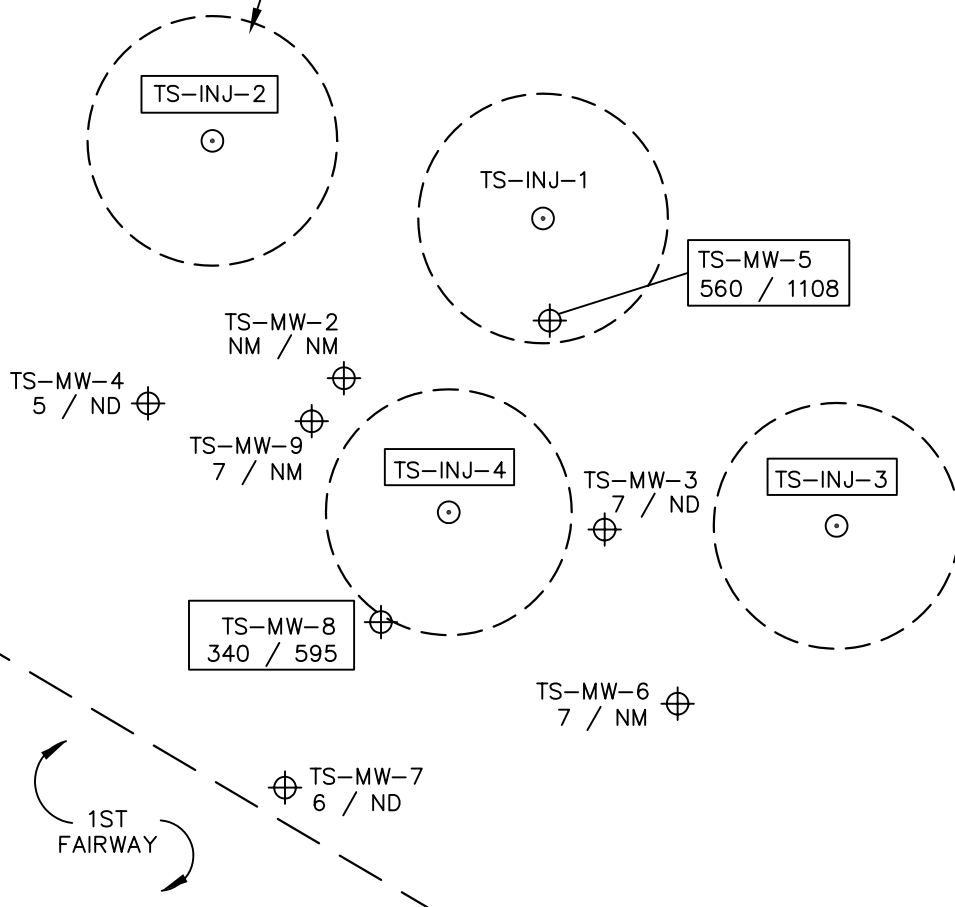


TS-MW-1
4 / ND

DIRECTION OF
GROUNDWATER FLOW

THEORETICAL RADIUS OF INFLUENCE
OF THE VEGETABLE OIL EMULSION
(ASSUMING UNIFORM DISTRIBUTION
AND 20% EFFECTIVE POROSITY)



SCALE: 1"=10'

LEGEND

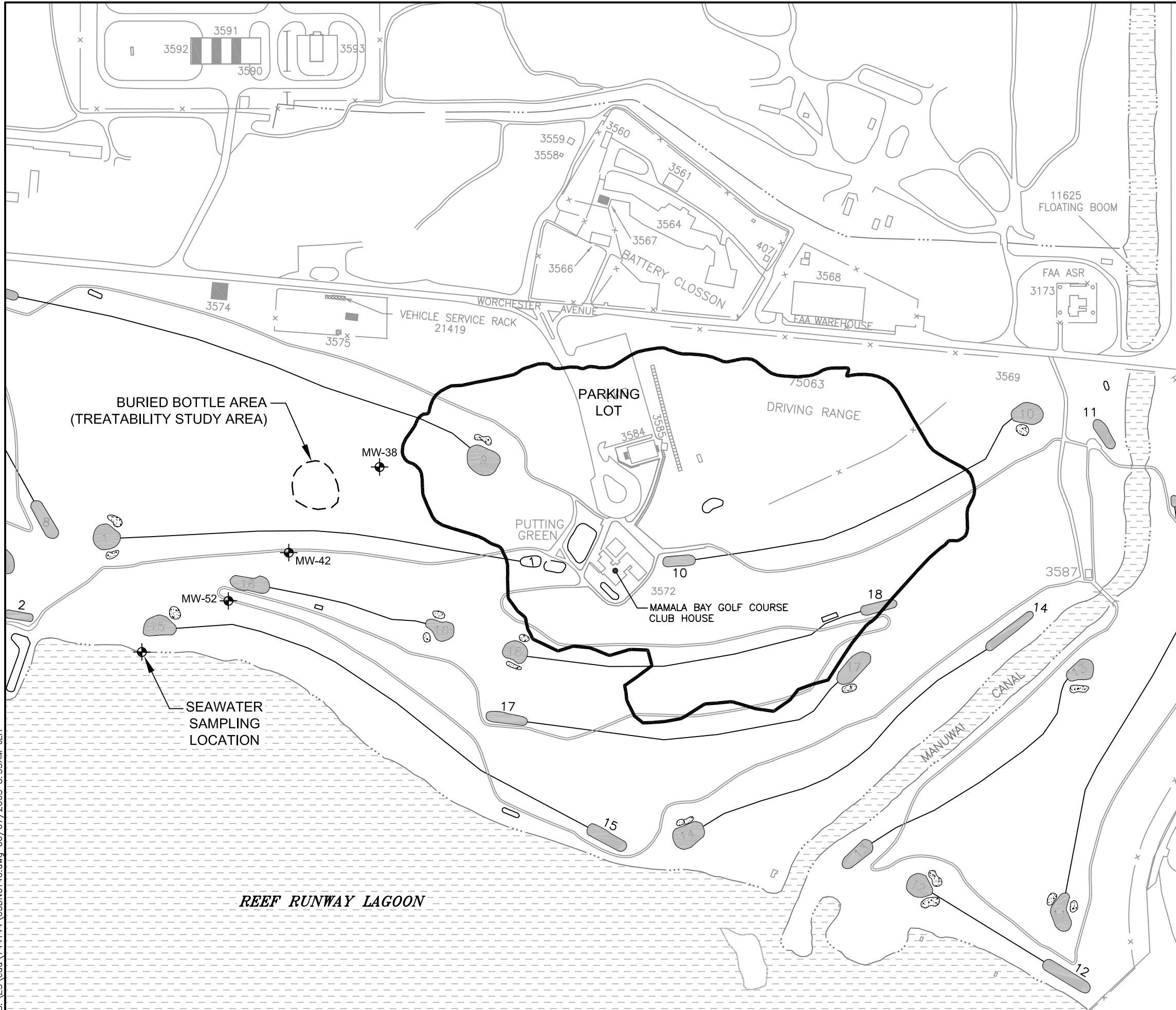
- TS-INJ-1A INJECTION WELL
- TS-MW-1 MONITORING WELL
- 9.9 / ND DISSOLVED ORGANIC CARBON / TOTAL METABOLIC ACID CONCENTRATIONS IN MG/L (OCTOBER 2004)
- INDICATES THAT FLOATING OIL / EMULSION WAS OBSERVED
- ND NOT DETECTED
- NM NOT MEASURED

FIGURE 2

**TREATABILITY STUDY
INJECTION WELL AND
MONITORING WELL LOCATIONS**

Vegetable Oil Injection at LF-05
Hickam AFB, Hawaii

PARSONS



LEGEND

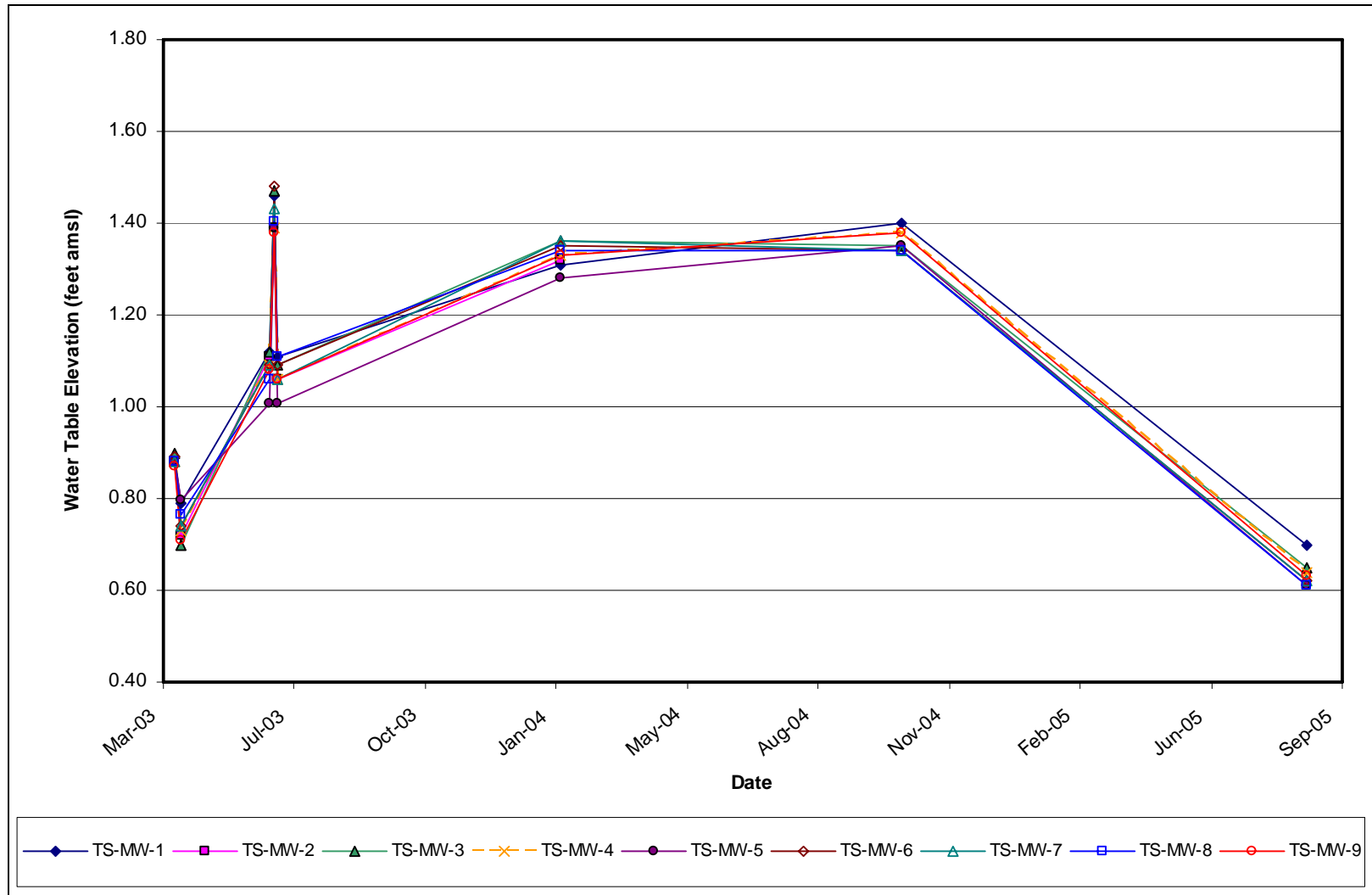
- SHALLOW MONITORING WELL/SAMPLING LOCATION
- GOLF COURSE FAIRWAY ALIGNMENT
- GOLF COURSE BUNKER
- GOLF COURSE TEE / PUTTING GREEN
- APPROXIMATE PRIMARY LANDFILL BOUNDARY

0' 150' 300'
 SCALE: 1"=300'

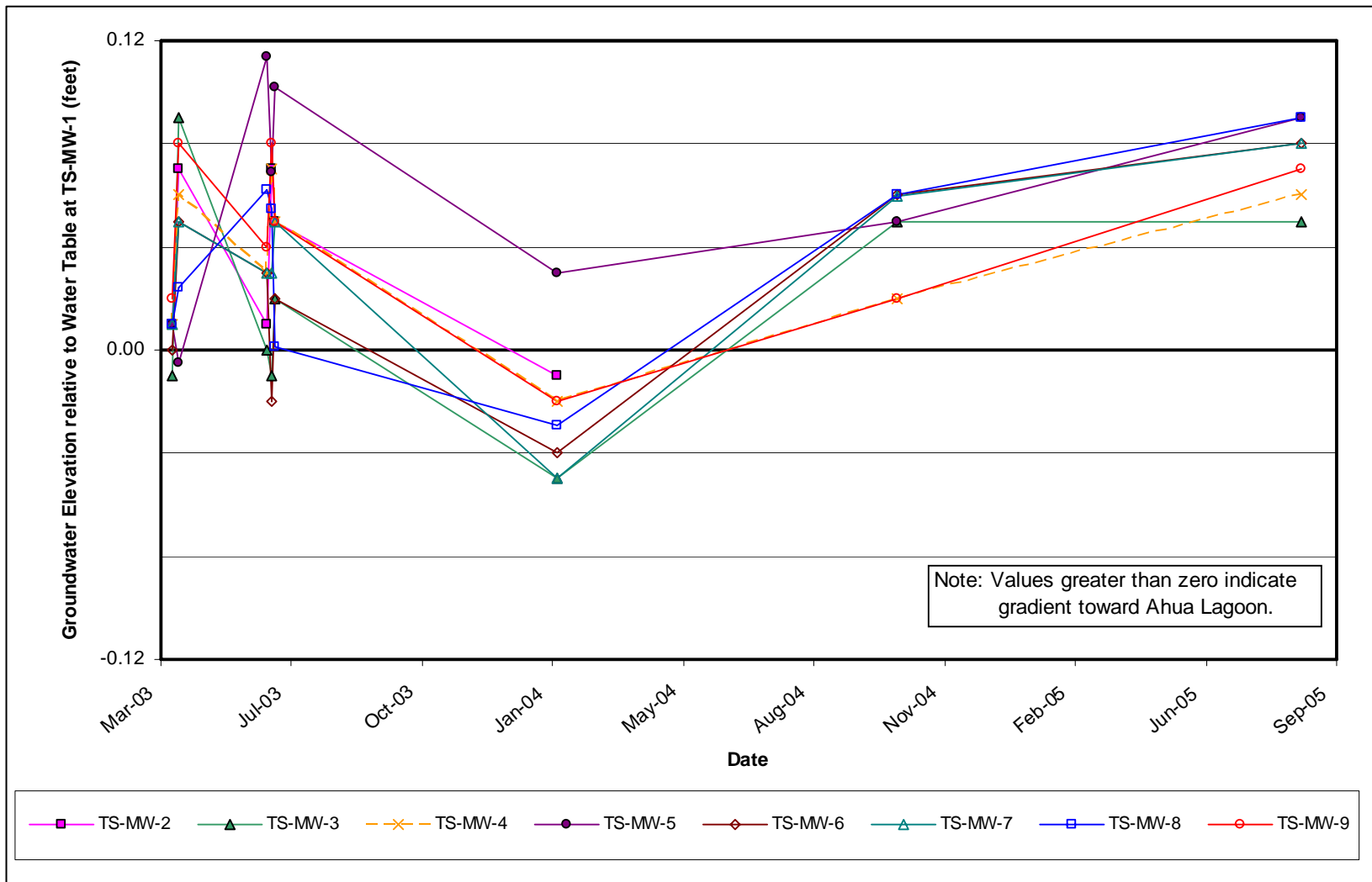
FIGURE 3
TREATABILITY STUDY AREA MAP
 Vegetable Oil Injection at LF-05
 Hickam AFB, Hawaii
PARSONS

S:\ES\cod\744144\05DN0146.dwg 06/07/2005 8:35AM JH

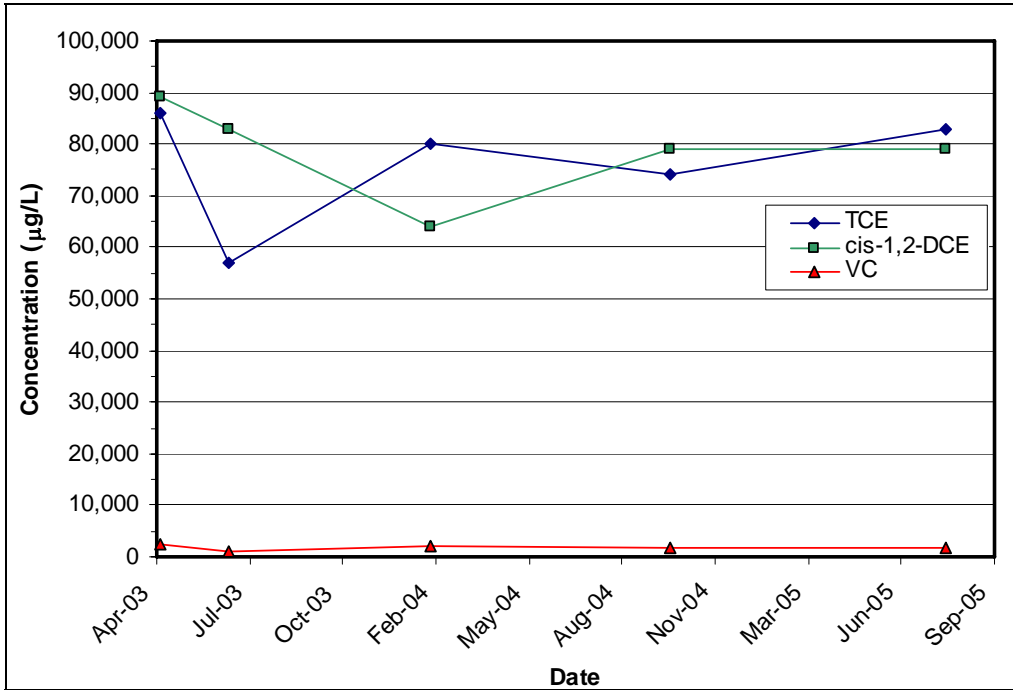
**FIGURE 4. WATER TABLE ELEVATION MEASUREMENTS COLLECTED BETWEEN APRIL 2003 AND AUGUST 2005
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII**



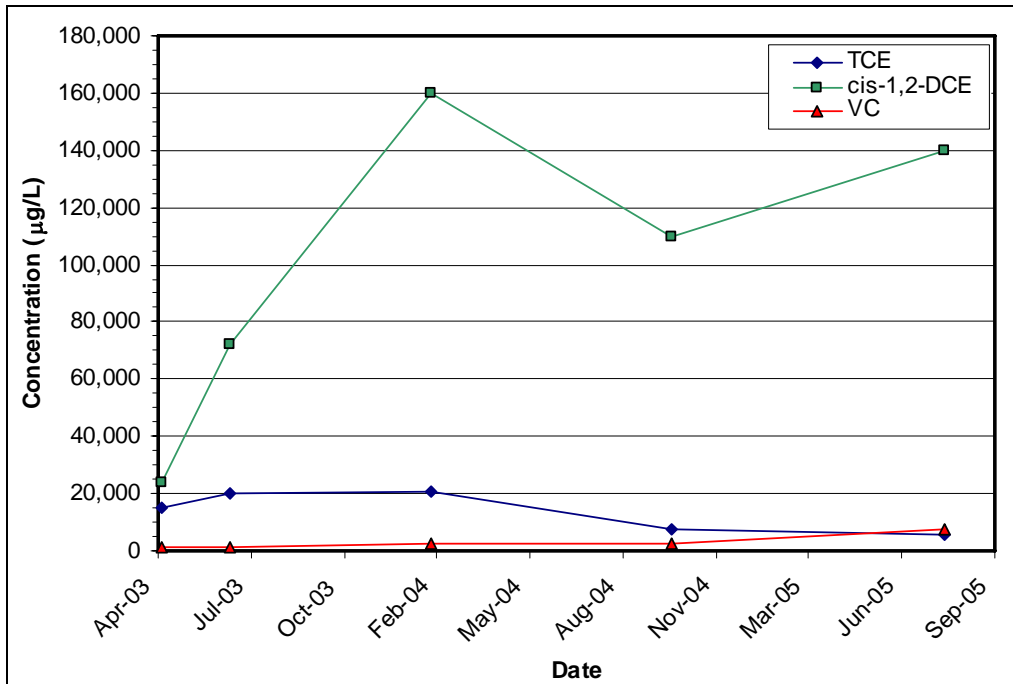
**FIGURE 5. GROUNDWATER ELEVATIONS RELATIVE TO TS-MW-1 BETWEEN APRIL 2003 AND AUGUST 2005
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII**



**FIGURE 6. CHLORINATED ETHENE CONCENTRATIONS VERSUS DISTANCE AT TS-MW-7
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII**



**FIGURE 7. CHLORINATED ETHENE CONCENTRATIONS VERSUS DISTANCE AT TS-MW-8
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII**



**FIGURE 8. CHLORINATED ETHENE CONCENTRATIONS VERSUS
DISTANCE AT TS-MW-6
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII**

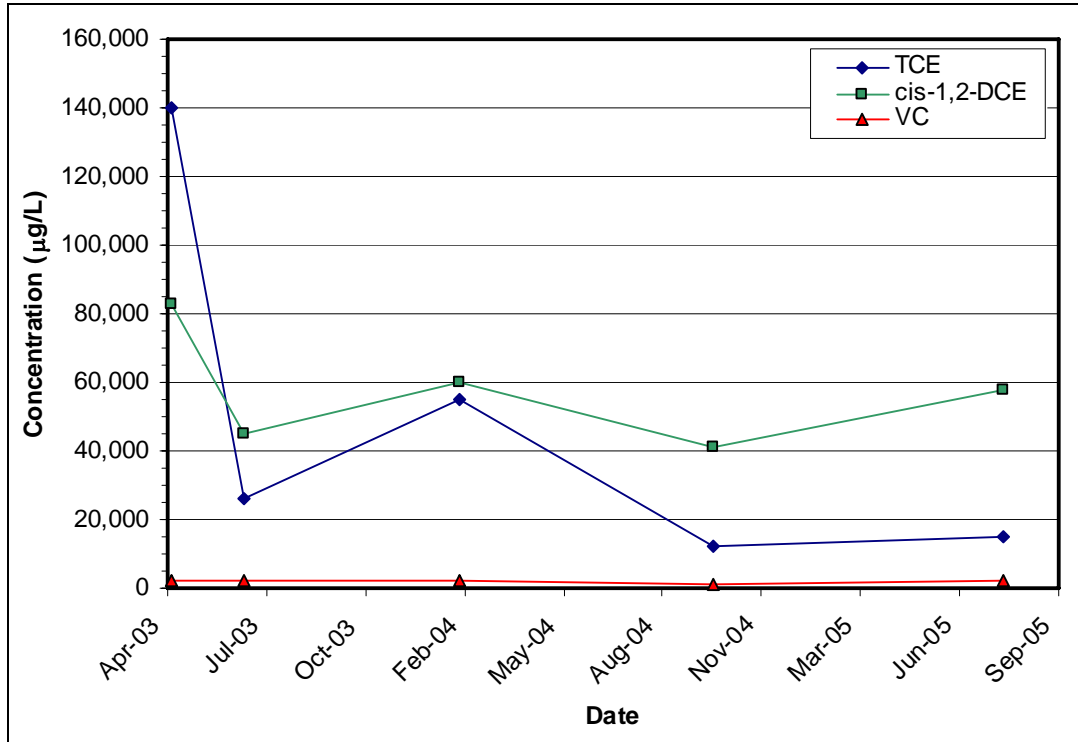


TABLE 1
SUMMARY OF WELL POINT CONSTRUCTION
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Well/Borehole Identification	Well Installation Date	Well Diameter (inches)	Screened Interval (feet bgs) ^{a/}	Ground Surface Elevation (feet amsl) ^{b/}	Top of Casing Elevation (feet amsl)	Survey Northing (State Plane)	Survey Easting (State Plane)
Monitoring Wells							
TS-MW-1	2-Apr-03	1.0	7.5 - 17.5	4.19	3.86	54630.73	1661930.79
TS-MW-2	1-Apr-03	1.0	2.5 - 21.0	5.02	4.73	54584.82	1661879.57
TS-MW-3	1-Apr-03	1.0	7.5 - 17.5	5.20	4.81	54576.94	1661893.15
TS-MW-4	1-Apr-03	1.0	7.5 - 17.5	5.06	4.80	54583.51	1661869.37
TS-MW-5	1-Apr-03	1.0	2.5 - 22.5	5.43	4.93	54587.82	1661890.29
TS-MW-6	1-Apr-03	1.0	7.5 - 17.5	5.01	4.59	54567.87	1661896.95
TS-MW-7	1-Apr-03	1.0	7.5 - 17.5	4.80	4.45	54563.50	1661876.50
TS-MW-8	2-Apr-03	1.0	10.0 - 15.0	4.89	4.56	54572.12	1661881.50
TS-MW-9	2-Apr-03	1.0	10.0 - 15.0	5.02	4.68	54582.58	1661877.89
TS-INJ-1	9-Apr-03	1.0	10.0 - 15.0	5.38	4.93	54593.14	1661889.94
TS-INJ-2	9-Apr-03	1.0	10.0 - 15.0	4.83	4.55	54597.18	1661872.72
TS-INJ-3	9-Apr-03	1.0	10.0 - 15.0	5.25	4.68	54577.13	1661905.23
TS-INJ-4	9-Apr-03	1.0	10.0 - 15.0	5.15	4.78	54577.84	1661885.03

^{a/} feet bgs indicates depth in feet below ground surface.

^{b/} feet amsl indicates elevation in feet above mean sea level.

TABLE 2
SUMMARY OF SUBSTRATE INJECTION
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Well	Emulsion Mixture			Oil Loading during Injection (percent oil)	Volume of Water Push (gallons)	Total Injection Volume (gallons)	Final Oil Loading (percent oil)	Injection Interval (feet)	Radius of Influence ^{b/} (feet)	Oil Injection Flow Rate (gpm) ^{c/}	Water Injection Flow Rate (gpm)
	Oil (gallons)	Water (gallons)	Emulsifier ^{a/} (agent)								
TS-INJ-1	133	668	Polysorbate 80	17	93	894	15	5	6.5	0.3 - 0.7	2.0 - 3.5
TS-INJ-2	122	644	Polysorbate 80	16	125	891	14	5	6.5	0.3 - 0.7	1.9 - 3.7
TS-INJ-3	120	625	Polysorbate 80	16	125	870	14	5	6.4	0.4 - 0.75	3.1 - 3.4
TS-INJ-4	120	625	Polysorbate 80	16	125	870	14	5	6.4	0.4 - 0.75	3.1 - 3.4
Totals	495	2562			468	3525					

^{a/} Polysorbate 80 mixed with the oil at a volumetric ratio of 1 part polysorbate 80 to 200 parts oil.

^{b/} Assumes an effective porosity of 20 percent to calculate the radius of influence.

^{c/} gpm = gallons per minute.

TABLE 3
ANALYTICAL PROTOCOLS FOR SOIL, GROUNDWATER, AND OIL SAMPLES
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

MATRIX Analyte	METHOD	FIELD (F) OR ANALYTICAL LABORATORY (L)
SOIL		
Total Organic Carbon	Walkley Black Acid Digestion Method	L
GROUNDWATER		
Oxidation-reduction Potential (ORP)	Direct-reading meter	F
Dissolved Oxygen (DO)	Direct-reading meter	F
pH	Direct-reading meter	F
Specific Conductivity	Direct-reading meter	F
Temperature	Direct-reading meter	F
Turbidity	Direct-reading meter	F
Ferrous Iron (Fe ⁺²)	Colorimetric, Hach Method 8146 (or similar)	F
Manganese	Colorimetric, Hach Method 8034 (or similar)	F
Sulfide	Hach Method 8131 or HS-C	F
Alkalinity (Carbonate [CO ₃ ⁻] and Bicarbonate [HCO ₃ ⁻])	Titrimetric, Hach Method 8221 (or similar)	F
Carbon Dioxide	Titrimetric, Hach Method 1436-01 (or similar)	F
Nitrate + Nitrite [as nitrogen (N)]	EPA Method 353.1	L
Sulfate	EPA Method 375.4	L
Chloride	EPA Method 325.3	L
Bromide	EPA Method 320.1	L
Methane, Ethane, Ethene	AM-18/20GAX ^{a/}	L
Total Organic Carbon	SW-846 9060	L
VOCs ^{b/}	SW-846 8260B	L
Dissolved Hydrogen	AM-20GAX ^{a/}	L
Volatile Fatty Acids	Microbial Insights SOP	L
Phospholipid Fatty Acids	Microbial Insights SOP	L
OIL		
VOCs	SW-846 8260B	L

^{a/} AM-18/20 & AM-20 are standard operating procedures at Microseeps, Inc.

^{b/} VOCs = volatile organic compounds.

TABLE 4
SUMMARY OF GROUNDWATER ELEVATIONS
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Well or Borehole Identification	Screened Interval (feet bgs) ^{a/}	Ground Surface Elevation (feet amsl) ^{b/}	Date	Elevation Datum (feet amsl)	Depth to Water (feet btoc) ^{c/}	Depth to Emulsion/Oil (feet btoc)	Groundwater Elevation ^{d/} (feet amsl)
Monitoring Wells							
TS-MW-1	7.5 - 17.5	4.19	07-Apr-03	3.86	2.97	--	0.89
			13-Apr-03		3.07	--	0.79
			19-Jun-03		2.74	--	1.12
			23-Jun-03		2.40	--	1.46
			25-Jun-03		2.75	--	1.11
			27-Jan-04		2.55	--	1.31
			14-Oct-04		2.46	--	1.40
			19-Aug-05		3.16	--	0.70
TS-MW-2	2.5 - 21.0	5.02	07-Apr-03	4.73	3.85	--	0.88
			13-Apr-03		4.01	--	0.72
			19-Jun-03		3.62	--	1.11
			23-Jun-03		3.34	--	1.39
			25-Jun-03		3.67	--	1.06
			27-Jan-04		3.41	--	1.32
			14-Oct-04		NM ^{e/}	--	NC ^{f/}
			19-Aug-05		4.16	--	0.65
TS-MW-3	7.5 - 17.5	5.20	07-Apr-03	4.81	3.91	--	0.90
			13-Apr-03		4.11	--	0.70
			19-Jun-03		3.69	--	1.12
			23-Jun-03		3.34	--	1.47
			25-Jun-03		3.72	--	1.09
			27-Jan-04		3.45	--	1.36
			14-Oct-04		3.46	--	1.35
			19-Aug-05		4.16	--	0.65
TS-MW-4	7.5 - 17.5	5.06	07-Apr-03	4.80	3.92	--	0.88
			13-Apr-03		4.07	--	0.73
			19-Jun-03		3.71	--	1.09
			23-Jun-03		3.41	--	1.39
			25-Jun-03		3.74	--	1.06
			27-Jan-04		3.47	--	1.33
			14-Oct-04		3.42	--	1.38
			19-Aug-05		4.16	--	0.64

TABLE 4 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Well or Borehole Identification	Screened Interval (feet bgs) ^{a/}	Ground Surface Elevation (feet amsl) ^{b/}	Date	Elevation Datum (feet amsl)	Depth to Water (feet btoc) ^{c/}	Depth to Emulsion/Oil (feet btoc)	Groundwater Elevation ^{d/} (feet amsl)
Monitoring Wells							
TS-MW-5	2.5 - 22.5	5.43	07-Apr-03	4.93	4.05	--	0.88
			13-Apr-03		4.45	4.10	0.80
			19-Jun-03		5.85	3.71	1.01
			23-Jun-03		5.06	3.37	1.39
			25-Jun-03		5.92	3.70	1.01
			27-Jan-04		4.55	3.55	1.28
			14-Oct-04		3.58	--	1.35
			19-Aug-05		4.32	--	0.61
TS-MW-6	7.5 - 17.5	5.01	07-Apr-03	4.59	3.70	--	0.89
			13-Apr-03		3.85	--	0.74
			19-Jun-03		3.50	--	1.09
			23-Jun-03		3.11	--	1.48
			25-Jun-03		3.50	--	1.09
			27-Jan-04		3.24	--	1.35
			14-Oct-04		3.25	--	1.34
			19-Aug-05		3.97	--	0.62
TS-MW-7	7.5 - 17.5	4.80	07-Apr-03	4.45	3.57	--	0.88
			13-Apr-03		3.71	--	0.74
			19-Jun-03		3.36	--	1.09
			23-Jun-03		3.02	--	1.43
			25-Jun-03		3.39	--	1.06
			27-Jan-04		3.09	--	1.36
			14-Oct-04		3.11	--	1.34
			19-Aug-05		3.83	--	0.62
TS-MW-8	10.0 - 15.0	4.89	07-Apr-03	4.56	3.68	--	0.88
			13-Apr-03		4.10	3.76	0.77
			19-Jun-03		4.60	3.38	1.06
			23-Jun-03		3.92	3.07	1.41
			25-Jun-03		4.18	3.37	1.11
			27-Jan-04		3.23	3.22	1.34
			14-Oct-04		3.22	--	1.34
			19-Aug-05		3.95	--	0.61

TABLE 4 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Well or Borehole Identification	Screened Interval (feet bgs) ^{a/}	Ground Surface Elevation (feet amsl) ^{b/}	Date	Elevation Datum (feet amsl)	Depth to Water (feet btoc) ^{c/}	Depth to Emulsion/Oil (feet btoc)	Groundwater Elevation ^{d/} (feet amsl)
Monitoring Wells							
TS-MW-9	10.0 - 15.0	5.02	07-Apr-03	4.68	3.81	--	0.87
			13-Apr-03		3.97	--	0.71
			19-Jun-03		3.60	--	1.08
			23-Jun-03		3.30	--	1.38
			25-Jun-03		3.62	--	1.06
			27-Jan-04		3.35	--	1.33
			14-Oct-04		3.30	--	1.38
			19-Aug-05		4.05	--	0.63
MW-38	--	--	13-Oct-04	--	1.89	--	--
MW-42	--	--	13-Oct-04	--	2.74	--	--
MW-52	--	--	13-Oct-04	--	3.17	--	--
Injection Wells							
TS-INJ-1	10.0 - 15.0	5.38	7-Apr-03	4.93	4.16	--	0.77
			13-Apr-03		4.20	--	0.73
			14-Oct-04		3.79	3.55	1.14
			19-Aug-05		4.47	4.27	0.64
TS-INJ-2	10.0 - 15.0	4.83	7-Apr-03	4.55	3.62	--	0.93
			13-Apr-03		3.92	3.80	0.74
			27-Jan-04		--	2.50	--
			19-Aug-05		6.80	3.56	0.67
TS-INJ-3	10.0 - 15.0	5.25	7-Apr-03	4.68	4.11	--	0.57
			13-Apr-03		4.15	3.92	0.74
			19-Aug-05		9.39	3.61	0.49
TS-INJ-4	10.0 - 15.0	5.15	7-Apr-03	4.78	3.97	--	0.81
			13-Apr-03		4.10	4.06	0.72
			27-Jan-04		--	2.57	--
			12-Oct-04		2.86	--	1.92
			19-Aug-05		12.10	3.85	0.11

^{a/} feet bgs indicates depth in feet below ground surface.

^{b/} feet amsl indicates elevation in feet above mean sea level.

^{c/} feet btoc indicates depth in feet below top of casing.

^{d/} Where oil was present, groundwater elevations have been adjusted based on a 9/10 ratio of oil/water density.

^{e/} NM = not measured. Field notes indicate obstruction in well prevented measurement of water level.

^{f/} NC = not calculated

"--" Indicates that no floating emulsion or oil was observed.

TABLE 5
HYDRAULIC CONDUCTIVITY ESTIMATES
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Monitoring Well	Test Date	Screened Interval (ft bgs) ^{a/}	Inside Diameter of Casing (inches)	Borehole Diameter (inches)	Filter Pack Porosity (percent)	Static Water Level (feet btoc) ^{b/}	Base Permeable Barrier (ft bgs)	Hydraulic Conductivity (K)		
								(ft/day) ^{c/}	(cm/sec) ^{d/}	(gpd/ft ²) ^{e/}
TS-MW-3	7-Apr-03	7.5 - 17.5	1.0	2.5	30	4.01	17.5	2.25	7.94E-04	17
	7-Apr-03	7.5 - 17.5	1.0	2.5	30	4.01	17.5	2.50	8.83E-04	19
Pre-Injection Average for TS-MW-3								2.4	8.4E-04	18
TS-MW-3	19-Jun-03	7.5 - 17.5	1.0	2.5	30	3.69	17.5	7.36	2.60E-03	55
	19-Jun-03	7.5 - 17.5	1.0	2.5	30	3.69	17.5	6.85	2.42E-03	51
	25-Jan-04	7.5 - 17.5	1.0	2.5	30	3.45	17.5	4.53	1.60E-03	34
	25-Jan-04	7.5 - 17.5	1.0	2.5	30	3.45	17.5	5.07	1.79E-03	38
	21-Dec-04	7.5 - 17.5	1.0	2.5	30	3.43	17.5	2.00	6.00E-04	15
	4-Aug-05	7.5 - 17.5	1.0	2.5	30	4.16	17.5	0.76	2.67E-04	5.7
	4-Aug-05	7.5 - 17.5	1.0	2.5	30	4.16	17.5	0.73	2.59E-04	5.5
Post-Injection Average for TS-MW-3								3.9	1.4E-03	29
TS-MW-5	07-Apr-03	7.5 - 22.5	1.0	2.5	30	4.11	22.5	1.31	4.62E-04	9.8
	07-Apr-03	7.5 - 22.5	1.0	2.5	30	4.11	22.5	1.31	4.62E-04	9.8
Pre-Injection Average for TS-MW-5								1.3	4.6E-04	9.8
TS-MW-5	19-Jun-03	7.5 - 22.5	1.0	2.5	30	5.85	22.5	1.64	5.79E-04	12
	19-Jun-03	7.5 - 22.5	1.0	2.5	30	5.85	22.5	1.16	4.09E-04	8.7
	26-Jan-04	7.5 - 22.5	1.0	2.5	30	4.55	22.5	0.78	2.76E-04	5.8
	26-Jan-04	7.5 - 22.5	1.0	2.5	30	4.55	22.5	0.87	3.08E-04	6.5
	21-Dec-04	7.5 - 22.5	1.0	2.5	30	3.48	22.5	1.00	4.00E-04	7.5
	04-Aug-05	7.5 - 22.5	1.0	2.5	30	4.32	22.5	0.57	2.01E-04	4.3
	Post-Injection Average for TS-MW-5								1.0	3.6E-04

TABLE 5 (Continued)
HYDRAULIC CONDUCTIVITY ESTIMATES
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Monitoring Well	Test Date	Screened Interval (ft bgs) ^{a/}	Inside Diameter of Casing (inches)	Borehole Diameter (inches)	Filter Pack Porosity (percent)	Static Water Level (feet btoc) ^{b/}	Base Permeable Barrier (ft bgs)	Hydraulic Conductivity (K)		
								(ft/day) ^{c/}	(cm/sec) ^{d/}	(gpd/ft ²) ^{e/}
TS-MW-7	07-Apr-03	7.5 - 17.5	1.0	2.5	30	3.65	17.5	5.54	1.96E-03	41
	07-Apr-03	7.5 - 17.5	1.0	2.5	30	3.65	17.5	8.23	2.91E-03	62
Pre-Injection Average for TS-MW-7								6.9	2.4E-03	51
TS-MW-7	19-Jun-03	7.5 - 17.5	1.0	2.5	30	3.36	17.5	2.82	9.95E-04	21
	19-Jun-03	7.5 - 17.5	1.0	2.5	30	3.36	17.5	1.88	6.64E-04	14
	25-Jan-04	7.5 - 17.5	1.0	2.5	30	3.09	17.5	5.97	2.11E-03	45
	25-Jan-04	7.5 - 17.5	1.0	2.5	30	3.09	17.5	3.67	1.30E-03	27
	21-Dec-04	7.5 - 17.5	1.0	2.5	30	3.09	17.5	1.00	3.53E-04	7.5
	21-Dec-04	7.5 - 17.5	1.0	2.5	30	3.09	17.5	3.00	1.06E-03	22
	04-Aug-05	7.5 - 17.5	1.0	2.5	30	3.09	17.5	0.44	1.55E-04	3.3
	04-Aug-05	7.5 - 17.5	1.0	2.5	30	3.09	17.5	1.23	4.34E-04	9.2
Post-Injection Average for TS-MW-7								2.5	8.8E-04	19
TS-MW-8	07-Apr-03	10.0 - 15.0	1.0	2.5	30	3.75	15.0	7.63	2.69E-03	57
	07-Apr-03	10.0 - 15.0	1.0	2.5	30	3.75	15.0	8.68	3.06E-03	65
Pre-Injection Average for TS-MW-8								8.2	2.9E-03	61
TS-MW-8	19-Jun-03	10.0 - 15.0	1.0	2.5	30	4.60	15.0	8.91	3.15E-03	67
	19-Jun-03	10.0 - 15.0	1.0	2.5	30	4.60	15.0	7.96	2.81E-03	60
	26-Jan-04	10.0 - 15.0	1.0	2.5	30	3.23	15.0	4.94	1.74E-03	37
	26-Jan-04	10.0 - 15.0	1.0	2.5	30	3.23	15.0	3.40	1.20E-03	25
	21-Dec-04	10.0 - 15.0	1.0	2.5	30	3.17	15.0	3.00	1.06E-03	22
	04-Aug-05	10.0 - 15.0	1.0	2.5	30	3.95	15.0	2.88	1.02E-03	22
Post-Injection Average for TS-MW-8								5.2	1.8E-03	39

^{a/} ft bgs = feet below ground surface.

^{b/} ft btoc = feet below top of casing.

^{c/} ft/day = feet per day.

^{d/} cm/sec = centimeters per second.

^{e/} gpd/ft² = gallons per day per square foot.

^{f/} ft/ft = foot per foot.

^{g/} ft/yr = foot per year.

TABLE 6
SUMMARY OF CHLORINATED ALIPHATIC HYDROCARBONS IN GROUNDWATER
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Sample Location	Sample Date	Screened Interval (ft bgs) ^a	PCE ^b (µg/L) ^c	TCE (µg/L)	1,1-DCE (µg/L)	<i>cis</i> -1,2-DCE (µg/L)	<i>trans</i> -1,2-DCE (µg/L)	VC (µg/L)	1,1,2,2-PCA (µg/L)	1,1,1-TCA ^b (µg/L)	1,1,2-TCA (µg/L)	1,1-DCA ^b (µg/L)	1,2-DCA (µg/L)	Chloroethane (µg/L)	Methylene Chloride (µg/L)	Chloroform (µg/L)	1,2-DCB ^b (µg/L)	1,4-DCB (µg/L)	Chlorobenzene (µg/L)
Monitoring Wells																			
TS-MW-1	12-Apr-03	7.5 - 17.5	<23	3.0 F ^d	7.8 F	5,700	710	220	<6.7	<13	<17	<6.7	<10	<17	5.7 F,B	<6.7	<6.7	5.7 F	22.0
	24-Jun-03		<18	4.2 F	6.8 F	5,300	530	120	<5	<10	<12	<5	<7.5	<12	<62	<5	<5	6.6	24.0
	27-Jan-04		<56	<40	9.5 F	6,200	1,500	1,200	<16	<32	<40	<16	<24	<40	<200	<16	<16	4.0 F	12 F
	11-Oct-04		<6.6	<5.8	<5.0	6,300	990	520	<13	<4	<7	<3	<6	<9	38 F	<3	<8	<5	<7
	1-Aug-05		<9.2	<6.2	<4.4	6,400	950	520	<9	<8	<9	<4	<4	<17	<18	<5	<13	<8	<3
TS-MW-3	12-Apr-03	7.5 - 17.5	400 F	200,000	230 F	70,000	3,000	2,700	32,000	<400	560	<200	<300	<500	230 F,B ^e	<200	<200	<200	<200
	24-Jun-03		140 F	79,000	240	140,000	2,700	1,700	6,000	<160	120 F	<80	<120	<200	<1,000	<80	<80	<80	<80
	27-Jan-04		380 F	77,000	240 F	100,000	3,600	3,500	17,000	<320	570	<160	<240	<400	<2,000	<160	<160	<160	<160
	11-Oct-04		<83	19,000	330 F	97,000	2,400 F	5,400	<158	<53	<88	<43	<73	<110	360 F	<38	<100	<63	<83
	2-Aug-05		<120	35,000	280 F	140,000	3,800	6,900	<120	<100	380 F	<55	<45	<210	<220	<58	<170	<98	<42
TS-MW-4	12-Apr-03	7.5 - 17.5	140 F	80,000	95 F	40,000	6,100	4,200	26,000	<160	1,200	<80	<120	<200	97 F,B	35 F	<80	<80	<80
	24-Jun-03		190	72,000	100 F	44,000	6,200	3,600	27,000	<100	1,700	<50	<75	<120	<620	37 F	<50	<50	<50
	27-Jan-04		210 F	56,000	130 F	45,000	6,200	3,200	8,300	<160	780	<80	<120	<200	<1,000	13 F	<80	<80	<80
	11-Oct-04		<66	38,000	220 F	77,000	7,400	4,300	1,400	42 F	420	<34	<58	<86	310 F	<30	<80	<50	<66
	2-Aug-05		<92	14,000	<44	53,000	7,400	7,000	<92	<82	<86	<44	<36	<170	<180	<46	<130	<78	<34
TS-MW-5	12-Apr-03	2.5 - 22.5	4.0 F	10,000	45 F	20,000	1,100	1,800	690	<40	200	<20	<30	<50	22 F,B	3.0 F	<20	<20	<20
	25-Jun-03		<280	15,000	99 F	79,000	1,800	1,600	410	<160	140 F	<80	<120	<200	<1,000	<80	<80	<80	<80
	28-Jan-04		<700	19,000	230 F	120,000	4,100	12,000	1,100	<400	160 F	<200	<300	<500	<2,500	<200	<200	<200	<200
	12-Oct-04		<83	12,000	340 F	170,000	2,800	2,800	360 F	<53	<88	<43	<73	<108	270 F	<38	<100	<63	<83
	3-Aug-05		<230	12,000	<110	240,000	4,200 F	2,700 F	<230	<200	<220	<110	<90	<420	<440	<120	<340	<200	<85
TS-MW-6	12-Apr-03	7.5 - 17.5	90 F	140,000	160 F	83,000	2,000	2,000	2,500	<270	37 F	<130	<200	<330	140 F,B	<130	<130	<130	<130
	25-Jun-03		<140	26,000	150	45,000	3,700	2,200	410	<80	14 F	<40	<60	<100	<500	<40	<40	<40	<40
	28-Jan-04		<280	55,000	140 F	60,000	2,000	2,300	520	<160	25 F	<80	<120	<200	<1,000	<80	<80	<80	<80
	11-Oct-04		<66	12,000	<50	41,000	1,200	1,300	<130	<42	<70	<34	<58	<86	320 F	<30	<80	<50	<66
	1-Aug-05		<92	15,000	<44	58,000	1,800 F	2,200	<110	<82	<86	<44	<36	<170	<180	<46	<130	<78	<34
TS-MW-7	13-Apr-03	7.5 - 17.5	21 F	86,000	210 F	89,000	4,000	2,600	3,400	<160	67 F	<80	<120	<200	93 F,B	<80	<80	<80	<80
	25-Jun-03		<140	57,000	74 F	83,000	1,100	1,000	99	<80	<100	<40	<60	<100	<500	<40	<40	<40	<40
	28-Jan-04		<470	80,000	170 F	64,000	3,300	2,100	370	<270	35 F	<130	<200	<330	<1,700	<130	<130	<130	<130
	12-Oct-04		<66	74,000	240 F	79,000	4,200	1,600 F	<126	<42	<70	<34	<58	<86	310 F	<30	<80	<50	<66
	3-Aug-05		<92	86,000	<44	79,000	4,400	1,600 F	<92	<82	<86	<44	<36	<170	<180	<46	<130	<78	<34
TS-MW-8	13-Apr-03	10.0 - 15.0	4.7 F	15,000	66 F	24,000	1,100	1,200	39	<53	190	<27	<40	<67	28 F,B	<27	<27	<27	<27
	25-Jun-03		<280	20,000	110 F	72,000	2,000	1,000	16 F	<160	98 F	<80	<120	<200	<1,000	<80	<80	<80	<80
	28-Jan-04		<1100	21,000	270 F	160,000	3,300	2,700	<320	<640	<800	<320	<480	<800	<4,000	<320	<320	<320	<320
	12-Oct-04		<83	7,500	<63	110,000	3,000	2,400	<158	<53	<88	<43	<73	<108	350 F	<38	<73	<63	<83
	2-Aug-05		<230	5,400	<110	140,000	5,500	7,800	<230	<200	<220	<110	<90	<420	<440	<120	<340	<200	<85
TS-MW-9	12-Apr-03	10.0 - 15.0	77 F	81,000	120 F	40,000	5,300	4,100	240	<160	90 F	<80	<120	<200	82 F,B	<80	<80	<80	<80
	25-Jun-03		33 F	82,000	120 F	47,000	5,100	3,600	120	<160	77 F	<80	<120	<200	<1,000	<80	<80	<80	<80
	28-Jan-04		52 F	59,000	110 F	38,000	5,200	3,400	1,200	<160	280	<80	<120	<200	<1,000	<80	<80	<80	<80
	11-Oct-04		<66	42,000	<50	36,000	4,100	2,100	<130	<42	<70	<34	<58	<86	370 F	<30	<80	<50	<66
	1-Aug-05		<92	56,000	<44	61,000	6,300	3,400	<110	<82	<86	<44	<36	<170	<180	<46	<130	<78	<34
MW-38	11-Apr-03	1.2 - 11.2	650 F	310,000	550 F	30,000	4,800	2,900	1,700	<800	3,700	<400	<600	<1,000	370 F,B	<400	<400	<400	<400

TABLE 6 (Continued)
SUMMARY OF CHLORINATED ALIPHATIC HYDROCARBONS IN GROUNDWATER
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Sample Location	Sample Date	Screened Interval (ft bgs) ^{a/}	PCE ^{b/} (µg/L) ^{c/}	TCE (µg/L)	1,1-DCE (µg/L)	<i>cis</i> -1,2-DCE (µg/L)	<i>trans</i> -1,2-DCE (µg/L)	VC (µg/L)	1,1,2-PCA (µg/L)	1,1,1-TCA ^{b/} (µg/L)	1,1,2-TCA (µg/L)	1,1-DCA ^{b/} (µg/L)	1,2-DCA (µg/L)	Chloroethane (µg/L)	Methylene Chloride (µg/L)	Chloroform (µg/L)	1,2-DCB ^{b/} (µg/L)	1,4-DCB (µg/L)	Chlorobenzene (µg/L)
Injection Wells																			
TS-INJ-1	13-Oct-04	--	<17	4,200	50.2 F	16,000	630.5	420 F	<32	<11	150 F	<9	<15	<22	77 F	<8	<20	<13	<17
TS-INJ-3	3-Aug-05	--	<46	16,000	160 F	34,000	890 F	15,000	<46	<41	<43	<22	<18	<83	<89	<23	<67	<39	<17
TS-INJ-4	12-Oct-04	--	<17	3,600	<13	27,000	590	740	<32	<11	100 F	<9	<15	<22	<28	<8	<20	<13	<17
	3-Aug-05	--	<46	3,000	<22	15,000	420 F	5,200	<46	<41	<43	<22	<18	<83	<89	<23	<67	<39	<17
TS-INJ-4A	2-Feb-04	10.0 - 15.0	4.9 F	3,600	7.6 F	11,000	250	270	19	<32	130	<16	7.3 F	<40	17 F	<16	<16	<16	<16
Oil Results																			
TS-MW-5 (Oil)	25-Jun-03	2.5 - 22.5	15,000 F	3,500,000	10,000 F	4,900,000	200,000	69,000	97,000	<10,000	20,000	<5,000	<7,500	<12,000	<62,000	<5,000	<5,000	<5,000	<5,000
TS-MW-5 (Oil)	28-Jan-04	2.5 - 22.5	32,000	2,400,000	3,800 F	1,600,000	140,000	130,000	650,000	<10,000	35,000	<5,000	<7,500	<12,000	<5,000	<5,000	<5,000	<5,000	<5,000
TS-MW-8 (Oil)	25-Jun-03	10.0 - 15.0	4,600 F	3,400,000	3,900 F	1,600,000	63,000	10,000 F	19,000	<8,000	23,000	<4,000	<6,000	<10,000	<50,000	<4,000	<4,000	<4,000	680 F
TS-INJ-1 (Oil)	13-Oct-04	--	12,000 F	3,300,000	<2,300	1,030,000	60,000 F	<2,000	89,000	<1,900	25,000 F	<1,900	<2,100	<3,600	11,000 F	<1,700	<2,100	<4,900	<1,500
TS-INJ-3 (Oil)	3-Aug-05	--	11,000 F	5,500,000	6,500 F	1,400,000	63,000 F	14,000 F	17,000 F	<3,400	36,000 F	<3,400	<3,400	<9,900	<14,000	<1,400	<3,100	<4,400	<3,100
TS-INJ-4 (Oil)	12-Oct-04	--	10,340 F	2,705,000 F	<1,940	388,000	31,080 F	9,190 F	15,040 F	<2,120	23,010 F	<1,590	<1,770	<3,000	<6,900	<1,400	<1,700	<4,070	<1,240
TS-INJ-4 (Oil)	3-Aug-05	--	8,800 F	2,700,000	<4,900	430,000	36,000 F	12,000 F	<12,000	<3,500	22,000 F	<3,506	<3,500	<10,000	<14,000	<1,400	<3,200	<4,600	<3,200
TS-INJ-4A (Oil)	28-Jan-04	10.0 - 15.0	8,700 F	3,100,000	3,800 F	430,000	34,000	13,000 F	12,000	<10,000	21,000	<5,000	<7,500	<12,000	<5,000	<5,000	<5,000	<5,000	<5,000
Quality Assurance/Quality Control Samples																			
TS-MW-15	12-Apr-03	2.5 - 22.5	4.6 F	11,000	43 F	16,000	730	1,200	200	<40	180	<20	<30	<50	19 F,B	<20	<20	<20	<20
(Duplicate of MW-5)	25-Jun-03		<280	17,000	100 F	82,000	1,800	1,600	370	<160	120 F	<80	<120	<200	<1,000	<80	<80	<80	<80
	28-Jan-04		<7,000	12,000	<6,000	93,000	2,800 F	6,600	800 F	<4,000	<5,000	<2,000	<3,000	<5,000	<25,000	<2,000	<2,000	<2,000	<2,000
	12-Oct-04		<83	11,000	370 F	160,000	2,700	2,700	370 F	<53	<88	<43	<73	<108	260 F	<38	<100	<63	<83
	3-Aug-05		<230	13,000 F	220 F	240,000	4,300 F	2,700 F	<230	<200	<220	<110	<90	<420	<440	<120	<340	<200	<85
Trip Blanks	12-Apr-03	NA	<1.4	0.48 F	<1.2	0.13 F	0.076 F	<1.1	<0.40	<0.80	<1.0	<0.40	<0.60	<1.0	0.40 F,B	<0.40	<0.40	<0.40	<0.40
	25-Jun-03		<1.4	0.074 F	0.053 F	0.18 F	0.085 F	<1.1	<0.40	<0.80	<1.0	<0.40	<0.60	<1.0	<5.0	<0.40	<0.40	<0.40	<0.40
	13-Oct-04		<0.033	<0.029	<0.025	<0.021	<0.037	<0.023	<0.063	<0.021	<0.035	<0.017	<0.029	<0.043	0.26 F	<0.015	<0.040	<0.025	<0.033
	1-Aug-05		<0.050	<0.030	<0.020	<0.040	<0.040	<0.030	<0.050	<0.040	<0.040	<0.020	<0.020	<0.080	<0.090	<0.020	<0.070	<0.040	<0.020
	2-Aug-05		<0.050	<0.030	<0.020	<0.040	<0.040	<0.030	<0.050	<0.040	<0.040	<0.020	<0.020	<0.080	<0.090	<0.020	<0.070	<0.040	<0.020

^{a/} ft bgs = feet below ground surface.

^{b/} PCE = tetrachloroethene, TCE = trichloroethene, DCE = dichloroethene, VC = vinyl chloride, PCA = tetrachloroethane, TCA = trichloroethane, DCA = dichloroethane, and DCB=dichlorobenzene

^{c/} µg/L = micrograms per liter.

^{d/} F flag indicates the concentration detected was below the project reporting limit but above the method detection limit, and the value is therefore estimated.

^{e/} B flag indicates that methylene chloride was detected in the method blanks at concentrations below the reporting limit, but above the method detection limit.

TABLE 7
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Sample Location	Sample Date	Temp (°C) ^{ai}	pH (su) ^{bi}	Conductivity (mS/cm) ^{ci}	Dissolved Oxygen (mg/L) ^{di}	Dissolved Hydrogen (nM) ^{ei}	ORP (mV) ^{fi}	Total Organic Carbon (mg/L)	Nitrite+Nitrate ^h (mg/L)	Manganese (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Chloride (mg/L)	Carbon Dioxide (mg/L)	Alkalinity (mg/L)	Bromide (mg/L)	Methane (µg/L) ^{ji}	Ethene (µg/L)	Ethane (µg/L)	
Monitoring Wells																					
TS-MW-1	12-Apr-03	25.4	7.39	11.0	0.49	NA ^j	-146	11	<0.050	0.10	0.19	800	0.08	2,400	274	453	8.5	280	3.1	0.37	
	24-Jun-03	25.5	7.42	10.5	1.43	1.3	-218	10	<0.050	0.00	0.24	1,400	0.30	2,000	230	205	<0.10	210	0.9	0.29	
	27-Jan-04	25.3	6.31	12.5	0.06	0.87	NM ^k	9	<0.050	0.30	0.24	2,600	0.03	3,800	240	297	<1.0	130	4.6	0.30	
	29-Jan-04	NA	NA	NA	NA	1.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Duplicate	11-Oct-04	26.7	7.29	11.1	0.34	0.87	201	4 (DOC) ^{iv}	<0.050	0.00	0.13	1,800	0.01	2,600	120 * ^{mi}	448	9.1	150	2.5	0.29
		1-Aug-05	26.0	7.20	10.2	0.21	1.40	36	22	NA	0.20	0.08	1,600	<0.01	2,400	126 *	457	10.0	160	2.7	0.29
TS-MW-3	12-Apr-03	25.5	6.96	10.5	0.51	NA	-92	13	<0.050	1.70	1.15	2,000	<0.01	2,300	264	394	8.2	170	13	0.20	
	24-Jun-03	25.5	7.05	11.2	1.31	3.1	-359	13	<0.050	1.60	0.07	1,700	0.80	2,400	268	220	8.1	210	7.6	0.35	
	27-Jan-04	25.6	6.14	10.2	0.05	1.3	NM	12	<0.050	1.80	0.10	2,100	0.80	2,700	360	480	8.5	120	11	0.22	
	11-Oct-04	27.5	7.13	9.8	0.19	0.76	-17	7 (DOC)	0.088	0.60	0.10	1,600	6.00	2,200	175 *	555	8.0	220	11	0.35	
	2-Aug-05	25.8	7.26	9.0	0.22	1.2	-146	24	NA	1.60	<0.03	1,700	6.48	2,500	260 *	570	9.8	190	8.9	0.37	
TS-MW-4	12-Apr-03	25.3	6.86	13.7	0.47	NA	-68	14	<0.050	1.00	1.42	3,000	0.05	3,200	316	570	18	34	21	0.18	
	24-Jun-03	25.1	6.85	13.3	1.46	0.9	-146	14	<0.050	3.90	1.66	2,400	0.01	2,800	324	202	<0.10	41	210	0.20	
	27-Jan-04	25.5	6.07	15.3	0.36	1.0	NM	14	<0.050	22.0	0.32	3,700	0.01	4,500	376	505	<1.0	31	17	0.10	
	11-Oct-04	26.7	6.80	13.9	0.25	0.7	107	5 (DOC)	<0.050	2.50	1.02	NA	0.01	NA	246 *	505	NA	23	61	0.21	
	21-Dec-04	25.7	6.59	14.4	2.35	NA	220	NA	NA	NA	NA	2,900	NA	3,800	NA	NA	<1.0	NA	NA	NA	
	2-Aug-05	25.6	7.05	13.7	0.22	6.1	52	27	NA	0.80	0.79	3,200	<0.01	4,200	360 *	540	13	19	77	0.34	
TS-MW-5	12-Apr-03	25.4	7.06	9.7	0.66	NA	-21	140	<0.050	NA* ^{vi}	0.80	1,800	0.80	2,200	304	720	71	130	13	0.31	
	25-Jun-03	NA	NA	NA	NA	26	NA	230	<0.050	>22.0	0.15	790	0.43	2,100	1,040	NA	<0.10	130	10	1.20	
	28-Jan-04	25.6	6.05	12.8	2.75	77	NM	280	0.052	>22.0	0.00	1,100	0.24	4,700	876	1,570	<1.0	64	100	1.50	
	12-Oct-04	26.1	5.73	12.3	0.25	160	-250	560 (DOC)	<0.050	73.0	0.05	NA	0.14	NA	968	1,850	NA	150	42	0.72	
	21-Dec-04	25.9	6.40	12.7	2.22	NA	-314	NA	NA	NA	NA	620	NA	3,500	NA	NA	<1.0	NA	NA	NA	
	3-Aug-05	25.6	6.22	11.9	0.57	200	-290	470	NA	82.0	<0.03	410	0.11	3,500	320 *	1,800	31	190	34	0.57	
TS-MW-6	12-Apr-03	25.5	7.04	9.7	0.68	NA	-109	11	<0.050	0.80	0.19	1,800	0.01	1,700	174	484	5.8	240	11	0.32	
	25-Jun-03	25.4	7.22	10.0	1.61	NA	-165	11	<0.050	0.00	0.34	1,500	0.01	2,000	388	187	<0.10	260	5.6	0.30	
	28-Jan-04	25.2	6.41	8.3	0.10	NA	NM	9	<0.050	0.20	0.27	1,900	0.03	2,300	234	453	<1.0	220	11	0.35	
	11-Oct-04	27.5	7.24	9.5	0.29	NA	208	7 (DOC)	<0.050	0.20	0.03	1,600	0.01	2,100	98	467	8.1	240	8.8	0.37	
	1-Aug-05	27.0	7.16	9.3	0.22	NA	66	19	NA	<0.12	0.04	1,700	<0.01	2,500	123	483	9.7	220	8.2	0.37	
TS-MW-7	13-Apr-03	25.3	5.94	9.8	0.44	NA	-57	13	<0.050	1.30	0.60	2,000	0.06	2,100	242	524	85	170	16	0.53	
	25-Jun-03	25.5	6.99	10.5	1.78	1.2	-120	11	<0.050	0.20	1.04	1,800	0.00	2,000	446	182	<0.10	150	14	0.22	
	28-Jan-04	24.9	6.26	9.8	0.16	0.77	NM	10	<0.050	1.30	0.62	2,300	0.02	2,600	260	441	<1.0	130	13	0.20	
	12-Oct-04	26.2	6.74	10.8	0.19	5.20	233	6 (DOC)	<0.050	0.60	0.51	2,000	0.20	2,400	134 *	524	7.4	150	14	0.24	
	3-Aug-05	26.6	6.60	7.1	0.61	5.80	-200	39	NA	1.20	0.27	2,600	0.02	3,100	36	550	9.1	130	11	0.23	
TS-MW-8	13-Apr-03	25.6	6.31	10.5	0.83	NA	-19	110	<0.050	NA*	0.34	1,900	0.47	2,300	300	525	110	140	6.8	0.18	
	25-Jun-03	25.5	7.07	12.3	3.30	9.9	-421	140	<0.050	>22.0	0.33	740	0.15	2,600	1,060	NA	<0.10	200	7.7	0.39	
	28-Jan-04	25.4	6.10	12.6	0.02	84	NM	210	<0.050	>22.0	0.02	1,000	0.24	4,800	828	1,693	<1.0	210	14	0.40	
	12-Oct-04	28.7	6.05	11.8	0.13	10	-263	340 (DOC)	<0.050	101	0.05	390	0.21	2,700	760	1,904	<1.0	210	18	0.75	
	2-Aug-05	26.1	7.14	11.2	0.40	3.5	-311	230	NA	36	<0.03	670	0.16	2,800	620 *	1,500	35	160	19	0.76	

TABLE 7 (Continued)
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Sample Location	Sample Date	Temp (°C) ^{a/}	pH (su) ^{b/}	Conductivity (mS/cm) ^{c/}	Dissolved Oxygen (mg/L) ^{d/}	Dissolved Hydrogen (nM) ^{e/}	ORP (mV) ^{f/}	Total Organic Carbon (mg/L)	Nitrite+Nitrate ^{h/} (mg/L)	Manganese (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Chloride (mg/L)	Carbon Dioxide (mg/L)	Alkalinity (mg/L)	Bromide (mg/L)	Methane (µg/L) ^{i/}	Ethene (µg/L)	Ethane (µg/L)	
Monitoring Wells																					
TS-MW-9	12-Apr-03	25.4	6.95	14.7	0.58	NA	4	14	<0.050	1.60	0.19	3,200	0.04	3,500	286	490	6.2	49	16	0.16	
	25-Jun-03	NA	NA	NA	NA	NA	NA	14	<0.050	12.0	0.47	3,100	0.30	3,400	382	172	<0.10	61	17	0.18	
	28-Jan-04	25.1	6.37	14.7	4.25	NA	NM	14	<0.050	>22.0	0.46	3,900	0.00	4,400	306	447	<1.0	14	7.5	0.09	
	11-Oct-04	27.0	6.81	13.7	0.26	NA	218	7 (DOC)	<0.050	14.4	0.75	NA	0.02	NA	175 *	487	NA	26	13	0.22	
	21-Dec-04	25.7	6.72	14.0	1.67	NA	213	NA	NA	NA	NA	3,300	NA	3,600	NA	NA	NA	<1.0	NA	NA	NA
	1-Aug-05	25.9	6.96	13.8	0.21	NA	-148	28	NA	0.04	0.42	3,400	0.02	3,900	180 *	514	11.0	36	37	0.51	
TS-MW-15 (Duplicate of MW-5)	12-Apr-03	NA	NA	NA	NA	NA	NA	6	<0.050	NA	NA	1,800	NA	2,200	NA	NA	81	140	9.2	0.30	
	25-Jun-03	NA	NA	NA	NA	31	NA	210	<0.050	>22.0	0.15	900	0.43	2,400	1,040	NA	27	120	9.7	1.30	
	28-Jan-04	NA	NA	NA	NA	NA	NA	240	0.053	NA	NA	950	NA	3,700	NA	NA	<1.0	160	170	3.20	
	12-Oct-04	NA	NA	NA	NA	NA	NA	580 (DOC)	<0.050	NA	NA	NA	NA	NA	NA	NA	NA	190	36	0.76	
	21-Dec-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	630	NA	3,300	NA	NA	<1.0	NA	NA	NA	
	3-Aug-05	NA	NA	NA	NA	200	NA	470	NA	NA	NA	410	NA	3,600	NA	NA	31	200	35	0.58	
Injection Wells																					
TS-INJ-3	2-Aug-05	26.3	5.96	10.2	0.50	NA	-254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
TS-INJ-4	3-Aug-05	26.2	5.95	10.5	1.43	NA	-260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
MW-38	11-Apr-03	26.7	6.96	8.6	1.37	NA	-49	14	<0.050	NA	0.27	1,400	0.02	1,900	292	500	190	62	11	0.18	
	13-Oct-04	26.6	6.86	6.4	0.47	NA	-192	9 (DOC)	<0.050	0.50	0.73	1,100	ND	1,200	240	380	3.3	NA	NA	NA	
MW-42	13-Oct-04	27.5	6.99	9.4	0.28	NA	58	9 (DOC)	0.760	0.10	ND	2,200	ND	1,800	164 *	490	5.0	NA	NA	NA	
MW-52	13-Oct-04	26.8	7.12	12.7	0.26	NA	-146	5 (DOC)	0.640	0.20	0.01	2,400	0.02	3,000	186 *	330	9.7	NA	NA	NA	
Seawater																					
Seawater	13-Oct-04	NA	NA	NA	NA	NA	NA	<1 (DOC)	<0.050	0.10	0.04	2,800	ND	22,000	146 *	90	60	NA	NA	NA	

^{a/} °C = degrees Centigrade.

^{b/} su = standard pH units.

^{c/} mS/cm = millisiemens per centimeter.

^{d/} mg/L = milligrams per liter.

^{e/} nM = nanomoles.

^{f/} ORP = oxidation-reduction potential.

^{g/} mV = millivolts.

^{h/} Nitrate+Nitrite analyzed by USEPA Method E353.3.

^{i/} µg/L = micrograms per liter.

^{j/} NA = not analyzed.

^{k/} NM = not measured.

^{l/} NA* = not analyzed due to interference from turbidity.

^{m/} * indicates that the analysis (titration) was performed outside the calibration range for the titration reagent.

^{n/} DOC indicates the data is Dissolved Organic Carbon rather than Total Organic Carbon.

TABLE 8
METABOLIC ACIDS IN GROUNDWATER
VEGETABLE OIL INJECTION AT LF-05
HICKAM AFB, HAWAII

Sample Location	Sample Date	Total Organic	Total	Metabolic Acids					
		Carbon (mg/L)	Metabolic Acids (mg/L) ^{a/}	Pyruvic (mg/L)	Lactic (mg/L)	Formic (mg/L)	Acetic (mg/L)	Propionic (mg/L)	Butyric (mg/L)
Monitoring Wells									
TS-MW-1	12-Apr-03	11	ND ^{b/}	<80 ^{c/}	<1	<1	<1	<1	<1
	24-Jun-03	10	ND	<4	<1	<1	<1	<1	<1
	27-Jan-04	9.3	ND	<4	<1	<1	<1	<1	<1
	11-Oct-04	4 (DOC) ^{d/}	ND	<4	<1	<1	<1	<1	<1
	1-Aug-05	22	ND	<4	<1	<1	<1	<1	<1
TS-MW-3	12-Apr-03	13	ND	<80	<1	<1	<1	<1	<1
	24-Jun-03	13	ND	<4	<1	<1	<1	<1	<1
	27-Jan-04	12	ND	<4	<1	<1	<1	<1	<1
	11-Oct-04	7 (DOC)	ND	<4	<1	<1	<1	<1	<1
TS-MW-4	12-Apr-03	14	ND	<80	<1	<1	<1	<1	<1
	24-Jun-03	14	ND	<4	<1	<1	<1	<1	<1
	27-Jan-04	14	ND	<4	<1	<1	<1	<1	<1
	11-Oct-04	5 (DOC)	ND	<4	<1	<1	<1	<1	<1
TS-MW-5	12-Apr-03	140	ND	<80	<1	<1	<1	<1	<1
	25-Jun-03	230	330	<4	<1	<1	305	16	9.5
	28-Jan-04	280	416	<4	<1	<1	386	28	2.5
	12-Oct-04	560 (DOC)	1,108	<4	<1	4	1,019	53	32
	3-Aug-05	470	1,167	<40	<10	<10	1,004	137	26
TS-MW-7	13-Apr-03	13	ND	<80	<1	<1	<1	<1	<1
	25-Jun-03	11	ND	<4	<1	<1	<1	<1	<1
	28-Jan-04	9.9	ND	<4	<1	<1	<1	<1	<1
	12-Oct-04	6 (DOC)	ND	<4	<1	<1	<1	<1	<1
	3-Aug-05	39	ND	<4	<1	<1	<1	<1	<1
TS-MW-8	13-Apr-03	110	ND	<80	<1	<1	<1	<1	<1
	25-Jun-03	140	181	<4	<1	<1	171	6.2	3.8
	28-Jan-04	210	386	<4	<1	<1	357	26	2.8
	12-Oct-04	340 (DOC)	595	<4	<1	<1	572	7.2	15
	2-Aug-05	230	196	<4	<1	<1	191	4.7	<1
TS-MW-15 (Duplicate of MW-5)	12-Apr-03	6.3	ND	<80	<1	<1	<1	<1	<1
	25-Jun-03	210	324	<4	<1	<1	299	16	8.7
	12-Oct-04	580 (DOC)	1,027	<4	<1	4.2	930	63	29
	3-Aug-05	470	1,257	<4	<1	<1	1,039	186	32

^{a/} pmoles PLFA/ml = picomoles of phospholipid fatty acid per milliliter of sample.

^{a/} mg/L = milligrams per liter.

^{b/} ND = not detected

^{c/} "<" indicates that the analyte was below the limit of quantitation.

^{d/} DOC indicates the data is Dissolved Organic Carbon rather than Total Organic Carbon.