/\text{kg}$)
- Benzo(b)fluoranthene (1,000 $\mu\text{g}/\text{kg}$)
- Benzo(k)fluoranthene (770 $\mu\text{g}/\text{kg}$)
- Chrysene (1,100 $\mu\text{g}/\text{kg}$)
- Fluoranthene (2,600 $\mu\text{g}/\text{kg}$)
- Phenanthrene (1,200 $\mu\text{g}/\text{kg}$)
- Pyrene (2,200 $\mu\text{g}/\text{kg}$)

In addition, fluoranthene was detected at 2 feet (830 $\mu\text{g}/\text{kg}$), and pyrene was detected at 2 feet (710 $\mu\text{g}/\text{kg}$). Benzo(a)anthracene, bis(2-ethylhexyl)phthalate, carbazole, and indeno(1,2,3-cd)pyrene were also identified below the CRDLs in the surface sample. In the 2-foot sample at 07_NP2, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and phenanthrene were also identified below the CRDLs.

Pesticides were detected in two of nine samples. In the surface sample at 07_NP3, pesticides detected are 4,4'-DDT (3.77 $\mu\text{g}/\text{kg}$) and endosulfan sulfate (0.88 $\mu\text{g}/\text{kg}$). At 07_NP2, dieldrin (0.19 $\mu\text{g}/\text{kg}$), endosulfan sulfate (4.52 $\mu\text{g}/\text{kg}$), and endrin ketone (2.1 $\mu\text{g}/\text{kg}$) were detected in the 2-foot sample. PCBs were not detected.

Metal results are presented in Table B7-2.

Headspace readings were less than 1 ppmv for the Stratum 3 soil samples.

In summary, TFH-diesel was detected only at 07_NP2 and TFH-gasoline was detected only at 07_NP3. TRPH was not detected at any of the stations. VOCs were detected at all stations and SVOCs were detected at Stations 07_NP1 and 07_NP2. Pesticides were detected at Stations 07_NP3 and 07_NP2.

B7.5.2.5 Stratum 4: Drainage Ditch

Seven soil samples were collected from the three sampling locations in this stratum. Detected compounds were hydrocarbons, two VOCs, and metals.

Hydrocarbons were detected in one of seven soil samples. In the surface sample at 07_DD3, hydrocarbon concentrations include TFH-diesel at 37 mg/kg, TFH-gasoline at 0.066 mg/kg, and TRPH at 206 mg/kg. All of these concentrations are below California LUFT action levels.

Two VOCs, toluene and acetone, were detected in the samples at Stratum 4. Toluene was detected in the surface sample at 07_DD1 at a concentration of 14 $\mu\text{g}/\text{kg}$, and was identified below the CRDL at 07_DD2 at 6 and 4 $\mu\text{g}/\text{kg}$ (surface sample) and at 3 $\mu\text{g}/\text{kg}$ (at 2 feet). Acetone was identified below the CRDL in the surface (7 $\mu\text{g}/\text{kg}$) and 2-foot (5 $\mu\text{g}/\text{kg}$) samples at 07_DD1. Acetone is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 37 $\mu\text{g}/\text{L}$.

No SVOCs, pesticides, or PCBs were detected.

Headspace readings were less than 1 ppmv for the Stratum 4 soil samples. This correlates with samples where hydrocarbons, VOCs, and SVOCs were not detected or are present at low levels only.

In summary, hydrocarbons were detected at 07_DD3, and one VOC was detected at 07_DD1.

B7.5.2.6 Stratum 5: Partially Paved Area South of Building 296

Seven soil samples from three sampling locations were collected at this stratum. Detected compounds were hydrocarbons, four VOCs, seven SVOCs, five pesticides, and metals.

Elevated TRPH concentrations were detected at all three sampling stations. At 07_GN1, TRPH concentrations were 32,091 and 1,007 mg/kg in the surface and 2-foot samples, respectively; the concentration in the duplicate sample at 2 feet is 145 mg/kg. At 07_GN2, TRPH concentrations are 4,074 and 983 mg/kg in the surface and 2-foot samples, respectively. At 07_GN3, TRPH was detected in the 2-foot sample only (2,222 mg/kg). Five of the seven samples have TRPH concentrations greater than 1,000 mg/kg (California LUFT action levels).

TFH-diesel was detected in five of the seven samples collected. At 07_GN1, TFH-diesel concentrations are 426 mg/kg (surface) and 16.9 mg/kg (2 feet). Lower concentrations are found at 07_GN2, where TFH-diesel concentrations are less than 100 mg/kg in both samples. At 07_GN3, TFH-diesel was detected in the 2-foot sample only (146 mg/kg). TFH-gasoline was not detected or was less than 1 mg/kg in the Stratum 5 samples.

Three VOCs, acetone, toluene, and methylene chloride, were detected in the samples. Methylene chloride was detected below the CRDL in the surface sample at 07_GN2 (5 $\mu\text{g}/\text{kg}$). Methylene chloride is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 42 $\mu\text{g}/\text{L}$. Toluene was detected in the surface (14 $\mu\text{g}/\text{kg}$) and 2-foot (12 $\mu\text{g}/\text{kg}$) samples at 07_GN3; it was also identified below the CRDL at the surface at 07_GN1. Xylene was also identified below the CRDL in the surface sample at 07_GN3.

SVOCs were detected in the surface sample at 07_GN1; they are:

- Benzo(g,h,i)perylene (6,900 $\mu\text{g}/\text{kg}$)
- Bis(2-ethylhexyl)phthalate (1,400 $\mu\text{g}/\text{kg}$)
- Chrysene (940 $\mu\text{g}/\text{kg}$)
- Fluoranthene (730 $\mu\text{g}/\text{kg}$)
- Pyrene (3,500 $\mu\text{g}/\text{kg}$)

Several SVOCs were identified below the CRDLs at 07_GN2 and 07_GN3, including benzo(a)pyrene (07_GN2), diethylphthalate (07_GN2), fluoranthene (07_GN2), and pyrene (07_GN2 and 07_GN3).

PCBs were not detected. Pesticides were detected only in the surface sample at 07_GN1:

- 4,4'-DDD (36.4 $\mu\text{g}/\text{kg}$)
- 4,4'-DDT (115 $\mu\text{g}/\text{kg}$)
- Dieldrin (25.3 $\mu\text{g}/\text{kg}$)
- Endosulfan sulfate (66.9 $\mu\text{g}/\text{kg}$)
- Endrin (6.54 $\mu\text{g}/\text{kg}$)

Metals concentrations are presented in Table B7-2. The lead concentration in the surface sample at 07_GN1 is 931 mg/kg. The lead concentrations in the other six samples range from 1.5 to 35 mg/kg.

All headspace readings for Stratum 5 were less than 1 ppmv.

In summary, hydrocarbons, VOCs, and SVOCs were detected at all sampling stations. Pesticides were detected at 07_GN1 only. PCBs were not detected.

The surface and near-surface soils have detectable concentrations of hydrocarbons (up to 32,091 mg/kg), VOCs (up to 27 $\mu\text{g}/\text{kg}$), SVOCs (up to 6,900 $\mu\text{g}/\text{kg}$), pesticides (up to 200 $\mu\text{g}/\text{kg}$), and metals (up to 931 $\mu\text{g}/\text{kg}$). Generally, hydrocarbon, SVOC, and metals concentrations are highest at Stratum 5, and VOCs and pesticides are highest at Stratum 1. PCBs were not detected in the surface/near-surface soils.

B7.6 Vadose Zone Soils

B7.6.1 Description of Subsurface Soil Samples

Three deep boring/monitoring wells and three downgradient wells were drilled and 38 soil samples were collected.

B7.6.2 **Subsurface Geology**

Site 7 overlies approximately 350 feet of unconsolidated Quaternary sediments, which in turn overlie the semiconsolidated bedrock of the Irvine Area Groundwater Basin. From youngest to oldest, the Quaternary deposits are differentiated into Holocene alluvial and colluvial deposits, primarily coarse stream channels with a matrix of finer overbank deposits, and Pleistocene beach-lagoonal and near-shore deposits (SAP, 1991).

Alluvium encountered during drilling consists of layered sequences dominated by variable mixtures of sands, silts, and clays (e.g., sandy clay, clayey silt). Thus, well-defined permeable units, such as well-sorted coarse sands, are infrequent. More detailed descriptions are provided on the soil boring logs presented in Appendix K and in the geologic cross section (Figure B7-2).

B7.6.3 **Analytical Results**

The analytical results for the vadose zone samples are described below and are summarized in Table B7-3. Wells B7_DGMW71, B7_DGMW72, and B7_DGMW91 are not located within a stratum and are discussed together. Compounds detected were hydrocarbons, six VOCs, one SVOC, and metals.

Hydrocarbons (TRPH, TFH). TRPH was detected in 4 of the 10 samples collected from 07_DBMW43, at depths of 5 feet (74 mg/kg), 10 feet (74 mg/kg), 15 feet (138 mg/kg), and 20 feet (117 mg/kg); TRPH was not detected in the duplicate samples collected at 15 and 20 feet. TRPH was also detected at 07_DBMW100 at 3 feet (72 mg/kg, estimated) and 109 feet (75 mg/kg). Petroleum hydrocarbons were not detected in the vadose zone samples from the other three wells. TFH-gasoline was not detected or was detected at concentrations of less than 1 mg/kg. TFH-diesel was not detected.

Volatile Organic Compounds (VOCs). VOCs were detected in Wells 07_DBMW43, 07_DBMW70, 07_DBMW100, and in downgradient Well 07_DGMW71.

- Well 07_DBMW43:
 - Acetone at 5 feet (74 $\mu\text{g}/\text{kg}$)
- Well 07_DBMW70:
 - 2-Butanone at 60 feet (4 $\mu\text{g}/\text{kg}$, estimated)
 - Acetone at 40 feet (10 $\mu\text{g}/\text{kg}$, estimated)
 - Methylene chloride at 130 feet (4 $\mu\text{g}/\text{kg}$, estimated)
 - Toluene at 100 feet (3 $\mu\text{g}/\text{kg}$, estimated)
- Well 07_DBMW100:
 - Acetone at 38 feet (8 $\mu\text{g}/\text{kg}$, estimated)
- Well 07_DGMW71:
 - 1,1-DCE at 110 feet (3 $\mu\text{g}/\text{kg}$, estimated)
 - TCE at 74 $\mu\text{g}/\text{kg}$ at 110 feet and 27 $\mu\text{g}/\text{kg}$ at 120 feet

With the exception of TCE (74 and 27 $\mu\text{g}/\text{kg}$, 07_DGMW71) and acetone (74 $\mu\text{g}/\text{kg}$, 07_DBMW43), all VOC concentrations were detected at less than or equal to 15 $\mu\text{g}/\text{kg}$. Acetone, methylene chloride, and 2-butanone are demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks were 37 $\mu\text{g}/\text{L}$, 42 $\mu\text{g}/\text{L}$, and 33 $\mu\text{g}/\text{L}$, respectively.

Semivolatile Organic Compounds (SVOCs). Only one SVOC, benzyl butyl phthalate, was detected above the CRDLs in the vadose zone soil samples. At 07_DBMW70, benzyl butyl phthalate was detected at 40 feet (900 $\mu\text{g}/\text{kg}$) and at 60 feet (1,100 $\mu\text{g}/\text{kg}$). Benzyl butyl phthalate was also identified below the CRDL at 07_DBMW70, 07_DGMW71, and 07_DGMW72.

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

Metals. Metals concentrations are presented in Table B7-3.

Total Organic Carbon (TOC). Total organic carbon (TOC) analyses were performed on the soil samples collected from below the water table at 07_DBMW70, 07_DBMW100, and 07_DGMW72. The TOC concentration was

below the CRDL in 07_DBMW100. TOC was detected in 07_DBMW43 (121 mg/kg) and 07_DBMW70 (164 mg/kg).

In summary, TRPH was detected (up to 138 mg/kg) in 07_DBMW43 and 07_DBMW100 and VOCs were detected (up to 74 $\mu\text{g}/\text{kg}$) in all but 07_DGMW72 and 07_DGMW91. SVOCs were detected (up to 1,100 $\mu\text{g}/\text{kg}$) in 07_DBMW70, 07_DGMW71, and 07_DGMW72. Pesticides and PCBs were not detected. TOC concentrations were as high as 212 mg/kg.

In general, the organic vapor analysis (OVA) data and the laboratory data agree in that they both indicate the presence of organic and/or petroleum compounds in the subsurface soil. Typically, the maximum OVA concentrations were recorded within the coarser-grained units (e.g., the sand lenses identified during drilling).

B7.6.4 Soil Vapor Headspace Concentrations

Field headspace values (presented in Attachment 1 to Appendix B), as measured with the OVA, were detected at low levels in each of wells. The maximum headspace values were found in Well 07_DGMW71 at 40 feet (8.0 ppmv) and 60 feet (16.0 ppmv). The headspace readings show little correlation with laboratory analytical results.

B7.7 Groundwater

B7.7.1 Site-Specific Hydrogeology

The static water levels recorded in Wells 07_DBMW43, 07_DBMW70, 07_DGMW71, 07_DGMW72, 07_DGMW91, 07_DBMW100 are indicated in Figure B7-2. Depth to water is 110 to 130 feet bgs. The horizontal hydraulic gradient measured across Site 7 is approximately 0.007 toward the northwest. The vertical hydraulic gradient is expected to be down at Site 7, in response to regional pumping of the underlying aquifers.

Table B7-4 summarizes well construction, pump type, and installation data. Pump and slug tests performed on the wells yielded hydraulic conductivities, transmissivities, and storativities ranging from 2 to 8 ft/day, 75 to 320 ft²/day, and 1E-08 to 1E-05, respectively, Table B7-5. The average linear groundwater velocity ranges from 0.07 to 0.28 feet/day, based on the hydraulic conductivities, a hydraulic gradient of 0.007, and an estimated porosity of 20 percent.

B7.7.2 Analytical Results

A summary of detected chemicals is presented in Table B7-6. Detected compounds were hydrocarbons, VOCs, and metals.

Hydrocarbons (TRPH, TPH). Only one hydrocarbon, TFH-diesel, was detected in groundwater samples. At Well 07_DBMW70, TFH-diesel was detected at 2,660 µg/L. Hydrocarbons were not detected in 07_DBMW43, 07_DBMW100, 07_DGMW71, 07_DGMW72, and 07_DGMW91 groundwater samples.

Volatile Organic Compounds (VOCs). VOCs were detected in groundwater at all of the Site 7 monitoring wells. Carbon tetrachloride was detected in all of the onsite deep boring/monitoring wells; it was detected above the MCL of 0.5 µg/l at 07_DBMW70 (1 µg/L) and 07_DBMW100 (0.6 µg/L, estimated). At 07_DBMW43, carbon tetrachloride was identified at below the CRDL at a concentration of 0.3 µg/L. Methylene chloride was detected only at 07_DBMW70 at a concentration of 2 µg/L (below the MCL). Methylene chloride is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 42 µg/L.

VOCs detected in the downgradient monitoring wells include TCE, PCE, carbon tetrachloride, chloroform, and methylene chloride. TCE was detected in groundwater at 07_DGMW72 (120 µg/L), 07_DGMW91 (48 µg/L), and 071_DGMW71 (23 µg/L); all of these values exceed the MCL of 5 µg/L for TCE. PCE was detected in groundwater at 07_DGMW72 (2 µg/L) and 07_DGMW91 (3 µg/L); these values are below the MCL concentration of 5 µg/L. Carbon

tetrachloride was detected in the groundwater at 07_DGMW72 (3 µg/L) and 07_DGMW91 (2 µg/L); these values exceed the MCL of 0.5 µg/L. Chloroform was detected in groundwater at 07_DGMW72 (4 µg/L) and 07_DGMW91 (3 µg/L), both below the MCL of 100 µg/L. 1,1-dichloroethene was identified below the CRDLs in the groundwater at 07_DGMW71. Methylene chloride is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 42 µg/L.

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

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

Metals and Cyanide. Metals detected above MCLs in Well 07_DGMW91 include cadmium (10 µg/L) and manganese (102 µg/L). Metals detected above MCLs in 07_DBMW43 include manganese (91 µg/L) and selenium (21 µg/L). Selenium was detected above the MCL in Wells 07_DBMW70 (34 µg/L), 07_DGMW71 (18 µg/L), and 07_DBMW100 (11 µg/L). Cyanide was also detected, at a concentration of 5.5 µg/L at Well 07_DBMW72; however, cyanide was also detected in the laboratory blank.

General Chemistry. At 07_DBMW43, the alkalinity of the sampled groundwater (as CaCO₃) is 126 mg/L, the bicarbonate concentration is 153 mg/L, and the concentration of total dissolved solids (TDS) is 880 mg/L. The chloride, sulfate, and nitrate/nitrite-N levels are 185 mg/L, 144 mg/L, and 14.8 mg/L, respectively.

At Well 07_DBMW70, the alkalinity (as CaCO₃) is 126 mg/L, the bicarbonate concentration is 154 mg/L, and TDS measures 1,210 mg/L. The chloride, sulfate, and nitrate/nitrite-N levels are 267 mg/L, 319 mg/L, and 17.1 mg/L, respectively, all of which exceed the MCLs. Field pH was 6.88, field electrical conductivity (EC) was 1,690, and groundwater temperature was 24.4°C.

At Well 07_DGMW71, the alkalinity (as CaCO₃) is 182 mg/L, the bicarbonate concentration is 222 mg/L, and TDS measures 937 mg/L. The chloride, sulfate,

and nitrate/nitrite-N levels are 217 mg/L, 174 mg/L, and 15.4 mg/L, respectively, all of which exceed the MCLs. Field pH was 7.14, field EC was 1,320, and the groundwater temperature was 22.8°C.

At Well 07_DGMW72, the alkalinity (as CaCO₃) is 209 mg/L, the bicarbonate concentration is 255 mg/L, and TDS measured 1,120 mg/L. The chloride, sulfate, and nitrate/nitrite-N levels are 241 mg/L, 112 mg/L, and 14.8 mg/L, respectively. Field pH was 7.13, field Electrical Conductivity (EC) was 1,460, and groundwater temperature was 22.7°C.

At Well 07_DGMW91, the alkalinity (as CaCO₃) is 200 mg/L, the bicarbonate concentration is 244 mg/L, and TDS measures 913 mg/L. The chloride, sulfate, and nitrate/nitrite-N levels are 192 mg/L, 168 mg/L, and 17.7 mg/L, respectively. Field pH was 7.13, field EC was 1,360, and groundwater temperature was 24.0°C.

At Well 07_DBMW100, the nitrate/nitrite-N concentrations are 9.27 mg/L and 9.37 mg/L. Field pH was 6.94, field EC was 1,150, and groundwater temperature was 23.0°C.

In general, Site 7 groundwaters are calcium chloride type water and exceed regulatory guidelines for one or more of the following: TDS, chloride, sulfate, nitrite, and selenium. Stiff and Piper diagrams for this site are found in Appendix J.

In summary, TFH-diesel was detected (2,660 µg/L) in 07_DBMW70 and VOCs were detected (up to 120 µg/L) in all site and downgradient wells. SVOCs, pesticides, and PCBs were not detected in any of the site or downgradient wells. Elevated metals include: cadmium (10 µg/L in 07_DGMW91), manganese (102 µg/L in 07_DGM91, 91 µg/L in 07_DBMW43), and selenium (21 µg/L in 07_DBMW43, 34 µg/L in 07_DBM70, 18 µg/L in 07_DGMW71, and 11 µg/L in 07_DGMW100). Lastly, cyanide at 5.5 µg/L was detected in 07_DBMW72. Note that cyanide was also detected in the laboratory blank.

B7.7.3 Comparison with Drinking Water Standards

Analytical results are compared to the most stringent of three drinking water criteria: EPA MCL, California MCL, and California action levels. Groundwater samples exceed the drinking water criteria for various constituents. Following is a summary of the constituents exceeding drinking water standards in the three wells within the site boundaries and the three downgradient wells:

Site Wells

- 07_DBMW43, selenium, and nitrate/nitrite-N,
- 07_DBMW70, carbon tetrachloride, selenium, and nitrate/nitrite-N,
- 07_DBMW100, selenium, carbon tetrachloride

Downgradient Wells

- 07_DGMW71, TCE, selenium, nitrate/nitrite-N, and TDS
- 07_DGMW72, carbon tetrachloride, TCE, nitrate/nitrite-N, and TDS
- 07_DGMW91, carbon tetrachloride, TCE, cadmium, manganese, nitrate/nitrite-N, and TDS

Regulatory exceedances are summarized in Table B7-7.

B7.8 Potential Contaminant Migration Pathways

Surface water and groundwater are the most likely potential contaminant migration pathways. The likely surface water pathways are from the catch basin (north of Building 295) to the Agua Chinon Wash, and surface water runoff from the paved area into the drainage ditch (Stratum 4) and towards Agua Chinon Wash. Groundwater contaminant transport would be expected to result from the infiltration of contaminated surface waters or, in areas where noncontaminated precipitation infiltrates through vadose zone contaminants. There is minimal infiltration in the paved areas of Strata 2 and 5.

B7.9 Summary and Conclusions

In summary, hydrocarbons, VOCs, and metals were detected in all media: surface and near-surface soils, vadose soils, and groundwater. Additional detected compounds include SVOCs (surface and near-surface soils, vadose soils) and pesticides (surface and near-surface soils).

The VOC groundwater contamination (TCE) identified at and immediately downgradient of Site 7 appears to have resulted from a source, or sources, at or just west of Site 7. Site 7 does appear to be a contributor to the regional groundwater VOC contamination.

- Table B7-1: Types of Samples and Chemical Analyses
- Table B7-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil
- Table B7-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples
- Table B7-4: Well Construction Details
- Table B7-5: Summary of Hydraulic Parameters
- Table B7-6: Summary of Detected Chemicals in Groundwater Samples
- Table B7-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

**Table B7-1
Site 7 (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															
1	07_ST1	S1454098	0	X	X	X		X	X	X					
		S1454107	2	X	X	X		X	X	X					
		S1454097	4	X	X	X		X	X	X					
	07_ST2	S1454102	0	X	X	X		X	X	X					
S1454106		2	X	X	X		X	X	X						
07_ST3	S1454072	0	X	X	X		X	X	X						
	S1454063	2	X	X	X		X	X	X						
	S1454065	4	X	X	X		X	X	X						
07_STDB	S1454073	0	X	X	X		X	X	X						
	S1454572 ^b	0	X	X	X		X	X	X						
2	07_OP1	S1454069	0	X	X	X		X	X	X					
		S1454067	2	X	X	X		X	X	X					
		S1454077	4	X	X	X		X	X	X					
07_OP2	S1454076	0	X	X	X		X	X	X						
	S1454068	2	X	X	X		X	X	X						
07_OP3	S1454099	0	X	X	X		X	X	X						
	S1454566 ^b	0	X	X	X		X	X	X						
	S1454084	2	X	X	X		X	X	X						
	S1454100	4	X	X	X		X	X	X						
3	07_NP1	S1454087	0	X	X	X		X	X	X					
		S1454089	2	X	X	X		X	X	X					
	07_NP2	S1454092	0	X	X	X		X	X	X					
S1454093		2	X	X	X		X	X	X						
S1454473 ^b		2	X	X	X		X	X	X						
07_NP3	S1454095	0	X	X	X		X	X	X						
	S1454088	2	X	X	X		X	X	X						
	S1454474 ^b	2	X	X	X		X	X	X						
	S1454081	4	X	X	X		X	X	X						
4	07_DD1	S1454074	0	X	X	X		X	X	X					
		S1454075	2	X	X	X		X	X	X					
	07_DD2	S1454062	0	X	X	X		X	X	X					
S1454472 ^b		0	X	X	X		X	X	X						
S1454066		2	X	X	X		X	X	X						
07_DD3	S1454086	0	X	X	X		X	X	X						
	S1454090	2	X	X	X		X	X	X						
5	07_GN1	S1454096	0	X	X	X		X	X	X					
		S1454105	2	X	X	X		X	X	X					
		S1454558 ^b	2	X	X	X		X	X	X					
07_GN2	S1454083	0	X	X	X		X	X	X						
	S1454080	2	X	X	X		X	X	X						

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Location/ Stratum	Station Identifi- cation	Sample Identifi- cation	Sample Depth (ft)	Groups of Analytes Requested ^a											
				VOCs	Semi- VOCs	Pesti- cides/ PCBs	Herbi- cides	TPH	TFH	Metals	CN	Geni. Chem- istry	TOC	Dioxins/ Furans	Gross Alpha/ Beta
5	07_GN3	S1454070	0	X	X	X		X	X	X					
		S1454061	2	X	X	X		X	X	X					
Vadose Zone Soils															
	07_DBMW43	S1456099	5	X	X	X		X	X	X					
		S1456105 ^b	5	X	X	X		X	X	X					
		S1456108	10	X	X	X		X	X	X					
		S1456110	15	X	X	X		X	X	X					
		S1457060 ^b	15	X	X	X		X	X	X					
		S1456107	20	X	X	X		X	X	X					
		S1457061 ^b	20	X	X	X		X	X	X					
		S1456096	25	X	X	X		X	X	X					
		S1456097	50	X	X	X		X	X	X					
		S1456098	100	X	X	X		X	X	X					
		S145610601	165									X			
	07_DBMW70	S1456112	5	X	X	X		X	X	X					
		S1456117	10	X	X	X		X	X	X					
		S1456116	15	X	X	X		X	X	X					
		S1456111	20	X	X	X		X	X	X					
		S1456109	25	X	X	X		X	X	X					
		S1456100	40	X	X	X		X	X	X					
		S1456160 ^b	40	X	X	X		X	X	X					
		S1456101	60	X	X	X		X	X	X					
		S1456114	100	X	X	X		X	X	X					
				S1456106	130	X								X	
	07_DBMW100	S1457113	3	X	X	X		X	X	X					
		S1457114	8	X	X	X		X	X	X					
		S1457115	13	X	X	X		X	X	X					
		S1457116	18	X	X	X		X	X	X					
		S1456117	23	X	X	X		X	X	X					
		S1456118	28	X	X	X		X	X	X					
		S1457122 ^b	28	X	X	X		X	X	X					
		S1457119	38	X	X	X		X	X	X					
		S1457123 ^b	38	X	X	X		X	X	X					
		S1457120	109	X	X	X		X	X	X					
		S1457121	128	X								X			
	07_DGMW71	S1456103	110	X	X	X		X	X	X					
		S1456115	120	X									X		
	07_DGMW72	S1456113	90	X	X	X		X	X	X					
		S1456158 ^b	90	X	X	X		X	X	X					
		S1456102	110	X									X		
	07_DGMW91	S1456341	110	X	X	X		X	X	X					
		S1456342	120	X									X		
Groundwater															
	07_DBMW43	S1452046	150-190	X	X	X		X	X	X	X	X			
	07_DBMW70	S1452047	125-165	X	X	X		X	X	X	X	X			
	07_DBMW100	S1452328	131-171	X	X	X		X	X	X	X	X			
		S1452400 ^b	131-171	X	X	X		X	X	X	X	X			

**Table B7-1
Site 7 (OU-3): Types of Samples and Chemical Analyses
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Location/ Stratum	Station Identifi- cation	Sample Identifi- cation	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
DG	07_DGMW71	S1452048	115-155	X	X	X		X	X	X	X	X			
DG	07_DGMW72	S1452049	110-150	X	X	X		X	X	X	X	X			
DG	07_DGMW91	S1452117	110-150	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 B7-2

Site 7 (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	07_DD1		07_DD1		07_DD2		07_DD2		07_DD2		07_DD3		07_DD3		07_GH1	
		S1454074 (0)	DVF(a)	S1454075 (2)	DVF(a)	S1454062 (0)	DVF(a)	S1454472 (0)	DVF(a)	S1454066 (2)	DVF(a)	S1454086 (0)	DVF(a)	S1454090 (2)	DVF(a)	S1454098 (0)	DVF(a)
METALS																	
POTASSIUM	MG/KG	4350		2280		2540		2670		3290		2520		1140		2520	
ZINC	MG/KG	50.4		25.4		31.5		33.4		43.7		78		15.1		151	
THALLIUM	MG/KG	0.15	U	0.14	U	0.14	U	0.29	U	0.34	b	0.2	b	0.22	b	0.14	U
VANADIUM	MG/KG	36.1		16.2		26.4		26.9		33.5		18.6		10.3		20.1	
SODIUM	MG/KG	248	b	191	b	64.7	U	201	b	241	b	175	b	189	b	178	b
MANGANESE	MG/KG	249		188		183		196		240		183		111		177	
MERCURY	MG/KG	0.03	U	0.04	U	0.05	U	0.03	U								
LEAD	MG/KG	12.6		1.5		1.2		1.3		2.7		38.8		1.4		931	
ARSENIC	MG/KG	2.1		1.7	b	1.8	b	1.5	b	3.6		2.6		0.69	b	1.9	b
COPPER	MG/KG	8.8		3.8	b	4.9	b	5.2	b	9.5		23.1		3.5	b	18.5	
CHROMIUM	MG/KG	12		4.6		7.6		8.1		10.5		21.8		3.8		49	
COBALT	MG/KG	4.8	b	2.1	b	3.4	b	3.7	b	5.2	b	3.3	b	1.2	b	3.1	b
ALUMINIUM	MG/KG	12300		4520		7500		8550		9540		5540		2870		6020	
CADMIUM	MG/KG	1.3		0.52	b	0.87	b	0.85	b	2		5.3		0.59	b	2.8	
CALCIUM	MG/KG	6650		5530		10700		13000		10300		5230		3080		3450	
BERYLLIUM	MG/KG	0.32	J	0.1	UJ	0.11	J	0.22	J	0.38	J	0.1	UJ	0.1	UJ	0.1	UJ
SELENIUM	MG/KG	0.1	U	0.1	U	0.1	U	0.1	U	0.11	U	0.15	U	0.1	U	0.1	U
NICKEL	MG/KG	7.4	b	2	b	5.4	b	5.8	b	10.4		7.5	b	2.1	b	8.7	
MAGNESIUM	MG/KG	6440		3450		4710		5200		6030		3300		1770		3140	
BARIUM	MG/KG	253		93.5		0.24	UJ	115		141		95		40.4	b	91	
IRON	MG/KG	14900		6730		12.1	U	10700		12300		6210		4070		10200	
VOLATILE ORGANIC COMPOUNDS																	
METHYLENE CHLORIDE	UG/KG	10	U	10	U	10	U	10	U	11	U	-	-	-	-	10	U
TOLUENE	UG/KG	14	U	10	U	6	J	4	J	3	J	-	-	-	-	4	J
XYLENE (TOTAL)	UG/KG	10	U	10	U	10	U	10	U	11	U	-	-	-	-	10	U
CARBON TETRACHLORIDE	UG/KG	10	U	10	U	10	U	10	U	11	U	-	-	-	-	10	U
ACETONE	UG/KG	7	J	5	J	10	U	28	U	11	U	-	-	-	-	64	B
BENZENE	UG/KG	10	U	10	U	10	U	10	U	11	U	-	-	-	-	10	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	1400	
PYRENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	3500	
BENZO(GH)PERYLENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	6900	
INDENO(1,2,3-CD)PYRENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
BENZO(B)FLUORANTHENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
FLUORANTHENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	730	
BENZO(K)FLUORANTHENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
CHRYSENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	940	
BENZO(A)PYRENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
DIBENZO(A,H)ANTHRACENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
BENZO(A)ANTHRACENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
DIETHYL PHTHALATE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
PHENANTHRENE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
CARBAZOLE	UG/KG	680	U	680	U	670	U	680	U	750	U	-	-	-	-	670	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.41	U	3.42	U	3.35	U	3.38	U	3.74	U	-	-	-	-	66.9	
4,4'-DDT	UG/KG	3.41	U	3.42	U	3.35	U	3.38	U	3.74	U	-	-	-	-	115	
ENDRIN KETONE	UG/KG	3.41	U	3.42	U	3.35	U	3.38	U	3.74	U	-	-	-	-	33.7	U
DIELDRIN	UG/KG	3.41	U	3.42	U	3.35	U	3.38	U	3.74	U	-	-	-	-	25.3	
ENDRIN	UG/KG	3.41	U	3.42	U	3.35	U	3.38	U	3.74	U	-	-	-	-	6.54	
4,4'-DDD	UG/KG	3.41	U	3.42	U	3.35	U	3.38	U	3.74	U	-	-	-	-	38.4	
4,4'-DDE	UG/KG	3.41	U	3.42	U	3.35	U	3.38	U	3.74	U	-	-	-	-	33.7	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	12.9	U	12.9	U	12.7	U	12.8	U	14.2	U	37		12.7	U	426	
TFH GASOLINE	MG/KG	0.052	U	0.052	U	0.051	U	0.051	U	0.057	U	0.066		0.051	U	0.089	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	208		20	U	32091									

Table B7-2
Site 7 (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	07_GN1 S1484105 (2)	DVF(a)	07_GN1 S1484658 (2)	DVF(a)	07_GN2 S1484083 (0)	DVF(a)	07_GN2 S1484090 (2)	DVF(a)	07_GN3 S1484070 (0)	DVF(a)	07_GN3 S1484061 (2)	DVF(a)	07_NP1 S1484087 (0)	DVF(a)	07_NP1 S1484089 (2)	DVF(a)
METALS																	
POTASSIUM	MG/KG	3480		3720		1820		2940		1950		2200		3080		3180	
ZINC	MG/KG	41.1		43.6		44.7		46.5		40.3		24.2		107		37.1	
THALLIUM	MG/KG	0.17	b	0.18	b	0.15	U	0.15	U	0.17	U	0.15	U	0.23	b	0.28	b
VANADIUM	MG/KG	28.4		34.3		28.2		25.8		24.1		15.1		32.1		27.5	
SODIUM	MG/KG	282	b	325	b	444	b	315	b	436	b	197	b	258	b	720	b
MANGANESE	MG/KG	229		249		234		207		219		150		218		206	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.03	U	0.17		0.51		0.03	U	0.03	U
LEAD	MG/KG	15		2.5		14.6		35.1		9.1		1.5		311		2.2	
ARSENIC	MG/KG	2.1	b	1.8	b	3.8		3.1		3.7		1.3	b	2	b	3.2	
COPPER	MG/KG	7.4		8.1		13.6		8.8		11.5		4.8	b	46		5.6	
CHROMIUM	MG/KG	11.2		11.9		13.8		14.9		8.5		5.3		39		7.4	
COBALT	MG/KG	4.6	b	4.8	b	4.9	b	5	b	3.9	b	2.3	b	5.1	b	3.8	b
ALUMINUM	MG/KG	9310		10900		8260		7740		7190		4510		10100		7520	
CADMIUM	MG/KG	1.5		1.9		1	b	1.3		0.7	b	0.89	b	4.2		0.77	b
CALCIUM	MG/KG	3610		4070		21300		5270		15800		2090		7390		6570	
BERYLLIUM	MG/KG	0.11	J	0.28	J	0.19	b	0.39	b	0.32	b	0.28	b	0.32	J	0.11	U
SELENIUM	MG/KG	0.21	U	0.3	U	0.11	U	0.11	U	0.12	b	0.11	U	0.1	U	0.13	U
NICKEL	MG/KG	8.3	b	10.1		14.3		8.2	b	9.8		5.2	b	10.7		5.2	b
MAGNESIUM	MG/KG	4390		5180		4220		4140		3900		2280		5750		5390	
BARIUM	MG/KG	126		129		87.1		117		82.5		86.4		534		144	
IRON	MG/KG	11900		13900		12300		11500		11600		6680		13500		10500	
VOLATILE ORGANIC COMPOUNDS																	
METHYLENE CHLORIDE	UG/KG	11	U	11	U	5	JB	-		11	U	10	U	11	U	11	U
TOLUENE	UG/KG	11	U	11	U	10	U	10	U	14		12		13		11	U
XYLENE (TOTAL)	UG/KG	11	U	11	U	10	U	10	U	3	J	11	U	10	U	11	U
CARBON TETRACHLORIDE	UG/KG	11	U	11	U	10	U	10	U	11	U	11	U	10	U	11	U
ACETONE	UG/KG	18		16	U	10	U	24		11	U	11	U	10	U	8	J
BENZENE	UG/KG	11	U	11	U	10	U	10	U	11	U	11	U	10	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	490	J	710	U
PYRENE	UG/KG	710	U	710	U	400	J	690	U	700	U	290	J	3400		710	U
BENZO(GH)PERYLENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	730		710	U
INDENO(1,2,3-CD)PYRENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	1500		710	U
BENZO(B)FLUORANTHENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	2800		710	U
FLUORANTHENE	UG/KG	710	U	710	U	330	J	690	U	700	U	1400	U	4100		710	U
BENZO(K)FLUORANTHENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	1200		710	U
CHRYSENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	2400		710	U
BENZO(A)PYRENE	UG/KG	710	U	710	U	370	J	690	U	700	U	1400	U	1800		710	U
DIBENZO(A,H)ANTHRACENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	410	J	710	U
BENZO(A)ANTHRACENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	1300		710	U
DIETHYL PHTHALATE	UG/KG	710	U	710	U	1400	U	240	J	700	U	1400	U	680	U	710	U
PHENANTHRENE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	1300		710	U
CARBAZOLE	UG/KG	710	U	710	U	1400	U	690	U	700	U	1400	U	480	J	710	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.57	U	3.55	U	34.6	U	17.2	U	3.51	U	34.9	U	33.9	U	3.56	U
4,4'-DDT	UG/KG	3.57	U	3.55	U	34.6	U	17.2	U	3.51	U	34.9	U	33.9	U	3.56	U
ENDRIN KETONE	UG/KG	3.57	U	3.55	U	34.6	U	17.2	U	3.51	U	34.9	U	33.9	U	3.56	U
DIELDRIN	UG/KG	3.57	U	3.55	U	34.6	U	17.2	U	3.51	U	34.9	U	33.9	U	3.56	U
ENDRIN	UG/KG	3.57	U	3.55	U	34.6	U	17.2	U	3.51	U	34.9	U	33.9	U	3.56	U
4,4'-DDD	UG/KG	3.57	U	3.55	U	34.6	U	17.2	U	3.51	U	34.9	U	33.9	U	3.56	U
4,4'-DDE	UG/KG	3.57	U	3.55	U	34.6	U	17.2	U	3.51	U	34.9	U	33.9	U	3.56	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	16.9		13.5	U	68.8		30.3		13.2	U	148		118	U	13.5	U
TFH GASOLINE	MG/KG	0.054	U	0.054	U	0.103		0.111		0.053	U	0.053	U	0.052	U	0.054	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	145		1007		4074		963		20	U	2222		20	U	20	U

Table B7-2

Site 7 (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	07_NP2 S1454092 (0)	DVF(a)	07_NP2 S1454093 (2)	DVF(a)	07_NP2 S1454473 (2)	DVF(a)	07_NP3 S1454095 (0)	DVF(a)	07_NP3 S1454088 (2)	DVF(a)	07_NP3 S1454474 (2)	DVF(a)	07_NP3 S1454081 (4)	DVF(a)	07_OP1 S1454089 (0)	DVF(a)
METALS																	
POTASSIUM	MG/KG	2190		4150		2950		3020		2230		1720		3430		866	b
ZINC	MG/KG	147		50.5		58.1		52.9		28.6		21.3		42.7		15.2	
THALLIUM	MG/KG	0.14	U	0.15	U	0.14	U	0.21	b	0.17	b	0.15	U	0.47	b	0.15	U
VANADIUM	MG/KG	19.8		40.1		32.4		30.5		20.3		17.9		31.3		9.4	b
SODIUM	MG/KG	221	b	258	b	285	b	200	b	163	b	192	b	236	b	248	b
MANGANESE	MG/KG	170		272		226		200		155		153		238		74.8	
MERCURY	MG/KG	0.05	U	0.03	U												
LEAD	MG/KG	98.9		1.8		40.8		27		5		1		3.3		2.3	
ARSENIC	MG/KG	2.2		2.4		4.4		2.3		0.84	b	1.2	b	3.3		1.2	b
COPPER	MG/KG	12.4		7.8		16.4		8.5		5.4		3.8	b	8.6		6.7	
CHROMIUM	MG/KG	23.5		12.2		30.1		18.5		6.5		5.1		10.3		3.4	
COBALT	MG/KG	4.2	b	5.8	b	5	b	4.7	b	2.9	b	2	b	4.3	b	31.2	
ALUMINIUM	MG/KG	6080		12100		11000		10900		6110		4780		9500		2840	
CADMIUM	MG/KG	2.1		1.4		2.7		3		0.85	b	0.75	b	1.4		0.7	b
CALCIUM	MG/KG	10800		14300		12800		6760		5580		5290		8670		18200	
BERYLLIUM	MG/KG	0.1	UJ	0.15	J	0.32	J	0.21	J	0.1	UJ	0.1	UJ	0.32	J	0.15	b
SELENIUM	MG/KG	0.1	U	0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.12	U	0.11	U
NICKEL	MG/KG	16.4		7.7	b	10.7		6.5	b	3.7	b	3.2	b	7.2	b	3.7	b
MAGNESIUM	MG/KG	4230		7880		6050		4770		3370		2730		5440		1500	
BARIUM	MG/KG	729		174		184		118		87.2		86.8		137		46	
IRON	MG/KG	8550		15800		13200		12000		8140		6780		12300		3570	
VOLATILE ORGANIC COMPOUNDS																	
METHYLENE CHLORIDE	UG/KG	10	U	11	U	6	U										
TOLUENE	UG/KG	9	J	11	U	8	J	10	U	10	U	10	U	2	J	11	U
XYLENE (TOTAL)	UG/KG	10	U	11	U	10	U	10	U	10	U	10	U	11	U	11	U
CARBON TETRACHLORIDE	UG/KG	10	U	11	U	10	U	10	U	10	U	10	U	11	U	13	U
ACETONE	UG/KG	5	J	5	J	30	U	10	J	6	J	5	J	11	U	13	U
BENZENE	UG/KG	10	U	11	U	10	U	10	U	10	U	10	U	11	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	280	J	710	U	670	U	670	U	690	U	880	U	720	U	710	U
PYRENE	UG/KG	2200		710	U	710		670	U	690	U	880	U	720	U	710	U
BENZO(GH)PERYLENE	UG/KG	670	U	710	U	670	U	670	U	690	U	880	U	720	U	710	U
INDENO(1,2,3-CD)PYRENE	UG/KG	540	J	710	U	670	U	670	U	690	U	880	U	720	U	710	U
BENZO(B)FLUORANTHENE	UG/KG	1000		710	U	230	J	670	U	690	U	880	U	720	U	710	U
FLUORANTHENE	UG/KG	2600		710	U	830		670	U	690	U	880	U	720	U	710	U
BENZO(K)FLUORANTHENE	UG/KG	770		710	U	220	J	670	U	690	U	880	U	720	U	710	U
CHRYSENE	UG/KG	1100		710	U	310	J	670	U	690	U	880	U	720	U	710	U
BENZO(A)PYRENE	UG/KG	740		710	U	160	J	670	U	690	U	880	U	720	U	710	U
DIBENZO(A,H)ANTHRACENE	UG/KG	670	U	710	U	670	U	670	U	690	U	880	U	720	U	710	U
BENZO(A)ANTHRACENE	UG/KG	580	J	710	U	670	U	670	U	690	U	880	U	720	U	710	U
DIETHYL PHTHALATE	UG/KG	670	U	710	U	670	U	670	U	690	U	880	U	720	U	710	U
PHENANTHRENE	UG/KG	1200		710	U	280	J	670	U	690	U	880	U	720	U	710	U
CARBAZOLE	UG/KG	320	J	710	U	670	U	670	U	690	U	880	U	720	U	710	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	18.8	U	3.56	U	4.52	U	0.881		3.43	U	3.41	U	3.6	U	-	
4,4'-DDT	UG/KG	18.8	U	3.56	U	3.38	U	3.77		3.43	U	3.41	U	3.6	U	-	
ENDRIN KETONE	UG/KG	18.8	U	3.56	U	2.1		3.34	U	3.43	U	3.41	U	3.6	U	-	
DIELDRIN	UG/KG	18.8	U	3.56	U	0.186		3.34	U	3.43	U	3.41	U	3.6	U	-	
ENDRIN	UG/KG	18.8	U	3.56	U	3.38	U	3.34	U	3.43	U	3.41	U	3.6	U	-	
4,4'-DDD	UG/KG	18.8	U	3.56	U	3.38	U	3.34	U	3.43	U	3.41	U	3.6	U	-	
4,4'-DDE	UG/KG	18.8	U	3.56	U	3.38	U	3.34	U	3.43	U	3.41	U	3.6	U	-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	110		13.5	U	20.8		12.8	U	13	U	12.9	U	13.6	U	43.3	
TFH GASOLINE	MG/KG	0.051	U	0.054	U	0.051	U	0.124		0.052	U	0.052	U	0.055	U	0.378	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	94													

Table B7-2

Site 7 (OU-3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

NCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	07_OP1 S1484067 (2)	DVF(a)	07_OP1 S1484077 (4)	DVF(a)	07_OP2 S1484076 (0)	DVF(a)	07_OP2 S1484088 (2)	DVF(a)	07_OP3 S1484099 (0)	DVF(a)	07_OP3 S1484866 (0)	DVF(a)	07_OP3 S1484084 (2)	DVF(a)	07_OP3 S1484100 (4)	DVF(a)
METALS																	
POTASSIUM	MG/KG	2560		3900		1190		1420		2200		2780		3760		2420	
ZINC	MG/KG	29.9		42.2		15.7		16.1		34.5		41.9		47.5		32.6	
THALLIUM	MG/KG	0.16	U	0.16	U	0.16	U	0.15	U	0.15	U	0.15	U	0.17	b	0.16	U
VANADIUM	MG/KG	21.7		32		13.4		10	b	18.9		29		40.7		22.1	
SODIUM	MG/KG	279	b	483	b	254	b	191	b	249	b	283	b	350	b	277	b
MANGANESE	MG/KG	188		244		88.1		101		239		271		259		203	
MERCURY	MG/KG	0.03	U														
LEAD	MG/KG	17.2		2.3		1		0.82		5.1		4.3		2.8		2.1	
ARSENIC	MG/KG	1.6	b	2.3		1.5	b	0.55	b	5.8		5		2.6		1.5	b
COPPER	MG/KG	8.6		6.4		3.3	b	2.7	b	8.1		10		8.6		6.4	
CHROMIUM	MG/KG	7.8		9.4		4		2.8		6.9		10.6		14.2		6.7	
COBALT	MG/KG	3.7	b	4.9	b	1.4	b	1.8	b	16.7		16.1		6.1	b	3.3	b
ALUMINUM	MG/KG	6500		8680		4250		2770		5390		9070		14000		6320	
CADMIUM	MG/KG	0.95	b	0.8	b	0.41	b	0.39	b	1.1		1.4		1.6		0.98	b
CALCIUM	MG/KG	3140		7920		21000		1880		9580		8820		4070		3750	
BERYLLIUM	MG/KG	0.31	b	0.36	b	0.16	U	0.23	U	0.37	b	0.46	b	0.49	b	0.5	b
SELENIUM	MG/KG	0.11	U	0.12	U	0.11	U										
NICKEL	MG/KG	7.2	b	7.8	b	2.6	b	2	b	7.7	b	11.5		10		6.8	b
MAGNESIUM	MG/KG	3330		8170		2020		1800		2960		3790		6070		4040	
BARIUM	MG/KG	91.2		143		56.4		57		108		110		140		122	
IRON	MG/KG	9040		12800		5110		4270		10300		14500		16000		9070	
VOLATILE ORGANIC COMPOUNDS																	
METHYLENE CHLORIDE	UG/KG	6	U	8	U	12	U	13	U	29	U	30	U	48	U	6	U
TOLUENE	UG/KG	11	U	12	U	12	U	11	U								
XYLENE (TOTAL)	UG/KG	11	U	12	U	12	U	11	U								
CARBON TETRACHLORIDE	UG/KG	11	U	12	U	12	U	11	U								
ACETONE	UG/KG	11	U	23	U	13	U	13	U	22	U	40	U	54	U	13	U
BENZENE	UG/KG	11	U	12	U	12	U	11	U								
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
PYRENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
BENZO(GH)PERYLENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
INDENO(1,2,3-CD)PYRENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
BENZO(B)FLUORANTHENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
FLUORANTHENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
BENZO(K)FLUORANTHENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
CHRYSENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
BENZO(A)PYRENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
DIBENZO(A,H)ANTHRACENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
BENZO(A)ANTHRACENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
DIETHYL PHTHALATE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
PHENANTHRENE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
CARBAZOLE	UG/KG	730	U	810	U	780	U	700	U	710	U	720	U	750	U	740	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	-		-		3.6	U	3.52	U	-		-		-		-	
4,4'-DDT	UG/KG	-		-		3.6	U	3.52	U	-		-		-		-	
ENDRIN KETONE	UG/KG	-		-		3.6	U	3.52	U	-		-		-		-	
DIELDRIN	UG/KG	-		-		3.6	U	3.52	U	-		-		-		-	
ENDRIN	UG/KG	-		-		3.6	U	3.52	U	-		-		-		-	
4,4'-DDD	UG/KG	-		-		3.6	U	3.52	U	-		-		-		-	
4,4'-DDE	UG/KG	-		-		3.6	U	3.52	U	-		-		-		-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.9	U	15.4	U	25		17.4		13.4	U	13.6	U	14.3	U	13.9	U
TFH GASOLINE	MG/KG	0.113		0.062	U	0.058	U	0.053	U	0.054	U	0.055	U	0.057	U	0.056	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U														

Table B7-2

Site 7 (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	07_ST1 S1484098 (0)	DVF(a)	07_ST1 S1484107 (2)	DVF(a)	07_ST2 S1484102 (0)	DVF(a)	07_ST2 S1484106 (2)	DVF(a)	07_ST2 S1484097 (4)	DVF(a)	07_ST3 S1484072 (0)	DVF(a)	07_ST3 S1484063 (2)	DVF(a)	07_ST3 S1484065 (4)	DVF(a)
METALS																	
POTASSIUM	MG/KG	3180		5480		2850		3320		2010		2050		3750		3720	
ZINC	MG/KG	50.5		65.5		150		37.5		23.3		79.7		43.2		47.2	
THALLIUM	MG/KG	0.14	U	0.37	b	0.14	UJ	0.15	UJ	0.15	UJ	0.17	b	0.2	b	0.16	U
VANADIUM	MG/KG	34.9		54.6		37.1		29.7		20.6		30.2		31.4		36.5	
SODIUM	MG/KG	220	b	930	b	282	b	277	b	252	b	259	b	303	b	433	b
MANGANESE	MG/KG	269		325		246		206		141		216		244		259	
MERCURY	MG/KG	0.03	U	0.04	U	0.03	U										
LEAD	MG/KG	38.6		2.2		139		1.5		0.87		0.53		0.01		0.02	
ARSENIC	MG/KG	5.1		3		5.2		2.1	b	1.2	b	4.5		1.6	b	2.8	
COPPER	MG/KG	18.3		11		20.1		5.6		4.3	b	15.7		7.4		8.1	
CHROMIUM	MG/KG	13.2		15.7		17.5		7.8		5.8		62		9.8		10.5	
COBALT	MG/KG	5.7	b	8.3	b	4.6	b	4.2	b	2.8	b	4.4	b	5.1	b	6	b
ALUMINUM	MG/KG	10900		16900		7770		7810		5850		6970		9570		11200	
CADMIUM	MG/KG	1.5		1.4		2.8		0.6	b	0.37	b	2.2		0.6	b	0.72	b
CALCIUM	MG/KG	11600		19200		10400		11400		6120		12800		6830		15200	
BERYLLIUM	MG/KG	0.48	b	0.72	b	0.32	b	0.36	b	0.25	b	0.26	J	0.28	J	0.51	J
SELENIUM	MG/KG	0.1	U	0.12	U	0.1	UJ	0.11	UJ	0.11	UJ	0.11	U	0.11	U	0.11	U
NICKEL	MG/KG	13.8		11.1		16.1		3.3	b	2.9	b	14.5		6.5	b	5.6	b
MAGNESIUM	MG/KG	5040		10800		4740		5520		3710		4220		5710		7530	
BARIUM	MG/KG	130		202		505		112		75.6		210		146		189	
IRON	MG/KG	15000		21400		12300		11900		7770		11200		13000		15100	
VOLATILE ORGANIC COMPOUNDS																	
METHYLENE CHLORIDE	UG/KG	33	U	12	U	10	U	14		10	U	11	U	11	U	14	U
TOLUENE	UG/KG	7	J	12	U	6	J	11	U	10	U	3	J	11	U	11	U
XYLENE (TOTAL)	UG/KG	10	U	12	U	10	U	11	U	10	U	11	U	11	U	11	U
CARBON TETRACHLORIDE	UG/KG	2	J	12	U	10	U	11	U	10	U	11	U	11	U	11	U
ACETONE	UG/KG	37		19		38	U	25	U	12	U	11	U	11	U	27	
BENZENE	UG/KG	10	U	12	U	9	J	11	U	10	U	11	U	11	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	370	J	710	U	710	U
PYRENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	1000	J	710	U	710	U
BENZO(GH)PERYLENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	290	J	710	U	710	U
INDENO(1,2,3-CD)PYRENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	350	J	710	U	710	U
BENZO(B)FLUORANTHENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	1200	J	710	U	710	U
FLUORANTHENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	1500	J	710	U	710	U
BENZO(K)FLUORANTHENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	970	J	710	U	710	U
CHRYSENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	980	J	710	U	710	U
BENZO(A)PYRENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	600	J	710	U	710	U
DIBENZO(A,H)ANTHRACENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	1400	U	710	U	710	U
BENZO(A)ANTHRACENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	600	J	710	U	710	U
DIETHYL PHTHALATE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	1400	U	710	U	710	U
PHENANTHRENE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	610	J	710	U	710	U
CARBAZOLE	UG/KG	1300	U	810	U	21000	U	710	U	690	U	1400	U	710	U	710	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	33.4	U	4.04	U	-	-	3.54	U	3.46	U	35	U	3.56	U	3.57	U
4,4'-DDT	UG/KG	200		4.04		-	-	3.54	U	3.46	U	39.3		3.56	U	3.57	U
ENDRIN KETONE	UG/KG	33.4	U	4.04	U	-	-	3.54	U	3.46	U	35	U	3.56	U	3.57	U
DIELDRIN	UG/KG	33.4	U	4.04	U	-	-	3.54	U	3.46	U	35	U	3.56	U	3.57	U
ENDRIN	UG/KG	33.4	U	4.04	U	-	-	3.54	U	3.46	U	35	U	3.56	U	3.57	U
4,4'-DDE	UG/KG	163		4.04		-	-	3.54	U	3.46	U	35	U	3.56	U	3.57	U
4,4'-DDE	UG/KG	38.7		4.04		-	-	3.54	U	3.46	U	35	U	3.56	U	3.57	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TPH DIESEL	MG/KG	27.5		17.9		666		13.4	U	13.1	U	20.6		13.5	U	13.5	U
TPH GASOLINE	MG/KG	0.072		0.061	U	2.88		0.054	U	0.052	U	0.251		0.054	U	0.054	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	942		20	U	3329		20	U	20	U	3188		20	U	20	U

Table B7-3

Site 7 (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	07_DBMW100 S1457113 (3)	DVF(a)	07_DBMW100 S1457114 (8)	DVF(a)	07_DBMW100 S1457115 (13)	DVF(a)	07_DBMW100 S1457116 (18)	DVF(a)	07_DBMW100 S1457117 (23)	DVF(a)	07_DBMW100 S1457118 (28)	DVF(a)	07_DBMW100 S1457122 (28)	DVF(a)	07_DBMW100 S1457119 (38)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.46	U	0.48	U	0.47	U	0.58	b	0.47	U	0.49	U	0.46	U	0.5	b
ALUMINUM	MG/KG	5950		10200		4760		11000		9540		3430		3960		9580	
ARSENIC	MG/KG	1.3	b	3.1		1.8	b	2.6		1.4	b	2	b	2	b	1.1	b
BARIUM	MG/KG	77		102		58.4		99.7		101		44.7	b	112		65.4	
BERYLLIUM	MG/KG	0.49	U	0.55	U	0.44	U	0.51	U	0.79	U	0.49	U	0.45	U	0.7	U
CALCIUM	MG/KG	2930		5140		3130		6480		5520		2610		3190		2500	
CADMIUM	MG/KG	0.85	b	1.5		1.9		1.2		0.8	b	0.88	b	0.82	b	0.75	b
COBALT	MG/KG	2.8	b	4.8	b	3.9	b	4.5	b	4.3	b	1.8	b	2.4	b	4.9	b
CHROMIUM	MG/KG	7.1		11.9		9.8		10.8		7.9		3.5		4.6		10.2	
COPPER	MG/KG	6.8		9.9		4.9	b	8		9		3.8	b	4	b	4.9	b
IRON	MG/KG	8780		12800		7260		12100		11900		4730		5110		10500	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	2160		2690		1830		2700		2510		1060	b	1270		2300	
MAGNESIUM	MG/KG	3420		5170		2180		4500		4260		1580		1920		3030	
MANGANESE	MG/KG	176		225		174		218		231		113		137		181	
SODIUM	MG/KG	282	b	353	b	387	b	322	b	332	b	204	b	299	b	424	b
NICKEL	MG/KG	7.2	U	14.3		12.8		8.7	b	6.9	U	5.2	U	4.7	U	7	U
LEAD	MG/KG	1.7		3.2		1.7		2.6		1.8		2.2		1.8		2.2	
ANTIMONY	MG/KG	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.6	U	2.8	U
SELENIUM	MG/KG	0.27	U	0.12	U	0.17	U	0.12	U	0.11	U	0.12	U	0.11	U	0.12	U
THALLIUM	MG/KG	0.2	b	0.42	b	0.25	b	0.16	U	0.16	U	0.31	b	0.15	U	0.16	U
VANADIUM	MG/KG	21.6		33.1		20.5		28.4		24.3		11.1	b	11.7		23.6	
ZINC	MG/KG	29.2		43.9		24.6		36.6		37.2		14.7		17.9		27.6	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	11	U	12	U	12	U	12	U	12	U	10	U	12	U
ACETONE	UG/KG	17	U	16	U	26	U	32	U	33	U	20	U	10	U	8	J
METHYLENE CHLORIDE	UG/KG	11	U	11	U	28	U	37	U	30	U	13	U	10	U	12	U
1,1-DICHLOROETHENE	UG/KG	11	U	11	U	12	U	12	U	12	U	12	U	10	U	12	U
2-BUTANONE	UG/KG	11	U	11	U	12	U	12	U	12	U	12	U	10	U	12	U
TRICHLOROETHYLENE	UG/KG	11	U	11	U	12	U	12	U	12	U	12	U	10	U	12	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BENZYL BUTYL PHTHALATE	UG/KG	700	U	740	U	780	U	780	U	810	U	780	U	690	U	780	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.134		0.058	U	0.058	U	0.059	U	0.082	U	0.059	U	0.06		0.058	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	72	J	20	UJ	20	UJ	20	UJ	20	UJ	20	UJ	-		20	UJ

Table B7-3

Site 7 (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	07_DBMW100 S1457120 (109)	DVF(a)	07_DBMW100 S1457121 (128)	DVF(a)	07_DBMW43 S1456099 (8)	DVF(a)	07_DBMW43 S1456105 (8)	DVF(a)	07_DBMW43 S1456108 (10)	DVF(a)	07_DBMW43 S1456110 (15)	DVF(a)	07_DBMW43 S1456060 (15)	DVF(a)	07_DBMW43 S1456107 (20)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		100	U	-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.39	U	-		0.51	U	0.48	U	0.5	U	0.43	U	0.43	U	0.5	U
ALUMINIUM	MG/KG	10500		-		7820		9180		12400		1780		2110		9120	
ARSENIC	MG/KG	2.4	b	-		2.2	b	3.8		3.4		0.19	b	0.77	b	2.7	
BARIUM	MG/KG	111		-		91.5		142		171		11.3	b	16.2	b	81.5	
BERYLLIUM	MG/KG	0.58	b	-		0.51	U	0.3	U	0.54	U	0.1	U	0.1	U	0.4	U
CALCIUM	MG/KG	8420		-		4330		14700		8850		425	b	597	b	8800	
CADMIUM	MG/KG	1.4		-		3		0.88	b	1.4		0.25	U	0.25	U	0.29	U
COBALT	MG/KG	5.9	b	-		5.2	b	4.3	b	5.2	b	1.2	U	1.2	U	3.3	b
CHROMIUM	MG/KG	12.3		-		10.8		9.8		13.5		1.3	b	1.5	b	8.7	
COPPER	MG/KG	5.3	b	-		8.5		8.6		10.8		0.92	b	1.3	b	4.7	b
IRON	MG/KG	13100		-		13600		12000		15700		1480		2050		14100	
MERCURY	MG/KG	0.28		-		0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.05	U
POTASSIUM	MG/KG	3420		-		2780		2970		2890		278	b	384	b	2240	
MAGNESIUM	MG/KG	4090		-		3270		5800		5980		372	b	561	b	4370	
MANGANESE	MG/KG	167		-		206		199		326		35.7		69.3		104	
SODIUM	MG/KG	834	U	-		369	b	348	b	474	b	152	b	170	b	507	b
NICKEL	MG/KG	12.1		-		14.4		8.8	U	13.1		1.6	U	1.6	U	2.8	U
LEAD	MG/KG	2.8		-		2		4.6		2.5		0.82		1.1		5.5	
ANTIMONY	MG/KG	3.2	U	-		2.9	U	2.7	U	2.9	U	2.5	U	2.5	U	2.9	U
SELENIUM	MG/KG	0.54	U	-		0.24	b	0.15	U	0.12	U	0.1	U	0.1	U	0.12	U
THALLIUM	MG/KG	0.41	U	-		0.24	U	0.18	U	0.52	U	0.27	U	0.17	U	0.28	U
VANADIUM	MG/KG	35.5		-		37		28.9		40.8		3.4	b	4.6	b	24.7	
ZINC	MG/KG	40.7		-		40		39.7		45.8		5.2		6.5		30	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	12	U	12	U	14	U	11	U	11	U	10	U	10	U	11	U
ACETONE	UG/KG	12	U	12	U	14	U	74	U	17	U	12	U	13	U	19	U
METHYLENE CHLORIDE	UG/KG	12	U	13	U	14	U	11	U	11	U	10	U	10	U	11	U
1,1-DICHLOROETHENE	UG/KG	12	U	12	U	14	U	11	U	11	U	10	U	10	U	11	U
2-BUTANONE	UG/KG	12	U	12	U	14	U	11	U	11	U	10	U	10	U	11	U
TRICHLOROETHYLENE	UG/KG	12	U	12	U	14	U	11	U	11	U	10	U	10	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BENZYL BUTYL PHTHALATE	UG/KG	790	U	-		900	U	730	U	750	U	680	U	680	U	740	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.06	U	-		0.108		0.233		0.093		0.052	U	0.052	U	0.056	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	75		-		20	U	74		74		138		20	U	117	

Table B7-3

Site 7 (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	07_DBMW43 S1457061 (20)	DVF(a)	07_DBMW43 S1456096 (25)	DVF(a)	07_DBMW43 S1456097 (50)	DVF(a)	07_DBMW43 S1456098 (100)	DVF(a)	07_DBMW43 S145610601 (165)	DVF(a)	07_DBMW70 S1456112 (9)	DVF(a)	07_DBMW70 S1456117 (10)	DVF(a)	07_DBMW70 S1456116 (15)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		212		-		-		-	
METALS																	
SILVER	MG/KG	0.47	U	0.47	U	0.5	U	0.44	U	-		0.55	U	0.54	U	0.45	b
ALUMINUM	MG/KG	5330		6980		11800		978		-		21200		16200		9520	
ARSENIC	MG/KG	2.3		2.3		4.2		0.21	b	-		4.6		4.6		3.8	
BARIUM	MG/KG	74.9		84		150		15.3	b	-		450		200		83.4	
BERYLLIUM	MG/KG	0.11	U	0.31	U	0.52	U	0.11	U	-		0.86	b	0.96	b	0.41	b
CALCIUM	MG/KG	18300		2210		9590		772	b	-		23000		10500		3340	
CADMIUM	MG/KG	0.6	b	0.42	b	1.8		0.36	U	-		1.7		1.8		0.61	b
COBALT	MG/KG	2.2	b	2.3	b	5.8	b	1.2	U	-		9.5	b	7.7	b	3.6	b
CHROMIUM	MG/KG	6.2		7.9		15.3		1.4	b	-		19.1		14.9		22.1	
COPPER	MG/KG	6.2		4.8	b	10.8		1.2	b	-		14		11.7		28.1	
IRON	MG/KG	7750		9300		16600		1320		-		28300		21200		16300	
MERCURY	MG/KG	0.1	U	0.03	U	0.05	U	0.03	U	-		0.04	U	0.04	U	0.04	U
POTASSIUM	MG/KG	1800		2170		3950		349	b	-		7930		5640		1280	
MAGNESIUM	MG/KG	2920		2750		6180		501	b	-		14200		9990		4210	
MANGANESE	MG/KG	140		127		308		39.5		-		423		335		249	
SODIUM	MG/KG	308	b	433	b	652	b	156	b	-		650	b	729	b	438	b
NICKEL	MG/KG	6	U	6.3	U	17.6		3.4	U	-		11.7		11.9		12.6	
LEAD	MG/KG	5.5		1.6		3.4		0.74		-		3.5		3.7		129	
ANTIMONY	MG/KG	2.7	U	2.7	U	2.9	U	2.8	U	-		3.1	U	3.3	b	2.5	UJ
SELENIUM	MG/KG	0.11	U	0.19	U	0.3	U	0.11	U	-		0.13	U	0.13	U	0.11	U
THALLIUM	MG/KG	0.2	U	0.16	U	0.43	U	0.15	U	-		0.31	J	0.31	J	0.16	UJ
VANADIUM	MG/KG	17.9		24.6		51.7		4.1	b	-		67.6		51.6		27.3	
ZINC	MG/KG	23.1		25.7		48.9		5.9		-		85.2		65.1		127	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	11	U	12	U	10	U	-		12	U	12	U	11	U
ACETONE	UG/KG	15	U	20	U	18	U	10	U	-		12	U	10	U	22	U
METHYLENE CHLORIDE	UG/KG	11	U	11	U	12	U	10	U	-		20	U	22	U	15	U
1,1-DICHLOROETHENE	UG/KG	11	U	11	U	12	U	10	U	-		12	U	12	U	11	U
2-BUTANONE	UG/KG	11	U	11	U	12	U	10	U	-		12	U	12	U	11	U
TRICHLOROETHYLENE	UG/KG	11	U	11	U	12	U	10	U	-		12	U	12	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BENZYL BUTYL PHTHALATE	UG/KG	750	U	730	U	780	U	680	U	-		810	U	160	J	150	J
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.057	U	0.056	U	0.059	U	0.052	U	-		0.061	U	0.061	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

Table B7-3

Site 7 (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	07_DBMW70 S1456111 (20)	DVF(a)	07_DBMW70 S1456109 (25)	DVF(a)	07_DBMW70 S1456100 (40)	DVF(a)	07_DBMW70 S1457160 (40)	DVF(a)	07_DBMW70 S1456101 (60)	DVF(a)	07_DBMW70 S1456114 (100)	DVF(a)	07_DBMW70 S1456106 (130)	DVF(a)	07_DGMW71 S1456103 (110)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		164		-	
METALS																	
SILVER	MG/KG	0.47	U	0.48	U	0.53	b	0.49	U	0.47	J	0.48	U	-		0.49	U
ALUMINIUM	MG/KG	4370		9100		19800		15800		6770		4780		-		11000	
ARSENIC	MG/KG	1.2	b	1.7	b	3.4		2.9		3.4		2.7		-		0.52	U
BARIUM	MG/KG	48.9		55.2		221		200		104		97.3		-		107	
BERYLLIUM	MG/KG	0.42	b	0.64	b	0.37	J	0.58	J	0.22	b	0.2	J	-		0.52	U
CALCIUM	MG/KG	1720		2280		5310		5180		8740		3850		-		4920	
CADMIUM	MG/KG	0.51	U	0.71	U	1.8		1.8		2		2.1		-		2.3	
COBALT	MG/KG	1.9	b	2.6	b	8.5	b	6.4	b	4.3	b	4.2	b	-		5.4	b
CHROMIUM	MG/KG	5.2		8.7		20.2		16.8		7.6		6.2		-		14.7	
COPPER	MG/KG	3	b	5	b	10.5		12.4		10.4		4.5	b	-		8.6	
IRON	MG/KG	6400		10300		23700		20500		8380		8390		-		13600	
MERCURY	MG/KG	0.03	U	0.03	U	-		0.04	b								
POTASSIUM	MG/KG	1590		2090		6460		5660		2000		2120		-		2660	
MAGNESIUM	MG/KG	2030		3000		9520		8100		3440		2640		-		3730	
MANGANESE	MG/KG	50.2		75.5		367		327		502		232		-		228	
SODIUM	MG/KG	668	b	711	b	885	b	820	b	371	b	338	b	-		333	b
NICKEL	MG/KG	3.6	b	6.1	b	13		10.5		9.4		8.7	b	-		16.8	
LEAD	MG/KG	1.9		2.7		3.1		2.4		2.7		1.8		-		2.9	
ANTIMONY	MG/KG	2.7	U	2.7	U	2.9	U	2.8	U	2.7	U	2.7	U	-		2.8	U
SELENIUM	MG/KG	0.11	U	0.11	U	0.12	U	0.12	U	0.11	U	0.11	U	-		0.12	U
THALLIUM	MG/KG	0.16	UJ	0.16	UJ	0.43	b	0.4	b	0.27	b	0.34	b	-		0.28	b
VANADIUM	MG/KG	13.4		25.9		63.1		53.8		34.8		22.5		-		31.3	
ZINC	MG/KG	18.4		27.3		71.9		60.2		31		27.2		-		38.3	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	12	U	12	U	12	U	11	U	3	J	12	U	11	U
ACETONE	UG/KG	18	U	12	U	12	U	10	JB	11	U	11	U	12	U	15	U
METHYLENE CHLORIDE	UG/KG	16	U	15	U	8	JB	12	U	13	U	10	JB	4	J	11	U
1,1-DICHLOROETHENE	UG/KG	11	U	12	U	12	U	12	U	11	U	11	U	12	U	3	J
2-BUTANONE	UG/KG	11	U	12	U	12	U	12	U	4	J	11	U	12	U	11	U
TRICHLOROETHYLENE	UG/KG	11	U	12	U	12	U	12	U	11	U	11	U	12	U	74	
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BENZYL BUTYL PHTHALATE	UG/KG	740	U	760	U	900		800	U	1100		740	U	-		180	J
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.058	U	0.058	U	0.062	U	0.06	U	0.055	U	0.058	U	-		0.057	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	-		20	U								

Table B7-3

Site 7 (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	07_DGMW71 S1456116 (120)	DVF(a)	07_DGMW72 S1456113 (90)	DVF(a)	07_DGMW72 S1457158 (90)	DVF(a)	07_DGMW72 S1456102 (110)	DVF(a)	07_DGMW91 S1456341 (110)	DVF(a)	07_DGMW91 S1456342 (120)	DVF(a)	07_MW100 S1457123 (38)	DVF(a)
GENERAL CHEMISTRY															
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-	
METALS															
SILVER	MG/KG	-		0.47	U	0.48	U	-		0.48	U	-		0.48	U
ALUMINUM	MG/KG	-		3690		6230		-		5490		-		4080	
ARSENIC	MG/KG	-		2	b	1.5	b	-		1.3	b	-		0.81	b
BARIUM	MG/KG	-		29.8	b	37.7	b	-		67		-		32.7	b
BERYLLIUM	MG/KG	-		0.33	b	0.44	b	-		0.27	U	-		0.35	U
CALCIUM	MG/KG	-		1430		1730		-		3500		-		1320	
CADMIUM	MG/KG	-		0.36	b	0.4	b	-		0.48	b	-		0.43	b
COBALT	MG/KG	-		4.5	U	4.5	U	-		2.9	b	-		1.9	b
CHROMIUM	MG/KG	-		3.7		6.5		-		6.5		-		10.1	
COPPER	MG/KG	-		2.7	b	4.1	b	-		3.6	b	-		2.6	b
IRON	MG/KG	-		4800		6650		-		8390		-		5140	
MERCURY	MG/KG	-		0.03	U	0.03	U	-		0.03	U	-		0.03	U
POTASSIUM	MG/KG	-		1000	b	1380		-		2490		-		1240	
MAGNESIUM	MG/KG	-		1270		1840		-		2670		-		1480	
MANGANESE	MG/KG	-		128		97.7		-		75.8		-		85.2	
SODIUM	MG/KG	-		205	b	260	b	-		217	b	-		255	b
NICKEL	MG/KG	-		3.7	b	3.7	b	-		6.1	b	-		2.2	U
LEAD	MG/KG	-		1.8		1.3		-		1.7		-		1.9	
ANTIMONY	MG/KG	-		2.7	U	2.7	U	-		2.7	U	-		2.8	U
SELENIUM	MG/KG	-		0.11	U	0.11	U	-		0.11	U	-		0.12	U
THALLIUM	MG/KG	-		0.16	UJ	0.15	UJ	-		0.23	U	-		0.16	U
VANADIUM	MG/KG	-		13.2		16.7		-		21.5		-		11.7	
ZINC	MG/KG	-		13.8		17.6		-		23.2		-		14.7	
VOLATILE ORGANIC COMPOUNDS															
TOLUENE	UG/KG	12	U	12	U	11	U	12	U	11	U	11	U	11	U
ACETONE	UG/KG	13	U	12	U	11	U	10	U	11	U	11	U	12	U
METHYLENE CHLORIDE	UG/KG	12	U	12	U	11	U	10	U	11	U	11	U	11	U
1,1-DICHLOROETHENE	UG/KG	12	U	12	U	11	U	12	U	11	U	11	U	11	U
2-BUTANONE	UG/KG	12	U	12	U	11	U	12	U	11	U	11	U	11	U
TRICHLOROETHYLENE	UG/KG	27		12	U	11	U	12	U	11	U	11	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS															
BENZYL BUTYL PHTHALATE	UG/KG	-		210	J	730	U	-		740	U	-		710	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)															
TPH GASOLINE	MG/KG	-		0.105		0.136		-		0.056	U	-		0.055	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)															
TRPH	MG/KG	-		20	U	20	U	-		20	U	-		20	UJ

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

Table B7-4
Site 7 (OU-3): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum

Item	Station Identification					
	07_DGMW71	07_DGMW72	07_DGMW91	07_DBMW70	07_DBMW43	07_DBMW10
Survey Location--Northing	N548547.07	N548010.99	N548183.12	N549075.59	N548303.96	N547500.77
Survey Location--Easting	E1548610.42	E1547856.91	E1547330.09	E1549267.95	E1549287.59	E1549124.37
Ground Surf. Elev.(ft above MSL ^a)	284.02	277.34	273.71	293.94	293.42	286.60
Measuring Pt. Elev.(ft above MSL ^a)	283.66	276.85	273.39	293.44	292.56	286.44
Measuring Point Location	Top of sounding tube					
Type of Surface Completion	Below ground					
Casing Diameter and Material	4" Sch. 40 PVC					
Screen Diameter and Material	4" 20-slot SS ^c					
Screen Interval (ft bgs ^b)	115-155	110-150	110-150	125-165	150-190	131-171
Length of Drop Pipe (ft bgs ^b)	153	147	147	163	188	168
Make and Model of Installed Pump	Grundfos Rediflow 2 2" dia. subm.					
Date of Pumping Test	(None)	19 Nov 92	5 Nov 92	11 Nov 92	(None)	5 Nov 92
Date of Water Quality Sampling	15 Dec 92	19 Nov 92	18 Dec 92	8 Dec 92	1 Dec 92	8 Dec 92

^aMean sea level

^bBelow ground surface

^cSS=Stainless Steel

**Table B7-5
Site 7 (OU-3): Summary of Hydraulic Parameters
MCAS El Toro Phase I RE Technical Memorandum**

Well Identification	Type of Test	Analysis Method	Transmissivity (ft ² /day)	Hydraulic Conductivity (ft/day)	Storage Coefficient ^a	Leakance Factor ^a
07_DGMW72	Pumping	Theiss (1935): Recovery Data	320	8.1	NA	NA
07_DBMW70	Slug	Bouwer and Rice (1976); Bouwer (1989; Cooper-Jacob (1946)	100	2.7	1E-05	NA
07_DGMW91	Slug	Bouwer and Rice (1976); Bouwer (1989)	170	4.3	NA	NA
07_DGMW100	Slug	Bouwer and Rice (1976); Bouwer (1989)	80	2.0	NA	NA

^aNA=Not applicable
Source: Table F-2 (Appendix F)

Table B7-6

Site 7 (OU-3): Summary of Detected Chemicals in Groundwater Samples

MCAS El Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SCREEN INTERVAL	REG.CODE(b)	REG.LEVEL(c)	UNITS	07_DBMW100 S1452328 (131-171)	DVF(a)	07_DBMW100 S1452406 (131-171)	DVF(a)	07_DBMW43 S1452646 (150-190)	DVF(a)	07_DBMW70 S1452047 (125-166)	DVF(a)	07_DGMW71 S1452048 (115-156)	DVF(a)	07_DGMW72 S1452049 (110-150)	DVF(a)	07_DGMW91 S1452117 (110-150)	DVF(a)
ANALYTE BY GROUP	REG.CODE(b)	REG.LEVEL(c)	UNITS														
GENERAL CHEMISTRY																	
ALKALINITY AS CaCO3	NA	NA	MG/L	-		-		126		126		182		209		200	
CARBONATE	NA	NA	MG/L	-		-		-		-		-		-		-	
CYANIDE	NA	NA	UG/L	3	U	3	U	3	U	3	U	3	U	5.5	B	3	U
BICARBONATE	NA	NA	MG/L	-		-		153		154		222		255		244	
CHLORIDE	3	250	MG/L	-		-		185		267		217		241		192	
SULFATE	3	250	MG/L	-		-		144		319		174		112		166	
NITRATE/NITRITE-N	1	10	MG/L	9.27		9.37		14.6		17.1		15.4		14.6		17.7	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	-		-		880		1210		937		1120		913	
METALS																	
SILVER	1	50	UG/L	2.1	U	2.1	U	2.1	U	2.1	U	2.8	b	2.1	U	2.1	U
ALUMINUM	3	50	UG/L	31	U	31	U	34.2	b	31	U	31	UJ	31	U	31	UJ
ARSENIC	2	50	UG/L	0.7	U	0.8	b	0.7	U	0.7	U	0.7	b	0.7	U	0.7	U
BARIUM	2	2000	UG/L	100	b	100	b	41.3	b	32.2	b	41.1	b	51.1	b	34.3	b
BERYLLIUM	NA	NA	UG/L	0.84	b	0.84	b	0.5	UJ	0.5	U	0.5	UJ	0.5	U	1.1	UJ
CALCIUM	NA	NA	UG/L	104000		104000		122000		181000		139000		136000		148000	
CADMIUM	2	5	UG/L	3	b	2.5	b	2.4	b	1.2	U	1.2	U	1.3	b	10.2	
COBALT	NA	NA	UG/L	5.8	UJ	8	UJ	8.9	b	5.8	UJ	5.8	U	5.8	U	9.5	b
IRON	3	300	UG/L	28.8	U	26.1	U	9	b	73.9	b	12	U	24.1	U	61	b
MERCURY	2	2	UG/L	0.1	U	0.1	U	0.12	b	0.1	U	0.1	U	0.1	U	0.1	U
POTASSIUM	NA	NA	UG/L	2420	b	2570	b	3680	b	2540	b	2700	b	2250	b	2540	b
MAGNESIUM	NA	NA	UG/L	32800		32900		33400		58100		35500		40300		41100	
MANGANESE	3	50	UG/L	42.9		44.5		90.8		28.5		16		8.4	b	102	
SODIUM	NA	NA	UG/L	78400		77000		70100		82600		85100		88800		74800	
NICKEL	NA	NA	UG/L	180		190		95.8		93.8		49.6		11.6	b	567	
ANTIMONY	NA	NA	UG/L	16.8	b	16.8	b	12.1	U	18.4	b	12.1	U	16.1	b	22.3	b
SELENIUM	1	10	UG/L	11.2	b	10.6	b	20.6	b	33.6	b	17.8	b	5.4	J	10.9	U
VANADIUM	NA	NA	UG/L	15.5	b	14.3	b	10	b	11.8	b	15	b	15.8	b	11.3	b
ZINC	2	5000	UG/L	3.3	J	2.2	UJ	2.5	b	4.2	J	4.4	U	2.9	U	2.2	UJ
VOLATILE ORGANIC COMPOUNDS																	
TETRACHLOROETHENE	2	5	UG/L	1	U	1	U	1	U	1	U	1	U	2		3	
CARBON TETRACHLORIDE	1	0.5	UG/L	0.8	J	0.6	J	0.3	J	1	U	1	U	3		2	
CHLOROFORM	2	100	UG/L	1	U	1	U	1	U	1	U	1	U	4		3	
METHYLENE CHLORIDE	4	40	UG/L	1	U	1	U	1	U	2	U	1	U	1	U	1	U
1,1-DICHLOROETHENE	NA	NA	UG/L	1	U	1	U	1	U	1	U	0.7	J	1	U	1	U
TRICHLOROETHYLENE	2	5	UG/L	1	U	1	U	1	U	1	U	23		120	D	48	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	NA	NA	UG/L	250	U	250	U	250	U	2680		500	U	250	U	250	U
GROSS ALPHA AND BETA																	
GROSS ALPHA	2	15	PCIU	-		-		-		-		6.3		-		-	
GROSS BETA	2	50	PCIU	-		-		-		-		11.7		-		-	

(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 B7-7
Site 7 (OU-3): Analyte Concentrations in Groundwater
Exceeding Regulatory Standards or DTSC^a Action Levels
MCAS EI Toro Phase I RI Technical Memorandum

Page 1 of 2

Well Identification	SI (ft bgs) ^b	Analyte	Units	Concentration	Regulatory Level ^c	Regulatory Code ^d
07_DGMW72	(110-150)	Nitrate/Nitrite-N	mg/L	14.8	10	2
		Total Dissolved Solids	mg/L	1120	500	3
		Carbon tetrachloride	µg/L	3	0.5	2
		Trichloroethylene	µg/L	120	5	1
07_DBMW100	(0-0)	Selenium	µg/L	11.2	10	2
		Carbon tetrachloride	µg/L	0.6	0.5	2
07_DBMW70	(125-165)	Selenium	µg/L	33.8	10	2
		Chloride	mg/L	267	250	3
		Nitrate/Nitrite-N	mg/L	17.1	10	2
		Sulfate	mg/L	319	250	3
		Total Dissolved Solids	mg/L	1210	500	3
		Carbon tetrachloride	µg/L	1	0.5	2
07_DGMW71	(0-0)	Nitrate/Nitrite-N	mg/L	15.4	10	2
		Total Dissolved Solids	mg/L	937	500	3
		Selenium	µg/L	17.8	10	2
		Trichloroethylene	µg/L	23	5	1
07_DGMW91	(110-150)	Carbon tetrachloride	µg/L	2	0.5	2
		Trichloroethylene	µg/L	48	5	1
		Nitrate/Nitrite-N	mg/L	17.7	10	2
		Total Dissolved Solids	mg/L	913	500	3
		Cadmium	µg/L	10.2	5	1
		Manganese	µg/L	102	50	3

**Table B7-7
Site 7 (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	Concentration	Regulatory Level^c	Regulatory Code^d
07_DBMW43	(150-190)	Nitrate/Nitrite-N	mg/L	14.8	10	2
		Total Dissolved Solids	mg/L	880	500	3
		Manganese	µg/L	90.8	50	3
		Selenium	µg/L	20.6	10	2

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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: Non-enforceable 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 B8

**Nature and Extent of Contamination:
Site 8 (OU-3) — DRMO Storage Yard**

Appendix B8
NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION:
SITE 8 (OU-3): DRMO STORAGE YARD

This discussion of Site 8 is supplemented by the figures and data tables listed below. The figures begin on page B8-3, and the tables are grouped at the end of this Appendix B8. Field headspace values for soils at this site are presented in Table BA1-8, in Attachment 1 to Appendix B (directly following Appendix B22).

- Figure B8-1: (Site Map)
- Figure B8-2: Geologic Cross Section

- Table B8-1: Types of Samples and Chemical Analyses
- Table B8-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil
- Table B8-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples
- Table B8-4: Well Construction Details
- Table B8-5: Summary of Hydraulic Parameters
- Table B8-6: Summary of Detected Chemicals in Groundwater Samples
- Table B8-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B8.1 Site Description

The Defense Reutilization and Marketing Office (DRMO) Storage Yard, located on the southwest corner of Marine Way and "R" Street, is a storage area for containerized liquids and various scrap and salvage materials. The scrap materials include mechanical and electrical components, and the liquids are of unknown origin. Two primary areas have been identified at Site 8: the Old Salvage Yard (on the eastern portion of the site), and the Storage Yard (on the western portion). The same activities occurred at both yards. The Old Salvage Yard is now a gravel-topped pad elevated several feet above the surrounding street culverts and is used as a parking lot for Building 800; it appears that the parking lot is elevated as a result of paving over the Old Salvage Yard. The Storage Yard is a fenced, unpaved lot located north of Building 360 and is still in use as a storage yard.

In 1984, an estimated several gallons of PCB oil from a leaking electrical console was spilled onto a small area in the Storage Yard (Brown and Caldwell, 1986). Contaminated soils in the immediate vicinity of the spill were excavated to one foot below grade. A hazardous waste contractor transported the excavated soil to an offsite disposal facility. No other spills are documented at Site 8.

A review of site aerial photographs indicates refuse piles and staining in the Storage Yard since 1952, with the refuse piles mostly in the central portion, and the heaviest staining in the southeastern portion. Possible staining was also observed at the Old Salvage Yard.

For sampling and analyzing surface and near-surface soil contamination, the site was divided into four statistical strata (all in the Storage Yard):

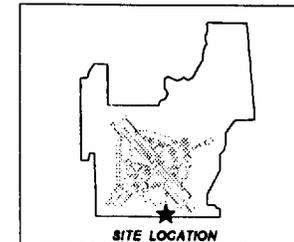
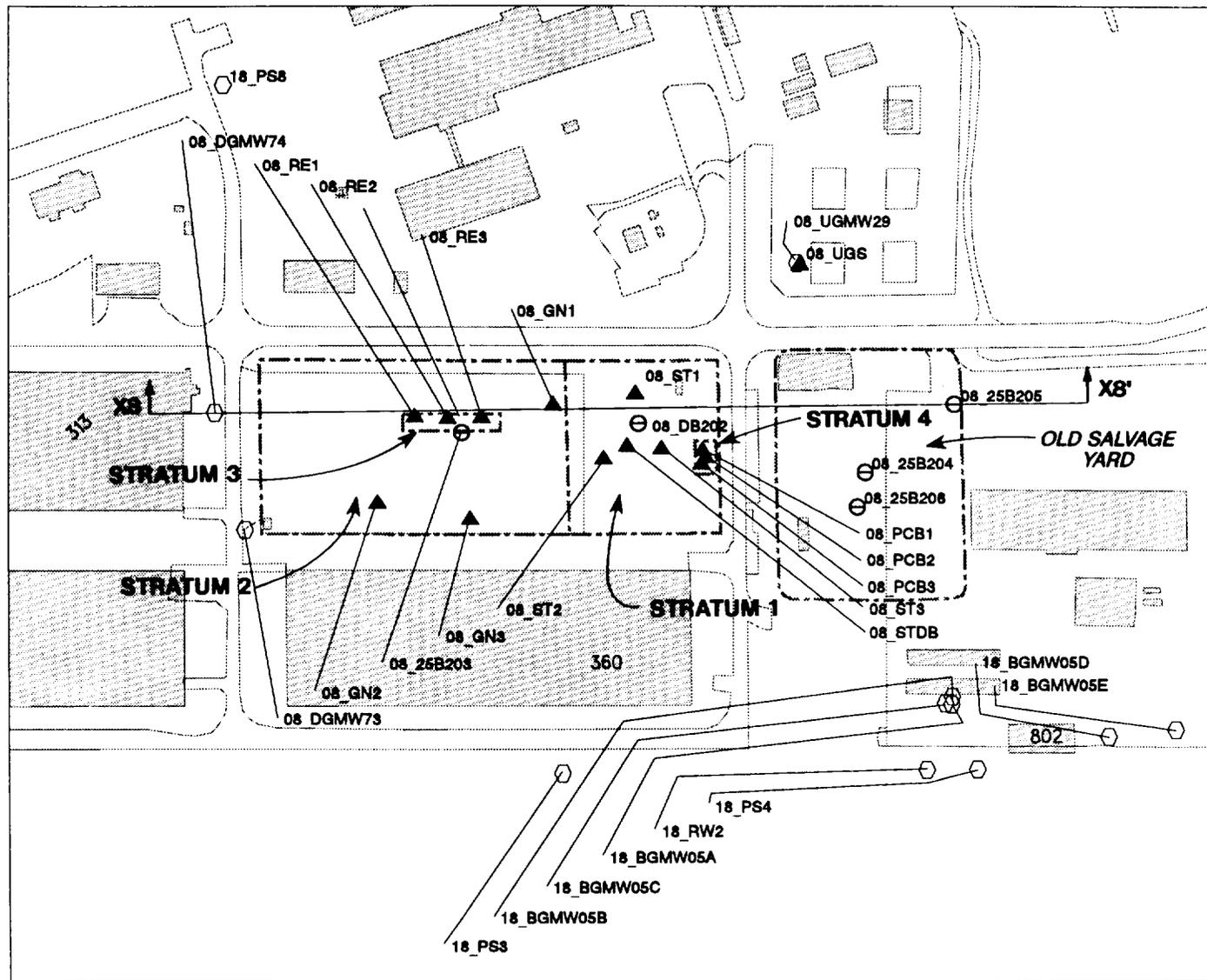
- Stratum 1: Storage Yard, East Portion
- Stratum 2: Storage Yard, West Portion
- Stratum 3: Refuse Pile
- Stratum 4: PCB Spill Area

In the Old Salvage Yard, 25-foot borings were drilled into the pad to allow samples to be collected beneath the surface of the former yard. Although strata were normally established for the random allocation of surface and near-surface soil samples, the 25-foot borings were distributed randomly.

Figure B8-1 is the site map, showing the statistical stratum locations, and the individual sampling and well locations.

B8.2 Suspected Waste Types and Contaminants

The nature and extent of potential contaminants include PCBs, fuels, solvents that may have leaked from the scrap materials, and miscellaneous liquids of unknown composition.



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

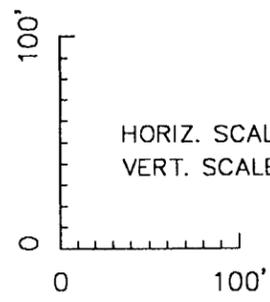
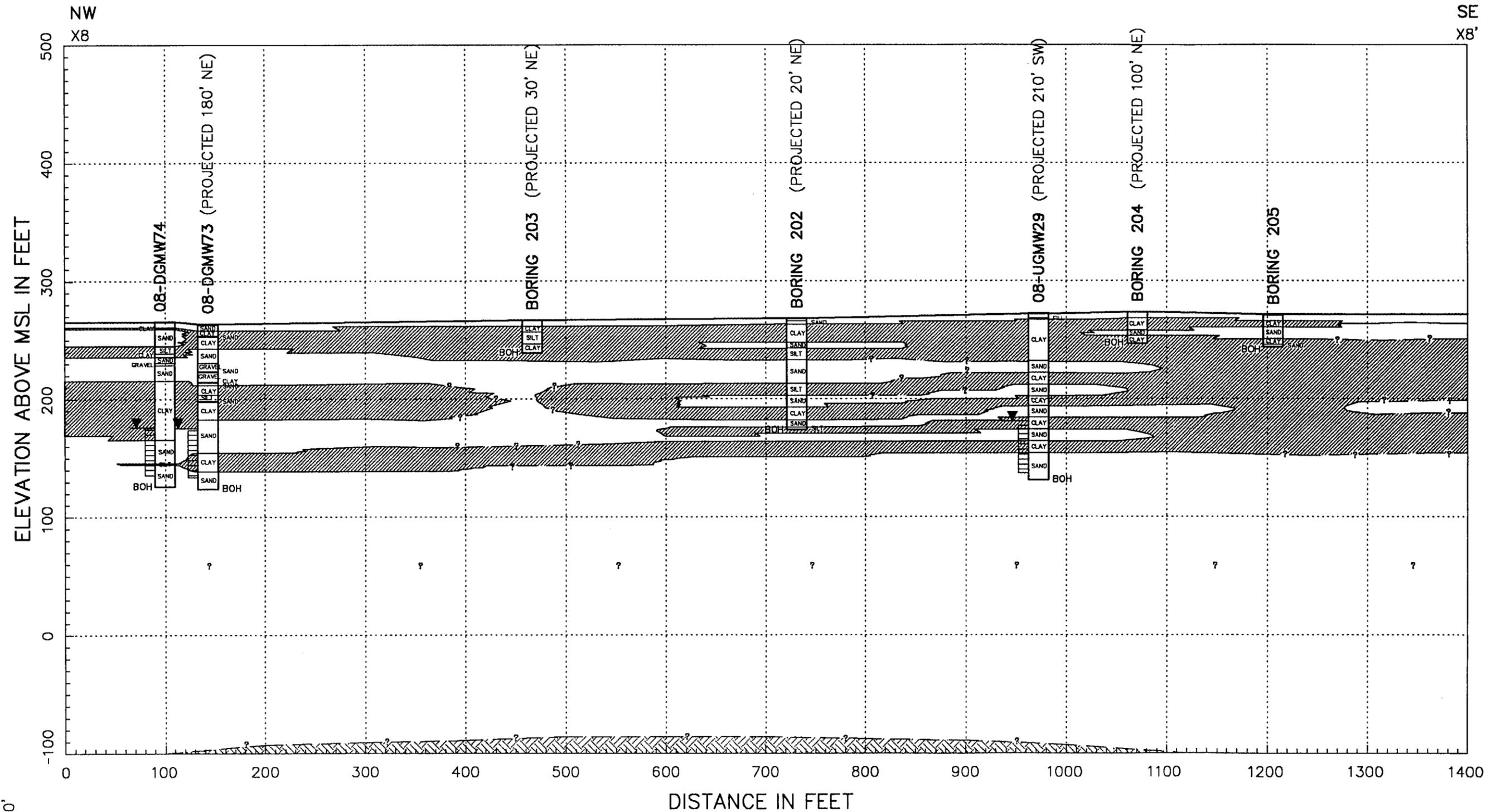
FIGURE B8-1

SITE 8 (OU-3): DRMO STORAGE YARD

MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

PAGE NUMBER B8-4

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

- LEGEND**
- UNCONSOLIDATED PERMEABLE SEDIMENTS
 - SEMICONSOLIDATED LOW-PERMEABILITY SEDIMENTS
 - UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS
 - WELL SCREEN INTERVAL
 - BOH BOTTOM OF HOLE
 - WATER LEVEL ELEVATION, DECEMBER 1992

FIGURE B8-2
SITE 8 (OU-3)
GEOLOGIC CROSS SECTION X8-X8'
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

Page B8-6

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B8.3 Field Investigation

The field investigation consisted of drilling and sampling one deep soil boring, three groundwater monitoring wells, and four 25-foot soil borings, and collecting surface and near-surface soil samples. Sampling was conducted in accordance with the *SAP Amendment*, except that a surface soil sample associated with the 25-foot-deep boring located in the former refuse pile was not collected. The sampling stations, depths of sampling, and analyses requested are shown in Table B8-1.

B8.3.1 Surface Water and Sediment

Surface water and sediment samples were not collected at this site.

B8.3.2 Surface and Near-Surface Soils

There are a total of 13 surface sampling locations, with four sampling locations at Stratum 1 and three sampling locations each at Strata 2, 3, and 4. Only surface and near-surface soils from Stratum 3 plus the surface sample at the deep boring (08_STDB) were tested for herbicides; the *SAP Amendment* called for all surface and near-surface soils to be tested for herbicides. The samples from Stratum 4 (the PCB Spill Area) were analyzed for VOCs, TRPH, TFH, SVOCs, and metals in addition to the required PCB analysis.

B8.3.3 Vadose Zone Soils

Four 25-foot borings (08_25B203 through 08_25B206) were drilled; 08_25B203 was drilled in the refuse pile in the Storage Yard, and the remaining three borings were drilled in the Old Salvage Yard. One deep boring, designated 08_DB202, was drilled to 94 feet below ground surface (bgs) at the east portion of the Storage Yard.

B8.3.4 Groundwater Monitoring Wells

Three wells were drilled: one upgradient well (08_UGMW29), and two downgradient wells (08_DGMW73 and 08_DGMW74). The location of 08_DGMW74 was moved northeast from the location planned in the *SAP Amendment* when the assumed groundwater flow was revised.

Aquifer tests were conducted at each well; slug tests were conducted at 08_UGMW29 and 08_DGMW73, and a pumping test was conducted at 08_DGMW74. After the aquifer tests (summarized in Subsection B8.7), groundwater samples were collected at each well and analyzed.

B8.4 Surface Water and Sediments

Surface water and sediment samples were not collected at this site.

B8.5 Surface and Near-Surface Soils

Detected contaminants in the surface and near-surface soils are primarily pesticides, PCBs, and petroleum hydrocarbons. TCE was not detected in the surface or near-surface soils.

B8.5.1 Description of Surface and Near-Surface Soil Samples

The surface soils are mapped as Sorrento loam 2 to 9 percent (Wachtell, 1978). The Sorrento loam generally consists of well-drained loam from 0 to 12 inches in depth overlying silty clay loam to 62 inches, below which lies sandy loam to 72 inches. The percolation rate ranges from 0.2 to 6.0 in./hr., and the available water capacity rate ranges from 0.16 to 0.21 in./in. The soil is in Hydrologic Group B, indicating moderate infiltration when the ground is saturated.

The surface and near-surface soils were sampled by four statistical strata:

- Stratum 1: 08_ST-1, 08_ST-2, 08_ST-3, and 08_STDB

- Stratum 2: 08_GN-1, 08_GN-2, 08_GN-3
- Stratum 3: 08_RE-1, 08_RE-2, 08_RE-3
- Stratum 4: 08_PCB-1, 08_PCB-2, 08_PCB-3

There were 13 surface sampling stations with four stations at Stratum 1, and three stations each at Strata 2, 3, and 4. The station identified as 08_STDB is the surface sample associated with the deep boring. In addition, one upgradient surface sample was collected at 08_UGS.

The surface and near-surface soils were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, total petroleum hydrocarbons (TRPH), total fuel hydrocarbons (TFH), and total metals; samples at Stratum 3 and 08_STDB (surface) were also evaluated for herbicides. Samples from Strata 1 and 2 and the upgradient location were originally planned (in the *SAP Amendment*) to be analyzed for herbicides. Other samples were tested even though the tests were not planned in the *SAP Amendment*; these include samples from Stratum 4 (the PCB Spill Area) that were tested for VOCs, TFH, SVOCs, TRPH, and total metals. Tests for TRPH and TFH were added to the upgradient surface sample analyses during the field investigation. Sample depths and analytes are summarized in Table B8-1, and sampling stations are shown on Figure B8-1.

B8.5.2 Analytical Results and Soil Vapor Headspace Values

Surface soils and lithologic samples from the borings were evaluated in the field for organic vapors using an HNu photo-ionization detector or a flame ionization detector (OVA). The results of the field head space analyses are provided in Attachment 1 to Appendix B.

Table B8-2 presents a summary of detected analytes for the surface and near-surface soils. The analyses indicate the presence of metals, PCBs, petroleum and fuel hydrocarbons, SVOCs, and low levels of VOCs in the surface and near-surface soils. The analyses indicate that PCBs are present at the site outside of the known PCB Spill Area (Stratum 4). Trichloroethylene (TCE) was not detected

in the surface soils. Tetrachloroethylene (PCE) was detected in the surface soil in one sample at the Refuse Pile (Stratum 3).

B8.5.2.1 Upgradient Area

In the upgradient surface sample, low levels of fuel and petroleum hydrocarbons and metals were detected; the sample was not analyzed for VOCs, SVOCs, or pesticides.

Fuel and petroleum hydrocarbons were detected in both the surface and 2-foot-deep samples. Total recoverable petroleum hydrocarbons (TRPH) were detected in the surface sample at 512 mg/kg, with TFH-diesel detected at 13.7 mg/kg. Neither TRPH nor TFH-diesel was detected in the 2-foot-deep sample, but TFH-gasoline was detected at 0.056 mg/kg. The TRPH value is not considered high, and the TFH values are below California LUFT action levels.

In the upgradient samples, five metals (antimony, beryllium, mercury, silver, and thallium) were not detected; the remaining seventeen metals were detected at levels less than background.

Soil vapor headspace results on the soil samples were 1.4 and 4.0 ppmv at 0- and 2-foot depths, respectively.

B8.5.2.2 Stratum 1 - East Portion of Storage Yard

Fuel and petroleum hydrocarbons, pesticides, and PCBs are present at Stratum 1.

Fuel and petroleum hydrocarbons are present in the ground surface samples at 08_ST1, 08_ST2 and 08_STDB, and in all samples at 08_ST3. TFH-diesel ranges from 18 to 91.3 mg/kg and TFH-gasoline is present from 0.094 to 0.351 mg/kg. TRPH was detected at concentrations of 86 to 7730 mg/kg; surface samples at 08_ST3 and 08_STDB have TRPH concentrations exceeding 1000 mg/kg. The highest TFH and TRPH concentrations occur at the central portion of the stratum

at 08_ST3 and 08_STDB; the concentrations are highest at the ground surface and decrease with depth. Many of the TRPH and TFH-gasoline concentrations at Stratum 1 exceed California LUFT action levels, and therefore petroleum hydrocarbons are of concern at Stratum 1.

Six SVOCs are present at the zero-depth surface soils. Two VOCs are present in the surface and near-surface soils: 2-hexanone (at 13 $\mu\text{g}/\text{kg}$) and toluene (3 to 8 $\mu\text{g}/\text{kg}$). Toluene values are below the CRDL and are therefore estimates.

Several pesticides and PCBs are present in the Stratum 1 surface soils and the 2-foot sample at 08_ST2. As shown in Table B8-2, twelve pesticides and three PCB compounds were detected. Pesticide concentrations range from 2 to 170 $\mu\text{g}/\text{kg}$, and PCB concentrations range from 122 to 1,060 $\mu\text{g}/\text{kg}$. Thus, PCBs are present outside of the PCB Spill Area (Stratum 4). The pesticide and PCB concentrations are highest at the middle of the stratum at 08_ST3 and 08_STDB.

All of the metals except thallium were detected in the surface and near-surface soils. The detected concentrations were below background levels for the project, except for the sample concentrations of lead (1,520 mg/kg) and silver (2 mg/kg) at the 08_ST3 surface. Similar to hydrocarbon and pesticides, the metals exceeding background occur at the central portion of the stratum.

Headspace values ranged from zero to 2 ppmv for these soil samples. The high concentrations of TFH and TRPH in the soil do not seem to correlate with the headspace results.

Fuel and petroleum hydrocarbons, pesticides, and PCBs are present at Stratum 1; these chemicals appear to be limited to the surface at 08_ST1, and extend to at least 2 feet at 08_ST2 and to 4 feet at 08_ST3. The depth of contamination at the deep boring is discussed further in Subsection B8.6. The highest contamination levels generally occur at the central portion of the stratum, at 08_ST3 and 08_STDB.

B8.5.3.3 Stratum 2 - West Portion of Storage Yard

Fuel and petroleum hydrocarbons metals, VOCs, and SVOCs are also present in Stratum 2. TFH-diesel concentrations range from 14.1 to 74.8 mg/kg and occur in the zero-and 2-foot samples. TFH-gasoline ranges from 0.162 to 2.26 mg/kg, and TRPH ranges from 678 mg/kg to 1,698 mg/kg in the surface samples. The highest concentration of TRPH occurs at 08_GN3.

VOCs detected include 2-butanone (3 to 4 $\mu\text{g}/\text{kg}$, estimated) and toluene (6 to 8 $\mu\text{g}/\text{kg}$, estimated) in 08_GN2 and 08_GN3, and ethylbenzene (2 $\mu\text{g}/\text{kg}$, estimated) and xylene (16 $\mu\text{g}/\text{kg}$) in 08_GN1. 2-Butanone is a demonstrated laboratory contaminant. The maximum detected concentration of 2-butanone in the trip blanks was 33 $\mu\text{g}/\text{L}$. One SVOC, benzyl butyl phthalate, was encountered in 08_GN2 and 08_GN3 from 140 $\mu\text{g}/\text{kg}$ to 260 $\mu\text{g}/\text{kg}$.

None of the values detected for metals exceeded the background values, and no antimony, selenium, or silver was detected. Pesticides and PCBs were not detected.

Headspace values in 08_GN1 and 08_GN3 were essentially nondetects. The headspace reading at 08_GN2 at ground surface was 24 ppmv.

B8.5.3.4 Stratum 3 - Refuse Pile

Metals, PCBs, fuel and petroleum hydrocarbons, and SVOCs are present at this stratum.

TFH-diesel ranges in concentration from 27.4 to 231.0 mg/kg and occurs in all of the samples. TFH-gasoline ranges from 0.08 to 0.44 mg/kg, and TRPH ranges from 891 to 1806 mg/kg; these analytes were detected in the surface samples and at 08_RE1 at 2 feet below the surface (bgs). The highest concentration of TRPH occurred at the ground surface in 08_RE2.

VOCs detected were 2-butanone (2 to 4 $\mu\text{g}/\text{kg}$, estimated), methylene chloride (2 to 66 $\mu\text{g}/\text{kg}$), PCE (4 $\mu\text{g}/\text{kg}$, estimated), and toluene (4 to 10 $\mu\text{g}/\text{kg}$, estimated). Methylene chloride is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 42 $\mu\text{g}/\text{L}$. 2-Butanone is also a demonstrated laboratory contaminant; its maximum detected concentration in the trip blanks was 33 $\mu\text{g}/\text{L}$. PCE was detected only in the surface sample at 08_RE2.

Eight SVOCs were detected; the highest concentrations were benzyl butyl phthalate (2,300 $\mu\text{g}/\text{kg}$ at 08_RE2 at 0 feet) bis(2-ethylhexyl)phthalate (8,800 $\mu\text{g}/\text{kg}$ at 08_RE2 at 0 feet), and di-n-butyl phthalate (1,400 $\mu\text{g}/\text{kg}$ at 08_RE3 at 0 feet).

Three PCBs were detected at the Refuse Pile, with concentrations ranging from 214 to 20,400 $\mu\text{g}/\text{kg}$; the highest concentrations of PCBs for Site 8 occurred in sample 08_RE2 at 0 feet. Herbicides were not detected.

Seven metal values exceeded the background values: antimony (3 to 11 mg/kg), cadmium (0 to 108 mg/kg), chromium (3 to 113 mg/kg), lead (1 to 1,100 mg/kg), mercury (0 to 15 mg/kg), silver (1 to 21 mg/kg), and zinc (14 to 1,510 mg/kg). The highest concentrations of these metals occur at 08_RE2. In addition, values for copper and iron were noticeably higher in 08_RE2 than at the other Site 8 locations.

Headspace values samples were below 1 ppmv; the values do not appear to correlate with the concentrations of detected VOCs and SVOCs at the site.

The presence of metals, PCBs, petroleum hydrocarbons, and SVOCs are in general accordance with the suspected contaminants of concern. The highest concentrations of contaminants generally occur at 08_RE2, which is at the center of the stratum.

B8.5.3.5 Stratum 4 - PCB Spill Area

In addition to PCBs, metals, petroleum hydrocarbons and SVOCs were detected at significant levels at this stratum.

TFH-diesel at Stratum 4 ranges in concentration from 14.9 to 1,060 mg/kg and was detected in all of the surface samples plus the 2-foot sample at 08_PCB2. TFH-gasoline ranges from 0.176 to 1.25 mg/kg, and TRPH ranges from 86 to 6,001 mg/kg; these analytes were detected in the surface samples and at 08_PCB2 and 08_PCB3 at 4 feet. The highest concentration of TRPH occurred at the ground surface in 08_PCB1.

Acetone was the only VOC detected, at 11 $\mu\text{g}/\text{kg}$ in 08_PCB3 at 4 feet. Acetone is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks is 37 $\mu\text{g}/\text{L}$. Three SVOCs were detected: benzyl butyl phthalate (180 $\mu\text{g}/\text{kg}$ at 08_PCB3 at 4 feet) bis(2-ethylhexyl)phthalate (230 to 440 $\mu\text{g}/\text{kg}$), and di-n-butyl phthalate (200 $\mu\text{g}/\text{kg}$ at 08_PCB3 at 0 feet).

Two PCBs (PCB 1254 and PCB 1260) were detected, with concentrations ranging from 303 to 1,820 $\mu\text{g}/\text{kg}$.

Except for beryllium, mercury, selenium, and thallium, all metals that were analyzed were detected. Silver was the only metal that was detected at levels above background, with concentrations ranging from 0.64 to 0.95 mg/kg in the surface samples at 08_PCB1 and 08_PCB3. The remaining metals were detected at levels below background.

Headspace values ranged from 0.5 to 7.0 ppmv; these values do not appear to correlate with the concentrations of detected VOCs and SVOCs at the site.

The presence of metals, PCBs, petroleum hydrocarbons, and SVOCs are in general accord with the suspected contaminants of concern at this location.

B8.6 Vadose Zone Soils

B8.6.1 Description of Subsurface Soil Samples

Four 25-foot borings were drilled: 08_25B203 in the Refuse Pile in the Storage Yard (Stratum 3), and 08_25B204 through 08_25B206 in the Old Salvage Yard. One deep boring, (08_DB202), was drilled to 94 feet bgs at Stratum 1 of the Storage Yard. The three monitoring wells (08_UGMW29, 08_DGMW73, and 08_DBMW74) were also sampled during drilling. Sample depths and analytes are summarized in Table B8-1, and boring locations are shown on Figure B8-1.

B8.6.2 Subsurface Geology

Subsurface soils encountered at the site consisted of Quaternary alluvium. Sandy lean clay, silty sand, sandy silt, and poorly graded sand were the primary materials encountered at the site. The sand was generally fine-grained, with occasional gravel in the sand layers. The soils encountered were heterogeneous with generally discontinuous soil layering. Figure B8-2, Geologic Cross Section, presents a generalized profile of the site geology. Detailed boring logs in Appendix K.

B8.6.3 Analytical Results

The results of the laboratory analysis of the subsurface soils are presented in Table B8-3, which includes soil samples from the 25-foot borings, the deep boring, and the well borings.

The primary chemicals in the vadose zone soils are petroleum hydrocarbons. Evidence of visible contamination, as well as headspace values greater than 10 ppmv, supports the analytical results for the soils. Small concentrations of seven VOCs are present in the subsurface soils, but three of them were also detected in rinsate samples and trip blanks.

Hydrocarbons (TRPH, TFH). Petroleum hydrocarbons were detected in the analyses for all soil borings except 08_25B206. TFH-diesel concentrations in the subsurface soils range from 14.2 to 39.1 mg/kg, and TFH-gasoline concentrations range from 0.059 to 2.4 mg/kg. TRPH concentrations range from 52 to 596 mg/kg.

Volatile Organic Compounds (VOCs). Seven VOCs are present in the subsurface soils. Carbon disulfide (3 µg/kg, estimated), chloroform (0.6 µg/kg, estimated) and methylene chloride (3 to 6 µg/kg, estimated) were detected in several samples, but these chemicals were also detected in various trip blanks and rinsate samples from this site. Methylene chloride is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 42 µg/L. Three VOCs were detected only in 08_25B206, including 2-butanone (7 µg/kg, estimated), 2-hexanone (8 µg/kg, estimated), and toluene (2 to 5 µg/kg, estimated) (2-butanone is a demonstrated laboratory contaminant). Acetone was detected in concentrations of 10 to 210 µg/kg in soils at all of the borings and wells except 08_25B205, 08_25B206, and 08_UGMW29 (the upgradient well). Acetone is a demonstrated laboratory contaminant.

Semivolatile Organic Compounds (SVOCs). Two SVOCs were detected at the site: benzyl butyl phthalate (250 to 400 µg/kg, estimated) and bis(2-ethylhexyl) phthalate (580 to 900 µg/kg).

Pesticides and Polychlorinated Biphenyls (PCBs). One pesticide, endosulfan sulfate, was detected, at 0.91 µg/kg (estimated) at 25 feet in boring 08_25B206. No other pesticides or PCBs were detected.

Metals. Metals concentrations are presented in Table B8-3.

Total Organic Carbon (TOC). Total organic carbon (TOC) was detected at concentrations ranging from 167 to 381 mg/kg in the soils at the screen interval in the monitoring wells.

B8.6.4 Soil Vapor Headspace Concentrations

Soil vapor headspace concentrations are presented in Attachment 1, Field Headspace Values. Moderate to high headspace concentrations were detected using HNu and OVA meters; the HNu readings were often significantly higher than the OVA readings. The headspace readings generally showed the trend of subsurface contamination through the subsurface soils; however, the headspace concentrations do not seem to correspond to the laboratory concentrations.

B8.7 Groundwater

B8.7.1 Site-Specific Hydrogeology

Groundwater was first observed in 08_DB202 and 08_DGMW74 at 92 feet bgs, and in 08_DGMW73 at 94 feet bgs. Groundwater quality sampling of the wells in February 1993 indicated potentiometric water levels at elevations 181.04, 175.18, and 175.93 feet MSL in 08_UGMW29, 08_DGMW73, and 08_DG_MW74, respectively. Information on the specific well construction, including screen setting and surface elevations, is in Table B8-4, Well Construction Details.

A 4-hour pumping test was performed on 08_DGM74, during which water levels were also monitored in 08_DGMW73. The water-quality sample from 08_DGM74 was collected during the pumping test; the water-quality samples from 08_DGMW73 and 08_UGMW29 were collected (with dedicated pumps) on 2 December 1992, and on 8 December 1992, respectively.

Estimated transmissivity and hydraulic conductivity, and a leakance factor, are provided in Table B8-5, Summary of Hydraulic Parameters. No storage coefficients could be calculated for this site. The average groundwater gradient for Site 8 is approximately 0.009 feet per foot, or about 47.5 feet per mile, toward

the west. Groundwater generally flows toward the northwest at an overall gradient of approximately 0.08 ft/ft at the Station.

Using the 0.009 gradient, the lower hydraulic conductivity (0.18 ft/day) in Table B8-5, and an assumed effective porosity of 0.3, the average linear velocity of groundwater would be 0.005 feet/day. Using the higher hydraulic conductivity of 23.1 feet/day, (08_DGMW74), the average linear velocity would be 0.7 feet/day.

B8.7.2 Analytical Results

Groundwater quality samples were analyzed for the parameters shown in Table B8-1. The analytical results are discussed by parameter below and are summarized in Table B8-6.

General Chemistry. As discussed in Section 6, the groundwater facies change dramatically across MCAS El Toro. This change in water quality is evident at Site 8. Differences can be seen in alkalinity, bicarbonate, and chloride between the upgradient well and the downgradient wells. Alkalinity and bicarbonate are lowest at the upgradient well, and range from 132 to 447 mg/L and 161 to 545 mg/L, respectively. Chloride is highest at the upgradient well, and ranges from 162 mg/L downgradient to 245 mg/L upgradient. Nitrate/nitrite concentrations range from 12 mg/L (upgradient) to 15 mg/L (downgradient), and TDS ranges from 804 to 942 mg/L.

Appendix A1 presents a more complete discussion of the general inorganic chemistry of the regional groundwater underlying the site. It appears that Site 8 has had no impact on inorganic water quality of the regional groundwater.

Hydrocarbons (TRPH, TFH). Hydrocarbons were not detected.

Volatile Organic Compounds (VOCs). Four VOCs were detected in the downgradient wells at levels exceeding the groundwater quality standards: 1,1 dichloroethene (5 to 8 µg/L), carbon tetrachloride (1 estimated to 6 µg/L), tetrachloroethene (PCE) (8 µg/L), and trichloroethylene (TCE) (100 to 140 µg/L).

TCE was also detected in the upgradient well at a concentration of 20 µg/L, which also exceeds the drinking water standards.

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

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

Metals and Cyanide. Metal results are presented in Table B8-6. Total cyanide was not detected.

B8.7.3 Comparison with Drinking Water Standards

A summary of detected contaminants at concentrations exceeding MCLs is provided in Table B8-7. Four VOCs, and nitrate (as nitrogen), exceed drinking water standards.

B8.8 Potential Contaminant Migration Pathways

The potential contaminant sources are spills or leaks of liquids, or leaks from components and scrap materials that have been stored at the site. Site 8 is flat, and the main route for contaminant transport is expected to be through groundwater movement. Chemical leaks or spills may have occurred, and these materials may have infiltrated down to the groundwater. The soil contamination appears to be migrating vertically through the soil, and may be travelling horizontally in groundwater in permeable soil layers.

B8.9 Summary and Conclusions

In summary, analyses of the surface and near-surface soils indicate the presence of pesticides, PCBs, petroleum hydrocarbons, VOCs, SVOCs, and heavy metals. Analyses of samples of the subsurface soils collected at Site 8 indicate the presence of petroleum

hydrocarbons, VOCs, SVOCs, heavy metals, and one pesticide. PCE was detected in one surface soil sample from the center of the Refuse Pile, but was not detected in the subsurface soil samples. TCE and benzene have not been detected in the soils at Site 21. Groundwater samples analyzed indicate that MCLs are exceeded by concentrations of four VOCs (1,1 dichloroethene, carbon tetrachloride, PCE, and TCE), one metal (manganese in the upgradient well), TDS, chloride, and nitrate/nitrite.

A comparison of the groundwater from Site 8 downgradient wells to the regional water indicates the site may be a potential contributor of 1,1-dichloroethene (1,1-DCE) to the groundwater. The data collected from the soils at Site 8 do not indicate the presence of 1,1-DCE. However, the groundwater samples collected downgradient of Site 8, from 08_DG MW73 and 08_DG MW74, contain concentration of 1,1-DCE higher than the surrounding wells; 1,1-DCE may be a breakdown product of TCE and PCE.

Higher levels of TCE and PCE are found in the downgradient wells than in the upgradient wells. The surface, near-surface, and vadose zone soils show detected levels of pesticides, PCBs, and petroleum hydrocarbons. These contaminants have not been found in the groundwater at this site. It does not appear that the soil contamination detected at Site 8 is a potential contributor to VOC regional groundwater contamination (OU-1).

**Table B8-1
Site 8 (OU-3): 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	Gen. Chem- istry	TOC	Dioxins/ Furans
Surface Water and Sediments (Not sampled)														
Surface and Near-Surface Soils														
Stratum 2	8_GN1	S1454113	0	X	X	X		X	X	X				
		S1454114	2	X	X	X		X	X	X				
Stratum 2	8_GN2	S1454541	0	X	X	X		X	X	X				
		S1454542	2	X	X	X		X	X	X				
		S1454543	4	X	X	X		X	X	X				
Stratum 2	8_GN3	S1454544	0	X	X	X		X	X	X				
		S1454545	2	X	X	X		X	X	X				
Stratum 4	8_PCB1	S1454123	0	X	X	X		X	X	X				
		S1454124	2	X	X	X		X	X	X				
		S1454125	4	X	X	X		X	X	X				
		S1454477 ^b	4	X	X	X		X	X	X				
Stratum 4	8_PCB2	S1454126	0	X	X	X		X	X	X				
		S1454127	2	X	X	X		X	X	X				
		S1454128	4	X	X	X		X	X	X				
Stratum 4	8_PCB3	S1454129	0	X	X	X		X	X	X				
		S1454130	2	X	X	X		X	X	X				
		S1454478 ^b	2	X	X	X		X	X	X				
		S1454131	4	X	X	X		X	X	X				
Stratum 4	8_PCB3	S1454479 ^b	4	X	X	X		X	X	X				
Stratum 3	8_RE1	S1454535	0	X	X	X	X	X	X	X				
		S1454536	2	X	X	X	X	X	X	X				
Stratum 3	8_RE2	S1454538	0	X	X	X	X	X	X	X				
		S1454539	2	X	X	X	X	X	X	X				
		S1454540	4	X	X	X	X	X	X	X				
Stratum 3	8_RE3	S1454464	0	X	X	X	X	X	X	X				
		S1454465	2	X	X	X	X	X	X	X				
		S1454534	4	X	X	X	X	X	X	X				
Stratum 1	8_ST1	S1454116	0	X	X	X		X	X	X				
		S1454117	2	X	X	X		X	X	X				
Stratum 1	8_ST2	S1454119	0	X	X	X		X	X	X				
		S1454120	2	X	X	X		X	X	X				
Stratum 1	8_ST3	S1454450	0	X	X	X		X	X	X				
		S1454451	2	X	X	X		X	X	X				
		S1454452	4	X	X	X		X	X	X				
Stratum 1	8_STDB	S1454122	0	X	X	X	X	X	X	X				
Upgradient	8_UGS	S1454108	0					X	X	X				
		S1454109	2					X	X	X				

**Table B8-1
Site 8 (OU-3): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Location/ Stratum	Station Identifi- cation	Sample Identifi- cation	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
Vadose Zone Soils															
Refuse Pile	8_25B-203	S1456118	5	X	X	X		X	X	X					
		S1456119	10	X	X	X		X	X	X					
		S1456120	15	X	X	X		X	X	X					
		S1456121	20	X	X	X		X	X	X					
		S1456122	25	X	X	X		X	X	X					
		S1457063 ^b	25	X	X	X		X	X	X					
Old Salvage Yard	8_25B-204	S1456123	5	X	X	X		X	X	X					
		S1456124	10	X	X	X		X	X	X					
		S1457024 ^b	10	X	X	X		X	X	X					
		S1456125	15	X	X	X		X	X	X					
		S1456126	20	X	X	X		X	X	X					
		S1456127	25	X	X	X		X	X	X					
Old Salvage Yard	8_25B-205	S1456128	5	X	X	X		X	X	X					
		S1456129	10	X	X	X		X	X	X					
		S1456130	15	X	X	X		X	X	X					
		S1457026 ^b	15	X	X	X		X	X	X					
		S1456143	20	X	X	X		X	X	X					
		S1456144	25	X	X	X		X	X	X					
Old Salvage Yard	8_25B-206	S1457027	5	X	X	X		X	X	X					
		S1457028	10	X	X	X		X	X	X					
		S1457029	15	X	X	X		X	X	X					
		S1457032 ^b	15	X	X	X		X	X	X					
		S1457030	20	X	X	X		X	X	X					
		S1457031	25	X	X	X		X	X	X					
Stratum 1	8_DB202	S1456135	5	X	X	X		X	X	X					
		S1456136	10	X	X	X		X	X	X					
		S1456140 ^b	10	X	X	X		X	X	X					
		S1456137	15	X	X	X		X	X	X					
		S1456138	20	X	X	X		X	X	X					
		S1456139	25	X	X	X		X	X	X					
		S1457057	45	X	X	X		X	X	X					
		S1457058	55	X	X	X		X	X	X					
		S1457059	75	X	X	X		X	X	X					
		S1456141	85	X	X	X		X	X	X					
S1456142	95	X	X	X		X	X	X							
Downgradient	8_DGMW73	S1456145	60	X	X	X		X	X	X					
		S1457049 ^b	60	X	X	X		X	X	X					
		S1456132	110	X								X			
Downgradient	8_DGMW74	S1456133	80	X	X	X		X	X	X					
		S1457067 ^b	80	X	X	X		X	X	X					
		S1456146	100	X								X			
		S1457068 ^b	100	X								X			
Upgradient	8_UGMW29	S1456395	78	X	X	X		X	X	X					
		S1456396	118	X								X			

**Table B8-1
Site 8 (OU-3): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 3 of 3

Location/ Stratum	Station Identifi- cation	Sample Identifi- cation	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
Groundwater														
Downgradient	8_DGMW73	S1452055	90-130	X	X	X	X	X	X	X	X	X		
Downgradient	8_DGMW74	S1452056	90-130	X	X	X	X	X	X	X	X	X		
Upgradient	8_UGMW29	S1452061	95-135	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 B8-2

Site 8 (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	08_GN1 S1484113 (0)	DVF(a)	08_GN1 S1484114 (2)	DVF(a)	08_GN2 S1484541 (0)	DVF(a)	08_GN2 S1484542 (2)	DVF(a)	08_GN2 S1484543 (4)	DVF(a)	08_GN3 S1484544 (0)	DVF(a)	08_GN3 S1484545 (2)	DVF(a)	08_PCB1 S1484123 (0)	DVF(a)
METALS																	
SILVER	MG/KG	0.44	U	0.45	U	0.45	U	0.44	U	0.43	U	0.44	U	0.48	U	0.95	b
ZINC	MG/KG	41.8		28		40.7		23.8		17.4		39.2		35.5		101	
ALUMINUM	MG/KG	7470		5580		8850		5290		3250		8150		7020		6040	
ARSENIC	MG/KG	3		1.3	b	3.1		1.1	b	1.1	b	3.2		1.2	b	3.6	
BARIIUM	MG/KG	55.9		86.2		83.5		91.8		62.5		66.9		113		94	
BERYLLIUM	MG/KG	0.43	U	0.3	U	0.11	UJ	0.11	UJ	0.1	UJ	0.12	J	0.18	J	0.53	U
CALCIUM	MG/KG	6580		6210		9490		6470		5170		7450		3520		5720	
CADMIUM	MG/KG	1	J	0.81	J	0.92	b	0.68	b	0.42	b	0.88	b	1.1	b	6.1	
COBALT	MG/KG	5.9	U	4.1	U	3.8	b	2.8	b	2.4	b	4.4	b	4.3	b	4.3	b
CHROMIUM	MG/KG	9.8		6.1		8.3		5.3		3.5		6.3		7.6		53.9	
COPPER	MG/KG	15		4.6	b	12.9		3.1	b	2.6	b	11.6		5.3	b	33.8	
IRON	MG/KG	15500		8540		13000		7570		5260		12900		10300		13800	
MERCURY	MG/KG	0.03	U	0.03	U	0.04	b	0.03	U	0.03	U	0.12		0.03	U	0.07	U
POTASSIUM	MG/KG	926	b	2110		1240		2040		1440		881	b	2590		1140	
MAGNESIUM	MG/KG	4110		3450		3940		3200		2250		3610		4290		3230	
MANGANESE	MG/KG	233		159		278		173		124		257		215		211	
SODIUM	MG/KG	200	b	226	b	267	b	218	b	190	b	246	b	256	b	293	b
NICKEL	MG/KG	10.3		4.1	b	9.2		2.7	b	1.7	b	8.8		6.4	b	8.9	
LEAD	MG/KG	3.2		0.97		4		1.2		0.93		4.1		1.6		122	
ANTIMONY	MG/KG	2.5	UJ	2.6	UJ	2.6	U	2.6	U	2.5	U	2.5	U	2.7	U	2.5	U
SELENIUM	MG/KG	0.1	U	0.11	U	0.11	U	0.11	U	0.1	U	0.1	U	0.11	U	0.1	UJ
THALLIUM	MG/KG	0.15	UJ	0.15	UJ	0.23	b	0.15	b	0.14	U	0.17	b	0.26	b	0.14	UJ
VANADIUM	MG/KG	30.6		20.5		24.9		19.4		12.9		21.7		25.1		20.3	
VOLATILE ORGANIC COMPOUNDS																	
ETHYLBENZENE	UG/KG	2	J	11	U	10	U	11	U	10	U	10	U	10	U	10	U
TOLUENE	UG/KG	8	J	11	U	10	U	11	U	10	U	8	J	10	U	10	U
TETRACHLOROETHENE	UG/KG	10	U	11	U	10	U	11	U	10	U	10	U	10	U	10	U
XYLENE (TOTAL)	UG/KG	16		11	U	10	U	11	U	10	U	10	U	10	U	10	U
2-HEXANONE	UG/KG	10	U	11	U	10	U	11	U	10	U	10	U	10	U	10	U
ACETONE	UG/KG	19	U	11	U	10	U	11	U	10	U	10	U	10	U	15	U
METHYLENE CHLORIDE	UG/KG	16	U	11	U	13	U	15	U	18	U	12	U	10	U	15	U
2-BUTANONE	UG/KG	10	U	11	U	4	J	4	J	3	J	3	J	3	J	10	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	440	J
PYRENE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
DIMETHYL PHTHALATE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
BENZO(GH)PERYLENE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
INDENO(1,2,3-CD)PYRENE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
FLUORANTHENE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
CHRYSENE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
BENZO(A)PYRENE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
HEXACHLOROETHANE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
DI-N-BUTYL PHTHALATE	UG/KG	1400	U	710	U	690	U	710	U	690	U	690	U	680	U	670	U
BENZYL BUTYL PHTHALATE	UG/KG	1400	U	710	U	150	J	710	U	140	J	280	J	680	U	670	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	12	J
PCB-1260	UG/KG	171	U	35.4	U	344	U	35.4	U	34.3	U	344	U	34.2	U	33.3	UJ
PCB-1254	UG/KG	171	U	35.4	U	344	U	35.4	U	34.3	U	344	U	34.2	U	33.3	UJ
PCB-1248	UG/KG	171	U	35.4	U	344	U	35.4	U	34.3	U	344	U	34.2	U	33.3	UJ
BHC-ALPHA	UG/KG	8.8	U	1.83	U	17.7	U	1.82	U	1.78	U	17.7	U	1.76	U	1.71	UJ
ENDOSULFAN II	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	60	D
4,4'-DDT	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	33.2	J
ALPHA-CHLORDANE	UG/KG	8.8	U	1.83	U	17.7	U	1.82	U	1.78	U	17.7	U	1.76	U	10.2	J
GAMMA-CHLORDANE	UG/KG	8.8	U	1.83	U	17.7	U	1.82	U	1.78	U	17.7	U	1.76	U	2.94	J
ENDRIN KETONE	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	10.1	J
DIELDRIN	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	23.6	J
ENDRIN	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	3.33	UJ
METHOXYCHLOR	UG/KG	88	U	18.3	U	177	U	18.2	U	17.8	U	177	U	17.8	U	4.28	J
4,4'-DDD	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	122	D
4,4'-DDE	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	44.3	J
ENDRIN ALDEHYDE	UG/KG	17.1	U	3.54	U	34.4	U	3.54	U	3.43	U	34.4	U	3.42	U	36.9	J
ENDOSULFAN I	UG/KG	8.8	U	1.83	U	17.7	U	1.82	U	1.78	U	17.7	U	1.76	U	7.5	J
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	17.7		14.1		74.8		20.7		13	U	14.2		26.6		1060	
TFH GASOLINE	MG/KG	0.162		0.054	U	2.26		0.054	U	0.052	U	0.231		0.052	U	1.25	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	678		20	U	907		20	U	20	U	1698		20	U	6001	

Table B8-2

Site 8 (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	06_PCB1	DVF(a)	08_PCB1	DVF(a)	08_PCB1	DVF(a)	06_PCB2	DVF(a)	08_PCB2	DVF(a)	08_PCB2	DVF(a)	06_PCB3	DVF(a)	08_PCB3	DVF(a)
		S1454124 (2)		S1454126 (4)		S1454127 (4)		S1454126 (0)		S1454127 (2)		S1454128 (4)		S1454129 (0)		S1454130 (2)	
METALS																	
SILVER	MG/KG	0.45	U	0.43	U	0.43	U	0.44	U	0.45	U	0.44	U	0.64	b	0.46	U
ZINC	MG/KG	23.9		13.3		12.9		87		24.5		16.3		81.1		28.3	
ALUMINIUM	MG/KG	5230		3650		2640		7920		4800		3220		7000		7880	
ARSENIC	MG/KG	0.98	b	0.64	J	0.78	b	4.2		1.2	b	0.85	J	2.8		1.2	b
BARIUM	MG/KG	78.9		55.9		56.3		86		75.7		47.2		84.3		95.1	
BERYLLIUM	MG/KG	0.5	U	0.43	U	0.44	U	0.42	U	0.51	U	0.33	U	0.34	U	0.55	U
CALCIUM	MG/KG	2290		4080		3330		7310		2450		3050		9000		2780	
CADMIUM	MG/KG	0.82	b	0.25	U	0.4	b	1.9		0.89	b	0.48	b	6.8		0.71	b
COBALT	MG/KG	3.8	b	1.9	b	1.2	b	5.8	b	2.5	b	1.8	b	5.5	b	4	b
CHROMIUM	MG/KG	5.9		3.9		3.4		13.6		5.4		3.6		16		8	
COPPER	MG/KG	4.3	b	2.5	b	2.3	b	18.2		4.7	b	3.8	b	22.3		5.3	b
IRON	MG/KG	7550		5010		3980		17100		7450		4760		15300		10100	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.09	U	0.04	U	0.04	U	0.08	U	0.04	U
POTASSIUM	MG/KG	1770		970	b	887	b	1220		1710		1160		1190		2070	
MAGNESIUM	MG/KG	2840		1730		1530		4280		2840		1900		3790		3650	
MANGANESE	MG/KG	142		95.3		87.9		273		144		99.9		297		163	
SODIUM	MG/KG	230	b	158	b	164	b	243	b	227	b	180	b	309	b	287	b
NICKEL	MG/KG	5.8	b	1.8	b	2.2	b	11.7		5.8	U	2.5	b	12		7	U
LEAD	MG/KG	1		0.97		0.76		248		4.1		5.7		56.1		1.2	
ANTIMONY	MG/KG	2.8	U	2.5	U	2.5	U	2.5	U	2.6	U	2.5	U	2.8	b	2.6	U
SELENIUM	MG/KG	0.11	UJ	0.1	UJ	0.1	UJ	0.11	UJ	0.11	UJ	0.1	UJ	0.1	UJ	0.11	UJ
THALLIUM	MG/KG	0.15	UJ	0.14	UJ	0.14	UJ	0.15	UJ								
VANADIUM	MG/KG	18.2		12.5		10.1	b	24		16.9		11		24		24.8	
VOLATILE ORGANIC COMPOUNDS																	
ETHYLBENZENE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	11	U
TOLUENE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	11	U
TETRACHLOROETHENE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	11	U
XYLENE (TOTAL)	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	11	U
2-HEXANONE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	11	U
ACETONE	UG/KG	19	U	10	U	17	U	10	U	41	U	10	U	10	U	18	U
METHYLENE CHLORIDE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	11	U
2-BUTANONE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	230	J	710	U
PYRENE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
DIMETHYL PHTHALATE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
BENZO(GH)PERYLENE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
INDENO(1,2,3-CD)PYRENE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
FLUORANTHENE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
CHRYSENE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
BENZO(A)PYRENE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
HEXACHLOROETHANE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
DIN-BUTYL PHTHALATE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	200	J	710	U
BENZYL BUTYL PHTHALATE	UG/KG	700	U	680	U	670	U	680	U	710	U	680	U	680	U	710	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	1.77	J	3.53	UJ	3.41	UJ	33.6	UJ	3.53	UJ
PCB-1260	UG/KG	35.2	UJ	33.8	UJ	33.6	UJ	489	J	35.3	UJ	34.1	UJ	336	UJ	35.3	UJ
PCB-1254	UG/KG	35.2	UJ	33.8	UJ	33.6	UJ	516	J	35.3	UJ	34.1	UJ	3020	J	35.3	UJ
PCB-1248	UG/KG	35.2	UJ	33.8	UJ	33.6	UJ	33.9	UJ	35.3	UJ	34.1	UJ	338	UJ	35.3	UJ
BHC-ALPHA	UG/KG	1.81	UJ	1.74	UJ	1.73	UJ	1.75	UJ	1.82	UJ	1.78	UJ	17.3	UJ	1.82	UJ
ENDOSULFAN II	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	18.1	J	3.53	UJ	3.41	UJ	45.8	J	3.53	UJ
4,4'-DDT	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	11.1	J	3.53	UJ	0.672	J	20.1	J	3.53	UJ
ALPHA-CHLORDANE	UG/KG	1.81	UJ	1.74	UJ	1.73	UJ	1.75	UJ	1.82	UJ	1.78	UJ	17.3	UJ	1.82	UJ
GAMMA-CHLORDANE	UG/KG	1.81	UJ	1.74	UJ	1.73	UJ	0.729	J	1.82	UJ	1.78	UJ	10.4	J	1.82	UJ
ENDRIN KETONE	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	1.58	J	3.53	UJ	3.41	UJ	33.6	UJ	3.53	UJ
DIELDRIN	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	4.52	J	3.53	UJ	3.41	UJ	102	J	3.53	UJ
ENDRIN	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	3.38	UJ	3.53	UJ	3.41	UJ	33.6	UJ	3.53	UJ
METHOXYCHLOR	UG/KG	18.1	UJ	17.4	UJ	17.3	UJ	17.5	UJ	18.2	UJ	17.8	UJ	173	UJ	18.2	UJ
4,4'-DDD	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	86.2	J	3.53	UJ	3.41	UJ	98.8	J	3.53	UJ
4,4'-DDE	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	14.8	J	3.53	UJ	3.41	UJ	33.6	UJ	3.53	UJ
ENDRIN ALDEHYDE	UG/KG	3.52	UJ	3.38	UJ	3.36	UJ	11.6	J	3.53	UJ	3.41	UJ	18.9	J	3.53	UJ
ENDOSULFAN I	UG/KG	1.81	UJ	1.74	UJ	1.73	UJ	1.75	UJ	1.82	UJ	1.78	UJ	63.5	J	1.82	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.3	U	12.8	U	12.7	U	183		14.9		12.9	U	55.9		13.5	U
TFH GASOLINE	MG/KG	0.053	U	0.052	U	0.051	U	0.262		0.054	U	0.052	U	0.178		0.054	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	5094		20	U	339		1299		20	U

Table B8-2

Site 8 (OU- 3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

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STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	08_PCB3 S1484478 (2)	DVF(a)	08_PCB3 S1484131 (4)	DVF(a)	08_PCB3 S1484479 (4)	DVF(a)	08_RE1 S1484835 (8)	DVF(a)	08_RE1 S1484836 (2)	DVF(a)	08_RE2 S1484838 (8)	DVF(a)	08_RE2 S1484839 (2)	DVF(a)	08_RE2 S1484840 (4)	DVF(a)
METALS																	
SILVER	MG/KG	0.48	U	0.44	U	0.44	U	1.1	b	0.45	U	21.4		0.44	U	0.58	U
ZINC	MG/KG	29.9		20.1		20.5		238		29.5		1510		19.4	U	92.5	
ALUMINUM	MG/KG	8950		3150		5410		8670		8190		8140		3970		29800	
ARSENIC	MG/KG	2	b	0.9	b	1.3	b	4.1		2.1		7.9		1.4	b	5.3	
BARIIUM	MG/KG	146		74.9		70.8		69.4		107		255		52.8		287	
BERYLLIUM	MG/KG	0.49	U	0.45	U	0.37	U	0.33	b	0.21	b	0.28	J	0.1	UJ	0.92	J
CALCIUM	MG/KG	2900		2050		2140		4070		5810		8680		1760		33700	
CADMIUM	MG/KG	0.89	b	0.94	b	0.58	b	22.3		0.86	U	108		0.73	b	2.4	
COBALT	MG/KG	2.9	b	2.9	b	2.7	b	6	U	2.7	b	12.7		1.4	b	10.8	b
CHROMIUM	MG/KG	8.5		3.7		5.3		30.6		6.2		113		4.4		23.6	
COPPER	MG/KG	5.6		3.5	b	4	b	50.4		4.3	b	213		2.9	b	15.2	
IRON	MG/KG	11000		5040		7080		15300		9350		39300		5640		31100	
MERCURY	MG/KG	0.04	U	0.03	U	0.04	U	0.82		0.03	U	15.1		0.19		0.04	b
POTASSIUM	MG/KG	2190		1250		1520		1020	b	2490		1340		1270		6380	
MAGNESIUM	MG/KG	3930		1930		2470		3430		3680		3790		2100		15900	
MANGANESE	MG/KG	175		128		121		214		177		401		98.4		429	
SODIUM	MG/KG	241	b	213	b	156	b	212	b	193	b	472	b	178	b	473	b
NICKEL	MG/KG	6.5	U	3	U	2.3	U	15.9		4.4	b	70.3		2	b	13.2	
LEAD	MG/KG	1.6		2.1		1.4		121		8.4		1100		4.3		4	
ANTIMONY	MG/KG	2.6	U	2.5	U	2.5	U	5	b	2.6	U	11.1	b	2.5	U	3.3	b
SELENIUM	MG/KG	0.11	UJ	0.1	UJ	0.1	UJ	0.1	U	0.11	U	0.16	b	0.1	U	0.13	U
THALLIUM	MG/KG	0.15	UJ	0.15	UJ	0.15	UJ	0.14	UJ	0.15	UJ	0.15	b	0.17	b	0.51	b
VANADIUM	MG/KG	27.5		11.8		17		22.8		21.7		29		14		76.2	
VOLATILE ORGANIC COMPOUNDS																	
ETHYLBENZENE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	12	U
TOLUENE	UG/KG	11	U	10	U	10	U	10	J	11	U	4	J	10	U	12	U
TETRACHLOROETHENE	UG/KG	11	U	10	U	10	U	10	U	11	U	4	J	10	U	12	U
XYLENE (TOTAL)	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	12	U
2-HEXANONE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	12	U
ACETONE	UG/KG	21	U	24	U	11		16	U	11	U	10	U	10	U	15	U
METHYLENE CHLORIDE	UG/KG	11	U	10	U	10	U	15	U	11	U	66		2	J	16	U
2-BUTANONE	UG/KG	11	U	10	U	10	U	10	U	11	U	10	U	10	U	4	J
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	710	U	680	U	690	U	420	J	700	U	8800		690	U	810	U
PYRENE	UG/KG	710	U	680	U	690	U	1400	U	700	U	230	J	690	U	810	U
DIMETHYL PHTHALATE	UG/KG	710	U	680	U	690	U	1400	U	700	U	330	J	690	U	810	U
BENZO(GH)PERYLENE	UG/KG	710	U	680	U	690	U	1400	U	700	U	680	U	690	U	810	U
INDENO(1,2,3-CD)PYRENE	UG/KG	710	U	680	U	690	U	1400	U	700	U	680	U	690	U	810	U
FLUORANTHENE	UG/KG	710	U	680	U	690	U	1400	U	700	U	160	J	690	U	810	U
CHRYSENE	UG/KG	710	U	680	U	690	U	1400	U	700	U	160	J	690	U	810	U
BENZO(A)PYRENE	UG/KG	710	U	680	U	690	U	1400	U	700	U	680	U	690	U	810	U
HEXACHLOROETHANE	UG/KG	710	U	680	U	690	U	1400	U	700	U	140	J	690	U	810	U
DI-N-BUTYL PHTHALATE	UG/KG	710	U	680	U	690	U	1400	U	700	U	470	J	690	U	810	U
BENZYL BUTYL PHTHALATE	UG/KG	710	U	680	U	180	J	1400	U	700	U	1900		690	U	190	J
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.54	UJ	3.4	UJ	3.42	UJ	33.8	U	3.48	U	342	U	3.48	U	4.04	U
PCB-1260	UG/KG	35.4	UJ	34	UJ	34.2	UJ	338	U	34.8	U	3420	U	34.8	U	214	
PCB-1254	UG/KG	35.4	UJ	34	UJ	303	J	4590		34.8	U	20400		34.8	U	397	
PCB-1248	UG/KG	35.4	UJ	34	UJ	34.2	UJ	338	U	34.8	U	17800		34.8	U	244	
BHC-ALPHA	UG/KG	1.82	UJ	1.75	UJ	1.76	UJ	17.4	U	3.57	U	176	U	1.78	U	2.08	U
ENDOSULFAN II	UG/KG	3.54	UJ	3.4	UJ	4.55	J	49.7		3.48	U	342	U	3.48	U	4.04	U
4,4'-DDT	UG/KG	3.54	UJ	3.4	UJ	3.7	J	51.4		82.3		127		3.48	U	4.04	U
ALPHA-CHLORDANE	UG/KG	1.82	UJ	1.75	UJ	1.76	UJ	17.4	U	2.43		453		1.78	U	2.08	U
GAMMA-CHLORDANE	UG/KG	1.82	UJ	1.75	UJ	1.04	J	19.1		1.79	U	75.8		1.78	U	1.28	
ENDRIN KETONE	UG/KG	3.54	UJ	3.4	UJ	3.42	UJ	33.8	U	3.48	U	342	U	3.48	U	4.04	U
DIELDRIN	UG/KG	3.54	UJ	3.4	UJ	10.2	J	33.8	U	3.51		836		3.48	U	12.6	
ENDRIN	UG/KG	3.54	UJ	3.4	UJ	3.42	UJ	216		0.304		342	U	3.48	U	4.04	U
METHOXYCHLOR	UG/KG	18.2	UJ	17.5	UJ	17.8	UJ	174	U	17.9	U	1780	U	17.8	U	20.8	U
4,4'-DDD	UG/KG	3.54	UJ	3.4	UJ	5.12	J	33.8	U	11.8		342	U	3.48	U	4.04	U
4,4'-DDE	UG/KG	3.54	UJ	3.4	UJ	3.42	UJ	33.8	U	3.48	U	342	U	3.48	U	4.04	U
ENDRIN ALDEHYDE	UG/KG	3.54	UJ	3.4	UJ	1.79	J	30.2		3.48	U	292		3.48	U	4.04	U
ENDOSULFAN I	UG/KG	1.82	UJ	1.75	UJ	1.78	UJ	17.4	U	1.79	U	176	U	1.78	U	2.08	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.4	U	12.8	U	13.1	U	79.2		127		231		51.7		28.7	
TFH GASOLINE	MG/KG	0.054	U	0.052	U	0.052	U	0.354		0.441		0.08		0.052	U	0.061	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	86		1661		891		1808		20	U	20	U

Table B8-2

Site 8 (OU- 3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

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STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	06_RE3 S1464484 (0)	DVF(a)	06_RE3 S1464485 (2)	DVF(a)	06_RE3 S1464534 (4)	DVF(a)	06_ST1 S1464116 (0)	DVF(a)	06_ST1 S1464117 (2)	DVF(a)	06_ST2 S1464119 (0)	DVF(a)	06_ST2 S1464120 (2)	DVF(a)	06_ST3 S1464480 (0)	DVF(a)
METALS																	
SILVER	MG/KG	3.5		0.43	U	1.5	b	0.45	b	0.44	U	0.44	b	0.45	U	2.3	
ZINC	MG/KG	209		13.9		101		127		26.1		51.7		24.8		189	
ALUMINUM	MG/KG	8190		2580		13800		9520		4470		8320		5230		8840	
ARSENIC	MG/KG	2.4		0.56	b	3.7		3.8		1.3	b	3.3		1.7	b	4.3	
BARIUM	MG/KG	78.2		32.7	b	192		83.4		91.5		44.1		78.1		127	
BERYLLIUM	MG/KG	0.18	J	0.1	UJ	0.59	J	0.38	U	0.45	b	0.28	b	0.41	b	0.46	U
CALCIUM	MG/KG	8710		1880		17200		3340		5940		4700		2580		3670	
CADMIUM	MG/KG	37.2		0.41	b	3.7		3.4	J	0.66	b	1.4		0.63	b	9.9	
COBALT	MG/KG	5.4	b	1.2	U	7.9	b	6.5	U	3.9	U	5.4	U	3.6	U	5.3	b
CHROMIUM	MG/KG	34.9		3.2		26.9		22.1		5.7		12.4		6		33.9	
COPPER	MG/KG	63.3		2.5	b	13		28.1		4.1	b	16.4		4.4	b	72.1	
IRON	MG/KG	14000		4290		19100		18300		9230		13900		8370		16700	
MERCURY	MG/KG	5.8		0.03	U	0.15		0.04	U	0.03	U	0.03	U	0.03	U	0.08	U
POTASSIUM	MG/KG	967	b	920	b	4180		1020	b	1860		785	b	2090		1330	
MAGNESIUM	MG/KG	3760		1470		9970		4210		3020		3520		2970		3020	
MANGANESE	MG/KG	324		77.3		315		249		137		248		181		248	
SODIUM	MG/KG	212	b	141	b	319	b	195	b	186	b	237	b	220	b	230	b
NICKEL	MG/KG	15.4		1.7	b	9.3	b	12.6		3.3	b	8	b	4.1	b	12	
LEAD	MG/KG	109		1.1		8		129		1.3		54.5		3.8		1520	
ANTIMONY	MG/KG	2.5	U	2.5	U	3.1	U	2.5	UJ	2.6	b	2.5	U	2.6	U	2.5	U
SELENIUM	MG/KG	0.1	U	0.1	U	0.23	U	0.1	U	0.1	U	0.1	U	0.11	U	0.27	J
THALLIUM	MG/KG	0.23	b	0.14	U	0.23	b	0.14	UJ	0.15	UJ	0.14	UJ	0.15	UJ	0.14	UJ
VANADIUM	MG/KG	22.2		11.5		46.9		27.3		22.7		21.4		19.5		23.2	
VOLATILE ORGANIC COMPOUNDS																	
ETHYLBENZENE	UG/KG	10	U	10	U	12	U	10	U	10	U	10	U	11	U	10	U
TOLUENE	UG/KG	5	J	10	U	12	U	8	J	10	U	6	J	11	U	3	J
TETRACHLOROETHENE	UG/KG	10	U	10	U	12	U	10	U	10	U	10	U	11	U	10	U
XYLENE (TOTAL)	UG/KG	10	U	10	U	12	U	10	U	10	U	10	U	11	U	10	U
2-HEXANONE	UG/KG	10	U	10	U	12	U	13		10	U	10	U	11	U	10	U
ACETONE	UG/KG	10	U	11	U	12	U	12	U	10	U	11	U	27	U	39	U
METHYLENE CHLORIDE	UG/KG	19	U	12	U	15	U	10	U	10	U	14	U	17	U	25	U
2-BUTANONE	UG/KG	3	J	2	J	4	J	10	U	10	U	10	U	11	U	10	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	3500		690	U	1400		1400		690	U	1500		690	U	400	J
PYRENE	UG/KG	160	J	690	U	600	U	670	U	690	U	670	U	690	U	670	U
DIMETHYL PHTHALATE	UG/KG	690	U	690	U	600	U	670	U	690	U	670	U	690	U	670	U
BENZO(GH)PERYLENE	UG/KG	690	U	690	U	600	U	140	J	690	U	670	U	690	U	670	U
INDENO(1,2,3-CD)PYRENE	UG/KG	690	U	690	U	600	U	150	J	690	U	670	U	690	U	670	U
FLUORANTHENE	UG/KG	150	J	690	U	600	U	670	U	690	U	670	U	690	U	670	U
CHRYSENE	UG/KG	690	U	690	U	600	U	670	U	690	U	670	U	690	U	670	U
BENZO(A)PYRENE	UG/KG	690	U	690	U	600	U	150	J	690	U	670	U	690	U	670	U
HEXACHLOROETHANE	UG/KG	690	U	690	U	600	U	670	U	690	U	670	U	690	U	670	U
DI-N-BUTYL PHTHALATE	UG/KG	1400		690	U	600	U	670	U	690	U	670	U	690	U	310	J
BENZYL BUTYL PHTHALATE	UG/KG	580	J	690	U	350	J	670	U	690	U	160	J	690	U	280	J
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	34.2	U	3.46	U	40.1	U	2.32		3.45	U	3.36	U	3.48	U	9.26	J
PCB-1260	UG/KG	342	U	34.6	U	401	U	283		34.5	U	33.6	U	34.8	U	599	J
PCB-1254	UG/KG	912		34.6	U	401	U	33.5	U	34.5	U	548		122		1060	J
PCB-1248	UG/KG	342	U	34.6	U	401	U	33.5	U	34.5	U	297		34.8	U	33.2	UJ
BHC-ALPHA	UG/KG	17.6	U	1.78	U	20.6	U	1.72	U	1.78	U	1.73	U	1.79	U	0.294	J
ENDOSULFAN II	UG/KG	34.2	U	3.46	U	40.1	U	3.48		3.45	U	7.16		3.48	U	21.2	J
4,4'-DDT	UG/KG	25.8		3.46	U	6.75		170		3.45	U	72.4		2.94		138	J
ALPHA-CHLORDANE	UG/KG	20		1.78	U	20.6	U	2.04		1.78	U	7.75		2.26		1.71	UJ
GAMMA-CHLORDANE	UG/KG	17.6	U	1.78	U	20.6	U	1.72	U	1.78	U	1.73	U	1.79	U	3.37	J
ENDRIN KETONE	UG/KG	34.2	U	3.46	U	40.1	U	1.86		3.45	U	3.36	U	3.48	U	4.32	J
DIELDRIN	UG/KG	34.4		3.46	U	40.1	U	6.75		3.45	U	18		4.74		38	J
ENDRIN	UG/KG	34.2	U	3.46	U	40.1	U	3.35	U	3.45	U	3.38	U	3.48	U	3.32	UJ
METHOXYCHLOR	UG/KG	176	U	17.8	U	206	U	17.2	U	17.8	U	17.3	U	17.9	U	1.55	J
4,4'-DDD	UG/KG	34.2	U	3.46	U	40.1	U	94.4		3.45	U	15.6		3.48	U	43	J
4,4'-DDE	UG/KG	34.2	U	3.46	U	40.1	U	35.7		3.45	U	23.9		3.48	U	33.6	J
ENDRIN ALDEHYDE	UG/KG	34.2	U	3.46	U	40.1	U	8.17		3.45	U	2.95		3.48	U	9.38	J
ENDOSULFAN I	UG/KG	17.6	U	1.78	U	20.6	U	1.72	U	1.78	U	1.73	U	1.79	U	1.71	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	35.8		33.9		27.4		18.4		13.1	U	12.7	U	13.2	U	91.3	
TFH GASOLINE	MG/KG	0.12		0.053	U	0.061	U	0.136		0.052	U	0.094		0.053	U	0.351	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	1314		20	U	20	U	665		20	U	86		20	U	7730	

Table B8-2

Site 8 (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	08_ST3 S1454451 (2)	DVF(a)	08_ST3 S1454452 (4)	DVF(a)	08_STDB S14544122 (0)	DVF(a)	08_UGS S1454108 (0)	DVF(a)	08_UGS S1454109 (2)	DVF(a)							
METALS																		
SILVER	MG/KG	0.46	U	0.44	U	0.51	b	0.43	U	0.44	U							
ZINC	MG/KG	16.1		16.3		81.4		17.1		18.9								
ALUMINUM	MG/KG	2620		3850		7310		2410		3990								
ARSENIC	MG/KG	0.72	b	0.5	b	2.1		1.3	b	1.1	b							
BARIIUM	MG/KG	54.6		54.3		73.3		17.8	b	46.2								
BERYLLIUM	MG/KG	0.34	U	0.44	U	0.33	b	0.1	UJ	0.1	UJ							
CALCIUM	MG/KG	1510		1990		6090		1440		2030								
CADMIUM	MG/KG	0.51	b	0.5	b	2.8		0.55	b	0.65	b							
COBALT	MG/KG	2.2	b	1.9	b	6.3	U	1.6	b	1.7	b							
CHROMIUM	MG/KG	3		4.5		11.7		2	b	4.2								
COPPER	MG/KG	5.2	b	3.5	b	22.3		6.2		3.9	b							
IRON	MG/KG	4470		5500		17000		5610		5670								
MERCURY	MG/KG	0.04	U	0.03	U	0.14		0.03	U	0.03	U							
POTASSIUM	MG/KG	1070	b	1010	b	916	b	475	b	1370								
MAGNESIUM	MG/KG	1360		1690		3780		1700		2270								
MANGANESE	MG/KG	115		115		195		94.2		121								
SODIUM	MG/KG	178	b	149	b	259	b	217	b	202	b							
NICKEL	MG/KG	2.9	U	3.1	U	11.8		3.2	b	4.2	b							
LEAD	MG/KG	80.8		13.9		25.9		1.6		0.9								
ANTIMONY	MG/KG	2.6	U	2.5	U	2.5	U	2.5	U	2.5	U							
SELENIUM	MG/KG	0.11	UJ	0.1	UJ	0.1	U	0.1	U	0.1	U							
THALLIUM	MG/KG	0.15	UJ	0.15	UJ	0.15	UJ	0.14	U	0.15	U							
VANADIUM	MG/KG	10.1	b	12.7		26.9		9.9	b	14.6								
VOLATILE ORGANIC COMPOUNDS																		
ETHYLBENZENE	UG/KG	11	U	10	U	10	U	-		-								
TOLUENE	UG/KG	11	U	3	J	7	J	-		-								
TETRACHLOROETHENE	UG/KG	11	U	10	U	10	U	-		-								
XYLENE (TOTAL)	UG/KG	11	U	10	U	10	U	-		-								
2-HEXANONE	UG/KG	11	U	10	U	10	U	-		-								
ACETONE	UG/KG	12	U	19	U	13	U	-		-								
METHYLENE CHLORIDE	UG/KG	11	U	10	U	10	U	-		-								
2-BUTANONE	UG/KG	11	U	10	U	10	U	-		-								
SEMI-VOLATILE ORGANIC COMPOUNDS																		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	700	U	680	U	570	J	-		-								
PYRENE	UG/KG	700	U	680	U	1400	U	-		-								
DIMETHYL PHTHALATE	UG/KG	700	U	680	U	1400	U	-		-								
BENZO(GH)PERYLENE	UG/KG	700	U	680	U	1400	U	-		-								
INDENO(1,2,3-CD)PYRENE	UG/KG	700	U	680	U	1400	U	-		-								
FLUORANTHENE	UG/KG	700	U	680	U	1400	U	-		-								
CHRYSENE	UG/KG	700	U	680	U	1400	U	-		-								
BENZO(A)PYRENE	UG/KG	700	U	680	U	1400	U	-		-								
HEXACHLOROETHANE	UG/KG	700	U	680	U	1400	U	-		-								
DI-N-BUTYL PHTHALATE	UG/KG	700	U	680	U	1400	U	-		-								
BENZYL BUTYL PHTHALATE	UG/KG	700	U	680	U	1400	U	-		-								
PESTICIDES AND PCBs																		
ENDOSULFAN SULFATE	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
PCB-1280	UG/KG	34.9	UJ	33.6	UJ	343	U	-		-								
PCB-1254	UG/KG	34.9	UJ	33.6	UJ	739	U	-		-								
PCB-1248	UG/KG	34.9	UJ	33.6	UJ	343	U	-		-								
BHC-ALPHA	UG/KG	1.8	UJ	1.73	UJ	17.7	U	-		-								
ENDOSULFAN II	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
4,4'-DDT	UG/KG	3.49	UJ	3.36	UJ	19.9		-		-								
ALPHA-CHLORDANE	UG/KG	1.8	UJ	1.73	UJ	17.7	U	-		-								
GAMMA-CHLORDANE	UG/KG	1.8	UJ	1.73	UJ	6.97		-		-								
ENDRIN KETONE	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
DIELDRIN	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
ENDRIN	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
METHOXYCHLOR	UG/KG	18	UJ	17.3	UJ	177	U	-		-								
4,4'-DDD	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
4,4'-DDE	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
ENDRIN ALDEHYDE	UG/KG	3.49	UJ	3.36	UJ	34.3	U	-		-								
ENDOSULFAN I	UG/KG	1.8	UJ	1.73	UJ	17.7	U	-		-								
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																		
TFH DIESEL	MG/KG	30		18		43.7		13.7		13.1	U							
TFH GASOLINE	MG/KG	0.269		0.052	U	0.327		0.051	U	0.056								
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																		
TRPH	MG/KG	160		141		2144		512		20	U							

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

Table B8-3

Site 8 (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	08_25B203 S1456118 (8)	DVF(a)	08_25B203 S1456119 (10)	DVF(a)	08_25B203 S1456120 (15)	DVF(a)	08_25B203 S1456121 (20)	DVF(a)	08_25B203 S1456122 (25)	DVF(a)	08_25B203 S1457063 (25)	DVF(a)	08_25B204 S1456123 (5)	DVF(a)	08_25B204 S1456124 (10)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.48	U	0.47	U	0.49	U	0.54	U	0.58	U	0.48	U	0.69	U	0.73	U
ALUMINUM	MG/KG	11500		5420		8010		17700		17300		8750		11700		10000	
ARSENIC	MG/KG	3.1		3.5		3.3		4.9		5.7		2.5		1.9	U	4.9	
BARIUM	MG/KG	130		60.4		94.9		148		132		72.1		131		144	
BERYLLIUM	MG/KG	0.35	U	0.32	U	0.58	U	1	U	0.85	U	0.38	U	0.75	U	0.8	U
CALCIUM	MG/KG	12100		6280		4740		9500		10300		3820		3830		9770	
CADMIUM	MG/KG	1.8		0.72	b	0.73	b	2		2.2		1.2		1.5		0.98	b
COBALT	MG/KG	3.7	b	2.9	b	3.8	b	6.8	b	8.7	b	3.8	b	5.8	b	5.5	b
CHROMIUM	MG/KG	12.8		5.5		14.2		13.3		12.2		6.9		11.3		12	
COPPER	MG/KG	10.6		4.1	b	6.5		12.3		9.8		5.8	b	8		9.5	
IRON	MG/KG	13700		7840		10500		19100		17800		9050		14400		13000	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.04	U	0.04	U	0.03	U	0.14		0.03	U
POTASSIUM	MG/KG	3010		1900		2120		3700		4040		1830		3410		2840	
MAGNESIUM	MG/KG	5360		3290		3580		6650		6530		2770		5070		5200	
MANGANESE	MG/KG	232		159		198		348		319		189		254		288	
SODIUM	MG/KG	301	b	227	b	284	b	658	b	848	b	394	b	353	b	353	b
NICKEL	MG/KG	11		7.3	U	14.5		12		7.9	U	6.1	U	9		9.4	
LEAD	MG/KG	3		2.3		2.4		4.3		4.9		1.8		1.8		3	
SELENIUM	MG/KG	0.12	U	0.11	U	0.12	U	0.13	U	0.14	U	0.12	U	0.11	U	0.12	U
THALLIUM	MG/KG	0.37	U	0.34	U	0.23	U	0.23	U	0.19	U	0.16	U	0.28	b	0.25	b
VANADIUM	MG/KG	35.1		19.5		21.7		39.2		35.9		20.5		34.7		34.9	
ZINC	MG/KG	44.2		25.9		30.8		53.5		49.8		27.1		44.2		39.4	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	12	U	11	U	13	U	12	U	12	U	12	U	11	U	11	U
2-HEXANONE	UG/KG	12	U	11	U	13	U	12	U	12	U	12	U	11	U	11	U
ACETONE	UG/KG	20	U	210		16		12	U	36		26		11	U	11	U
METHYLENE CHLORIDE	UG/KG	12	U	11	U	13	U	12	U	12	U	12	U	11	U	11	U
CARBON DISULFIDE	UG/KG	12	U	11	U	13	U	12	U	12	U	12	U	11	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	770	U	750	U	830	U	830	U	820	U	780	U	730	U	760	U
BENZYL BUTYL PHTHALATE	UG/KG	770	U	250	J	250	J	830	U	820	U	780	U	730	U	760	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.85	UJ	3.75	UJ	4.09	UJ	4.12	U	4.11	UJ	3.89	UJ	3.61	UJ	3.75	UJ
BHC-DELTA	UG/KG	1.98	UJ	1.93	UJ	2.11	UJ	2.12	U	2.12	UJ	2	UJ	1.88	UJ	1.93	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	14.4	U	14.1	U	15.8	U	15.5	U	15.5	U	14.8	U	13.8	U	14.3	U
TFH GASOLINE	MG/KG	0.058	U	0.057	U	0.063	U	0.063	U	0.062	U	0.059	U	0.055	U	0.057	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	71		61		70		20	U	289	

Table B8-3

Site 8 (OU- 3): Summary of Detected Chemicals in the Vadose Zone (Subsurface) Samples

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STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	08_25B204 S1457024 (10)	DVF(a)	08_25B204 S1456125 (15)	DVF(a)	08_25B204 S1456126 (20)	DVF(a)	08_25B204 S1456127 (25)	DVF(a)	08_25B205 S1456128 (5)	DVF(a)	08_25B205 S1456129 (10)	DVF(a)	08_25B205 S1456130 (15)	DVF(a)	08_25B205 S1457026 (15)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.62	U	0.49	U	0.78	U	1.1	U	0.45	U	0.46	U	0.45	U	0.46	U
ALUMINUM	MG/KG	7170		5490		7890		21800		8040		4670		3220		10600	
ARSENIC	MG/KG	2.4	U	0.77	U	2.4	U	4.2		2.7		1.2	U	1.6	U	1.9	U
BARIUM	MG/KG	95.4		39.6	b	65		155		89.5		46.5		48.6		56.9	
BERYLLIUM	MG/KG	0.72	U	0.35	U	0.6	U	1.1	b	0.38	U	0.56	U	0.35	U	0.6	U
CALCIUM	MG/KG	4290		2240		1890		5600		4740		1830		976	b	1810	
CADMIUM	MG/KG	0.82	b	0.26	U	0.38	b	1.8		0.73	b	0.27	U	0.46	b	0.37	b
COBALT	MG/KG	5	b	3.1	b	4.5	b	14.6		4.7	b	2.4	b	3.2	b	2	b
CHROMIUM	MG/KG	11.5		5.1		8.6		22.3		10.1		6.1		4.7		10.3	
COPPER	MG/KG	7.5		2.6	b	5.9		11.2		8.9		3.8	b	4.9	b	5.1	b
IRON	MG/KG	10300		5940		8680		23800		9760		4680		5790		10200	
MERCURY	MG/KG	0.03	U	0.06	U	0.04	U	0.03	U	0.03	U	0.03	U	0.03	U	0.07	U
POTASSIUM	MG/KG	1620		638	b	1520		4330		1770		1360		1090		1630	
MAGNESIUM	MG/KG	3590		2110		2270		7880		3240		2270		1550		2680	
MANGANESE	MG/KG	326		75.8		246		269		274		52.9		153		67.1	
SODIUM	MG/KG	270	b	194	b	217	b	441	b	363	b	420	b	360	b	497	b
NICKEL	MG/KG	9.2		3.6	b	4.5	b	15.2		6.2	b	1.7	U	5.3	b	6.2	b
LEAD	MG/KG	3		1.8		2.1		3.5		2.2		1.9		1.3	U	1.8	
SELENIUM	MG/KG	0.11	U	0.11	U	0.11	U	0.12	U	0.11	U	0.11	U	0.11	U	0.11	U
THALLIUM	MG/KG	0.18	b	0.15	U	0.18	b	0.38	b	0.15	U	0.18	b	0.15	U	0.15	b
VANADIUM	MG/KG	27.8		11.4		18.9		61.6		27.8		10.5	b	13.3		21	
ZINC	MG/KG	27.9		17		23		60.2		25.4		14.9		15.8		25.6	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
2-HEXANONE	UG/KG	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
ACETONE	UG/KG	11	U	11	U	78	U	11	U	11	U	11	U	11	U	11	U
METHYLENE CHLORIDE	UG/KG	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
CARBON DISULFIDE	UG/KG	11	U	11	U	11	U	11	U	11	U	3	J	11	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	730	U	700	U	730	U	740	U	710	U	720	U	700	U	700	U
BENZYL BUTYL PHTHALATE	UG/KG	730	U	700	U	730	U	740	U	710	U	720	U	700	U	700	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.63	UJ	3.5	UJ	3.87	UJ	3.66	UJ	3.52	UJ	3.58	UJ	3.5	UJ	3.51	UJ
BHC-DELTA	UG/KG	1.87	UJ	1.8	UJ	1.89	UJ	1.89	UJ	1.82	UJ	1.84	UJ	1.8	UJ	1.81	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	39.1		15.4		16.1		14.2		13.5	UJ	13.6	UJ	13.1	UJ	13.3	UJ
TFH GASOLINE	MG/KG	0.055	U	0.053	U	0.056	U	0.056	U	0.083		0.489		1.53		1.23	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	96		20	U	20	U	20	U	20	U	20	U	52	

Table B8-3

Site 8 (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	08_26B206 S1456143 (20)	DVF(a)	08_26B206 S1456144 (25)	DVF(a)	08_26B206 S1457027 (5)	DVF(a)	08_26B206 S1457028 (10)	DVF(a)	08_26B206 S1457029 (15)	DVF(a)	08_26B206 S1457032 (15)	DVF(a)	08_26B206 S1457030 (20)	DVF(a)	08_26B206 S1457031 (25)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.76	U	0.47	U	0.88	b	0.44	U	0.47	U	0.47	U	0.49	U	0.5	U
ALUMINIUM	MG/KG	19700		1540		8230		6460		7870		11800		11300		12400	
ARSENIC	MG/KG	5.1		0.96	U	3.4		2	U	2.1	U	2.3	U	2.2	U	2.6	
BARIUM	MG/KG	249		24.4	b	110		104		70.2		71.7		101		133	
BERYLLIUM	MG/KG	1	b	0.35	U	0.56	U	0.39	U	0.5	U	0.42	U	0.65	U	0.72	U
CALCIUM	MG/KG	5790		1300		4210		8110		3480		9900		4070		4530	
CADMIUM	MG/KG	4.1		0.28	b	1.7		0.86	b	0.42	b	0.38	b	0.79	b	1.2	
COBALT	MG/KG	24		1.5	b	5.4	b	3.8	b	2.8	b	2.2	b	5.4	b	4.1	b
CHROMIUM	MG/KG	23.6		2.5		9.8		7.1		7.5		7.8		10		15.1	
COPPER	MG/KG	11.6		1.7	b	10.7		5	b	3.3	b	3.2	b	5.6	b	7.4	
IRON	MG/KG	22000		2550		11900		9560		7890		10100		13600		15900	
MERCURY	MG/KG	0.04	U	0.03	U	0.03	U	0.03	U	0.03	U	0.04	U	0.04	U	0.04	U
POTASSIUM	MG/KG	3800		597	b	3880		2290		1790		1830		3360		3570	
MAGNESIUM	MG/KG	7100		771	b	4590		4210		3120		4950		5240			
MANGANESE	MG/KG	742		55.4		249		170		69.7		80.9		189		104	
SODIUM	MG/KG	1170	b	239	b	325	b	237	b	180	b	208	b	286	b	420	b
NICKEL	MG/KG	31.2		3.1	b	5.5	U	5.5	U	7.1	U	3.1	U	10.2		7.8	U
LEAD	MG/KG	8.5		1	U	3.2		2.4		2.2		2.7		2.3		3.6	
SELENIUM	MG/KG	0.24	b	0.1	U	0.23	U	0.11	U	0.11	U	0.11	U	0.12	U	0.12	U
THALLIUM	MG/KG	0.34	b	0.15	U	0.3	b	0.15	U	0.16	U	0.16	U	0.21	b	0.33	b
VANADIUM	MG/KG	60.1		6.9	b	29		22.8		17.8		20.8		30.6		37.4	
ZINC	MG/KG	58.2		8.2		40.2		29.6		21.8		24.6		35.4		40.3	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	10	U	4	J	10	U	2	J	4	J	12	U	5	J
2-HEXANONE	UG/KG	11	U	10	U	8	J	10	U	11	U	11	U	12	U	12	U
ACETONE	UG/KG	11	U	10	U	18	U	27	U	28	U	44	U	16	U	32	U
METHYLENE CHLORIDE	UG/KG	11	U	10	U	3	J	4	J	6	J	5	J	12	U	6	J
CARBON DISULFIDE	UG/KG	11	U	10	U	12	U	10	U	11	U	11	U	12	U	12	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	750	U	690	U	760	U	680	U	740	U	740	U	780	U	580	J
BENZYL BUTYL PHTHALATE	UG/KG	750	U	690	U	760	U	680	U	740	U	740	U	780	U	780	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.72	UJ	3.43	UJ	3.77	UJ	3.36	UJ	3.66	UJ	3.67	UJ	3.9	UJ	0.911	J
BHC-DELTA	UG/KG	1.92	UJ	1.77	UJ	1.94	UJ	1.73	UJ	1.89	UJ	1.89	UJ	2.01	UJ	1.99	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	14	UJ	12.9	UJ	14.3	U	12.8	U	14	U	13.8	U	14.6	U	14.6	U
TFH GASOLINE	MG/KG	1.97		2.4		0.058	U	0.051	U	0.058	U	0.058	U	0.059	U	0.059	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	193		20	U	20	U	20	U	20	U	20	U	20	U

Table B8-3

Site 8 (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(F.T.BGS) ANALYTE BY GROUP	UNITS	08_DB202 S1456135 (5)	DVF(a)	08_DB202 S1456136 (10)	DVF(a)	08_DB202 S1456140 (10)	DVF(a)	08_DB202 S1456137 (15)	DVF(a)	08_DB202 S1456138 (20)	DVF(a)	08_DB202 S1456139 (25)	DVF(a)	08_DB202 S1457067 (45)	DVF(a)	08_DB202 S1457068 (55)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.49	U	0.48	U	0.48	U	0.48	U	0.48	U	0.55	U	0.45	U	0.45	U
ALUMINUM	MG/KG	12200		11300		7520		7270		3980		13200		3780		2520	
ARSENIC	MG/KG	3.5		1.7	b	1.9	b	3.7		1.3	b	4.6		2.3		2.3	
BARIUM	MG/KG	128		85.3		96.8		105		54		150		41.8	b	36.1	b
BERYLLIUM	MG/KG	0.47	U	0.51	U	0.32	U	0.37	U	0.33	U	0.45	U	0.21	U	0.28	U
CALCIUM	MG/KG	5370		8850		3340		2480		1840		4340		2220		1380	
CADMIUM	MG/KG	1.7		0.28	b	0.27	U	0.81	b	0.46	b	2.1		0.25	U	0.28	U
COBALT	MG/KG	5.1	b	1.3	U	2.4	b	10.2	b	3.3	b	4		1.4	b	3.2	b
CHROMIUM	MG/KG	24.7		12.1		7.6		10.7		4.8		16.4		3.9		8.9	
COPPER	MG/KG	10.1		3.1	b	3.3	b	5.9		2.8	b	11.7		4.4	b	2.7	b
IRON	MG/KG	14500		10000		9600		10700		5730		18200		3730		4480	
MERCURY	MG/KG	0.05	U	0.19		0.03	U	0.07		0.03	U	0.04		0.03	U	0.03	U
POTASSIUM	MG/KG	2390		1310		1880		2300		1240		3940		770	b	1030	b
MAGNESIUM	MG/KG	5760		3300		3670		3290		1780		5490		1200		1230	
MANGANESE	MG/KG	262		61.9		78.8		430		181		239		112		141	
SODIUM	MG/KG	330	b	295	b	304	b	369	b	327	b	780	b	319	b	331	b
NICKEL	MG/KG	23.2		8	U	1.9	U	8.6	U	6	U	15.2		3	U	9.5	
LEAD	MG/KG	2.9		2.6		2.6		3.6		2		2.5		1.8		1.6	
SELENIUM	MG/KG	0.15	U	0.11	U	0.11	U	0.11	U	0.11	U	0.14	U	0.11	U	0.18	U
THALLIUM	MG/KG	0.54	U	0.34	U	0.16	U	0.27	U	0.15	U	0.37	U	0.19	U	0.15	U
VANADIUM	MG/KG	40.7		19.3		23.7		24.5		14.1		50.2		10.7		14.4	
ZINC	MG/KG	42.3		21.8		24.2		29.1		17.8		54.8		12.9		13.8	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	12	U	11	U												
2-HEXANONE	UG/KG	12	U	11	U												
ACETONE	UG/KG	54	U	32	U	20	U	34	U	27	U	23	U	20	U	14	U
METHYLENE CHLORIDE	UG/KG	15	U	11	U	11	U	17	U	16	U	11	U	11	U	11	U
CARBON DISULFIDE	UG/KG	12	U	11	U												
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	760	U	750	U	750	U	760	U	750	U	740	U	710	U	740	U
BENZYL BUTYL PHTHALATE	UG/KG	760	U	750	U	750	U	760	U	750	U	740	U	710	U	400	J
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.78	U	3.74	U	3.73	U	3.77	U	3.74	U	3.89	U	3.53	U	3.66	UJ
BHC-DELTA	UG/KG	1.95	U	1.93	U	1.92	U	1.94	U	1.92	U	1.9	U	1.82	U	1.88	MJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	14.3	U	14.1	U	14.1	U	14.3	U	13.9	U	14	U	13.3	U	13.9	U
TFH GASOLINE	MG/KG	0.058	U	0.057	U	0.059		0.128		0.057	U	0.178		0.054	U	0.058	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	76		596		166		208		104		55		209		127	

Table B8-3

Site 8 (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	08_DB202 S1457069 (76)	DVF(a)	08_DGMW73 S1456148 (60)	DVF(a)	06_DGMW73 S1457049 (60)	DVF(a)	08_DGMW73 S1456132 (110)	DVF(a)	06_DGMW74 S1456133 (80)	DVF(a)	08_DGMW74 S1457067 (80)	DVF(a)	08_DGMW74 S1456148 (100)	DVF(a)	08_DGMW74 S1457068 (100)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		381		-		-		233		100	U
METALS																	
SILVER	MG/KG	0.48	U	0.33	U	0.6	U	-		0.48	U	0.48	U	-		-	
ALUMINIUM	MG/KG	6050		6880		7870		-		4390		6290		-		-	
ARSENIC	MG/KG	2.4		4.1		4.2		-		1.6	b	1.5	b	-		-	
BARIUM	MG/KG	68.7		52.8		54.3		-		48.2		49.2		-		-	
BERYLLIUM	MG/KG	0.32	U	0.33	b	0.37	b	-		0.26	b	0.32	b	-		-	
CALCIUM	MG/KG	2570		3040		3000		-		2030		2540		-		-	
CADMIUM	MG/KG	0.44	b	0.66	b	0.72	b	-		0.37	b	0.4	b	-		-	
COBALT	MG/KG	1.3	U	5.4	U	5.8	U	-		3.1	b	1.3	U	-		-	
CHROMIUM	MG/KG	10.1		8.8		10.3		-		5.1		8.8		-		-	
COPPER	MG/KG	5.3	b	7.2		8.3		-		3.5	b	5.3	b	-		-	
IRON	MG/KG	8830		9070		10200		-		6030		8550		-		-	
MERCURY	MG/KG	0.03	U	0.02	U	0.02	U	-		0.03	U	0.03	U	-		-	
POTASSIUM	MG/KG	1880		1950		2900		-		1690		2430		-		-	
MAGNESIUM	MG/KG	2580		2400		2640		-		1890		2650		-		-	
MANGANESE	MG/KG	61.5		176		187		-		63.2		64.2		-		-	
SODIUM	MG/KG	503	b	444	U	385	U	-		213	b	248	b	-		-	
NICKEL	MG/KG	9.1		7.9	b	8.1	b	-		4.8	b	6	b	-		-	
LEAD	MG/KG	1.7		2.6		3.1		-		1.4		2.2		-		-	
SELENIUM	MG/KG	0.17	U	4.6	U	4.7	U	-		0.11	U	0.11	U	-		-	
THALLIUM	MG/KG	0.25	U	0.35	U	0.35	U	-		0.15	U	0.16	U	-		-	
VANADIUM	MG/KG	22.9		23.8		26.9		-		15.9		21.2		-		-	
ZINC	MG/KG	25.1		28.4		30.3		-		18.3		24		-		-	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	12	U	11	U	12	U	11	U	11	U	12	U	11	U
2-HEXANONE	UG/KG	11	U	12	U	11	U	12	U	11	U	11	U	12	U	11	U
ACETONE	UG/KG	18	U	12	U	31	B	17	B	11	U	30	U	12	U	11	U
METHYLENE CHLORIDE	UG/KG	11	U	12	U	11	U	12	U	11	U	11	U	12	U	11	U
CARBON DISULFIDE	UG/KG	11	U	12	U	11	U	12	U	11	U	11	U	12	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	710	U	770	U	900		-		750	U	740	U	-		-	
BENZYL BUTYL PHTHALATE	UG/KG	710	U	770	U	740	U	-		750	U	740	U	-		-	
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.56	U	3.86	UJ	3.7	UJ	-		3.72	UJ	3.89	UJ	-		-	
BHC-DELTA	UG/KG	1.83	U	1.99	UJ	1.9	UJ	-		1.82	UJ	1.9	UJ	-		-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.4	U	16.7		18.3		-		32.8		13.9	U	-		-	
TFH GASOLINE	MG/KG	0.054	U	0.059	U	0.056	U	-		0.067		0.058	U	-		-	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	53		82		528		-		20	U	20	U	-		-	

**Table B8-4
Site 8 (OU-3): Well Construction Details
MCAS EI Toro Phase I RI Technical Memorandum**

Sheet 1 of 1

Item	Station Identification		
	08_DGMW73	08_DGMW74	08_UGMW29
Survey Location--Northing	547091.53	547253.87	546536.73
Survey Location--Easting	1547853.14	1547932.84	1548943.63
Ground Surface Elevation (ft above MSL ^a)	264.01	264.11	272.68
Measuring Point Elevation (ft above MSL ^a)	263.77	264.75	271.94
Measuring Point Location	Top of casing	Top of casing	Top of casing
Type of Surface Completion	Below ground	Above ground	Below ground
Casing Diameter and Material	4" Sch. 40 PVC	4" Sch. 40 PVC	4" Sch. 40 PVC
Screen Diameter and Material	4 inch stainless steel	4 inch stainless steel	4 inch stainless steel
Screen Interval (ft bgs ^b)	90 - 130	90 - 130	95 - 135
Length of Drop Pipe (ft bgs ^b)	125	125	132
Make and Model of Installed Pump	Grundfos Redi-flow 2	Grundfos Redi-flow 2	Grundfos Redi-flow 2
Date of Pumping Test	Slug test 11 November 92	Pump test 16 November 92	Slug test 14 October 92
Date of Water Quality Sampling	2 December 92	16 November 92	8 December 92
^a Mean sea level ^b Below ground surface			

**Table B8-5
 Site 8 (OU-3): Summary of Hydraulic Parameters
 MCAS El Toro Phase I RI Technical Memorandum**

Sheet 1 of 1

Well Identification	Type of Test	Analysis Method	Transmissivity (ft²/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient^a	Leakance Factor^a
08_UGMW29	Slug	B&R; CBP	7.2	0.18	6E-08	NA
08_DGMW29	Slug	B&R	570	14.3	NA	NA
08_DGMW29	Slug	Theiss: Recovery	920	23.1	NA	NA

^aNA = Not applicable
 Source: Table F-2 (Appendix F)

Table B8-6
Site 8 (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	08_DGMW73 81452086 (90-130)	DVF(a)	08_DGMW74 81452086 (90-130)	DVF(a)	08_UGMW29 81452061 (95-135)	DVF(a)
GENERAL CHEMISTRY									
ALKALINITY AS CaCO3	NA	NA	MG/L	447		266		132	
CARBONATE	NA	NA	MG/L	-		-		-	
CYANIDE	NA	NA	UG/L	3.9	B	3	U	3	U
BICARBONATE	NA	NA	MG/L	545		324		161	
CHLORIDE	3	250	MG/L	182		189		245	
SULFATE	3	250	MG/L	69.5		79.6		99.5	
NITRATE/NITRITE-N	1	10	MG/L	15.4		12.6		11.7	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	942		804		847	
METALS									
ALUMINUM	3	50	UG/L	41.7	b	31	U	31	U
ARSENIC	2	50	UG/L	1	b	1.9	b	0.7	U
BARIUM	2	2000	UG/L	137	b	64.6	b	54.6	b
CALCIUM	NA	NA	UG/L	120000		95700		97900	
CADMIUM	2	5	UG/L	1.2	U	2.5	b	2.1	b
COPPER	2	1300	UG/L	0.9	U	1.4	b	1.4	J
IRON	3	300	UG/L	21.5	b	38.2	b	34.8	b
MERCURY	2	2	UG/L	0.16	b	0.1	U	0.1	U
POTASSIUM	NA	NA	UG/L	2450	b	2060	b	4150	b
MAGNESIUM	NA	NA	UG/L	33600		26000		30800	
MANGANESE	3	50	UG/L	25.2		24.6		110	
SODIUM	NA	NA	UG/L	163000		138000		109000	
NICKEL	NA	NA	UG/L	122		138		134	
SELENIUM	1	10	UG/L	2.5	U	3.8	b	4.2	U
VANADIUM	NA	NA	UG/L	22.3	b	22.9	b	12.3	b
ZINC	2	5000	UG/L	4.8	b	23		4.1	J
VOLATILE ORGANIC COMPOUNDS									
TOLUENE	2	1000	UG/L	1	U	1	U	0.7	J
TETRACHLOROETHENE	2	5	UG/L	7		6		1	U
XYLENE (TOTAL)	NA	NA	UG/L	1	U	1	U	1	J
CARBON TETRACHLORIDE	1	0.5	UG/L	0.9	J	6		1	U
CHLOROFORM	2	100	UG/L	9		6		0.8	J
BENZENE	1	1	UG/L	0.3	J	1	U	1	U
CHLOROMETHANE (METHYL CHLORIDE)	NA	NA	UG/L	0.4	J	0.9	J	2	U
1,1-DICHLOROETHENE	NA	NA	UG/L	8		5		1	U
1,1,2-TRICHLOROETHANE	1	32	UG/L	2		1	U	1	U
TRICHLOROETHYLENE	2	5	UG/L	140	D	100	D	20	

(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 B8-7
Site 8 (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	Concentration	Regulatory Level ^c	Regulatory Code ^d
08_DGMW73	(90-130)	Nitrate/Nitrite-N	mg/L	15.4	10	2
		Total Dissolved Solids	mg/L	942	500	3
		Carbon Tetrachloride	µg/L	0.9	0.5	2
		Tetrachloroethene	µg/L	7	5	1
		Trichloroethylene	µg/L	140	5	1
08_DGMW74	(90-130)	Nitrate/Nitrite-N	mg/L	12.6	10	2
		Total Dissolved Solids	mg/L	804	500	3
		Carbon Tetrachloride	µg/L	6	0.5	2
		Tetrachloroethene	µg/L	8	5	1
		Trichloroethylene	µg/L	100	5	1
08_UGMW29	(95-135)	Manganese	µg/L	110	50	3
		Nitrate/Nitrite-N	mg/L	11.7	10	2
		Total Dissolved Solids	mg/L	847	500	3
		Trichloroethylene	µg/L	20	5	1

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 B9

**Nature and Extent of Contamination:
Site 9 (OU-3) — Crash Crew Pit No. 1**

Appendix B9

NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION:

Site 9 (OU-3): CRASH CREW PIT NO. 1

This discussion of Site 9 is supplemented by the figures and data tables listed below. The figures begin on page B9-3, and the tables are grouped at the end of this Appendix B9. Field headspace values for soils at this site are presented in Table BA1-9, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B9-1: (Site Map)

Figure B9-2: Geologic Cross Section

Table B9-1: Types of Samples and Chemical Analyses

Table B9-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

Table B9-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples

Table B9-4: Well Construction Details

Table B9-5: Summary of Hydraulic Parameters

Table B9-6: Summary of Detected Chemicals in Groundwater Samples

Table B9-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B9.1 Site Description

Crash Crew Pit No. 1 is located in the west quadrant of the facility, west of Building 435 and north of the Transformer Storage Area (Site 11). Interpretation of historical aerial photographs reveal the existence of a second pit. These two pits (designated "west pit" and "east pit") together constitute one stratum, even though they are geographically separated, because their activities were similar and occurred at about the same time (Figure B9-1).

From 1965 to 1971, the west pit (estimated to be approximately 50 to 70 feet in diameter and 3 to 4 feet deep) was used for fire-fighting training. In these exercises, the pit was filled with water and layered with 100 to 500 gallons of JP-5 fuel, aviation gasoline, and possibly crankcase oil and other wastes. The liquid was then ignited and used in fire-fighting training. It has been estimated that approximately 123,700 gallons of waste

liquids were used for the training exercises and that approximately 10 percent (12,000 gallons) of this volume may have infiltrated into the subsurface (Brown and Caldwell, 1986). It is unknown what volumes of waste were used at the east pit.

B9.2 Suspected Waste Types and Contaminants

Suspected waste types include JP-5 fuel, aviation gasoline, and other liquid wastes such as crankcase oil. Suspected contaminants include VOCs and SVOCs, petroleum hydrocarbons, and metals. Certain metals can be found in waste oils due to friction within the engine.

B9.3 Field Investigation

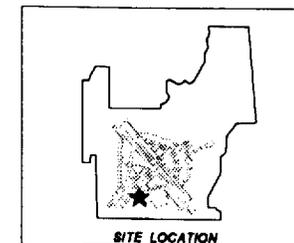
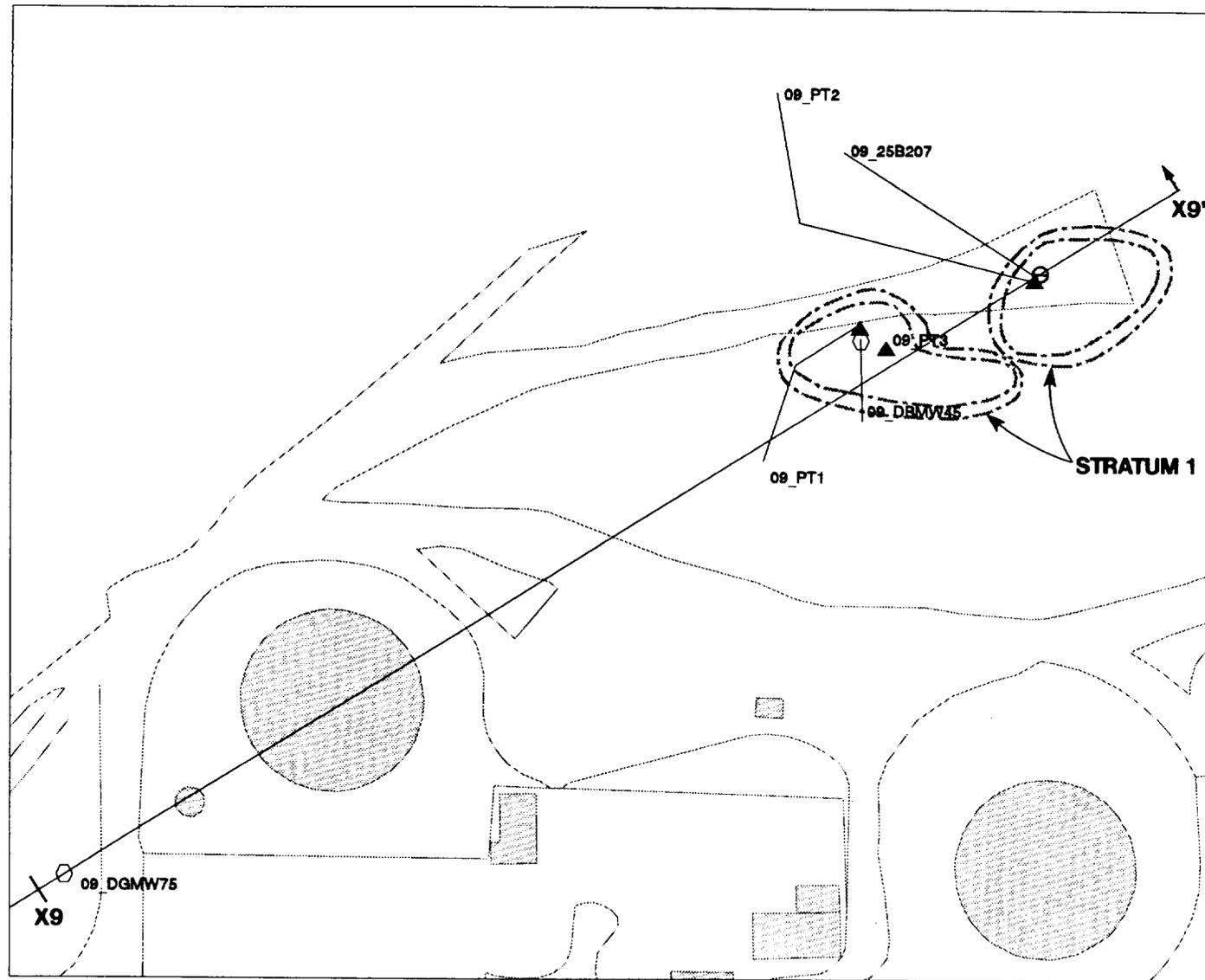
The field investigation consisted of:

- Drilling and sampling one deep boring completed as a monitoring well
- Drilling and sampling one downgradient monitoring well
- Drilling and sampling 25-foot boring,
- Sampling surface soil at three stations

The sampling stations, depths of sampling, and types of analyses requested are listed in Table B9-1. Because the site is flat and fuels were collected in a pit, surface water transport is not a suspected pathway of concern, and so surface water and sediment samples were not collected.

Changes were made to the site boundary, the number and location of monitoring wells, and the number of surface soil samples from those in the original *SAP*, as documented by the *SAP Amendment*:

- The site boundary was altered to incorporate the second (east) pit.
- The downgradient well southwest of the pits, 09_DGMW75, was repositioned based upon groundwater flow directions (Figure B9-1).
- One downgradient well was eliminated due to the small size of the site, leaving a total of two wells.



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

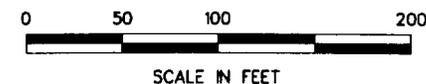


FIGURE B9-1

SITE 9 (OU-3): CRASH CREW PIT NO. 1

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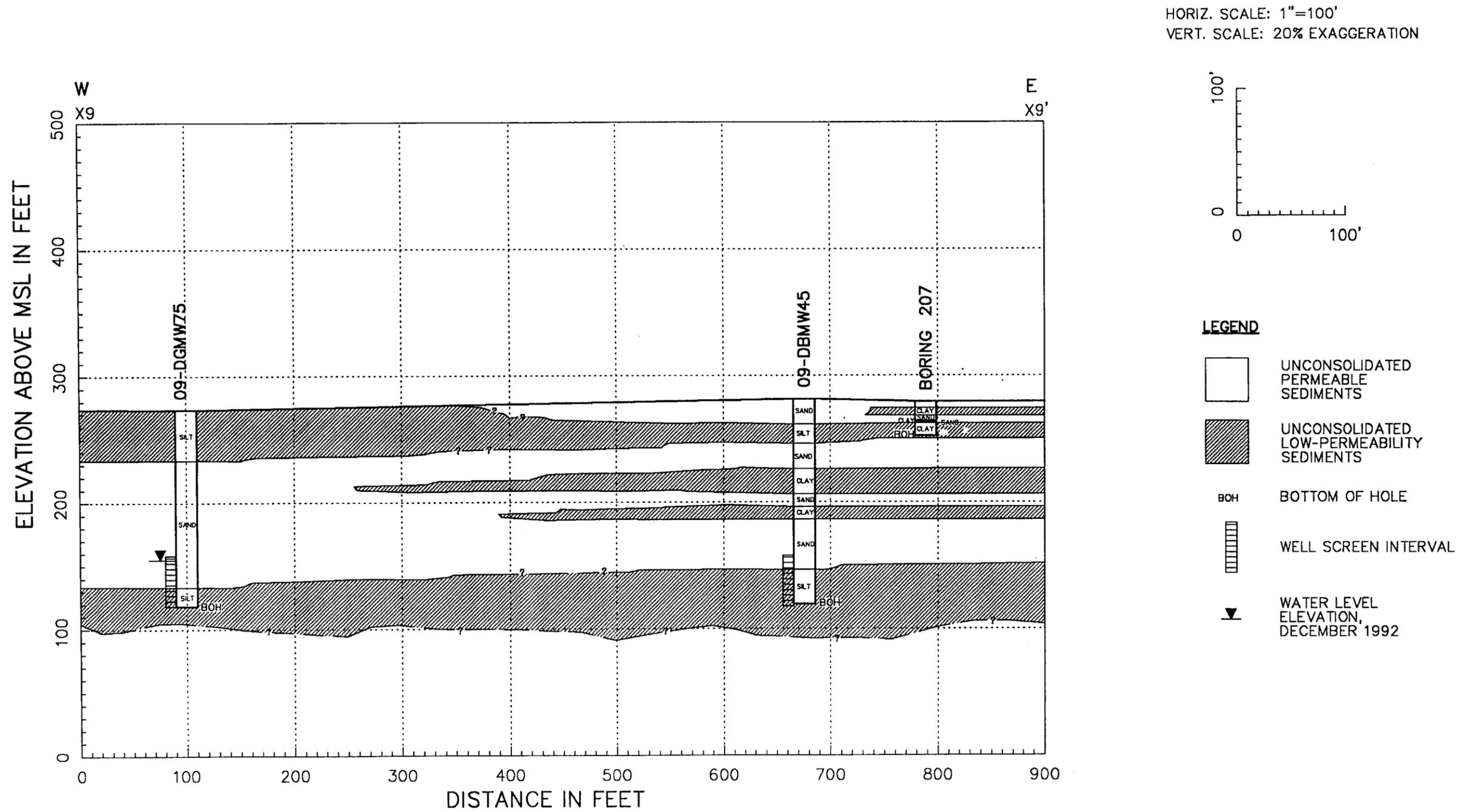


FIGURE B9-2
SITE 9 (OU-3)
GEOLOGIC CROSS SECTION X9-X9'
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

PAGE NUMBER B9-6

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- The deep soil boring was positioned in the downgradient pit and was completed as a monitoring well, and analysis for gross alpha and beta particle activity was added for this well.
- The number of dioxin and furan samples was reduced from two to one, to be collected at a depth of 10 feet in the deep boring.
- The three surface soil sampling stations were randomly distributed between the two pits for risk assessment.

The 25-foot boring in the upgradient pit was drilled and sampled, even though the *SAP Amendment* specified that it was to be eliminated.

Nineteen soil samples (including duplicates) were collected, at 09_25B207 at 5, 10, 15, 20, and 25 feet deep, and at 09_DBMW45 at 5, 10, 15, 20, 25, 35, 55, 95, 120, and 135 feet deep.

B9.3.1 Surface Water and Sediment

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

B9.3.2 Surface and Near-Surface Soils

Within the west pit, two surface soil locations (09_PT1, 09_PT3) were sampled, and a total of three samples collected: one original sample and one duplicate sample were collected at 09_PT1, and one sample was collected at 09_PT3. In the east pit, one surface sample was also collected at 09_PT2.

B9.3.3 Vadose Zone Soils (Soil Borings)

A 25-foot soil boring was drilled in the center of the east pit and sampled at depths of 5, 10, 15, 20, and 25 feet. Duplicate samples were collected at 20 and 25 feet, for a total of seven samples. The samples were analyzed for VOCs SVOCs, TFH, TRPH, and metals. The deep vertical soil boring sampling program differs from the *SAP* and *SAP Amendment* in that:

- The deep boring was repositioned from the west pit center to northwest of the west pit to provide improved downgradient coverage of Site 9.
- The dioxin and furan sample was collected at 20 feet rather than at 10 feet.

B9.3.4 Groundwater Monitoring Wells

Two soil borings were drilled and sampled, and completed as wells; both wells were subsequently sampled for groundwater. The downgradient well northwest of the west pit (09_DGMW75) was sampled at depths of 60 and 120 feet; a duplicate sample was collected at 60 feet. An aquifer test was performed on this well; the pump rate was 19 gpm and the duration was 4 hours.

The deep boring monitoring well (09_DBMW45), located in the west pit, was sampled at 5, 10, 15, 20, 25, 35, 55, 95, and 135 feet. No duplicate samples were collected. The samples were analyzed for VOCs, SVOCs, TFH, TRPH, and metals. An aquifer test was not performed on this well.

Dioxin and furan analysis was also performed on the 09_DBMW45 soil sample collected at 20 feet, and TOC analysis was performed on the 09_DBMW45 and 09_DGMW75 soil samples collected at 135 feet and 120 feet, respectively.

B9.4 Surface Water and Sediments

B9.4.1 Description of Surface Water and Sediment Samples

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

B9.5 Surface and Near-Surface Soils

B9.5.1 Description of Surface and Near-Surface Soils

The soils of Site 9 are Omni Series, Section 206 - Sorrento loam, 0 to 2 percent slopes. The Omni Series is characterized by poorly drained soils on flood plains

and in basins. These soils form in mixed alluvium. About 10 percent of the mapping unit includes areas of Sorrento clay loam; 3 percent Sorrento sandy loam; 5 percent soils that are noncalcareous throughout but are otherwise similar to this Sorrento soils; 5 percent Mocho loam, 0 to 2 percent slopes; and 3 percent Bolsa silt loam, drained (Wachtell, 1978).

At depths of 0 to 12 inches, the soils have a permeability of 0.6 to 2.0 in./hr, an available water capacity of 0.16 to 0.21 in./hr, and a pH of 6.1 to 8.4 (Wachtell, 1978).

B9.5.2 Analytical Results and Soil Vapor Headspace Values

Compounds detected in the near-surface soils include hydrocarbons, four VOCs, one SVOC, and metals. A summary of detected chemicals is presented in Table B9-2. Headspace analysis of the east and west pit near-surface soils, as measured with an OVA, detected no soil organic vapor (see Attachment 1, Appendix B.)

B9.5.2.1 Upgradient Area

(Upgradient soils samples were not collected at this site.)

B9.5.2.2 Stratum 1

Hydrocarbons (TRPH, TFH). TFH-diesel, TFH-gasoline, and TRPH were detected in both pits. In the west pit (09_PT1 and 09_PT3), concentrations of TFH-diesel ranged from 38 to 51 mg/kg; of TFH-gasoline, 0.1 to 0.2 mg/kg; and of TRPH, 65 to 217 mg/kg. In the east pit (09_PT2), concentrations were 19 mg/kg for TFH-diesel, 0.9 mg/kg for TFH-gasoline and 259 mg/kg for TRPH. All hydrocarbon concentrations are below California LUFT guidelines.

Volatile Organic Compounds (VOCs). VOCs were detected in both west pit soil borings: 1,1,1-TCA at 6 mg/kg, 2 butanone at 2 to 3 mg/kg, carbon

tetrachloride at 2 to 3 $\mu\text{g}/\text{kg}$, and toluene at 2 mg/kg . In the east pit, 1,1,1-TCA was detected at 9 $\mu\text{g}/\text{kg}$. All VOC concentrations are below CRDLs.

Semivolatile Organic Compounds (SVOCs). SVOCs were not detected in the west pit. In the east pit, dimethyl phthalate at 360 $\mu\text{g}/\text{kg}$, was the only SVOC detected; this concentration is below the CRDL.

Metals and Cyanide. Table B9-2 presents the results of the detected metals.

In summary, the near-surface soils have hydrocarbon concentrations that are below California LUFT, VOC and SVOC concentrations below CRDLs, and metals.

B9.6 Vadose Zone Soils

B9.6.1 Description of Subsurface Soil Samples

A deep boring completed as a well, a downgradient well, and a 25-foot boring were drilled during the investigation of Site 9 (Figure B9-1). Figure B9-2 is an east-west geologic cross section through the site.

B9.6.2 Subsurface Geology

Site 9 overlies approximately 350 feet of unconsolidated Quaternary sediments, which in turn overlie the semiconsolidated bedrock of the Irvine Area Groundwater Basin. A detailed description of site geology is provided in Section 1.

Alluvium encountered during drilling consists of layered sequences dominated by variable mixtures of sands, silts, and clays (e.g., sandy clay, clayey silt). Thus well-defined permeable units, such as well-sorted coarse sands, are infrequent. More detailed descriptions are provided by the geologic cross section (Figure B9-2) and the soil boring logs (Appendix K).

B9.6.3 Analytical Results

Detected compounds include hydrocarbons, two VOCs, two SVOCs, metals, and TOC.

Hydrocarbons (TRPH, TFH). TFH-gasoline was detected at 09_25B07, 09_DBMW45, and 09_DGNW45. At 09_25B207, TFH-gasoline concentrations (mg/kg) increase with depth and are 0.061 at 5 feet and 0.550 at 25 feet. TFH-gasoline was not detected in the soil samples collected during drilling at 09_DBMW45 and 09_DGMW75. TRPH concentrations in 09_DBMW45 soils are 228 mg/kg at 5 feet and 23 mg/kg at 20 feet. The TRPH concentration of the 09_DGMW75 soil sample collected at 60 feet is 49 mg/kg. All hydrocarbon detects are below California LUFT guideline concentrations.

Volatile Organic Compounds (VOCs). VOCs detected were acetone and toluene. In Boring 09_25B207, acetone concentrations increase with depth and are 25 $\mu\text{g}/\text{kg}$ at 5 feet, 31 $\mu\text{g}/\text{kg}$ at 10 feet, 37 $\mu\text{g}/\text{kg}$ and 48 $\mu\text{g}/\text{kg}$ at 20 feet, and 34 $\mu\text{g}/\text{kg}$ at 25 feet. Acetone is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 37 $\mu\text{g}/\text{L}$. A similar depth-concentration trend is not seen in Well 09_DBMW45; concentrations range from 13 $\mu\text{g}/\text{kg}$ to 28 $\mu\text{g}/\text{kg}$ over the depths sampled. Toluene in 09_DBMW45 is 4 $\mu\text{g}/\text{kg}$ at 5 feet, 3 $\mu\text{g}/\text{kg}$ at 35 feet, and 6 $\mu\text{g}/\text{kg}$ at 55 feet. The toluene concentrations are below the CRDLs.

Semivolatile Organic Compounds (SVOCs). SVOCs concentrations detected in 09_DBMW45 were bis(2-ethylhexyl)phthalate (460 $\mu\text{g}/\text{kg}$ at 25 feet), and benzyl butyl phthalate (270 $\mu\text{g}/\text{kg}$ at 95 feet). In 09_DBMW45, the benzyl butyl phthalate and bis(2-ethylhexyl) phthalate concentrations are below the CRDLs. Bis(2-ethylhexyl) phthalate was also detected in Boring 09_25B207 at 6,500 $\mu\text{g}/\text{kg}$ at 10 feet.

Metals and Cyanide. Table 9-3 presents results of the detected metals.

Dioxins and Furans. Dioxins and furans were not detected.

Total Organic Carbon (TOC). TOC concentration is 175 mg/kg at 135 feet 09_DBMW45.

In summary, TFH-gasoline appears to increase with depth in the east pit, but these concentrations, and all hydrocarbon concentrations detected in Site 9 vadose soils, are below California LUFT guidelines. VOCs appear to increase with depth in the east pit, but this relationship is not evident in 09_DBMW45, located west of the west pit. Detected SVOCs also do not appear to indicate a spatial trend.

B9.6.4 Soil Vapor Headspace Concentrations

Organic vapor analysis (OVA) results are presented in Attachment 1 to Appendix B. Figure B9-2 presents the OVA headspace concentration (ppmv) contours overlain on the Site 9 geologic cross section. The maximum organic vapor concentrations were detected in 09_25B207: 19 ppmv at 25 feet and 8 ppmv at 20 feet. Concentrations of 8 ppmv in 09_DBMW45 at 30 feet deep and 5 ppmv in 09_DGMW75 at 40 feet deep were also recorded. Headspace concentrations for all other samples were 4 ppmv or less.

B9.7 Groundwater

B9.7.1 Site-Specific Hydrogeology

Table B9-4 (Well Construction Details) summarizes well construction, pump installation, and water quality sampling data.

The static water levels recorded in 09_DBMW45 and 09_DGMW75 are indicated in Figure B9-2. Depth to water is approximately 120 to 130 feet bgs (See Appendix I, Hydrographs). Based on December 1992 static water levels, the horizontal hydraulic gradient measured across the site is approximately 0.007 to the northwest. Downward vertical hydraulic gradients are expected in response to regional pumping of aquifers which underlie the site. Such downward vertical

gradients are measured in Well Cluster 3, located approximately 2,000 feet southeast.

Slug test and pumping test data are discussed and evaluated in Appendix F (Aquifer Test Analysis). Table B9-5 shows aquifer parameters for wells for which aquifer tests or slug tests were performed.

The hydraulic conductivity and transmissivity values (40-foot screen) for Well 09_DGMW75 are approximately 65.1 feet/day and 2,280 feet/day, respectively (Table B9-5). Based on this hydraulic conductivity, a hydraulic gradient of 0.007 and assuming an effective porosity of 0.3, the average linear groundwater velocity is 1.5 feet/day.

B9.7.2 Analytical Results

A summary of detected chemicals in groundwater is presented in Table B9-6. Hydrocarbons, eight VOCs, and gross alpha and beta activity were detected.

Hydrocarbons (TRPH, TFH). Only TFH-gasoline was detected, at 0.085 to 0.250 mg/L in 09_DBMW45.

Volatile Organic Compounds (VOCs). At 09_DBMW45, VOCs detected were:

- 1,1-DCE at 2 to 4 $\mu\text{g/L}$
- 1,2-DCE (Total) at 1 $\mu\text{g/L}$
- Carbon tetrachloride at 3 to 7 $\mu\text{g/L}$
- Chloroform at 2 $\mu\text{g/L}$
- PCE at 5 to 8 $\mu\text{g/L}$
- TCE up to 2,000 $\mu\text{g/L}$ (a duplicate sample shows 1,800 $\mu\text{g/L}$)
- 1,1-DCA at 0.5 $\mu\text{g/L}$, estimated

At 09_DGMW75, VOCs detected were:

- Methyl chloride at 0.6 $\mu\text{g/L}$, estimated
- 1,1-DCE at 1 $\mu\text{g/L}$
- Carbon tetrachloride at 2 $\mu\text{g/L}$
- Chloroform at 0.9 $\mu\text{g/L}$

- PCE at 8 $\mu\text{g/L}$
- TCE at 270 $\mu\text{g/L}$

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

Pesticides and Polychlorinated Biphenyls (PCBs). Pesticides and PCBs were not detected at 09_DBMW45 and 09_DGMW75.

Metals and Cyanide. Selenium (up to 41.8 $\mu\text{g/L}$) was detected in 09_DGMW75. No cyanide was detected.

Gross Alpha and Beta Particle Activity. Gross alpha and beta particle activity at 09_DBMW45 ranged from 8.3 to 9.6 pCi/L, and gross beta ranged from 9.9 to 11.2 pCi/L.

General Chemistry. TDS levels exceed the MCLs in 09_DBMW45 and 09_DGMW75, at 1,090 and 1,370 mg/kg, respectively. Nitrate as N in 09_DBMW45 and 09_DGMW75, and chloride and sulphate in 09_DGMW75, also exceed MCLs slightly to moderately. Well 09_DBMW45 has a field pH of 6.95, a field electrical conductivity of 1,500 $\mu\text{mhos/cm}$, and a temperature of 22.8°C; these field values were not recorded for 09_DGMW75.

Stiff and Piper diagrams for Site 9 are found in Appendix J. In general, the groundwaters for the Site 9 monitoring wells are calcium chloride to calcium sulphate type waters.

In summary, Site 9 groundwater samples appear to have nondetected to low concentrations of hydrocarbons (i.e., well below California LUFT); nondetected concentrations of SVOCs, pesticides, and PCBs; elevated selenium concentrations; and detectable gross alpha and beta particle activity. Inorganic compound regulatory guidelines are exceeded for chloride, nitrate/nitrate-N, sulphate, and TDS. Regulatory guidelines are exceeded for five VOCs, ranging from less than two times (PCE) to 400 times (TCE).

B9.7.3 Comparison with Drinking Water Standards

Analytical results are compared to the most stringent of three drinking water criteria: EPA MCLs, California MCLs, and California action levels. Groundwater samples from the downgradient wells exceed the state or federal MCLs for the following constituents:

- Nitrate/nitrite-N (09_DBMW45 and 09_DGMW75)
- Carbon tetrachloride (09_DGMW75)
- Methylene chloride (09_DBMW45)
- 1,2-DCA (09_DBMW45)
- PCE (09_DBMW45)
- TCE (09_DBMW45)

A summary of regulatory exceedances is presented in Table B9-7.

B9.8 Potential Contaminant Migration Pathways

Surface water runoff does not appear to be a significant contaminant migration pathway, because the site topography is relatively flat and there are no discrete surface water drainage courses near the site. The main contaminant migration pathway at Site 9 appears to be a combination of infiltration through the vadose zone and subsequent horizontal and vertical groundwater transport.

B9.9 Summary and Conclusions

Preliminary investigation of shallow vadose soils, deep vadose soils, and groundwater at Site 9 reveals that: Contaminants have been observed at Site 9 in all sampled media: surface and near-surface soils, vadose soils, and groundwater. Compounds detected in all media include hydrocarbons, VOCs, SVOCs, and metals. An additional detected compound is gross alpha and beta particle activity (groundwater). The major VOC detected in groundwater is TCE.

It appears that subsurface contaminants at Site 9, or just upgradient of Site 9, may represent a possible source of VOC contamination of groundwater. However, it is uncertain whether contaminants that potentially originated at Site 9 may have contributed to the regional VOC contamination. TCE detected in groundwater samples may have originated at an unknown source upgradient of Site 9.

**Table B9-1
Site 9 (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
Surface Water and Sediments (Not Sampled)														
Surface and Near-Surface Soils														
1	09_PT1	S1454132	0	X	X			X	X	X				
1	09_PT1	S1454482 ^b	0	X	X			X	X	X				
1	09_PT2	S1454133	0	X	X			X	X	X				
1	09_PT3	S1454134	0	X	X			X	X	X				
Vadose Zone Soils														
	09_DBMW45	S1456148	5	X	X			X	X	X				
	09_DBMW45	S1456151	10	X	X			X	X	X				
	09_DBMW45	S1456152	15	X	X			X	X	X				
	09_DBMW45	S1456169	20	X	X			X	X	X			X	
	09_DBMW45	S1456150	25	X	X			X	X	X				
	09_DBMW45	S1456158	35	X	X			X	X	X				
	09_DBMW45	S1456155	55	X	X			X	X	X				
	09_DBMW45	S1456170	95	X	X			X	X	X				
	09_DBMW45	S1456149	135	X									X	
	09_DGMW75	S1456167	60	X	X			X	X					
	09_DGMW75	S1457134 ^b	60	X	X			X	X	X				
	09_DGMW75	S1456153	120										X	
	09_25B207	S1456154	5	X	X			X	X	X				
	09_25B207	S1456156	10	X	X			X	X	X				
	09_25B207	S1456159	15	X	X			X	X	X				
	09_25B207	S1456160	20	X	X			X	X	X				
	09_25B207	S1456161	25	X	X			X	X	X				
	09_25B207	S1457079 ^b	20	X	X			X	X	X				
	09_25B207	S1457080 ^b	25	X	X			X	X	X				

**Table B9-1
Site 9 (OU-3): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 2 of 2

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	Geni. Chem- istry	TOC	Dioxins/ Furans	Gross Alpha/Beta
Groundwater															
	09_DBMW45	S1452065	117-157	X	X	X		X	X	X	X	X			X
	09_DBMW45	S1452391 ^b	117-157	X	X	X		X	X	X	X	X			X
	09_DBMW45	S1452062	117-157	X											
	09_DGMW75	S1452063	114-154	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 B9-2

Site 9 (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	09_PT1 S1454132 (0)	DVF(a)	09_PT1 S1454482 (0)	DVF(a)	09_PT2 S1454133 (0)	DVF(a)	09_PT3 S1454134 (0)	DVF(a)
METALS									
VANADIUM	MG/KG	27.1		31.4		25.1		35.7	
THALLIUM	MG/KG	0.25	b	0.15	U	0.21	b	0.15	U
SELENIUM	MG/KG	0.11	U	0.12	b	0.3	b	0.1	U
LEAD	MG/KG	14.3		26.2		62.5		14.1	
NICKEL	MG/KG	5.8	b	6.7	b	4.7	b	8.5	
SODIUM	MG/KG	531	b	550	b	539	b	483	b
MANGANESE	MG/KG	228		246		292		272	
MAGNESIUM	MG/KG	4950		5460		3990		5950	
POTASSIUM	MG/KG	3820		4180		2850		4730	
ZINC	MG/KG	48.2		56.8		35.8		57.9	
IRON	MG/KG	11800		13900		11000		15600	
COPPER	MG/KG	9.9		13.1		7		11	
CHROMIUM	MG/KG	9.3		11.7		23		13.7	
COBALT	MG/KG	5.9	b	5	b	5.5	b	6.1	b
CADMIUM	MG/KG	1.2		1.3		1.1		1.7	
CALCIUM	MG/KG	4930		5070		4520		5010	
BARIUM	MG/KG	2500		1760		160		2610	
ARSENIC	MG/KG	2.7		2.7		4.7		2.1	
ALUMINUM	MG/KG	8180		10500		7310		11600	
VOLATILE ORGANIC COMPOUNDS									
TOLUENE	UG/KG	10	U	10	U	11	U	2	J
CARBON TETRACHLORIDE	UG/KG	10	U	2	J	11	U	3	J
1,1,1-TRICHLOROETHANE	UG/KG	10	U	6	J	9	J	10	U
2-BUTANONE	UG/KG	2	J	2	J	11	U	3	J
SEMIVOLATILE ORGANIC COMPOUNDS									
DIMETHYL PHTHALATE	UG/KG	680	U	690	U	360	J	690	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)									
TFH DIESEL	MG/KG	37.6		51.1		19.1		12.9	U
TFH GASOLINE	MG/KG	0.171		0.11		0.89		0.113	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)									
TRPH	MG/KG	72		217		259		65	
(a) A definition of each data validation flag (DVF) is provided in Table B-1.									

Table B9-3

Site 9 (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	09_25B207 S1456154 (5)	DVF(a)	09_25B207 S1456156 (10)	DVF(a)	09_25B207 S1456159 (15)	DVF(a)	09_25B207 S1456160 (20)	DVF(a)	09_25B207 S1457079 (20)	DVF(a)	09_25B207 S1456161 (25)	DVF(a)	09_25B207 S1457080 (25)	DVF(a)	09_DBMW45 S1456148 (5)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	0.44	b	0.78	b	0.49	b	0.4	b	0.39	b	0.35	U	0.37	b	0.4	b
ALUMINUM	MG/KG	19200		32900		29000		9750		15200		11200		15300		9480	
ARSENIC	MG/KG	4		5.7		7.3		4.3		3.5		3.3		3.8		1.9	b
BARIUM	MG/KG	227		333		247		110		194		184		148		8620	
BERYLLIUM	MG/KG	0.7	b	1.2	b	1.2	b	0.47	b	0.55	b	0.52	b	0.71	b	0.42	b
CALCIUM	MG/KG	8940		22800		20800		6150		9580		4230		5740		8280	
CADMIUM	MG/KG	1.2		1.2	b	1.4		0.63	U	0.87	b	0.95	b	1.2	b	1.8	
COBALT	MG/KG	10.8	b	16.1		14.6		5.8	b	8.5	b	5.9	b	7.3	b	8.1	b
CHROMIUM	MG/KG	18.6		26.8		23.6		9.3		14.2		10.7		14.3		19.2	
COPPER	MG/KG	11.3		19		17.1		6.2		9.3		7.7		11.2		24.3	
IRON	MG/KG	23500		35900		32000		12200		18300		13500		17200		17700	
MERCURY	MG/KG	0.01	U	0.01	U	0.01	U	0.01	U	0.02	U	0.01	U	0.02	U	0.06	
POTASSIUM	MG/KG	5830		10100		9780		3280		5320		3530		4850		3880	
MAGNESIUM	MG/KG	11900		20500		18000		5830		8650		5290		8940		5130	
MANGANESE	MG/KG	388		470		471		214		298		235		298		265	
SODIUM	MG/KG	398	U	2010		4450		1440		1890		1440		1880		795	b
NICKEL	MG/KG	12		18.1		14.8		5.9	b	10.2		7.1	b	11.8		10.5	
LEAD	MG/KG	4.7		6.6		9.3		3.9		4.5		4		4.4		15.3	
SELENIUM	MG/KG	5	U	0.56	U	5.8	U	4.8	U	4.9	U	0.49	U	5.1	U	0.09	b
THALLIUM	MG/KG	0.38	U	0.42	U	0.43	U	0.37	U	0.37	U	0.37	U	0.39	U	0.23	b
VANADIUM	MG/KG	53.9		88.6		79.1		32.4		47.4		32		36.9		31.1	
ZINC	MG/KG	71.8		117		102		39.2		56.8		42.4		58.9		111	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	12	U	12	U	12	U	12	U	12	U	11	U	12	U	4	J
ACETONE	UG/KG	25		31		12	U	37	U	48		34		12	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	780	U	6500		760	U	810	U	790	U	730	U	780	U	710	U
BENZYL BUTYL PHTHALATE	UG/KG	780	U	780	U	760	U	810	U	790	U	730	U	780	U	710	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.061		0.188		0.283		0.242		0.119		0.37		0.55		0.054	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	20	U	20	U	20	U	20	U	228	

Table B9-3

Site 9 (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	09_DBMW45 S1456161 (10)	DVF(a)	09_DBMW45 S1456162 (15)	DVF(a)	09_DBMW45 S1456169 (20)	DVF(a)	09_DBMW45 S1456150 (25)	DVF(a)	09_DBMW45 S1456168 (35)	DVF(a)	09_DBMW45 S1456165 (55)	DVF(a)	09_DBMW45 S1456170 (95)	DVF(a)	09_DBMW45 S1456149 (135)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	177
METALS																	
SILVER	MG/KG	0.32	U	0.3	U	0.33	b	0.32	U	0.32	UJ	0.31	UJ	0.3	UJ	-	
ALUMINUM	MG/KG	16900		10400		6690		14500		8010		5100		3170		-	
ARSENIC	MG/KG	2.9		1.9	b	1.8	b	2.2	b	2.4		1.6	b	0.87	b	-	
BARIIUM	MG/KG	280		159		113		228		109		84.8		77		-	
BERYLLIUM	MG/KG	0.6	b	0.36	b	0.17	U	0.54	b	0.44	b	0.33	b	0.17	U	-	
CALCIUM	MG/KG	16600		10600		7270		16300		9530		4960		2220		-	
CADMIUM	MG/KG	2.2		1.3	U	1.1	U	1.8		1.6		1.1		1.1		-	
COBALT	MG/KG	10.2	b	4.9	b	3.5	b	7.7	b	4.9	b	3.8	b	2.5	b	-	
CHROMIUM	MG/KG	20		10		7.4		14.2		8		6.9		8.8		-	
COPPER	MG/KG	40.6		6.8		5.3	b	9.7		6.7		5.9		5.6		-	
IRON	MG/KG	23700		15000		10100		21000		11000		7680		5280		-	
MERCURY	MG/KG	0.04	U	0.03	U	0.04	U	0.03	U	0.03	U	0.03	U	0.03	U	-	
POTASSIUM	MG/KG	5790		4430		3190		8050		2380		2140		1070		-	
MAGNESIUM	MG/KG	11900		6960		5060		12000		4440		3150		1350		-	
MANGANESE	MG/KG	354		296		206		405		196		148		119		-	
SODIUM	MG/KG	1240		954	b	1050	b	1830		1190		678	b	418	b	-	
NICKEL	MG/KG	15.5		6.8	b	6.1	b	11.4		8.4	b	6.1	b	8.1	b	-	
LEAD	MG/KG	10.5		1.6		1.5		2.3		2.3		1.9		1.2		-	
SELENIUM	MG/KG	0.09	U	0.09	U	0.09	U	0.08	U	0.08	U	0.09	U	0.09	U	-	
THALLIUM	MG/KG	0.32	b	0.22	b	0.26	b	0.3	b	0.23	b	0.18	U	0.17	U	-	
VANADIUM	MG/KG	57		37.9		26.1		56.1		27.5		18		13		-	
ZINC	MG/KG	124		45.8		33.3		65.6		33.4		26.6		13.7		-	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	12	U	11	U	11	U	12	U	3	J	6	J	11	U	11	U
ACETONE	UG/KG	22		16		13		12	U	11	U	13		27		28	
SEMIVOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	790	U	720	U	700	U	460	J	710	U	790	U	710	U	-	
BENZYL BUTYL PHTHALATE	UG/KG	790	U	720	U	700	U	780	U	710	U	780	U	270	J	-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.06	U	0.055	U	0.053	U	0.059	U	0.054	U	0.06	U	0.054	U	-	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	23		20	U	20	U	20	U	20	U	-	

Table B9-3

Site 9 (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	09_DGMW75 S1456167 (60)	DVF(a)	09_DGMW75 S1457134 (60)	DVF(a)	09_DGMW75 S1456153 (120)	DVF(a)													
GENERAL CHEMISTRY																				
TOTAL ORGANIC CARBON	MG/KGW	-		-		100	U													
METALS																				
SILVER	MG/KG	-		0.66	b	-														
ALUMINUM	MG/KG	-		10700		-														
ARSENIC	MG/KG	-		3.2		-														
BARIIUM	MG/KG	-		134		-														
BERYLLIUM	MG/KG	-		0.22	b	-														
CALCIUM	MG/KG	-		7330		-														
CADMIUM	MG/KG	-		1.6		-														
COBALT	MG/KG	-		5.9	b	-														
CHROMIUM	MG/KG	-		29.8		-														
COPPER	MG/KG	-		18.9		-														
IRON	MG/KG	-		20100		-														
MERCURY	MG/KG	-		0.03	U	-														
POTASSIUM	MG/KG	-		3530		-														
MAGNESIUM	MG/KG	-		6070		-														
MANGANESE	MG/KG	-		285		-														
SODIUM	MG/KG	-		891	b	-														
NICKEL	MG/KG	-		15.5		-														
LEAD	MG/KG	-		2		-														
SELENIUM	MG/KG	-		0.12	U	-														
THALLIUM	MG/KG	-		0.39	U	-														
VANADIUM	MG/KG	-		36.8		-														
ZINC	MG/KG	-		69		-														
VOLATILE ORGANIC COMPOUNDS																				
TOLUENE	UG/KG	11	U	11	U	-														
ACETONE	UG/KG	16	U	16	U	-														
SEMIVOLATILE ORGANIC COMPOUNDS																				
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	740	U	740	U	-														
BENZYL BUTYL PHTHALATE	UG/KG	740	U	740	U	-														
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																				
TFH GASOLINE	MG/KG	0.056	U	0.056	U	-														
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																				
TRPH	MG/KG	49		20	U	-														

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

**Table B9-4
Site 9 (OU-3): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 1 of 1

Item	Station Identification	
	09_DGMW75	09_DBMW45
Survey Location--Northing	549910	549844
Survey Location--Easting	1546829	1547402
Ground Surface Elevation (ft above MSL ^a)	270	279
Measuring Point Elevation (ft above MSL ^a)	271	280
Measuring Point Location	Top of sounding tube	Top of sounding tube
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" 0.02"-slot SS	4" 0.02"-slot SS
Screen Interval (ft bgs ^b)	114-154	117-157
Length of Drop Pipe (ft bgs ^b)	153	147
Make and Model of Installed Pump	4" Grundfos Rediflow	2" Grundfos Rediflow
Date of Pumping Test	1 December 1992	Not tested
Date of Water Quality Sampling	11 December 1992	10 December 1992
^a Mean sea level ^b Below ground surface SS = Stainless Steel		

<p align="center">Table B9-5 Site 9 (OU-3): Summary of Hydraulic Parameters MCAS El Toro Phase I RI Technical Memorandum</p> <p align="right">Sheet 1 of 1</p>						
Station Identification	Type of Test	Analysis Method	Transmissivity (ft²/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient^a	Leakance Factor^a
09_DGMW75	Pumping	Theis (1935): Recovery Data	2280	65	NA	NA
<p>^aNA = Not applicable. Source: Table F-2 (Appendix F)</p>						

Table B9-6
Site 9 (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	09_DBMW45 S1452062 (117-157)	DVF(a)	09_DBMW45 S1452065 (117-157)	DVF(a)	09_DBMW45 S1452391 (117-157)	DVF(a)	09_DGMW75 S1452063 (114-154)	DVF(a)
GENERAL CHEMISTRY											
CARBONATE	NA	NA	MG/L	-		-		-		-	
BICARBONATE	NA	NA	MG/L	-		230		230		191	
ALKALINITY AS CaCO ₃	NA	NA	MG/L	-		189		188		156	
CHLORIDE	3	250	MG/L	-		197		202		273	
SULFATE	3	250	MG/L	-		228		231		423	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	-		1050		1090		1370	
NITRATE/NITRITE-N	1	10	MG/L	-		19.1		18.7		23.6	
METALS											
SODIUM	NA	NA	UG/L	-		72800		70100		116000	
NICKEL	NA	NA	UG/L	-		22.2	b	18.4	b	14.8	b
MAGNESIUM	NA	NA	UG/L	-		45000		43700		58900	
ANTIMONY	NA	NA	UG/L	-		12.1	U	12.1	U	14.6	b
POTASSIUM	NA	NA	UG/L	-		2320	b	2300	b	2480	b
SELENIUM	1	10	UG/L	-		20.2	U	22	U	41.8	
ZINC	2	5000	UG/L	-		3.5	U	2.2	U	15	b
MANGANESE	3	50	UG/L	-		4.3	b	3.9	b	12.1	b
VANADIUM	NA	NA	UG/L	-		15.7	b	17	b	17.4	b
CALCIUM	NA	NA	UG/L	-		173000		169000		216000	
MERCURY	2	2	UG/L	-		0.1	U	0.1	U	0.14	b
BARIUM	2	2000	UG/L	-		25.5	b	24.9	b	20.8	b
ALUMINUM	3	50	UG/L	-		33.1	J	31	UJ	44.3	b
VOLATILE ORGANIC COMPOUNDS											
1,2-DICHLOROETHANE	1	0.5	UG/L	1	U	1	U	0.5	J	1	U
TETRACHLOROETHENE	2	5	UG/L	5		7		8		8	
1,2-DICHLOROETHENE (TOTAL)	NA	NA	UG/L	1	U	1	U	1		1	U
CARBON TETRACHLORIDE	1	0.5	UG/L	3		7		6		2	
CHLOROFORM	2	100	UG/L	2		2		2		0.9	J
CHLOROMETHANE (METHYL CHLORIDE)	NA	NA	UG/L	2	U	2	U	2	U	0.6	J
1,1-DICHLOROETHENE	NA	NA	UG/L	2		4		1	U	0.5	J
TRICHLOROETHYLENE	2	5	UG/L	1000	D	1800	D	2000	D	270	D
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)											
TFH GASOLINE	NA	NA	UG/L	-		85		250		50	U
GROSS ALPHA AND BETA											
GROSS ALPHA	2	15	PCI/L	-		9.6		8.3		-	
GROSS BETA	2	50	PCI/L	-		11.2		9.9		-	

(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 B9-7
Site 9 (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	Concentration	Regulatory Level ^c	Regulatory Code ^d
09_DBMW45	(117-157)	Carbon tetrachloride	µg/L	7	0.5	2
		Tetrachloroethene	µg/L	8	5	1
		Trichloroethylene	µg/L	2000	5	1
		Nitrate/Nitrite-N	mg/L	19.1	10	2
		Total Dissolved Solids	mg/L	1090	500	3
		Methylene chloride	µg/L	80	40	3
		1,2-Dichloroethane	µg/L	0.5	0.5	2
09_DGMW75	(114-154)	Chloride	mg/L	273	250	3
		Nitrate/Nitrite-N	mg/L	23.6	10	2
		Sulfate	mg/L	423	250	3
		Total Dissolved Solids	mg/L	1370	500	3
		Selenium	µg/L	41.8	10	2
		Carbon tetrachloride	µg/L	2	0.5	2
		Tetrachloroethene	µg/L	8	5	1
		Trichloroethylene	µg/L	270	5	1
09_DGMW75	(0-0)	Carbon tetrachloride	µg/L	2	0.5	2
		Tetrachloroethene	µg/L	6	5	1
		Trichloroethylene	µg/L	270	5	1

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 B10

**Nature and Extent of Contamination:
Site 10 (OU-2) — Petroleum Disposal Area**

Appendix B10

NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION:

Site 10 (OU-2) - PETROLEUM DISPOSAL AREA

This discussion of Site 10 is supplemented by the figures and data tables listed below. The figures begin on page B10-3, and the tables are grouped at the end of this Appendix B10. 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 B10-1: (Site Map)

Figure B10-2: Geologic Cross Section

Table B10-1: Types of Samples and Chemical Analyses

Table B10-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

Table B10-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples

Table B10-4: Well Construction Details

Table B10-5: Summary of Hydraulic Parameters

Table B10-6: Summary of Detected Chemicals in Groundwater Samples

Table B10-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B10.1 Site Description

The Petroleum Disposal Area is directly south of Building 435 and east of Building 369. The disposal area is approximately 1,200 feet long by 800 feet wide and is currently covered with aircraft matting and a concrete apron. These two surfaces were installed at different times (the concrete in 1971 and the matting in 1973) and may have differences in their permeability to water and air. Therefore, the site consists of two strata: Stratum 1, the Concrete Apron, and Stratum 2, the Aircraft Matting (Figure B10-1).

From 1952 through the mid-1960s, waste oils were applied to the ground for dust control. Reportedly, waste crankcase oil, antifreeze, hydraulic and transmission fluids, motor oils, and solvents were used. It is estimated that approximately 52,000 gallons of waste were sprayed over an area covering approximately 960,000 square feet, based on the assumption that about 500 gallons were used every 3 months for 13 years. The

practice has stopped and the areas that were sprayed have been excavated and covered with concrete or built over. It is estimated that 90 percent of the wastes disposed of at the site were crankcase oil (Brown and Caldwell, 1986).

B10.2 Suspected Waste Types and Contaminants

The types of waste associated with the site include waste crankcase oil, antifreeze, hydraulic and transmission fluids, motor oils, and solvents. Suspected contaminants include VOCs, SVOCs, and hydrocarbons.

B10.3 Field Investigation

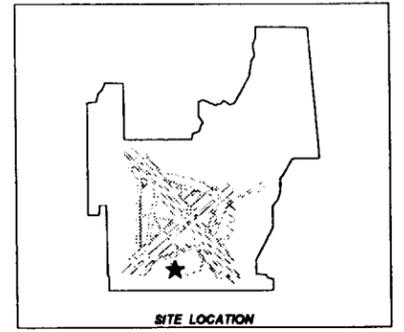
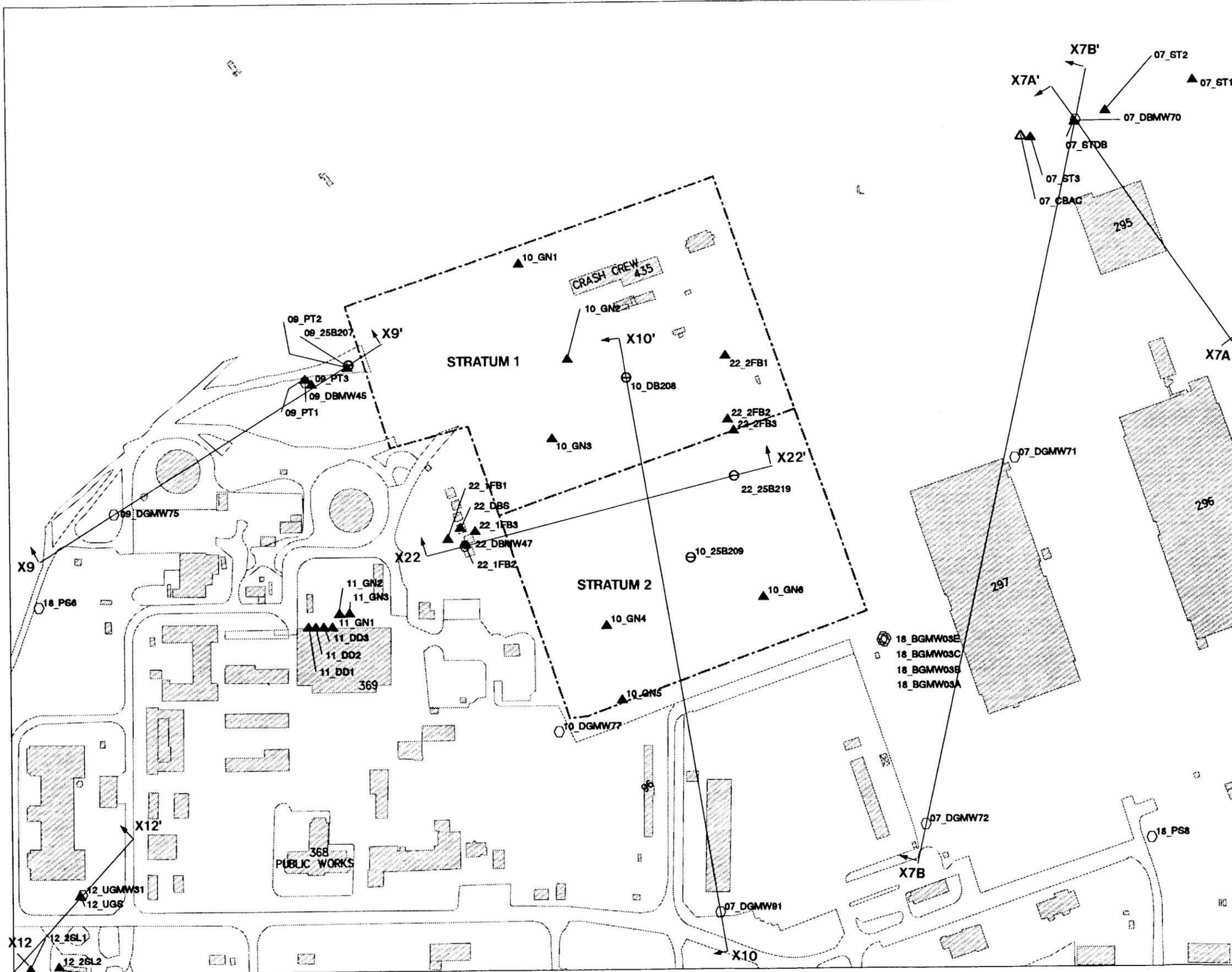
As described in the *SAP*, the field investigation at Site 10 consisted of:

- Drilling and sampling one 25-foot boring
- Drilling and sampling one deep boring
- Drilling and sampling one downgradient monitoring well
- Collecting surface and near-surface soil samples from 6 sampling stations.

Because the site is flat and has no permanent water courses, no surface water or sediment samples were collected.

Changes were made in the site boundaries and the number and location of monitoring wells, deep soil borings, and shallow soil borings from those in the original *SAP*, as documented by the *SAP Amendment*. The boundaries were extended west towards Tank 174 and Building 369. One additional well west of the site was added to improve downgradient coverage, and the deep soil boring was not completed as a monitoring well, so there was no net change in the number of constructed wells. Sets of shallow soil borings were reduced from nine to seven. Three sets of borings were located in each stratum, and one set at the upgradient well.

Field changes were made after the *SAP Amendment*. The upgradient monitoring well and the set of upgradient shallow soil borings were eliminated, because of access problems and because improved understanding of the groundwater flow direction revealed that the upgradient well was actually cross-gradient to Site 10. Instead, Deep



- 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

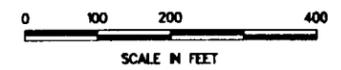


FIGURE B10-1
SITE 10 (OU-2): PETROLEUM DISPOSAL AREA
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

B10-3

PAGE NUMBER B10-4

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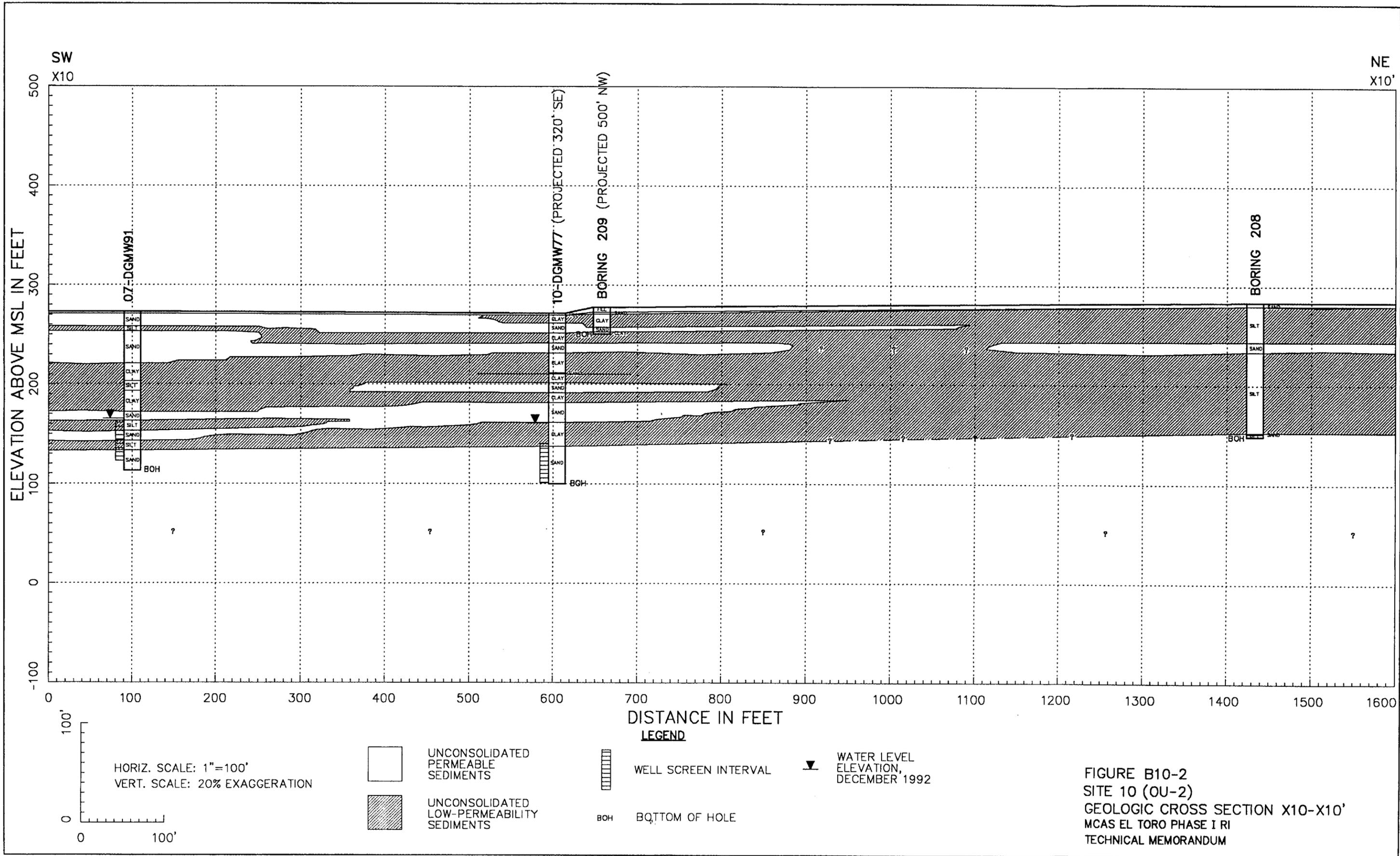


FIGURE B10-2
 SITE 10 (OU-2)
 GEOLOGIC CROSS SECTION X10-X10'
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

PAGE NUMBER B10-6

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Boring 07_DBMW70 at Site 7 was completed as a monitoring well. In addition, the second downgradient well at Site 10 was eliminated, because it was realized that monitoring wells at Sites 9 and 22 would provide adequate coverage for Site 10.

B10.3.1 Surface Water and Sediment

(No surface water or sediment samples were collected.)

B10.3.2 Surface and Near-Surface Soil

Three shallow borings were drilled in each stratum: 10_GN1, 10_GN2, and 10_GN3 in Stratum 1, and 10_GN4, 10_GN5, and 10_GN6 in Stratum 2. Samples were collected at 0, 2, and 4 feet in Stratum 1, and at 0 and 2 feet in Stratum 2.

B10.3.3 Vadose Zone Soil

The 25-foot boring (10_25B209) was sampled at 5-foot intervals to 25 feet; two duplicates were collected (20 and 25 feet) for a total of seven samples. Eight samples were collected from the deep soil boring (10_DB208), at 5, 10, 15, 20, 25, 40, 50, and 123 feet; no duplicate samples were collected. This boring was not completed as a monitoring well. Three soil samples were collected from the downgradient monitoring well (10_DGMW77), at 120 and 134 feet, and a duplicate sample was collected at 134 feet.

B10.3.4 Groundwater

Groundwater samples were collected from the downgradient monitoring well (10_DGMW77), and an aquifer test and Theis Recovery test were performed.

B10.4 Surface Water and Sediments

B10.4.1 Description of Surface Water and Sediment Samples

(No surface water or sediment samples were collected at this site.)

B10.5 Surface and Near-Surface Soils

B10.5.1 Description of Surface and Near-Surface Soil Samples

The soils of Site 9 are Omni Series, Section 206 - Sorrento loam, 0 to 2 percent slopes. The Omni Series is characterized by poorly drained soils on flood plains and in basins. These soils form in mixed alluvium. About 10 percent of the mapping unit includes areas of Sorrento clay loam; 3 percent Sorrento sandy loam; 5 percent soils that are noncalcareous throughout but are otherwise similar to this Sorrento soils; 5 percent Mocho loam, 0 to 2 percent slopes; and 3 percent Bolsa silt loam, drained (Wachtell, 1978).

At depths of 0 to 12 inches, the soils have a permeability of 0.6 to 2.0 inches/hour, an available water capacity of 0.16 to 0.21 inch/inch, and a pH of 6.1 to 8.4 (Wachtell, 1978).

B10.5.2 Analytical Results and Soil Vapor Headspace Values

A summary of requested analyses is presented in Table B10-1. A summary of detected chemical compounds is presented in Table B10-2.

B10.5.2.1 Upgradient Area

(No upgradient soil samples were collected.)

B10.5.2.2 Stratum 1: Aircraft Matting

The analytical results, presented in Table B10-2, are discussed briefly below. Detected compounds include hydrocarbons, one VOC, 12 SVOCs, and metals.

At 10_GN2, TRPH was detected at 282 and 293 mg/kg in the surface soil (a duplicate sample was collected). At 10_GN3, TRPH was detected in the surface sample (204 mg/kg) and at 4 feet (75 mg/kg); TRPH was not detected in the 2-foot sample. TFH-diesel was detected at low concentrations at all stations in

Stratum 1. Concentrations are as follows: 35 mg/kg at 10_GN1 at 0 feet; 38 and 24 mg/kg at 0 and 2 feet, respectively, at 10_GN2; and, 27 mg/kg at 0 feet at 10_GN3. TFH-gasoline was not detected or was less than 1 mg/kg in the Stratum 1 samples.

One VOC, toluene, was detected at Stratum 1. Toluene was detected at 10_GN2 4 feet (13 $\mu\text{g}/\text{kg}$). Toluene was also identified below the CRDL at 0 feet at 10_GN2 and at 0 and 4 feet at 10_GN3.

Two SVOCs, fluoranthene and pyrene, were detected above the CRDLs at Stratum 1. At 10_GN1, fluoranthene (770 $\mu\text{g}/\text{kg}$) and pyrene (780 $\mu\text{g}/\text{kg}$) were detected in the surface sample only. Nine other SVOCs were also identified below the CRDLs in this sample. At 10_GN2, diethyl phthalate was identified below the CRDL in the surface sample.

Silver was found in the surface samples at 10_GN1 (0.82 mg/kg) and 10_GN3 (0.84 mg/kg). Both of these values are estimated as they are below the CRDL.

In summary, hydrocarbons were detected (up to 293 mg/kg) at all sampling stations. VOCs were detected (up to 130 $\mu\text{g}/\text{kg}$) at Station 10_GN2, and SVOCs were detected (up to 780 $\mu\text{g}/\text{kg}$) at 10_GN1 and 10_GN2. Silver concentrations (up to 0.84 mg/kg) were detected at 10_GN1 and 10_GN3. The highest OVA concentration (3 ppmv) was recorded at stations 10_GN1 and 10_GN2.

B10.5.2.3 Stratum 2: Concrete Apron

Compounds detected were hydrocarbons, three VOCs, and metals.

Four VOCs were detected at Stratum 2. PCE was detected in the surface soil sample at 10_GN5 at a concentration of 19 $\mu\text{g}/\text{kg}$. PCE was also identified below the CRDL in the 2-foot sample at 10_GN5 (5 $\mu\text{g}/\text{kg}$). Toluene (at 0 and 2 feet) and 1,2-DCE (at 0 feet) were also identified below the CRDLs at 10_GN5. Toluene was detected at 10_GN4 at 2 feet at 18 $\mu\text{g}/\text{kg}$, and in 10_GN5 below the CRDL.

Acetone was detected in 10_GN4 at 0 feet at 130 $\mu\text{g}/\text{kg}$, but was also detected in the blank for this sample. VOCs were not detected at 10_GN6.

TRPH was detected only in the surface sample at 10_GN4, at a concentration of 532 mg/kg. TFH-diesel, TFH-gasoline, and SVOCs were not detected.

In summary, among hydrocarbons, TRPH was detected at 532 mg/kg at 10_GN4. TFH-diesel and TFH-gasoline were not detected, nor were SVOCs. VOCs detected were PCE (up to 19 $\mu\text{g}/\text{kg}$) at 10_GN5, and toluene and 1,2-DCE at 10_GN5 at concentrations below the CRDLs.

B10.6 Vadose Zone Soils

B10.6.1 Description of Subsurface Soil Samples

A downgradient well, a 25-foot boring, and deep boring were drilled.

B10.6.2 Subsurface Geology

Site 9 overlies approximately 350 feet of unconsolidated Quaternary sediments, which in turn overlie the semiconsolidated bedrock of the Irvine Area Groundwater Basin. Alluvium encountered during drilling consists of layered sequences dominated by variable mixtures of sands, silts, and clays (e.g., sandy clay, clayey silt). Thus, well-defined permeable units, such as well-sorted coarse sands, are infrequent. More detailed descriptions are provided on the soil boring logs presented in Appendix K and in the geologic cross section (Figure B10-2).

B10.6.3 Analytical Results

The analytical results, presented in Table B10-3, are discussed briefly below. Detected compounds were hydrocarbons, three VOCs, and metals.

Hydrocarbons (TRPH, TFH). TRPH was detected only in the 25-foot boring (10_25B209) at 5 feet (299 mg/kg) and 10 feet (529 mg/kg). TRPH was not

detected in the samples at 10_DB208 and 10_DGMW77. TFH-gasoline was detected below 1 mg/kg in the samples from 10_25B209, and was not detected at 10_DB208 and 10_DGMW77. TFH-diesel was not detected.

Volatile Organic Compounds (VOCs). Three VOCs were detected. At 10_DB208, acetone was detected only at 40 feet (12 $\mu\text{g}/\text{kg}$). At 10_DGMW77, acetone was detected at 134 feet at concentrations of 70 and 76 $\mu\text{g}/\text{kg}$ (duplicate sample). Acetone is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks is 37 $\mu\text{g}/\text{L}$. Methylene chloride was identified below the CRDL in the 124-foot sample at 10_DGMW77, and 2-butanone was identified below the CRDL at 10_DB208 at 15, 20, and 25 feet. Methylene and 2-butanone are also demonstrated laboratory contaminants; their maximum detected concentrations in the trip blanks were 42 $\mu\text{g}/\text{L}$, and 33 $\mu\text{g}/\text{L}$, respectively.

Semivolatile Organic Compounds (SVOCs). SVOCs and total organic carbon were not detected.

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

Metals. Metal results are presented in Table B10-3.

Total Organic Carbon (TOC). TOC was not detected.

Soil Vapor Headspace Concentrations. Organic vapor analysis (OVA) results are presented in Attachment 1 to Appendix B. In Well 10_DGMW77, the maximum OVA headspace concentrations of 5, 5, and 4 ppmv correspond with the 40-, 60-, and 80-foot soil samples, respectively. In Boring 10_DB208, the maximum headspace concentration of 2 ppmv was recorded for the 15- and 50-foot samples. In Boring 10_25B209, the maximum headspace concentration of 2 mg/kg was recorded for the 20-foot sample. Headspace analysis on the other soil samples yielded concentrations of 1 ppmv or less. In general, the maximum

OVA concentrations were recorded within the coarser-grained units (e.g., the sand lenses identified during drilling).

In summary, hydrocarbons were detected at 10_25B209, as TRPH (up to 599 mg/kg) and as TFH-gasoline (less than 1 mg/kg). Hydrocarbons were not detected in 10_DB208 and 10_DGMW77. VOCs detected were acetone (12 $\mu\text{g}/\text{kg}$ at 10_DB208, and 70 and 76 $\mu\text{g}/\text{kg}$ at 10_DGMW77) and methylene chloride and butanone in 10_DGMW77 at concentrations less than CRDLs. SVOCs and TOC were not detected. Mercury was detected (0.70 mg/kg) in 10_DB208 in the 20-foot sample.

B10.7 Groundwater

B10.7.1 Site-Specific Hydrogeology

Table B10-4 summarizes well construction, pump installation, and water quality sampling data.

The static water level recorded in Well 10_DGMW77 is indicated in Figure B10-2. Depth to water is approximately 110 feet bgs. Based on December 1992 static water levels for Site 10 and surrounding site monitoring wells, the horizontal hydraulic gradient component measured across Site 10 is 0.007 to the northwest. Vertical hydraulic gradients are expected to be down at Site 9 in response to regional pumping of aquifers that underlie the site, as seen in Site 18, Well Cluster 3 (about one-third of a mile southeast of Site 9).

Slug test and pumping test data are discussed and evaluated in Appendix F. Table F-2 shows aquifer parameters for all wells for which aquifer tests or slug test were performed. The hydraulic conductivity and transmissivity (40-foot screen) for Well 10_DGMW77 are approximately 42 ft/day, and 1,690 ft^2/day , respectively (Table B10-5). Assuming the hydraulic conductivity above, an effective porosity of 20 percent, and a hydraulic gradient of 0.007, the average linear groundwater velocity is 1.5 ft/day.

B10.7.2 Analytical Results

A summary of detected chemicals in groundwater is presented in Table B10-6. Compounds detected were six VOCs, one SVOC, and metals.

General Chemistry. The alkalinity in the downgradient monitoring well (10_DGMW77), expressed as CaCO₃, is 189 mg/L. The bicarbonate concentration is 230 mg/L. The sample has a TDS of 1,030 mg/L. Chloride, sulphate, and nitrite/nitrate (as N) concentrations are 188, 217, and 16 mg/L, respectively. Groundwater from 10_DGMW77 is characterized as calcium chloride to calcium sulphate water; Stiff and Piper diagrams are found in Appendix J. The field pH was 7.06, the field EC was 1,280 (units), and the field temperature was 24.4°C.

Hydrocarbons (TRPH, TFH). Hydrocarbons were not detected.

Volatile Organic Compounds (VOCs). VOCs detected in the groundwater in Well 10_DGMW77 include TCE (35 µg/L), PCE (8 µg/L), carbon tetrachloride (2 µg/L), and chloroform (1 µg/L). In addition, 1,1-DCE and methyl chloride were identified below the CRDLs.

Semivolatile Organic Compounds (SVOCs). One SVOC, benzyl butyl phthalate, was detected in Well 10_DGMW77 at a concentration of 19 µg/L.

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

Metals and Cyanide. Selenium was detected in 10_DGMW77 at a concentration of 15.4 µg/L. Cyanide was not detected.

In summary, hydrocarbons were not detected in Well 10_DGMW77. VOCs detected were TCE (35 µg/l), PCE (8 µg/l), carbon tetrachloride (2 µg/l), and chloroform (1 µg/l). Methyl chloride and 1,1-DCE were also detected below CRDLs. Benzyl butyl phthalate, at 19 µg/l, was the only SVOC detected. Lastly, selenium (15.4 µg/l) was detected.

B10.7.3 Comparison with Drinking Water Standards

Analytical results were compared with the most stringent of three drinking water criteria: EPA MCLs, California MCLs, and California LUFT action levels. Well 10_DGMW77 groundwater exceeds the state or federal maximum contaminant levels (MCLs) for the following constituents nitrate as N, TDS, selenium, carbon tetrachloride, PCE, and TCE. A summary of regulatory exceedances is presented in Table B10-7.

B10.8 Potential Contaminant Migration Pathways

Surface water runoff does not appear to be a significant migration pathway because the site topography is relatively flat and no discrete surface water drainage courses are near the site.

Contaminant migration via infiltration and groundwater transport is not believed to represent a significant migration pathway for the Concrete Apron (Stratum 1), because infiltration through this area should be minimal. When aircraft matting (Stratum 2) was placed at Site 10 in 1973, the soil was first mixed with dry cement, then wetted; thus, Stratum 2 has essentially been paved since 1973. It is doubtful that large quantities of aqueous contaminants would migrate through the vadose zone to groundwater with infiltrated water. However, as at the concrete apron, contaminants may migrate under the influence of gravity.

B10.9 Summary and Conclusions

Contaminants have been detected at Site 10, in all sampled media: surface and near-surface soils, vadose soils, and groundwater. Compounds detected in all media include hydrocarbons, VOCs, and metals. SVOCs were also detected in the surface and near-surface soils.

TCE and PCE were the two major VOCs detected in both the surface soil and the groundwater samples. PCE was detected (up to 19 $\mu\text{g}/\text{kg}$) at 10_GNS (Stratum 2). Well 10_DGMW77 should detect levels of TCE (35 $\mu\text{g}/\text{L}$) and PCE (8 $\mu\text{g}/\text{L}$).

It appears that contaminants at or near Site 10 may represent possible sources of VOC groundwater contamination. This contamination is likely a contributor to the Site 18 (OU-1) regional VOC groundwater contamination.

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**Table B10-1
Site 10 (OU-2): Types of Samples and Chemical Analyses
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 1 of 1

Location/ Stratum ^c	Station Identifi- cation	Sample Identifi- cation	Sample Depth (ft)	Groups of Analytes Requested ^a										
				VOCs	Semi- VOCs	Pesti- cides/ PCBs	Herbi- cides	TPH	TFH	Metals	CN	Geni. Chem- istry	TOC	Dioxins/ Furans
Surface Water and Sediments (Not Sampled.)														
Surface and Near-Surface Soils														
1	10_GN1	S1454138	0	X	X	X		X	X	X				
		S1454139	2	X	X	X		X	X	X				
		S1454140	4	X	X	X		X	X	X				
1	10_GN2	S1454141	0	X	X	X		X	X	X				
		S1454483 ^b	0	X	X	X		X	X	X				
		S1454142	2	X	X	X		X	X	X				
		S1454484 ^b	2	X	X	X		X	X	X				
1	10_GN3	S1454143	4	X	X	X		X	X	X				
		S1454144	0	X	X	X		X	X	X				
		S1454145	2	X	X	X		X	X	X				
2	10_GN4	S1454146	4	X	X	X		X	X	X				
		S1454147	0	X	X	X		X	X	X				
		S1454148	2	X	X	X		X	X	X				
2	10_GN5	S1454150	0	X	X	X		X	X	X				
		S1454151	2	X	X	X		X	X	X				
2	10_GN6	S1454153	0	X	X	X		X	X	X				
		S1454154	2	X	X	X		X	X	X				
Vadose Zone Soils														
	10_DB208	S1456399	5	X	X	X		X	X	X				
		S1456400	10	X	X	X		X	X	X				
		S1456401	15	X	X	X		X	X	X				
		S1456402	20	X	X	X		X	X	X				
		S1456403	25	X	X	X		X	X	X				
		S1456404	40	X	X	X		X	X	X				
		S1456405	50	X	X	X		X	X	X				
		S1456406	123	X	X	X		X	X	X				
	10_25B209	S1456532	5	X	X	X		X	X	X				
		S1456533	10	X	X	X		X	X	X				
		S1456535	15	X	X	X		X	X	X				
		S1456534	20	X	X	X		X	X	X				
		S1457084 ^b	20	X	X	X		X	X	X				
		S1456536	25	X	X	X		X	X	X				
	10_DGMW77	S1456181	120	X	X	X		X	X	X				
		S1456179	134	X								X		
		S1457126 ^b	134	X								X		
Groundwater														
	10_DGMW77	S1452069	130-170	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

^c Stratum 1 = Aircraft Matting Area; Stratum 2 = Concrete Area

Table B10-2

Site10 (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	10_GN1 S1454138 (0)	DVF(a)	10_GN1 S1454139 (2)	DVF(a)	10_GN1 S1454140 (4)	DVF(a)	10_GN2 S1454141 (0)	DVF(a)	10_GN2 S1454483 (0)	DVF(a)	10_GN2 S1454142 (2)	DVF(a)	10_GN2 S1454484 (2)	DVF(a)	10_GN2 S1454143 (4)	DVF(a)
METALS																	
THALLIUM	MG/KG	0.16	UJ	0.3	J	0.29	J	0.15	J	0.15	UJ	0.15	UJ	0.15	UJ	0.16	UJ
CADMIUM	MG/KG	1	b	1.5		1	b	0.44	b	0.48	b	0.58	b	0.82	b	1.4	
CALCIUM	MG/KG	5340		7910		4840		5240	b	13000		4800		4730		5800	
SODIUM	MG/KG	427	b	962	b	473	b	272	b	318	b	297	b	263	b	354	b
LEAD	MG/KG	19.2		3.1		7.8		2.6		14.8		10		3		16.2	
POTASSIUM	MG/KG	3610		7540		3130		2740		2450		2020		1920		4310	
MANGANESE	MG/KG	189		356		185		149		154		175		122		256	
BERYLLIUM	MG/KG	0.51	b	0.89	b	0.35	b	0.14	b	0.26	b	0.2	b	0.27	b	0.44	b
ARSENIC	MG/KG	3.3		2.8		5	J	2.7		3.8		3.2		2.4		2.9	
NICKEL	MG/KG	8.2	b	12.1		8.3	b	3.5	b	5.2	b	5.4	b	6.3	b	11.4	
MERCURY	MG/KG	0.03	U														
VANADIUM	MG/KG	33.3		63.7		25.4		18.5		19.7		17		17.1		32.6	
BARIUM	MG/KG	127		237		121		80.3		77.7		73.1		65.9		144	
MAGNESIUM	MG/KG	5330		12400		4590		2550		2590		2830		2840		5700	
IRON	MG/KG	13800		27200		11300		9300		9540		7200		7340		14800	
ZINC	MG/KG	55.9		79.8		40.4		26.3		34.7		25.7		24.8		50.2	
CHROMIUM	MG/KG	13.9		20.4		10.7		7.9		10.1		6.9		6.3		14.4	
SELENIUM	MG/KG	0.12	UJ	0.12	UJ	0.12	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.11	UJ	0.12	UJ
SILVER	MG/KG	0.82	b	0.52	U	0.51	U	0.45	U	0.46	U	0.46	U	0.46	U	0.48	U
ALUMINIUM	MG/KG	12000		23400		8560		4780		5040		4860		5260		11100	
COBALT	MG/KG	4.9	b	10	b	4.3	b	3.1	b	3.6	b	2.5	b	3	b	5.5	b
COPPER	MG/KG	15.6		13		10		3.7	b	4.1	b	5.2	b	4.6	b	9.7	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	12	U	12	U	3	J	4	J	11	U	12	U	13	
TETRACHLOROETHENE	UG/KG	11	U	12	U	12	U	11	U	11	U	11	U	12	U	12	U
1,2-DICHLOROETHENE (TOTAL)	UG/KG	11	U	12	U	12	U	11	U	11	U	11	U	12	U	12	U
ACETONE	UG/KG	11	U	25	U	16	U	15	U	27	U	28	U	37	U	35	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	280	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
PYRENE	UG/KG	780		820	U	790	U	710	U	730	U	710	U	770	U	760	U
BENZO(GH)PERYLENE	UG/KG	220	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
INDENO(1,2,3-CD)PYRENE	UG/KG	290	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
BENZO(B)FLUORANTHENE	UG/KG	370	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
FLUORANTHENE	UG/KG	770		820	U	790	U	710	U	730	U	710	U	770	U	760	U
BENZO(K)FLUORANTHENE	UG/KG	230	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
CHRYSENE	UG/KG	480	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
BENZO(A)PYRENE	UG/KG	380	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
BENZO(A)ANTHRACENE	UG/KG	350	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
DIETHYL PHTHALATE	UG/KG	740	U	820	U	790	U	710	U	240	J	710	U	770	U	760	U
PHENANTHRENE	UG/KG	340	J	820	U	790	U	710	U	730	U	710	U	770	U	760	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	34.9		15.5	U	14.8	U	13.4	U	38.3		13.4	U	24.4		14.4	U
TFH GASOLINE	MG/KG	0.108		0.082	U	0.06	U	0.117		0.104		0.054	U	0.072		0.058	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U	282		293		20	U	20	U	20	U

Table B10-2

Site10 (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	10_GN3 S1484144 (0)	DVF(e)	10_GN3 S1484148 (2)	DVF(e)	10_GN3 S1484148 (4)	DVF(e)	10_GN4 S1484147 (0)	DVF(e)	10_GN4 S1484148 (2)	DVF(e)	10_GN5 S1484150 (0)	DVF(e)	10_GN5 S1484151 (2)	DVF(e)	10_GN6 S1484153 (0)	DVF(e)	
METALS																		
THALLIUM	MG/KG	0.15	U	0.4	b	0.21	b	0.22	b	0.37	b	0.19	b	0.36	b	0.15	U	
CADMIUM	MG/KG	0.49	b	1.3		1	b	0.94	b	1.8		1.2		2.3		0.58	b	
CALCIUM	MG/KG	12900		5700		3610		8650		7200		5730		7050		2500		
SODIUM	MG/KG	211	b	272	b	265	b	384	b	415	b	463	b	388	b	260	b	
LEAD	MG/KG	0.04		8.4		3.3		2.6		3.3		9.4		4.7		1.3		
POTASSIUM	MG/KG	2320		4850		4190		2520		5530		4820		5350		2650		
MANGANESE	MG/KG	141		280		240		161		301		224		353		189		
BERYLLIUM	MG/KG	0.11	UJ	0.88	b	0.49	b	0.37	b	0.65	b	0.25	b	0.44	b	0.11	U	
ARSENIC	MG/KG	2.7		3.6		1.8	b	1.7	b	2.7		3		4.5		1.1	b	
NICKEL	MG/KG	4.5	b	9.3	b	8.1	b	6.3	b	11		10.7		15		4.3	b	
MERCURY	MG/KG	0.03	U	0.06	b	0.03	U											
VANADIUM	MG/KG	20.1		34.8		31.3		24.7		38.3		36.8		53.3		20.1		
BARIUM	MG/KG	78.2		152		128		96.9		189		134		189		83.2		
MAGNESIUM	MG/KG	2780		6070		5200		3960		8410		6360		8450		2540		
IRON	MG/KG	9560		15100		13700		9880		17900		17300		21900		8430		
ZINC	MG/KG	29.6		58.8		44		31.3		61.8		58.3		70.3		27.4		
CHROMIUM	MG/KG	8.4		12.2		10.5		8.3		14		12.1		16.7		5.4		
SELENIUM	MG/KG	0.13	b	0.17	b	0.11	U	0.11	U	0.17	b	0.12	U	0.12	U	0.11	U	
SILVER	MG/KG	0.46	UJ	0.84	J	0.55	J	0.47	UJ	0.52	UJ	0.49	U	0.51	U	0.46	U	
ALUMINIUM	MG/KG	5260		10600		9880		7490		15100		12100		16100		5150		
COBALT	MG/KG	2.3	b	6.5	b	5.4	b	4	b	7.5	b	8.8	b	8.8	b	2.8	b	
COPPER	MG/KG	3.5	b	11.9		6.7		6		13.4		11.5		12.9		4.8	b	
VOLATILE ORGANIC COMPOUNDS																		
TOLUENE	UG/KG	5	J	11	U	3	J	12	U	18		9	J	5	J	11	U	
TETRACHLOROETHENE	UG/KG	11	U	11	U	11	U	12	U	12	U	19		6	J	11	U	
1,2-DICHLOROETHENE (TOTAL)	UG/KG	11	U	11	U	11	U	12	U	12	U	6	J	12	U	11	U	
ACETONE	UG/KG	18	U	36	U	25	U	130	B	53	U	33	U	17	U	11	U	
SEMI-VOLATILE ORGANIC COMPOUNDS																		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
PYRENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
BENZO(GH)PERYLENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
INDENO(1,2,3-CD)PYRENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
BENZO(B)FLUORANTHENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
FLUORANTHENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
BENZO(K)FLUORANTHENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
CHRYSENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
BENZO(A)PYRENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
BENZO(A)ANTHRACENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
DIETHYL PHTHALATE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
PHENANTHRENE	UG/KG	730	U	760	U	730	U	760	U	790	U	810	U	780	U	710	U	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																		
TFH DIESEL	MG/KG	26.6		14.3	U	13.9	U	14.4	U	15.1	U	15.3	U	14.9	U	13.4	U	
TFH GASOLINE	MG/KG	0.055	U	0.058	U	0.056	U	0.058	U	0.06	U	0.062	U	0.06	U	0.054	U	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																		
TRPH	MG/KG	204		20	U	75		532		20	U	20	U	20	U	20	U	

Table B10-3

Site10 (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)	UNITS	10_25B209 S1456532 (5)	DVF(a)	10_25B209 S1456533 (10)	DVF(a)	10_25B209 S1456535 (15)	DVF(a)	10_25B209 S1456534 (20)	DVF(a)	10_25B209 S1457084 (20)	DVF(a)	10_25B209 S1456536 (25)	DVF(a)	10_25B209 S1457085 (25)	DVF(a)	10_DB208 S1456399 (5)	DVF(a)
ANALYTE BY GROUP	UNITS																
METALS																	
ALUMINUM	MG/KG	19100		14100		24100		2380		3660		9150		3870		17600	
ARSENIC	MG/KG	5		3		4.2		0.67	b	1.2	b	2	b	2.2		3.4	
BARIIUM	MG/KG	152		143		194		18.6	b	27.2	b	32.9	b	38.8	b	180	
BERYLLIUM	MG/KG	0.31	U	0.57	U	0.7	U	0.11	U	0.11	U	0.34	U	0.11	U	0.45	b
CALCIUM	MG/KG	89800		40000		5840		494	b	827	b	1270		7180		11800	
CADMIUM	MG/KG	1.3		0.96	b	1.8		0.25	U	0.44	b	0.33	b	0.38	b	1.3	
COBALT	MG/KG	5.9	b	5.7	b	8.2	b	1.4	b	2.1	b	2.8	b	2.5	b	7.5	b
CHROMIUM	MG/KG	15.5		13.7		20.4		2.5		3.8		7.2		6.5		16.4	
COPPER	MG/KG	12.1		11.4		14		2.3	b	2.8	b	3.8	b	4	b	12.8	
IRON	MG/KG	18500		16600		23900		2590		3990		6710		4800		22200	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	4220		3520		5530		439	b	548	b	1200		876	b	6160	
MAGNESIUM	MG/KG	7440		7950		11100		619	b	821	b	1790		1580		11400	
MANGANESE	MG/KG	238		257		349		80.5		98.1		71.6		88.4		356	
SODIUM	MG/KG	618	b	740	b	2230		325	b	387	b	692	b	448	b	570	b
NICKEL	MG/KG	12.6		8.1	U	11.6		2.1	U	3.3	U	4.8	U	4.3	U	8.5	b
LEAD	MG/KG	12.6		5.2		2.9		1.1		1.5		2.8		3.7		3.1	
ANTIMONY	MG/KG	3	U	2.8	U	3	U	2.5	U	2.6	U	2.8	b	2.6	U	2.9	U
SELENIUM	MG/KG	0.13	b	0.12	U	0.12	U	0.11	U	0.11	U	0.11	U	0.11	U	0.12	U
VANADIUM	MG/KG	44.9		38.5		61.5		5.8	b	9.3	b	15.6		10.2	b	55.1	
ZINC	MG/KG	47.1		49.7		68.7		7.7		10		18.3		15.4		68.8	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	12	U	12	U	3	J	3	J	10	U	3	J	11	U	11	U
ACETONE	UG/KG	27	U	12	U	17	U	57	U	28	U	24	U	31	U	11	U
METHYLENE CHLORIDE	UG/KG	12	U	12	U	37	U	27	U	31	U	35	U	35	U	11	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.332		0.189		0.186		0.052	U	0.229		0.357		0.055	U	0.055	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	299		529		20	U	20	U								

Table B10-3

Site10 (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	10_DB208 S1456400 (10)	DVF(a)	10_DB208 S1456401 (15)	DVF(a)	10_DB208 S1456402 (20)	DVF(a)	10_DB208 S1456403 (25)	DVF(a)	10_DB208 S1456404 (40)	DVF(a)	10_DB208 S1456405 (50)	DVF(a)	10_DB208 S1456406 (123)	DVF(a)	10_DGMW77 S1456181 (120)	DVF(a)
METALS																	
ALUMINUM	MG/KG	12900		16600		14200		5040		2130		14000		13100		5850	
ARSENIC	MG/KG	2	b	3.8		3.6		2	b	0.31	b	2.6		2.6		2	b
BARIUM	MG/KG	160		162		144		57.9		13	b	219		163		65.8	
BERYLLIUM	MG/KG	0.25	b	0.26	b	0.43	b	0.11	U	0.11	U	0.45	b	0.41	b	0.21	b
CALCIUM	MG/KG	7880		9580		5630		2800		492	b	4000		5910		2690	
CADMIUM	MG/KG	0.76	b	1.5		1.6		0.83	b	0.26	U	1.7		2.4		0.6	b
COBALT	MG/KG	4.9	b	8	b	5	b	2.4	b	2.1	b	6.7	b	4.3	b	3.6	b
CHROMIUM	MG/KG	11.7		20.7		13.8		8		2.2	b	15.6		19.4		6.5	
COPPER	MG/KG	7.1		11.5		10.7		4.1	b	2.5	b	10		13.1		5.1	b
IRON	MG/KG	15800		21000		16700		6700		3180		18500		19000		8710	
MERCURY	MG/KG	0.04	U	0.03	U	0.7		0.3		0.03	U	0.03	U	0.04	U	0.03	U
POTASSIUM	MG/KG	4540		5890		4050		1270		422	b	4990		3690		1930	
MAGNESIUM	MG/KG	7090		10200		6970		2260		508	b	5920		8010		2350	
MANGANESE	MG/KG	262		330		277		130		62.1		318		220		97.6	
SODIUM	MG/KG	801	b	2270		2120		933	b	295	b	748	b	455	b	314	b
NICKEL	MG/KG	6.5	b	16.4		10.4		6.6	b	1.7	U	12.2		15.3		6.5	b
LEAD	MG/KG	1.4		2.7		3.2		1.6		0.77		3.4		3.6		1.7	
ANTIMONY	MG/KG	3.2	U	3	U	3	U	2.6	U	2.7	U	2.8	U	2.9	U	3	U
SELENIUM	MG/KG	0.13	U	0.12	U	0.12	U	0.14	b	0.11	U	0.14	b	0.12	U	0.12	U
VANADIUM	MG/KG	39		54.2		41.5		17.4		7.4	b	45.6		43.4		22.8	
ZINC	MG/KG	44		62		49.7		19.8		6.1		51.6		51		26.4	
VOLATILE ORGANIC COMPOUNDS																	
2-BUTANONE	UG/KG	14	U	10	U	11	U	11	U	11	U	11	U	12	U	12	U
ACETONE	UG/KG	14	U	10	U	11	U	11	U	12	U	11	U	12	U	82	U
METHYLENE CHLORIDE	UG/KG	14	U	10	U	11	U	11	U	11	U	11	U	12	U	13	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.068	U	0.051	U	0.054	U	0.057	U	0.057	U	0.053	U	0.059	U	0.06	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	20	U	20	U										

Table B10-3

Site10 (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	10_DGMW77 S1456179 (134)	DVF(a)	10_DGMW77 S1457126 (134)	DVF(a)														
METALS																			
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	-		-															
VANADIUM	MG/KG	-		-															
ZINC	MG/KG	-		-															
VOLATILE ORGANIC COMPOUNDS																			
2-BUTANONE	UG/KG	12	U	11	U														
ACETONE	UG/KG	70		76															
METHYLENE CHLORIDE	UG/KG	12	U	4	J														
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																			
TFH GASOLINE	MG/KG	-		0.056	U														
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																			
TRPH	MG/KG	-		20	U														
(a) A definition of each data validation flag (DVF) is provided in Table B-1.																			

Table B10-4 Site 10 (OU-2): Well Construction Details MCAS El Toro Phase I RI Technical Memorandum	
Sheet 1 of 1	
Item	Station Identification
	10_DGMW77
Survey Location--Northing	N548779.46
Survey Location--Easting	E1547313.73
Ground Surface Elevation (ft above MSL ^a)	271.71
Measuring Point Elevation (ft above MSL ^a)	271.4
Measuring Point Location	Top of sounding tube
Type of Surface Completion	Below ground
Casing Diameter and Material	4" Schedule 40 PVC
Screen Diameter and Material	4" 20-slot Stainless Steel
Screen Interval (ft bgs ^b)	130-170
Length of Drop Pipe (ft bgs ^b)	165
Make and Model of Installed Pump	Grundfos Rediflow 2, 2"-diameter submersible
Date of Pumping Test	17 Nov 92
Date of Water Quality Sampling	17 Nov 92
^a Mean sea level ^b Below ground surface	

<p align="center">Table B10-5 Site 10 (OU-2): Summary of Hydraulic Parameters MCAS El Toro Phase I RI Technical Memorandum</p> <p align="right">Sheet 1 of 1</p>						
Well Identification	Type of Test	Analysis Method	Transmissivity (ft ² /day)	Hydraulic Conductivity (ft/day)	Storage Coefficient ^a	Leakance Factor ^a
10_DGMW77	Pumping	Theiss (1935): Recovery data	1,690	42.4	NA	NA
<p>^aNA = Not applicable Source: Table F-2 (Appendix F)</p>						

Table B10-6

Site10 (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	10_DGMW77 S1452069 (130-170)	DVF(a)
GENERAL CHEMISTRY					
ALKALINITY AS CaCO3	NA	NA	MG/L	189	
CARBONATE	NA	NA	MG/L	-	
BICARBONATE	NA	NA	MG/L	230	
CHLORIDE	3	250	MG/L	188	
SULFATE	3	250	MG/L	217	
NITRATE/NITRITE-N	1	10	MG/L	15.8	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	1030	
METALS					
ARSENIC	2	50	UG/L	1.5	b
BARIUM	2	2000	UG/L	32.6	b
CALCIUM	NA	NA	UG/L	158000	
COPPER	2	1300	UG/L	1.2	b
POTASSIUM	NA	NA	UG/L	2210	b
MAGNESIUM	NA	NA	UG/L	41400	
MANGANESE	3	50	UG/L	19.3	
SODIUM	NA	NA	UG/L	70600	
NICKEL	NA	NA	UG/L	57.3	
SELENIUM	1	10	UG/L	15.4	b
VANADIUM	NA	NA	UG/L	16.7	b
ZINC	2	5000	UG/L	11.3	b
VOLATILE ORGANIC COMPOUNDS					
TETRACHLOROETHENE	2	5	UG/L	8	
CARBON TETRACHLORIDE	1	0.5	UG/L	2	
CHLOROFORM	2	100	UG/L	1	
CHLOROMETHANE (METHYL CHLORIDE)	NA	NA	UG/L	1	J
1,1-DICHLOROETHENE	NA	NA	UG/L	0.6	J
TRICHLOROETHYLENE	2	5	UG/L	35	D
SEMIVOLATILE ORGANIC COMPOUNDS					
BENZYL BUTYL PHTHALATE	NA	NA	UG/L	19	

(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 B10-7
Site 10 (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	Concentration	Regulatory Level ^c	Regulatory Code ^d
10_DGMW77	(130-170)	Selenium	µg/L	15.4	10	2
		Nitrate/Nitrite-N	mg/L	15.8	10	2
		Total Dissolved Solids	mg/L	1030	500	3
		Carbon Tetrachloride	µg/L	2	0.5	2
		Tetrachloroethene	µg/L	8	5	1
		Trichloroethylene	µg/L	35	5	1

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 B11

**Nature and Extent of Contamination:
Site 11 (OU-3) — Transformer Storage Area**

Appendix B11
NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION:
SITE 11 (OU-3) - TRANSFORMER STORAGE AREA

This discussion of Site 11 is supplemented by the figures and data tables listed below. The figure is on page B11-3, and the tables are grouped at the end of this Appendix B11. Field headspace values for soils at this site are presented in Table BA1-11, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B11-1: (Site Map)

Table B11-1: Types of Samples and Chemical Analyses

Table B11-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

B11.1 Site Description

Site 11 (OU-3), the Transformer Storage Area, is a 30-foot concrete pad located on the northeast side of Building 369. The site consists of two strata: the perimeter of a concrete pad, and an asphalt-lined drainage ditch that runs from the pad to the edge of the yard, parallel to Building 369 (Figure B11-1).

Approximately 50 to 75 transformers were stored on the concrete pad from 1968 to 1983. Based on previous investigation reports, five transformers leaked and one spilled. It has been estimated that about 60 gallons of PCB transformer oil may have leaked onto the concrete pad during this period (Brown and Caldwell, 1986). The PCB oil probably would have flowed into the adjacent drainage ditch and surrounding soils. A catch basin that discharges into the Bee Canyon Wash is located west of Building 369, and receives runoff from a wide area near the building.

B11.2 Suspected Waste Types and Contaminants

The only suspected contaminants are PCBs, which were widely used in the 1960s and 1970s to lubricate industrial machinery (such as transformers) at high temperatures.

B11.3 Field Investigation

The field investigation consisted of collecting 17 surface and near-surface soil samples. The sample stations, depths of sampling, and types of analyses requested are listed in Table B11-1.

The site boundary and the number of sample locations were changed from the original *SAP*, based on additional information gathered, and are documented in the *SAP Amendment*. The boundaries were altered to include the two strata defined at the site:

- Stratum 1: Concrete Pad Perimeter
- Stratum 2: Drainage Ditch

The number of shallow soil borings was reduced from 10 to 6 (three borings in each strata). All samples were analyzed for pesticides and PCBs.

Two sample locations were located on the edge of the concrete pad (11_GN2 and 11_GN3). A 12-inch-diameter hole was cut through the concrete to reach the native soil. The asphalt was also cored to sample the soil beneath the drainage ditch.

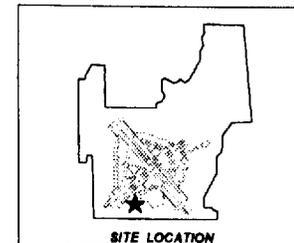
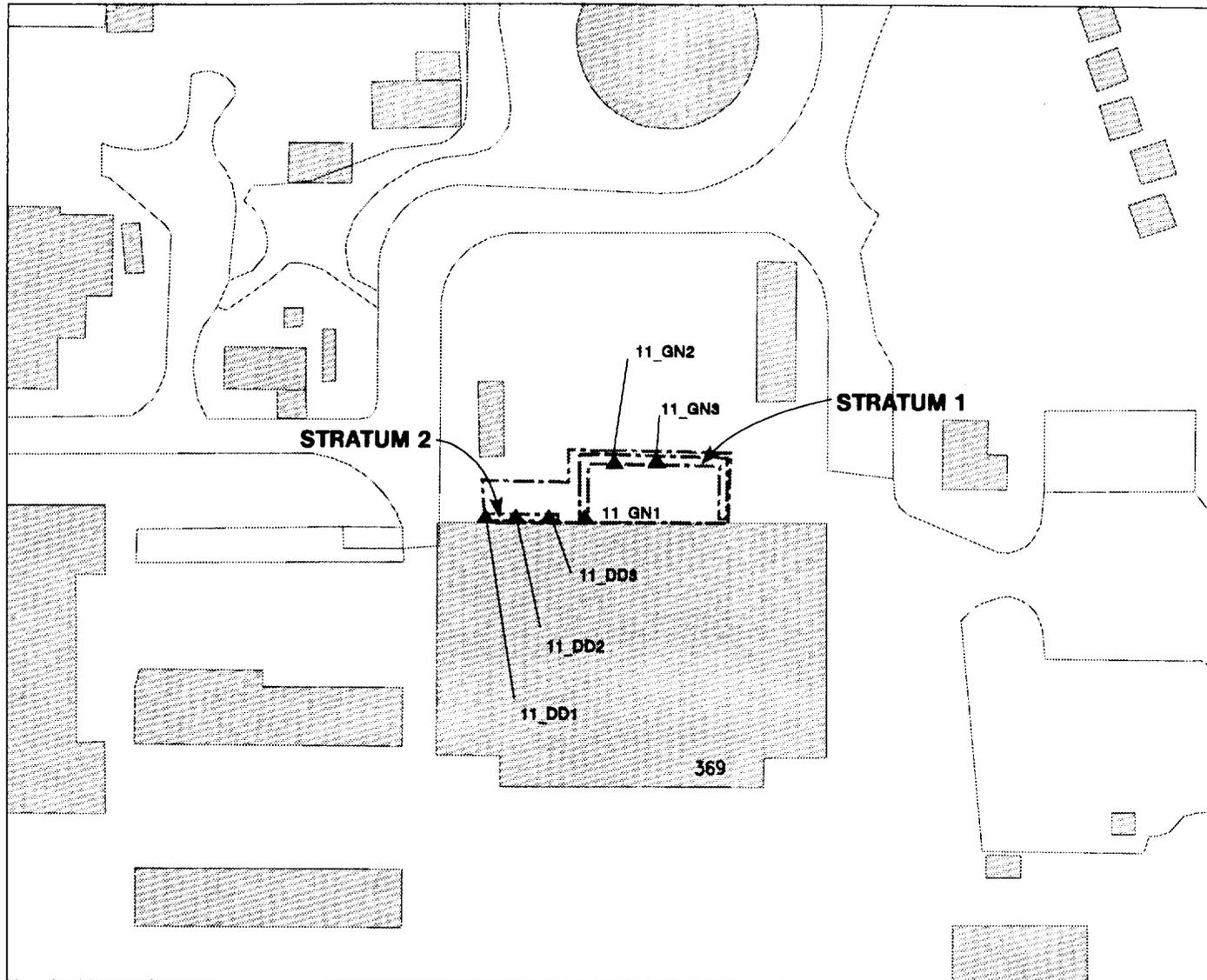
B11.3.1 Surface Water and Sediment

(No surface water or sediment samples were collected at this site.)

B11.3.2 Surface and Near-Surface Soils

Surface and near-surface soils were sampled by stratum within the site. There were six sample locations at the site, three in each stratum. Eight samples were collected from Stratum 1, and nine from Stratum 2.

Five samples, at 0 and 2 feet, were taken at sampling stations 11_GN1 and 11_GN3. One duplicate sample was taken at 11_GN1 at the surface. Samples at 0, 2, and 4 feet were taken at 11_DD1, 11_DD2, 11_DD3 and 11_GN2.



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

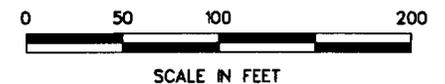


FIGURE B11-1
SITE 11 (OU-3): TRANSFORMER STORAGE AREA
 MCAS EL TORO PHASE I RI TECHNICAL MEMORANDUM

PAGE NUMBER B11-4

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B11.3.3 Vadose Zone Soils (Soil Borings)

(No vadose zone soil samples were collected at this site.)

B11.3.4 Groundwater Monitoring Wells

(No groundwater samples were collected at this site.)

B11.4 Surface Water and Sediments

(No surface water or sediment samples were collected at this site.)

B11.5 Surface and Near-Surface Soils

B11.5.1 Description of Surface and Near-Surface Soil Samples

The soils of Site 11 are Omni Series, section 206 - Sorrento loam, which have 0 to 2 percent slopes. The Omni Series is characterized by poorly drained soils on flood plains and in basins. These soils form in mixed alluvium. At depths of 0 to 12 inches, the soils have a permeability of 0.6 to 2.0 in./hr, an available water capacity of 0.16 to 0.21 in./in., and a pH of 6.1 to 8.4. (Wachtell, 1978).

Five samples from Stratum 1 were taken directly underneath the concrete pad (after coring through the pad) at 11_GN2 and 11_GN3, and three were taken just off the pad, at 11_GN1. Nine samples from Stratum 2 were taken from the asphalt-lined drainage ditch. All the samples were analyzed for pesticides and PCBs.

B11.5.2 Analytical Results and Soil Vapor Headspace Values

The detected pesticides are: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endrin aldehyde, endrin, and endosulfan II. PCB-1260 was also detected. Soil vapor headspace samples were obtained at each sample location; no significant readings above background were detected. (See Table BA1-11, Field Headspace Values.) It was

expected that PCBs would be detected in laboratory samples and not in headspace samples. PCBs are highly stable (nonvolatile), which led to their earlier widespread industrial use.

B11.5.2.1 Stratum 1: Concrete Pad Perimeter

In Stratum 1, five pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endrin aldehyde, and endosulfan II) and PCB-1260 were detected. Low pesticide concentrations (less than 10 $\mu\text{g}/\text{kg}$) were detected in 11_GN2 at 2 feet (4,4'-DDD and 4,4'-DDE) and in 11_GN3 at 0 feet (endrin aldehyde) and at 2 feet (4,4'-DDD). Three pesticides (4,4'-DDT, endrin aldehyde, and endosulfan II) were detected in 11_GN1 at 0 feet. Only endosulfan II was detected in both the regular and duplicate sample at 67.9 and 134 $\mu\text{g}/\text{kg}$, respectively. Endrin aldehyde was detected at 73.2 $\mu\text{g}/\text{kg}$ (not in the duplicate) and 4,4'-DDT at 105 $\mu\text{g}/\text{kg}$ (only in the duplicate). PCB-1260 was detected in 11_GN1 and 11_GN3 at 0 feet at 2,800 $\mu\text{g}/\text{kg}$ (4,960 $\mu\text{g}/\text{kg}$ in the duplicate) and 94.7 $\mu\text{g}/\text{kg}$, respectively.

B11.5.3.3 Stratum 2: Drainage Ditch

In Stratum 2, five pesticides (4,4'-DDD, 4,4'-DDT, endrin, endrin aldehyde, and endosulfan II) and PCB-1260 were detected. In 11_DD3 at 2 feet, 4,4'-DDD was detected at 137 $\mu\text{g}/\text{kg}$. All other compounds detected in Stratum 2 are in 11_DD1 at 4 feet and/or 11_DD2 at 0 feet. At 11_DD1 and 11_DD2, endrin aldehyde was detected at 145 and 55.2 $\mu\text{g}/\text{kg}$, respectively; and endosulfan II was detected at 81 and 51.6 $\mu\text{g}/\text{kg}$, respectively. Endrin and 4,4'-DDT were detected at 11_DD1, at 24.9 and 85.1 $\mu\text{g}/\text{kg}$, respectively.

PCB-1260 was detected in 11_DD1 at 4 feet and in 11_DD2 at 0 feet, at 3,580 and 2,100 $\mu\text{g}/\text{kg}$, respectively.

B11.6 Vadose Zone Soils

B11.6.1 Description of Subsurface Soil Samples

(No subsurface soil samples were collected at this site.)

B11.6.2 Subsurface Geology

Site 11 overlies approximately 400 feet of unconsolidated Quaternary sediments, which in turn overlie the semiconsolidated bedrock of the Irvine Area Groundwater Basin. The Quaternary deposits are differentiated (from youngest to oldest) into Holocene alluvial and colluvial deposits, primarily coarse stream channels with a matrix of finer overbank deposits, and Pleistocene beach-lagoonal and near-shore deposits (SAP, 1991).

No wells or deep borings were drilled at Site 11. Based on soil boring logs from nearby sites (9, 10, and 22) alluvium encountered during drilling consists of variable mixtures of sands, silts, and clays. More detailed descriptions can be found on the soil boring logs (Appendix K) and geologic cross sections for Sites 9, 10, and 22 (Figures B9-2, B10-2, and B22-2, respectively).

B11.7 Groundwater

B11.7.1 Site-Specific Hydrogeology

No wells exist at the site. Based on data from adjacent sites, the depth to groundwater at the site is approximately 120 feet bgs. One upgradient well (22_MW47, at Site 22) and one downgradient well (09_MW75) were used as references to estimate the depth to groundwater. Groundwater flows to the northwest under the site; see Figures 3-4a, b, and c for the regional groundwater flow and hydraulic gradient information in the vicinity.

B11.8 Potential Contaminant Migration Pathways

The contaminated soil at Site 11 is covered with concrete or asphalt, which limits the potential of the drainage ditch to be a pathway for surface water contamination. However, if the asphalt has any cracks, contaminated soil could be eroded into surface water runoff as sediment. The sediment could then be carried down the drainage ditch, into the catch basin west of Building 369, and into Bee Canyon Wash.

B11.9 Summary and Conclusions

The soil beneath the concrete pad and under the asphalt drainage ditch is contaminated with pesticides and PCBs. It appears that some migration of contaminants into surface and near-surface soil took place as a result of the spill(s). Pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan II, endrin, and endrin aldehyde are present in both strata and at various depths within each strata. PCB-1260 is present on the surface at both the edge of the concrete pad (11_GN1) and the drainage ditch, from 2,100 to 4,960 $\mu\text{g}/\text{kg}$ at 11_DD1 and 11_DD2, respectively. PCB-1260 was also detected at 3,580 $\mu\text{g}/\text{kg}$ in the 4-foot depth at 11_DD1, which is the farthest sampling point downgradient of the concrete pad. The presence of PCBs 4 feet deep at the farthest downgradient sample location indicates that deeper migration may have occurred. However, pesticides and PCBs are relatively immobile; therefore, Site 11 does not appear to be a contributor to groundwater contamination.

**Table B11-1
Site 11 (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	TCN	General Chemistry	TOC	Dioxins/ Furans
Surface Water and Sediments (Not sampled.)														
Surface and Near-Surface Soils														
2	11_DD1	S1454168	0			X								
2	11_DD1	S1454172	2			X								
2	11_DD1	S1454173	4			X								
2	11_DD2	S1454183	0			X								
2	11_DD2	S1454179	2			X								
2	11_DD2	S1454180	4			X								
2	11_DD3	S1454175	0			X								
2	11_DD3	S1454178	2			X								
2	11_DD3	S1454160	4			X								
1	11_GN1	S1454159	0			X								
1	11_GN1	S1454487 ^b	0			X								
1	11_GN1	S1454161	2			X								
1	11_GN2	S1454187	0			X								
1	11_GN2	S1454182	2			X								
1	11_GN2	S1454185	4			X								
1	11_GN3	S1454176	0			X								
1	11_GN3	S1454171	2			X								
Vadose Zone Samples (Not samples)														
Groundwater (Not sampled.)														
^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 B11-2

Site 11 (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	11_DD1 S1454168 (0)	DVF(a)	11_DD1 S1454172 (2)	DVF(a)	11_DD1 S1454173 (4)	DVF(a)	11_DD2 S1454183 (0)	DVF(a)	11_DD2 S1454179 (2)	DVF(a)	11_DD2 S1454180 (4)	DVF(a)	11_DD3 S1454175 (0)	DVF(a)	11_DD3 S1454178 (2)	DVF(a)
PESTICIDES AND PCBs																	
PCB-1260	UG/KG	383	U	377	U	3580		2100		372	U	357	U	365	U	372	U
ENDOSULFAN II	UG/KG	38.3	U	37.7	U	81		51.6		37.2	U	35.7	U	36.5	U	37.2	U
4,4'-DDT	UG/KG	38.3	U	37.7	U	85.1		40.6	U	37.2	U	35.7	U	36.5	U	37.2	U
ENDRIN	UG/KG	38.3	U	37.7	U	24.9		40.6	U	37.2	U	35.7	U	36.5	U	37.2	U
4,4'-DDD	UG/KG	38.3	U	37.7	U	36.7	U	40.6	U	37.2	U	35.7	U	36.5	U	137	
4,4'-DDE	UG/KG	38.3	U	37.7	U	36.7	U	40.6	U	37.2	U	35.7	U	36.5	U	37.2	U
ENDRIN ALDEHYDE	UG/KG	38.3	U	37.7	U	145		55.2		37.2	U	35.7	U	36.5	U	37.2	U

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	11_DD3 S1454160 (4)	DVF(a)	11_GN1 S1454159 (0)	DVF(a)	11_GN1 S1454487 (0)	DVF(a)	11_GN1 S1454181 (2)	DVF(a)	11_GN2 S1454187 (0)	DVF(a)	11_GN2 S1454182 (2)	DVF(a)	11_GN2 S1454185 (4)	DVF(a)	11_GN3 S1454176 (0)	DVF(a)
PESTICIDES AND PCBs																	
PCB-1260	UG/KG	356	U	2800		4960		381	U	35.9	U	37.4	U	36.5	U	94.7	
ENDOSULFAN II	UG/KG	35.6	U	67.9		134		38.1	U	3.59	U	3.74	U	3.85	U	3.85	U
4,4'-DDT	UG/KG	35.6	U	37.4	U	105		38.1	U	3.59	U	3.74	U	3.85	U	3.85	U
ENDRIN	UG/KG	35.6	U	37.4	U	37.2	U	38.1	U	3.59	U	3.74	U	3.85	U	3.85	U
4,4'-DDD	UG/KG	35.6	U	37.4	U	37.2	U	38.1	U	3.59	U	9.89		3.85	U	3.85	U
4,4'-DDE	UG/KG	35.6	U	37.4	U	37.2	U	38.1	U	3.59	U	3.78		3.85	U	3.85	U
ENDRIN ALDEHYDE	UG/KG	35.6	U	73.2		37.2	U	38.1	U	3.59	U	3.74	U	3.85	U	6.48	

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	11_GN3 S1454177 (2)	DVF(a)														
PESTICIDES AND PCBs																	
PCB-1260	UG/KG	38.7	U														
ENDOSULFAN II	UG/KG	3.87	U														
4,4'-DDT	UG/KG	3.87	U														
ENDRIN	UG/KG	3.87	U														
4,4'-DDD	UG/KG	5.31															
4,4'-DDE	UG/KG	3.87	U														
ENDRIN ALDEHYDE	UG/KG	3.87	U														

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

Appendix B12

**Nature and Extent of Contamination:
Site 12 (OU-3) — Sludge Drying Beds**

Appendix B12

NATURE AND EXTENT OF SITE-SPECIFIC CONTAMINATION: SITE 12 (OU-3) - SLUDGE DRYING BEDS

This discussion of Site 12 is supplemented by the figures and data tables listed below. The figures begin on page B12-3, and the tables are grouped at the end of this Appendix B12. Field headspace values for soils at this site are presented in Table BA1-12, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B12-1: (Site Map)

Figure B12-2: Geologic Cross Section

Table B12-1: Types of Samples and Chemical Analyses

Table B12-2: Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

Table B12-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples

Table B12-4: Well Construction Details

Table B12-5: Summary of Hydraulic Parameters

Table B12-6: Summary of Detected Chemicals in Groundwater Samples

Table B12-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B12.1 Site Description

From 1943 to 1972, MCAS El Toro operated a secondary wastewater treatment plant. The sludge from this plant was dewatered in two drying bed areas (east and west), as shown in Figure B12-1 as Strata 1 and 2.

Site 12 is located in the southwest corner of the facility west of Building 307 near Plant Road, South Marine Way, and Bee Canyon Wash, and has three main areas of concern:

- The west sludge drying beds lie between Bee Canyon Wash and Plant Road, south of South Marine Way. Aerial photos indicate these were abandoned by 1965.
- The east sludge drying beds lie east of Plant Road and west of South Marine Way. This area may have been the site of wastewater plant impoundments or additional sludge beds. The east area was abandoned around 1972.

- A drainage ditch runs from east to west around much of the perimeter of the east area, south of the west beds, and into the Bee Canyon Wash. This ditch receives runoff from both the west and east areas. Recent aerial photos of the site indicate a large, dark stain on the ground surface near the south portion of the west drying beds and the north sidewall of the drainage ditch. The material was described in the field as a "tar-like" substance.

When the treatment plant was closed, the sludge may have been abandoned in the drying beds and eventually plowed under, according to the *SAP*. The west area is currently a construction yard for Station contractors, and the east area is a grassy field.

The site was divided into 3 statistical strata for sampling and discussing surface and near-surface soil contamination:

- Stratum 1: The West Sludge Drying Beds
- Stratum 2: The East Sludge Drying Beds
- Stratum 3: The Drainage Ditch

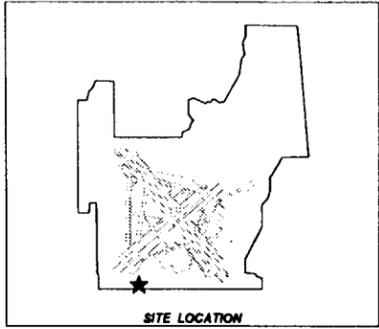
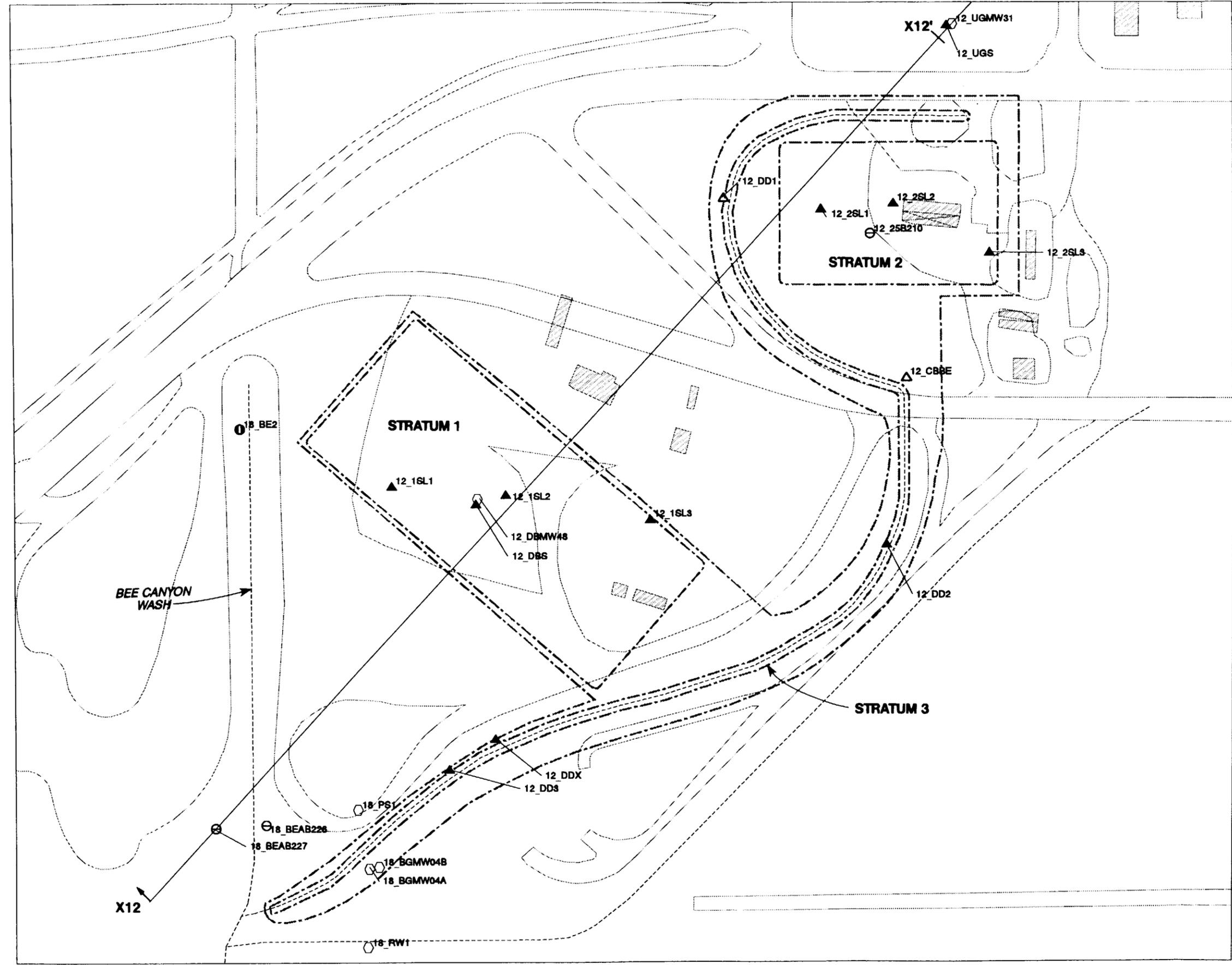
Figure B12-1 shows the site, the statistical strata locations, and the individual sampling and well locations.

B12.2 Suspected Waste Types and Contaminants

The potential contaminants at the site are the heavy metals typically found in municipal sludges: chromium, cyanide, zinc, silver, arsenic, cadmium, copper, mercury, nickel, lead, and selenium. These heavy metals may also have come from a plating shop that was located on-station and discharged its wastewater into the treatment facility system for several years during the 1940s. Other contaminants may also have been present in the sludge.

B12.3 Field Investigation

The field investigation consisted of drilling and sampling one deep boring developed as a monitoring well, two monitoring wells, one 25-foot soil boring, and collecting at-surface and shallow soil and sediment samples. The sample stations, depths of sampling, and types of analyses requested are shown in Table B12-1, Types of Samples and Chemical Analytes. Sampling was conducted in accordance with the *SAP Amendment*, with two exceptions: a surface soil sample associated with the 25-foot deep boring was not



- 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

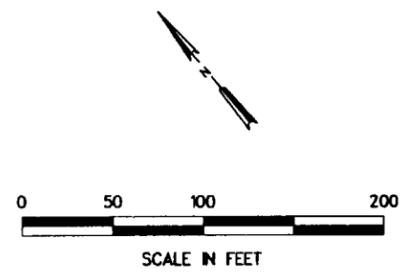
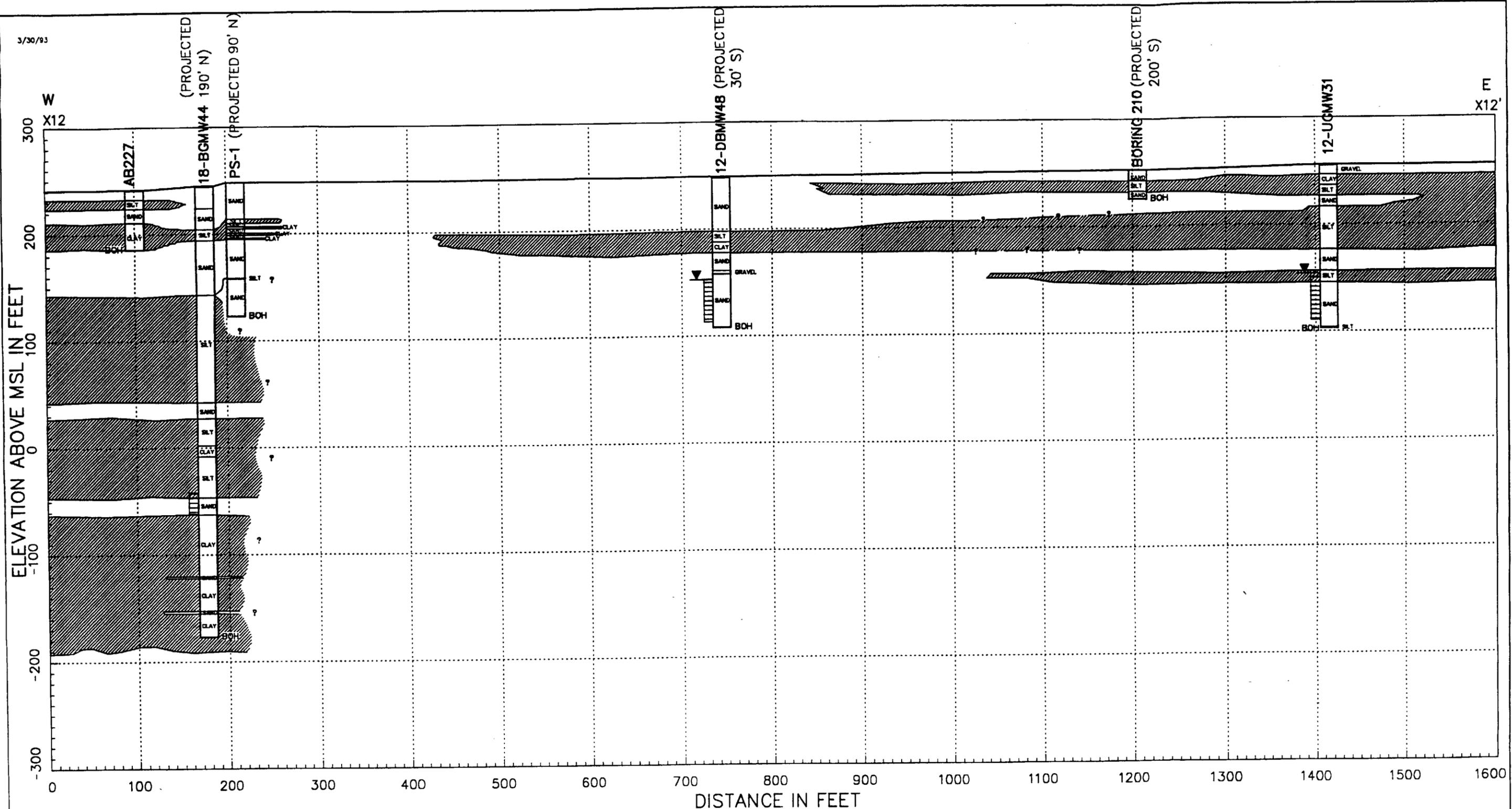


FIGURE B12-1
SITE 12 (OU-3): SLUDGE DRYING BEDS
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

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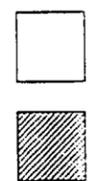


ELEVATION ABOVE MSL IN FEET

DISTANCE IN FEET

VERT. SCALE: 20% EXAGGERATION

LEGEND



UNCONSOLIDATED PERMEABLE SEDIMENTS

UNCONSOLIDATED LOW-PERMEABILITY SEDIMENTS



WATER LEVEL ELEVATION, DECEMBER 1992

WELL SCREEN INTERVAL

BOH BOTTOM OF HOLE

FIGURE B12-2
 SITE 12 (OU-3)
 GEOLOGIC CROSS SECTION X12-X12'
 MCAS EL TORO PHASE I RI
 TECHNICAL MEMORANDUM

PAGE NUMBER B12-6

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collected, and an additional near-surface sample was collected at the drainage ditch to sample the tar-like material that stains the southwest portion of the site.

Sediment, surface soils, and lithologic samples from the borings were evaluated in the field for organic vapors with an HNu photo-ionization detector or a flame ionization detector. The results of the field headspace analyses are provided in Attachment 1.

B12.3.1 Surface Water and Sediment

Sediment samples were collected from a catch basin located at the south end of the East Sludge Drying area. Two samples, designated 21_CBBE (one sample is a duplicate), were collected from the catch basin to provide information on potential contaminants that may be transported to the catch basin during rainfall. The samples from the catch basin were analyzed for VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), herbicides, TRPH, TFH, and metals.

B12.3.2 Surface and Near-Surface Soils

There are a total of 12 surface sampling stations at Site 12, with four stations each at Strata 1 and 3, three stations at Stratum 2, and one upgradient surface sampling station. The sample locations are identified as follows:

- Stratum 1: 12_1SL1, 12_1SL2, 12_1SL3, and 12_DBS
- Stratum 2: 12_2SL1, 12_2SL2, and 12_2SL3
- Stratum 3: 12_DD1, 12_DD2, 12_DD3, and 12_DDX

The sample identified as 12_DBS is the surface sample associated with the deep boring, and 12_DDX is the extra sample taken in the drainage ditch. Upgradient surface samples are identified as 12_UGS.

Surface and near-surface soils were tested for VOCs, SVOCs, pesticides, PCBs, herbicides, TRPH, TFH, metals, and cyanide. The upgradient samples were tested for hydrocarbons and metals only. Samples 12_DBS, 12_1SL1, and 12_1SL3 were not tested for herbicides or cyanide, and samples 12_DD2 and 12_DBS were not tested for cyanide.

B12.3.3 Vadose Zone Soils

One 25-foot boring, designated 12_25B210, was drilled in the center of the East Sludge Drying Bed.

B12.3.4 Groundwater Monitoring Wells

Two wells were drilled: one upgradient well, designated 12_UGMW31, and one deep boring developed as a well, designated 12_DBMW48.

Aquifer tests were conducted at the two wells; a slug test was conducted at 12_DBMW48, and a pumping test was conducted at Well 12_UGMW31. The results of the aquifer tests are summarized in Section B12.7. Groundwater samples were collected at the wells following the aquifer tests.

B12.4 Surface Water and Sediments

The sediment sampling station is designated 12_CBBE, and it was analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, TRPH, TFH, and metals.

B12.4.1 Description of Surface Water and Sediment Samples

The analytical results from Station 21_CBBE are summarized in Table B12-2. Contaminants were found from each analyte group except for PCBs. PCE and TCE were not detected in the sediment.

Low levels of petroleum hydrocarbon contamination are present in the sediment. Total recoverable petroleum hydrocarbons (TRPH) were detected at 30 mg/kg, with TFH-gasoline at 0.102 mg/kg. TFH-diesel was not detected in the sediment. The TRPH and TFH-gasoline values are below the California LUFT action levels.

VOCs detected in the sediment include acetone (21 $\mu\text{g}/\text{kg}$), methylene chloride (35 $\mu\text{g}/\text{kg}$), and toluene (8 $\mu\text{g}/\text{kg}$, estimated). Methylene chloride was also detected in the sample blank. Acetone is a demonstrated laboratory

contaminant; the maximum detected concentration of acetone in the trip blanks is 37 $\mu\text{g/L}$. One SVOC was detected in the sediment sample: bis(2-ethylhexyl)phthalate, at an estimated concentration of 230 $\mu\text{g/kg}$.

Seven pesticides were detected at concentrations ranging from 0.47 to 418 $\mu\text{g/kg}$. Those with the highest concentrations are 4,4-DDD (59.2 $\mu\text{g/kg}$), 4,4-DDE (203 $\mu\text{g/kg}$), and 4,4-DDT (418 $\mu\text{g/kg}$).

Concentrations of the detected metals are presented in Table 12-2. Five metals (antimony, beryllium, selenium, sodium, and thallium) were not detected in the sediment sample.

B12.5 Surface and Near-Surface Soils

Contamination from each sample matrix was present in the surface and near-surface soils at Site 12.

B12.5.1 Description of Surface and Near-Surface Soil Samples

The surface soils are mapped as Sorrento loam, which generally consists of well-drained loam from 0 to 12 inches depth overlying silty clay loam to 62 inches depth, below which lies sandy loam to 72 inches depth (Wachtell, 1978). The percolation rate ranges from 0.2 to 6.0 in/hr and the available water capacity rate ranges from 0.16 to 0.21 in/in (Wachtell, 1978).

The surface and near-surface soils were analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, TRPH, TFH, total metals, and total cyanide. Tests for TRPH and TFH were added to the upgradient surface sample analyses during the field investigation.

B12.5.2 Analytical Results and Soil Vapor Headspace Values

In general, the analyses indicate the presence of heavy metals, pesticides, PCBs, herbicides, petroleum and fuel hydrocarbons, SVOCs, and VOCs in the surface

and near-surface soils. PCE, TCE, and benzene were not detected in the surface soils.

Surface soils and lithologic samples from the borings were evaluated in the field for organic vapors using an HNu photo-ionization detector or a flame ionization detector (OVA). The results of the field headspace analyses are provided in Attachment 1 to Appendix B. Table B12-2 summarizes all detected analytes for the surface and near-surface soils.

B12.5.2.1 Upgradient Area

Fuel and petroleum hydrocarbons and metals were detected in the upgradient surface sample.

Fuel and petroleum hydrocarbons were detected in both the surface and 2-foot samples. Total recoverable petroleum hydrocarbons (TRPH) were detected in the surface sample at 6,770 mg/kg, with TFH-gasoline detected at 0.062 mg/kg; neither TRPH nor TFH-gasoline were detected in the 2-foot depth sample. TFH-diesel was detected at 65.4 and 86.8 mg/kg in the surface and 2-foot depth samples, respectively. The TFH-gasoline and TFH-diesel values are below California LUFT Action Levels, but the TRPH value exceeds the California LUFT Action Level.

Three metals (antimony, mercury, and silver) were not detected. The remaining metals were detected at low levels in the upgradient surface soil samples (Table B12-2).

B12.5.2.2 Stratum 1 - West Sludge Drying Beds

Hydrocarbons, VOCs, SVOCs, pesticides, PCBs, herbicides, and metals are present at Stratum 1; the highest levels of contamination are generally present at the middle of the stratum. TCE and PCE are not present.

Fuel and petroleum hydrocarbons are present in the ground surface samples at 12_1SL3 and 12_DBS, in the 0- and 2-foot samples at 12_1SL2, and in all samples at 12_1SL1. TFH-diesel was detected at 13.1 and 20.6 mg/kg in the surface samples at 12_1SL2 and 12_DBS, respectively. TFH-gasoline is present from 0.059 to 0.207 mg/kg. TRPH was detected at concentrations of 58 to 372 mg/kg. The highest TFH and TRPH concentrations occur at 12_1SL2, which is at the central portion of the stratum; the concentrations are highest at the ground surface and decrease with depth.

Four VOCs are present in the surface and near-surface soils: acetone (9 to 27 $\mu\text{g}/\text{kg}$), 2-butanone (79 $\mu\text{g}/\text{kg}$), carbon tetrachloride (5 $\mu\text{g}/\text{kg}$), and toluene (2 to 10 $\mu\text{g}/\text{kg}$). Acetone and 2-butanone are demonstrated laboratory contaminants. Their maximum detected concentrations in the trip blanks are 37 and 33 $\mu\text{g}/\text{L}$, respectively. Toluene values are below the CRDL and are therefore estimates. Each of these VOCs was detected at 12_1SL2, and toluene was also detected at 12_DBS and 12_1SL1.

Ten SVOCs, all polynuclear aromatic hydrocarbons (PAHs), were detected at the West Sludge Drying Beds in 12_DBS; SVOCs were not detected in the other surface and near-surface samples. The SVOCs and their concentrations detected in sample 12_DBS are shown in Table B12-2.

Several pesticides and PCBs are present in the surface soils and in some 2- and 4-foot samples. As shown in Table B12-2, six pesticides and one PCB compound were detected. Pesticide concentrations ranged from 4.01 to 240 $\mu\text{g}/\text{kg}$. PCBs were detected only at 12_1SL2 at the ground surface at a concentration of 283 $\mu\text{g}/\text{kg}$. The pesticide and PCB concentrations are highest at the middle of the stratum, at 12_1SL2 at the ground surface.

Two herbicides were detected at 12_1SL2: Dalapon (at 198 and 241 $\mu\text{g}/\text{kg}$, estimated, for the sample plus a duplicate at 4 feet), and MCPP (94,000 $\mu\text{g}/\text{kg}$ at ground surface).

All of the metals except antimony were detected (Table B12-2).

Fuel and petroleum hydrocarbons, VOCs, PAHs, pesticides, PCBs, herbicides, and metals are present at Stratum 1. The depth of contamination at the deep boring is discussed further in Section B12.6, Vadose Zone Soils. In general, many of the highest contamination levels occur at the central portion of the stratum, at 12_1SL2, with the PAHs detected only at 12_DBS.

B12.5.2.3 Stratum 2 -East Sludge Drying Beds

All of the analyte groups tested are present in the surface and near-surface soils at Stratum 2. These include hydrocarbons, VOCs, SVOCs, pesticides, PCBs, one herbicide, metals, and cyanide. TCE and PCE are not present.

TFH-diesel was not detected. TFH-gasoline detected at the East Sludge Drying Beds ranged from 0.07 to 0.349 mg/kg in the 0- and 2-foot samples, and TRPH ranged from 53 to 314 mg/kg in the surface samples. The highest concentrations of TFH-gasoline and TRPH occur at 12_2SL3 at the ground surface. The TFH-gasoline concentrations decrease with depth at this stratum.

VOCs detected at Stratum 2 include acetone (8 and 12 $\mu\text{g}/\text{kg}$ in 12_2SL1 at 0 and 2 feet, respectively), carbon tetrachloride (6 $\mu\text{g}/\text{kg}$ at 12_2SL1 at 0 foot), and toluene (3 to 5 $\mu\text{g}/\text{kg}$ in all surface samples). Acetone is a demonstrated laboratory contaminant; the maximum detected concentration of acetone in the trip blanks is 37 $\mu\text{g}/\text{L}$. The highest concentration of toluene occurs at 12_2SL1.

One SVOC, bis(2-ethylhexyl)phthalate, was encountered in 12_2SL2 at 230 and 160 $\mu\text{g}/\text{kg}$ at the 0- and 2-foot samples, respectively.

Seven pesticides were detected and the highest values occur at 12_2SL3. These pesticides are 4,4-DDD, 4,4-DDE, 4,4-DDT, alpha-chlordane, dieldrin, endrin aldehyde, and gamma-chlordane. The highest pesticide concentration was 4,4-DDT at 142 $\mu\text{g}/\text{kg}$, estimated, in 12_2SL1 at the ground surface. Concentrations of these pesticides are shown in Table B12-2.

One PCB compound, PCB-1254, was detected at 107 $\mu\text{g}/\text{kg}$, estimated, at the ground surface sample from 12_2SL1. One herbicide was detected at 12_2SL1 at the ground surface, and at 12_2SL2 and 12_2SL3 at 2 feet bgs. MCPP was detected at 29,200 to 38,700 $\mu\text{g}/\text{kg}$.

Mercury was detected at concentrations of 0.29 to 1.3 mg/kg , with the highest level found at 12_2SL2 at 2 feet; the mercury concentration increases with depth in the samples tested. The Stratum 2 mercury concentrations are higher than at the other Site 12 strata. Selenium was detected at concentrations of 0.14 to 0.33 mg/kg , and the highest concentration was detected at 12_2SL2 at the ground surface. The silver concentration decreases with depth, and ranges from 1.5 to 3.8 mg/kg ; the highest concentration was found in 12_2SL1 at the ground surface.

Cyanide was detected at 12_2SL3 at 2 and 4 feet and at 12_2SL2 at the ground surface, at concentrations ranging from 0.18 to 1.0 mg/kg .

B12.5.2.4 Stratum 3 - Drainage Ditch

Hydrocarbons, VOCs, SVOCs (including PAHs), pesticides, PCBs, herbicides, and heavy metals were detected; TCE and PCE were not detected.

TFH-diesel at the drainage ditch ranges in concentration from 15.2 to 1,970 mg/kg . TFH-gasoline ranges from 0.0808 to 24.7 mg/kg , and TRPH ranges from 45 to 42,529 mg/kg . The highest concentrations of TRPH, TFH-diesel, and TFH-gasoline occur at the sample of the tar-like material from the drainage ditch (12_DDX at 1 foot).

VOCs detected include acetone (7 to 35 $\mu\text{g}/\text{kg}$), carbon disulfide (2 $\mu\text{g}/\text{kg}$, estimated), carbon tetrachloride (6 to 11 $\mu\text{g}/\text{kg}$), methylene chloride (24 $\mu\text{g}/\text{kg}$), toluene (3 to 10 $\mu\text{g}/\text{kg}$, estimated), and xylene (2 $\mu\text{g}/\text{kg}$, estimated). Acetone and methylene chloride are demonstrated laboratory contaminants. The maximum detected concentrations of methylene chlorine and acetone in the trip blanks were 42 and 37 $\mu\text{g}/\text{L}$, respectively.

Ten SVOCs, including 9 PAHs, were detected at Stratum 3 and are shown on Table B12-2.

Nine pesticides were detected: 4,4-DDD, 4,4-DDE, 4,4-DDT, alpha-chlordane, dieldrin, endrin aldehyde, endrin ketone, gamma-chlordane, and methoxychlor. The highest concentration of pesticides generally occurs at 12_DD1, and the concentrations at each location decrease with depth. The highest pesticide concentration was 4,4-DDT, at 3,650 $\mu\text{g}/\text{kg}$ (estimated) in 12_DD1 at the ground surface.

One PCB compound (PCB-1254) was detected, with concentrations ranging from 0.63 to 2,490 $\mu\text{g}/\text{kg}$ (estimated); the highest concentration of PCBs for Site 12 occur at sample 12_DD1 at the ground surface. Herbicides detected were 2,4 dichlorophenoxy acetic acid (140 $\mu\text{g}/\text{kg}$ in 12_DD1 at 0'), Dalapon (65.1 to 135 $\mu\text{g}/\text{kg}$), and MCPP (153,000 $\mu\text{g}/\text{kg}$ in 12_DD2 at 2').

Detected metals are presented in Table B12-2.

B12.6 Vadose Zone Soils

B12.6.1 Description of Subsurface Soil Samples

One 25-foot boring, designated 12_25B210, was drilled in Stratum 2. One deep boring, designated 12_DBMW48, was drilled to 140 feet bgs at Stratum 1. The upgradient monitoring well, 12_UGMW31, was also sampled during drilling.

B12.6.2 Subsurface Geology

Subsurface soils encountered at the site consisted of Quaternary alluvium. The soils encountered were heterogeneous with generally discontinuous layering. Silty sand and sandy silt were the primary materials encountered. The sand was generally fine- to coarse-grained, with occasional gravel encountered in the sand layers. Figure B12-2, Geologic Cross Section, presents a generalized profile of

the site geology. Detailed boring logs that describe the specific soil layers are presented in Appendix D.

B12.6.3 Analytical Results

The results of the laboratory testing on the subsurface soils at Site 12 are presented in Table B12-3. This table includes soil samples from the 25-foot boring, the deep boring, and the upgradient well boring. Analyses of the vadose zone soils indicates the presence of metals, low levels of hydrocarbons, two VOCs, one SVOC, and two pesticides.

Hydrocarbons (TRPH, TFH). Petroleum hydrocarbons were detected only at 12_DBMW48. TFH-gasoline was detected in 12_DBMW48 at 20 feet, at a concentration of 0.113 mg/kg. TRPH concentrations ranged from 56 to 192 mg/kg, below California LUFT action levels.

Volatile Organic Compounds (VOCs). Two VOCs were detected. In 12_DBMW48, 2-butanone ranged from 2 to 6 $\mu\text{g}/\text{kg}$, estimated. 2-Butanone is a demonstrated laboratory contaminant; the maximum detected concentration in the trip blanks was 33 $\mu\text{g}/\text{L}$. Acetone was detected in concentrations of 3 (estimated) to 69 $\mu\text{g}/\text{kg}$, and was highest in the upgradient well, 12_UGMW31. (Acetone is also a demonstrated laboratory contaminant.)

Semivolatile Organic Compounds (SVOCs). One SVOC was detected at the site: di-n-octyl phthalate (330 $\mu\text{g}/\text{kg}$, estimated) at 25 feet in 12_25B210.

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. Two pesticides, 4,4-DDE and 4,4-DDT, were detected at concentrations of 24.4 and 29.1 $\mu\text{g}/\text{kg}$, respectively, at 5 feet in Boring 12_25B210. No other pesticides, herbicides, or PCBs were detected.

Metals and Cyanide. The results of detected metals are presented in Table B12-4.

Total Organic Carbon (TOC). Total organic carbon (TOC) was detected at concentrations ranging from 100 to 418 mg/kg in the soils at the screen interval in the monitoring wells.

B12.6.4 Soil Vapor Headspace Concentrations

Soil vapor headspace concentrations are presented in Attachment 1 to Appendix B. Low to moderate headspace concentrations, ranging from 0 to 6 ppmv, were detected in the subsurface soils using HNu and OVA meters. The headspace concentrations do not seem to correspond to the laboratory concentrations.

B12.7 Groundwater

B12.7.1 Site-Specific Hydrogeology

Groundwater was first noted during drilling in 12_UGMW31 at about 115 feet bgs, and in 12_DBMW48 at about 97 feet bgs. During the February 1993 groundwater quality sampling event, water level elevations measured in Wells 12_UGMW31 and 12_DBMW48 were 154.88 and 153.08 feet, respectively. Information on the specific well construction, including screened intervals and survey information, are provided in Table B12-4.

A 4-hour pumping test was conducted at Well 12_UGMW31 on 8 October 1992. A slug test was conducted on 12_DBMW48 on 6 November 1992. The water quality sample from 12_UGMW31 was collected during the pumping test; the water quality sample from 12_DBMW48 was collected with a dedicated pump on 10 December 1992.

Transmissivity, hydraulic conductivity, and storage coefficient were calculated on the basis of aquifer test data analyses and are provided in Table B12-5. No leakance factors could be calculated for this site. The average groundwater gradient for Site 12 is approximately 0.007 ft/ft, or about 35 ft/mi, toward the

north-northwest. Groundwater generally flows toward the northwest at an average gradient of approximately 0.08 ft/ft in the vicinity of the Station.

Using the gradient of 0.0076 ft/ft, the lower hydraulic conductivity (4.3 ft/day) in Table B12-5, and an assumed effective porosity of 0.3, the average linear velocity of groundwater would be approximately 0.1 ft/day. Using the higher rate of 9.7 ft/day (12_DBMW48), the flow velocity would be 0.2 ft/day.

B.12.7.2 Analytical Results

The analytical results are discussed by parameter below and are summarized in Table B12-6. In the tested groundwater samples, three VOCs, two metals, total dissolved solids (TDS), chloride, and sulfate exceeded drinking water standards (MCLs). Several herbicides were also detected in the groundwater.

General Chemistry. Nitrate/nitrite (as N) exceeded the MCLs in water quality samples from both upgradient and Site 12 wells:

- Nitrate/nitrite (as N) - 22.5 (12_UGMW31) and 22.9 (12_DBMW48) mg/L

As discussed in Subsection 3.1, the groundwater facies change dramatically across MCAS El Toro, and this change in water quality is evident at Site 12. Differences can be seen in TDS, chloride, and sulfate between the upgradient and downgradient wells. Appendix A presents a more complete discussion of the general inorganic chemistry of the regional groundwater underlying the site. It appears that Site 12 has had no impact on inorganic water quality of the regional groundwater.

Hydrocarbon (TRPH, TFH). Hydrocarbons were not detected.

Volatile Organic Compounds (VOCs). Three VOCs were detected in the groundwater at levels at or exceeding the groundwater quality standards: carbon tetrachloride (0.5 µg/L, estimated, at 12_DBMW48), tetrachloroethylene (PCE) (18 µg/L, at 12_DBMW48), and trichloroethylene (TCE) (0.8 and 7 µg/L, in

12_DBMW48 and 12_UGMW31, respectively). As indicated here, TCE was detected in the upgradient well at a concentration higher than the concentration detected at Site 12.

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

Pesticides, Polychlorinated Biphenyls (PCBs), and Herbicides. Pesticides and PCBs were not detected. Nine herbicides were detected at 12_UGMW31: 2,4 dichlorophenoxy acetic acid; 2,4,5-T; 2,4,5-trichlorophenoxy propionic acid; 2,4-DB; Dalapon; dicamba; dichloroprop; MCPA; and MCPP. Herbicides were not detected in 12_DBMW48.

Metals and Cyanide. Two metals were detected that exceed the MCLs: aluminum (34.6 to 60.2 $\mu\text{g/L}$) and selenium (20.5 to 56.7 $\mu\text{g/L}$). The highest concentrations of metals occur at 12_DBMW48.

B12.7.3 Comparison with Drinking Water Standards

A summary of detected contaminants at concentrations exceeding MCLs is provided in Table B12-7. As shown on the table, three VOCs (carbon tetrachloride, PCE, and TCE), selenium, and nitrate/nitrite exceed drinking water standards.

B12.8 Potential Contaminant Migration Pathways

Site 12 is relatively flat, so the surface flow does not seem to be a transport pathway. The main route for contaminant transport appears to be through groundwater movement. Unknown chemicals may have also been disposed of at the Sludge Drying Beds, and these materials may have infiltrated down to the groundwater. The soil contamination appears to be migrating vertically into the soil, and horizontally toward the drainage ditch. Soil staining is apparent at the south portion of the West Sludge Drying Beds, and appears to be progressing toward the drainage ditch.

**Table B12-1
Site 12 (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																
Catch Basin	12_CBBE	S1451030	0	X	X	X		X	X	X						
Surface and Near-Surface Soils																
Stratum 1	12_DBS	S1454188	0	X	X	X		X	X	X						
		S1457105 ^b	0	X	X	X		X	X	X						
Stratum 1	12_1SL1	S1454190	0	X	X	X		X	X	X						
		S1454195	2	X	X	X		X	X	X						
		S1454202	4	X	X	X		X	X	X						
Stratum 1	12_1SL2	S1454197	0	X	X	X	X	X	X	X	X					
		S1454198	2	X	X	X	X	X	X	X	X					
		S1454491 ^b	4	X	X	X	X	X	X	X	X	X				
		S1454199	4	X	X	X	X	X	X	X	X	X				
Stratum 1	12_1SL3	S1454196	0	X	X	X		X	X	X						
		S1454213	2	X	X	X		X	X	X						
Stratum 2	12_2SL1	S1454216	0	X	X	X	X	X	X	X	X					
		S1454209	2	X	X	X	X	X	X	X	X	X				
Stratum 2	12_2SL2	S1454207	0	X	X	X	X	X	X	X	X					
		S1454204	2	X	X	X	X	X	X	X	X	X				
Stratum 2	12_2SL3	S1454206	0	X	X	X	X	X	X	X	X					
		S1454200	2	X	X	X	X	X	X	X	X					
		S1454490 ^b	2	X	X	X	X	X	X	X	X	X				
		S1454201	4	X	X	X	X	X	X	X	X	X				
Stratum 3	12_DD1	S1454189	0	X	X	X	X	X	X	X	X					
		S1454194	2	X	X	X	X	X	X	X	X					
		S1454191	4	X	X	X	X	X	X	X	X	X				
Stratum 3	12_DD2	S1454493 ^b	0	X	X	X	X	X	X	X	X	X				
		S1451075	0	X	X	X	X	X	X	X	X					
		S1451076	2	X	X	X	X	X	X	X	X					
		S1451077	4	X	X	X	X	X	X	X	X					
Stratum 3	12_DD3	S1451082	0	X	X	X	X	X	X	X	X					
		S1451083	2	X	X	X	X	X	X	X	X					
		S1451080	4	X	X	X	X	X	X	X	X	X				
		S1451081 ^b	4	X	X	X	X	X	X	X	X	X				
Stratum 3	12_DDX	S1454527	1	X	X	X	X	X	X	X	X					
Upgradient	12_UGS	S1454205	0					X	X	X						
		S1454210	2					X	X	X						

**Table B12-1
Site 12 (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
Vadose Zone Soils														
	12_25B210	S1456407	5	X	X	X		X	X	X	X			
		S1456408	10	X	X	X		X	X	X	X			
		S1456410	20	X	X	X		X	X	X	X			
		S1456411	25	X	X	X		X	X	X	X			
	12_DBMW48	S1456199	5	X	X	X		X	X	X				
		S1456195	10	X	X	X		X	X	X				
		S1456197	15	X	X	X		X	X	X				
		S1457104 ^b	15	X	X	X		X	X	X				
		S1456193	20	X	X	X		X	X	X				
		S1456192	25	X	X	X		X	X	X				
		S1456190	30	X	X	X		X	X	X				
		S1456191	40	X	X	X		X	X	X				
		S1456189	90	X	X	X		X	X	X				
	S1456198	100	X								X			
Upgradient	12_UGMW31	S1456196	100	X	X	X		X	X	X			X	
		S1456194	125	X									X	
Groundwater														
	12_DBMW48	S1452074	95-135	X	X	X	X	X	X	X	X	X		
	12_UGMW31	S1452077	105-145	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 B12-2

Site12 (OU-3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

MCAS EI Toro Phase I RI Technical Memorandum

STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	12_18L1 S1454190 (0)	DVF(a)	12_18L1 S1454195 (2)	DVF(a)	12_18L1 S1454202 (4)	DVF(a)	12_18L2 S1454197 (0)	DVF(a)	12_18L2 S1454198 (2)	DVF(a)	12_18L2 S1454199 (4)	DVF(a)	12_18L2 S1454491 (4)	DVF(a)	12_18L3 S1454196 (0)	DVF(a)
GENERAL CHEMISTRY																	
CYANIDE	MG/KG	-		-		-		0.15	U	0.16	U	0.16	U	0.17	U	-	
METALS																	
SILVER	MG/KG	0.44	UJ	0.45	UJ	0.46	UJ	7.4		0.46	U	0.46	U	0.46	U	0.47	UJ
ALUMINUM	MG/KG	8780		7930		10100		6680		10400		7660		7440		11700	
ARSENIC	MG/KG	1.9	b	2.1	b	1.9	b	2.7		7.1		2	b	0.9	b	4.3	
BARIUM	MG/KG	94.6		76.6		128		238		102		113		114		134	
BERYLLIUM	MG/KG	0.32	J	0.46	J	0.28	J	0.54	U	0.55	U	0.56	U	0.51	U	0.27	J
CALCIUM	MG/KG	3180		4090		3430		5430		3840		3480		3260		4930	
CADMIUM	MG/KG	1.5		1	b	1.2		7.2		1.5		1.4		0.8	b	1.6	
COBALT	MG/KG	4.2	b	3.9	b	4.3	b	3.9	b	4.6	b	4.2	b	4.9	b	5.7	b
CHROMIUM	MG/KG	10.7		9		10.3		24.4		11.1		10.9		8.4		15.4	
COPPER	MG/KG	9.8		7.3		7.1		45.4		12.4		8.4		8.4		12.3	
IRON	MG/KG	11400		9730		13900		9930		14000		11600		11600		21600	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.6		0.09	U	0.16	U	0.03	U	0.03	U
POTASSIUM	MG/KG	3190		2000		3940		3690		3630		3790		4250		4290	
MAGNESIUM	MG/KG	4080		3480		5400		3970		5000		4350		4430		5830	
MANGANESE	MG/KG	201		175		248		174		214		224		241		325	
SODIUM	MG/KG	186	b	197	b	177	b	219	b	255	b	246	b	240	b	240	b
NICKEL	MG/KG	6.9	b	8.5	b	7	b	8.1	b	7.4	b	6.8	b	7.3	b	8.3	b
LEAD	MG/KG	0.1		0.04		0.01		109		56.8		15.1		1.7		0.29	
SELENIUM	MG/KG	0.11	U	0.11	U	0.11	U	0.48	U	0.31	U	0.38	U	0.11	U	0.11	U
THALLIUM	MG/KG	0.15	b	0.15	b	0.18	b	0.14	b	0.17	b	0.15	U	0.15	U	0.33	b
VANADIUM	MG/KG	26.1		33		33		22.6		31.9		26.9		27.1		32.6	
ZINC	MG/KG	68.7		23.4		42.5		217		99.2		54.9		38.5		57.2	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	2	J	3	J	11	U	10	J	6	J	11	U	11	U	11	U
XYLENE (TOTAL)	UG/KG	10	U	11	U	11	U	10	U	11	U	11	U	11	U	11	U
CARBON TETRACHLORIDE	UG/KG	10	U	11	U	11	U	5	J	11	U	11	U	11	U	11	U
ACETONE	UG/KG	10	U	11	U	21	U	9	J	19		12		27		11	U
METHYLENE CHLORIDE	UG/KG	10	U	11	U	23	U	10	U	11	U	11	U	11	U	11	U
CARBON DISULFIDE	UG/KG	10	U	11	U	11	U	10	U	11	U	11	U	11	U	11	U
2-BUTANONE	UG/KG	10	U	11	U	11	U	10	U	11	U	11	U	79		11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
PYRENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
BENZO(GH)PERYLENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
INDENO(1,2,3-CD)PYRENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
BENZO(B)FLUORANTHENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
FLUORANTHENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
BENZO(K)FLUORANTHENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
CHRYSENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
BENZO(A)PYRENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
DIBENZO(A,H)ANTHRACENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
BENZO(A)ANTHRACENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
PHENANTHRENE	UG/KG	690	U	720	U	710	U	670	U	700	U	710	U	720	U	730	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.46	U	35.8	U	3.57	U	-	UJR	-	UJR	-	UJR	-	UJR	3.64	U
PCB-1254	UG/KG	34.6	U	358	U	35.7	U	283	JN	-	UJR	-	UJR	-	UJR	36.4	U
4,4'-DDT	UG/KG	49		35.8	U	5.37	U	240	JN	188	JN	7.36	JN	4.01	JN	42.6	U
ALPHA-CHLORDANE	UG/KG	4.36		18.4	U	1.84	U	8.98	JN	-	UJR	-	UJR	-	UJR	1.87	U
GAMMA-CHLORDANE	UG/KG	4.39		18.4	U	1.84	U	7.37	JN	-	UJR	-	UJR	-	UJR	1.87	U
ENDRIN KETONE	UG/KG	3.46	U	35.8	U	3.57	U	-	UJR	-	UJR	-	UJR	-	UJR	3.64	U
DIELDRIN	UG/KG	9.11		35.8	U	3.57	U	27.7	JN	-	UJR	-	UJR	-	UJR	3.64	U
METHOXYCHLOR	UG/KG	17.8	U	184	U	18.4	U	-	UJR	-	UJR	-	UJR	-	UJR	18.7	U
4,4'-DDD	UG/KG	9.56		35.8	U	3.57	U	107	JN	11.8	JN	-	UJR	-	UJR	9.9	U
4,4'-DDE	UG/KG	53.3		59.1		13.3		229	JN	94.9	JN	8.36	JN	10.5	JN	73.6	U
ENDRIN ALDEHYDE	UG/KG	3.46	U	35.8	U	3.57	U	-	UJR	-	UJR	-	UJR	-	UJR	3.64	U
HERBICIDES																	
DALAPON	UG/KG	-		-		-		51.1	UJ	53.4	UJ	198	J	241	J	-	
MCPP	UG/KG	-		-		-		94000	U	26700	U	27100	U	27100	U	-	
2,4 DICHLOROPHENOXY ACETIC ACID	UG/KG	-		-		-		102	U	107	U	108	U	108	U	-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.1	U	13.6	U	13.5	U	13.1	U	13.2	U	13.4	U	13.6	U	13.8	U
TFH GASOLINE	MG/KG	0.052	U	0.069	U	0.054	U	0.207	U	0.06	U	0.054	U	0.054	U	0.064	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	88		182		58		372		74		20	U	20	U	78	

Table B12-2

Site12 (OU- 3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

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STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	12_18L3 S1454213 (0)	DVF(a)	12_28L1 S1454216 (0)	DVF(a)	12_28L1 S1454209 (2)	DVF(a)	12_28L2 S1454207 (0)	DVF(a)	12_28L2 S1454204 (2)	DVF(a)	12_28L3 S1454206 (0)	DVF(a)	12_28L3 S1454200 (2)	DVF(a)	12_28L3 S1454490 (2)	DVF(a)
GENERAL CHEMISTRY																	
CYANIDE	MG/KG	-		0.15	U	0.15	U	0.18	B	0.16	U	0.15	U	1		0.71	
METALS																	
SILVER	MG/KG	0.5	UJ	3.8		1.6	b	2.1		1.5	b	2.8		0.47	U	0.47	U
ALUMINUM	MG/KG	12800		10700		8180		9280		4850		6720		9490		8880	
ARSENIC	MG/KG	3.4		4.4		4.7		5.4		7.6		14.3		2	b	2.8	
BARIUM	MG/KG	176		130		71.4		137		89.2		97.7		122		141	
BERYLLIUM	MG/KG	0.41	J	0.51	U	0.53	U	0.42	U	0.16	U	0.19	U	0.45	U	0.39	U
CALCIUM	MG/KG	4970		4400		2500		4820		3610		6900		3960		4100	
CADMIUM	MG/KG	1.3		1.7		1		1.5		1	b	1.4		1.5		1.4	
COBALT	MG/KG	5.7	b	4.9	b	3.2	b	5.3	b	2.6	b	4.6	b	6.1	b	5	b
CHROMIUM	MG/KG	12.3		18.5		13		13.4		8.7		11.4		10.3		9.7	
COPPER	MG/KG	9.7		30		29.1		27.1		12.3		22.7		8.9		8.8	
IRON	MG/KG	16200		14400		12700		13300		6550		12800		14000		12800	
MERCURY	MG/KG	0.03	U	0.39		0.17	U	1.2		1.3		0.48		0.29		0.72	
POTASSIUM	MG/KG	4700		3650		1310		4330		1630		2340		4710		4580	
MAGNESIUM	MG/KG	6430		5470		3800		5480		3120		4360		5190		4840	
MANGANESE	MG/KG	282		216		124		224		119		200		278		289	
SODIUM	MG/KG	248	b	207	b	312	b	391	b	376	b	270	b	279	b	306	b
NICKEL	MG/KG	8	b	9.2		8.1	b	8.9		7.5	b	10		9.6		7.9	b
LEAD	MG/KG	0.02		24.5		10.8		25.4		11.7		81.8		2.7		2.8	
SELENIUM	MG/KG	0.14	b	0.41	U	0.28	U	0.33	b	0.24	b	0.15	b	0.19	b	0.29	b
THALLIUM	MG/KG	0.33	b	0.19	b	0.14	U	0.17	b	0.15	U	0.14	U	0.16	b	0.31	b
VANADIUM	MG/KG	36.1		34.1		26.4		31.6		17.1		25.4		30.9		29.8	
ZINC	MG/KG	52.1		87.3		59.8		94.4		56.3		92.4		45.6		43.8	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	11	U	5	J	10	U	4	J	10	U	3	J	11	U	11	U
XYLENE (TOTAL)	UG/KG	11	U	10	U	11	U	11	U								
CARBON TETRACHLORIDE	UG/KG	11	U	8	J	10	U	10	U	10	U	10	U	11	U	11	U
ACETONE	UG/KG	11	U	8	J	12	U	10	U	10	U	59	U	11	U	11	U
METHYLENE CHLORIDE	UG/KG	11	U	10	U	10	U	14	U	10	U	10	U	12	U	13	U
CARBON DISULFIDE	UG/KG	11	U	10	U	11	U	11	U								
2-BUTANONE	UG/KG	11	U	10	U	11	U	11	U								
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	740	U	670	U	660	U	230	J	160	J	670	U	720	U	720	U
PYRENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
BENZO(GH)PERYLENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
INDENO(1,2,3-CD)PYRENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
BENZO(B)FLUORANTHENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
FLUORANTHENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
BENZO(K)FLUORANTHENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
CHRYSENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
BENZO(A)PYRENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
DIBENZO(A,H)ANTHRACENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
BENZO(A)ANTHRACENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
PHENANTHRENE	UG/KG	740	U	670	U	660	U	680	U	690	U	670	U	720	U	720	U
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	3.88	U	-	UJR												
PCB-1254	UG/KG	36.8	U	107	JN	-	UJR										
4,4'-DDT	UG/KG	3.88	U	142	JN	21.2	JN	-	JR								
ALPHA-CHLORDANE	UG/KG	1.9	U	4.4	JN	-	UJR										
GAMMA-CHLORDANE	UG/KG	1.9	U	3.81	JN	-	UJR	-	UJR	1.08	JR	-	JR	-	JR	-	JR
ENDRIN KETONE	UG/KG	3.88	U	-	UJR												
DIELDRIN	UG/KG	3.88	U	4.08	JN	-	UJR										
METHOXYCHLOR	UG/KG	19	U	-	UJR												
4,4'-DDD	UG/KG	3.88	U	40.4	JN	5.22	JN	-	JR								
4,4'-DDE	UG/KG	3.88	U	85.9	JN	12.2	JN	-	JR								
ENDRIN ALDEHYDE	UG/KG	3.88	U	-	UJR												
HERBICIDES																	
DALAPON	UG/KG	-		51.3	UJ	50.7	UJ	51.2	U	52	U	50.8	U	54.7	U	54.7	U
MCPP	UG/KG	-		29200		25400	U	25600	U	38700				27400	U	31500	U
2,4 DICHLOROPHENOXY ACETIC ACID	UG/KG	-		103	U	101	U	102	U	104	U	102	U	109	U	109	U
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	13.9	U	12.7	U	12.5	U	12.6	UJ	12.9	UJ	12.7	UJ	13.6	UJ	13.6	UJ
TFH GASOLINE	MG/KG	0.056	U	0.154		0.07		0.129		0.071		0.349		0.097		0.055	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	53		20	U	67		20	U	314		20	U	20	U

Table B12-2

Site12 (OU- 3): Summary of Detected Chemicals in Sediments and Surface/Near-Surface Soil

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STATION ID SAMPLE NUMBER SAMPLE DEPTH(FT.BGS) ANALYTE BY GROUP	UNITS	12_28L3 S1484201 (4)	DVF(a)	12_CBBE S1481030 (0)	DVF(a)	12_DB8 S1484188 (0)	DVF(a)	12_DD1 S1484188 (0)	DVF(a)	12_DD1 S1484194 (2)	DVF(a)	12_DD1 S1484191 (4)	DVF(a)	12_DD2 S1481075 (0)	DVF(a)	12_DD2 S1481076 (2)	DVF(a)	
GENERAL CHEMISTRY																		
CYANIDE	MG/KG	0.81		-		-		0.35	B	0.16	U	0.17	U	0.17	B	0.16	U	
METALS																		
SILVER	MG/KG	0.48	U	0.5	b	0.43	U	1.6	b	0.54	b	0.46	U	1.1	b	0.52	b	
ALUMINUM	MG/KG	22500		5520		7190		12200		6350		7230		15400		24200		
ARSENIC	MG/KG	3		2.9		4		4.8		3.5		1.9	b	6.3		4.5		
BARIUM	MG/KG	170		355		115		181		94.6		119		163		198		
BERYLLIUM	MG/KG	0.59	U	0.1	U	0.4	b	0.67	U	0.56	U	0.38	U	0.85	U	1.2	U	
CALCIUM	MG/KG	5600		2340		3730		4300		2650		2860		5160		15500		
CADMIUM	MG/KG	1.8		0.92	b	1.8		4.6	b	2.7		0.64	b	3.1		1.9		
COBALT	MG/KG	7.7	b	3.4	b	4.4	b	8.4	b	4.9	b	3.7	b	8.2	b	10.8	b	
CHROMIUM	MG/KG	19.4		7.1		11.1		35.7		10.7		8		23.3		22.2		
COPPER	MG/KG	12.2		9.2		9.4		43.8		16.7		8.7		25.7		17.7		
IRON	MG/KG	24100		8810		11100		17700		9780		11200		19700		29500		
MERCURY	MG/KG	1		1.3		0.03	U	0.18	U	0.05	U	0.03	U	0.27		0.07	U	
POTASSIUM	MG/KG	5850		1820		4050		3800		3270		3330		5280		7180		
MAGNESIUM	MG/KG	10300		2710		4040		5670		3590		4180		7530		15100		
MANGANESE	MG/KG	347		131		223		344		214		216		332		412		
SODIUM	MG/KG	305	b	181	U	236	b	258	b	228	b	226	b	266	b	294	b	
NICKEL	MG/KG	12.7		6.8	b	7.1	b	22.3		9.4		8.4	b	13.8		17.3		
LEAD	MG/KG	2.9		41.5		40.3		531		95.9		2.2		289		20.2		
SELENIUM	MG/KG	0.11	U	0.1	U	0.1	UJ	0.38	U	0.18	U	0.25	U	0.34	U	0.12	U	
THALLIUM	MG/KG	0.16	U	0.14	U	0.14	UJ	0.15	U	0.15	U	0.2	b	0.34	b	0.38	b	
VANADIUM	MG/KG	59.7		17.5		25.8		43.2		23.6		27.1		48.4		74.1		
ZINC	MG/KG	68.2		127		57.7		418		210		37.9		247		93.5		
VOLATILE ORGANIC COMPOUNDS																		
TOLUENE	UG/KG	11	U	8	J	8	J	4	J	3	J	11	U	8	J	11	U	
XYLENE (TOTAL)	UG/KG	11	U	10	U	10	U	10	U	11	U	11	U	10	U	11	U	
CARBON TETRACHLORIDE	UG/KG	11	U	10	U	10	U	6	J	11	U	11	U	11	U	11	U	
ACETONE	UG/KG	11	U	21		22	U	18		15		7	J	18		25		
METHYLENE CHLORIDE	UG/KG	11	U	35	B	10	U	10	U	11	U	11	U	27	U	16	U	
CARBON DISULFIDE	UG/KG	11	U	10	U	10	U	10	U	2	J	11	U	10	U	11	U	
2-BUTANONE	UG/KG	11	U	10	U	10	U	10	U	11	U	11	U	10	U	11	U	
SEMI-VOLATILE ORGANIC COMPOUNDS																		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	740	U	230	J	670	U	600	J	700	U	720	U	330	J	740	U	
PYRENE	UG/KG	740	U	670	U	1100		340	J	700	U	720	U	1400	U	740	U	
BENZO(GH)PERYLENE	UG/KG	740	U	670	U	340	J	680	U	700	U	720	U	1400	U	740	U	
INDENO(1,2,3-CD)PYRENE	UG/KG	740	U	670	U	440	J	180	J	700	U	720	U	1400	U	740	U	
BENZO(B)FLUORANTHENE	UG/KG	740	U	670	U	840		680	U	700	U	720	U	1400	U	740	U	
FLUORANTHENE	UG/KG	740	U	670	U	1300		360	J	700	U	720	U	1400	U	740	U	
BENZO(K)FLUORANTHENE	UG/KG	740	U	670	U	540	J	680	U	700	U	720	U	1400	U	740	U	
CHRYSENE	UG/KG	740	U	670	U	1000		290	J	700	U	720	U	1400	U	740	U	
BENZO(A)PYRENE	UG/KG	740	U	670	U	670		150	J	700	U	720	U	1400	U	740	U	
DIBENZO(A,H)ANTHRACENE	UG/KG	740	U	670	U	670	U	680	U	700	U	720	U	1400	U	740	U	
BENZO(A)ANTHRACENE	UG/KG	740	U	670	U	690	U	680	U	700	U	720	U	1400	U	740	U	
PHENANTHRENE	UG/KG	740	U	670	U	340	J	180	J	700	U	720	U	1400	U	740	U	
PESTICIDES AND PCBs																		
ENDOSULFAN SULFATE	UG/KG	-	UJR	0.474		16.8	U	-	UJR									
PCB-1254	UG/KG	-	UJR	33.4	U	-		2490	JN	0.632	JN	-	UJR	358	JN	-	UJR	
4,4'-DDT	UG/KG	-	UJR	418	D	145		3650	J	272	JN	-	UJR	1730	PCJN	72.3	JN	
ALPHA-CHLORDANE	UG/KG	-	UJR	2.59		8.67	U	78.5	JN	2.21	JN	-	UJR	-	UJR	-	UJR	
GAMMA-CHLORDANE	UG/KG	-	UJR	2.17		6.67	U	93.1	JN	-	UJR	-	UJR	-	UJR	-	UJR	
ENDRIN KETONE	UG/KG	-	UJR	3.34	U	16.8	U	-	UJR									
DIELDRIN	UG/KG	-	UJR	3.75		16.8	U	104	JN	-	UJR	-	UJR	-	UJR	-	UJR	
METHOXYCHLOR	UG/KG	-	UJR	17.2	U	66.7	U	-	UJR									
4,4'-DDD	UG/KG	-	UJR	54.6		26.2		1190	JN	27.7	JN	4.28	JN	199	JN	8.04	JN	
4,4'-DDE	UG/KG	-	UJR	203	D	129		281	JN	20.3	JN	-	UJR	236	JN	6.8	JN	
ENDRIN ALDEHYDE	UG/KG	-	UJR	-		16.8	U	85.6	JN	-	UJR	-	UJR	-	UJR	-	UJR	
HERBICIDES																		
DALAPON	UG/KG	56.4	U	-		-		51.7	UJ	135	J	55	UJ	51.7	UJ	56.8	UJ	
MCPP	UG/KG	28200	U	-		-		25900	U	26500	U	27500	U	25900	U	153000		
2,4 DICHLOROPHENOXY ACETIC ACID	UG/KG	113	U	-		-		140	U	106	U	110	U	103	U	114	U	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																		
TFH DIESEL	MG/KG	13.9	UJ	12.9	U	20.8		21.2		16.2		15.2		12.8	U	14.2	U	
TFH GASOLINE	MG/KG	0.056	U	0.102		0.051	U	0.278		0.061		0.055	U	0.178		0.057	U	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																		
TRPH	MG/KG	20	U	30		68		700		20	U	20	U	136		20	U	

Table B12-2

Site12 (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	12_DD2 S1451077 (4)	DVF(a)	12_DD3 S1451082 (9)	DVF(a)	12_DD3 S1451083 (2)	DVF(a)	12_DD3 S1451080 (4)	DVF(a)	12_DD3 S1451081 (4)	DVF(a)	12_DDX S1454527 (1)	DVF(a)	12_UGS S1454205 (9)	DVF(a)	12_UGS S1454210 (2)	DVF(a)
GENERAL CHEMISTRY																	
CYANIDE	MG/KG	0.2	U	0.15	U	0.17	U	0.16	U	0.16	U	0.16	U	-	-	-	-
METALS																	
SILVER	MG/KG	0.58	b	0.43	U	0.87	b	0.45	U	0.45	U	3.8	U	0.44	U	0.48	U
ALUMINUM	MG/KG	28200		4150		16200		7120		9690		2460		5650		17300	
ARSENIC	MG/KG	5.6		1.7	b	3.2		2	b	2.2		0.6	b	2	b	2.1	b
BARIUM	MG/KG	352		80.3		198		123		135		50.9		-		148	
BERYLLIUM	MG/KG	1.5		0.43	U	0.85	U	0.55	U	0.53	U	1.7		0.12	b	0.51	b
CALCIUM	MG/KG	14800		2220		4720		7590		6280		2950		7500		4210	
CADMIUM	MG/KG	2.3		1.3		1.3		0.7	b	0.82	b	2.7		0.88	b	1.5	
COBALT	MG/KG	11.7	b	2	b	8.6	b	4.6	b	4.6	b	2.1	b	4.6	b	6.9	b
CHROMIUM	MG/KG	24.7		6.9		15.1		7.4		10.2		9.5		6.2		15.9	
COPPER	MG/KG	20.1		9.2		10.5		5.6		6.7		6.2		6.7		9.6	
IRON	MG/KG	32200		6350		19900		12300		14000		3470		-		19000	
MERCURY	MG/KG	0.06	U	0.08	U	0.04	U	0.04	U	0.04	U	0.3		0.03	U	0.03	U
POTASSIUM	MG/KG	7970		2230		5110		3330		3490		1190		1540		4910	
MAGNESIUM	MG/KG	17500		2300		7690		4870		5620		1310		3390		7570	
MANGANESE	MG/KG	455		117		307		211		234		57.8		242		293	
SODIUM	MG/KG	414	b	182	b	240	b	215	b	239	b	170	b	-		275	b
NICKEL	MG/KG	18.1		4.1	b	10.8		5.1	b	5.3	b	84.2		16.2		10.6	
LEAD	MG/KG	12.4		36.3		3.8		1.7		4.2		17		4.4		2.3	
SELENIUM	MG/KG	0.13	U	0.18	U	0.29	U	0.11	U	0.11	U	0.1	U	0.11	U	0.12	U
THALLIUM	MG/KG	0.34	b	0.14	U	0.2	b	0.17	b	0.23	b	0.14	U	0.15	U	0.18	b
VANADIUM	MG/KG	60.5		14.9		45.9		26.8		34.1		800		29.8		47.9	
ZINC	MG/KG	106		52.2		58.1		37		43.6		48.3		-		53.6	
VOLATILE ORGANIC COMPOUNDS																	
TOLUENE	UG/KG	12	U	10		11	U	11	U	3	J	10	U	-		-	
XYLENE (TOTAL)	UG/KG	12	U	10	U	11	U	11	U	11	U	2	J	-		-	
CARBON TETRACHLORIDE	UG/KG	12	U	10		11	U	11	U	11	U	10	U	-		-	
ACETONE	UG/KG	12	U	35		11	U	22		18		39	U	-		-	
METHYLENE CHLORIDE	UG/KG	18	U	30	U	13	U	11	U	11	U	24	B	-		-	
CARBON DISULFIDE	UG/KG	12	U	10	U	11	U	11	U	11	U	10	U	-		-	
2-BUTANONE	UG/KG	12	U	10	U	11	U	11	U	11	U	10	U	-		-	
SEMI-VOLATILE ORGANIC COMPOUNDS																	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	810	U	670	U	720	U	710	U	700	U	20000	U	-		-	
PYRENE	UG/KG	810	U	730		720	U	710	U	700	U	20000	U	-		-	
BENZO(GH)PERYLENE	UG/KG	810	U	870	U	720	U	710	U	700	U	20000	U	-		-	
INDENO(1,2,3-CD)PYRENE	UG/KG	810	U	150	J	720	U	710	U	700	U	20000	U	-		-	
BENZO(B)FLUORANTHENE	UG/KG	810	U	930		720	U	710	U	700	U	20000	U	-		-	
FLUORANTHENE	UG/KG	810	U	1700		720	U	710	U	700	U	20000	U	-		-	
BENZO(K)FLUORANTHENE	UG/KG	810	U	550	J	720	U	710	U	700	U	20000	U	-		-	
CHRYSENE	UG/KG	810	U	940		720	U	710	U	700	U	20000	U	-		-	
BENZO(A)PYRENE	UG/KG	810	U	210	J	720	U	710	U	700	U	20000	U	-		-	
DIBENZO(A,H)ANTHRACENE	UG/KG	810	U	130	J	720	U	710	U	700	U	20000	U	-		-	
BENZO(A)ANTHRACENE	UG/KG	810	U	670	U	720	U	710	U	700	U	20000	U	-		-	
PHENANTHRENE	UG/KG	810	U	590	J	720	U	710	U	700	U	20000	U	-		-	
PESTICIDES AND PCBs																	
ENDOSULFAN SULFATE	UG/KG	-	UJR	101	U	-		-									
PCB-1254	UG/KG	-	UJR	47.7	JN	-	UJR	-	UJR	-	UJR	1010	U	-		-	
4,4'-DDT	UG/KG	71.2	JN	119	JN	20.2	JN	11.3	JN	-	UJR	195	-	-		-	
ALPHA-CHLORDANE	UG/KG	-	UJR	52.1	U	-		-									
GAMMA-CHLORDANE	UG/KG	-	UJR	23.7	-	-		-									
ENDRIN KETONE	UG/KG	-	UJR	133	-	-		-									
DIELDRIN	UG/KG	-	UJR	101	U	-		-									
METHOXYCHLOR	UG/KG	-	UJR	175	-	-		-									
4,4'-DDD	UG/KG	7.78	JN	26	JN	-	UJR	-	UJR	-	UJR	103	-	-		-	
4,4'-DDE	UG/KG	6.2	JN	69.6	JN	4.12	JN	-	UJR	-	UJR	108	-	-		-	
ENDRIN ALDEHYDE	UG/KG	-	UJR	101	U	-		-									
HERBICIDES																	
OALAPON	UG/KG	62.1	UJ	65.1	J	91.1	J	54.3	UJ	53	UJ	511	UJ	-		-	
MCPP	UG/KG	31100	U	25400	U	27400	U	27100	U	26500	UJ	255000	UJ	-		-	
2,4 DICHLOROPHENOXY ACETIC ACID	UG/KG	124	U	102	U	110	U	108	U	106	UJ	1020	UJ	-		-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH DIESEL	MG/KG	15.3	U	25.9		13.7	U	17.7		13.2	U	1970		65.4		86.8	
TFH GASOLINE	MG/KG	0.179		0.244		0.081		0.154		0.088		24.7		0.062		0.058	U
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	20	U	106		20	U	45		20	U	42529		6770		20	U

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

Table B12-3

Site12 (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	12_25B210 S1456407 (5)	DVF(a)	12_25B210 S1456408 (10)	DVF(a)	12_25B210 S1456410 (20)	DVF(a)	12_25B210 S1456411 (25)	DVF(a)	12_DBMW48 S1456199 (5)	DVF(a)	12_DBMW48 S1456195 (10)	DVF(a)	12_DBMW48 S1456197 (15)	DVF(a)	12_DBMW48 S1457104 (15)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		-		-	
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		-		-		-	
METALS																	
SILVER	MG/KG	2	b	0.52	U	0.48	U	0.61	b	0.71	b	0.52	U	0.45	U	0.44	U
ALUMINUM	MG/KG	18700		15000		7330		12100		6690		16000		7890		4250	
ARSENIC	MG/KG	5.3		3.8		1.9	b	2.1	b	2.3	U	2.4	U	1.1	U	0.87	U
BARIUM	MG/KG	181		211		68.3		85.5		108		231		116		77.6	
BERYLLIUM	MG/KG	0.53	b	0.59	b	0.31	b	0.36	b	0.5	U	0.97	U	0.42	U	0.26	U
CALCIUM	MG/KG	5890		11500		2900		6130		3390		13400		8120		33400	
CADMIUM	MG/KG	2		1.3		1.2		1.6		0.97	b	1.2	b	0.72	b	1.4	
COBALT	MG/KG	7.8	b	9.2	b	4.4	b	5	b	4.2	b	8.8	b	2.8	b	2.1	b
CHROMIUM	MG/KG	19.3		15.2		8.5		12.1		11.2		15.9		10.3		4.5	
COPPER	MG/KG	17.2		12		6.7		7		12.7		12.4		4.9	b	3.1	b
IRON	MG/KG	21700		21000		9540		13700		9490		20200		10300		5860	
MERCURY	MG/KG	0.04	U	0.03	U	0.03	U	0.03	U	0.06	U	0.03	U	0.03	U	0.03	U
POTASSIUM	MG/KG	5520		5930		2130		2060		3500		5770		2720		1710	
MAGNESIUM	MG/KG	8200		10800		3560		4940		3620		12500		4590		3280	
MANGANESE	MG/KG	350		353		199		236		202		331		199		122	
SODIUM	MG/KG	339	b	501	b	326	b	386	b	188	b	728	b	278	b	226	b
NICKEL	MG/KG	11.3		10.1		5.3	b	6.5	b	7.1	b	11.7		7.1	b	5	b
LEAD	MG/KG	10.3		2.8		2.3		2.4		16.3		2		0.84		0.58	b
ANTIMONY	MG/KG	3.1	U	3	U	2.8	U	2.8	U	2.7	U	3.9	b	2.6	U	2.9	b
THALLIUM	MG/KG	0.3	b	0.4	b	0.27	b	0.16	U	0.15	U	0.35	b	0.22	b	0.15	b
VANADIUM	MG/KG	52.1		54.4		23.5		34.5		21.5		51.6		26		15.9	
ZINC	MG/KG	82.7		68.1		29.3		38.9		54		67.1		29		19.8	
VOLATILE ORGANIC COMPOUNDS																	
ACETONE	UG/KG	11	U	14	U	3	J	11	U	12	U	12	U	11	U	11	U
2-BUTANONE	UG/KG	11	U	14	U	12	U	11	U	3	J	3	J	6	J	5	J
SEMIVOLATILE ORGANIC COMPOUNDS																	
DI-N-OCTYL PHTHALATE	UG/KG	740	U	940	U	800	U	330	J	710	U	780	U	710	U	700	U
PESTICIDES AND PCBs																	
4,4'-DDT	UG/KG	29.1		4.73	U	3.97	U	3.65	U	3.59	UJ	3.95	UJ	3.58	UJ	3.51	UJ
4,4'-DDE	UG/KG	24.4		4.73	U	3.97	U	3.65	U	3.59	UJ	3.95	UJ	3.58	UJ	3.51	UJ
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.056	U	0.071	U	0.061	U	0.055	U	0.054	U	0.06	U	0.054	U	0.053	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 B12-3

Site12 (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	12_DBMW48 S1456193 (20)	DVF(a)	12_DBMW48 S1456192 (28)	DVF(a)	12_DBMW48 S1456190 (30)	DVF(a)	12_DBMW48 S1456191 (40)	DVF(a)	12_DBMW48 S1456189 (95)	DVF(a)	12_DBMW48 S1456198 (100)	DVF(a)	12_UGMW31 S1456196 (100)	DVF(a)	12_UGMW31 S1456194 (125)	DVF(a)
GENERAL CHEMISTRY																	
TOTAL ORGANIC CARBON	MG/KG	-		-		-		-		-		-		100	J	418	J
TOTAL ORGANIC CARBON	MG/KGW	-		-		-		-		-		104		-		-	
METALS																	
SILVER	MG/KG	0.7	b	0.47	U	0.47	U	0.5	U	0.46	U	-		0.49	UJ	-	
ALUMINUM	MG/KG	15100		4570		4780		11200		2420		-		6530		-	
ARSENIC	MG/KG	2.5	U	1.4	U	1.1	U	2.1	U	0.86	U	-		1.2	b	-	
BARIUM	MG/KG	154		86.4		55.9		170		43	b	-		51.9		-	
BERYLLIUM	MG/KG	0.76	U	0.53	U	0.47	U	0.62	U	0.29	U	-		0.31	b	-	
CALCIUM	MG/KG	4850		2940		1310		4200		1690		-		2380		-	
CADMIUM	MG/KG	1.7		0.83	b	0.52	b	0.73	b	0.31	b	-		0.96	b	-	
COBALT	MG/KG	6.1	b	2.3	b	4.1	b	4.9	b	1.3	U	-		1.4	UJ	-	
CHROMIUM	MG/KG	18		6.2		9.8		15.2		4.1		-		6		-	
COPPER	MG/KG	9.4		4.6	b	4.5	b	9.1		4.4	b	-		3.6	b	-	
IRON	MG/KG	17300		6520		6210		18000		4190		-		6800		-	
MERCURY	MG/KG	0.03	U	0.03	U	0.03	U	0.33	U	0.03	U	-		0.03	U	-	
POTASSIUM	MG/KG	4540		1570		1120	b	5990		1060	b	-		1400		-	
MAGNESIUM	MG/KG	7810		2510		1620		6430		1200		-		1860		-	
MANGANESE	MG/KG	281		154		256		192		51.3		-		115		-	
SODIUM	MG/KG	490	b	378	b	457	b	849	b	224	b	-		301	b	-	
NICKEL	MG/KG	15.8		5.5	b	8.4	b	9.9		3.1	b	-		6	b	-	
LEAD	MG/KG	2		1.6		1.8		2.6		3.8		-		1.9		-	
ANTIMONY	MG/KG	2.9	U	2.7	U	2.7	U	2.9	U	2.7	U	-		2.8	U	-	
THALLIUM	MG/KG	0.27	b	0.16	U	0.25	b	0.21	b	0.15	U	-		0.19	b	-	
VANADIUM	MG/KG	45		16.8		14.2		44.5		10.6	b	-		18		-	
ZINC	MG/KG	52.9		22.3		15.1		55.9		16.3		-		17.8		-	
VOLATILE ORGANIC COMPOUNDS																	
ACETONE	UG/KG	24	UJ	13	U	52	U	14	U	56	U	110	U	69	U	30	U
2-BUTANONE	UG/KG	6	J	3	J	3	J	3	J	2	J	4	J	11	U	11	U
SEMI-VOLATILE ORGANIC COMPOUNDS																	
DI-N-OCTYL PHTHALATE	UG/KG	760	U	730	U	750	U	780	U	720	U	-		730	U	-	
PESTICIDES AND PCBs																	
4,4'-DDT	UG/KG	3.84	UJ	3.65	UJ	-		3.85	UJ	-		3.98	UJ	3.68	U	-	
4,4'-DDE	UG/KG	3.84	UJ	3.65	UJ	-		3.85	UJ	-		3.98	UJ	3.68	U	-	
TOTAL FUEL HYDROCARBONS (DIESEL AND GASOLINE)																	
TFH GASOLINE	MG/KG	0.113		0.055	U	0.057	U	0.058	U	0.054	U	-		0.056	U	-	
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS (TRPH)																	
TRPH	MG/KG	192		20	U	56		77		20	U	-		20	U	-	

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

Table B12-4
Site 12 (OU-3): Well Construction Details
MCAS El Toro Phase I RI Technical Memorandum

Sheet 1 of 1

Item	Station Identification	
	12_DBMW48	12_UGMW31
Survey Location--Northing	594213.50	549259.70
Survey Location--Easting	1545490.30	1546158.98
Ground Surface Elevation (ft above MSL ^a)	247.14	255.97
Measuring Point Elevation (ft above MSL ^a)	247.81	255.82
Measuring Point Location	Top of casing	Top of casing
Type of Surface Completion	Above ground	Below ground
Casing Diameter and Material	4-inch PVC	4-inch PVC
Screen Diameter and Material	4-inch stainless steel	4-inch stainless steel
Screen Interval (ft bgs ^b)	95-135	105-145
Length of Drop Pipe (ft bgs ^b)	132	140
Make and Model of Installed Pump	2-inch Grundfos Rediflow	Grundfos 10e-11
Date of Pumping Test	6 November 1992	8 October 1992
Date of Water Quality Sampling	10 December 1992	8 October 1992
^a Mean sea level ^b Below ground surface		

**Table B12-5
Site 12 (OU-3): Summary of Hydraulic Parameters
MCAS El Toro Phase I RI Technical Memorandum**

Sheet 1 of 1

Well Identification	Type of Test	Analysis Method	Transmissivity (ft²/day)	Hydraulic Conductivity (ft/day)	Storage Coefficient^a	Leakance Factor^a
12_DBMW48	Slug	B & R/CBP	380	9.7	1E-05	NA
12_UGMW31	Pump	C-J; Pumping	170	4.3	NA	NA

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

Table B12-6
Site12 (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	12_DBMW48 S1452074 (95-135)	DVF(e)	12_UGMW31 S1452077 (105-148)	DVF(f)
GENERAL CHEMISTRY							
ALKALINITY AS CaCO3	NA	NA	MG/L	183		188	
BICARBONATE	NA	NA	MG/L	199		229	
CHLORIDE	3	250	MG/L	401		211	
SULFATE	3	250	MG/L	549		283	
TOTAL DISSOLVED SOLIDS	3	500	MG/L	1800		1100	
NITRATE/NITRITE-N	1	10	MG/L	22.9		22.5	J
CARBONATE	NA	NA	MG/L	-		-	
METALS							
ALUMINIUM	3	50	UG/L	34.6	J	60.2	b
BARIUM	2	2000	UG/L	26.7	b	27.6	b
CALCIUM	NA	NA	UG/L	316000		177000	
CADMIUM	2	5	UG/L	2	b	1.2	U
IRON	3	300	UG/L	101		20.6	b
MERCURY	2	2	UG/L	0.1	b	0.1	U
POTASSIUM	NA	NA	UG/L	2940	b	2510	b
MAGNESIUM	NA	NA	UG/L	79000		50700	
MANGANESE	3	50	UG/L	22.3		33.4	
SODIUM	NA	NA	UG/L	110000		77100	
NICKEL	NA	NA	UG/L	120		12.1	b
ANTIMONY	NA	NA	UG/L	18	b	22.2	b
SELENIUM	1	10	UG/L	56.7		20.5	
VANADIUM	NA	NA	UG/L	15.3	b	14.9	b
ZINC	2	5000	UG/L	2.5	U	5.4	b
VOLATILE ORGANIC COMPOUNDS							
TETRACHLOROETHENE	2	5	UG/L	18		1	U
CARBON TETRACHLORIDE	1	0.5	UG/L	0.5	J	1	U
CHLOROFORM	2	100	UG/L	1	U	0.4	J
CHLOROMETHANE (METHYL CHLORIDE)	NA	NA	UG/L	2	J	2	U
TRICHLOROETHYLENE	2	5	UG/L	0.8	J	7	
HERBICIDES							
DICHLOROPROP	NA	NA	UG/L	0.5	U	6.41	
DICAMBA	NA	NA	UG/L	0.5	U	4.39	
DALAPON	NA	NA	UG/L	0.5	U	2.48	J
MCPP	NA	NA	UG/L	250	U	3530	
2,4,5-TP (SILVEX)	NA	NA	UG/L	0.25	U	2.67	
2,4,5-T	NA	NA	UG/L	0.25	U	2.51	
MCPA	NA	NA	UG/L	250	U	3490	
2,4 DICHLOROPHENOXY ACETIC ACID	2	70	UG/L	0.5	U	8.58	
2,4-DB	NA	NA	UG/L	0.5	U	2.88	J

(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 B12-7
Site 12 (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	Concentration	Regulatory Level ^c	Regulatory Code ^d
12_UGMW31	(105-145)	Trichloroethylene	µg/L	7	5	1
		Aluminum	µg/L	60.2	50	3
		Selenium	µg/L	20.5	10	2
		Nitrate/Nitrite-N	mg/L	22.5	10	2
		Sulfate	mg/L	263	250	3
		Total Dissolved Solids	mg/L	1,000	500	3
12_DBMW48	(95-135)	Carbon Tetrachloride	µg/L	0.5	0.5	2
		Tetrachloroethene	µg/L	18	5	1
		Chloride	mg/L	401	250	3
		Nitrate/Nitrite-N	mg/L	22.9	10	2
		Sulfate	mg/L	549	250	3
		Total Dissolved Solids	mg/L	1800	500	3
		Selenium	µg/L	56.7	10	2

^aCalifornia Department of Toxic Substances Control

^bScreen interval (feet below ground surface)

^cThe 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.

^dRegulatory 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 B13

**Nature and Extent of Contamination:
Site 13 (OU-3) — Oil Change Area**

Appendix B13
NATURE AND EXTENT OF CONTAMINATION:
SITE 13 (OU-3) - OIL CHANGE AREA

This discussion of Site 13 is supplemented by the figures and data tables listed below. The figures begin on page B13-3, and the tables are grouped at the end of this Appendix B13. Field headspace values for soils at this site are presented in Table BA1-13, in Attachment 1 to Appendix B (directly following Appendix B22).

Figure B13-1: (Site Map)

Figure B13-2: Geologic Cross Section

Table B13-1: Types of Samples and Chemical Analyses

Table B13-2: Summary of Detected Chemicals in Sediments and Surface/Near Surface Soil

Table B13-3: Summary of Detected Chemicals in Vadose Zone (Subsurface) Samples

Table B13-4: Well Construction Details

Table B13-5: Summary of Hydraulic Parameters

Table B13-6: Summary of Detected Chemicals in Groundwater Samples

Table B13-7: Analyte Concentrations in Groundwater Exceeding Regulatory Standards or DTSC Action Levels

B13.1 Site Description

Site 13 (OU-3), the Oil Change Area, is located southeast of Building 242, outside the fuel tank storage area (Tank Farm No. 2). The site consists of two strata:

- Stratum 1: The area to the southeast of the tank farm fence
- Stratum 2: The area between the tank farm and Building 242

At Stratum 1, about 7,000 gallons of waste crankcase oil were drained from heavy equipment onto the ground from 1977 to 1983. Oil-contaminated surface soil was subsequently scraped up and piled at the north end of the site. Presently, there are no visible signs of contamination, although past investigators have noted staining on the ground. This area initially constituted the only sampling stratum at Site 13. After a study of historical aerial photographs identified several additional stained areas between the tank farm and Building 242 during 1952 to 1986, Stratum 2 was added to Site 13 to

encompass the newly discovered stained areas. The addition of Stratum 2 is documented in the *SAP Amendment*.

Two of the underground tanks at Tank Farm No. 2 were investigated by the RFA Sampling Visit recently completed at the Station. The RFA investigation consisted of drilling four angle borings at two waste oil tanks and collecting soil samples every 10 feet, to a down-hole depth of 60 feet. The RFA did not detect elevated hydrocarbons or VOCs at the two tanks.

B13.2. Suspected Waste Types and Contaminants

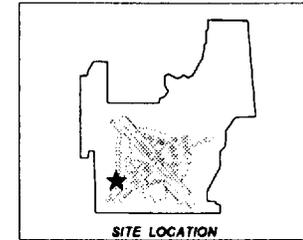
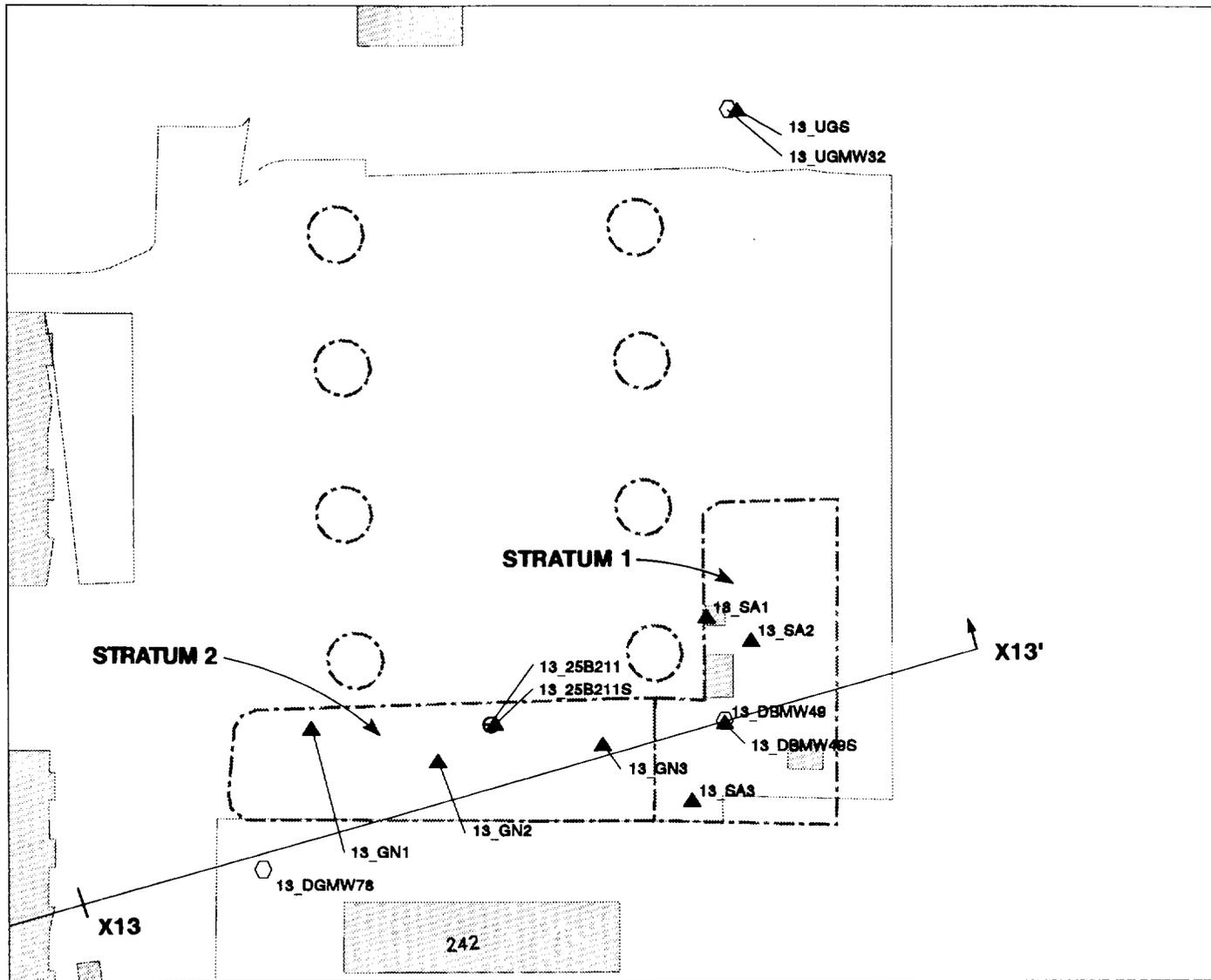
Contaminants under investigation at Site 13 are VOCs and SVOCs, petroleum compounds, and heavy metals. Metals are typically found in waste crankcase oils because friction within the engine causes them to accumulate in the lubricating oil. PCBs are also a suspected contaminant, because transformer oils containing PCB may also have been disposed of at this site.

B13.3 Field Investigation

As described in the *SAP Amendment*, the field investigation at Site 13 consisted of drilling and sampling one upgradient well (13_UGMW32), one downgradient well (13_DGMW78), and one deep boring within the site boundaries that was completed as a well (13_DBMW49). In addition, one 25-foot boring was drilled, and surface and near-surface soil samples were collected. Sampling stations, depths of sampling, and types of analyses requested are in Table B13-1. Sample locations are shown in the site map, Figure B13-1.

B13.3.1 Surface Water and Sediments

(No surface water or sediment samples were collected at this site.)



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

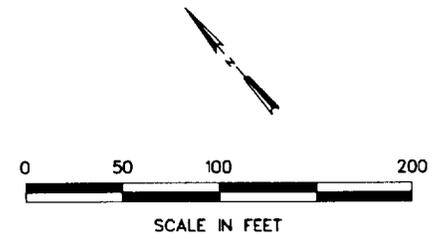


FIGURE B13-1

SITE 13 (OU-3): OIL CHANGE AREA

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