

M60050.001028 MCAS EL TORO SSIC # 5090.3	PROJECT NOTE NO. PN-0145-66 CLE-C01-01F145-I2-0054	PROJECT NO. 01-F145-H6  <i>M60050.001028</i>
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CONFIRMATION OF:	CONFERENCE      X TELECOM OTHER	DATE HELD	17 December 1992
		DATE ISSUED	24 December 1992
		RECORDED BY	Charles Flagg/CH2M HILL
		PLACE	MCAS El Toro
SUBJECT                      Marine Corps Air Station El Toro Remedial Investigation/Feasibility Study (RI/FS) Technical Review Committee Meeting Minutes			

**PARTICIPANTS: (\* DENOTES PART-TIME ATTENDANCE)**  
 See Page 5

ACTION REQ'D. BY	ITEM
	<p>A Technical Review Committee (TRC) meeting was held on 17 December 1992 from 1300 to 1500 hours at Marine Corps Air Station (MCAS) El Toro with representatives from MCAS El Toro; Naval Facilities Engineering Command, Southwest Division (SOUTHWESTDIV); U.S. Environmental Protection Agency (EPA); U.S. Fish &amp; Wildlife Service; Cal-EPA, Department of Toxic Substances Control (DTSC); Regional Water Quality Control Board (RWQCB), Santa Ana Region; City of Irvine; Irvine Ranch Water District (IRWD); The Irvine Company; Woodbridge Village Association; Jacobs Engineering Group Inc. (JEG); Bechtel Corporation; and CH2M HILL. These meeting minutes provide a summary of agenda items discussed; a copy of the agenda is attached.</p> <p><b>INTRODUCTION</b></p> <p>Wayne Lee/MCAS El Toro Facility Management Department provided opening remarks in lieu of Col Ron Lard/MCAS El Toro who was unable to attend the meeting. W. Lee then facilitated introductions of all TRC meeting participants followed by a brief overview of planned agenda topics.</p> <p><b>IRVINE DESALTER PROJECT</b></p> <p>LCDR Larry Serafini/MCAS El Toro Environmental Department presented the following Irvine Desalter Project schedule:</p> <ul style="list-style-type: none"> <li>o Commence Facility Design                      1 July 1993</li> <li>o Facility Design Complete                      1 March 1994</li> <li>o Start Facility Construction                      1 July 1994</li> <li>o Facility Operational                      1 October 1995</li> </ul>



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ACTION  
REQ'D. BY

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LCDR Serafini indicated that the status of the Irvine Desalter Project groundwater wells are as follows:

- o Well No. 1 is completed and is scheduled for pump testing in January 1993.
- o Well No. 2 construction is underway (a temporary easement has been granted to the Orange County Water District [OCWD] by MCAS El Toro) immediately adjacent to the MCAS El Toro Officer's Club.
- o Well No. 3 is under review for a title search to support a county road easement.
- o Well No. 4 is under negotiation and is the proposed site of the desalter plant.

LCDR Serafini also stated that OCWD is reevaluating its data and will provide additional documentation and an update to the Engineering Service Report for the Irvine Desalter Project. The additional documentation has been requested for review to ensure that the OCWD's data meets the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); such as public participation. LCDR Serafini indicated that an independent evaluation of cost sharing by the Navy, will be prepared to support requirements of the Federal Acquisition Requirements (FAR).

The first in a proposed series of community relations informational flyers (attached) that provide an update of the environmental investigation at MCAS El Toro was provided to meeting attendees. This flyer was also distributed to everyone on the current Community Relations Plan mail list.

**RI/FS PHASE I UPDATE**

Sylvia Ross/CH2M HILL presented a progress summary of the RI/FS on-Station sites that are potentially associated with the contaminated groundwater plume. Environmental field work began in May 1992 following construction of temporary site facilities for office trailers, drilling equipment, and waste handling.

S. Ross stated that installing and sampling monitoring wells generates wastewater and drill cuttings (soils). Solids from these operations are held in bins prior to chemical testing. Nearly 100 of the soil holding bins have been analyzed to date. None of the waste in the bins has been classified as hazardous. The hazardous soil is disposed in lined "burrietos" in two bermed areas on top of Site 5, Perimeter Road Landfill. One of the bermed burrieto beds holds clean soil and one stores designated soil. In the event that hazardous soil is detected, it will be transported off-Station to a landfill that accepts hazardous waste.

Background wells were drilled first. These wells are not located at suspected hazardous waste sites and serve as on-Station groundwater monitoring wells. After consultation with the Navy, it was decided to install dedicated pumps in all wells in order to provide for more cost-effective future sampling. An additional 20 feet of screen has been added to most wells to compensate for the fluctuation in water level expected from the desalter wells. Several of the proposed well sites were relocated when it was determined that the groundwater flow was different than expected. S. Ross provided a Summary of Well and Boring Status (attached).

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	<p>Site 17 wells, Communication Station Landfill, will be drilled in January 1993. The area bedrock is porous and permeable. Installation of these wells had been delayed pending completion of a seismic survey, however it has been decided that two downgradient wells should be drilled immediately and evaluate the need for the seismic survey at a later date.</p> <p>Hand auger borings (shallow borings) were planned to be initiated to 6 inches and then continue to 4 feet if contamination was detected at 2 feet. Many hand auger borings were completed to 4 feet and soil samples from that depth were tested. Sediment and background soil sediment sampling has been completed. Field crews are currently conducting background soil sampling for herbicides and pesticides on-Station.</p> <p>Surface water samples were taken at 16 sites that are basically the same locations from which sediment samples were taken. During the early December 1992 rains, nearly 600 bottles of surface water runoff samples were collected. These samples are being analyzed for a wide variety of parameters.</p> <p><u>FINDINGS (TCE)</u></p> <p>S. Ross stated that preliminary analysis of primarily development soil and wastewater has detected TCE at the following locations:</p> <ul style="list-style-type: none"> <li>o Site 2 (Magazine Road Landfill) - One surface sediment sample detected 3 parts per billion (ppb) (trace quantity).</li> <li>o Site 9 (Crash Crew Pit No. 1) - Groundwater monitoring well 45 contained 120 ppb; no detects in the soil samples. This level of contamination was expected because similar levels of TCE were indicated in previous sampling episodes.</li> <li>o Monitoring Well 23, located off-Station - Detected 6 ppb (trace quantity) in groundwater.</li> <li>o Monitoring Well 8, also off-Station - Detected 3 ppb (trace quantity) in groundwater.</li> <li>o Monitoring Well 4B; near Site 12 (Sludge Drying Beds) - Preliminary detection of 5 ppb in development water. Final groundwater sampling contaminant levels are expected to be higher.</li> </ul> <p>No additional TCE contamination has been indicated in laboratory analyses received to date; however, many of the remaining data to be received are for groundwater sampling. Final laboratory data will not be available for 2 to 4 months. Thus far the source of the TCE contamination has not been found, although preliminary findings tend to support previous studies that indicate the aircraft overhaul area as a possible source. S. Ross indicated that growth of the TCE plume has not been determined, however there are indications that the plume may be enlarging to the north near The Irvine Company (TIC) Well 3. Multi-port Well 10 is currently being installed to greater than 1,000 feet and will serve as a early warning should the plume continue to expand.</p>



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It was noted that any significant findings from the laboratory data will be provided to the TRC as soon as they become available. The data provided to the TRC will most likely be in the form of a summary due to the large volume of data. A final decision on the format has not been made.

Video cameras were lowered into several of the groundwater monitoring wells to determine if the screened intervals were properly placed and if well development was complete. The video tapes have been retained. The video tapes of about on third of the wells, revealed the presence of air bubbles (possibly naturally occurring methane gas) emanating from an undetermined source at a depth of less than 130 feet.

Field sediment and shallow boring sampling determinations and laboratory analyses at Agua Chion and Bee Canyon washes indicate the presence of high levels of volatile organic compounds (VOCs) including benzene, but no TCE.

**TEAMBUILDING**

LCDR Serafini reviewed the following revised Federal Facilities Agreement (FFA) schedules:

**OPERABLE UNIT 1 (OU-1)**

- o Phase I Technical Memorandum 7 May 1993
- o Draft Phase II Work Plan 9 August 1993
- o Draft RI Report 30 December 1994
- o Draft FS Report 23 March 1995
- o Draft Proposed Plan 23 June 1995
- o Draft Record of Decision 29 December 1995

**OPERABLE UNITS 2 & 3 (OU-2 & OU-3)**

- o Phase I Technical Memorandum 7 May 1993
- o Draft Phase II Work Plan 9 August 1993
- o Draft RI Report 2 January 1995
- o Draft FS Report 1 June 1995
- o Draft Proposed Plan 1 September 1995
- o Draft Record of Decision 12 March 1996

LCDR Serafini presented an overview of the Data Quality Objectives (DQO) process that resulted from meetings held in November 1992. The interrelationship of the DQO process is graphically illustrated on the attached figure. The DQO process is designed to provide a systematic approach to evaluation of each site. DQO use will facilitate quicker response on a site by site basis rather than waiting for the completion the final work plan.

LCDR Serafini stated that the project team is in the process of producing a graphic plan that visually illustrates the objectives and assignments for remediating contamination at MCAS El Toro. The graphic plan begins with a statement of the overall mission of the project and radiating outward to define the actions necessary to accomplish the mission. LCDR Serafini will provide copies of the graphic plan at the next TRC meeting.



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**OPEN DISCUSSION**

The next public meeting is tentatively being scheduled to occur after completion of the Phase I Technical Memorandum. LCDR Serafini will obtain a copy of the regional map showing MCAS El Toro and surrounding community groundwater monitoring well locations.

**Attendees**

John Hamill/EPA	Carol Roberts/USF&WS
Manny Alonzo/DTSC	Claire Best/DTSC
John Broderick/RWQCB	Andy Piszkin/Code 1812.AP
Desire Chandler/Code 1812.DC	Jeff Allen/Code 0231.JA
LCDR Larry Serafini/MCAS El Toro	Capt Tom Christensen/MCAS El Toro
Wayne Lee/MCAS El Toro	Chrisa Mitchell/MCAS El Toro
Arthur Chasin/MCAS El Toro	Ann Dotson/MCAS El Toro
Charlene Gallina-Siri/City of Irvine	William Mavity/Woodbridge Village Asso.
Mike Padian/Irvine Company	Robert McVicker/IRWD
Sebastian Tindall/Bechtel Corp.	Ed Baquerizo/Bechtel Corp.
Amir Matin/JEG-Pas	John Dolegowski/CH2M HILL
Bill Avolio/CH2M HILL	Sylvia Ross/CH2M HILL
Mike Arends/CH2M HILL	Chuck Elliott/CH2M HILL
Davi Richards/CH2M HILL	Charles Flagg/CH2M HILL

**Nonattendee Distribution**

R. Green/Code 0232.RG	File - PMO
M. Nuzum/Code 1812.MN	File - CTO Notebook/PMO
K. Tomeo/CH2M HILL	File - CH2M HILL
J. Robertson/CH2M HILL	

*Handwritten signature*



# UPDATE OF THE ENVIRONMENTAL INVESTIGATION AT MARINE CORPS AIR STATION EL TORO

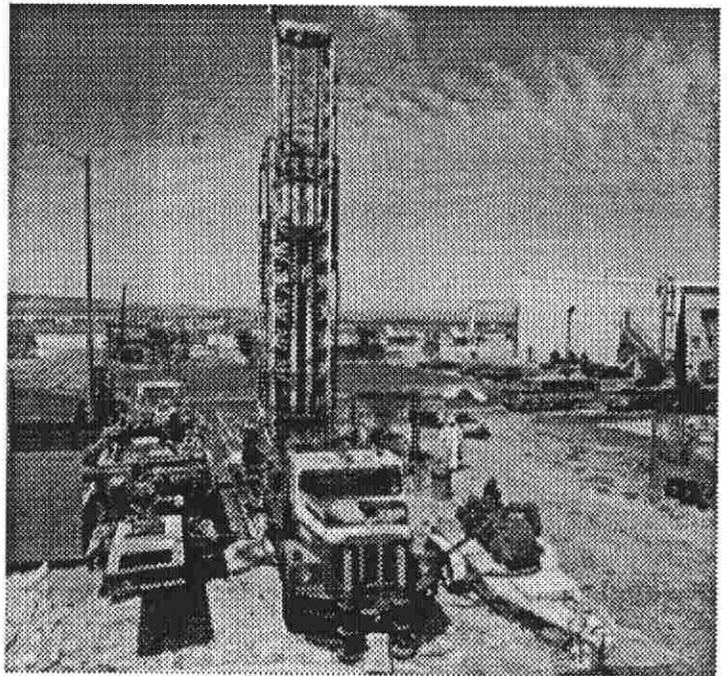
December 1992

This flyer describes the ongoing investigation of hazardous waste contamination at Marine Corps Air Station (MCAS) El Toro under the Department of Defense's Installation Restoration Program. This is one in a series of informational flyers that will be issued periodically throughout the remediation process. Future flyers will provide information concerning the progress of remediation activities at MCAS El Toro. If you have any questions or comments, would like to be put on the mailing list to receive fact sheets and other information, or would like someone to make a presentation to your group, please contact Chrisa Mitchell, MCAS El Toro, 714/726-6607. Copies of documents relating to the environmental remediation are on file and can be reviewed at the information repositories located at the MCAS El Toro Library and Heritage Park Regional Library.

In February 1992, the Navy began field work for Phase I of the Remedial Investigation/Feasibility Study (RI/FS) for Marine Corps Air Station (MCAS) El Toro. The purpose of the RI is to locate the source(s) and characterize the extent of groundwater contamination (consisting of solvents) in the vicinity of the Station and to test for the presence of contaminants at 22 identified hazardous waste sites at MCAS El Toro. During the FS, alternatives for remediating site contamination will be identified and evaluated. Field work includes installing and sampling groundwater monitoring wells, analyzing shallow surface soil borings, and taking sediment and surface water samples. Since May 1992, more than 100 monitoring wells have been installed. As of December 11, the well

drilling is approximately 98 percent completed, shallow soil sampling is more than 95 percent completed, and sediment sampling is 100 percent complete. The third round of surface water sampling was taken during the first major rainstorm this December.

Installing and sampling monitoring wells generates wastewater and drill cuttings (soil). The wastewater produced during drilling operations is treated and reused as irrigation water for the Station's golf course. Suspended solids are removed from the wastewater using lime addition and gravity settling, and pH is adjusted to neutral using acid. The resulting clear water is then pumped through three granular-activated carbon units to remove any contamination before reuse. Approximately 900,000 gallons of groundwater and wastewater has been treated and reused.



One of nine drilling rigs used to install more than 100 groundwater monitoring wells on and adjacent to MCAS El Toro.

Approximately 130 large holding bins of drill cuttings have been produced. These soils have been stored at the waste staging area, pending chemical testing. The results of the drilling soil analyses are being compared to test results of non-contaminated soil in the area. Based on this comparison, drilling soil identified as hazardous will be transported off-site to a hazardous waste disposal facility, while clean soil will be disposed of on-Station. Nearly 100 of the soil holding bins have been analyzed to date. None of the bins have been classified as hazardous.

The Navy is also conducting a Resource Conservation and Recovery Act (RCRA) Facility Assessment of approximately 140 additional sites at MCAS El Toro where hazardous materials have been used or are currently used on-

Station. These sites are being investigated to determine if release of any hazardous material has occurred. During the three months of field work that ended November 30, nearly 280 soil borings drilled to depths ranging from five to sixty feet were sampled for various chemicals. The laboratory data is currently being evaluated. The results of this portion of the investigation of MCAS El Toro will be published in a separate report.

Phase I and II of the Remedial Investigation will conclude with reports that will be available in the information repositories for public review and comment. Included in the reports will be an assessment of the extent and level of chemical contamination. The first report should be available by June 1993. Look for future flyers with progress updates.

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**Environmental & Safety Department  
U.S. Marine Corps Air Station  
El Toro (Santa Ana), CA 92709-5001  
ATTN: Chrisa Mitchell**

**FIRST CLASS  
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Summary of Well and Boring Status - December 15, 1992  
 RI Investigation, MCAS El Toro  
 (Screened When Completed)

No.	Function Site-ID*	Static Depth to Water, Feet	IT Clear	ROICC Clear	Drilled	Developed	Aquifer Test	Ded. Pump Installed	H2O Sample Collected	Surface Completion <sup>†</sup>	Notes
1A B C D E	BG 18-1	231 215 215 215 214	X	X	X X X X X	X X X X X	X X None None X		X X X X X	X X X X X	
2A C D E	BG 18-2	175 176 175 187	X	X	X X X X	X X X X	X X X X			X X X X	
3A B C E	BG 18-3	128 120 117 115	X	X	X X X X	X X X X	X X None X		X X X X	x x x x	TV Available
4A B	BG 18-4	107 88	X	X	X X	X X	X X		X X	X X	
5A B C D E	BG 18-5	96 95 90 89 85	X	X	X X X X X	X X X X X	X X X X None	X None	X X X X None		Wells 5D and 5E are a pumping well and a piezometer, respectively
6	BG 18-6		TIC Approved		X	X	NA	X	5X	X	Multiport (Westbay) Well-TV
7	BG 18-7	24	TIC Approved		X	X	None	X	X	X	TV Available
8	BG 18-8		TIC Approved		X	X	NA	X	4X	X	Multiport (Westbay) Well-TV
9	BG 18-9		TIC Approved		X	X	NA	X	6X	X	Multiport (Westbay) Well-TV
10	BG 18-10	15	TIC Approved		X	O	N.A.				Multiport (Westbay) Well
Well 11 (Site 18) Eliminated											
12	BG 18-12	163	X	X	X	X	X	X	X	X	
Well 13 (Site 18) Eliminated											
14	BG 18-14	73	X	X	X	X	X	X	X	X	
15	BG 18-15	175	X	X	X	X	X	X	X	X	TV Available
16	BG 18-16	227	X	X	X	X	X	X	X	X	
17	BG 18-17	147	X	X	X	X	X	X	X	X	
18	BG 18-18	138	X	X	X	X	X	X	X	X	TV Available
19A B C D E	BG 18-19	128 124 110 100 97	TIC Approved		X X X X X	X X X X X	None None X X X			X X X X X	

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No.	Function Site-ID*	Static Depth to Water, Feet	IT Clear	ROICC Clear	Drilled	Developed	Aquifer Test	Ded. Pump Installed	H2O Sample Collected	Surface Completion <sup>b</sup>	Notes
Well 20 (Site 18) eliminated											
Well 21 (Site 18) eliminated											
22	BG 18-22	245	X	X	X	X	X	X	X	X	
23	BG 18-23	31	TIC Approved		X	X	None	X	X	X	
24	BG 24-24	50	X	X	X	X	X	X	X	X	
25	UGW 2-1	25	X	X	X	X	X	X	X	X	
26	UGW 3-1	232	X	X	X	X	X	X	X	X	
27	UGW 5-1	193	X	X	X	X	None	X	X	X	TV available
28	UGW 6-1	144	X	X	X	X	None	X	X	X	
29	UGW 8-1	92	X	X	X	X	X	X	X	X	
MW-30 RELOCATED AS DEEP BORING COMPLETED AS A WELL - MW-100											
31	UGW 12-1	102	X	X	X	X	X	X	X	X	
32	UGW 13-1	141	X	X	X	X	X	X	X	X	
33	UGW 16-2	183	X	X	X	X	X	X*	<del>X</del>	X	
Well 34 (17-1) Eliminated											
35	UGW 19-1	164	X	X	X	X	None	X	X	X	
36	UGW 20-1	195	X	X	X	X	None	X	X	X	
37	UGW 21-1	96	X	X	X	X	None	X	X	X	
Well 38 (2-5) BOREHOLE ONLY [See 200]											
39	MW 3-6	240	X	X	X	X	X	X	X	X	
40	MW 4-1	224	X	X	X	X	None	X	X	X	
41	MW 5-4	185	X	X	X	X	None	X	X	X	
Well 42 (6-1) BOREHOLE ONLY [See 201]											
43	MW 7-1	120	X	X	X	X	None		X	X	TV Available
Well 44 (8-2) BOREHOLE ONLY [See 202]											
45	MW 9-3	125	X	X	X	X	None	X*	X	X	TV Available
Well 46 (10-1) BOREHOLE ONLY [See 208]											
47	MW 22-1	120	X	X	X	X	X		X	X	TV Available
48	MW 12-2	98	X	X	X	X	X		X	X	

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49	MW 13-2	136	X	X	X	X	None	X	X	X	
50	MW 14-1	126	X	X	X	X	None	X	X	X	
51	MW 15-1	127	X	X	X	X	X	X	X	X	
52	MW 16-2	182	X	X	X	X	X	X	X	X	
Well 53 (17-5): Sampled and abandoned at 170 feet and grouted											
54	MW 19-3	149	X	X	X	X	X	X		X	
55	MW 20-3	189	X	X	X	X	None	X	X	X	TV Available
56	MW 21-2	95	X	X	X	X	X		X	X	
57	DGW 1-2	63	X	X	X	X	X	X	X	X	
58	DGW 1-3	57	X	X	X	X	None		X	X	
59	DGW 2-2	85	X	X	X	X	X		X	X	
60	DGW 2-3	71	X	X	X	X	X	X	X	X	
61	DGW 2-4	60	X	X	X	X	X		X	X	
62 (3-2) Staked - DO NOT DRILL AT THIS TIME											
63	DGW 3-3	224	X	X	X	X	X		X	X	
64	DGW 3-4	243	X	X	X	X	X			X	
65	DGW 3-5	240	X	X	ABANDON - TV Available						
65A	DGW 3-5A	240	X	X	X	X	X			X	
66	DGW 4-2	225	X	X	X	X	X		X	X	
67	DGW 5-2	189	X	X	X	X	X		X	X	TV Available-Redo VOAs
68	DGW 5-3	185	X	X	X	X	X			X	
69	DGW 6-2	143	X	X	X	X	X	X	X	X	
70	DGW 7-2	128	X	X	X	X	X	X	X	X	
71	DGW 7-3	115	X	X	X	X	None			X	
72	DGW 7-4	108	X	X	X	X	X	X	X	X	
73	DGW 8-3	81	X	X	X	X	X	X	X	X	
74	DGW 8-4	91	X	X	X	X	X	X	X	X	
75	DGW 9-1	119	X	X	X	X	X		X	X	
Well 76 (9-2) Eliminated											

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77	DGW 10-2	118	X	X	X	X	X		X	X	
78	DGW 13-3	132	X	X	X	X	X		X	X	
79	DGW 14-2	125	X	X	X	X	None	X	X	X	
Well 80 (16-1) Eliminated											
81	DGW 16-4	176	X	X	X	X	None		X	X	
82	DGW 17-2	(235)									
83	DGW 17-3	(235)									
84	DGW 17-4	(235)									
85	DGW 19-2	148	X	X	X	X	X		X	X	
86	DGW 19-4	162	X	X	X	X	None			X	
Well 87 (20-2) Eliminated											
88	DGW 20-4	188	X	X	X	X	X	X	X	X	
Well 89 (21-3) Eliminated											
90	DGW 21-4	95	X	X	X	X	None	X	X*	X	Sample lost by Fed Ex-Redone
91	DGW S.10	109	X	X	X	X	X	X		x	
100	MW-Site 7	113	X	X	X	X	X	X	X	X	
101	DGW S.12	88	X	X	X	X	X	X	X	x	
102	DGW S.16		X	X							DO NOT DRILL NOW
103	Piezometer		X	X	X	O	None	None	None		Site 18 - 500-Ft Borehole
104	DWG-Site 2		X	X							DO NOT DRILL NOW
DW-1	Existing	124									
DW-2	Existing	130									
DW-3	Existing	147									
DW-4	Existing	146									
DW-5	Existing	145									
PS-1	Existing	934									
PS-2	Existing	105									
PS-3	Existing	89							X		

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No.	Function Site-ID*	Static Depth to Water, Feet	IT Clear	ROICC Clear	Drilled	Developed	Aquifer Test	Ded. Pump Installed	H2O Sample Collected	Surface Completion*	Notes
PS-4	Existing	82							X		
PS-5	Existing	93							X		
PS-6	Existing	117							X		
PS-7	Existing	92							X		
PS-8	Existing	108							X		
RW-1	Existing	107							X		
RW-2	Existing	84							X		
200	DB Site 2		X	X	X						Borings - No Development, Pumps or Aquifer Testing
201	DB Site 6		X	X	X						
202	DB Site 8		X	X	X						
203	SB Site 7		X	X	X						
204	SB Site 8		X	X	X						
205	SB Site 8		X	X	X						
206	SB Site 8		X	X	X						
207	SB Site 9		X	X	X						
208	DB Site 10		X	X	X						
209	SB Site 10		X	X	X						
210	SB Site 12		X	X	X						
211	SB Site 13		X	X	X						
212	SB Site 16		X	X	X						
213	AB SITE 16		X	X	X						
214	SB Site 19		X	X	X						
215	SB Site 19		X	X	X						
216	SB Site 19		X	X	X						
217	AB SITE 19		X	X	X						
218	AB SITE 19		X	X	X						
219	SB Site 22		X	X	X						
220	AB OU-1		X	X	X						

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 (Screened When Completed)

No.	Function Site-ID*	Static Depth to Water, Feet	IT Clear	ROICC Clear	Drilled	Developed	Aquifer Test	Ded. Pump Installed	H2O Sample Collected	Surface Completion*	Notes	
221	AB OU-1		X	X	X							
222	AB OU-1		X	X	X							
223	AB OU-1		X	X	X							
224	AB OU-1		X	X	X							
225	AB OU-1		X	X	X							
226	AB OU-1		X	X	X							
227	AB OU-1		X	X	X							
228	AB OU-1			Off Station		X						
229	AB OU-1			Off Station		X						

Note: O indicates that an item is in progress on the date in the heading. X indicates that the item has been completed. Screened rows indicate that all times in that row have been completed.

\* BG=background well, UGW=upgradient well, DGW=downgradient well, MW=deep boring completed as a monitoring well, DB=deep boring only no well completion, SB=25-foot deep (shallow boring), AB=60-foot deep angle boring.

\* x = Surface work is complete, but not approved. X = Surface Work is complete and approved, with or without a punch list.

## EL TORO RI/FS SUMMARY SITE DESCRIPTIONS

Prepared for the MCAS EL Toro Technical Advisory Committee Meeting  
December 17, 1992

MCAS El Toro is a United States military reservation that contains a large, active air station operated by the United States Marine Corp. The facility, which was opened in 1943, includes support areas such as aircraft and facility maintenance shops, office spaces, housing facilities, and large areas of undeveloped (or agricultural) land that act as a buffer zone with surrounding property. The following paragraphs summarize the historical information that was the basis for placing the Station into the Remedial Investigation/Feasibility Study (RI/FS) portion of the environmental evaluation at Marine Corp Air Station (MCAS) El Toro. The boxed information summarizes the work in the Phase I RI.

### Site 1 - Explosive Ordnance Disposal Range

The Explosive Ordnance Disposal (EOD) Range is in the extreme northeast portion of MCAS El Toro. It is not known how long this site has been used for EOD. The site is normally used for the detonation and disposal of small munitions (flares, small ordnance). In 1982, approximately 2,000 gallons of sulfur trioxide chlorosulfonic acid (FS Smoke) was disposed in trenches in the northern part of the site.

The disposal method was to partially bury the drums and rupture them with a small explosive charge. The FS Smoke material is a water-reactive compound that would degrade to an acidic material on contact with water. It was estimated that as much as 75 percent, or 1,500 gallons, may have remained after the explosion. There are unsubstantiated reports that a portion of the site was used to dispose of low-level radioactive material.

It is unknown whether undetonated explosives or drums are still present at the EOD range, buried beneath the soil. At present, munitions are exploded in shallow trenches. These trenches are continually being filled with soil and reexcavated. The location is in the foothills of the Santa Ana Mountains at an elevation of approximately 700 feet above mean sea level (msl), about 400 feet higher than the main portion of the station.

The EOD Range is situated along a minor tributary of the Borrego Canyon Wash. A small water retention pond is located immediately to the east (upgradient) of the EOD Range. The site is completely fenced and has a guard gate, and controlled access to the area is enforced. Soil in the EOD is frequently disked for weed control.

The RI/FS Investigation at Site 1 consists of:

- Drilling two down-gradient wells
- Collecting and analyzing two groundwater samples
- Collecting and analyzing surface and near-surface soil samples at four locations

### Site 2 - Magazine Road Landfill

The Magazine Road Landfill occupies approximately 22 acres between Borrego Canyon Wash and one of its tributaries. The site is bisected by a manmade drainage channel. The landfill is in an area that was used as a gravel borrow pit. The remains of the old borrow pit are still visible as a depression at the upper end of the channel. The Magazine Road Landfill was used from the late 1960s until approximately 1980. During this period, solid wastes from MCAS El Toro and some waste from MCAS Tustin were disposed at this

landfill. Previous reports estimate that between 800,000 and 1,000,000 cubic yards of material were placed in the landfill during its operational life. This material consisted of construction debris, municipal waste, batteries, waste oils, hydraulic fluids, paint residues, transformers, and solvents. Unlike earlier landfills, wastes placed in this landfill were not burned for volume reduction. Methane within the landfill as high as 45 percent was detected during subsurface gas probe surveys by a previous contractor.

The RI/FS Investigation at Site 2 consists of:

- Drilling one upgradient well, one deep boring adjacent to the landfill, and two downgradient wells
- Collecting and analyzing three groundwater samples
- Collecting and analyzing surface and near-surface soil samples at eight locations
- Collecting and analyzing 12 to 18 sediment samples
- Collecting and analyzing up to 18 surface runoff samples

### Site 3 - Original Landfill

The Original Landfill site is between Perimeter Road and North Marine Way along Agua Chinon Wash. The 20-acre landfill consists of six separate pits and trenches. The landfill was used from 1943 to 1955 as a cut-and-fill facility in conjunction with burning to reduce waste volume. Previous reports estimate that 163,500 to 243,000 cubic yards of material were placed in this landfill during its operation and burned before burial.

Chloroform, trichloroethylene (TCE) and perchloroethylene (PCE) were detected in the landfill gas samples in concentrations in the hundreds of parts per billion. During the gas probe surveys no methane was detected. Wastes potentially to be found in this landfill include metals, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily waste, municipal solid waste, and various inert solid waste. The project decontamination facility was constructed at this location.

The RI/FS Investigation at Site 3 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well adjacent to the landfill, and three downgradient wells
- Collecting and analyzing five groundwater samples
- Collecting and analyzing surface and near-surface soil samples at five locations
- Collecting and analyzing 6 to 9 sediment samples
- Collecting and analyzing up to 9 surface runoff samples

#### Site 4 - Ferrocene Spill Area

The Ferrocene Spill Area is southeast of Building 658, an engine testing facility. A dirt drainage ditch, southwest of the spill site, discharges into a catch basin for Agua Chinon Wash. In August 1983, approximately 5 gallons of ferrocene and hydrocarbon carrier solution were spilled onto the ground. Apparently, a 500-gallon tank was being washed when the contents overflowed onto the ground. Reportedly the rinse water containing the ferrocene and hydrocarbon carrier solution drained into the drainage ditch. The apparent hydrocarbon staining at this site has also been considered a potential contaminant.

The RI/FS Investigation at Site 4 consists of:

- Drilling one deep boring converted to a monitoring well at the site of the spill and one downgradient well
- Collecting and analyzing two groundwater samples
- Collecting and analyzing surface and near-surface soil samples at eight locations

#### Site 5 - Perimeter Road Landfill

The Perimeter Road Landfill is north of Gate No. 3 near the MCAS El Toro boundary. This landfill was activated in 1955 after the operations at the Original Landfill were phased out. Wastes were buried at this landfill until the late 1960s when the Magazine Road Landfill was opened. The Perimeter Landfill was a cut-and-fill operation, typically burning wastes prior to burial to reduce volume. Reports have estimated waste volumes between 50,000 and 60,000 cubic yards.

Wastes disposed in this landfill include burnable trash, municipal solid waste, unspecified fuels, oils, solvents, cleaning fluids, scrap metal, paint residues, and other waste materials. Any waste generated on the facility may have been disposed in this landfill. No methane was detected during the gas probe surveys. Borrego Canyon Wash is approximately 800 feet south-southeast of the landfill.

The RI/FS Investigation at Site 5 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well adjacent to the landfill, and two downgradient wells
- Collecting and analyzing four groundwater samples
- Collecting and analyzing surface soil samples at five locations

#### Site 6 - Drop Tank Drainage Area No. 1

Drop Tank Drainage Area No. 1 is a grassy area southwest of Building 727 in the southern quadrant of the facility. From 1969 to 1983, aircraft drop tanks were routinely transported to this area, where the remaining fuel would be drained; the remnants of JP-5 fuel were washed out onto the concrete apron. The fuel and wash/rinse water drained off the concrete apron onto the adjacent grassy area.

Previous investigators estimated 1,400 gallons of JP-5 fuel drained onto the vegetated area, based on an assumed spillage of 50 gallons per month. Waste lubricant oils from maintenance operations were reportedly stored in drums and staged in this area. Reportedly, waste oil spills and drum leaks would occasionally occur. Previous investigations estimated 300 gallons of waste oils were spilled at this site. Runoff from the site flows through a small swale located to the west of the tank drainage area to a ditch that flows along a runway to a catch basin.

The RI/FS Investigation at Site 6 consists of:

- Drilling one upgradient well, one deep boring, and one downgradient well
- Collecting and analyzing two groundwater samples
- Collecting and analyzing surface and near-surface soil samples at 11 locations
- Collecting and analyzing one sediment sample

#### Site 7 - Drop Tank Drainage Area No. 2

Drop Tank Drainage Area No. 2 is in the southwest quadrant of the station, north and east of Hangar Buildings 295 and 296. From 1969 to 1983, aircraft drop tanks were drained of residual JP-5 fuel in this area. Fuel residuals and wash/rinse water would drain onto a grassy area covering about 800 feet by 200 feet. Waste lubrication oils from nearby maintenance buildings were also disposed in this area. An unpaved area covered with aircraft matting between the runway and the concrete apron designates the investigation site north of Building 295. A catch basin that discharges to Agua Chinon Wash is adjacent to the spill area.

A grassy area northeast of Buildings 295 and 296 adjacent to the concrete pad constitutes the other Site 7 area of concern. Drop tanks were drained and flushed in this area as well, although reportedly at about half the rate of the disposal area north of Building 295. In addition, from 1972 to 1978 this area was an unpaved parking lot, and lubrication oils were applied for dust control. The concrete pad was placed in 1978. Finally, in 1982, 2,000 gallons of JP-5 were accidentally spilled from a tank truck in this area. The JP-5 was washed with water onto the soil at the edge of the pad. A surface drainageway runs to the south.

The RI/FS Investigation at Site 7 consists of:

- Drilling four deep borings converted to monitoring wells and one downgradient well
- Collecting and analyzing five groundwater samples
- Collecting and analyzing surface and near-surface soil samples at 16 locations
- Collecting and analyzing one sediment sample

### Site 8 - DRMO Storage Area

The Defense Reutilization and Marketing Office (DRMO) Storage Yard is on the southwest corner of the intersection of Marine Way and "R" Street. The yard, which is fenced and unpaved, has been used since the mid-1970s by MCAS El Toro and MCAS Tustin. The yard is used as a storage area for various scrap and salvage materials, including mechanical and electrical components, and the storage of containerized liquids of unknown composition. A polychlorinated biphenyl (PCB) spill occurred in 1984. Contaminated soils in the immediate vicinity of the spill were excavated to one foot below grade and transported to an offsite disposal facility.

The old salvage yard is an elevated pad, gravel topped, and several feet above the surrounding street culverts. This yard is used as a parking lot today. Both areas were investigated.

The RI/FS Investigation at Site 8 consists of:

- Drilling one upgradient well, one deep boring, four 25-foot borings, and two downgradient wells
- Collecting and analyzing five groundwater samples
- Collecting and analyzing surface and near-surface soil samples at 15 locations

### Site 9 - Crash Crew Pit No. 1

Crash Crew Pit No. 1 was used from 1965 through 1971 for firefighter training. A pit was filled with water and layered with 100 to 500 gallons of JP-5 fuel, aviation gasoline, and other liquid waste. The liquid was then ignited. Previous investigations have estimated that approximately 123,700 gallons of waste liquids were used for these practices. The exact location of the crash crew pit is not known. Historical aerial photography was used to determine the approximate location of the pit. Based on stressed vegetation formerly visible, an area covering approximately 70 feet in diameter may have been the crash crew pit. Conversely, the pit may have been located within the present matted area. Site 9 is to the west of Sites 10 and 22, and north of Site 11.

The RI/FS Investigation at Site 9 consists of:

- Drilling one deep boring converted to a monitoring well, one 25-foot boring, and one downgradient well
- Collecting and analyzing two groundwater samples
- Collecting and analyzing surface soil samples at three locations

### Site 10 - Petroleum Disposal Area

The Petroleum Disposal Area, south of Building 435 and east of Building 369, is approximately 1,200 feet long by 800 feet wide. The area is covered with aircraft matting and a concrete apron. From 1952 through the mid-1960s, waste oils were applied to the ground for dust control. Approximately 52,000 gallons of waste crankcase oil, antifreeze, hydraulic and transmission fluids, motor oils, and solvents were used. This value is based on the assumption that about 500 gallons were used every 3 months for 13 years. Since the practice has been stopped, the areas that were sprayed have been excavated and concreted and/or built over. Site 22, the Tactical Air Fuel Dispensing System (TAFDS), is adjacent to Site 10. Sites 10 and 22 are also located just to the east of Sites 9 and 11.

The RI/FS Investigation at Site 10 consists of:

- Drilling one deep boring, one 25-foot boring, and one downgradient well
- Collecting and analyzing one groundwater sample
- Collecting and analyzing surface soil samples at seven locations

### Site 11 - Transformer Storage Area

The Transformer Storage Area is a 30- by 30-foot concrete pad on the northeast side of Building 369. Approximately 50 to 75 transformers were stored on the pad from 1968 through 1983. Reportedly, five transformers leaked and one spilled, leading to an estimate of 60 gallons of PCB transformer oil that may have leaked onto the concrete pad during this period. The PCB oil would probably run off the concrete pad into the adjacent drainage ditch and surrounding soils. In 1983, the transformers were removed and disposed of off-Station. A 3-foot-wide asphalt-lined drainage ditch is adjacent to the transformer storage area. This ditch drains to the northwest, turns and drains onto the street that runs to the southwest of Building 369. A catch basin that discharges into Bee Canyon Wash is west of Building 369. This catch basin receives runoff from a wide area near Building 369. This site is adjacent to Sites 9, 10 and 22.

The RI/FS Investigation at Site 11 consists of:

- Collecting and analyzing surface and near-surface soil samples at six locations

### Site 12 - Sludge Drying Beds

From 1943 through 1972, MCAS El Toro operated a secondary wastewater treatment plant. The sludge from the plant was dewatered in the Sludge Drying Beds. This bed occupied a 135- by 210-foot area. When the facility was closed, the sludge may have been abandoned in the drying beds and eventually plowed under.

The contaminants of concern from this sludge may include heavy metals, such as silver, arsenic, cadmium, copper, mercury, nickel, lead, selenium, and zinc. These heavy metals may have come from a plating shop that was located on-Station and discharged its waste water into the treatment facility system for several years during the 1940s.

The RI/FS Investigation at Site 12 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well, and one 25-foot boring
- Collecting and analyzing two groundwater samples
- Collecting and analyzing surface and near-surface soil samples at 12 locations
- Collecting and analyzing one sediment sample

### Site 13 - Oil Change Area

The 1/4-acre Oil Change Area is northeast of Building 242 along the fence line, just east of a tank storage area in the southwest corner of the facility. Previous investigators estimated that approximately 7,000 gallons of crankcase oils were drained from heavy equipment directly onto the ground at this site.

The RI/FS Investigation at Site 13 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well, one 25-foot boring, and one downgradient well
- Collecting and analyzing three groundwater samples
- Collecting and analyzing surface and near-surface soil samples at nine locations

### Site 14 - Battery Acid Disposal Area

Site 14 is about 200 yards southwest of Site 13. The Battery Acid Disposal Area is about 50 feet southwest of Building 245, which was formerly a heavy equipment maintenance shop. Reportedly, from 1977 through 1983, batteries from facility vehicles were drained onto the soil; surface water runoff from washing down the asphalt drained onto this area. An estimated 210 gallons of battery acid (sulfuric acid) was estimated by previous investigators. Paints were also reportedly disposed of in this area. An L-shaped strip of land, approximately 50 feet long on the west side, 75 feet long on the south side, and 2 to 3 feet wide, is the area of investigation. A catch basin is west of this patch of land and receives water from a drainage ditch that runs parallel to the longer side of the L-shaped area. The catch basin discharges into Bee Canyon Wash.

The RI/FS Investigation at Site 14 consists of:

- Drilling one deep boring converted to a monitoring well and one downgradient well
- Collecting and analyzing two groundwater samples
- Collecting and analyzing surface and near-surface soil samples at seven locations
- Collecting and analyzing one sediment sample

#### Site 15 - Suspended Fuel Tanks

Site 15 is north of Building 31 and west of Building 29 along West Marine Way, within a fenced yard. Two 500-gallon elevated diesel tanks were located at this site from approximately 1979 through mid-1984. Reportedly, diesel leaked from these two tanks through fueling hose and nozzles onto the soil beneath the tanks. Approximately 500 gallons of diesel fuel were estimated to have leaked. The area of investigation consists of two areas where stained soils were evident beneath former elevated fuel tanks. No surface water bodies, drainage ditches or catch basins are within the immediate vicinity of Site 15.

The RI/FS Investigation at Site 15 consists of:

- Drilling one deep boring converted to a monitoring well
- Collecting and analyzing one groundwater samples
- Collecting and analyzing surface and near-surface soil samples at five locations

#### Site 16 - Crash Crew Pit No. 2

Crash Crew Pit No. 2 is in the central runway area of the facility near the current fire-training area. From 1972 through 1985, Site 16 was used for Crash Crew practice training to extinguish fires. Three pits made up the training area. The main pit was used for larger fire training exercises and was periodically filled with water and covered with a mixture of JP-5, leaded aviation gasoline, hydraulic fluid, and crankcase oil, and ignited. The secondary holding pit was used for storing the residual liquids from the main pit. A smaller third pit was used for practicing with handheld fire extinguishers. Previous investigators have estimated that about 275,000 gallons of residual fluids may have been placed in these pits. Of this amount, perhaps 10 percent, or 24,700 gallons, actually infiltrated into the soil. Small quantities of napalm, white phosphorus, and magnesium phosphate were also burned at this site. A drainage ditch along the runway northwest of Site 16 discharges into Bee Canyon Wash.

The RI/FS Investigation at Site 16 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well, and one downgradient well
- Collecting and analyzing three groundwater samples
- Collecting and analyzing surface and near-surface soil samples at 11 locations

#### Site 17 - Communication Station Landfill

The Communication Station Landfill lies approximately 1,800 feet west of the Magazine Road Landfill and covers a 26-acre rectangular area in a small canyon. The landfill was used from 1981 through 1983 as a Station-wide disposal facility. Any waste that was generated from the facility during the landfill's operation may have been disposed at the Communication Station Landfill. Wastes that could potentially be found in this landfill include domestic waste and rubble (e.g., couches, washing machines, refrigerators), cooking greases, oils and fuels from sumps, empty drums, and other unknown material. Assuming a full vacuum truck discharged its load at Site 17 an average of once a month, as much as 36,000 gallons of liquid waste may have been dumped at this site. No methane was detected during the gas probe survey. The landfill is located adjacent to a hill that has been leveled for flight paths. Soil from this hill and the landfill itself have buried the natural drainage.

The RI/FS Investigation at Site 17 consists of:

- Drilling one deep boring and two downgradient wells
- Collecting and analyzing two groundwater samples
- Collecting and analyzing surface and near-surface samples at seven locations

#### Site 18 - Regional VOC Investigation

Investigations conducted by the Orange County Water District (OCWD) west of MCAS El Toro concluded that groundwater contaminated with trichloroethylene (TCE) occurs off-Station mainly at depths ranging from 200 to 450 feet below the ground surface, and extends as much as 4 miles from the facility boundary.

Investigations conducted by MCAS El Toro delineated three areas of VOC contamination in shallow groundwater on or near the facility. Two of these areas are where Bee Canyon Wash and Agua Chinon Wash exit the facility. The third area is near Site 14. Soil gas surveys conducted by MCAS El Toro have generally confirmed these areas, and also identified potential contamination near the intersection of the Laguna and Santa Ana Freeways.

The RI/FS Investigation at Site 18 consists of:

- Drilling:
  - 6 well clusters (consisting of two to five wells each),
  - 4 multiport wells (each consisting of a single casing with four to six screened intervals),
  - 10 wells in locations not within other sites,
  - 10 60-foot angle borings beneath washes, and
  - 2 wells (piezometers) to be used for depth-to-water measurements
- Collecting and analyzing 55 groundwater samples from the above wells
- Collecting and analyzing groundwater samples from 15 existing wells
- Collecting and analyzing off-Station surface and near-surface soils for metals content
- Collecting and analyzing off-Station surface and near-surface soils for pesticides and herbicides at 21 locations
- Collecting and analyzing up to 33 sediment samples
- Collecting and analyzing up to 33 surface runoff samples after major storms

#### Site 19 - ACER Site

At the ACER Site, six 20,000-gallon JP-5 fuel aboveground storage bladder tanks were surrounded by a 4-foot-high bermed area. These bladder tanks were installed in 1964 and were used until 1987. An estimated 15,000 gallons of JP-5 fuel were spilled in 1986 due to a bladder rupture. An investigation following the rupture found total hydrocarbons in soil ranging up to a maximum of 11,300 milligrams per kilogram (mg/kg). Subsequently, all the fuel bladders were removed and the soil excavated to a depth of 15 feet over a 30-square-foot area. Minor spills and leaks also occurred throughout the operational period of the facility. An area 300 feet long and 60 feet wide has been excavated to a depth of 2 feet at the site. Soil is stockpiled at the site.

The RI/FS Investigation at Site 19 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well, two 60-foot angle borings, three 25-foot borings, and two downgradient wells
- Collecting and analyzing four groundwater samples
- Collecting and analyzing surface and near-surface samples at 11 locations

## Site 20 - Hobby Shop

The hobby shop is in Building 626 near the intersection of North 9th Street and West Marine Way. Since 1967, military personnel have used the facilities at the Hobby Shop to service privately owned vehicles. A 600-gallon underground waste oil tank, which is emptied periodically by a private contractor, is about 10 feet from the northwest side of the building. The ground surface around the tank and leading to the building, as well as part of the wall of the building, are stained black from oil.

Three 700-gallon oil/water separators are located at the Hobby Shop. Oil from these separators is emptied periodically by a contractor. Water drains from the separators to a ditch that runs along North 9th Street. The sides of this ditch are stained black. There are also three 50-gallon solvent parts tanks at the Hobby Shop. Sludge from these tanks is dispersed to the oil/water separators, while solvent is disposed of in drums. Prior to 1976, kerosene was used to wash down the asphalt pavement in the compound.

The RI/FS Investigation at Site 20 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well, and one downgradient well
- Collecting and analyzing three groundwater samples
- Collecting and analyzing surface and near-surface soil samples at 14 locations
- Collecting and analyzing one sediment sample

## Site 21 - Materials Management Group, Building 320

The Materials Management Group serves as a supply distribution center for MCAS El Toro and other USMC facilities. Drums of contaminated material are stored outside Building 320. In 1964, about 1,000 drums were stored there; by 1986 only about 100 to 125 drums were stored at the site. Potential contaminants may have leaked from stored drums on the site. However, no documented leakage or spillage has occurred.

The RI/FS Investigation at Site 21 consists of:

- Drilling one upgradient well, one deep boring converted to a monitoring well, and one downgradient well
- Collecting and analyzing three groundwater samples
- Collecting and analyzing surface and near-surface soil samples at four locations
- Collecting and analyzing one sediment sample

## Site 22 - Tactical Air Fuel Dispensing System

The Tactical Air Fuel Dispensing System (TAFDS) is adjacent to and west of Site 10, the Petroleum Disposal Area. This area has an undocumented history of spills and leaks.

The RI/FS Investigation at Site 22 consists of:

- Drilling one deep boring converted to a monitoring well
- Collecting and analyzing one groundwater sample
- Collecting and analyzing surface and near-surface soil samples at seven locations

# DQO Process

