WESTERN
GEO-ENGINEERS
CALIF. CONTRACTOR #513857
REGISTERED GEOLOGISTS

1386 EAST BEAMER STREET
WOODLAND CA 95776-6003
(530) 668-5300,
FAX (530) 662-0273
wege@mother.com

August 29, 2000

Mr. John Rutherford
Desert Petroleum
P.O. Box 1601
Oxnard, California 93032
(805) 644-6784 FAX (805) 654-0720

Dear Mr. Rutherford:

The following report documents the Third Quarter 2000 collection and certified laboratory analysis of groundwater samples from eight monitoring wells (MW1, RS2, RS5, RS6, RS7, RS8, RS9 and RS10), three water recovery/injection wells (R1, R2 and R3) and the receptor trench well (T1) associated with former Desert Petroleum Station #793. Also included with this report is the description to complete the receptor trench pump and treat system and the workplan for nutrient augmentation into wells R1, R2 and R3.

1.0 SITE LOCATION AND DESCRIPTION

Former Desert Petroleum #793 is a non-active service station, located on the northwest corner of the intersection of Park Boulevard and Hampel Street at 4035 Park Blvd., Oakland, California (Figure 1). The site is located in projected section 32; T1S; R3W; MDB&M at an approximate elevation of 210 feet above mean sea level (Figure 2).

2.0 LOCAL GEOLOGY

2.1 Geomorphology

The site is located on the western slope of the Berkeley Hills. The Berkeley Hills are a northwest-southeast trending range within the Coastal Range Province of California. Erosion of the Coastal Ranges has filled the valleys within and bordering the Coastal Range with sequences of gravels, silts, sands, and clays.

2.2 Stratigraphy

2.1.1 Station Property

The native soil from surface to 13 feet below ground surface (BGS) consists of dark brown silty clay. The dark brown clay is underlain by light brown stiff clay that includes subrounded to rounded metavolcanic gravel. This clay extends to approximately 23 feet BGS at the northwest corner of the site. A fine to medium sand, clayey sand, and silty sand underlies the gravel and clay.

2.1.2 Backyard Sewer Lateral Route

Assessments performed along the sewer lateral as it leaves the site and routes through the residentual area towards Brighton Avenue show the subsurface to consists of fill from a couple of inches thick to two feet thick. Beneath the fill is a sequence of clay formations that vary in color from light brown to dark gray to approximately the 6 foot depth. Silty clay then extends to approximately the 14-foot depth. Beneath the silty clay is sand with occasional gravel. This sand is 11 feet thick at RS5 and is underlain by silty clay.

2.1.3 Brighton Avenue

Construction of the receptor trench along the eastern curb area of Brighton Avenue revealed two separate sequences of lithology. North of the storm drain catch basin the sequence consists of; clay to the four foot depth, silty clay to the seven foot depth, fine silty sand to the 9 foot depth, medium sand to the 10 foot depth, silty caly to the 11 ½ foot depth, gravel to the 12 foot depth underlain by clay to the 16 foot depth. South of the storm catch basin is a sequence of silty clays and clays to depth.

3.0 COLLECTION AND ANALYSIS OF GROUNDWATER SAMPLES, AUGUST 8, 2000

The third quarter sampling occurred on August 8, 2000. Water samples were collected from wells R1, R2, R3, MW1, RS-2, RS-5, and RS-6 located on-site and RS-7, RS-8, RS-9, RS-10 and T1 located offsite in the backyards and along Brighton Avenue northeast of the site (Figure 3), see Table 1. Appendix A contains QA/QC, details, methods, procedures, abbreviations, and acronyms used in sampling and analysis.

3.1 Depth to Water Measurements

Depth to water was measured at each well using a product/water interface probe. Measurements are referenced to the surveyed elevation at the top of casing at each well. Table 1 shows the elevation of groundwater with respect to mean sea level for all wells through August 8, 2000.

3.2 Purging of Monitor Wells

David Pittman Well Purge (DPWP), using a truck mounted vacuum lift pump and one-inch diameter PVC tubing purged the monitor wells of three volumes of water. The specific volume of water removed from each well is recorded on the well sampling data sheets (Appendix A).

3.3 Collection and Certified Analysis of Groundwater Samples

After purging, the wells were allowed to recover to at least 80% of their original well volumes. A groundwater sample was then collected from each well with a disposable polyethylene bailer and decanted, with no headspace, into two 40 ml VOA vials containing 0.5 ml HCL acid as a preservative. North State Environmental Laboratories analyzed all water samples for concentrations of TPH-G, BTEX, and MTBE using EPA methods 5030/8015M/8020 (Appendix C). **On December 7,1989, this site ceased operation and all fuel was removed**. Presence of MTBE by Method 8020 from the November 24, 1998 sampling was verified with EPA Method 8260. This most recent sampling showed the absence of MTBE in all wells sampled (August 8, 2000). The November 24, 1998 was the first occurrence of MTBE and was associated with the upgradient wells MW-1 and RS-2. This indicates an upgradient source for the MTBE may exist. Previous sample results and the February 23, 1999 sample results showed all wells below laboratory lower detection limits for MTBE using standard methods and the September 1998 samples from all wells were also analyzed for the Fuel Oxygenants using EPA Method 8260. All wells tested below laboratory lower detection limits.

Fuel Oxygenants (Method 8260)	Laboratory Lower Detection Limits
Ethanol	500 ug/L
Methyl-t-Butyl Ether (MTBE)	1 ug/L
Di Isopropyl Ether (DIPE)	5 ug/L
Tertiary Butyl Alcohol (TBA)	5 ug/L
Ethyl t Butyl Ether (ETBE)	5 ug/L
t-Amyl Methyl Ether (TAME)	1 ug/L

Appendix D contains a chart comparing the amount of MTBE found in wells MW1, RS2, RS5, RS6 and RS7 versus time. This chart indicates two major occurrences of MTBE, the winter of 1996 and the summer of 1999.

3.4 Disposition of Waste Water

The wastewater generated from the purging of the monitor wells during sampling was pumped through two, in series, activated water carbon units and then to the on-site sanitary sewer (wastewater discharge permit # 5043550 1). As of August 24, 2000 29,721 gallons of treated groundwater have been discharged to East Bay Municipal Utility District sewer system, under the

permit. see Table 2 and Appendix B. Previous purged well water was removed from the site and transported to a recycling facility, by Evergreen Environmental Services.

4.0 RESULTS OF QUARTERLY GROUNDWATER MONITORING

4.1 Groundwater Gradient and Flow Direction

Figure 4A shows the groundwater elevation gradients and flow direction that were derived from the depth to water measurements of the monitor wells on August 8, 2000. Table 1 with charts shows the groundwater elevations for the wells during the assessment of this site.

The current flow direction is northwest to west. The hydraulic gradient averages 0.11 feet/linear foot downgradient from the overexcavated area at the site to 0.125-feet/linear foot downgradient off site, see Figure 4A. The current flow direction and hydraulic gradient are consistent with previous determinations by WEGE.

4.2 Results of Certified Analysis of Groundwater Samples

The results of the certified analyses of groundwater samples collected on August 8, 2000 are shown in Table 1 and Figure 4B. Copies of the laboratory reports are included as Appendix C of this report.

TPH-G concentrations in water samples from the eight monitor wells, the receptor trench well and three recovery wells ranged from a maximum of 100 mg/l at RS8, to 62 and 60 ug/L in wells MW1, and RS2 respectively. Benzene concentrations ranged from a maximum of 24 mg/L in RS8 to below the laboratory lower detection limits (0.5 ug/L) at wells RS2 and R3.

Analysis results for Oxygenant Methyl-t-Butyl Ether (MTBE) was below the laboratory lower detection limit (0.5 ug/L) in all wells sampled. During the September 16, 1998 all Fuel Oxygenants; MTBE, Di-isopropyl Ether (DIPE), tertiary Butyl Alcohol (TBA), Ethyl-t-Butyl Ether (ETBE) and t-Amyl Methyl Ether (TAME) were confirmed with EPA Method 8260. These analytes were below laboratory lower detection limits. Figure 4B shows the areal distribution of the hydrocarbon plume in groundwater as determined from groundwater samples collected from the monitor wells and from non-certified results from the Soil Probe Surveys.

5.0 WEEKLY PURGEING OF RECEPTOR TRENCH

Commencing on May 4, 2000, weekly pumping of the receptor trench has been performed for approximately 4 hours per week, see Table 2. During purging the depth to water within the trench

is lowered an average of one feet. Immediately after purging ceases, the water level in the trench recovers to its original depth. As of August 24, 2000, 29,721 gallons of contaminated groundwater have been removed from the trench, processed through two in series activated carbon water scrubs and discharged to the sanitary sewer. The weekly purging of the receptor trench will continue until a conduit can be placed along Park Avenue and Brighton Avenue connected the T1 well (receptor trench) to the treatment compound. This will allow the placement of a submersible pump into T1 that will continuously pump at 2 gpm, removing an estimated 20,000 gallons of contaminated water weekly, instead of the 700 to 1600 gallons currently being recovered on a weekly bases.

6.0 WEEKLY NUTRIENT AUGMENTATION

Presently there is no nutrient augmentation into any wells associated with this site. Nutrient augmentation will commence once the enclosed workplan has been approved. The workplan proposes to introduce fifty gallons of nutrient enriched water (consisting of 15 pounds of sodium hexametaphosphate and 15 pounds of ammonium sulfate) into well R3. Prior to introduction of the nutrient enriched water, wells R1, R2, R3, RS8, RS9, RS10 and T1 will be field screened for the presence of dissolved oxygen, reactive phosphorus, sulfate and nitrogen using the Hach DR/2000 Spectrophotometer. Four hours after introduction of the five gallons of nutrients into R3, wells R1, R2 and R3 will be sampled and field screened for reactive phosphorus, sulfate and nitrogen using the Hach DR/2000 Spectrophotometer. Thereafter weekly measurements will be obtained from R1, R2 and T1 and monthly measurements from RS8, RS9 and RS10, see Appendix E – Nutrient Augmentation Workplan, Appendix F-Scope News Letter, Appendix G-MSDS, and Appendix H – Hach field procedures.

7.0 SUMMARY

Since the installation and weekly purging of the receptor trench (T1) TPHg concentrations in down gradient well RS-7 have decreased along with the depth to groundwater, see Table 1 with charts RS-7. The weekly purging of the receptor trench is limited to a maximium daily discharge of 5 gpm, thus removing approximately 1200 to 2000 gallons per week. Although this does lower the water level in the trench, after pumping has ceased the water level rebounds to it original pre pump depth allowing for the gradient migration of TPHg contaminated groundwater to continue.

8.0 RECOMMENDATIONS

- Solicit bids to:
  Construct a subsurface 4-inch diameter conduit connecting the receptor trench to the treatment compound along the curb areas of Brighton and Park Avenues;
  Supply electrical power to the treatment compound;
  Connect the treatment compound components to the electrical power supply;
  And install a submersible pump with a no load sensor into T1 and connect the pump and discharge line to the treatment compound via the 4-inch diameter conduit;
- Continue the weekly four hour purge of T1 until the above pump system has been installed.

- Start augmentation of nutrients (sodium hexametaphosphate and ammonium sulfate) into well R3
- Perform monthly field measurements of dissolved oxygen, phosphate, sulfate and nitrogen at R1, R2, RS8, RS10, T1 and RS9.

9.0 LIMITATIONS

This report is based upon the following:

A. The observations of field personnel.
B. The results of laboratory analyses performed by a state certified laboratory.
C. Referenced documents.
D. Our understanding of the regulations of the State of California, Alameda County and the City of Oakland.
E. Changes in groundwater conditions can occur due to variations in rainfall, temperature, local and regional water use, and local construction practices.
F. In addition, variations in the soil and groundwater conditions could exist beyond the points explored in this investigation.

State Certified Laboratory analytical results are included in this report. This laboratory follows EPA and State of California approved procedures; however, WEGE is not responsible for errors in these laboratory results. Western Geo-Engineers is a corporation under California Registered Geologist #3037 and/or Contractors License #513857. The services performed by Western Geo-Engineers have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the State of California and the Oakland area. Our work and/or supervision of remediation and/or abatement operations, active or preliminary, at this site is in no way meant to imply that we are owners or operators of this site. Known or suspected contamination of soil and/or groundwater must be reported to the appropriate agencies in a timely manner. No other warranty, expressed or implied, is made.

Sincerely,

George Converse
Geologist

Jack E. Napper
Ca. Reg. Geologist #3037

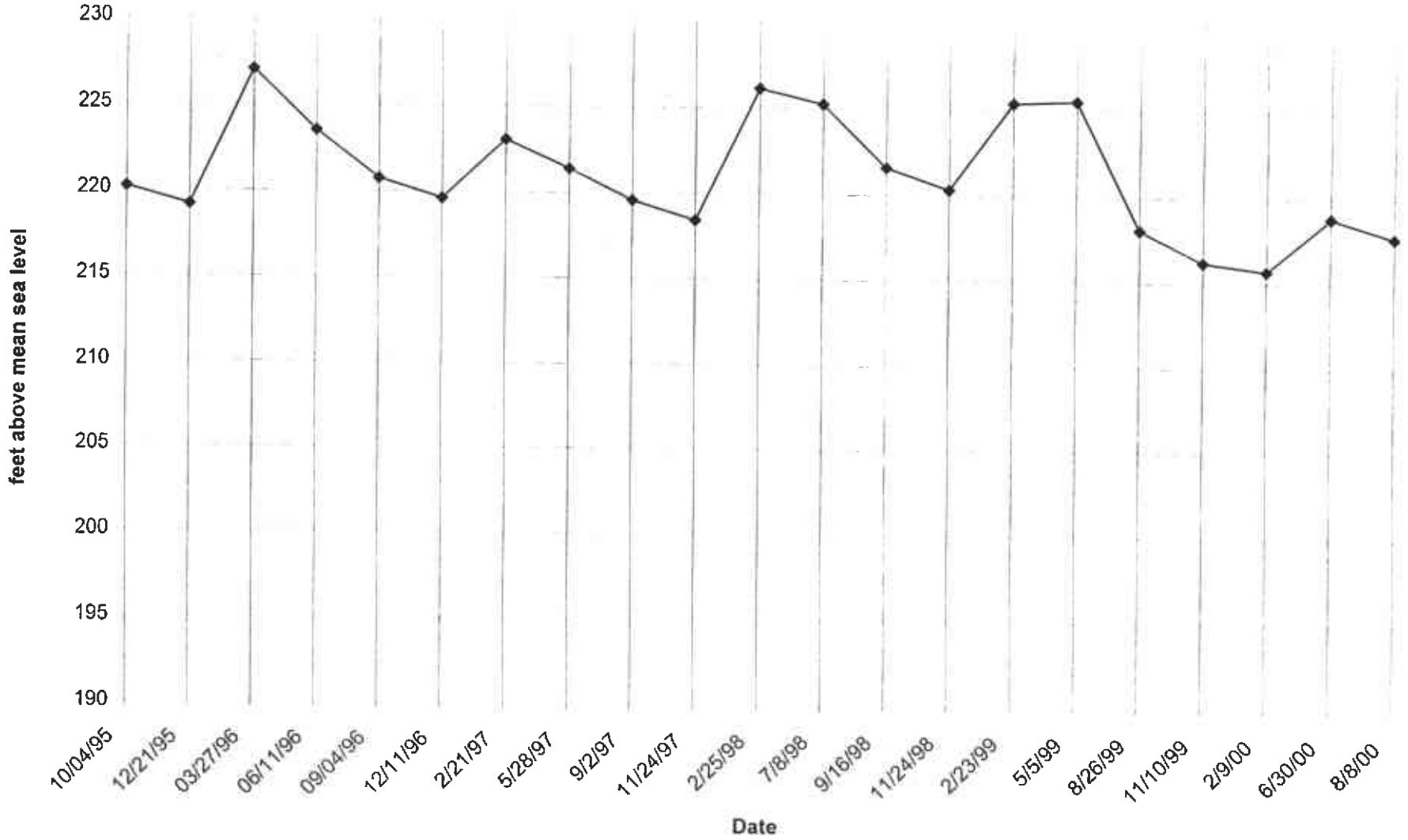
REGISTERED GEOLOGIST
JACK E. NAPPER
No. 3037
STATE OF CALIFORNIA

cc: Mr.Tom Peacock, Alameda County Health (510) 567-6774
Mr. Leroy Griffin, Oakland Fire Dept.

TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion [ug/L, ppb]) (AMSL = Above mean sea level) DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)	TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
RS-1	12/14/89	240	24.25	215.75	19000	2600	2700	200	1200		
RS-1	12/90				15000	3500	330	170	760		
RS-1	2/91				6900	910	200	39	540		
RS-1	6/91				1600	56	180,000	12	26		
RS-1	9/91				4100	730	7.6	5.1	24		
RS-1	12/91				8300	950	160	71	190		
RS-1	11/09/92	100.18	17.05	83.13	1700	730	9.6	16	14		
RS-1	04/07/94	100.18	13	87.18	860	84	12	16	110		
RS-1	06/19/94	228.15	13.37	214.78	1400	150	12	52	87		
RS-1	09/17/94	228.15	16.33	211.82	310	30	1.8	2.8	3.9		
RS-1	03/12/95	228.15	4.66	223.49	ND	ND	ND	ND	ND		
		DESTROYED BY OVER-EXCAVATION OF UST-DISPENSER AREAS (8/14/95									
		REPLACED WITH MW-1 9/5/95.									
MW-1	10/04/95	232.57	12.38	220.19	ND	ND	ND	ND	ND		
MW-1	12/21/95	232.57	13.40	219.17	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
MW-1	03/27/96	232.57	5.53	227.04	< 50	< 0.5	< 0.5	< 0.5	< 2	< 50	
MW-1	06/11/96	232.57	9.02	223.55	< 50	< 0.5	< 0.5	< 0.5	< 2	< 50	
MW-1	09/04/96	232.57	11.84	220.73	< 50	< 0.5	< 0.5	< 0.5	< 2	< 5	
MW-1	12/11/96	232.57	12.98	219.59	< 50	< 0.5	0.9	< 0.5	< 1	< 0.5	
MW-1	2/21/97	232.57	9.50	223.07	< 50	< 0.5	0.9	< 0.5	< 1	< 0.5	*
MW-1	5/28/97	232.57	11.18	221.39	< 50	3	3	< 0.5	< 1	< 0.5	*
MW-1	9/2/97	232.57	13.00	219.57	< 50	5	< 0.5	< 0.5	< 1	< 0.5	*
MW-1	11/24/97	232.57	14.12	218.45	< 50	5	< 0.5	< 0.5	< 1	< 0.5	*
MW-1	2/25/98	232.57	6.41	226.16	< 50	< 0.5	< 0.5	< 0.5	< 1	< 0.5	*
MW-1	7/8/98	232.57	7.28	225.29	< 50	< 0.5	< 0.5	< 0.5	< 1	< 1	*
MW-1	9/16/98	232.57	10.96	221.61	< 50	< 0.5	< 0.5	< 0.5	< 1	< 1	*
MW-1	11/24/98	232.57	12.24	220.33	52	2.3	5.2	< 0.5	5.4	11	*
MW-1	2/23/99	232.57	7.14	225.43	< 50	< 0.5	5	< 0.5	< 1	< 0.5	
MW-1	5/5/99	232.57	7.00	225.57	< 50	2	<0.5	< 0.5	< 1	8	
MW-1***	8/26/99	229.5	11.41	218.09	<50	4.1	<0.5	< 0.5	< 1	<1	
MW-1	11/10/99	229.5	13.27	216.23	<50	<0.5	<0.5	< 0.5	< 1	<0.5	
MW-1	2/9/00	229.5	13.76	215.74	<50	<0.5	<0.5	0.5	< 1	0.5	
MW-1	6/30/00	229.5	10.63	218.87	<50	<0.5	<0.5	< 0.5	< 1	< 0.5	
MW-1	8/8/00	229.5	11.77	217.73	62	1	2	< 0.5	2	< 0.5	

MW-1 Groundwater Elevation



RS-1/MW-1 TPHg

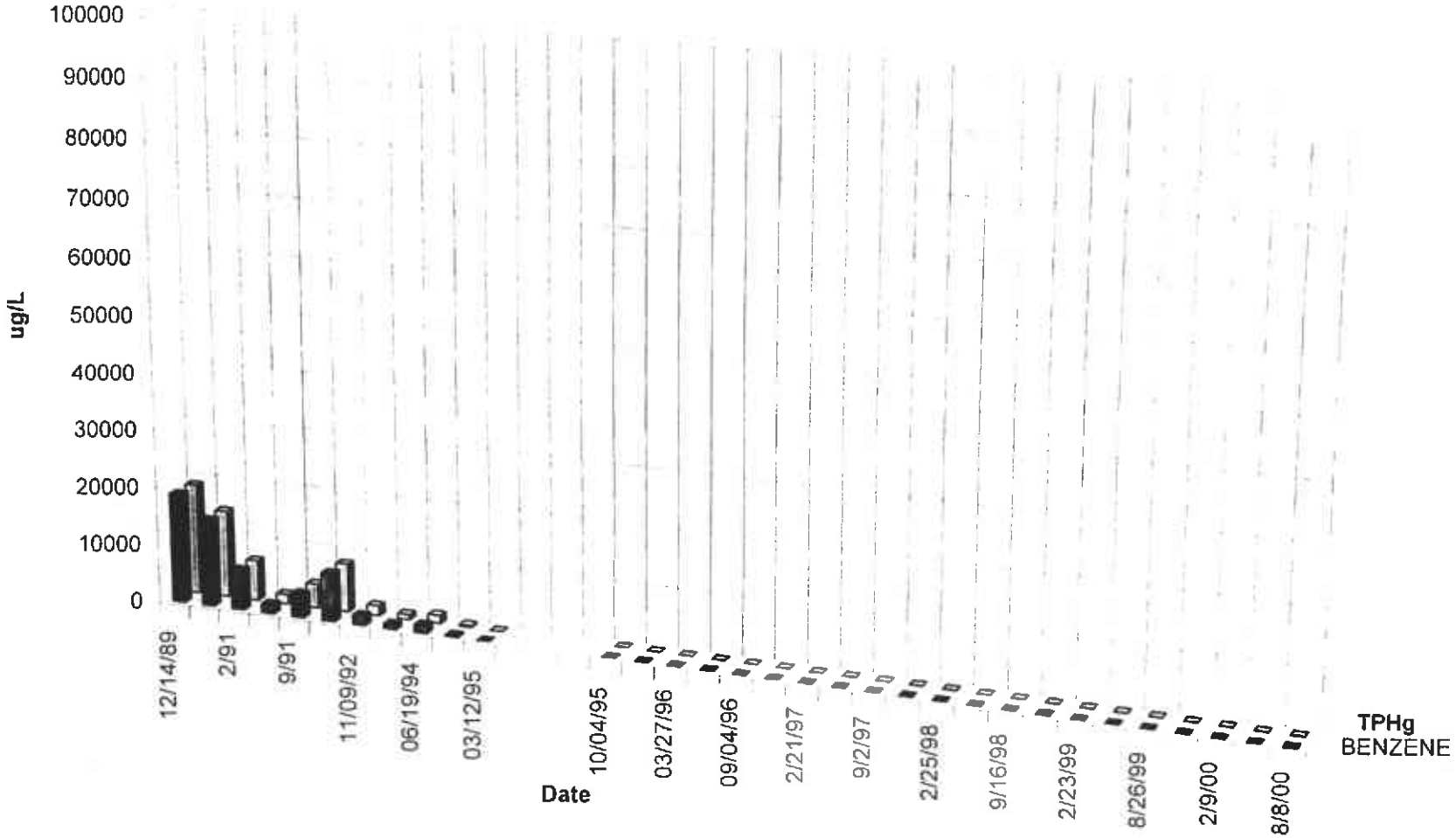
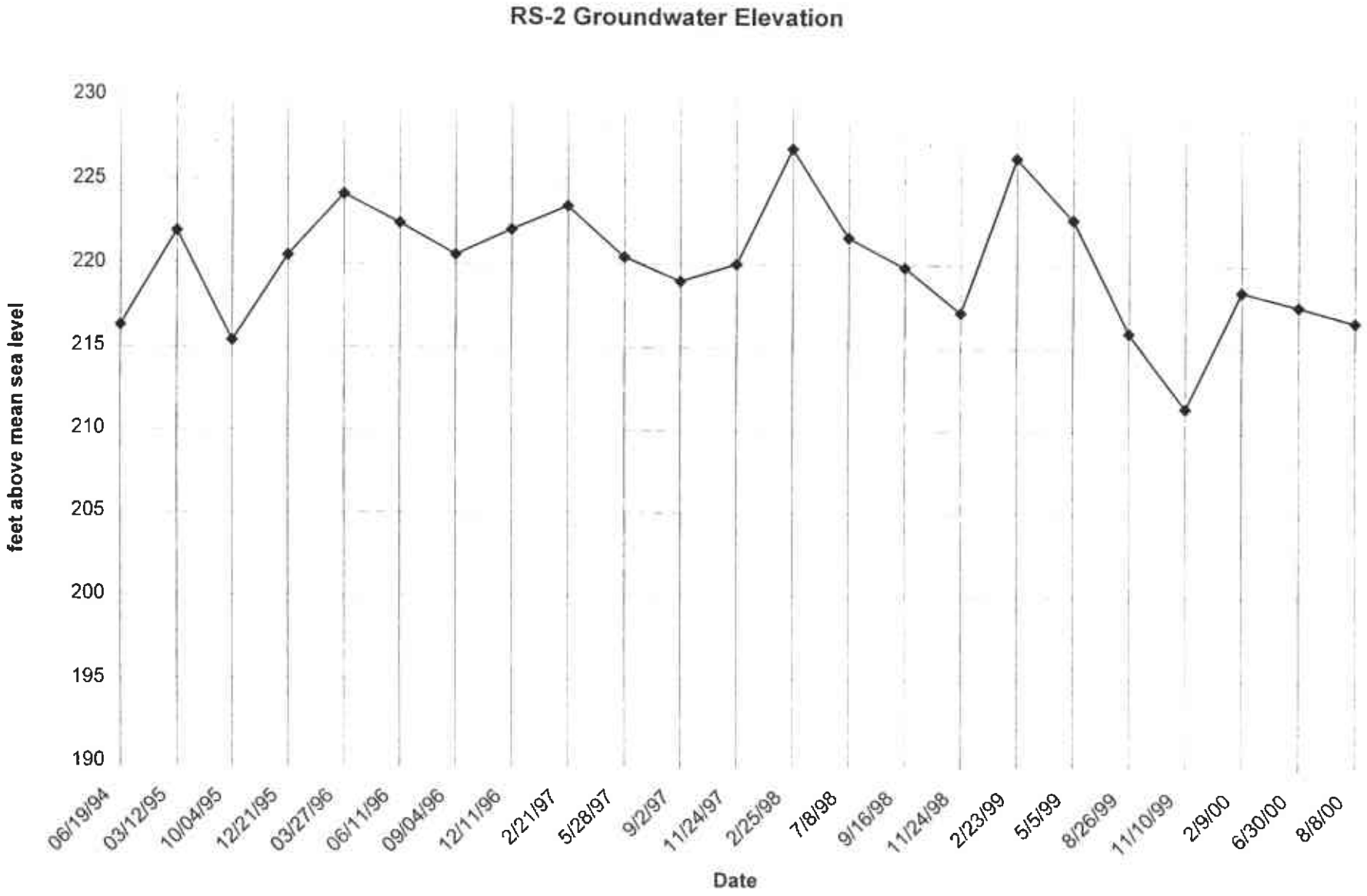

100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
ug/L
12/14/89
2/91
9/91
11/09/92
06/19/94
03/12/95
10/04/95
03/27/96
09/04/96
2/21/97
9/2/97
2/25/98
9/16/98
2/23/99
8/26/99
2/9/00
8/8/00
Date
TPHg
BENZENE

TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion (ug/L, ppb)) (AMSL = Above mean sea level) DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)		TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
RS-2	06/19/94	227.19	10.89	216.3		140	9.2	34	4.3	24.0		
RS-2	03/12/95	227.19	5.26	221.93		ND	ND	ND	ND	ND		
RS-2	10/04/95	230.43	15.05	215.38		ND	ND	ND	ND	ND		
RS-2	12/21/95	230.43	9.95	220.48		< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
RS-2	03/27/96	230.43	6.28	224.15		< 50	< 0.5	< 0.5	< 0.5	< 2	< 50	
RS-2	06/11/96	230.43	8.00	222.43		< 50	1.2	2.8	< 0.5	< 2	< 50	
RS-2	09/04/96	230.43	9.89	220.54		< 50	< 0.5	< 0.5	< 0.5	< 2	< 5	
RS-2	12/11/96	230.43	8.38	222.05		< 50	< 0.5	< 0.5	< 0.5	< 1	6	
RS-2	2/21/97	230.43	6.96	223.47		< 50	< 0.5	< 0.5	< 0.5	< 1	< 0.5	*
RS-2	5/28/97	230.43	10.02	220.41		< 50	3	3	< 0.5	< 1	< 0.5	*
RS-2	9/2/97	230.43	11.46	218.97		< 50	< 0.5	< 0.5	< 0.5	< 1	< 0.5	*
RS-2	11/24/97	230.43	10.43	220		< 50	< 0.5	1	< 0.5	3	< 0.5	*
RS-2	2/25/98	230.43	3.57	226.86		< 50	< 0.5	< 0.5	< 0.5	< 1	< 0.5	*
RS-2	7/8/98	230.43	8.83	221.6		< 50	< 0.5	< 0.5	< 0.5	< 1	< 1	*
RS-2	9/16/98	230.43	10.60	219.83		< 50	< 0.5	< 0.5	< 0.5	< 1	< 1	*
RS-2	11/24/98	230.43	13.27	217.16		140	2.8	19	2.6	3.3	15	*
RS-2	2/23/99	230.43	4.06	226.37		< 50	< 0.5	< 0.5	< 0.5	< 1	< 0.5	
RS-2	5/5/99	230.43	7.70	222.73		< 50	0.7	< 0.5	< 0.5	< 1	6	
RS-2***	8/26/99	227.39	11.42	215.97		200	15	23	1.7	23	9	*
RS-2	11/10/99	227.39	15.94	211.45		< 50	<0.5	<0.5	<0.5	< 1	<0.5	
RS-2	2/9/00	227.39	8.91	218.48		< 50	<0.5	<0.5	<0.5	< 1	<0.5	
RS-2	6/30/00	227.39	9.79	217.6		52	2	<0.5	<0.5	< 1	<0.5	
RS-2	8/8/00	227.39	10.71	216.68		60	<0.5	<0.5	<0.5	< 1	<0.5	


RS-2 Groundwater Elevation
feet above mean sea level
230
225
220
215
210
205
200
195
190
06/19/94
03/12/95
10/04/95
12/21/95
03/27/96
06/11/96
09/04/96
12/11/96
2/21/97
5/28/97
9/2/97
11/24/97
2/25/98
7/8/98
9/16/98
11/24/98
2/23/99
5/5/99
8/26/99
11/10/99
2/9/00
6/30/00
8/8/00
Date

RS-2 TPHg

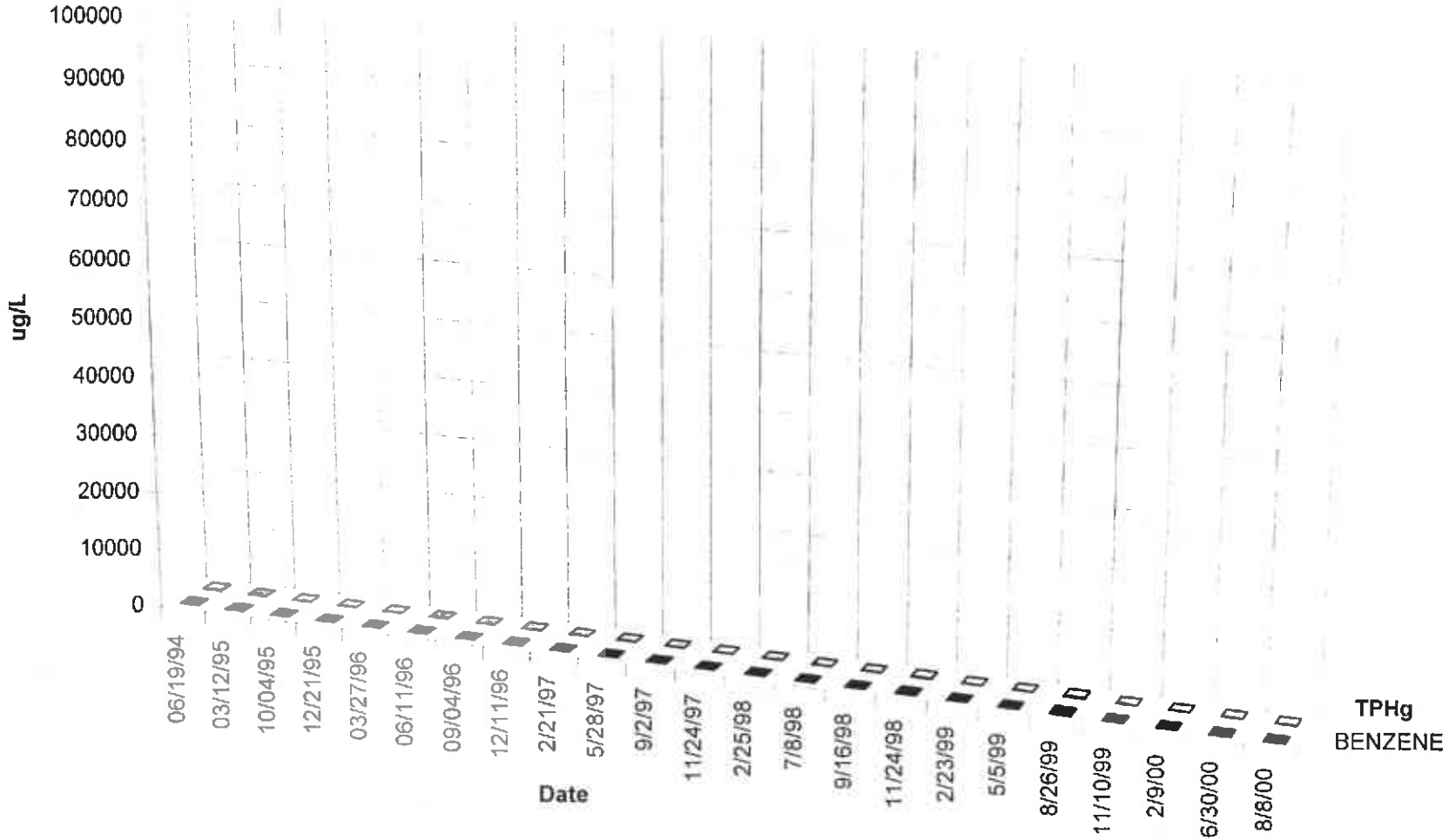
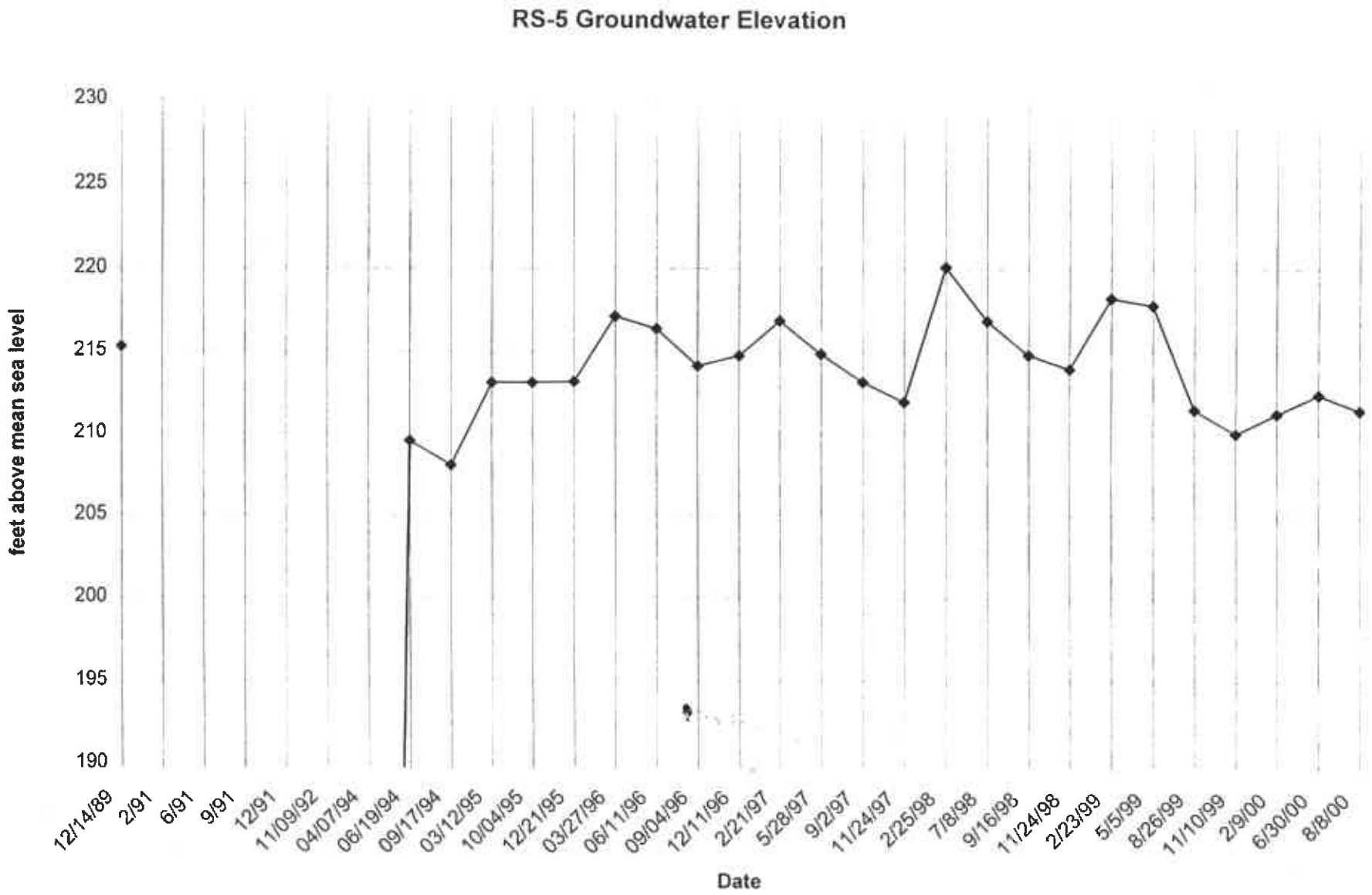

100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
ug/L
06/19/94
03/12/95
10/04/95
12/21/95
03/27/96
06/11/96
09/04/96
12/11/96
2/21/97
5/28/97
9/2/97
11/24/97
2/25/98
7/8/98
9/16/98
11/24/98
2/23/99
5/5/99
8/26/99
11/10/99
2/9/00
6/30/00
8/8/00
Date
TPHg
BENZENE

TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion (ug/L, ppb)) (AMSL = Above mean sea level) DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)		TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
RS-5	12/14/89	241.26	25.97	215.29		57000	3100	4300	670	3400		
RS-5	2/91		FLOATING PRODUCT									
RS-5	6/91		FLOATING PRODUCT									
RS-5	9/91		FLOATING PRODUCT									
RS-5	12/91		FLOATING PRODUCT									
RS-5	11/09/92	98.99	20.73	78.26		50000	650	4800	1100	15000		
RS-5	04/07/94	98.99	18.16	80.83		27000	5000	8700	550	2800		
RS-5	06/19/94	227.65	18.11	209.54		20000	2100	5300	470	2500		
RS-5	09/17/94	227.65	19.63	208.02		9300	230	340	110	700		
KS-5	03/12/95	227.65	14.54	213.11		93000	6400	2000	19000	10000		
RS-5	10/04/95	230.64	17.53	213.11		16000	420	2100	320	1800		
RS-5	12/21/95	230.64	17.47	213.17		48000	3500	9200	840	4800	56	
RS-5	03/27/96	230.64	13.51	217.13		68000	4900	18000	1700	11000	< 3000	
RS-5	06/11/96	230.64	14.25	216.39		66000	6300	20000	2100	12000	< 3000	
RS-5	09/04/96	230.64	16.50	214.14		31000	2100	11000	1100	6800	400	
RS-5	12/11/96	230.64	15.88	214.76		85000	7000	21000	1800	8900	570	
RS-5	2/21/97	230.64	13.76	216.88	sh	100000	5000	22000	1700	7300	<0.5	*
RS-5	5/28/97	230.64	15.77	214.87		52000	4500	19000	2100	10000	<0.5	*
RS-5	9/2/97	230.64	17.47	213.17		38000	2200	9400	1300	5800	<0.5	
RS-5	11/24/97	230.64	18.67	211.97		45000	4000	16000	1900	9700	<0.5	*
RS-5	2/25/98	230.64	10.53	220.11		160000	2700	31000	5300	28000	<0.5	*
RS-5	7/8/98	230.64	13.75	216.89		45000	2800	12000	2000	8500	<10	*
RS-5	9/16/98	230.64	15.80	214.84		49000	1400	7500	1700	8600	<5	*
RS-5	11/24/98	230.64	16.64	214		89000	5300	15000	2800	13000	<10	
RS-5	2/23/99	230.64	12.36	218.28		19000	1900	11000	2500	4800	<25	*
RS-5	5/5/99	230.64	12.78	217.86		78000	2000	10000	3000	15000	540	*
RS-5***	8/26/99	227.61	16.06	211.55		35000	870	4000	1900	8300	<1	*
RS-5	11/10/99	227.61	17.54	210.07		40000	1000	5600	1800	8100	<0.5	
RS-5	2/9/00	227.61	16.31	211.3		46000	1400	6900	2700	11000	<0.5	
RS-5	6/30/00	227.61	15.15	212.46		37000	810	5200	2200	9100	<2.5	*
RS-5	8/8/00	227.61	16.10	211.51		14000	330	500	1400	6500	<0.5	


RS-5 Groundwater Elevation
feet above mean sea level
230
225
220
215
210
205
200
195
190
12/14/89
2/91
6/91
9/91
12/91
11/09/92
04/07/94
06/19/94
09/17/94
03/12/95
10/04/95
12/21/95
03/27/96
06/11/96
09/04/96
12/11/96
2/21/97
5/28/97
9/2/97
11/24/97
2/25/98
7/8/98
9/16/98
11/24/98
2/23/99
5/5/99
8/26/99
11/10/99
2/9/00
6/30/00
8/8/00
Date

RS-5

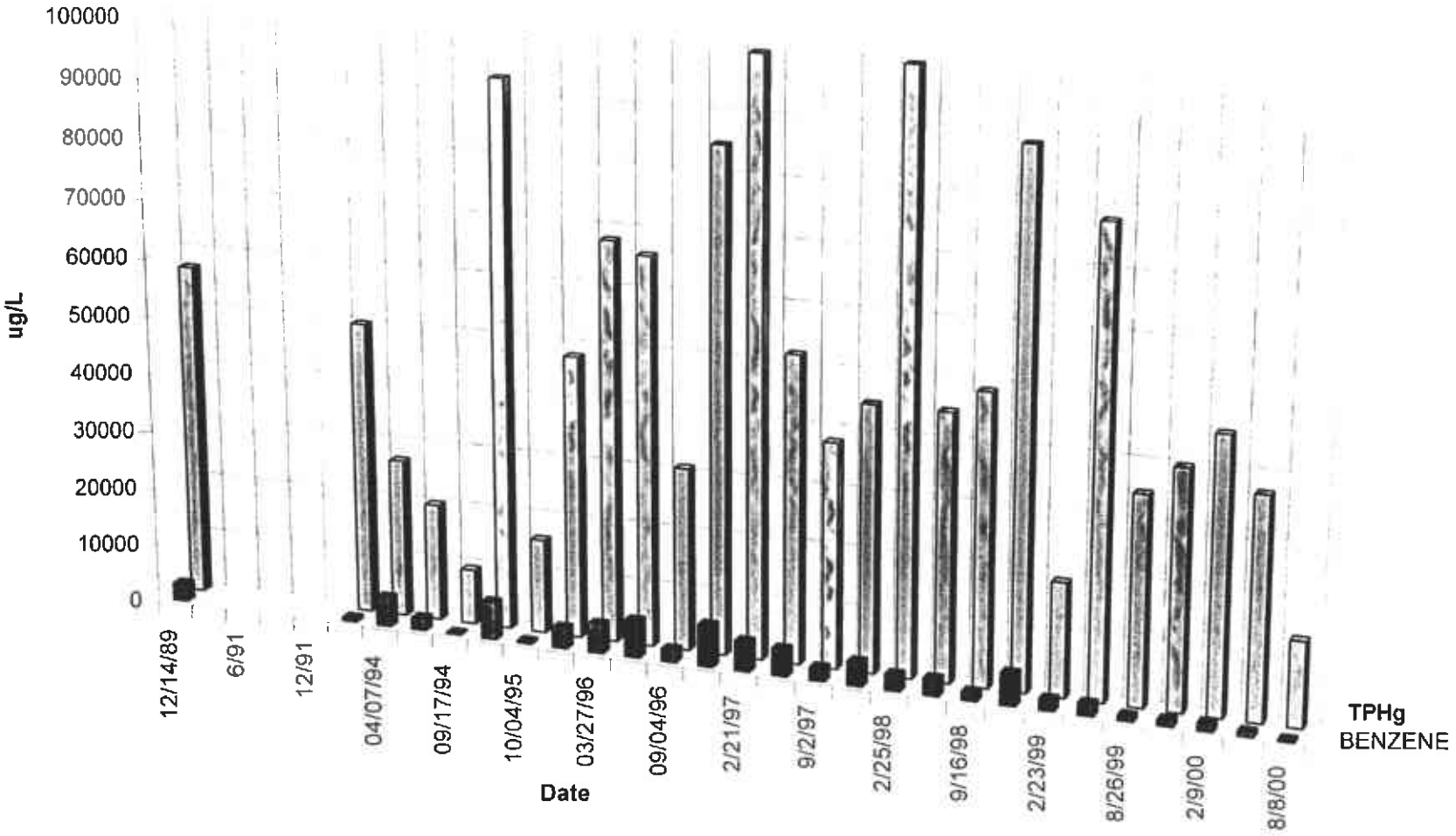
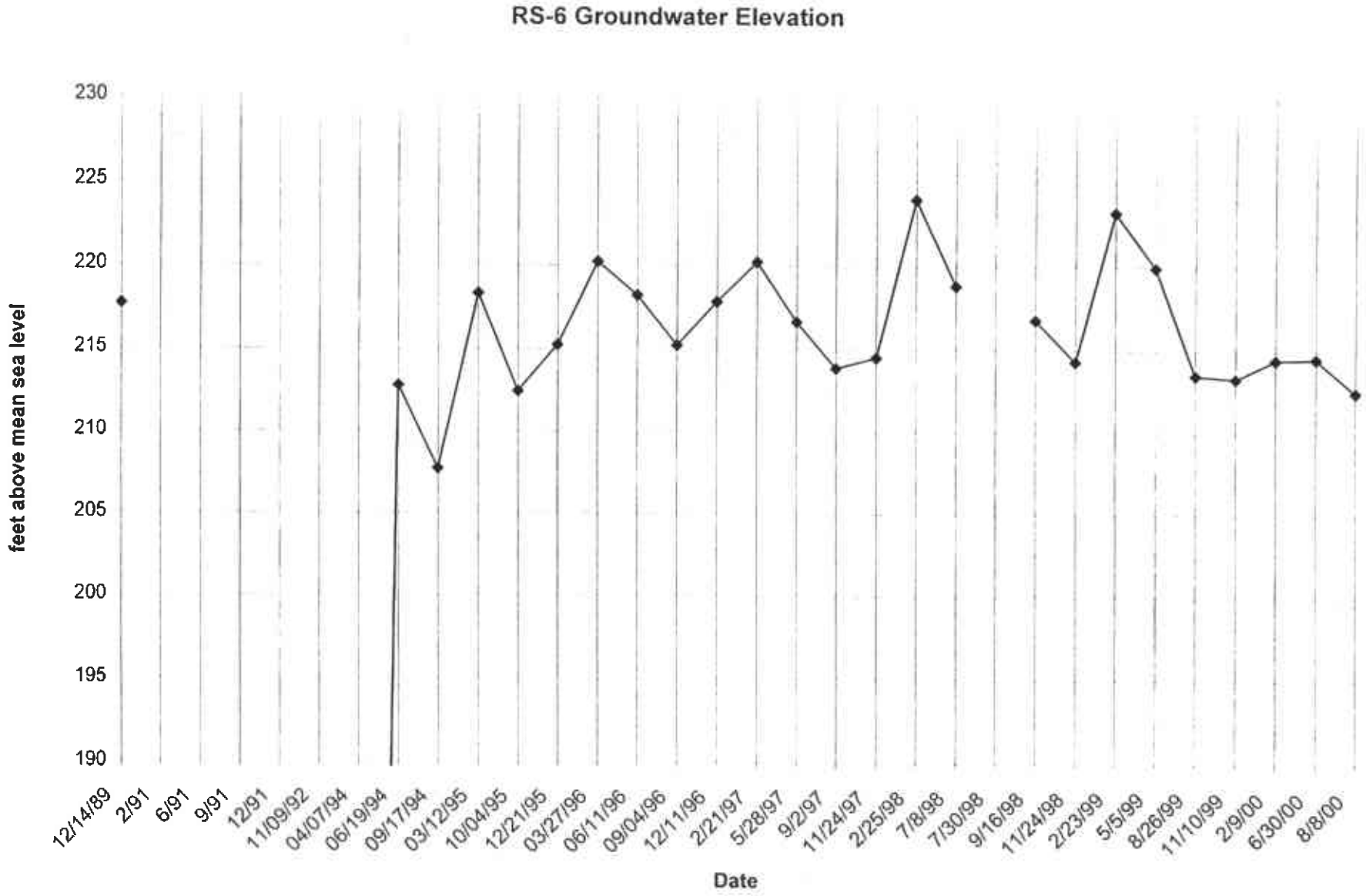

100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
ug/L
12/14/89
6/91
12/91
04/07/94
09/17/94
10/04/95
03/27/96
09/04/96
2/21/97
9/2/97
2/25/98
9/16/98
2/23/99
8/26/99
2/9/00
8/8/00
Date
TPHg
BENZENE

TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion [ug/L, ppb]) (AMSL = Above mean sea level)										
	DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)	TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
RS-6	12/14/89	240.23	22.52	217.71	11000	1400	1700	160	860		
RS-6	2/91		FLOATING PRODUCT								
RS-6	6/91				95000	4200	4200	650	3700		
RS-6	9/91		FLOATING PRODUCT								
RS-6	12/91				64000	3700	2300	730	4100		
RS-6	11/09/92	99.27	19.43	79.84	19000	1600	710	500	1600		
RS-6	04/07/94	99.27	14.42	84.85	16000	1200	1300	290	1100		
RS-6	06/19/94	227.22	14.45	212.77	23000	1300	2200	590	2200		
RS-6	09/17/94	227.22	19.52	207.7	24000	630	790	250	1100		
RS-6	03/12/95	227.22	8.90	218.32	3200	450	13	82	230		
RS-6	10/04/95	230.22	17.78	212.44	3700	170	250	38	290		
RS-6	12/21/95	230.22	14.98	215.24	3100	120	30	16	150	58	
RS-6	03/27/96	230.22	10.00	220.22	6900	180	440	79	360	< 300	
RS-6	06/11/96	230.22	12.00	218.22	7400	220	150	30	100	<1000	
RS-6	09/04/96	230.22	15.00	215.22	1400	68	2.6	7.7	9.2	14	
RS-6	12/11/96	230.22	12.36	217.86	1800	39	16	10	18	< 0.5	
RS-6	2/21/97	230.22	10.00	220.22	2100	71	85	25	40	< 0.5	*
RS-6	5/28/97	230.22	13.56	216.66	1700	34	12	11	16	< 0.5	*
RS-6	9/2/97	230.22	16.35	213.87	940	34	71	9	55	< 0.5	*
RS-6	11/24/97	230.22	15.72	214.5	490	9	6	1	7	< 0.5	*
RS-6	2/25/98	230.22	6.26	223.96	1400	22	47	5	52	< 0.5	*
RS-6**	7/8/98	230.22	11.41	218.81	1500	83	9	84	2	<10	*
RS-6	7/30/98	230.22			<50	<0.5	<0.5	<0.5	<1		
RS-6	9/16/98	230.22	13.42	216.8	990	23	<0.5	<0.5	<1	<1	*
RS-6	11/24/98	230.22	15.91	214.31	3400	5.3	<0.5	<0.5	14	<0.5	
RS-6	2/23/99	230.22	7.00	223.22	1000	3.4	3.2	1.6	7.3	<0.5	
RS-6	5/5/99	230.22	10.29	219.93	1100	50	10	80	15	2	
RS-6***	8/26/99	227.22	13.72	213.5	690	44	2.5	30	31	<5	
RS-6	11/10/99	227.22	13.90	213.32	1800	2	2	0.9	16	< 0.5	
RS-6	2/9/00	227.22	12.77	214.45	410	3	3	4	7	< 0.5	
RS-6	6/30/00	227.22	12.69	214.53	660	7	2	5	6	< 0.5	
RS-6	8/8/00	227.22	14.72	212.5	660	2	3	2	6	< 0.5	


RS-6 Groundwater Elevation
feet above mean sea level
230
225
220
215
210
205
200
195
190
12/14/89
2/91
6/91
9/91
12/91
11/09/92
04/07/94
06/19/94
09/17/94
03/12/95
10/04/95
12/21/95
03/27/96
06/11/96
09/04/96
12/11/96
2/21/97
5/28/97
9/2/97
11/24/97
2/25/98
7/8/98
7/30/98
9/16/98
11/24/98
2/23/99
5/5/99
8/26/99
11/10/99
2/9/00
6/30/00
8/8/00
Date

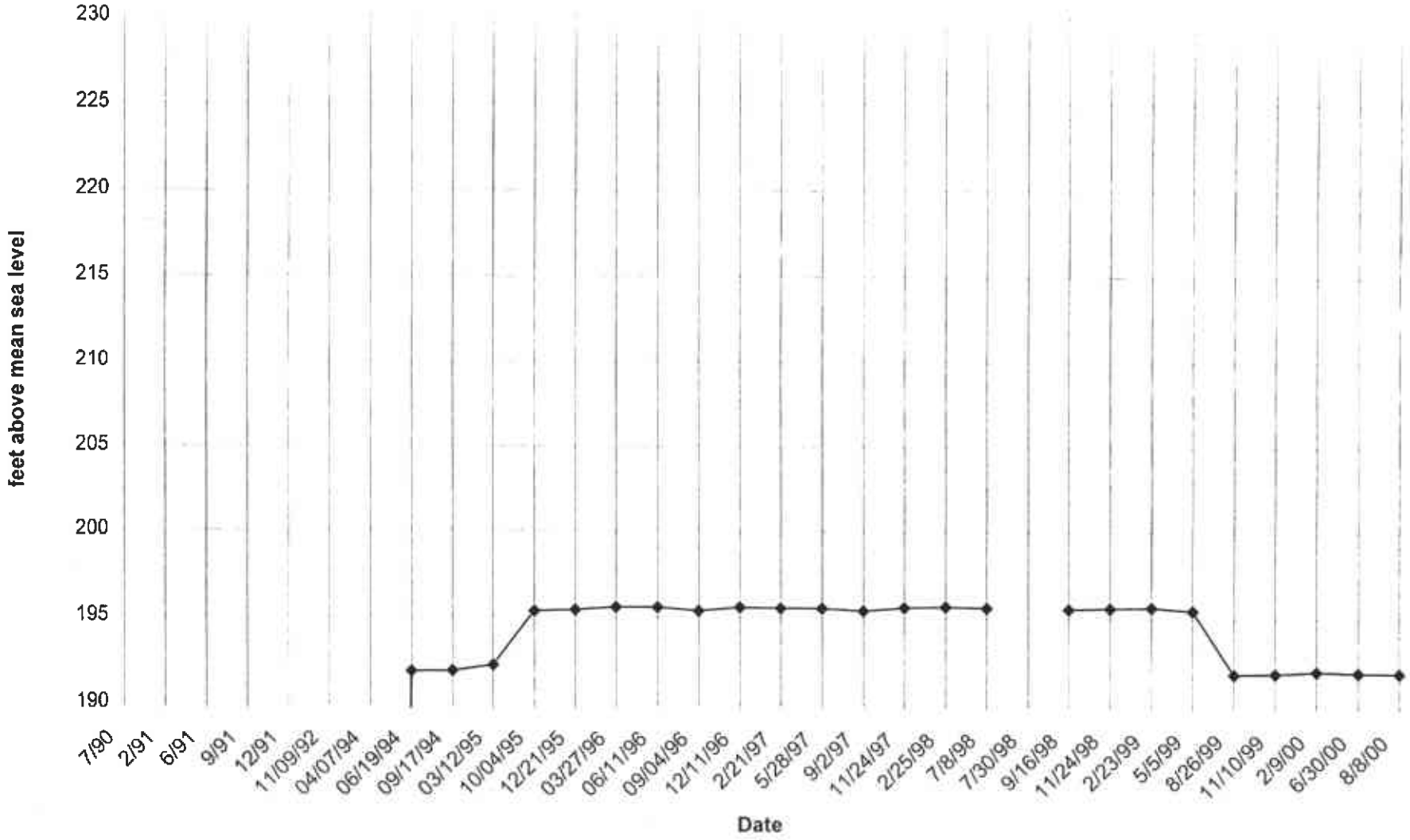
RS-6

100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
ug/L
12/14/89
6/91
12/91
04/07/94
09/17/94
10/04/95
03/27/96
09/04/96
2/21/97
9/2/97
2/25/98
7/30/98
11/24/98
5/5/99
11/10/99
6/30/00
Date
TPHg
BENZENE

TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion (ug/L, ppb)) (AMSL = Above mean sea level)										
	DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)		TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
RS-7	7/90					5600000	24000	210000	50000	740000		
RS-7	2/91		FLOATING PRODUCT									
RS-7	6/91		FLOATING PRODUCT									
RS-7	9/91		FLOATING PRODUCT									
RS-7	12/91					270000	11000	22000	2000	13000		
RS-7	11/09/92	67.88	4.62	63.26		81000	12000	16000	1900	13000		
RS-7	04/07/94	67.88	4.03	63.85		74000	16000	16000	1400	8500		
RS-7	06/19/94	195.92	4.07	191.85		83000	22000	19000	1500	9500		
RS-7	09/17/94	195.92	4.05	191.87		270000	13000	15000	2100	1100		
RS-7	03/12/95	195.92	3.72	192.2		35000	5100	560	6300	3600		
RS-7	10/04/95	199.35	4.03	195.32		96000	14000	14000	1300	7000		
RS-7	12/21/95	199.35	3.95	195.4		70000	9300	12000	860	5600	210	
RS-7	03/27/96	199.35	3.80	195.55		64000	8900	14000	1100	8300	< 3000	
RS-7	06/11/96	199.35	3.79	195.56		65000	12000	17000	1600	9700	<5000	
RS-7	09/04/96	199.35	3.99	195.36		20000	4900	2100	670	4400	100	
RS-7	12/11/96	199.35	3.78	195.57		17000	4400	7500	570	4600	180	
RS-7	2/21/97	199.35	3.82	195.53		93000	31000	47000	3800	23000	<0.5	*
RS-7	5/28/97	199.35	3.82	195.53		52000	12000	8200	2000	11000	<0.5	*
RS-7	9/2/97	199.35	3.96	195.39		28000	6100	2800	950	3800	<50	
RS-7	11/24/97	199.35	3.76	195.59		18000	4300	5900	600	2900	<0.5	*
RS-7	2/25/98	199.35	3.70	195.65		13000	4300	7100	1100	5800	<0.5	*
RS-7**	7/8/98	199.35	3.76	195.59		45000	10000	3400	2000	8000	<10	*
RS-7	7/30/98	199.35				72000	12000	2100	2000	9100		
RS-7	9/16/98	199.35	3.83	195.52		5000	6500	160	<2.5	500	<5	*
RS-7	11/24/98	199.35	3.77	195.58		19000	2100	1100	500	2100	<0.5	
RS-7	2/23/99	199.35	3.70	195.65		83000	6500	9900	1200	7000	<10	
RS-7	5/5/99	199.35	3.88	195.47		47000	7400	4800	1300	7400	540	
RS-7***	8/26/99	195.99	4.16	191.83		15000	3400	91	950	970	<5	
RS-7	11/10/99	195.99	4.12	191.87		10000	2900	170	630	1200	<0.5	
RS-7	2/9/00	195.99	3.98	192.01		9400	1400	120	480	600	<0.5	
RS-7	6/30/00	195.99	4.04	191.95		8200	3300	190	430	540	<0.5	
RS-7	8/8/00	195.99	4.06	191.93		11000	2300	150	430	520	<0.5	

RS-7 Groundwater Elevation



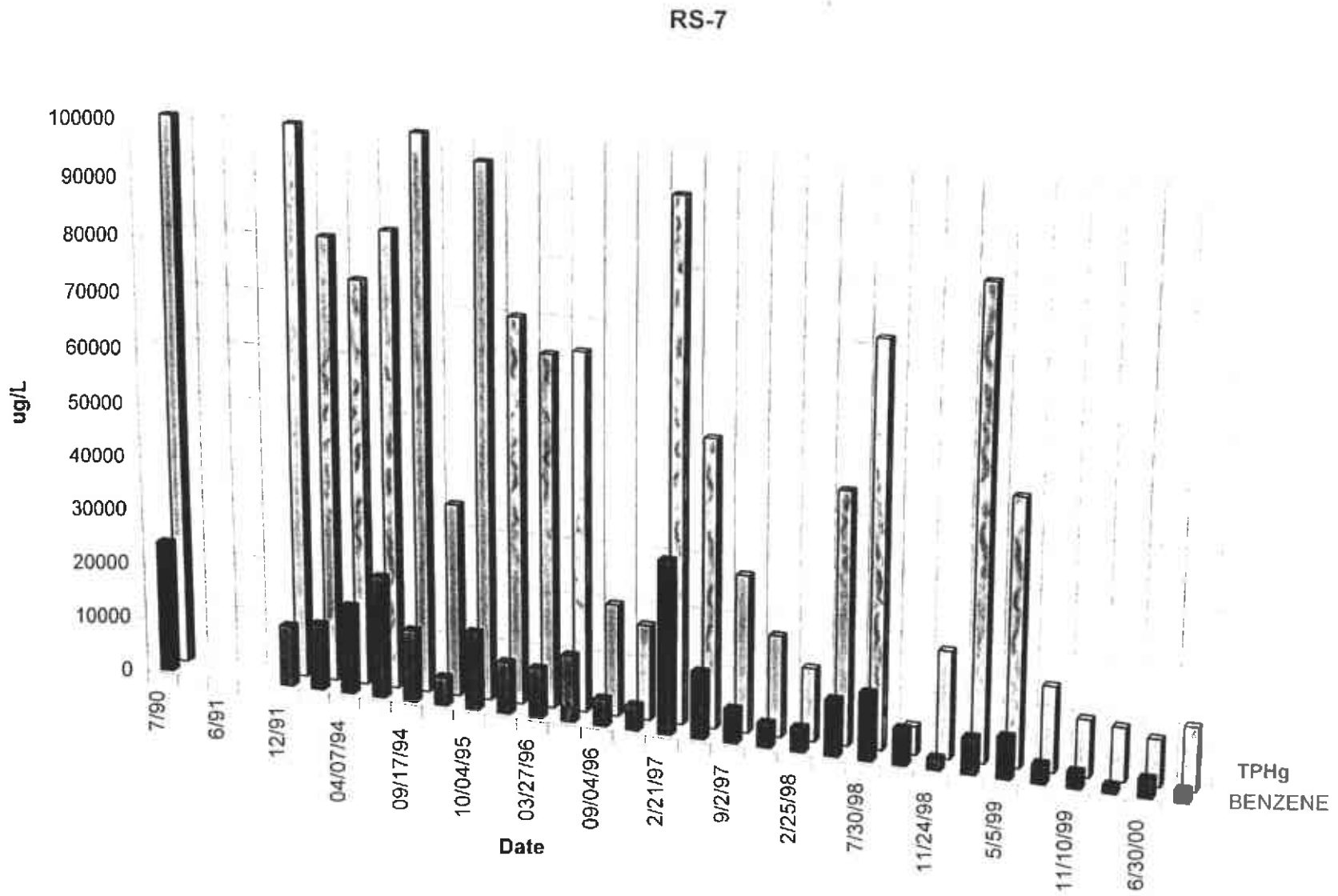

RS-7
ug/L
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
7/90
6/91
12/91
04/07/94
09/17/94
10/04/95
03/27/96
09/04/96
2/21/97
9/2/97
2/25/98
7/30/98
11/24/98
5/5/99
11/10/99
6/30/00
Date
TPHg
BENZENE

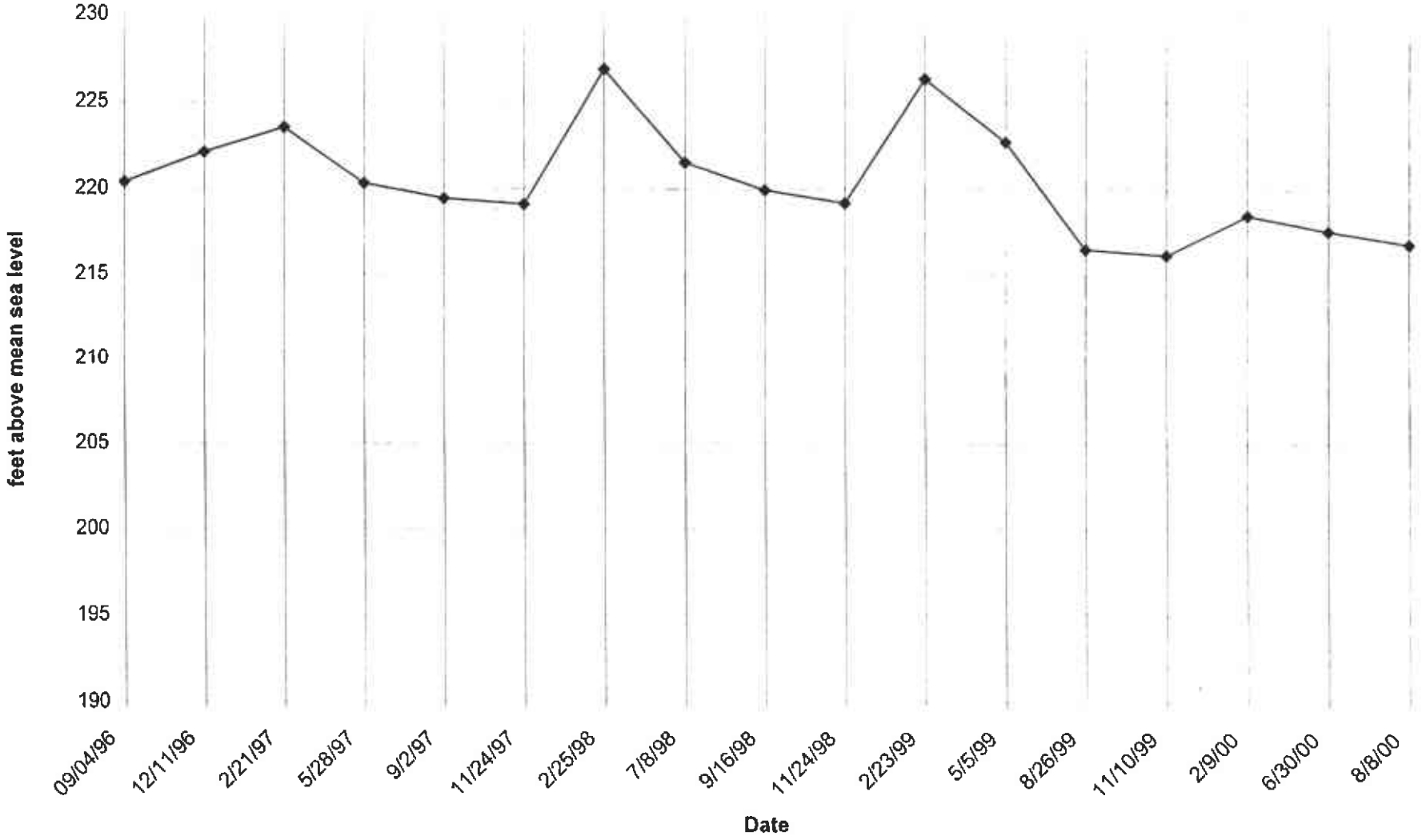
TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion [ug/L, ppb]) (AMSL = Above mean sea level) DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)	TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
RS-8***	8/26/99	214.67	7.25	207.42	160000	24000	35000	4200	24000	<5	
RS-8	11/10/99	214.67	8.69	205.98	150000	21000	29000	3000	14000	<0.5	
RS-8	2/9/00	214.67	7.23	207.44	14000	1900	3200	270	2300	<0.5	
RS-8	6/30/00	214.67	3.99	210.68	6400	570	870	150	770	<0.5	
RS-8	8/8/00	214.67	7.52	207.15	100000	24000	40000	2300	9900	<0.5	*
RS-9***	8/26/99	195.63	7.46	188.17	17000	3500	1200	360	1600	180	*
RS-9	11/10/99	195.63	7.91	187.72	2800	520	62	46	130	<0.5	
RS-9	2/9/00	195.63	6.09	189.54	3400	650	74	64	130	<0.5	
RS-9	6/30/00	195.63	6.77	188.86	3000	600	79	74	120	<0.5	
RS-9	8/8/00	195.63	7.32	188.31	4900	500	430	160	530	<0.5	
RS-10***	8/26/99	208.46	3.76	204.7	5100	160	340	190	1000	32	*
RS-10	11/10/99	208.46	3.83	204.63	500	7	2	2	4	<0.5	
RS-10	2/9/00	208.46	0.31	208.15	100	4	3	1	6	<0.5	
RS-10	6/30/00	208.46	2.22	206.24	640	5	2	4	2	<0.5	
RS-10	8/8/00	208.46	2.46	206	460	2	2	2	7	<0.5	

TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion [ug/L, ppb]) (AMSL = Above mean sea level) DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)	TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
RECOVERY 3	09/04/96	230.32	9.90	220.42	<50	<0.5	<0.5	<0.5	<2	<5	
RECOVERY 3	12/11/96	230.32	8.18	222.14	<50	<0.5	<0.5	<0.5	<1	5	
RECOVERY 3	2/21/97	230.32	6.76	223.56	340	35	59	8	54	<0.5	*
RECOVERY 3	5/28/97	230.32	9.98	220.34	<50	<0.5	<0.5	<0.5	<1	<0.5	*
RECOVERY 3	9/2/97	230.32	10.86	219.46	<50	4	<0.5	<0.5	<1	<0.5	*
RECOVERY 3	11/24/97	230.32	11.20	219.12	not enough water to sample. No sample						
RECOVERY 3	2/25/98	230.32	3.42	226.9	<50	<0.5	<0.5	<0.5	<1	<0.5	*
RECOVERY 3	7/8/98	230.32	8.78	221.54	140	<0.5	<0.5	4	24	<1	*
RECOVERY 3	9/16/98	230.32	10.38	219.94	<50	<0.5	<0.5	<0.5	<1	<1	*
RECOVERY 3	11/24/98	230.32	11.12	219.2	not enough water to sample. No sample						
RECOVERY 3	2/23/99	230.32	3.95	226.37	<50	<0.5	<0.5	<0.5	<1	<0.5	*
RECOVERY 3	5/5/99	230.32	7.58	222.74	80	9	<0.5	<0.5	<1	6	
RECOVERY 3***	8/26/99	227.25	10.76	216.49	<50	2	<0.5	<0.5	<1	1	*
RECOVERY 3	11/10/99	227.25	11.09	216.16	140	3	4	1	11	<0.5	
RECOVERY 3	2/9/00	227.25	8.76	218.49	<50	2	<0.5	<0.5	<1	<0.5	
RECOVERY 3	6/30/00	227.25	9.67	217.58	<50	0.7	<0.5	1	1	<0.5	
RECOVERY 3	8/8/00	227.25	10.44	216.81	72	<0.5	<0.5	<0.5	<1	<0.5	
T 1***	8/26/99	195.11	2.44	192.67	40000	7200	5000	950	8100	53	*
T 1	11/10/99	195.11	2.23	192.88	46000	5600	3600	910	6500	<0.5	
T 1	2/9/00	195.11	2.22	192.89	35000	2900	5700	720	6600	<0.5	
T 1	6/30/00	195.11	2.22	192.89	30000	3400	3200	950	4600	<5	
T 1	8/8/00	195.11	2.73	192.38	8900	1600	760	260	870	<5	
T 2***	8/26/99	195.3	CAR								
T 2	11/10/99	195.3	CAR								
T 2	2/9/00	195.3	CAR								
T 2	6/30/00	195.3	CAR								
T 2	8/8/00	195.3	CAR								
T 3***	8/26/99	202.38	CAR								
T 3	11/10/99	202.38	CAR								
T 3	2/9/00	202.38	CAR								
T 3	6/30/00	202.38	CAR								
T 3	8/8/00	202.38	9.80	192.58							

R-3 Groundwater Elevation



R-2

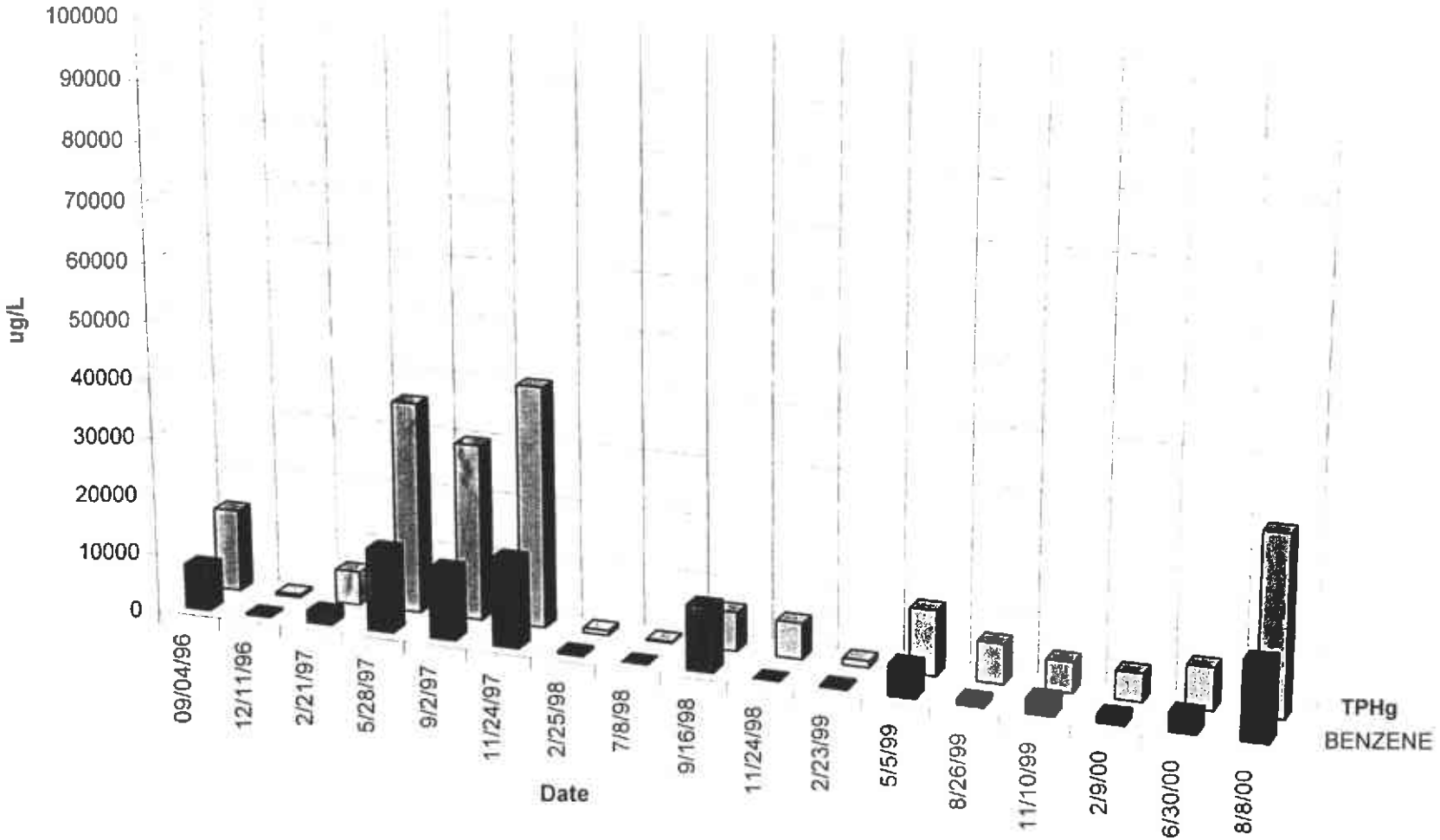

100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
ug/L
09/04/96
12/11/96
2/21/97
5/28/97
9/2/97
11/24/97
2/25/98
7/8/98
9/16/98
11/24/98
2/23/99
5/5/99
8/26/99
11/10/99
2/9/00
6/30/00
8/8/00
Date
TPHg
BENZENE

TABLE 1
GROUNDWATER ELEVATIONS AND CERTIFIED ANALYTICAL LABAORATAORY RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC. SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

ID#	(All concentrations in parts per billion [ug/L, ppb]) (AMSL = Above mean sea level) DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL)	DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)		TPH-G (UG/L)	BENZENE (UG/L)	TOLUENE (UG/L)	ETHYL-BENZENE (UG/L)	XYLENES (UG/L)	MTBE (UG/L)	
T 4***	8/26/99	197.48	CAR									
T 4	11/10/99	197.48	CAR									
T 4	2/9/00	197.48	CAR									
T 4	6/30/00	197.48	CAR									
T 4	8/8/00	197.48	4.77	192.71								
LF-1***	8/26/99	226.59	CAR									
LF-1	11/10/99	226.59	CAR									
LF-1	2/9/00	226.59	CAR									
LF-1	6/30/00	226.59	CAR									
LF-1	8/8/00	226.59	CAR									

ND BELOW LABORATORY DETECTION LIMITS
TPH-G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
* MTBE results confirmed by EPA Method 8260 (GC/MS)
** LAB REPORT HAD RS-6 AND RS-7 MISLABELED, RESAMPLE ON 7/30/98 CONFIRMED.
*** WELL CASING ELEVATION SURVEY 8-27-99, WADE HAMMOND No.6163,BENCH MARK CITY OF OAKLAND #2814

TABLE 2
WASTEWATER DISHCARGE PERMIT # 5043550 1
FORMER DP #793
4035 PARK BLVD., OAKLAND, CALIFORNIA

WASTEWATER SOURCE ID	DATE	METER READING IN GALLONS #35635668	NEW METER IN GALLONS #47083426	GALLONS DISCHARGED BETWEEN VISITS	ACCUMULATIVE GALLONS DISCHARGED	AVERAGE DISCHARGE PER MINUTE IN GALLONS	EPA METHOD 624 BENZENE ug/L	TOLUENE ug/L	ETHYL-BENZENE ug/L	XYLENES ug/L	7420 LEAD ug/L
		314110									
BAKER TANK	1/25/00	314110		0	0	0					
BAKER TANK	1/26/00	315050		940	940	1	<1	<1	<1	<1	<50
BAKER TANK	1/28/00	321120	1098330	6070	7010	2					
BAKER TANK	2/2/00		1102560	4230	11240	1					
BAKER TANK	2/3/00		1107482.2	4922	16162	3	<1	<1	<1	<1	<50
BAKER TANK	2/7/00		1107482.2	0	16162	0					
BAKER TANK AND 1/4LY SAMPLES	2/9/00		1109680	2198	18360	1	EPA METHOD 624				239.2
F1 (PSP No. 1)	3/23/00		1109720	40	18400	0	<1	<1	<1	<2	<5
F1 (PSP No. 1)	5/4/00		1110780	1060	19460	0					
F1 (PSP No. 1)	5/12/00		1111700	920	20380	0					
F1 (PSP No. 1)	5/18/00		1113359	1659	22039	0					
F1 (PSP No. 1)	5/25/00		1113840	481	22520	0					
F1 (PSP No. 1)	5/31/00		1115111	1271	23791	0					
F1 (PSP No. 1)	6/16/00		1115823	712	24503	0					
F1 (PSP No. 1)	6/28/00		1116293	470	24973	0					
F1 (PSP No. 1)	6/30/00		1116303	10	24983	0	EPA METHOD 624				200.7
F1 (PSP No. 1)	7/5/00		1116313	10	24993	0	<1	<1	<1	<2	<2
F1 (PSP No. 1)	7/13/00		1117816	1503	26496	0					
F1 (PSP No. 1)	7/20/00		1118892	1076	27572	0					
F1 (PSP No. 1)	7/27/00		1118892	0	27572	0					
F1 (PSP No. 1)	8/3/00		1120336	1444	29016	0					
F1 (PSP No. 1)	8/10/00		1121041	705	29721	0					
F1 (PSP No. 1)	8/17/00		1121041	0	29721	0					

< BELOW LABORATORY LOWER DETECTION LIMITS

ug/L micrograms per liter (parts per billion)

Note: water meter #47083426 did not function during initial test, substitute meter #35635668 used until cleaned and tested. Re-installed January 28, 2000.
WATER DISCHARGED TO SEWER IS FROM WEEKLY PURGEING OF T1 AND PURGED WATER FROM 1/4LY SAMPLING

TABLE 3
GROUNDWATER ELEVATIONS AND ELECTRON ACCEPTOR RESULTS FROM WATER SAMPLES
DESERT PETROLEUM, INC SITE #793
4035 PARK BOULEVARD, OAKLAND, CALIFORNIA

(All concentrations in parts per million (mg/L, ppm) unless otherwise noted)
(AMSL = Above mean sea level)

ID#	DATE SAMPLED	WELL CASING ELEVATION (FEET AMSL	FIELD MEASUREMENTS								CERTIFIED LABORATORY RESULTS DISSOLVED IN WATER					
			DEPTH TO GROUND WATER (FEET)	GROUND WATER ELEVATION (FEET AMSL)	DISSOLVED OXYGEN O2 (MG/L)	SULFATE SO4 (MG/L)	NITRATE NO3 (MG/L)	FERROUS IRON FE2 (MG/L)	TEMP-ERATURE (F)	pH	TOTAL PETROLEUM HYDROCARBONS GASOLINE (MG/L)	CARBON DI OXIDE CO2 (MG/L)	METHANE CH4 (MG/L)	AEROBIC HYDROCARBON DEGRADING BACTERIA CFU/ML	ORTHO-PHOSPHATE PO4, (MG/L)	AMMONIA as NITROGEN N (MG/L)
MW-1***	8/26/99	229.57	11.41	218.16	4.9	35	0	0.25	75.4	6.55	<0.05					
	9/2/99	229.57	11.65	217.92					72.9	8.16		0.13	<0.00001	10	<1	<0.5
BS-2***	8/26/99	227.39	11.42	215.97	0.7	46	2.7	0.65	80.9	6.97	0.2					
	9/2/99	227.39	12.00	215.39								nm	nm	nm	nm	nm
BS-5***	8/26/99	227.61	16.06	211.55	0.7	31	1.3	0.92	71.7	7.08	35					
	9/2/99	227.61	16.26	211.35					68.4	7.15		0.16	0.00021	5000	<1	<0.5
BS-6***	8/26/99	227.22	13.72	213.5	1.2	76	0.3	>1.3	77.8	6.66	0.69					
	9/2/99	227.22	14.14	213.08					69	6.69		0.36	<0.00001	400	<1	<0.5
BS-7***	8/26/99	195.99	4.16	191.83	0.1	>77	0.8	1.27	73.4	6.99	15					
	9/2/99	195.99	4.14	191.85								nm	nm	nm	nm	nm
BS-8	8/26/99	214.67	7.25	207.42	2.6	0	0	0.54	69.2	6.7	180					
	9/2/99	214.67	7.38	207.29					71.7	5.74		0.058	0.000018	6600	<1	<0.5
BS-9	8/26/99	195.63	7.46	188.17	2.1	7	0	0.59	73.5	6.95	17					
	9/2/99	195.63	7.61	188.02					70.9	6.98		0.25	0.0021	10000	<1	<0.5
BS-10	8/26/99	208.46	3.76	204.7	4.2	nm	nm	nm	70.9	8.03	5.1					
	9/2/99	208.46	3.96	204.5					73.3	7.24		0.1	0.000037	8800	<1	<0.5
RECOVERY 1***	8/26/99	227.69	13.97	213.72	0.4	9	0	>3.3	70.6	6.38	6.5					
	9/2/99	227.69	14.18	213.51								nm	nm	nm	nm	nm
RECOVERY 2***	8/26/99	227.28	13.14	214.14	0.4	>77	0.8	0.3	72.7	6.65	6.3					
	9/2/99	227.28	13.23	214.05								nm	nm	nm	nm	nm
RECOVERY 3***	8/26/99	230.32	10.76	219.56	2.5	>77	0.7	0.05	75	6.95	<0.05					
	9/2/99	230.32	10.87	219.45								nm	nm	nm	nm	nm
T-1	8/26/99	195.11	2.44	192.67	0.8	32	0.5	0.01	75.3	7.29	40					
	9/2/99	195.11	2.20	192.91					78.1	7.57		0.11	0.00019	1300	<1	<0.5

***	NEW ELEVATION SURVEY	MG/L	milligrams per liter (ppm)	NA	Not Analyzed
nm	NOT MEASURED	F	degrees Fahrenheit	<	below laboratory lower detection limits
CAR	CAR PARKED OVER WELL, NO ACCESS	CFU/ML	colony forming units per milliliter		

DP 793
4035 PARK BLVD, OAKLAND, CA

Table 4 Pounds TPHg in soil and in groundwater AUGUST 1999.

MASS GROUNDWATER CONTAMINATION AUGUST 1999								
		PORES	0.3					
Square	Thickness	Cubic	Upper	Lower	Average con	LITERS	mg	pounds
Feet		feet	mg/l	mg/l	mg/l	water	TPHg	TPHg
10520	16	168320	1	0.05	0.525	1429895	750695	1.66
8650	16	138400	10	1	5.5	1175722	6466470	14.26
2000	16	32000	40	10	25	271843	6796080	14.98
2550	16	40800	100	10	55	346600	19063004	42.03
750	16	12000	160	100	130	101941	13252356	29.22
Total Calculated Mass TPHg in Groundwater AUGUST 1999								102.14

MASS BENZENE GROUNDWATER CONTAMINATION AUGUST 1999								
assumption: free product contains 287 mg/L of benzene								
		PORES	0.3					
Square	Thickness	Cubic	Upper	Lower	Average con	LITERS	mg	pounds
Feet		feet	mg/l	mg/l	mg/l	water	Benzene	Benzene
6775	16	108400	0.1	0.0005	0.05025	920869	46274	0.10
7800	16	124800	1	0.1	0.55	1060188	583104	1.29
2000	16	32000	7.2	1	4.1	271843	1114557	2.46
2000	16	32000	10	1	5.5	271843	1495138	3.30
1200	16	19200	24	10	17	163106	2772801	6.11
Total Calculated Mass Benzene in Groundwater								13.25

-WEGE-

DESERT STATION #793
4035 Park Blvd.
Oakland, California

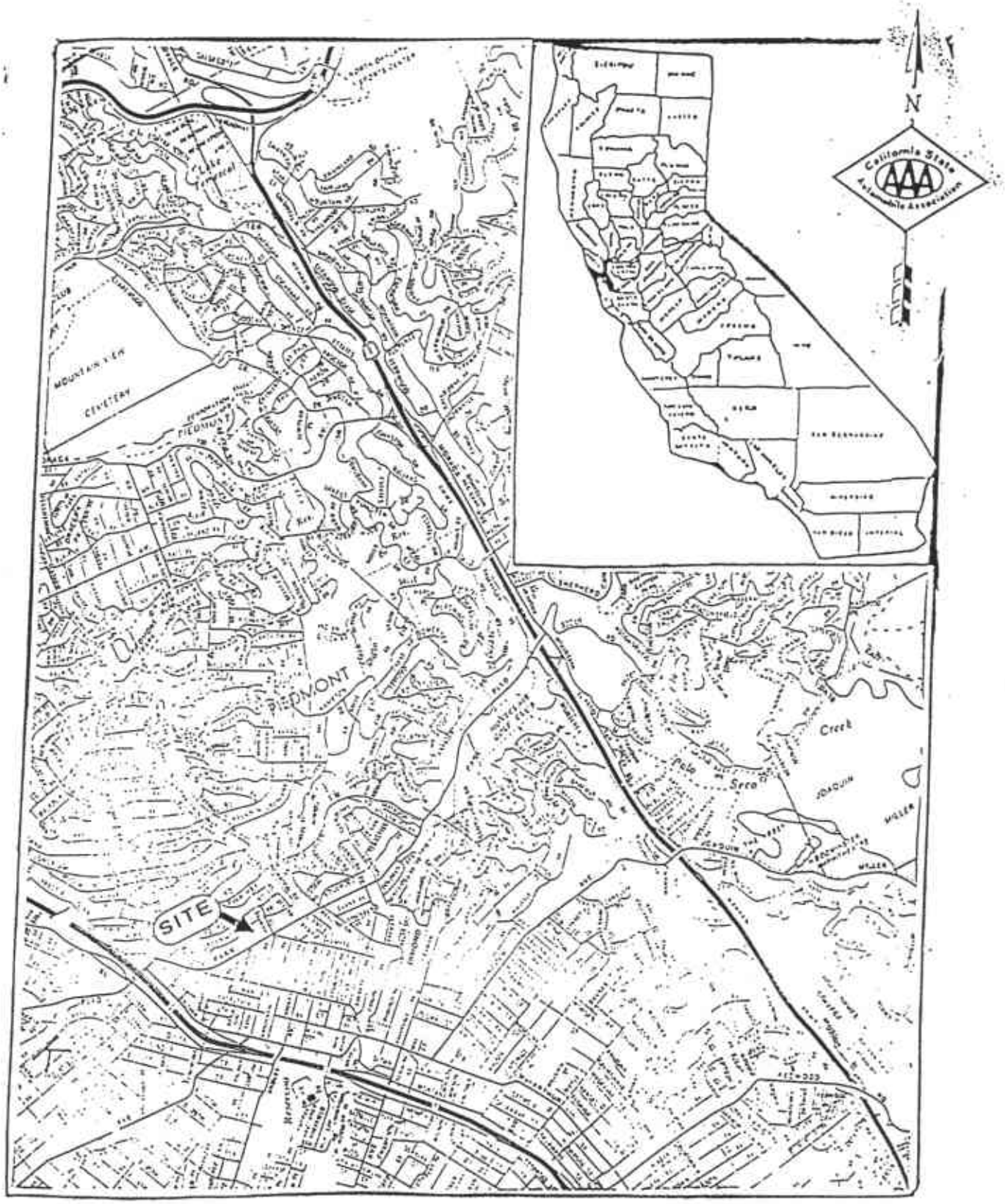


FIGURE 1

Location (AAA Map)

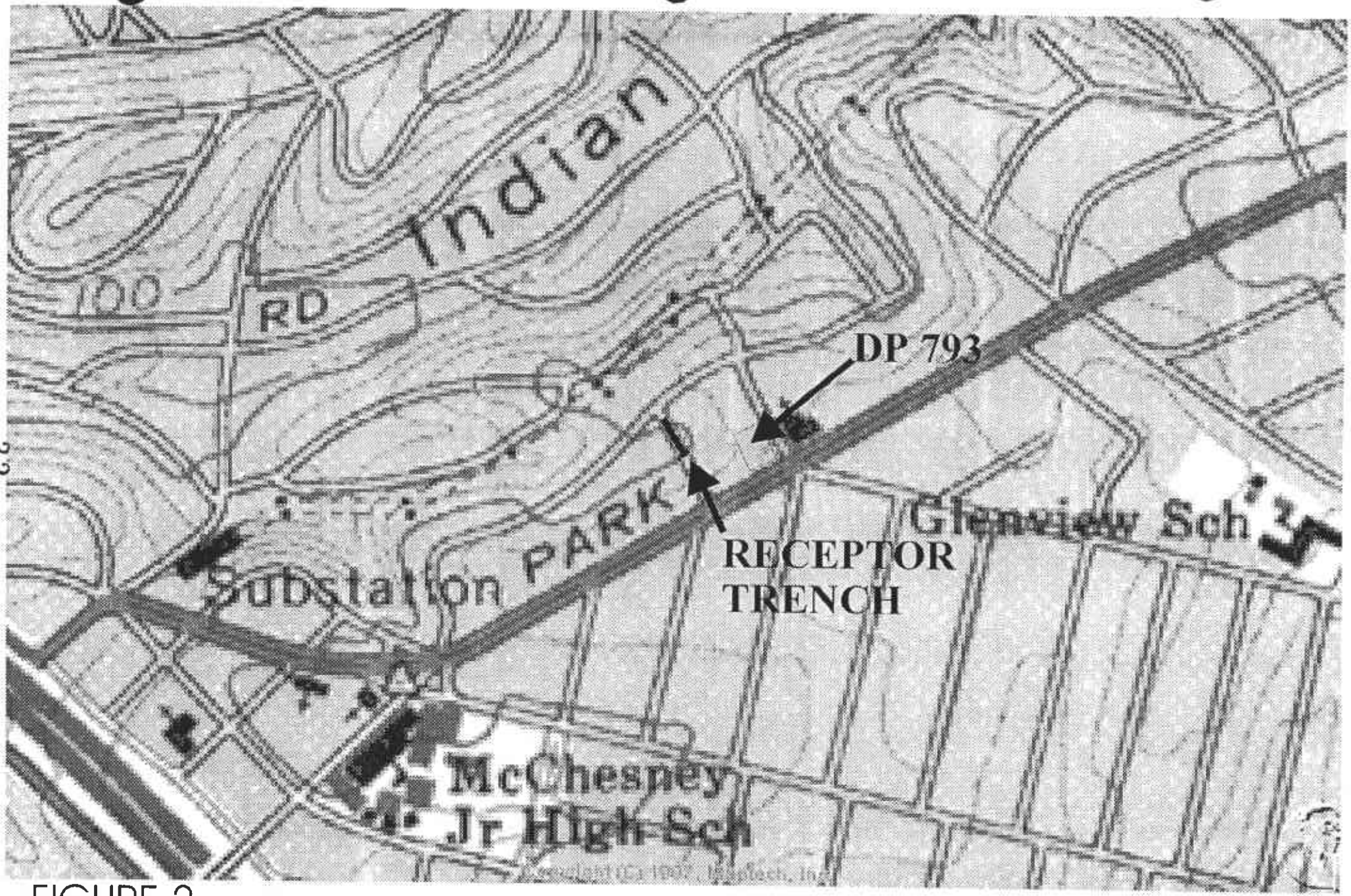


FIGURE 2
PORTION OF OAKLAND EAST 7.5 MINUTE USGS TOPOGRAPHIC MAP

NORTH

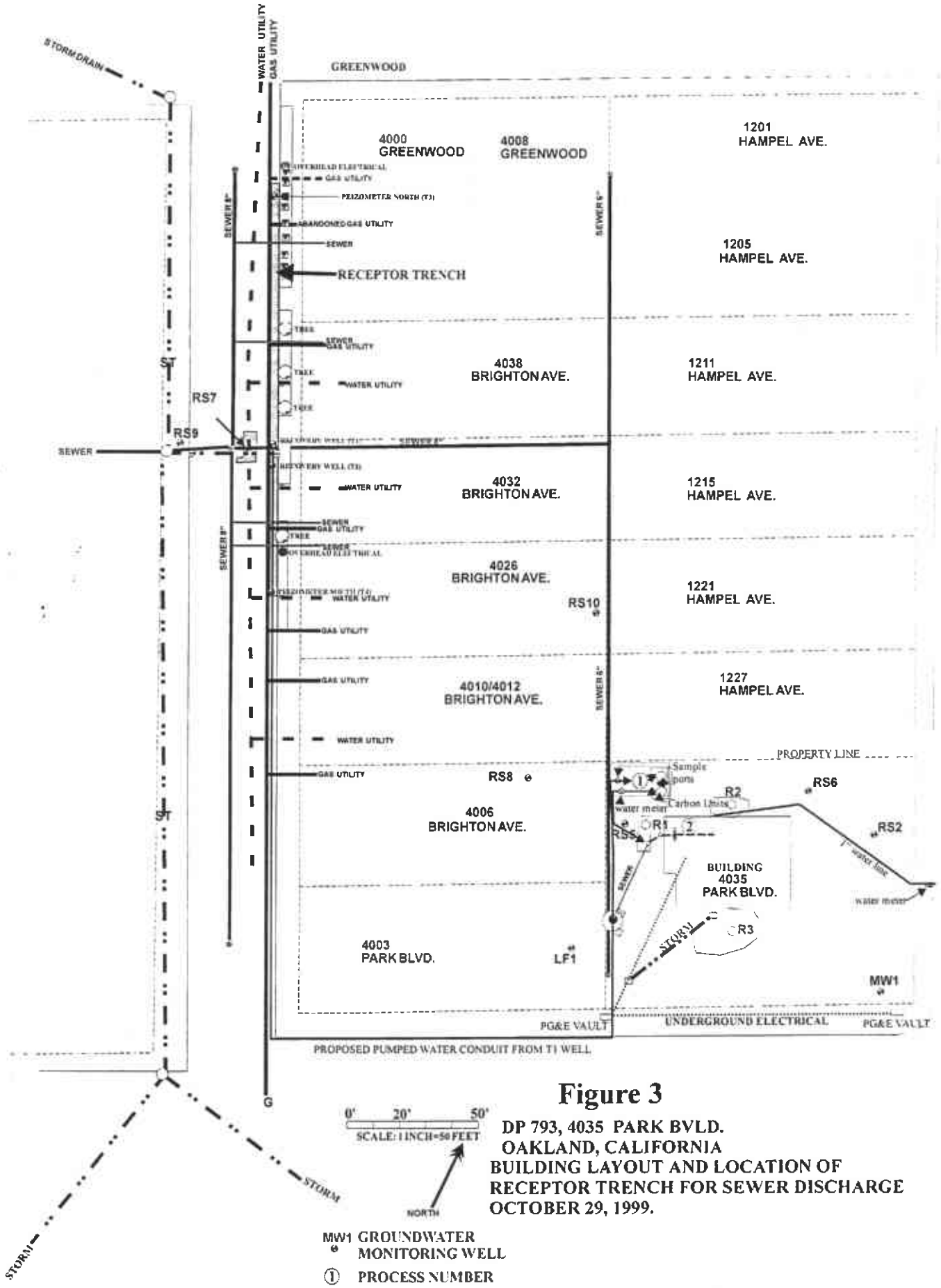


Figure 3

DP 793, 4035 PARK BVLD.
OAKLAND, CALIFORNIA
BUILDING LAYOUT AND LOCATION OF RECEPTOR TRENCH FOR SEWER DISCHARGE
OCTOBER 29, 1999.

MW1 GROUNDWATER MONITORING WELL

① PROCESS NUMBER

WATER METER

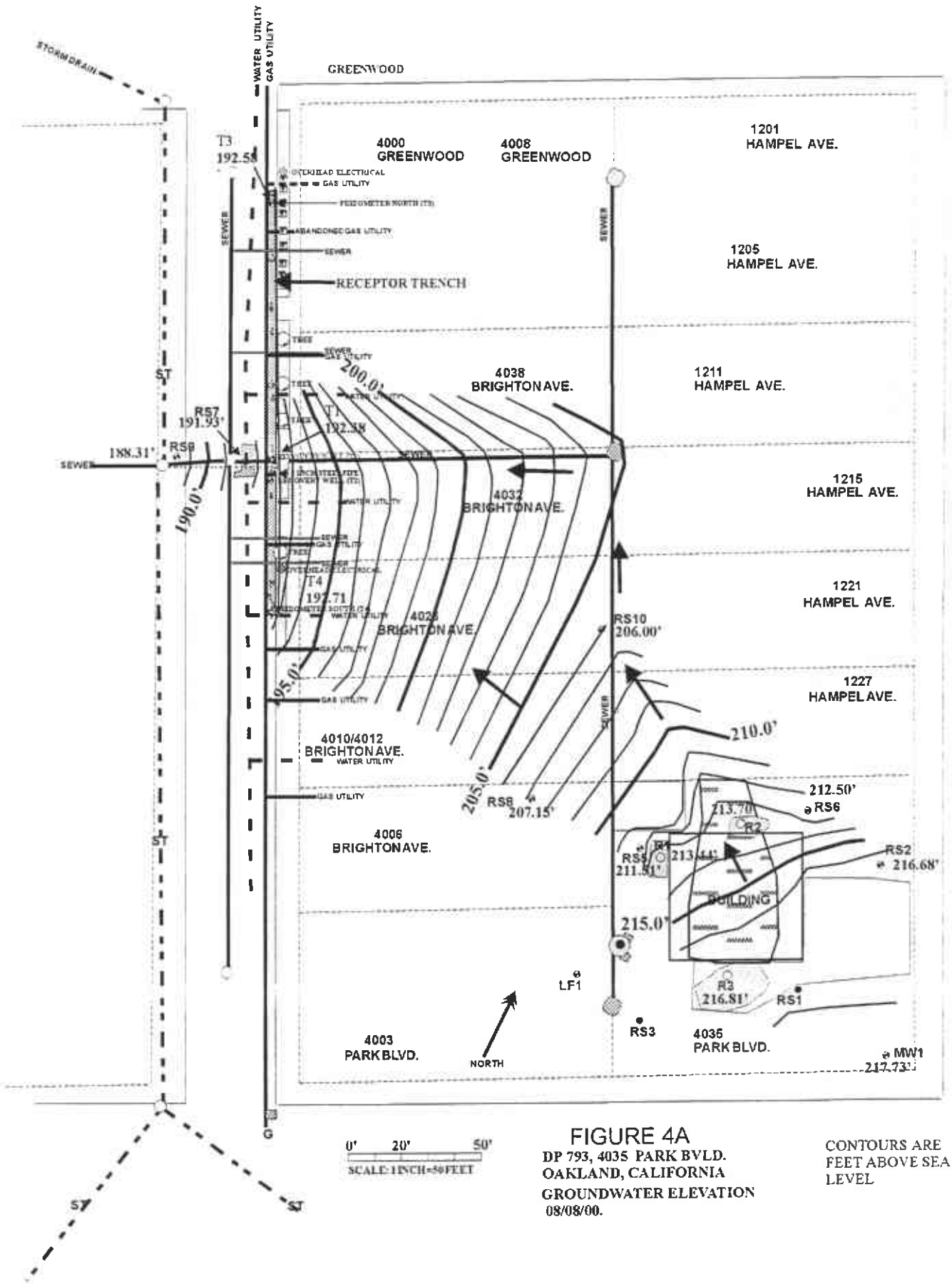


FIGURE 4A
DP 793, 4035 PARK BVLD.
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION
08/08/00.

CONTOURS ARE FEET ABOVE SEA LEVEL

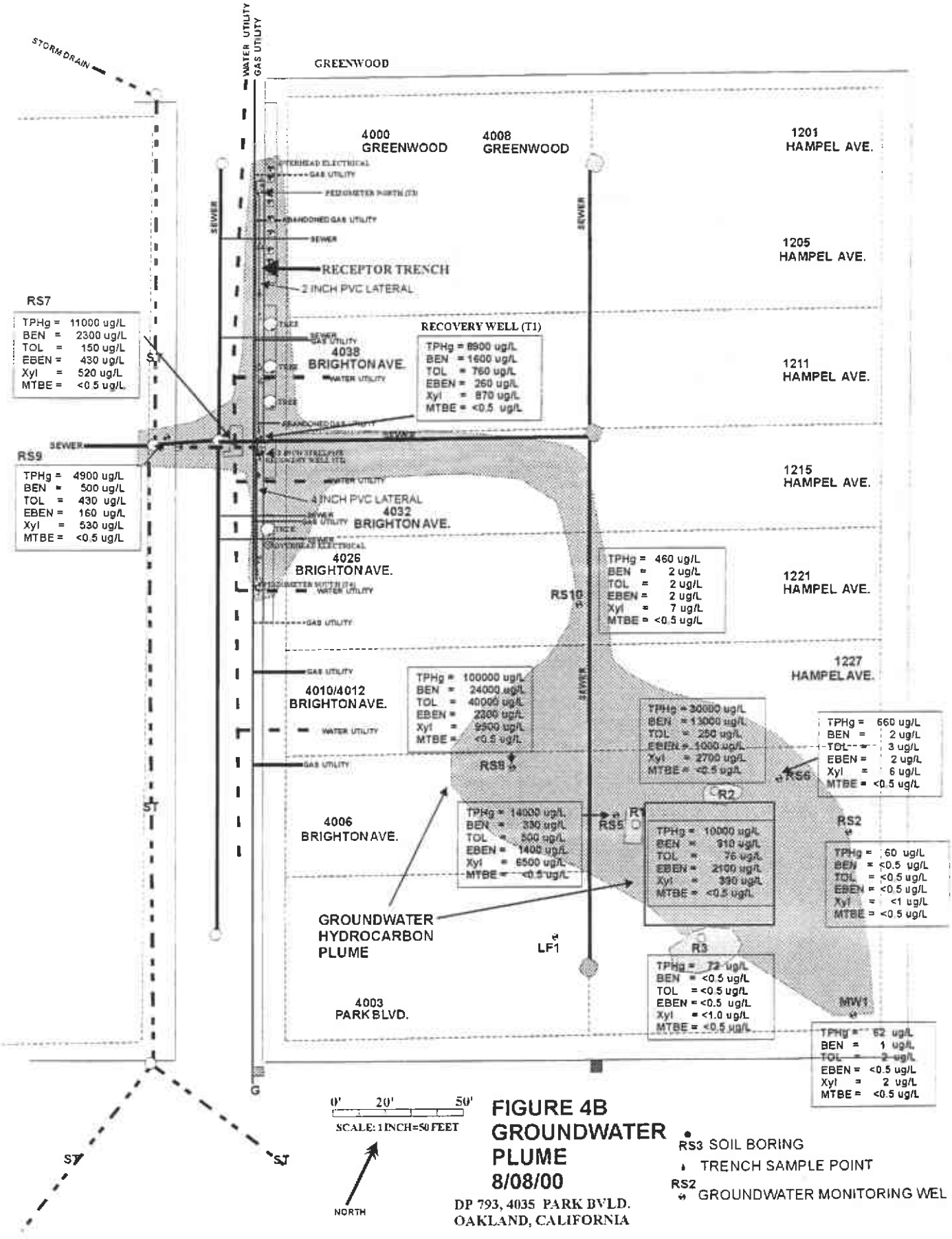


FIGURE 4B
GROUNDWATER PLUME
8/08/00
DP 793, 4035 PARK BVLD.
OAKLAND, CALIFORNIA

RS3 SOIL BORING
TRENCH SAMPLE POINT
RS2 GROUNDWATER MONITORING WEL

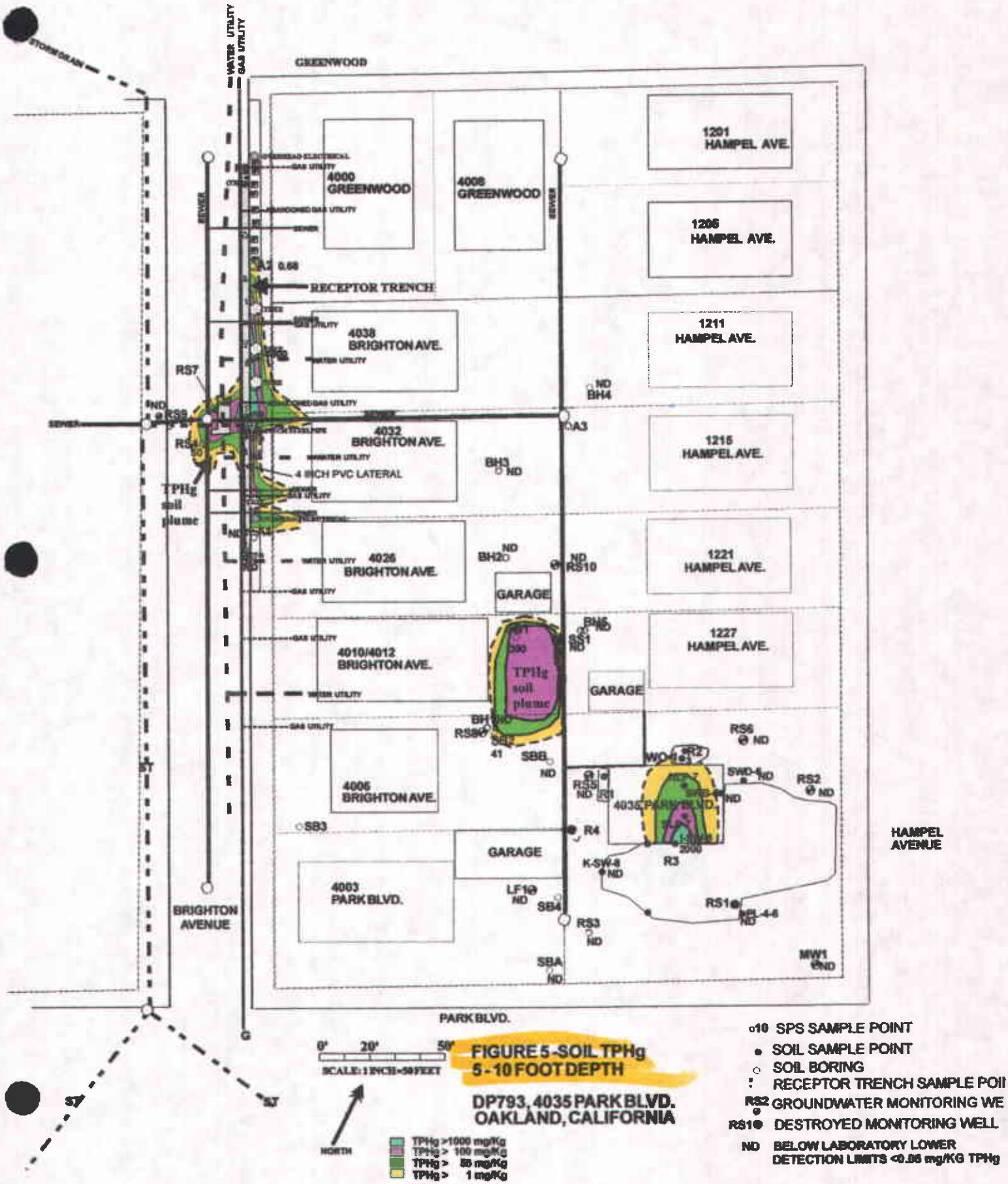


FIGURE 5 -SOIL TPHg 5 - 10 FOOT DEPTH

DP793, 4035 PARK BLVD. OAKLAND, CALIFORNIA

o10 SPS SAMPLE POINT

● SOIL SAMPLE POINT

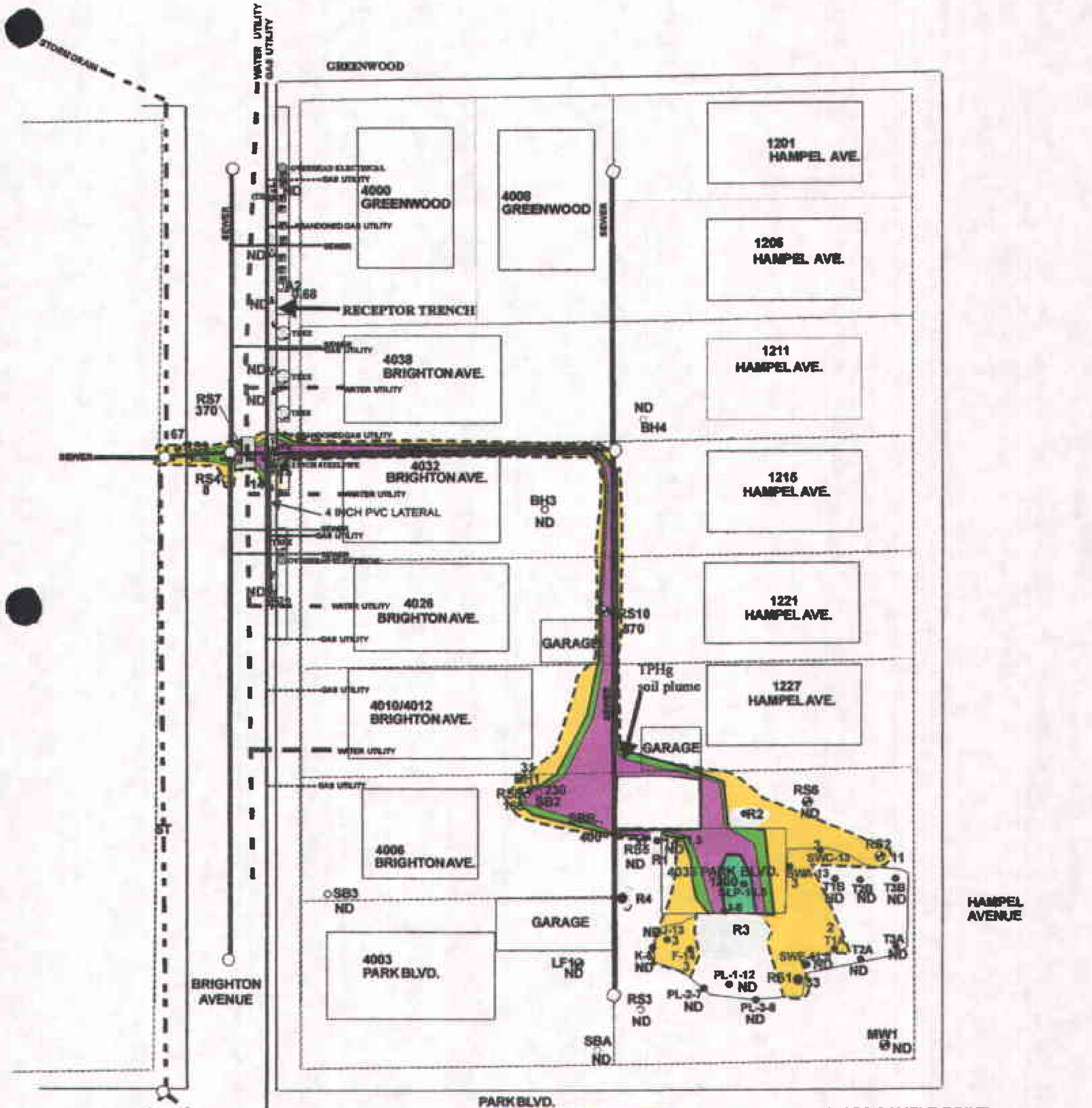
○ SOIL BORING

! RECEPTOR TRENCH SAMPLE POI

RS2 GROUNDWATER MONITORING WE

RS1● DESTROYED MONITORING WELL

ND BELOW LABORATORY LOWER DETECTION LIMITS <0.05 mg/KG TPHg



0' 20' 50'
SCALE: 1 INCH=50 FEET

NORTH

FIGURE 6 - SOIL TPHg 10 - 15 FOOT DEPTH

DP793, 4035 PARK BLVD. OAKLAND, CALIFORNIA

- TPHg >1000 mg/Kg
- TPHg > 100 mg/Kg
- TPHg > 50 mg/Kg
- TPHg > 1 mg/Kg

- ▫10 SPS SAMPLE POINT
- • SOIL SAMPLE POINT
- ○ SOIL BORING
- DESTROYED MONITORING WE
- RS2 GROUNDWATER MONITORING WELL
- RS1● DESTROYED MONITORING WELL
- ND BELOW LABORATORY LOWER DETECTION LIMIT < 0.05 mg/KG TP

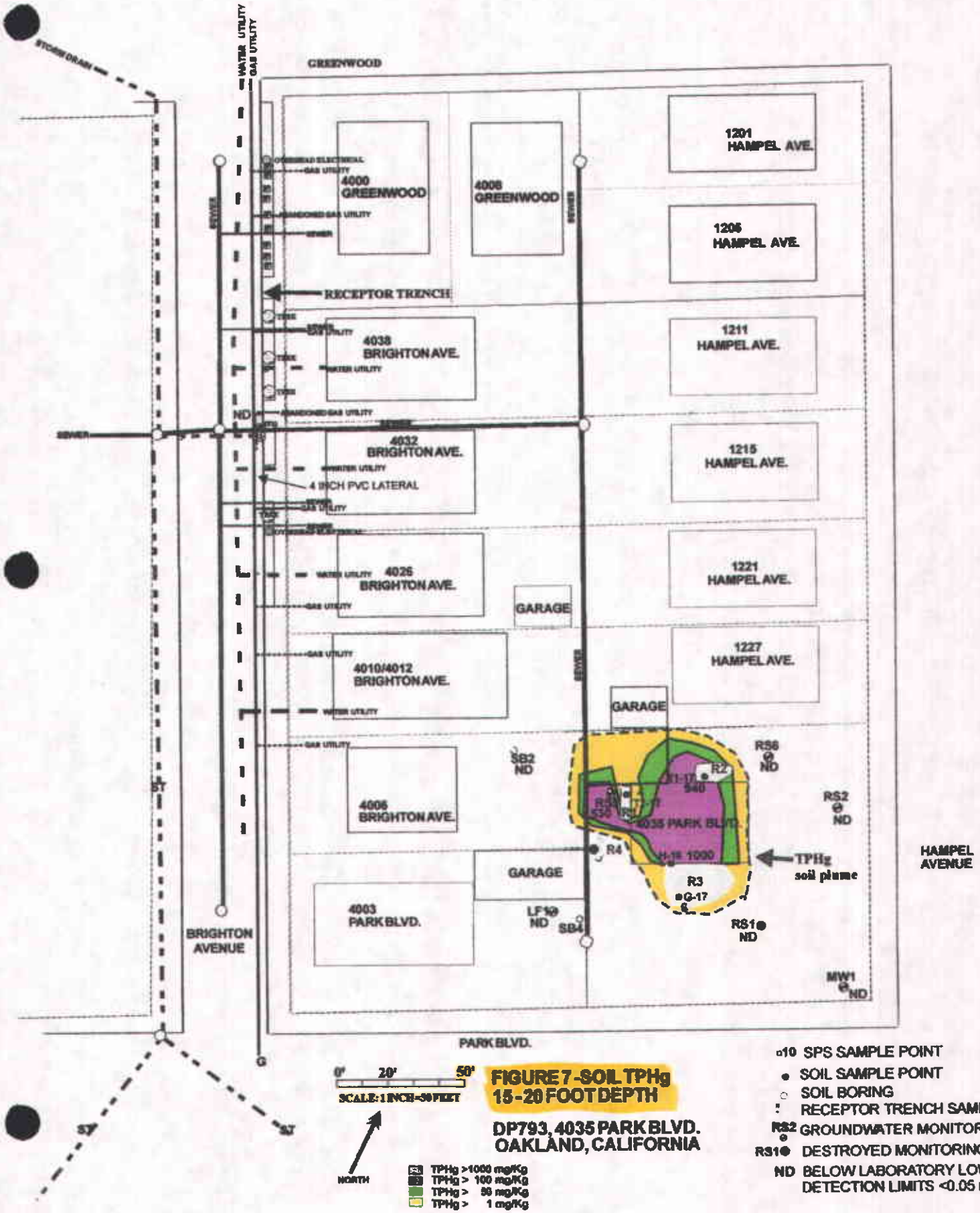
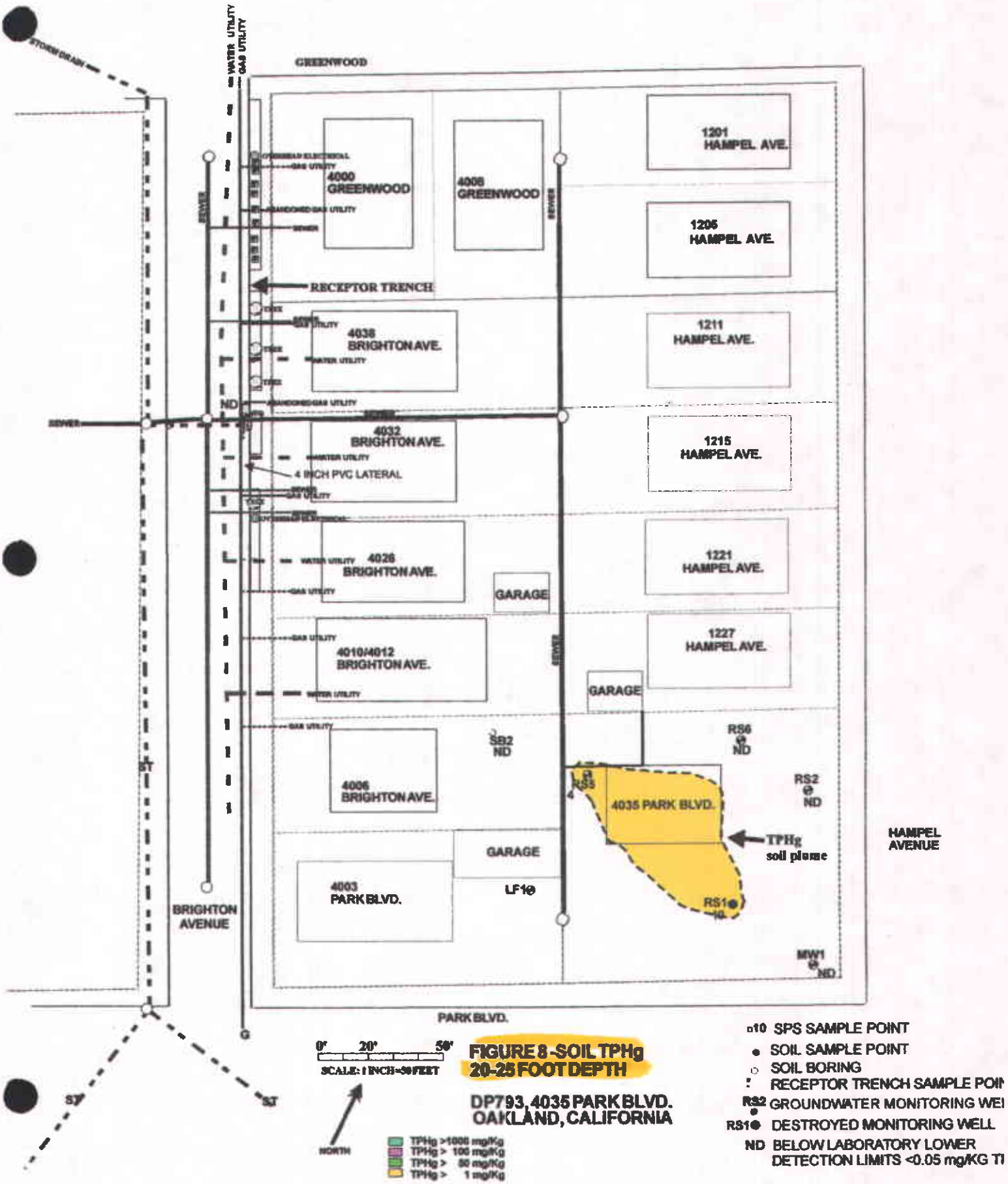


FIGURE 7 - SOIL TPHg 15 - 20 FOOT DEPTH

DP793, 4035 PARK BLVD. OAKLAND, CALIFORNIA


STORM DRAIN
WATER UTILITY
GAS UTILITY
GREENWOOD
4000 GREENWOOD
4008 GREENWOOD
1201 HAMPEL AVE.
1206 HAMPEL AVE.
1211 HAMPEL AVE.
1215 HAMPEL AVE.
1221 HAMPEL AVE.
1227 HAMPEL AVE.
RECEPTOR TRENCH
4038 BRIGHTON AVE.
4032 BRIGHTON AVE.
4 INCH PVC LATERAL
4026 BRIGHTON AVE.
4010/4012 BRIGHTON AVE.
4006 BRIGHTON AVE.
4003 PARK BLVD.
GARAGE
GARAGE
GARAGE
SEWER
ND
SB2 ND
RS6 ND
RS2 ND
4035 PARK BLVD.
TPHg soil plume
RS1
MW1 ND
LF10
BRIGHTON AVENUE
HAMPEL AVENUE
PARK BLVD.
ST
ST
ST
0' 20' 50'
SCALE: 1 INCH=50 FEET
NORTH
TPHg >1000 mg/Kg
TPHg > 100 mg/Kg
TPHg > 50 mg/Kg
TPHg > 1 mg/Kg
FIGURE 8-SOIL TPHg 20-25 FOOT DEPTH
DP793, 4035 PARK BLVD. OAKLAND, CALIFORNIA
SPS SAMPLE POINT
SOIL SAMPLE POINT
SOIL BORING
RECEPTOR TRENCH SAMPLE POI
GROUNDWATER MONITORING WE
DESTROYED MONITORING WELL
ND BELOW LABORATORY LOWER DETECTION LIMITS <0.05 mg/KG T

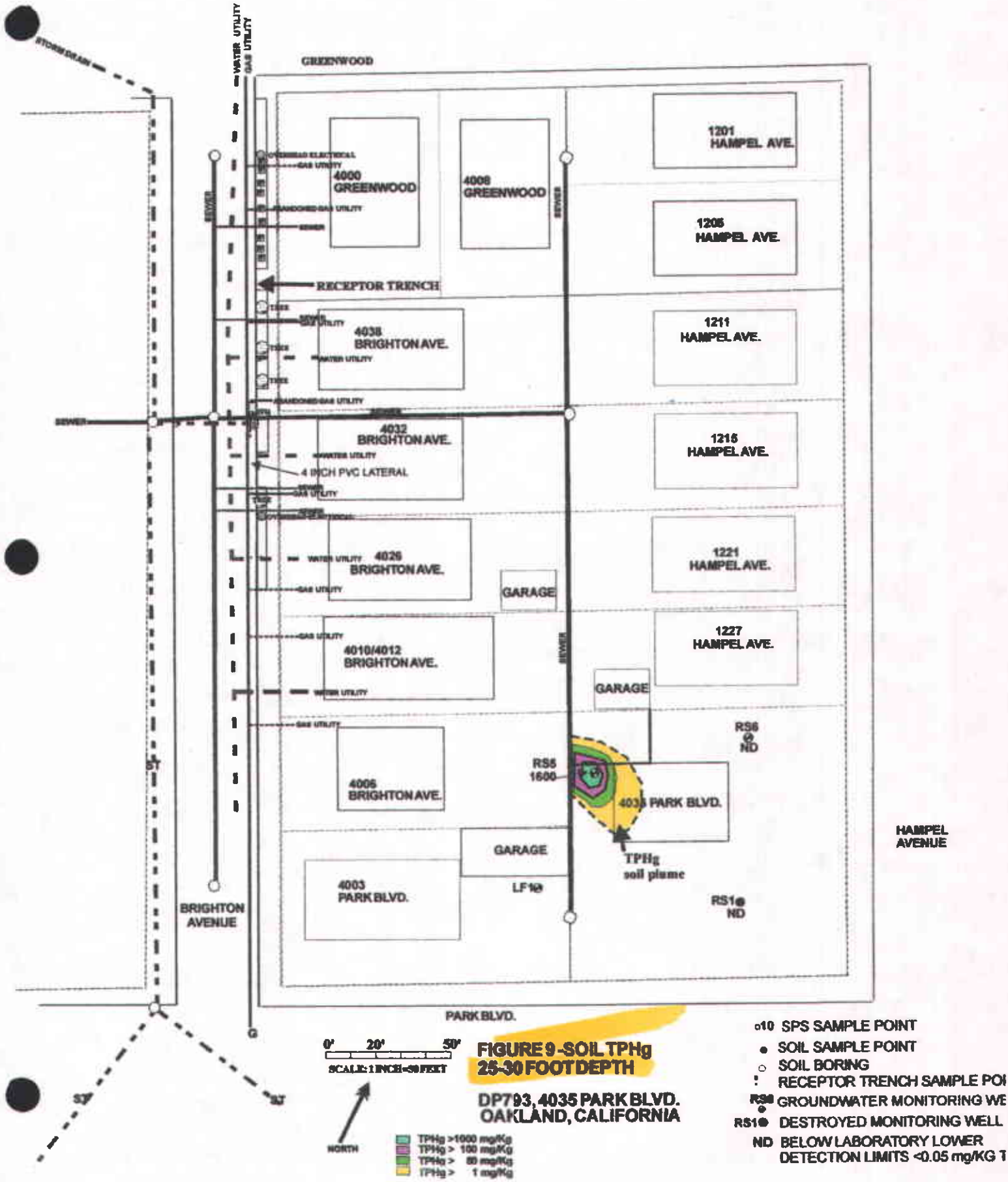


FIGURE 9 -SOIL TPHg 25-30 FOOT DEPTH

DP793, 4035 PARK BLVD. OAKLAND, CALIFORNIA

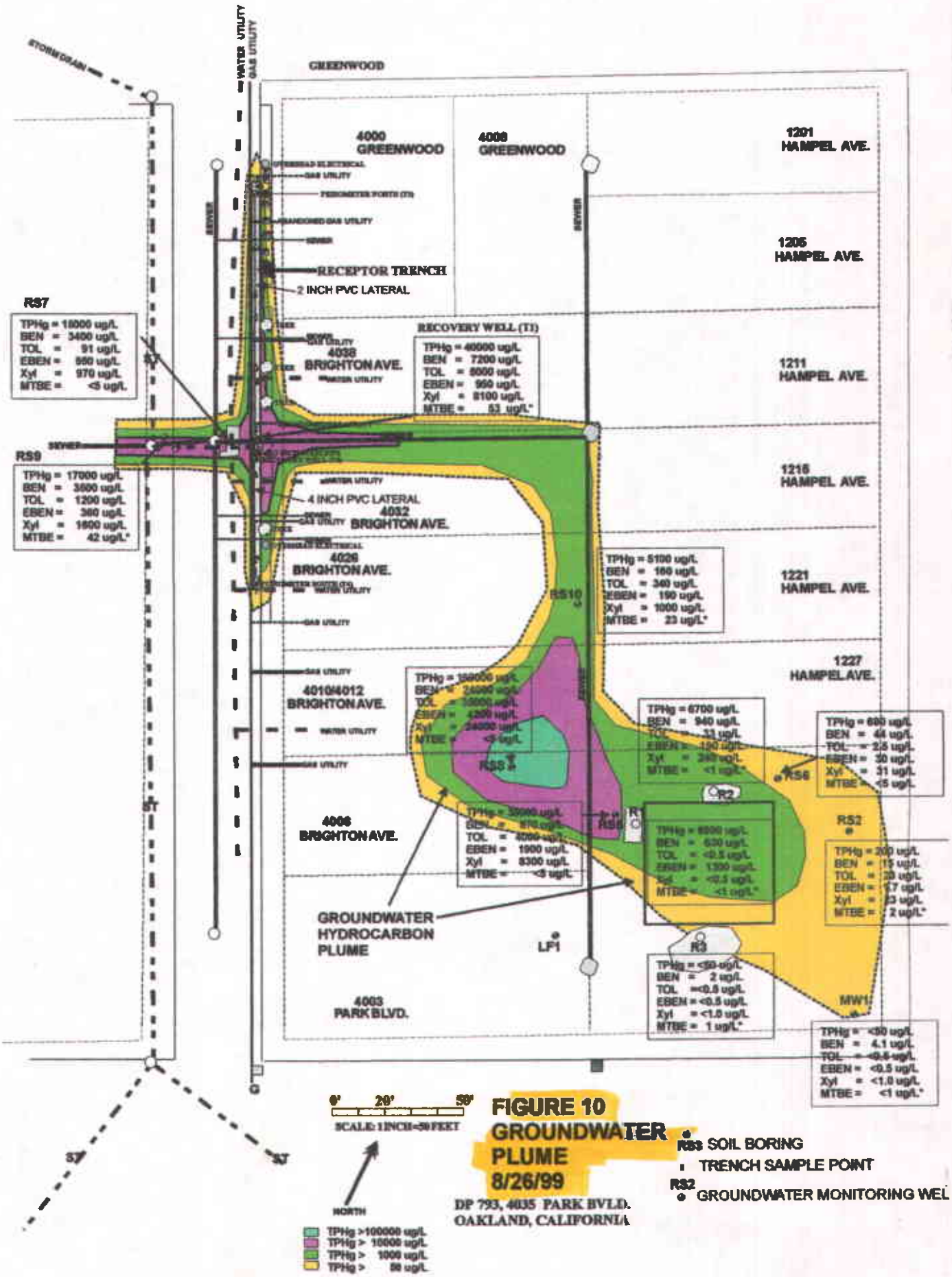


FIGURE 10
GROUNDWATER PLUME 8/26/99
DP 793, 4035 PARK BVLD.
OAKLAND, CALIFORNIA

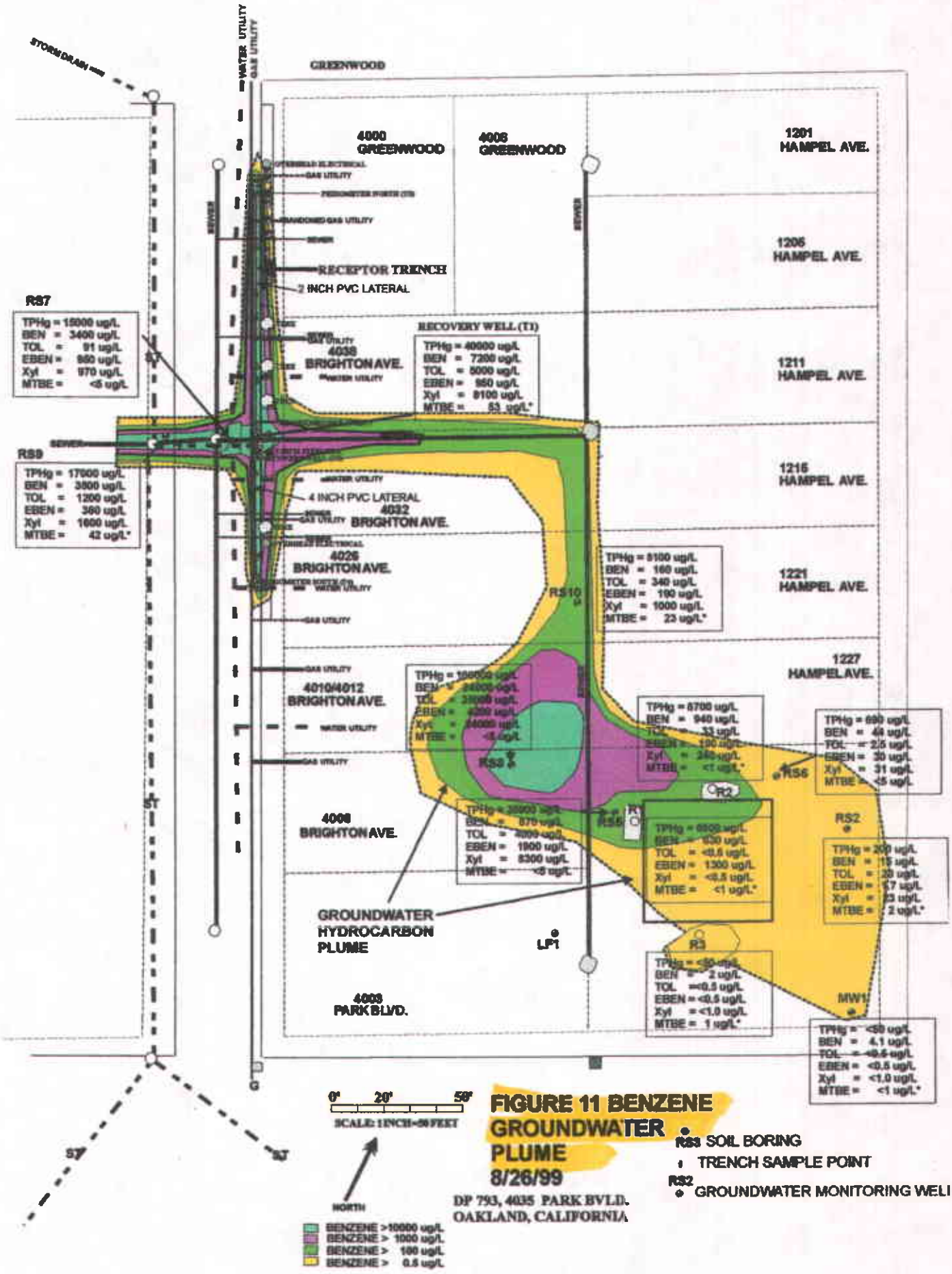


FIGURE 11 BENZENE GROUNDWATER PLUME 8/26/99

DP 793, 4035 PARK BVLD.
OAKLAND, CALIFORNIA

APPENDIX A

QA/QC METHODS & PROCEDURES WITH WELL SAMPLING DATA SHEETS

APPENDIX A.

METHODS AND PROCEDURES, QA/QC

This Appendix documents the specific methods, procedures, and materials used to collect and analyze ground water samples.

Gauging and Measuring Monitor Wells.

Prior to sampling a well, WEGE personnel obtain two measurements: the depth to ground water and the product thickness using a battery powered depth to water-product interface probe and or by using a specially designed bailer. The probe is lowered into the well casing until the instrument signals that the top of water has been reached. The distance from the top of water to the top of casing is read from the tape calibrated in 0.01 foot intervals for accuracy to 0.01 foot, that is attached to the probe. The measured distance is subtracted from the established elevation at the top of casing to determine the elevation of ground water with respect to mean sea level.

The probe is washed with TSP and rinsed in distilled water before each measurement. WEGE has designed and built bailers that will collect a sample of the contents of a well to show the exact thickness of any floating product.

Purging Standing Water from Monitor Wells

If no product is present, WEGE personnel purge the well. This is accomplished by removing ground water from the well until the water quality parameters (temperature, pH, and conductivity) stabilize, or until the well is emptied of water. Periodic measurements of ground water temperature, pH, and conductivity were taken with a Hydac Monitor or other meter and recorded along with the volume of ground water removed from the well. Purging is done by one or more methods singularly or in combination. Bailers, pneumatic or electric sample pumps, or vacuum pump tanks or trucks may be used. The usual amount of water removed is three well volumes. The water collected during purging is either safely stored onsite for later disposition, transported to an approved onsite or offsite sewer discharge system, or an approved onsite or offsite treatment system.

Collection of Water Sample for Analysis

The well is allowed to recover after purging and a ground water sample is collected. A fresh bailer is used to collect enough water for the requirements of the laboratory for the analyses needed or required. The water samples are decanted from the bailer into the appropriate number and size

containers. These containers are furnished pre-cleaned to exact EPA protocols, with and without preservatives added, by the analytical laboratory or a chemical supply company. The bottles are filled, with no headspace, and then capped with plastic caps with teflon liners.

The vials or bottles containing the ground water samples are labeled with site name, station, date, time, sampler, and analyses to be performed, and documented on a chain of custody form. They were placed in ziplock bags and stored in a chest cooled to 4øC with ice. The preserved samples are chain of custody delivered to the chosen laboratory.

Analytical Results

TPH is the abbreviations used for Total Petroleum Hydrocarbons used by the laboratories for water and soil analyses. The letter following TPH indicates a particular distinction or grouping for the results. The letters "g", "d", "k", or "o" indicates gasoline, diesel, kerosene, or oil, respectively, ie. TPH-d for diesel range TPH.

BTEX or MTBE are acronyms or abbreviations used for Benzene, Toluene, Ethylbenzene and all of the Xylenes (BTEX) and Methyl Tertiary Butyl Ether (MTBE), respectively.

MBTEX is the designation for the combination of the above five compounds.

The less than symbol, <, used with a "parts per value" indicates the lower detection limit for a given analytical result and the level, if present, of that particular analyte is below or less than that lower detection limit.

Other abbreviations commonly used are ppm, ppb, mg/Kg, ug/Kg, ml/l and ul/l are parts per million, parts per billion, milligrams per kilogram, micrograms per kilogram, milliliters per liter, microliters per liter, respectively.

Chain of Custody Documentation

All water samples that are collected by WEGE and transported to a certified analytical laboratory are accompanied by chain-of-custody (COC) documentation. This documentation is used to record the movement and custody of a sample from collection in the field to final analysis and storage. Samples to be analyzed at the certified laboratory were logged on the COC sheet provided by the laboratory. The same information provided on the sample labels (site name, sample location, date, time, and analysis to be performed) are also noted on the COC form. Each person relinquishing custody of the sample set signs the COC form indicating the date and time of the transfer to the recipient. A copy of the COC follows the samples or their extracts throughout the laboratory to aid the analyst in identifying the samples and to assure analysis within holding times.

Copies of the COC documentation are included with the laboratory results in Appendix B of this report.

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8-8-00	TIME 1250
WELL MW1	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	11.77 DTB 18.32	
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1252	1 Bailer	69.4	7.41	.24
1301	3.5gal	69.9	7.15	.23
1302	1	70.0	7.10	.22
1304	1	70.0	6.97	.22
1306	1	70.1	6.96	.22

FINAL VOLUME PURGED	6.5gal
TIME SAMPLED	1307
SAMPLE ID.	MW1
SAMPLE CONTAINERS	3/40cc VOA's
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear No Odor

2.61

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 6800	TIME 1310
WELL RS 2	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER 10.71	DTB 18.40	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP David Pittman		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1311	1 Bailer	68.9	6.98	.52
1314	16 gal	67.8	7.01	.53
1316	1	67.8	7.13	.53
1318	1	67.9	7.15	.53

FINAL VOLUME PURGED	18 gal
TIME SAMPLED	1320
SAMPLE ID.	RS 2
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1st Bailer Clear No Odor

WESTERN GEO-ENGINEERS
1388 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8 8 00	TIME 14:02
WELL RS 5	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	16.10 DTB	39.20
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1404	1 Bailer	66.1	7.80	.32
1410	45 gal	65.0	7.15	.30
1412	1	64.4	7.12	.29
1414	1	64.2	7.10	.28

FINAL VOLUME PURGED	47 gal
TIME SAMPLED	1416
SAMPLE ID.	RS5
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear Strong Odor

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8-8-00	TIME 1323
WELL RS6	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER 14.72	DTB 3402	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP David Pittman		

WELL PURGING RECORD				
TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1325	1 Bailer	67.5	6.81	.48
1333	30 gal	67.2	6.89	.47
1335	1	66.3	7.01	.44
1337	1	65.6	7.02	.44
1339	1	65.1	7.15	.44
1341	1	64.9	7.14	.44

FINAL VOLUME PURGED	34 gal
TIME SAMPLED	1345
SAMPLE ID.	RS6
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear Some Odor

2b1

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8 8 00	TIME 1230
WELL R57	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	4.06 DTB 7.00	
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1231	1 Bailer	68.4	7.06	.35
1233	6 gal	69.2	7.04	.36
1235	1	69.4	7.05	.35

FINAL VOLUME PURGED	7 gal
TIME SAMPLED	1240
SAMPLE ID.	R57
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Cloudy Strong Odor

2b.

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

TB-9.80
TH 4.77

SITE OP 793	DATE 8-8-00	TIME 1144
WELL RS 8	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	7.52 DTB 15	
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1147	1 Bailer	64.1	6.84	.36
1149	3 gal	63.7	6.89	.36
1150	1	63.3	6.88	.36
1152	1	63.2	6.90	.36

FINAL VOLUME PURGED	5 gal
TIME SAMPLED	1154
SAMPLE ID.	RS 8
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1st Bailer Clear No Odor

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8-8-00	TIME 1215
WELL RS9	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER 7.32	DTB 14.00	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP David Pittman		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1218	1 Bailer	63.8	7.08	.21
1221	3 gal	66.2	6.95	.23
1223	1	66.5	6.85	.23
1225	1	66.8	6.85	.23

FINAL VOLUME PURGED	5 gal
TIME SAMPLED	1227
SAMPLE ID.	RS9
SAMPLE CONTAINERS	2/40cc VOA's
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear No Odor

WESTERN GEO-ENGINEERS
1386 EAST HEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8 8 00	TIME 1158
WELL RS 1D	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	2.46 DTB 9.00	
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1200	1 Bailer	62.9	7.38	.12
1204	3 gal	62.8	7.06	.11
1206	1	63.1	6.82	.11
1208	1	62.9	6.83	.11

FINAL VOLUME PURGED	5 gal
TIME SAMPLED	1209
SAMPLE ID.	RS10
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Stained Smelly

26.

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8 8 00	TIME 1415
WELL R1	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	14.25 DTB 16.92	
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1416	1 Bailer	65.9	7.20	.37
1418	12 gal	64.1	7.09	.37
1419	1	63.9	7.03	.37
1421	1	64.0	7.02	.37

FINAL VOLUME PURGED	14 gal
TIME SAMPLED	1422
SAMPLE ID.	R1
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear Some Odor

2 b.

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8-8-00	TIME 1347
WELL R2	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER 13.58	DTB 16.8	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP David Pittman		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1348	1 Bailer	66.6	6.88	.46
1351	12 gal	66.6	7.00	.47
1353	1	66.9	7.12	.48
1355	1	66.9	7.10	.48

FINAL VOLUME PURGED	14 gal
TIME SAMPLED	1356
SAMPLE ID.	R2
SAMPLE CONTAINERS	2/40cc VOAs
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear Strong odor

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8-8-02	TIME
WELL R3	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	10.44 DTB 11.74	
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1427	1 Bailer	67.9	7.38	.42
1429	1 gal	68.8	7.45	.41
1431	1 "	68.7	7.30	.41
1433	1	68.7	7.28	.41

FINAL VOLUME PURGED	3 gal
TIME SAMPLED	1435
SAMPLE ID.	R3
SAMPLE CONTAINERS	2/40cc VOA's
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear n/a Odor

ESTERN
GEO-ENGINEERS
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE OP 793	DATE 8-16-00	TIME 1236
WELL T1	SAMPLED BY. BROADWAY	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER	2.73 DTB 14.63	
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP	David Pittman	

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP. F°	pH	COND. X1000
1237	1 Bailer	69.1	7.09	.24
1242	24 gal	68.9	7.09	.24

FINAL VOLUME PURGED	24 gal
TIME SAMPLED	1242
SAMPLE ID.	T1
SAMPLE CONTAINERS	2/40cc VOA's
ANALYSIS TO BE RUN	TPHg BTEX/MTBE
LABORATORY	NSE
NOTES:	1ST Bailer Clear Some Odor

North State Environmental Analytical Laboratory
90 South Spruce Avenue, Suite W, South San Francisco, CA 94080
Phone: (650) 266-4563 Fax: (650) 266-4560

Chain of Custody / Request for Analysis

Lab Job No.:________ Page___of___

Client: [illegible]	Report to: WEGE	Phone: 530-668-5300	Turnaround Time
Mailing Address: Western Geo Engineers, 1386 Beamer, Woodland, CA 95776	Billing to: WEGE	Fax: 530-662-0273	
		PO# / Billing Reference:	Date: 8-9-00
			Sampler: Broadway

Project / Site Address: DP 765 Park Blvd

Analysis Requested: TPHg BTEX MTBE

Sample ID	Sample Type	Container No. / Type	Pres.	Sampling Date / Time	TPHg BTEX MTBE							Comments / Hazards
MW-1	H_2O	2 VOAs	HCL	8/9/00 1307								
R1				1422								
R2				1356								
R3				1455								
RS2				1320								
RS5				1416								
RS6				1345								
RS7				1240								
RS8				1154								
RS9				1227								
RS10				1209								
T1				1242								

Relinquished by: Broadway	Date: 08/09/00	Time: 2:20	Received by: [signature]	Lab Comments
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by:	

APPENDIX B.

RECEPTOR TRENCH WEEKLY PURGING FIELD NOTES

FORMER DESERT PETROLEUM SITE DF 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRE TREATMENT SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM DAILY 2880 GALLONS

DATE 7-5-00 REASON FOR SITE VISIT carbon sample

TRENCH WELL T1					
TIME	PID	DTW	pH	TEMP	COND

TRENCH WELL T2				
PID	DTW	pH	TEMP	COND

TRENCH WELL T3				
PID	DTW	pH	TEMP	COND

TRENCH WELL T4				
PID	DTW	pH	TEMP	COND

WELL	DEPTH TO WATER DTW	TIME	DTW	TIME
MW1				
RS2				
RS5				
RS6				
RS7				
RS8				

WELL	DEPTH TO WATER DTW	TIME	DTW	TIME
RS9				
RS10				
R1				
R2				
R3				

COMMENTS pumped 50 gallons from T1 to run thru carbons - carbons have problems

ELECTRIC METER — WATER METER 111630

SAMPLE(carbon Effluent SITE MONITORED BY Boundary

WASTEWATER	INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE ___ GALLONS/____MINUTES GALLONS PURGED 50 PRESSURE WATER CARBONS #1_____PSI, #2_____PSI,
T2 FLOW RATE ___ GALLONS/____MINUTES GALLONS PURGED_____

FILTER INSPECTION AND COMMENTS ✓

WATER PHASE CARBON UNITS INSPECTION COMMENTS Need repair

CONDITION OF COMPOUND COMMENTS OK

Acceptance of water phase carbon units only if completely flooded with water_____yes _____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8 5 and containers are in good condition _____yes _____no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM, DAILY 2880 GALLONS

DATE 7-6-00 REASON FOR SITE VISIT carbon Repair

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND

TRENCH WELL T2

PID	DTW	pH	TEMP.	COND.

TRENCH WELL T3

PID	DTW	pH	TEMP	COND

TRENCH WELL T4

PID	DTW	pH	TEMP	COND

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1				
RS2				
RS5				
RS6				
RS7				
RS8				

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9				
RS10				
R1				
R2				
R3				

COMMENTS carbon unit #1 plugged - broken outlet pipe

ELECTRIC METER —

WATER METER 111593

SAMPLED —

SITE MONITORED BY Boundary

	WASTEWATER INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE ____ GALLONS/____ MINUTES GALLONS PURGED_____
T2 FLOW RATE ____ GALLONS/____ MINUTES GALLONS PURGED_____

PRESSURE WATER CARBONS #1_____PSI, #2_____PSI

FILTER INSPECTION AND COMMENTS_____

WATER PHASE CARBON UNITS INSPECTION COMMENTS Removed carbon, unit outlet, replaced carbon

CONDITION OF COMPOUND COMMENTS clean

Acceptance of water phase carbon units only if completely flooded with water_____yes _____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8 5 and containers are in good condition _____yes _____no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM, DAILY 2880 GALLONS

DATE 9-13-00 REASON FOR SITE VISIT Weekly

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND
935			NO		

TRENCH WELL T2

PID	DTW	pH	TEMP	COND.
		METER		

TRENCH WELL T3

PID	DTW	pH	TEMP.	COND

TRENCH WELL T4

PID	DTW	pH	TEMP	COND.

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1				
RS2				
RS5				
RS6				
RS7				
RS8				

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9				
RS10				
R1				
R2				
R3				

COMMENTS Carbon Units flowing well

ELECTRIC METER —

WATER METER 1117816

SAMPLE Carbon unit #1

SITE MONITORED BY Broadway

	WASTEWATER INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE 5 GALLONS/ 1 MINUTES GALLONS PURGED
T2 FLOW RATE GALLONS/ MINUTES GALLONS PURGED

PRESSURE WATER CARBONS #1 1.0 PSI #2 PSI

FILTER INSPECTION AND COMMENTS —

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS Clean

Acceptance of water phase carbon units only if completely flooded with water ____yes ____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition ____yes ____no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM. DAILY 2880 GALLONS

DATE 7-20-00 REASON FOR SITE VISIT weekly

	TRENCH WELL T1				
TIME	PID	DTW	pH	TEMP	COND
1102		2.29			
1443		3.53			

	TRENCH WELL T2				
PID	DTW	pH	TEMP	COND	
	3.2				
	4.43				

	TRENCH WELL T3			
PID	DTW	pH	TEMP	COND
	CAR			

	TRENCH WELL T4			
PID	DTW	pH	TEMP	COND
	4.96			
	5.58			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1	11.23	1		
RS2	10.04			
RS5	13.6			
RS6	13.3			
RS7	4.02	[illegible]	9.04	1520
RS8	7.07			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9	7.07		7.12	1500
RS10	2.9(			
R1	13.[illegible]			
R2	13.31			
R3	9.72			

COMMENTS Site OK

ELECTRIC METER —— WATER METER 1118892

SAMPLE(—— SITE MONITORED BY Broadway

WASTEWATER	INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE 5 GALLONS/1 MINUTES GALLONS PURGED 4 hours PRESSURE WATER CARBONS #1 .9 PSI, #2 —— PSI.
T2 FLOW RATE ___ GALLONS/___ MINUTES GALLONS PURGED ____

FILTER INSPECTION AND COMMENTS ——

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS Clean

Acceptance of water phase carbon units only if completely flooded with water ____yes ____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8 5 and containers are in good condition ____yes ____no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4005 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT: SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM DAILY 2880 GALLONS

DATE 7-27-00 REASON FOR SITE VISIT Weekly Pump & Inspection

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND
15:25		2.31			
17.50		3.14			

TRENCH WELL T2

PID	DTW	pH	TEMP	COND
	2.41			
	3.36			

TRENCH WELL T3

PID	DTW	pH	TEMP	COND
	CAR			

TRENCH WELL T4

PID	DTW	pH	TEMP	COND
	5.15			
	5.49			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1	11.27	4:00		
RS2	10.26			
RS5	13.78			
RS6	13.54			
RS7	4.04		4.05	12.55
RS8	7.24			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9	2.17			
RS10	1.84			
R1	14.09			
R2	18.40			
R3	9.84			

COMMENTS Only partial purge due to time restraints (9-6) Pumping T2*

ELECTRIC METER _____ WATER METER _____

SAMPLED _____ SITE MONITORED BY Broadway

	WASTEWATER INFLUENT	WASTEWATER EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE 5 GALLONS/ 1 MINUTES GALLONS PURGED _____ PRESSURE WATER CARBONS #1 60 PSI #2 _____ PSI
T2 FLOW RATE ___ GALLONS/ ___ MINUTES GALLONS PURGED _____

FILTER INSPECTION AND COMMENTS _____

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS Clean

Acceptance of water phase carbon units only if completely flooded with water _____yes _____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition _____yes _____no - return to carbon manufacture

* T1 is very close to driveway @ 4038 Brighton. T2 is out of the way

U.S. FILTER WESTATES

FIELD SERVICE REPORT

JOB#: 11764CA
DATE: 8/3
TIME: 9AM

LEAD TECH: _____ SERVICE TECH: _____

BILL TO: WESTERN GEO

JOB SITE: DESERT PETROLEUM
4035 PARK BLVD
OAKLAND

SITE CONTACT: GEORGE CONVERSE
PHONE#: 530-668-5300
PGR.#: _____

SPECIAL INST.: SOAK + BACKWASH

TIME:
LOADING _____ TO _____
YARD OUT _____
ARRIVAL 9:00
DEPART 9:15
END TIME 9:45

PROCEED TO OTHER JOB
☐ YES ☐ NO
SITE NAME _____
CITY _____
JOB# _____

☐ SERVICE
☐ PICK-UP
☒ DELIVERY 1200 ASC 200 w/ CC602
☐ REWORK
☐ WARRANTY
☒ SAMPLE

ADSORBERS SERVICED — **SERIAL NUMBERS**
QTY ____ ASC 1200 2000 _____
QTY ____ VSC 1200 2000 _____
QTY ____ PV 35 50 80 _____
QTY ____ OTHER: _____ _____

CARBON USED — **LOT#'S**
QTY ____ SKG/KG: _____
QTY ____ SCC/CC: _____
QTY ____ CC-602 12x30: _____
QTY ____ OTHER: _____ : _____

CONTAINERS USED:
QTY ____ DRUMS
QTY ____ TOTE BINS
QTY ____ ROLL-OFFS
QTY ____ OTHER: _____

LEFT ON SITE
☐ YES ☐ NO

SHIPPING INFORMATION:
PROFILE NO.: _____
BILL OF LADING #: _____
MANIFEST DOC.#: _____

SAMPLE ANALYTICAL:
EPA 8015-TPH VM/XM TCLP
EPA 8010/8020 EPA 8240 TOTALS
OTHER: _____

EQUIPMENT RENTED:
RENTAL COMPANY: _____
RELEASE NO.: _____
PHONE #: _____

SERVICE TECH COMMENTS: _____

CUSTOMER COMMENTS: _____

CUSTOMER SIGNATURE: Stephen L Brandon DATE: _____

WHITE - CUSTOMER • YELLOW - CUSTOMER SERVICE • PINK - SERVICE • GOLD - SALES

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRE TREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM. DAILY 2880 GALLONS

DATE 8-3-00 REASON FOR SITE VISIT Weekly I&M + Pump

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND
915		2.9			
		[illegible]			
1300		3.32			

TRENCH WELL T2

PID	DTW	pH	TEMP	COND
	2.69			
	[illegible]			
	3.30			

TRENCH WELL T3

PID	DTW	pH	TEMP	COND
	CAR			

TRENCH WELL T4

PID	DTW	pH	TEMP	COND
	5.15			
	CAR			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1	11.56	1000		
RS2	10.59	"		
RS5	15.36	"		
RS6	13.75	"		
RS7	4.00	930	4.05	1300
RS8	7.27	"		

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9	7.22	930	7.22	1300
RS10	4.82	"		
R1	14.27	1000		
R2	18.24	"		
R3	10.16	"		

COMMENTS Received new carbon unit - carrier took sample from old unit - New drum w/2"+1" adaptors

ELECTRIC METER ———— WATER METER 1120336

SAMPLED ———— SITE MONITORED BY Broadway

WASTEWATER	INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE 5 GALLONS/ 1 MINUTES GALLONS PURGED ———— PRESSURE WATER CARBONS #1 1.2 PSI, #2 ———— PSI
T2 FLOW RATE ____ GALLONS/____ MINUTES GALLONS PURGED ————

FILTER INSPECTION AND COMMENTS ————

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS C/CAN

Acceptance of water phase carbon units only if completely flooded with water X yes ____ no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition ____ yes ____ no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT: SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM. DAILY 2880 GALLONS

DATE 8/10/00 MINI RAY REASON FOR SITE VISIT Pump Trench + I & M

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND
1130		2.15			

TRENCH WELL T2

PID	DTW	pH	TEMP	COND
6.1	2.59			

TRENCH WELL T3

PID	DTW	pH	TEMP	COND
	980			

TRENCH WELL T4

PID	DTW	pH	TEMP	COND
	4.77			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1	11.78	1230		
RS2	10.93	1230		
RS5	14.46	1230		
RS6	14.89	1230		
RS7	4.06	1130		
RS8	7.54	1130		

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9	7.32	1137		
RS10	2.46	1130		
R1	14.36	1230		
R2	13.56	1230		
R3				

COMMENTS

ELECTRIC METER

WATER METER 1121041

SAMPLED

SITE MONITORED BY Broadway

	WASTEWATER INFLUENT	WASTEWATER EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE 5 GALLONS/ 1 MINUTES GALLONS PURGED

T2 FLOW RATE ____ GALLONS/____ MINUTES GALLONS PURGED

PRESSURE WATER CARBONS #1 .8 PSI, #2 ____ PSI

FILTER INSPECTION AND COMMENTS

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS Clean

Acceptance of water phase carbon units only if completely flooded with water ____yes ____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition ____yes ____no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550-1

WASTE WATER PRETREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM DAILY 2880 GALLONS

DATE 8-17-00 REASON FOR SITE VISIT Inspect & MAINTANANCE

TRENCH WELL T1					
TIME	PID	DTW	pH	TEMP	COND
1200		2.73			

TRENCH WELL T2				
PID	DTW	pH	TEMP	COND
	2.61			

TRENCH WELL T3				
PID	DTW	pH	TEMP	COND
	CAR			

TRENCH WELL T4				
PID	DTW	pH	TEMP	COND
	CAR			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1				
RS2				
RS5				
RS6				
RS7				
RS8				

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9				
RS10				
R1				
R2				
R3				

COMMENTS Trash pump broke - Low oil

ELECTRIC METER ~ WATER METER ~

SAMPLED _____ SITE MONITORED BY Broke way

WASTEWATER	
INFLUENT	EFFLUENT

TIME
pH
Conductivity
Temperature
PID

WATER TREATMENT

T1 FLOW RATE ~ GALLONS/~ MINUTES GALLONS PURGED _____
T2 FLOW RATE ___ GALLONS/_____MINUTES GALLONS PURGED _____

PRESSURE WATER CARBONS #1 ~ PSI, #2 ~ PSI

FILTER INSPECTION AND COMMENTS ~

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS Clean

Acceptance of water phase carbon units only if completely flooded with water _____yes _____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition _____yes _____no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM, DAILY 2880 GALLONS

DATE 8-24-00 REASON FOR SITE VISIT Inspect & Maintain

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND
1545		2.15			
1800		3.5			

TRENCH WELL T2

PID	DTW	pH	TEMP	COND.
	2.6			
	3.47			

TRENCH WELL T3

PID	DTW	pH	TEMP	COND
	9.81			
	9.75			

TRENCH WELL T4

PID	DTW	pH	TEMP	COND
	4.8			
	CAR			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1	11.9	1615		
RS2	10.14	1615		
RS5	16.18	1615		
RS6	14.7	1615		
RS7	4.06	1545	4.03	1800
RS8	7.56	1545		

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9	7.34	1545		
RS10	2.50	1545		
R1	14.27	1615		
R2	13.6	1613		
R3	10.42	1615		

COMMENTS New Pump - works great

ELECTRIC METER _____ WATER METER 112186O

SAMPLE(_____ SITE MONITORED BY Broadway

	WASTEWATER INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE ___ GALLONS/____MINUTES GALLONS PURGED_____ PRESSURE WATER CARBONS #1 .6 PSI #2_____ PSI
T2 FLOW RATE ___ GALLONS/____MINUTES GALLONS PURGED_____

FILTER INSPECTION AND COMMENTS ←

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS CLEAN

Acceptance of water phase carbon units only if completely flooded with water _____ yes _____ no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition _____ yes _____ no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM, DAILY 2880 GALLONS

DATE 8 30 00

REASON FOR SITE VISIT Weekly Inspect & Maintanace

	TRENCH WELL T1				
TIME	PID	DTW	pH	TEMP.	COND
		2.75			

TRENCH WELL T2				
PID	DTW	pH	TEMP.	COND.
	1.60			

TRENCH WELL T3				
PID	DTW	pH	TEMP	COND
	CAR			

TRENCH WELL T4				
PID	DTW	pH	TEMP	COND
	7.76			

DEPTH TO WATER

TIME	MW1	RS2	RS5	RS6
	12.26	11.33	16.30	14.65

RS7	RS8	RS9	RS10
4.09	8.09	7.99	2.46

R1	R2	R3
14.53	13.74	10.69

COMMENTS Cloudy - Not To Hot :)

ELECTRIC METER ———

WATER METER 1182720

SAMPLE(S) Sewer Discharge 1315

SITE MONITORED BY Broadway

WASTEWATER	
INFLUENT	EFFLUENT

TIME
pH
Conductivity
Temperature
PID

WATER TREATMENT

T1 FLOW RATE 5 GALLONS/ 1 MINUTES
T2 FLOW RATE ___ GALLONS/ ___ MINUTES

GALLONS PURGED ———
GALLONS PURGED ———

PRESSURE WATER CARBONS #1 .9 PSI, #2 ——— PSI,

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS CLEAN

Acceptance of water phase carbon units only if completely flooded with water ___yes ___no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition ___yes ___no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE OP 793

4035 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550 1

WASTE WATER PRETREATMENT, SEDIMENT SETTLING TANK AND 2 IN SERIES CARBON WATER SCRUB UNITS
PEAK HOURLY DISCHARGE 2 GPM, DAILY 2880 GALLONS

DATE 9-7-00

REASON FOR SITE VISIT Inspect & Maintain

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND
1110		2.88			
1245					

TRENCH WELL T2

PID	DTW	pH	TEMP	COND
	2.66			
	2.92			

TRENCH WELL T3

PID	DTW	pH	TEMP	COND
		CAR		

TRENCH WELL T4

PID	DTW	pH	TEMP	COND
	CAR			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1	4.73			
RS2	11.35			
RS5	16.56			
RS6	14.95			
RS7	4.11			
RS8	8.20			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9	7.51			
RS10	2.50			
R1	14.63			
R2	13.98			
R3	10.77			

COMMENTS Rent Trash pump — Fitting sprung Leak stopped pump 1245

ELECTRIC METER —

WATER METER 1123270

SAMPLE(—

SITE MONITORED BY Broadway

WASTEWATER	INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE 5 GALLONS/ 1 MINUTES GALLONS PURGED ____
T2 FLOW RATE ____ GALLONS/ ____ MINUTES GALLONS PURGED ____

PRESSURE WATER CARBONS #1 3 PSI #2 ____ PSI

FILTER INSPECTION AND COMMENTS —

WATER PHASE CARBON UNITS INSPECTION COMMENTS OK

CONDITION OF COMPOUND COMMENTS Clean

Acceptance of water phase carbon units only if completely flooded with water ____ yes ____ no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition ____ yes ____ no - return to carbon manufacture

FORMER DESERT PETROLEUM SITE DP 793

4015 PARK BLVD
OAKLAND, CALIFORNIA 94602
WASTE WATER DISCHARGE PERMIT NUMBER 5043550(1)

WASTE WATER PRETREATMENT: SEDIMENT SETTLING TANK AND 2 PRESSURE CARBON WATER SCRUBBERS
PEAK HOURLY DISCHARGE 2 GPM DAILY 2880 GALLONS

DATE 9-14-00

REASON FOR SITE VISIT Insp & MAINTAINANCE

TRENCH WELL T1

TIME	PID	DTW	pH	TEMP	COND
		2.19			

TRENCH WELL T2

PID	DTW	pH	TEMP	COND
	2.72			

TRENCH WELL T3

PID	DTW	pH	TEMP	COND
	CAR			

TRENCH WELL T4

PID	DTW	pH	TEMP	COND
	5.72			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
MW1	—			
RS2	—			
RS5	—			
RS6	—			
RS7	9.11			
RS8	—			

DEPTH TO WATER

WELL	DTW	TIME	DTW	TIME
RS9	1.29			
RS10	—			
R1	—			
R2	—			
R3	—			

COMMENTS 62.5" x 63" Tower — Need containment

ELECTRIC METER —

WATER METER 1124819

SAMPLED —

SITE MONITORED BY Broadway

	WASTEWATER INFLUENT	EFFLUENT
TIME		
pH		
Conductivity		
Temperature		
PID		

WATER TREATMENT

T1 FLOW RATE 2 GALLONS/ 1 MINUTES GALLONS PURGED
T2 FLOW RATE GALLONS/ MINUTES GALLONS PURGED

PRESSURE WATER CARBONS #1 PSI #2 PSI

FILTER INSPECTION AND COMMENTS —

WATER PHASE CARBON UNITS INSPECTION COMMENTS getting slow to start a good flow

CONDITION OF COMPOUND COMMENTS Clean

Acceptance of water phase carbon units only if completely flooded with water _____yes _____no - return to carbon manufacture
Acceptance of water phase carbon units only if pH is less than 8.5 and containers are in good condition _____yes _____no - return to carbon manufacture

North State Environmental Laboratory
CA ELAP # 1753
90 South Spruce Avenue, Suite V • South San Francisco, CA 94080 • (650) 266-4563 • FAX (650) 266-4560

C E R T I F I C A T E O F A N A L Y S I S

Lab Number: 00-1136
Client: Western Geo-Engineers
Project: DP793 PARK BLVD

Date Reported: 08/17/2000

Gasoline,BTEX and MTBE by Methods 8015M and 8020

Analyte	Method	Result	Unit	Date Sampled	Date Analyzed
Sample: 00-1136-01 Client ID: MW1				08/09/2000	WATER
Gasoline	8015M	62	ug/L		08/10/2000
Benzene	8020	1	ug/L		
Ethylbenzene	8020	ND			
MTBE	8020	ND			
Toluene	8020	2	ug/L		
Xylenes	8020	2	ug/L		
Sample: 00-1136-02 Client ID: R1				08/09/2000	WATER
Gasoline	8015M	10000	ug/L		08/10/2000
Benzene	8020	910	ug/L		
Ethylbenzene	8020	2100	ug/L		
MTBE	8020	ND			
Toluene	8020	76	ug/L		
Xylenes	8020	390	ug/L		
Sample: 00-1136-03 Client ID: R2				08/09/2000	WATER
Gasoline	8015M	30000	ug/L		08/10/2000
Benzene	8020	13000	ug/L		
Ethylbenzene	8020	1000	ug/L		
MTBE	8020	ND			
Toluene	8020	250	ug/L		
Xylenes	8020	2700	ug/L		

*Confirmed by GC/MS method 8260.

North State Environmental Laboratory
CA ELAP # 1753
90 South Spruce Avenue. Suite V • South San Francisco. CA 94080 • **(650) 266-4563** • FAX (650) 266-4560

C E R T I F I C A T E O F A N A L Y S I S

Lab Number: 00-1136
Client: Western Geo-Engineers
Project: DP793 PARK BLVD

Date Reported: 08/17/2000

Gasoline,BTEX and MTBE by Methods 8015M and 8020

Analyte	Method	Result	Unit	Date Sampled	Date Analyzed
Sample: 00-1136-04 Client ID: R3				08/09/2000	WATER
Gasoline	8015M	72	ug/L		08/10/2000
Benzene	8020	ND			
Ethylbenzene	8020	ND			
MTBE	8020	ND			
Toluene	8020	ND			
Xylenes	8020	ND			
Sample: 00-1136-05 Client ID: RS2				08/09/2000	WATER
Gasoline	8015M	60	ug/L		08/10/2000
Benzene	8020	ND			
Ethylbenzene	8020	ND			
MTBE	8020	ND			
Toluene	8020	ND			
Xylenes	8020	ND			
Sample: 00-1136-06 Client ID: RS5				08/09/2000	WATER
Gasoline	8015M	14000	ug/L		08/10/2000
Benzene	8020	330	ug/L		
Ethylbenzene	8020	1400	ug/L		
MTBE	8020	ND			
Toluene	8020	500	ug/L		
Xylenes	8020	6500	ug/L		

*Confirmed by GC/MS method 8260.

North State Environmental Laboratory
CA ELAP # 1753
90 South Spruce Avenue, Suite V • South San Francisco, CA 94080 • **(650) 266-4563** • FAX (650) 266-4560

C E R T I F I C A T E O F A N A L Y S I S

Lab Number: 00-1136
Client: Western Geo-Engineers
Project: DP793 PARK BLVD

Date Reported: 08/17/2000

Gasoline,BTEX and MTBE by Methods 8015M and 8020

Analyte	Method	Result	Unit	Date Sampled	Date Analyzed
Sample: 00-1136-07 Client ID: RS6				08/09/2000	WATER
Gasoline	8015M	660	ug/L		08/10/2000
Benzene	8020	2	ug/L		
Ethylbenzene	8020	2	ug/L		
MTBE	8020	ND			
Toluene	8020	3	ug/L		
Xylenes	8020	6	ug/L		
Sample: 00-1136-08 Client ID: RS7				08/09/2000	WATER
Gasoline	8015M	11000	ug/L		08/10/2000
Benzene	8020	2300	ug/L		
Ethylbenzene	8020	430	ug/L		
MTBE	8020	ND			
Toluene	8020	150	ug/L		
Xylenes	8020	520	ug/L		
Sample: 00-1136-09 Client ID: RS8				08/09/2000	WATER
Gasoline	8015M	100000	ug/L		08/10/2000
Benzene	8020	24000	ug/L		
Ethylbenzene	8020	2300	ug/L		
MTBE	8020	*ND			
Toluene	8020	40000	ug/L		
Xylenes	8020	9900	ug/L		

*Confirmed by GC/MS method 8260.

North State Environmental Laboratory
CA ELAP # 1753
90 South Spruce Avenue. Suite V • South San Francisco. CA 94080 • (650) 266-4563 • FAX (650) 266-4560

C E R T I F I C A T E O F A N A L Y S I S

Lab Number: 00-1136
Client: Western Geo-Engineers
Project: DP793 PARK BLVD

Date Reported: 08/17/2000

Gasoline,BTEX and MTBE by Methods 8015M and 8020

Analyte	Method	Result	Unit	Date Sampled	Date Analyzed
Sample: 00-1136-10 Client ID: RS9				08/09/2000	WATER
Gasoline	8015M	4900	ug/L		08/10/2000
Benzene	8020	500	ug/L		
Ethylbenzene	8020	160	ug/L		
MTBE	8020	ND			
Toluene	8020	430	ug/L		
Xylenes	8020	530	ug/L		
Sample: 00-1136-11 Client ID: RS10				08/09/2000	WATER
Gasoline	8015M	460	ug/L		08/10/2000
Benzene	8020	2	ug/L		
Ethylbenzene	8020	2	ug/L		
MTBE	8020	ND			
Toluene	8020	2	ug/L		
Xylenes	8020	7	ug/L		
Sample: 00-1136-12 Client ID: T1				08/09/2000	WATER
Gasoline	8015M	8900	ug/L		08/10/2000
Benzene	8020	1600	ug/L		
Ethylbenzene	8020	260	ug/L		
MTBE	8020	ND	ug/L		
Toluene	8020	760	ug/L		
Xylenes	8020	870	ug/L		

*Confirmed by GC/MS method 8260.

North State Environmental Laboratory
CA ELAP # 1753
90 South Spruce Avenue, Suite V • South San Francisco, CA 94080 • (650) 266-4563 • FAX (650) 266-4560

C E R T I F I C A T E O F A N A L Y S I S

Quality Control/Quality Assurance

Lab Number: 00-1136
Client: Western Geo-Engineers
Project: DP793 PARK BLVD

Date Reported: 08/17/2000

Gasoline,BTEX and MTBE by Methods 8015M and 8020

Analyte	Method	Reporting Limit	Unit	Blank	Avg MS/MSD Recovery	RPD
Gasoline	8015M	50	ug/L	ND	116	1
Benzene	8020	0.5	ug/L	ND	108	2
Ethylbenzene	8020	0.5	ug/L	ND	108	1
Toluene	8020	0.5	ug/L	ND	108	4
Xylenes	8020	1.0	ug/L	ND	107	1
MTBE	8020	0.5	ug/L	ND	113	4

ELAP Certificate NO:1753
Reviewed and Approved

John A.Murphy, Laboratory Director

00-1136.

North State Environmental Analytical Laboratory

90 South Spruce Avenue, Suite W, South San Francisco, CA 94080
Phone: (650) 266-4563 Fax: (650) 266-4560

Chain of Custody / Request for Analysis
Lab Job No.:_____ Page___of___

Client: WEGE	Report to: WEGE	Phone: 530-668-5306	Turnaround Time
Mailing Address: Western Geo Engineers 1386 Beamer St Woodland, CA 95776	Billing to: WEGE	Fax: 530-662-0273	
		PO# / Billing Reference:	Date: 8-9-00
			Sampler: Broadway

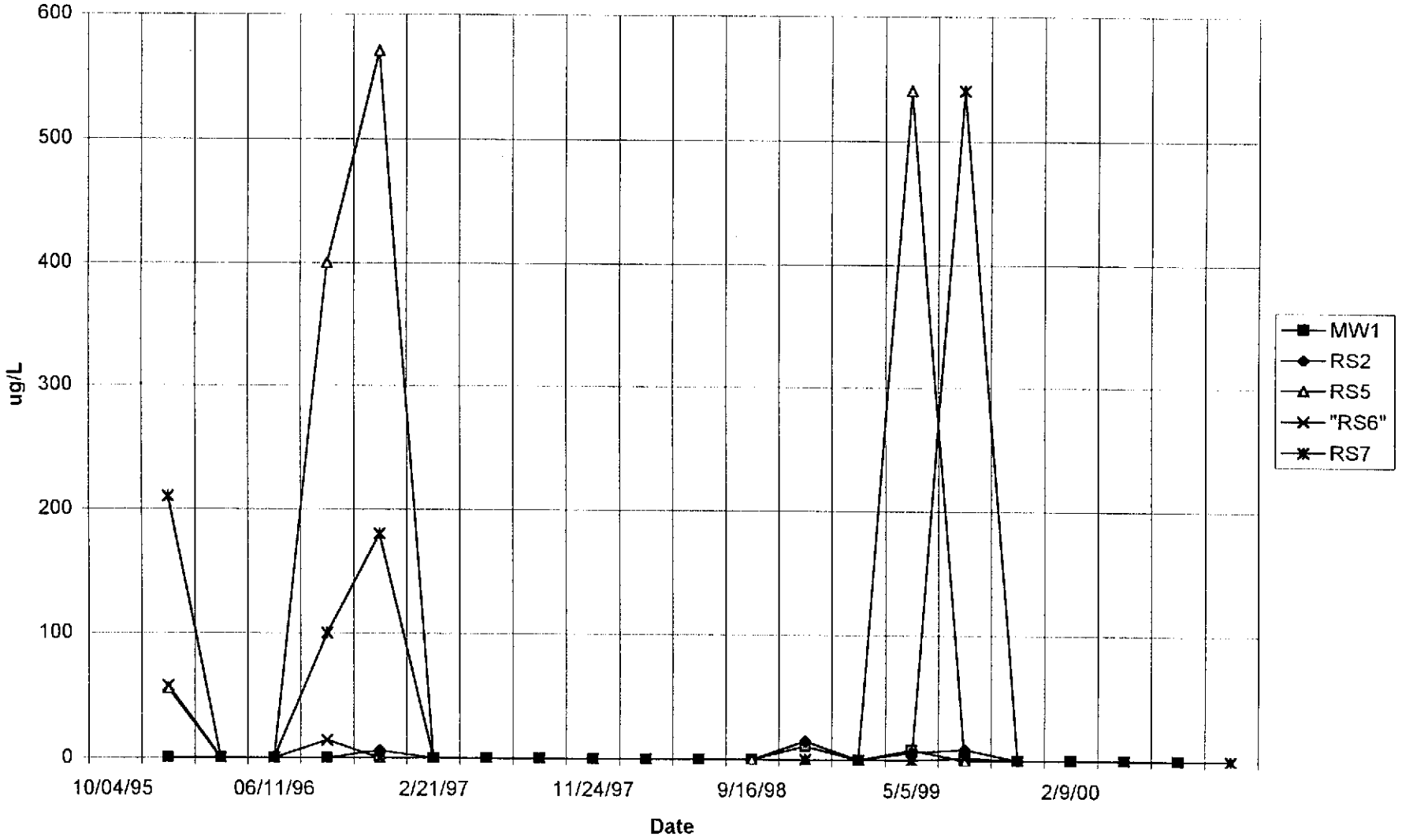
Project / Site Address: DP 793 Park blvd

Analysis Requested

	Sample ID	Sample Type	Container No. / Type	Pres.	Sampling Date / Time	TPHg BTEX MTBE							Comments / Hazards
01	MW1	H_2O	2 VOAs	HCL	8/9/00 1307								
02	R1				1422								
03	R2				1356								
04	R3				1435								
05	RS2				1320								
06	RS5				1416								
07	RS6				1345								
08	RS7				1240								
09	RS8				1154								
10	RS9				1227								
11	RS10				1209								
12	T1				1242								

Relinquished by: Broadway	Date: 08/09/00	Time: 2:20	Received by:	Lab Comments
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by:	

MTBE IN WELLS



APPENDIX E.
WORKPLAN – AUGMENT BIODEGRADATION

August 29. 2000

Mr. John Rutherford
Desert Petroleum
P.O. Box 1601
Oxnard. California 93032
(805) 644-6784 FAX (805) 654-0720

Dear Mr. Rutherford:

The following is the Workplan for nutrient augmentation into wells R1, R2 and R3 at former Desert Petroleum Station #793.

1 SITE LOCATION AND DESCRIPTION

Former Desert Petroleum #793 is a non-active service station, located on the northwest corner of the intersection of Park Boulevard and Hampel Street at 4035 Park Blvd., Oakland, California (Figure 1). The site is located in projected section 32; T1S; R3W; MDB&M at an approximate elevation of 210 feet above mean sea level (Figure 2).

2 INTRODUCTION

The following is a workplan to augment the ongoing natural bioremediation at former Desert Petroleum Inc. station DP 793. Gasoline was discovered trickling into a sewer manway on Brighton Avenue on November 30, 1989. The station was closed and all contents removed from the tanks by December 7, 1989. The UST's were removed on June 23,1994 and over-excavation of on-site contaminated soils occurred August 14, 1995. Various assessments have delineated the gasoline plume and show that the gasoline release followed the sewer main from the station to Brighton Avenue sewer manway. A receptor trench was installed along Brighton Avenue on August 12. 1999. On August 26, 1999 during the 1/4ly sampling round selected wells were also tested for the potential of natural biodegradation, see Western Geo-Engineers report "Further Assessment, Installation of Brighton Avenue Receptor Trench and 3rd Quarter 1999 Groundwater monitoring". The following workplan has been developed to enhance the natural biodegradation that is occurring along the parameters of the groundwater plume associated with this site.

3 BIOREMEDIATION

Bacteria native to the soil at hydrocarbon contamination sites normally degrade hydrocarbons. The most effective hydrocarbon degraders (eaters) are the aerobic (oxygen using) bacteria. The amount of available dissolved oxygen is usually the factor controlling the rate that these bacteria degrade the gasoline.

A much slower degradation process starts when the dissolved oxygen is depleted. The plume begins to become anaerobic and the bacterium commences to reduce nitrate, ferric iron, and sulfate to further degrade the hydrocarbons. Eventually, as these compounds and the oxygen are used, the bacteria begin methogenesis, in which the hydrocarbons are converted to methane.

The results of prior bioremediation sampling indicate that natural attenuation/bioremediation is active at this site and methogenesis is occurring. In a number of the wells the biodegradation has proceeded to the point that nearly all of the electron acceptors and the nutrients that bacteria require to degrade gasoline have been consumed while a significant amount of hydrocarbons remain. This makes it necessary to augment the electron acceptors and nutrients.

All of the wells show the impact of active biodegradation. It is not therefore possible to determine a background level of the compounds. The closest approximation for background levels at this site is the highest concentrations of electron acceptors and the lowest levels of by-products.

Compound	Function	Concentration	Well
Dissolved Oxygen (O_2)	Electron Acceptor	4.9 mg/l	MW1
Nitrate	Electron Acceptor	2.7 mg/l	RS2
Sulfate	Electron Acceptor	>77 mg/l	R2 & R3
Ferrous Iron	By-product	0.25 mg/l	MW1
Methane	By-product	<0.00001 mg/l	MW1
Carbon Dioxide	By-product	0.058 mg/l	RS8
Aerobic Bacteria	By-product	10 CFU/ml	MW1

mg/L milligrams per liter (parts per million)
CFU/ml plate count per milliliter

All of the tested wells have reduced levels of dissolved oxygen.

Both Nitrate and Sulfate have been reduced, with Nitrate being reduced to non-detectable levels in down gradient well RS9 and Sulfate reduced to non-detectable levels in well RS8, see Figures 7 and 8.

The presence of Ferrous Iron and Methane in the wells indicates that biodegradation has progressed to the point that the system is oxygen deficient and the bacteria have started to reduce the iron to provide oxygen for the degradation.

The carbon dioxide (CO_2) levels in the groundwater indicate that a portion of the hydrocarbons have been degraded. CO_2 and water are the final byproducts of the biodegradation of hydrocarbons. The carbon in CO_2 results from the oxidation of the hydrocarbon radical CH_2 and as such 1 mg of CO2 = 0.41 mg of CH_2 (CH_2 (12+1+1 = 14) / (CO_2 (12+16+16=34.

The presence of methane (CH_4) indicates that a number of the wells have progressed into methogenesis.

The levels of electron acceptors present and the presence of the reaction products, carbon dioxide, methane and ferrous iron indicate that the bacteria in the soil and the compounds in the groundwater have the capability to consume a significant amount of hydrocarbons.

Comparison of the hydrocarbon degrader counts (amount of bacteria) to the TPHg concentration, electron acceptors, byproducts, and nutrients, indicate that the addition of phosphate and ammonia sulfate can have a significant effect on the bioactivity, see Table 3 of Third Quarter 2000 report.

Five of the wells contain greater than 10 mg/l of TPHg with a high of 100 mg/L at RS8. This indicates that it would be beneficial to increase the biodegradation capacity of the aquifer. The most cost beneficial way to do this is by adding dissolved oxygen.

3.1 BIO-AUGMENTATION

3.1.1 Air Sparging

Air sparging should be performed by pumping, filtered, oil free compressed, air into RS5 and R2. The air would be delivered by a 3/8-inch polyethylene tube to an air-defusing filter set at a depth of 21 feet in well RS5 and 16 feet in well R2. The top of the wells will be sealed. The top of slots in RS5 is at 15 feet below surface and at 10 feet below the surface in R2. Sparging would be expected to pressure the casing until air escapes into the formation. Ideally this will cause the water near the well to become saturated with oxygen.

RS5 and R2 are recommended to be used for air sparging because they are at the upgradient edge of the plume and are associated with the soil plume. Laterals have already been run to these wells.

The pump would be placed in the treatment compound inside a noise and weather protection shed were the laterals are exposed and now terminate.

3.1.2 NUTRIENT ADDITION

As found during the September 2, 1999 sampling round the phosphate and ammonia levels are reduced to levels that negatively effects the biodegradation rate. Sodium hexametaphosphate and ammonium sulfate will be added to the wells in order to augment the levels of these compounds.

3.1.2.1 Phosphate

Research of the current literature indicates that the direct addition of orthophosphate may cause the precipitation of insoluble phosphate salts, thus plugging the infiltration wells and the surrounding aquifer. see Appendix F.

In sodium hexametaphosphate (SHMP), the phosphate is in the form of polyphosphate which and forms complex ions with the calcium and iron ions and does not precipitate out of solution. Additional sodium SHMP has a neutral pH of 7 and may be used in the treatment of potable water.

The current groundwater plume covers an area of approximately 22,800 square feet. The affected water bearing strata is an estimated 16 feet thick and extends from 10 to 26 feet below the surface at well RS5. The plume volume is 364,800 cubic feet. Assuming a porosity of 0.3, the plume contains 109,440 cubic feet, 818,611 gallons or 3,098,443 liters of water.

We hope to raise the initial phosphate concentration in the contaminated aquifer to 1 mg/l. To do this 2323 grams (1mg/l x 3098443 l x1g/1000mg) or 6.83 pounds (3098.4 g x 1lb/453.6 g) of phosphate will be added to the formation. Sodium hexametaphospate has a phosphate content of 66.5 percent; therefore, 6.83/.665= 10.3 pounds of SHMP has to be added to the formation. 15 pounds of SHMP will be mixed with 417 pounds or 50 gallons of water; the resulting 3.6 percent solution shall be decanted into R3 on a weekly basis. This concentration may be adjusted if later laboratory results indicate a change would be beneficial.

3.1.2.2 Ammonium Sulfate

In addition to the SHMP, 15 pounds of ammonium sulfate as an ammonia source shall be mixed into the water mixture. In addition to ammonia, this will also supply some sulfate, an important electron acceptor, to the system.

Fifteen pounds of ammonium sulfate should raise the concentration of ammonia and sulfate to the following:

$(NH_4)_2SO_4$ = 132g/mole

N=14, H=1, $(NH_4)_2$ = 36g/mole = 36g/mole/132g/mole = 0.273

S=32, O = 16, SO_4 =96g/mole = 96g/mole/132g/mole = 0.727

NH_4 = 15 x 0.273 = 4.1 pounds

SO_4 = 15 x 0.727 = 10.9 pounds

From phosphate addition calculations above, 6.87 pounds of a substance is equivalent to 1 mg/l in the contaminated aquifer. As with the phosphate, above, the concentration of ammonium sulfate may be changed, if warranted.

NH_4 4.1/6.87 = 0.6 mg/l in the formation.
SO_4 10.9/6.87 = 1.6 mg/l in the formation.

4 HYDROCARBON CONTAMINATION

The primary mass of hydrocarbon contamination left after over-excavation on site and installation of the receptor trench was found in the soil (2885 pounds) with significant amounts to be found in the groundwater (102 pounds). The soil contamination is present in three phases; absorbed onto the soil, vapor and free phase. The free phase product has been found either coating the sand grains or as a floating product layer. Presently there is no significant floating product plume associated with this site.

The amount bound to the soil (2885 pounds) was found by contouring the results of the soil samples taken during test borings to find the resulting areas and volumes, see Table 4 and Figures 5 – 9 of Third Quarter 2000 report.

The mass in groundwater (102 pounds) was found by contouring the August 24, 1999 ground water results and calculating the volume of contaminated water, as shown in Table 4 and Figures 10 and 11.

Past experience has shown that significant levels of soil hydrocarbons can be removed through vapor extraction. Examinations of lithology beneath this site and along Brighton Avenue show that the formation is too clayey for this technology to have any degree of success.

5 INTERESTED PARTIES

Mr. John Rutherford Desert Petroleum P.O. Box 1601 Oxnard, California 93032 (805) 644-6784 FAX (805) 654-0720	Mr. Thomas Peacock, Manger Environmental Health Services Environmental Protection (LOP) 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502-6577 (510) 567-6782, Fax (510) 337-9335
Mr. Leroy Griffin Oakland Fire Dept. OES Haz Mat Mgmt Program 1605 Martin Luther King Jr. Drive Oakland, CA 94612	Steve Marquez SWRCB, Cleanup Fund 2014 T Street Sacramento, CA 95814

6 LIMITATIONS

This report is based upon the following:

- The observations of field personnel.
- The results of laboratory analyses performed by a state certified laboratory.
- Referenced documents.
- Our understanding of the regulations of the State of California and Alameda County, Hazardous Materials Section and/or City of Oakland, California.

Changes in groundwater conditions can occur due to variations in rainfall, temperature, local and regional water usage and local construction practices. In addition, variations in the soil and groundwater conditions could exist beyond the points explored in this investigation.

State certified analytical results are included in this report. This laboratory follows EPA and State of California approved procedures; however, WEGE is not responsible for errors in these laboratory results.

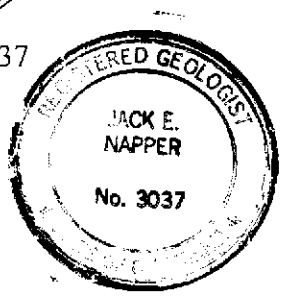
The services performed by Western Geo-Engineers, a corporation, under California Registered Geologist #3037 and/or Contractors License #513857, have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the State of California and the Oakland area. Our work and/or supervision of remediation and/or abatement operations, active or preliminary, at this site is in no way meant to imply that we are owners or operators of this site. Please note that known contamination of soil and/or groundwater must be reported to the appropriate agencies in a timely manner. No other warranty, expressed or implied, is made.

If you have any questions concerning this report or if we can be of further assistance, please don't hesitate to contact us at (530) 668-5300.

Respectfully,

George Converse
Project Geologist

Jack E. Napper
Registered Geologist #3037



APPENDIX F.
RESEARCH
WORKPLAN – AUGMENT BIODEGRADATION

SCOPE NEWSLETTER

Year : 1996 - Country : GERMANY
Bioremediation of an old fuel oil-contaminated site using hexametaphosphate

Groundwater is often found to be contaminated with various organic chemicals whereby heterotrophic bacteria dominate. Phosphate is a required electron acceptor, an essential nutrient, and an important limiting factor of hydrocarbon degradation in bioremediation.

This case concerns contamination, 40-50 years ago, by a leaking pipeline,of 15 000-17 000 L. Most of the oil floating on the groundwater was removed in the 70's ; the pollution now lies 4-9m below ground level.

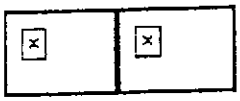
The in situ remediation design consists of 2 infiltration wells, production wells, plus a groundwater processing plant. Before infiltration, hydrogen peroxide and nitrate were added to the reinfiltrated water to meet the electron acceptor demand, plus phosphate to meet nutrient demand.

Initial results suggested that phosphorus was the limiting factor for heterotrophic bacterial activity. It is probable that the phosphate stopped the limitation and oxygen was used in and next to the infiltration wells. However, during the use of diphosphate, problems occured with the precipitation of insoluable phosphate salts and thus plugging of the infiltration wells and the surrounding aquifer occurred.

After 2 months the phosphorus source was stopped, the wells regenerated with H202 and acid, then 6 weeks later was replaced by sodium hexametaphosphate. This eliminated problems of precipitation and plugging in the infiltration wells. For the first time a phosphorus supply for the whole contaminated area was observed.

Although all the work to date on polyphosphates in bioremediation has concentrated on tripolyphosphates, this study showed the superiority of polyphosphate over orthophosphate on a field scale. It was also found that sodium hetamexaphosphate is superior over commonly used phosphates in transporting phosphorus over long aquifer distances.

Martin Steiof/Wolfgang Dott.Applied Bioremediation of Petroleum Hydrocarbons (301-309)



APPENDIX G.
MSDS
WORKPLAN – AUGMENT BIODEGRADATION

Coatings Performance Materials
Data Sheet

Sodium Hexametaphosphate (SHMP)

PRODUCT:	Sodium Hexametaphosphate (SHMP) Plates NSF® Certified to ANSI / NSF Std. 60
GRADE:	Technical
CODE NO.:	7890-310
GENERAL DESCRIPTION:	Clean, clear glass plates of amorphous sodium polyphosphate
FORMULA:	$Na_{(n+2)}P_nO_{(3n+1)}$; n = 9-15
MOLECULAR WEIGHT:	978-1592
CAS NO.:	68915-31-1
DATE EFFECTIVE:	June 21, 1996

CHARACTERISTICS	SPECIFICATION LIMITS
P_2O_5, %	66.5 Minimum
pH, 1% Solution	6.8 - 7.2
Plate Size:	
Thickness, inches	± 1/16
Width, inches	1.5 Maximum

Solutia Sodium Hexametaphosphate is a glassy, amorphous sodium polyphosphate with a Na_2O/P_2O_5 molar ratio of approximately 1.1.

NOTE: Specification Limits are subject to change from time to time.

Production Location:	Trenton, MI
Packaging:	50 lb. multiwall bags
Labeling Requirements:	Product label
Shipping Classification:	Sodium Phosphate
Handling Precautions:	No precautionary statement required on label. Handle in accordance with good industrial hygiene and safety practices. These include avoiding unnecessary exposure and removal of material from eyes, skin, and clothing.

Key Properties:

- Sequestration
- Neutral Salt
- Buffer Capacity
- Infinite Solubility in Water

- Deflocculation

Applications:

- Consumer Products: The unique combination of SHMP's ability to sequester water hardness and its infinite solubility in water makes it a product of choice in applications such as laundry boosters, water conditioners and in bath beads.
- Industrial Water Treatment: SHMP can be used in continuously recycled industrial water as a softener and to control scale formation in condensers, heat exchangers, pipelines and boilers. SHMP has two particular advantages over the pyro- and tripolyphosphates in industrial water treatment. First, it maintains polyphosphate properties longer in high temperature systems at mildly alkaline pH's. Second, its infinite solubility in water allows very concentrated stock solutions to be prepared.
- Potable Water Treatment: Due to the sequestration and threshold properties of SHMP, it is commonly added to potable water to aid in corrosion control and antiscaling of distribution equipment and lines. Solutia sodium hexametaphosphate conforms to the requirements of ANSI / NSF Standard 60, Maximum Use Level 11.9 mg/L, and meets or exceeds ANSI / AWWA Standard B502-88.
- Industrial Cleaning: In the textile industry, SHMP is used to chelate calcium and iron, hence keeping their salts from being redeposited on the surface of the fabric. It also provides good dispersion in pigmenting and dyeing operations.
- Film Development: The excellent sequestering properties of SHMP improve the efficiency of the photographic film developing process by chelating foreign metal ions.
- Oil Well Drilling Muds: Deflocculants are required in oil well drilling muds to maintain high specific gravity at the low viscosity necessary for easy pumping. SHMP is an excellent deflocculant and offers superior cost-performance in wells with depths down to 5,000 feet.
- Kaolin Clay Processing: SHMP is effective as a deflocculant in the preparation of high solids slurries with sufficient fluidity to allow rapid settling of coarse impurities. Another advantage occurs in the final bleaching of the clay with sulfuric acid. With SHMP's neutral pH, a minimal amount of sulfuric acid is required to lower the pH to 3.5, which is required for effective bleaching.

FOR MORE COMPLETE INFORMATION ON PROPERTIES AND SAFE HANDLING OF THIS MATERIAL, SEE THE Solutia MATERIAL SAFETY DATA SHEET (MSDS).

PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

For Technical Service assistance, call 314-674-4671 or FAX 314-674-2298.
For Customer Order assistance, call toll-free 800-325-4330 or FAX 314-674-2490.
Additional information follows.

Technical Bulletins | Ask the Experts | Literature & Sample Request

MONSANTO -- SODIUM HEXAMETAPHOSPHATE - SODIUM HEXAMETAPHOSPHATE,TECHNICAL
MATERIAL SAFETY DATA SHEET
NSN: 6810008238109
Manufacturer's CAGE: 76541
Part No. Indicator: A
Part Number/Trade Name: SODIUM HEXAMETAPHOSPHATE

General Information

Item Name: SODIUM HEXAMETAPHOSPHATE,TECHNICAL
Company's Name: MONSANTO COMPANY
Company's Street: 800 N LINDBERGH BLVD
Company's City: ST LOUIS
Company's State: MO
Company's Country: US
Company's Zip Code: 63167
Company's Emerg Ph #: 314-694-1000,800-424-9300(CHEMTREC)
Company's Info Ph #: 314-694-1000
Distributor/Vendor # 1: WALTRON LTD (201-534-5100)
Distributor/Vendor # 1 Cage: 71229
Record No. For Safety Entry: 007
Tot Safety Entries This Stk#: 009
Status: SE
Date MSDS Prepared: 03FEB92
Safety Data Review Date: 04APR95
Supply Item Manager: CX
MSDS Preparer's Name: NONE
MSDS Serial Number: BWSTG
Hazard Characteristic Code: N1
Unit Of Issue: DR
Unit Of Issue Container Qty: 100 POUNDS
Type Of Container: DRUM
Net Unit Weight: 100 LBS

Ingredients/Identity Information

Proprietary: NO
Ingredient: SODIUM HEXAMETAPHOSPHATE
Ingredient Sequence Number: 01
Percent: UNKNOWN
NIOSH (RTECS) Number: TR4950250
CAS Number: 68915-31-1
OSHA PEL: 15 MG/M3 TOTAL DUST
ACGIH TLV: 10 MG/M3 TDUST 9394
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: WHITE POWDER, GRANULES, OR GLASS PLATES. ODORLESS.
Boiling Point: NOT GIVEN
Melting Point: 1162F,628C
Vapor Pressure (MM Hg/70 F): NOT GIVEN
Vapor Density (Air=1): NOT GIVEN
Specific Gravity: 81 LBS/FT3 PWD
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: INFINITE
pH: 7.0
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: NOT APPLICABLE

Lower Explosive Limit: NOT GIVEN
Upper Explosive Limit: NOT GIVEN
Extinguishing Media: NONFLAMMABLE. USE EXTINGUISHING MEDIA SUITABLE FOR SURROUNDING FIRE.
Special Fire Fighting Proc: NONFLAMMABLE. USE STANDARD FIREFIGHTING PROCEDURES FOR SURROUNDING MATERIALS IN THE FIRE.
Unusual Fire And Expl Hazrds: MATERIAL IS NOT COMBUSTIBLE.

Reactivity Data

Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomp Products: NONE SPECIFIED BY MANUFACTURER.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): DOES NOT OCCUR.

Health Hazard Data

LD50-LC50 Mixture: LD50 RAT ORAL 6600 MG/KG.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: PRODUCT REPORTED NOT TO CAUSE SIGNIFICANT EYES: SLIGHTLY IRRITATING. SKIN: NON-IRRITATING. INGESTION: PRACTICALLY NON-TOXIC. CHRONIC: NONE SPECIFIED.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: THIS COMPOUND CONTAINS NO INGREDIENTS AT CONCENTRATIONS OF 0.1% OR GREATER THAT ARE CARCINOGENS OR SUSPECT CARCINOGENS.
Signs/Symptoms Of Overexp: EYES: SLIGHT IRRITATION. SKIN: NON- IRRITATING. INGESTION: NON-TOXIC.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: NONE SPECIFIED BY MANUFACTURER.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: SWEEP UP AND PLACE BULK MATERIAL IN CONTAINER. FLUSH SMALL SPILLS TO SEWER WITH PLENTY OF WATER. FLUSH SPILL AREA WITH WATER.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF WASTE IN A LANDFILL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions-Handling/Storing: PRODUCT IS VERY HYGROSCOPIC AND SHOULD BE STORED IN A DRY AREA IN POLY OR VAPOR BARRIER BAGS TO PREVENT MOISTURE PICKUP AND CAKING.
Other Precautions: HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES, INCLUDING AVOIDING UNNECESARY EXPOSURE AND REMOVAL OF MATERIAL FROM EYES, SKIN AND CLOTHING. AVOID EYE CONTACT. MINIMIZE SKIN CONTAMINATION. AVOID BREATHING DUST.

Control Measures

Respiratory Protection: USE NIOSH APPROVED EQUIPMENT WHEN AIRBORNE EXPOSURE IS EXCESSIVE.
Ventilation: PROVIDE VENTILATION TO MINIMIZE EXPOSURE. USE LOCAL EXHAUST AT SOURCES OF AIR CONTAMINATION.
Protective Gloves: NONE NORMALLY REQUIRED.
Eye Protection: NONE NORMALLY REQUIRED.
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.
Work Hygienic Practices: WASH AFTER HANDLING AND BEFORE EATING, DRINKING, OR SMOKING. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

==========
Transportation Data
==========
Trans Data Review Date: 95094
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
==========
Disposal Data
==========
==========
Label Data
==========
Label Required: YES
Technical Review Date: 04APR95
Label Status: F
Common Name: SODIUM HEXAMETAPHOSPHATE
Chronic Hazard: NO
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: PRODUCT REPORTED NOT TO CAUSE SIGNIFICANT EYES: SLIGHTLY IRRITATING. SKIN: NON-IRRITATING. INGESTION: PRACTICALLY NON-TOXIC. CHRONIC: NONE SPECIFIED. PRODUCT IS VERY HYGROSCOPIC AND SHOULD BE STORED IN A DRY AREA IN POLY OR VAPOR BARRIER BAGS TO PREVENT MOISTURE PICKUP AND CAKING. FIRST AID: NONE SPECIFIED BY MANUFACTURER. TARGET ORGENS; UNKNOWN.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: MONSANTO COMPANY
Label Street: 800 N LINDBERGH BLVD
Label City: ST LOUIS
Label State: MO
Label Zip Code: 63167
Label Country: US
Label Emergency Number: 314-694-1000,800-424-9300(CHEMTREC)
Year Procured: 1995
==========

FISHER SCIENTIFIC -- AMMONIUM SULFATE - AMMONIUM SULFATE,ACS
MATERIAL SAFETY DATA SHEET
NSN: 6810002646546
Manufacturer's CAGE: 22527
Part No. Indicator: B
Part Number/Trade Name: AMMONIUM SULFATE

General Information

Item Name: AMMONIUM SULFATE,ACS
Company's Name: FISHER SCIENTIFIC CO
Company's Street: 585 ALPHA DR
Company's City: PITTSBURGH
Company's State: PA
Company's Country: US
Company's Zip Code: 15238-2911
Company's Emerg Ph #: 412-526-8300 201-796-7100
Company's Info Ph #: 412-526-8300 201-796-7100
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 007
Status: SE
Date MSDS Prepared: 10JUN92
Safety Data Review Date: 10JUL95
Supply Item Manager: CX
Preparer's Company: FISHER SCIENTIFIC CHEMICAL DIV
Preparer's St Or P. O. Box: 1 REAGENT LN
Preparer's City: FAIR LAWN
Preparer's State: NJ
Preparer's Zip Code: 07410-5000
MSDS Serial Number: BXFQH
Specification Number: O-C-265
Hazard Characteristic Code: C3
Unit Of Issue: BT
Unit Of Issue Container Qty: 500 GRAM
Type Of Container: BOTTLE
Net Unit Weight: UNKNOWN

Ingredients/Identity Information

Proprietary: NO
Ingredient: AMMONIUM SULFATE (2:1), DIAMMONIUM SULFATE; SULFURIC ACID, DIAMMONIUM SALT
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: BS4500000
CAS Number: 7783-20-2
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NOT ESTABLISHED

Physical/Chemical Characteristics

Appearance And Odor: ODORLESS, COLORLESS RHOMBIC CRYSTALS/WHITE GRANULES
Melting Point: 455F,235C
Specific Gravity: 1.769
Solubility In Water: 76.7%
pH: 5.5

Fire and Explosion Hazard Data

Extinguishing Media: DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY, OR REGULAR FOAM. FOR LARGE FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM.
Special Fire Fighting Proc: NO ACUTE HAZARD. MOVE CONTAINER FROM AREA IF

POSSIBLE. AVOID BREATHING VAPORS/DUSTS. KEEP UPWIND.
Unusual Fire And Expl Hazrds: NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT/ FLAME.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): STABLE UNDER ABNORMAL TEMPERATURESS & PRESSURES.
Materials To Avoid: AMMONIUM NITRATE & POTASSUIM/SODIUM-POTASSIUM ALLOY, BASES, CHLORATES, CHLORINE, CONCRETE, COPPER & ALLOYS (SEE SUPP)
Hazardous Decomp Products: GASEOUS AMMONIA, OXIDES OF SULFUR, TOXIC OXIDES OF NITROGEN, NITROGEN TRICHLORIDE
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50(RAT): 2840 MG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: INHALATION: MILD RESPIRATORY SYSTEM IRRITATION, ASTHMATIC ATTACK. SKIN: IRRITATION, CHRONIC CONTACT MAY CAUSE DERMATITIS. EYES: IRRITATION, CHRONIC CONTACT MAY CAUSE CONJUNCTIVITIS. INGESTION: IRRITATION OF THE MOUTH, ESOPHAGUS & STOMACH.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION, SORE THROAT, COUGH, SHORTNESS OF BREATH, SYMPTOMS OF PULMONARY EDEMA, REDNESS, EYE PAIN, ABDOMINAL PAIN, NAUSEA, VOMITING, DIARRHEA.
Med Cond Aggravated By Exp: PERSONS WITH ASTHMA.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. IF BREATHING HAS STOPPED, PERFORM CPR. KEEP PERSON WARM & AT REST. SKIN: WASH W/SOAP/MILD DETERGENT & LARGE AMOUNT OF WATER 15-20 MINS. EYES: WASH ASPIRATION HAZARD. OBTAIN MEDICAL ATTENTION IN ALL CASES. NOTE TO PHYSICIAN: NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY & SUPPORTIVELY.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: SWEEP UP & PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION/LATER DISPOSAL. DON'T FLUSH INTO SEWER. KEEP UNNECESSARY PEOPLE AWAY.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE & LOCAL REGULATIONS. NFPA HAZARDOUS CHEMICAL 49.
Precautions-Handling/Storing: OBSERVE ALL FEDERAL, STATE & LOCAL REGULATIONS WHEN STORING. PROTECT CONTAINERS FROM PHYSICAL DAMAGE.
Other Precautions: SEPARATE FROM STRONG OXIDIZERS SUCH AS CHLORATES, NITRATES, NITRITES & ALL OTHER INCOMPATIBLE SUBSTANCES. PREVENT EYE & SKIN CONTACT W/MATERIAL.

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED RESPIRATOR SELECTED BASED ON CONTAMINATION LEVELS IN THE WORK PLACE, THE SPECIFIC OPERATION & THE WORKING LIMITS OF THE RESPIRATOR.
Ventilation: LOCAL EXHAUST VENTILATION SYSTEM
Protective Gloves: REQUIRED
Eye Protection: SPLASH-PROOF/DUST-RESISTANT GOGGLES
Other Protective Equipment: EYE WASH, IMPERVIOUS CLOTHING & EQUIPMENT

Work Hygienic Practices: REMOVE & LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Suppl. Safety & Health Data: MATERIALS TO AVOID: NITRATES, STRONG OXIDIZERS, POTASSIUM CHLORATE, POTASSIUM NITRATE, POTASSIUM NITRITE, SODIUM HYPOCHLORITE, ZINC

==========

Transportation Data

==========

Trans Data Review Date: 95191
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
MMAC Code: NR

==========

Disposal Data

==========

==========

Label Data

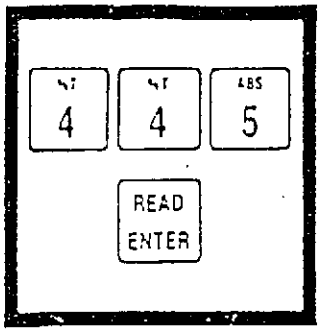
==========

Label Required: YES
Technical Review Date: 10JUL95
Label Status: F
Common Name: AMMONIUM SULFATE
Chronic Hazard: YES
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: INHALATION: MILD RESPIRATORY SYSTEM IRRITATION, ASTHMATIC ATTACK. SKIN: IRRITATION, CHRONIC CONTACT MAY CAUSE DERMATITIS. EYES: IRRITATION, CHRONIC CONTACT MAY CAUSE CONJUNCTIVITIS. INGESTION: IRRITATION OF THE MOUTH, ESOPHAGUS & STOMACH. IRRITATION, SORE THROAT, COUGH, SHORTNESS OF BREATH, SYMPTOMS OF PULMONARY EDEMA, REDNESS, EYE PAIN, ABDOMINAL PAIN, NAUSEA, VOMITING, DIARRHEA.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: FISHER SCIENTIFIC CO
Label Street: 585 ALPHA DR
Label City: PITTSBURGH
Label State: PA
Label Zip Code: 15238-2911
Label Country: US
Label Emergency Number: 412-586-8300 800-796-7100

==========

URL for this msds http://siri.org. If you wish to change, add to, or delete information in this archive please sent updates to dan@siri.org.

APPENDIX H.
HACH SPECTROPHOTOMETER
FIELD TEST METHODS
WORKPLAN – AUGMENT BIODEGRADATION



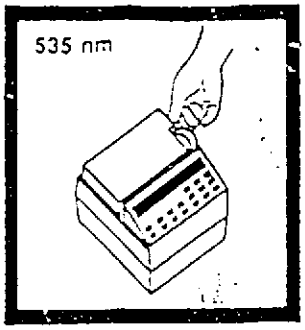
1. Enter the stored program number for dissolved oxygen.

Press: 4 4 5 READ/ENTER

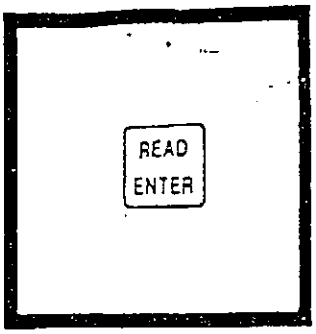
The display will show:
DIAL nm TO 535

Note: Or, use the up and down arrows to scroll the display to:
445 mg/l O_2 HRDO
and press: READ/ENTER

Note: Samples must be analyzed on site and cannot be stored; see Sampling and Storage below.

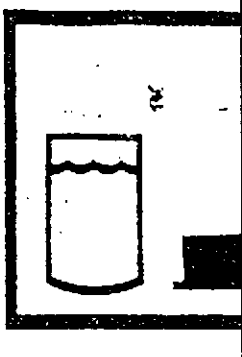


2. Rotate the wavelength dial until the small display shows:
535 nm

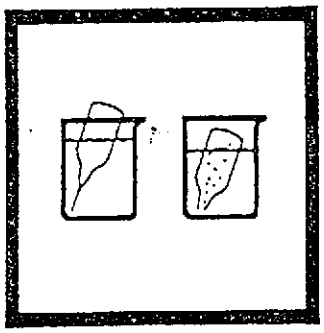


3. Press: READ/ENTER

The display will show:
mg/l O_2 HRDO

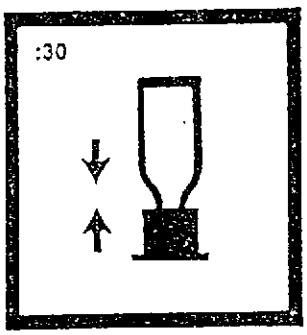


4. Fill a zeroing via
(the blank) with at le
10 mL of sample. Fill
blue ampul cap with
sample.



5. Fill a High Range Dissolved Oxygen AccuVac Ampul with sample.

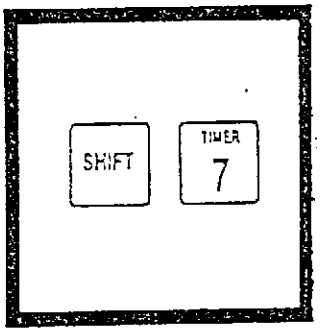
Note: Keep the tip immersed while the ampul fills completely.



6. Without inverting the ampul, immediately place the ampul cap that has been filled with sample securely over the tip of the ampul. Shake the ampul for approximately 30 seconds.

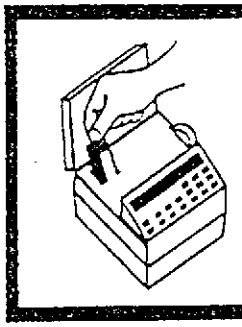
Note: A small amount of the undissolved HRDO Reagent does not affect results.

Note: The cap prevents contamination with atmospheric oxygen.



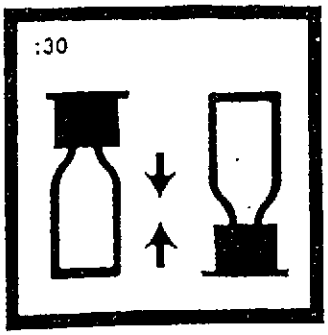
7. Press: SHIFT TIMER

A two-minute reaction period enables oxygen, which was degassed during aspiration, to redissolve and react.



8. Place the AccuVa
Vial Adapter into the
holder.

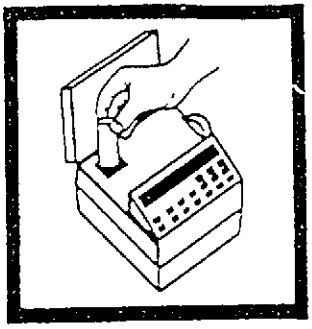
Note: Place the grip tab a
rear of the cell holder.



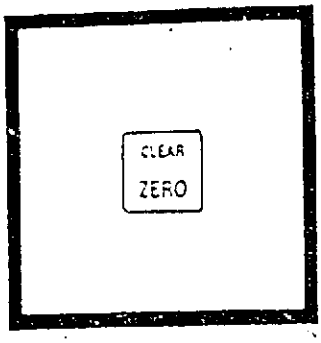
9. When the timer beeps, the display will show:

mg/l O_2 HRDO

Shake the ampul for 30 seconds.



10. Place the blank into the cell holder. Close the light shield.



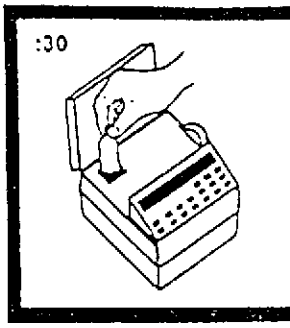
11. Press: ZERO

The display will show:

WAIT

then:

0.0 mg/l O_2 HRDO



12. Place the AccuVac ampul into the cell holder. Close the light shield. Wait approximate 30 seconds for the air bubbles to disperse from the light path.

Press: READ/ENTER

The display will show:

WAIT

then the result in mg/L dissolved oxygen will b displayed.

Note: In the constant-on mod pressing READ/ENTER is not required. WAIT will not appe When the display stabilizes, read the result.

SAMPLING AND STORAGE

The foremost consideration in sampling with the High Range Dissolved Oxygen AccuVac Ampul is to prevent the sample from becoming contaminated with atmospheric oxygen. This is accomplished by capping the ampul with an ampul cap in the interval between breaking open the ampul and reading the absorbance. If the ampul is securely capped, the ampul should be safe from contamination for several hours. The absorbance will decrease by approximately 3% during the first hour and will not change significantly afterwards.

Sampling and sample handling are important considerations in obtaining meaningful results. The dissolved oxygen content of the water being tested can be expected to change with depth, turbulence, temperature, sludge deposits, light, microbial action, mixing, travel time and other factors. A single dissolved oxygen test rarely reflects the accurate over-all condition of a body of water. Several samples taken at different times, locations and depths are recommended for most reliable results. Samples must be tested immediately upon collection although only a small error results if the absorbance reading is taken several hours later.

ACCURACY CHECK

The results of this procedure may be compared wi the results of a titrimetric procedure or dissolved oxygen meter.

PRECISION

In a single laboratory, using a standard solution of 7.22 mg/L O_2 determined by the Winkler method and two representative lots of reagent with the DR/2000, a single operator obtained a standard deviation of ± 0.20 mg/L O_2.

INTERFERENCES

The following do not interfere at a level of 10 mg which is in excess of naturally occurring levels of Cr^{3+}, Mn^{2+}, Fe^{2+}, Ni^{2+}, Cu^{2+} and NO_2^-