Converse Environmental Consultants California

CONVERSE ENVIRONMENTAL WEST
new name for
CONVERSE ENVIROMENTAL CONSULTANTS CALIFORNIA

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September 29, 1989
88-44-369-01-177

Ms. Dyan Whyte
Water Resource Control Engineer
San Francisco Bay Regional Water Quality Control Board
1111 Jackson Street, Sixth Floor
Oakland, California 94607

Subject: Shell Oil Company - Quarterly Report
630 High Street
Oakland, California

Dear Ms. Whyte:

Enclosed please find one copy of the Shell Oil Company Quarterly Report of Activities for Quarter 3, 1989 prepared by Converse Environmental West (CEW) - San Francisco.

Please call if you have any questions.

Very truly yours,

Converse Environmental West

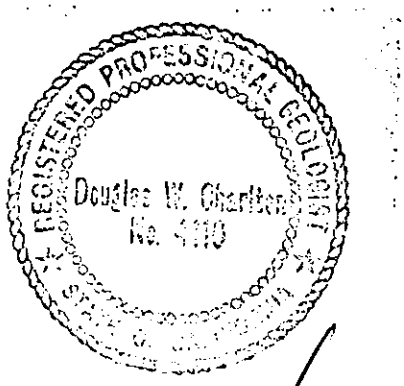
Robin Breuer

Marc I. Yalom
Project Hydrogeologist

MIY:fs
Enclosure

cc: Ms. Diane Lundquist - Shell Oil Company (w/encl.)
Mr. Rafat Shahid - Alameda County Health Car Services (w/encl.)
Mr. Douglas W. Charlton - CEW (w/o encl.)
Ms. Robin M. Breuer - CEW (w/encl.)

630 High St\ltr.177



DOUGLAS W. CHARLTON
Principal Geologist

ACTIVE GASOLINE STATION

SHELL OIL COMPANY
630 High Street
Oakland, California

September 29, 1989

CEW Project No. 88-44-369-01

This report has been prepared by the staff of **Converse Environmental West (CEW)** under the professional supervision of the Engineer and/or Geologist whose seal(s) and signature(s) appear hereon.

The findings, recommendations, specifications or professional opinions are presented, within the limits prescribed by the Client, after being prepared in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either express or implied.

Converse Environmental West

REPORT OF ACTIVITIES

SHELL OIL COMPANY FACILITY
630 High Street
Oakland, California

For Quarter 3, 1989
Submitted: September 29, 1989

RWQCB Representative:	Dyan Whyte Water Resource Control Engineer
LIA Representative:	Mr. Rafat Shahid Alameda County Health Care Services Agency
Shell Engineer:	Ms. Diane Lundquist Environmental Engineer
Converse Project Manager:	Mr. Marc I. Yalom, Project Manager 55 Hawthorne Street, Suite 500 San Francisco, California 94105 (415) 543-4200
Registered Geologist in Charge:	Douglas W. Charlton, Principal Geologist 55 Hawthorne Street, Suite 500 San Francisco, California 94105 (415) 543-4200
Site Owner:	Shell Oil Company

1. SITE DESCRIPTION

1.1 Maps

Vicinity Map: See Drawing 1
Plot Plan: See Drawing 2

1.2 Neighborhood Topography

Slightly sloping to the northwest.

1.3 Primary Surface Waters Nearby

Alameda Estuary is approximately one-eighth of a mile to the west.

1.4 Water Table Information

Q3/89: Depth to Water: 9-12 feet below grade.
Depth to Highest High Water by redox boundary: 9 feet below grade.

2. INVESTIGATION HISTORY

2.1 Soil Borings Drilled to Period Start

Boring	Date	Status
SB-1	4/89	Abandoned
SB-2	4/89	Abandoned

2.2 Groundwater Wells Drilled to Period Start

Well	Date	Status
MW-1	4/89	Active
MW-2	4/89	Active
MW-3	4/89	Active
MW-4	4/89	Active

2.3 Investigative History Summary

CHRONOLOGICAL SUMMARY

The following chronological summary is based on information available to CEW (formerly CECC) for preparation of this Work Plan.

Date	Description of Activity
01/85	Re-modernization of gas station. Armer/Norman dismantled and removed all fuel dispensing facilities and excavated certain areas near former pump islands, product lines and areas which smelled of gasoline.
01/26/89	Blaine Tech Services collected and analyzed (10) excavation soil samples. The inspector from the Alameda County Health Department specified sampling locations. Soils were analyzed for TPH-g, BTEX and organic lead.
02/03/89	Blaine Tech Services collected and analyzed soil samples in areas of product dispensing pump islands after additional excavation in these areas and in areas of former waste oil and gasoline tank pits (sample No. 10 - 75 ppm and No. 12 - 600 ppm TPH-g).
02/03/89	Further excavation in former waste oil tank pit. Soil and groundwater samples were collected and analyzed in the area around sample no. 12 of February 3, 1989 sampling event. These soil samples contained less than 50 ppm TPH-d. Groundwater sample no. 3 from that area contained 1,800 ppb TPH-g and 200 ppb TPH-d.
02/24/89	Alameda County Environmental Health Department notified Shell that site conditions indicated a confirmed release, which required an investigation Work Plan within 25 days of the letter date.
03/89	Shell transferred project to CEW.
03/20/89	CEW submitted Revised Work Plan to agencies.
04/26/89	CEW installed wells MW-1 through MW-4.
04/27/89	CEW installed soil borings SB-1 and SB-2.
05/19/89	CEW developed wells MW-1 through MW-4.
05/25/89	CEW surveyed site. Well head elevations (MW-1 through MW-4) surveyed to arbitrary datum.
05/26/89	CEW sampled groundwater from wells MW-1 through MW-4.
06/20/89	Quarter 2 1989 report issued.
08/15/89	**CEW installed wells MW-5 through MW-8 and Boring SB-3.**
08/22/89	**CEW surveyed wells MW-5 through MW-8 to arbitrary datum.**
08/29/89	**CEW developed wells MW-5 through MW-8.**
08/30/89	**CEW sampled wells MW-1 through MW-8.**

3. WORK COMPLETED THIS PERIOD

3.1 Introduction

Work initiated and completed during the quarter followed the task descriptions and modifications of the site Work Plan dated March 20, 1989. The relative timing and schedule of these activities is shown in summary in the Critical Path for the project (Drawing 3).

3.2 Work Plan Task Modifications

Task 1: Drill and Sample Soil Borings: The Work Plan called for drilling of ten soil borings. Six borings were to be abandoned. Four borings were to be completed as groundwater monitoring wells.

Eleven boring were actually drilled. Eight borings were completed as groundwater monitoring wells.

Task 5: Install New Groundwater Monitoring Wells: The Work Plan called for installation of four groundwater monitoring well. Eight wells were actually installed.

3.3 Soil Boring Drilling/Sampling

During Quarter 3, 1989, a total of five soil borings were drilled, sampled, and abandoned following the protocols described in Appendices A and B. Soil cuttings were handled by Crosby Overton, following task procedures described in Appendix G. Boring logs are enclosed as Attachment 1. A summary of soil boring activities is presented in Table 2.

TABLE 2: Summary of Soil Borings Drilled

Boring No.	Date Drilled	Completion	Diameter (inches)	T.D. (ft. bgs)	Unsaturated Soil Samples (ft. bgs)	High OVM	Saturated Soil Samples (ft. bgs)
MW-1	4/25/89	4" well	12	20	5	>1000 @ 12'	None
MW-2	4/25/89	4" well	12	25	5,10	NR	15
MW-3	4/26/89	4" well	12	20	5,10	0	None
MW-4	4/26/89	4" well	12	22	5,10	5 @ 5'	None
MW-5	**8/17/89**	**4" well**	**12**	**20**	**5,10**	**450 @ 16'**	**None**
MW-6	**8/26/89**	**4" well**	**12**	**24**	**5,10**	**0**	**15**
MW-7	**8/15/89**	**4" well**	**12**	**24**	**5,10**	**0**	**15,20**
MW-8	**8/15/89**	**4" well**	**12**	**24**	**5**	**0**	**10**
SB-1	4/27/89	Abandoned	8	10	5	NR	None
SB-2	4/27/89	Abandoned	8	10	5,10	NR	None
SB-3	**8/17/89**	**Abandoned**	**8**	**10**	**5,10**	**1300 @ 5'**	**None**

NR - Not recorded

3.4 Well Installations

Four groundwater monitoring wells were installed, developed and sampled following the protocols in Appendices A, C, D and E. All wells were installed as 4-inch diameter filter-packed PVC wells through hollow-stem auger drilling equipment. Boring logs and as-built well construction diagrams are included as Attachment 1. A summary of well installations is provided in Table 3.

TABLE 3: Summary of Groundwater Monitoring Well Installations

Well No.	Date	Diameter Well (in.)	Initial Water Table (ft. bgs)	Static Water Table (ft. bgs)	T.D. Well (ft. bgs)	Screen (ft. bgs)	Bentonite Seal (ft. bgs)	Grout Seal (ft. bgs)
MW-1	4/25/89	4	10	NA	20	13-9	9-6	6-0
MW-2	4/25/89	4	14.5	16.0	25	20-10	10-8	8-0
MW-3	4/26/89	4	11.5	NA	20	17-8	8-6	6-0
MW-4	4/26/89	4	10.0	NA	22	17-7	7-6	6-0
MW-5	**08/17/89**	**4**	**12.0**	**NA**	**18.0**	**8-18**	**5-7**	**1-5**
MW-6	**08/16/89**	**4**	**15.0**	**NA**	**20**	**10-20**	**7-9**	**1-7**
MW-7	**08/15/89**	**4**	**17.5**	**NA**	**20**	**10-20**	**7-9**	**1-7**
MW-8	**08/15/89**	**4**	**9.0**	**NA**	**21**	**9-21**	**6-8**	**1-6**

NA - Not available

3.5 Soil Analysis/Results

Soil samples were properly packaged and transferred to a California State-certified analytical laboratory under proper chain-of-custody and preservation (see Appendix F). The samples were analyzed for TPH as gasoline (EPA Methods 5030 and 8015), TPH as diesel (EPA Methods 3550 and 8015), TPH as motor oil (EPA Methods 3550 and 8015), BTEX (EPA Methods 5030 and 8020), lead (EPA Methods 3050 and 7421) and oil and grease (EPA Methods 503D&E). In addition, the samples from SB-3 were analyzed for chlorinated hydrocarbons (EPA Methods 5030 and 8010), and Zn, Cr, Cd (by ICP). Analytical results are summarized in Table 4, and certified sheets from all analyses are enclosed as Attachment 2.

TABLE 4: Soil Analytical Results (ppm)

Boring No.	Sample Depth (ft. bgs)	TPH-g	TPH-d	TPH-mo	Benzene	Toluene	Total Oil and Grease	Xylene	Total Lead
SB-1	5	12*	27	85	<0.025	0.10	NA	0.14	71
SB-2	5	<10	<10	<10	0.042	0.054	NA	<0.075	16
SB-2	5,10**	<10	<10	130	<0.025	0.04	NA	<0.075	10
SB-3	**5**	**<10**	**<10**	**<10**	**<0.025**	**0.22**	**290**	**<0.075**	**66**
SB-3	**10**	**<10**	**<10**	**<10**	**<0.025**	**0.045**	**<50**	**<0.075**	**4.2**
MW-1	5	11	<10	<10	<0.025	0.11	NA	<0.075	9.6
MW-1	5,10**	63	<10	<10	0.042	0.14	NA	0.16	7.6
MW-2	5	<10	<10	<10	<0.025	0.34	NA	<0.075	13
MW-2	5,10,15**	<10	<10	<10	<0.025	0.15	NA	<0.075	4.0
MW-3	10	<10	<10	<10	<0.025	<0.025	NA	<0.075	3.9
MW-3	5,10**	<10	<10	<10	<0.025	0.068	NA	<0.075	5.1
MW-4	5	<10	<10	<10	0.046	0.21	NA	<0.075	26
MW-4	5,10**	<10	<10	<10	<0.025	0.066	NA	<0.075	27
MW-5	**5**	**<10**	**<10**	**<10**	**<0.025**	**<0.025**	**<50**	**<0.075**	**14.0**
MW-5	**10**	**<10**	**<10**	**<10**	**<0.025**	**<0.025**	**<50**	**<0.075**	**5.9**
MW-6	**5**	**<10**	**<10**	**<10**	**<0.025**	**0.057**	**220**	**<0.075**	**5.6**
MW-6	**10**	**<10**	**<10**	**<10**	**<0.025**	**<0.025**	**<50**	**<0.075**	**4.3**
MW-7	**5**	**<10**	**<10**	**<10**	**<0.025**	**0.040**	**<50**	**<0.075**	**9.8**
MW-7	**10**	**<10**	**<10**	**<10**	**<0.025**	**<0.025**	**<50**	**<0.075**	**3.7**
MW-8	**5**	**<10**	**<10**	**<10**	**<0.025**	**<0.025**	**<50**	**<0.075**	**5.1**
MW-8	**10**	**<10**	**<10**	**<10**	**<0.025**	**<0.025**	**<50**	**<0.075**	**2.6**

* Sample contains higher boiling hydrocarbons not characteristic with gasoline.
** Composite sample.

3.6 Groundwater Analysis and Results

Groundwater samples were properly packaged and transferred to a California State-certified analytical laboratory under proper chain-of-custody and preservation (see Appendix E). The samples were analyzed for TPH as gasoline (Methods 5030 and 8015), TPH as diesel (Methods 3510 and 8015), TPH as motor oil (EPA Methods 3510 and 8015) BTEX (EPA Methods 5030 and 602), and lead (EPA Methods 5030 and 7421). In addition, samples from MW-1 were analyzed for chlorinated hydrocarbons (EPA Method 624), Zn, Cr, Cd (by ICP) and oil and grease (EPA Methods 503A&E). Selected analytical results are summarized in Table 5, and certified sheets from all analyses are enclosed as Attachment 3.

TABLE 5: Groundwater Analytical Results (ppm)

Well No.	Date Sampled	TPH-g	TPH-d	TPH-mo	Benzene	Toluene	Ethyl-benzene	Xylene	Lead
MW-1	5/25/89	11	7.1	1.6	0.0066	0.023	0.023	0.180	NA
MW-1	**8/29/89**	**17**	**7.2**	**1.9**	**0.20**	**0.18**	**0.059**	**0.55**	**<0.002**
MW-2	5/25/89	<0.05	<0.05	<0.05	<0.0005	<0.0005	<0.0015	<0.0015	NA
MW-2	**8/29/89**	**<0.05**	**<0.05**	**<0.05**	**<0.0005**	**<0.0005**	**<0.0015**	**<0.0015**	**<0.002**
MW-3	5/25/89	1.2	0.40	0.088	<0.0005	<0.0005	<0.0015	<0.0015	NA
MW-3	**8/29/89**	**2.5**	**0.81**	**<0.05**	**0.025**	**0.01**	**0.0065**	**0.0055**	**<0.002**
MW-4	5/25/89	2.9	1.1	0.29	<0.005	0.0094	<0.0015	0.0034	NA
MW-4	**8/29/89**	**2.9**	**1.5**	**0.79**	**0.029**	**<0.0005**	**0.012**	**0.0016**	**<0.002**
MW-5	**8/30/89**	**1.4**	**0.30**	**<0.05**	**0.0049**	**0.00079**	**0.0056**	**0.0068**	**<0.002**
MW-6	**8/29/89**	**<0.05**	**0.32**	**0.45**	**<0.0005**	**<0.0005**	**<0.0015**	**<0.0015**	**<0.002**
MW-7	**8/29/89**	**<0.05**	**<0.05**	**<0.05**	**<0.0005**	**<0.0005**	**<0.0015**	**<0.0015**	**<0.002**
MW-8	**8/29/89**	**<0.05**	**<0.05**	**<0.05**	**<0.0005**	**<0.0005**	**<0.0015**	**<0.0015**	**<0.002**

NA - Not Analyzed

3.7 Physical Monitoring Results

A total of eight wells were physically monitored for depth to water table, and measurement of floating product, if any, one time during the quarter. A summary of these results is presented in Table 6.

TABLE 6: Physical Monitoring Results: Evidence of Contamination*

Well No.	Date	Depth to Water (ft.)	Petroleum Water Odor	Thickness Floating Product (inches)	Notes
MW-1	5/25/89	10.43	Strong	None	Gray sheen
MW-1	**8/29/89**	**10.94**	**Strong**	**None**	**Sheen**
MW-2	5/25/89	11.63	None	None	No sheen
MW-2	**8/29/89**	**12.62**	**None**	**None**	**No sheen**
MW-3	5/25/89	10.43	None	None	No sheen
MW-3	**8/29/89**	**10.90**	**None**	**None**	**No sheen**
MW-4	5/25/89	10.72	Moderate	None	Sheen
MW-4	**8/29/89**	**11.28**	**Strong**	**None**	**No sheen**
MW-5	**8/30/89**	**11.38**	**Slight**	**None**	**No sheen**
MW-6	**8/29/89**	**10.59**	**Slight**	**None**	**No sheen**
MW-7	**8/29/89**	**9.75**	**None**	**None**	**No sheen**
MW-8	**8/29/89**	**9.02**	**None**	**None**	**No sheen**

* Sheen; odor; FID; color; PID (opened/odor trapped in casing)

4. REVIEW OF DATA

4.1 Groundwater Elevation and Gradient (See Drawing 4)

- The tops of wells casings MW-5 through MW-8 were surveyed to an arbitrary datum this quarter.
- The gradient magnitude is approximately 0.005 ft/ft.
- The gradient direction varies from southwest to west.

4.2 Distribution of MVF Contamination in Soil (See Drawings 5, 6, 7 and 8)

- TPH-g was detected at SB-1 and MW-1 at 5 feet bgs.
- TPH-d was detected at MW-1 from the composite sample of 5 and 10 feet bgs.
- TPH-d was detected at SB-1.
- TPH-mo was detected at SB-1 and SB-2.
- The highest concentrations of lead in soil were found at 5 feet bgs at SB-1 (71 ppm) and SB-3 (66 ppm).
- Lead concentrations greater than 10 ppm were detected at SB-2, MW-2, MW-4, and MW-5.
- Benzene was detected at SB-2 and MW-4 at the 5 foot bgs level, and in an equal weight composite from the 5 and 10 foot bgs level at MW-1.
- Toluene concentrations at the 5 foot bgs level were highest at MW-2 (0.34 ppm). Sample locations surrounding MW-2 (SB-1 through SB-3, and MW-1) also showed detectable levels of toluene.
- Lower, outlying toluene concentrations were detected at wells MW-4, MW-6, and MW-7 at the 5 foot bgs level.
- At 10 feet bgs, toluene was detected at MW-1 through MW-4, and SB-1 through SB-3. Concentrations of toluene decline with depth, indicating onsite sources.
- Ethylbenzene was not detected at any boring.
- Xylenes were detected at SB-1 at 5 feet bgs and in the MW-1 composite (5 and 10 foot bgs) sample.
- Total Oil & Grease were detected at SB-3 (290 ppm @ 5' bgs) and MW-6 (220 ppm @ 5' bgs). Non-polar oil and grease were not detected.

- Samples from SB-3 were analyzed for cadmium, chromium and zinc. Cadmium was not detected. Chromium was detected at 31 ppm (5 feet bgs) and 77 ppm (10 feet bgs). Zinc was detected at 38 ppm (5 feet bgs) and 43 ppm (10 feet bgs).

- Samples from SB-3 were analyzed for chlorinated hydrocarbons. These compounds were not detected.

4.3 Distribution of MVF dissolved in Groundwater (See Drawings 9 and 10)

- TPH-g was detected at wells MW-1, and MW-3 through MW-5. The highest concentration was detected at MW-1 (17 ppm).

- TPH-d was detected at wells MW-1, and MW-3 through MW-6. The highest concentration was detected at MW-1 (7.2 ppm).

- TPH-mo was detected at wells MW-1, and MW-3 through MW-6. The highest concentration was detected at MW-1 (1.9 ppm).

- Benzene was detected at wells MW-1, and MW-3 through MW-5. The highest concentration was detected at MW-1 (0.20 ppm).

- Toluene was detected at wells MW-1, and MW-3 through MW-5. The highest concentration was detected at MW-1 (0.18 ppm).

- Ethylbenzene was detected at wells MW-1, and MW-3 through MW-5. The highest concentration was detected at MW-1 (0.059 ppm).

- Xylenes were detected at wells MW-1, and MW-3 through MW-5. The highest concentration was detected at MW-1 (0.55 ppm).

- Lead was not detected at any well.

- Groundwater from MW-1 was analyzed for cadmium, chromium, and zinc. Cadmium and chromium were not detected. Zinc was detected at 0.09 ppm.

- Groundwater from MW-1 was analyzed for oil and grease. These compounds were not detected.

- Groundwater from MW-1 was analyzed for chlorinated hydrocarbons by EPA Method 624. Benzene (.24 ppm), ethylbenzene (.62 ppm) and xylenes (.73 ppm) were detected. Toluene was not detected.

4.4 Distribution of Floating Product on Groundwater

- Floating product was not detected on groundwater in any well.
- Sheen has been present with groundwater from wells MW-1 (May and August 1989) and MW-4 (May 1989).

4.5 Site Geology (See Drawings 11 and 12, and Attachment 1)

- The uppermost part of the subsurface consists of fill averaging four feet in thickness. The fill soil materials include gravel, sand, and clay in heterogeneous mixtures. Concrete rubble, wood fragments, asphalt chunks, and rubbish are present in the fill.
- Beneath the fill is a layer of clay varying up to 8 feet in thickness (MW-7). At wells MW-2 and MW-3 this clay is parted by a sand layer not greater than 2 feet thick. The base of the clay layer is approximately 10 feet bgs.
- A layer of sands and gravels, ranging between 2 feet (MW-7) and 12 feet (MW-8) in thickness underlies the clayey stratum. These more permeable soils are generally clayey with scattered clean zones.
- The more permeable zone is underlain by clays. These clays extend from approximately 15 to 24 feet bgs, the depth of maximum exploration.

5. INTERPRETATIONS

- The highest petroleum hydrocarbon soil contamination is centered about the site of the former underground waste oil and fuel tanks.

  Petroleum hydrocarbons were detected in native soil samples from MW-1. This well was sited adjacent to the former underground fuel tank bed and in the general vicinity of the former waste oil tank. These tanks are suggested as the sources of contamination at MW-1.

  Petroleum hydrocarbons were also detected from soil samples at SB-1 and SB-2, samples collected from fill materials of the former fuel tank excavation.

  Lead, toluene, benzene, xylenes, and grease were also detected in the same area.

- An additional area of petroleum hydrocarbon soil contamination is located in the vicinity of well MW-4.

  Analysis of soil samples indicated the presence of benzene, toluene, and lead in excess of 20 ppm at MW-4. Groundwater analyses detected TPH-g, -d, -mo, and BTEX.

MW-4 is sited in an area of no known previous underground tanks or piping runs. Soil analytical results suggest a surface product release to the vadose zone. This is supported by the detection of heavier hydrocarbon fractions (diesel and motor oil), which would have been less likely to migrate from the former underground tank bed at SB-1 and SB-2.

- Offsite sources of contamination are not ruled out and will require further investigation.

  Petroleum hydrocarbon contamination (TPH-g, -d, and BTEX) was detected in groundwater at well MW-5. This well is located cross-gradient from the former underground tank bed, and on the upgradient side of the property. Non-detection of petroleum hydrocarbons in the soil at MW-5 indicates migration of contaminants through groundwater.

- Toluene was detected in groundwater at MW-1 analyzed by EPA Method 602 (GC). Toluene was not detected by EPA Method 624 (GC/MS). The analytical laboratory consultant indicated that other organic compounds with molecular weights close to toluene may by masking toluene detection. Analytical fingerprinting will be required to resolve the discrepency. (See Section 9).

- Neighborhood background concentrations of lead in the soil have not been established. Lead in site soils may not be the result fuel releases at the site.

  Elevated Highway 880 is located adjacent to the site (directly east). Decades of leaded fuel exhaust emissions from vehicular traffic may have contributed to lead concentrations in the neighborhood and site.

6. WORK PLAN MODIFICATIONS

There were no Work Plan Modifications.

7. STATUS OF SCHEDULE

- Task 1: Drill and Sample Soil Borings. Through Quarter 3 1989, eleven soil borings were drilled and sampled. Analyses of soil samples indicated only one sample exceeding 100 ppm TPH (SB-2 130 ppm @ 5 and 10 foot bgs composite). TPH exceeding 100 ppm were not detected in samples from surrounding borings MW-1, SB-1, and SB-3.

  Task 1 is complete. No additional onsite soil borings are planned.

- Task 5: Install New Groundwater Monitoring Wells. Through Quarter 3 1989, eight onsite groundwater monitoring wells were installed and developed.

  Task 5 is complete. No additional onsite wells are planned.

8. WORK PLANNED BUT NOT COMPLETED

- Task 7: Conduct Hydrology Tests and Research. Slug tests planned Quarter 3 for each well were not accomplished due to lack of available personnel.

- Survey of well heads to standard (sea level) datum was not accomplished due to time constraints.

Uncompleted Task 7 activities will be undertaken in Quarter 4 1989.

9. WORK PLANNED FOR NEXT QUARTER

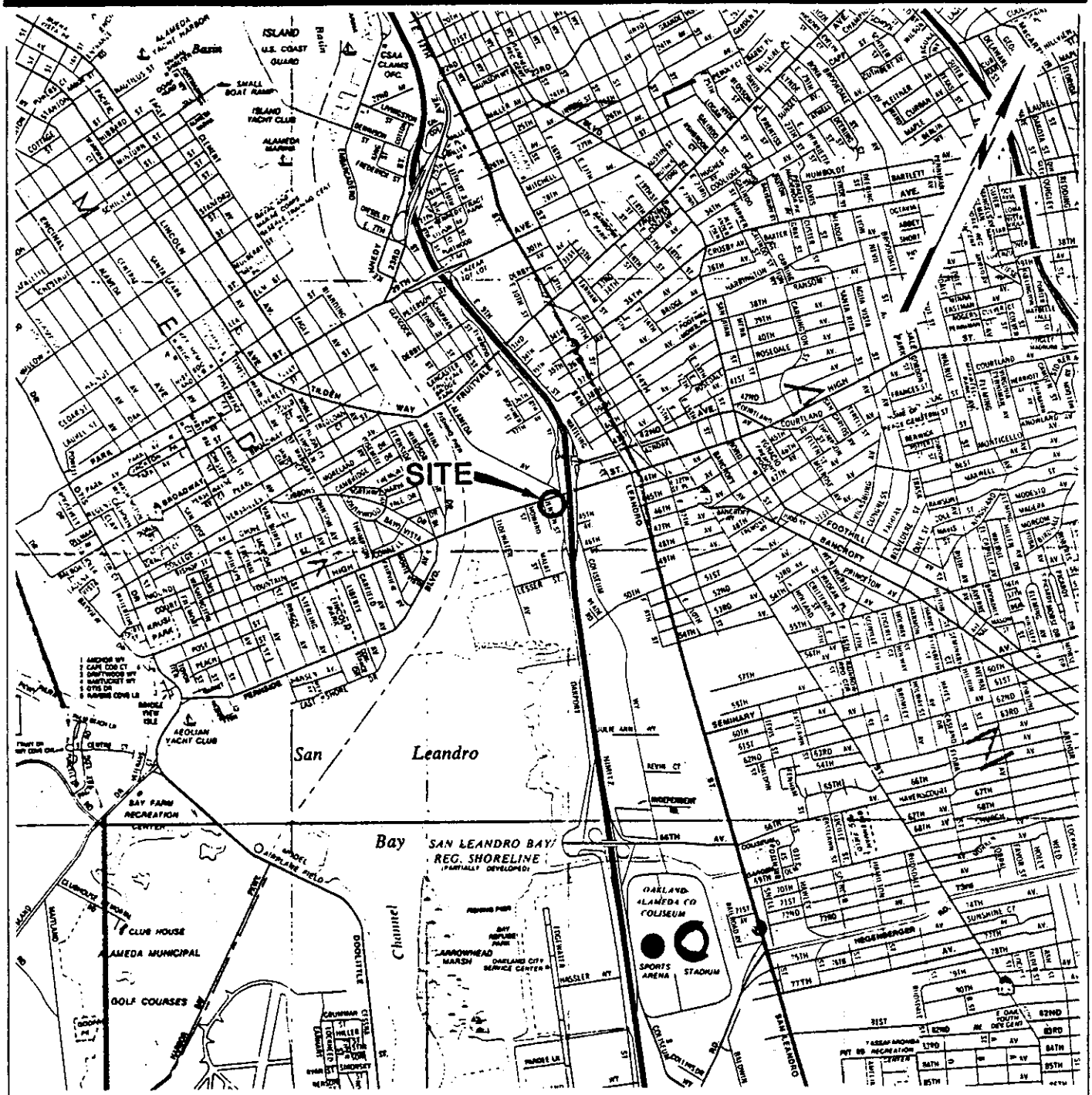
- Task 2: Prepare Soil Remediation Action Plan. Options for cost effective soil remediation will be identified and relatively evaluated on the volume of contaminated soil, the hydrologic conditions of contamination, and the concentration of contaminants involved.

- Task 6: Collect and Analyze Groundwater Samples. Proceed with the collection and analyses of Quarter 4 1989 groundwater quality samples. Samples collected from MW-1 will be fingerprinted to determine compounds masking toluene.

- Task 7: Conduct Hydrology Tests and Research. Perform and analyze slug tests on groundwater wells MW-1 through MW-8.

- Task 8: Perform a Neighborhood Environmental Assessment. Conduct an assessment of neighborhood businesses, ownerships, and prior operational practices may identify dischargers of MVF to the environment upgradient of the property.

- Task 11: Prepare Offsite Groundwater Investigation Plan. Amend the March 20, 1989 Revised Work Plan to address the potential for offsite groundwater MVF contamination.



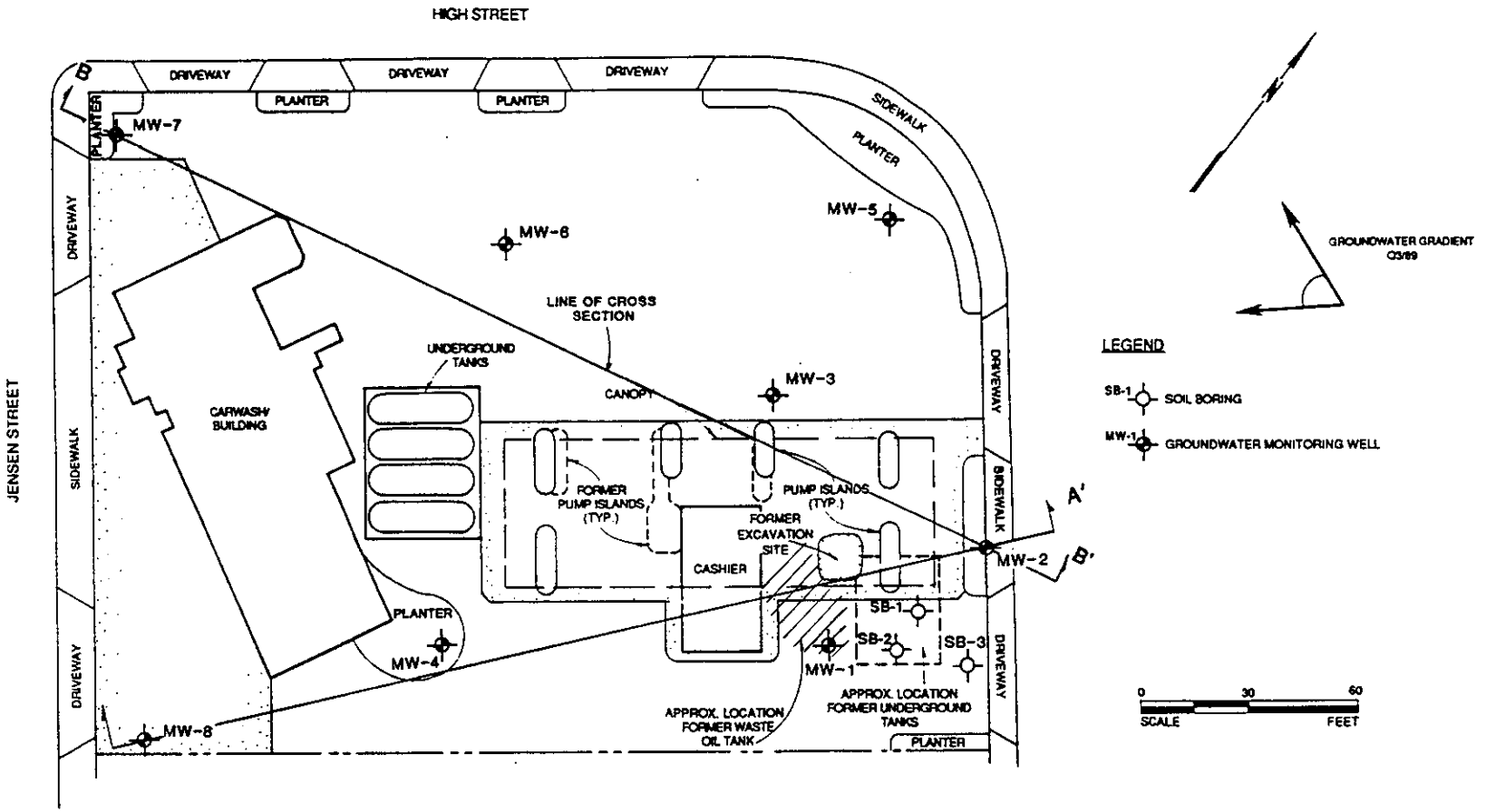
SOURCE: California State Automobile Association

SITE LOCATION MAP

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental
Consultants California

Scale: AS SHOWN	Project No.: 88-44-369-01
Prepared by: KGC	Date: 3/16/89
Checked by: RMB	Drawing No.: 1
Approved by: DWC	



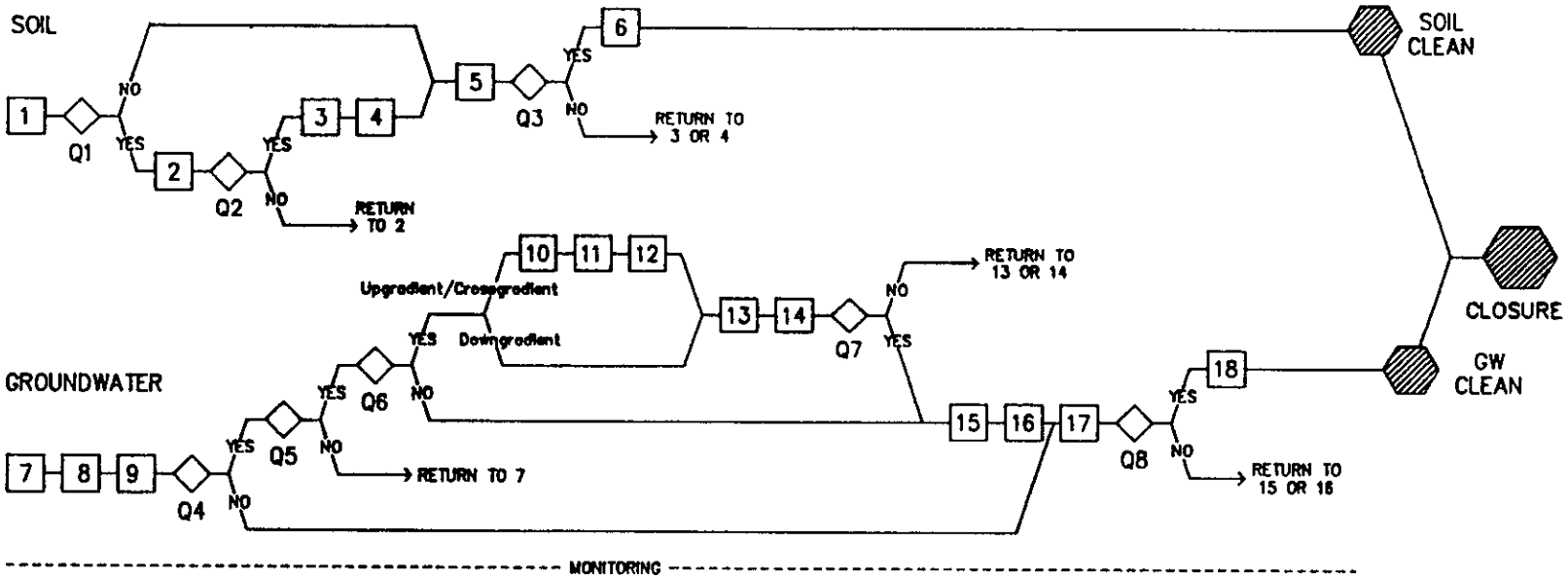
PLOT PLAN Q3/89

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/13/89
Prepared By	MLL
Checked By	MIY
Approved By	DWC
Project No	88-44-389-01
Drawing No	2

Base Map: after Robert H. Lee & Ass. Inc.



TASKS

Program 1: Onsite Soil Investigation/Remediation

Task 1 Drill and Sample Soil Borings
Task 2 Drill Step-Out Borings
Task 3 Prepare Soil Remedial Action Plan (if needed)
Task 4 Remediate Soil (if needed)
Task 5 Establish Clean Standards - Soil
Task 6 Confirm Remediated Soil

Program 2: Onsite Groundwater Investigation

Task 7 Install/Develop Groundwater Monitoring Wells
Task 8 Sample/Analyze Groundwater
Task 9 Conduct Hydrology Tests and Research

Program 3: Offsite Groundwater Investigation (if needed)

Task 10 Perform Neighborhood Assessment
Task 11 Refer to Legal Counsel
Task 12 Inform RWQCB
Task 13 Prepare Offsite Groundwater Investigation Plan
Task 14 Install Offsite Wells, Sample/Analyze

Program 4: Groundwater Remediation (if needed)

Task 15 Prepare Groundwater Remedial Action Plan
Task 16 Implement Remedial Action Plan
Task 17 Establish Cleanup Standards - Groundwater
Task 18 Confirm Groundwater Remediation

QUESTIONS

Q1: Are there concentrations of TPH greater than 100 ppm in any soil?

Q2: Is soil characterized?

Q3: Is the leaching potential acceptably low for contaminants proposed to be left in place?

Q4: Is groundwater actionable?

Q5: Is groundwater characterized onsite?

Q6: Does groundwater pollution extend offsite?

Q7: Is groundwater characterized offsite?

Q8: Is the environmental risk acceptably low for contaminants proposed to be left in groundwater?

SUMMARY OF PROGRESS - QUARTER 3, 1989

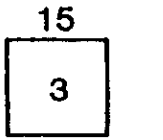
SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

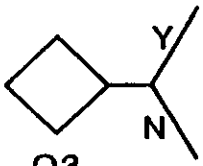
Scale	N/A
Date	5-24-89
Prepared By	LQL
Checked By	RMB
Approved By	DWC
Project No	88-44-369-01
Drawing No	3

KEY TO CRITICAL PATH DIAGRAMS

Time proceeds from left to right, with Tasks shown in relative order of succession.

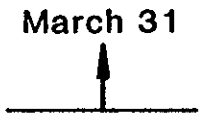


Task, showing Task number (inside) and anticipated number of days to completion (above), including preparatory activities, report preparation and review, and other related actions.



Question to be answered based on information from prior tasks.

Solid symbols indicate Letter Reports or formal Completion Reports coincident with question response.



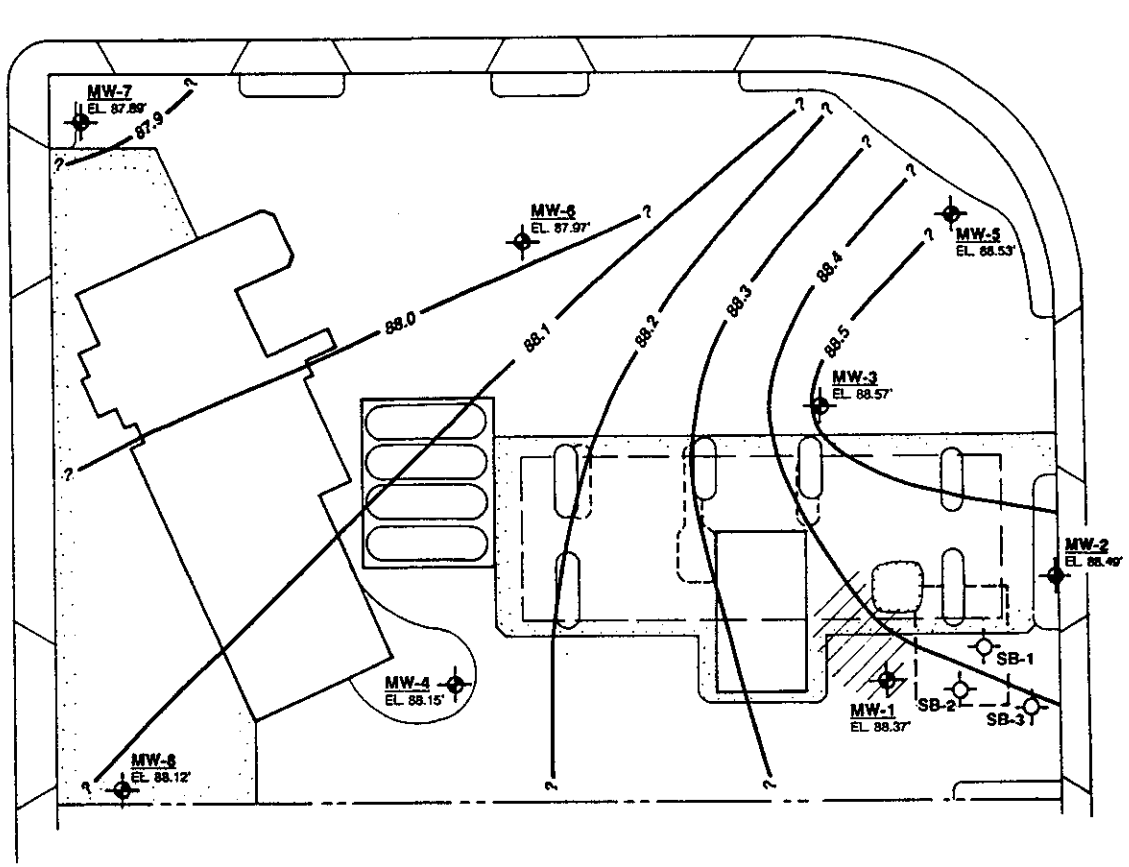
Relative calendar dates and dates of quarterly program reports to regulatory agencies.

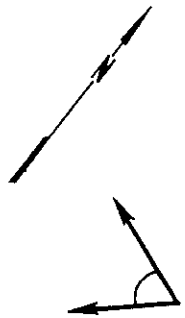
KEY TO CRITICAL PATH DIAGRAM

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	N/A
Date	3/16/89
Prepared By	LQL
Checked By	RMB
Approved By	DWC
Project No	88-44-369-01
Drawing No	3a





GROUNDWATER GRADIENT
Q3/89

LEGEND

GROUNDWATER CONTOUR INTERVAL 0.1'

SB-1 SOIL BORING

MW-1 GROUNDWATER MONITORING WELL

NOTE: ELEVATION OF WATER TABLE IN FEET ABOVE MEAN SEA LEVEL.

0 30 60
SCALE FEET

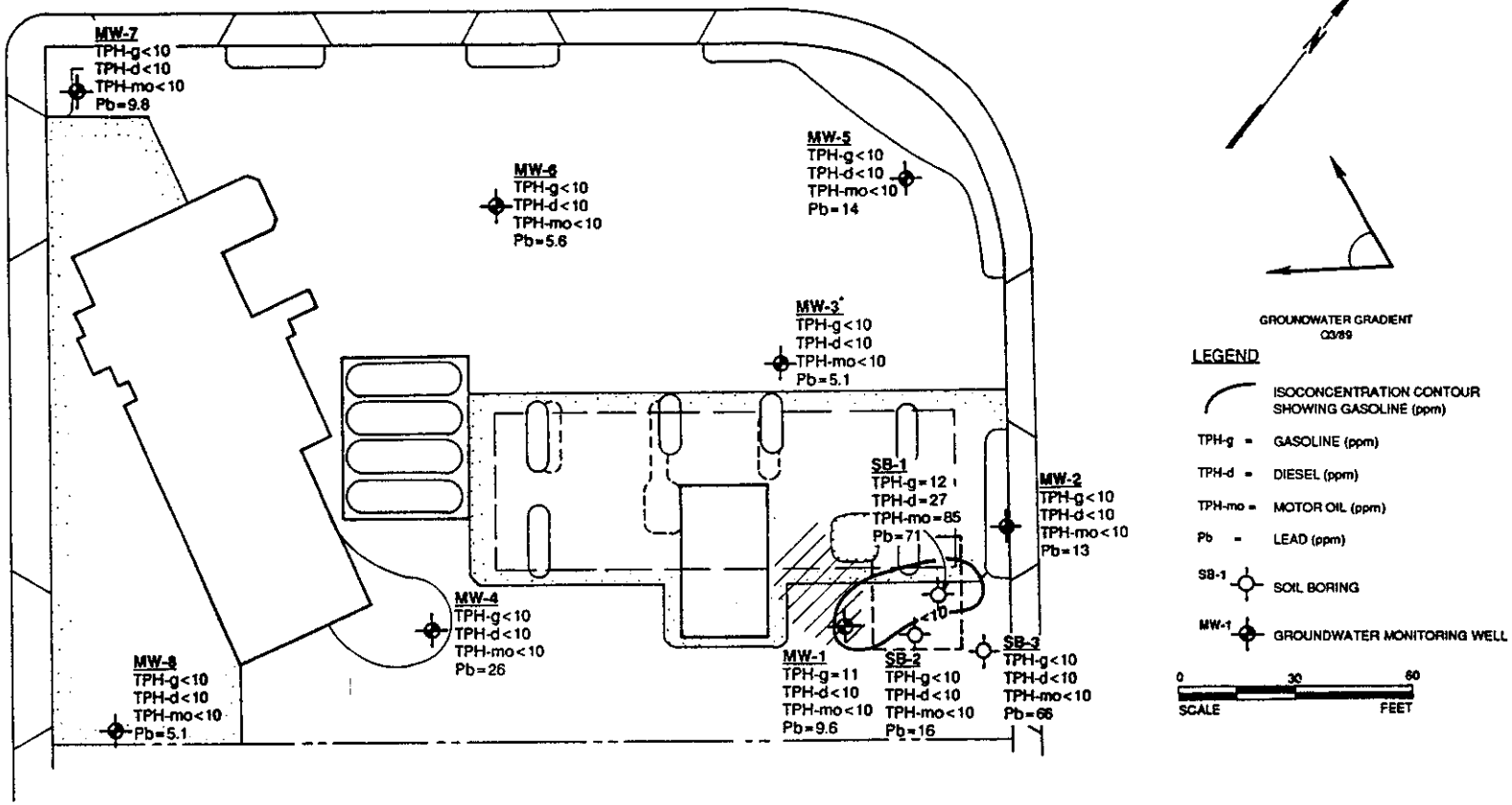
Base Map: after Robert H. Lee & Ass. Inc. 1986.

GROUNDWATER GRADIENT Q3/89

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/25/89
Prepared By	CJD
Checked By	MIY
Approved By	DWC
Project No	86-44-389-01
Drawing No.	4



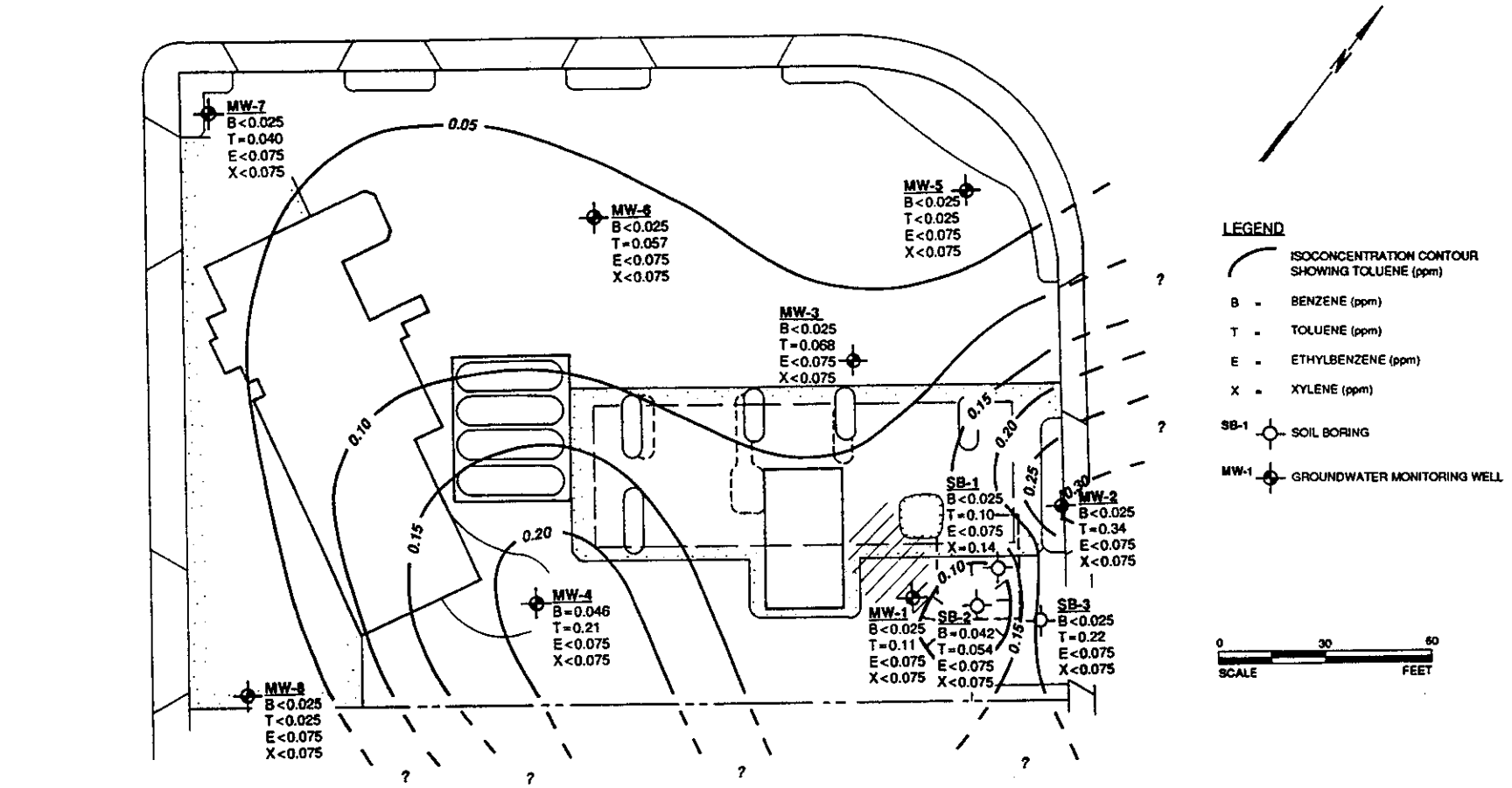
Base Map: after Robert H. Lee & Ass. Inc. 1986.

PLAN: SOIL TPH AND Pb AT (-5') Q3/89

SHELL OIL COMPANY
630 High Street
Oakland, California

Scale	AS SHOWN
Date	9/22/89
Prepared By	MLL
Checked By	MIY
Approved By	DWC
Project No	88-44-359-01
Drawing No.	5

Converse Environmental Consultants California



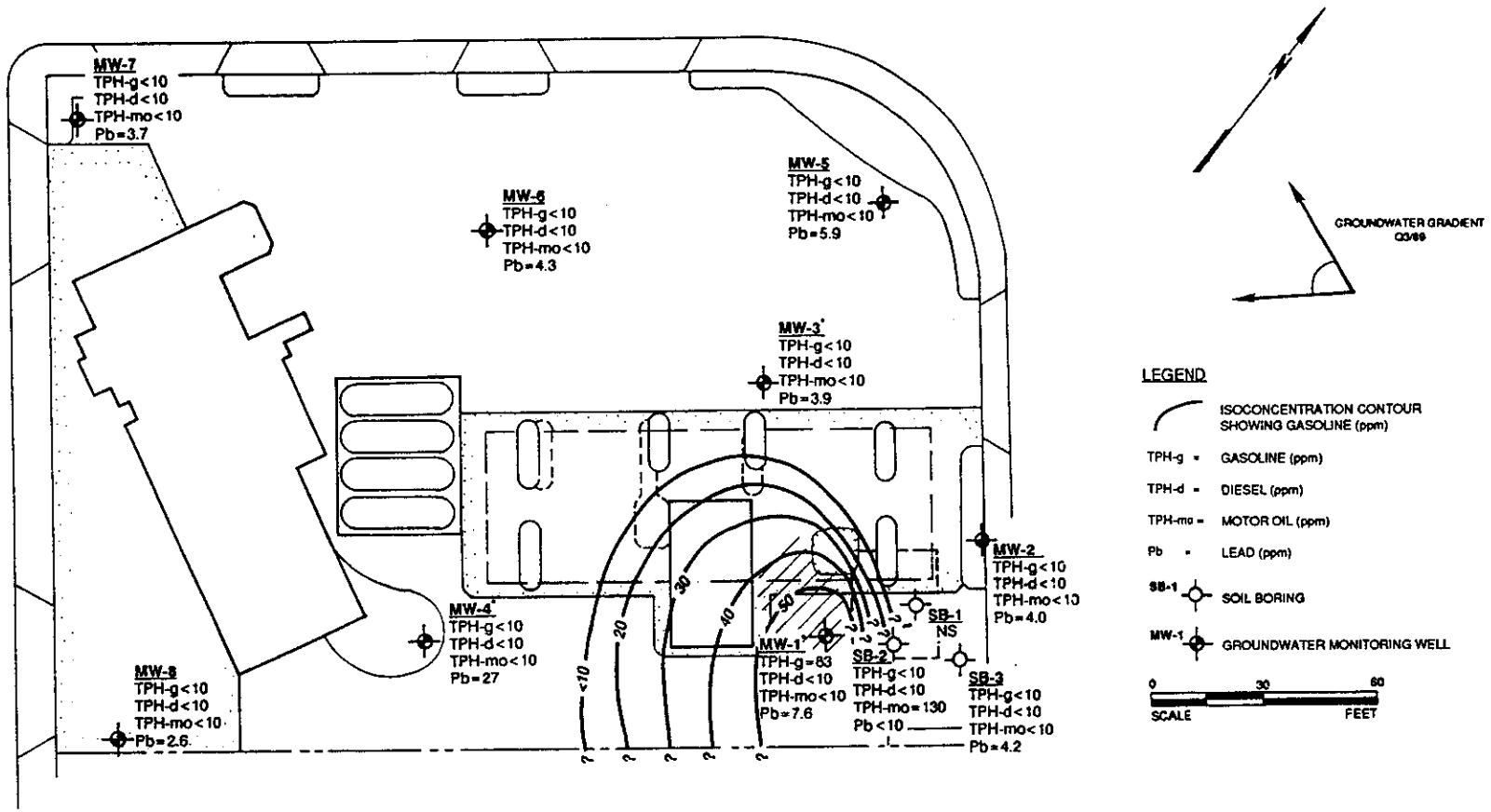
Base Map: after Robert H. Lee & Ass. Inc. 1986.

PLAN: SOIL BTEX AT (-5') Q3/89

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/25/89
Prepared By	MRS
Checked By	MIY
Approved By	DWC
Project No.	88-44-369-01
Drawing No.	6



Base Map: after Robert H. Lee & Ass. Inc. 1986.

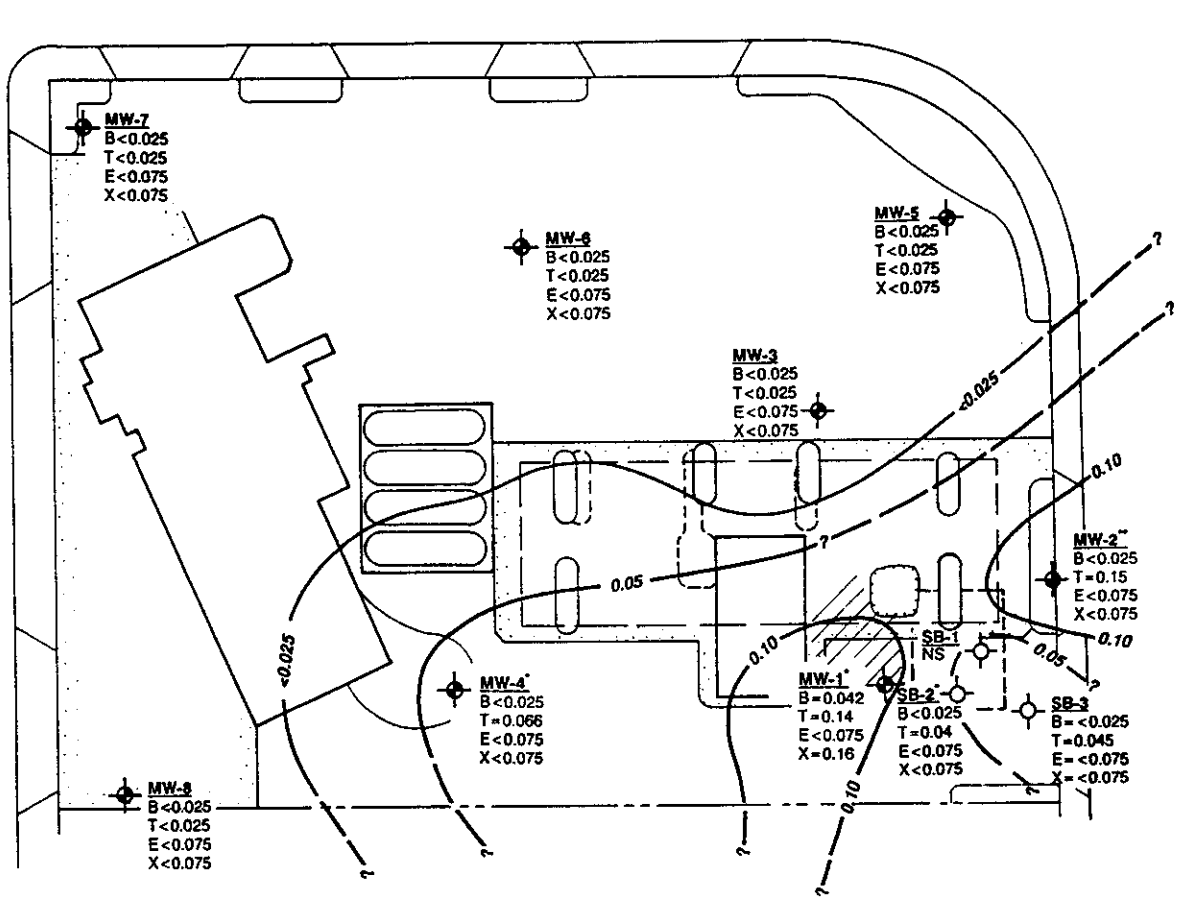
PLAN: SOIL TPH AND Pb AT (-10') Q3/89

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/25/89
Prepared By	CJD
Checked By	MIY
Approved By	DWC

Project No
88-44-369-01
Drawing No
7



GROUNDWATER GRADIENT
Q3/89

LEGEND

- ISOCONCENTRATION CONTOUR SHOWING TOLUENE (ppm)
- B = BENZENE (ppm)
- T = TOLUENE (ppm)
- E = ETHYLBENZENE (ppm)
- X = XYLENE (ppm)
- SB-1 — SOIL BORING
- MW-1 — GROUNDWATER MONITORING WELL
- * Composite (5'&10' bgs)
- ** Composite (5',10'&15' bgs)
- NS - Not Sampled (Total depth < 10' bgs)

SCALE 0 30 60 FEET

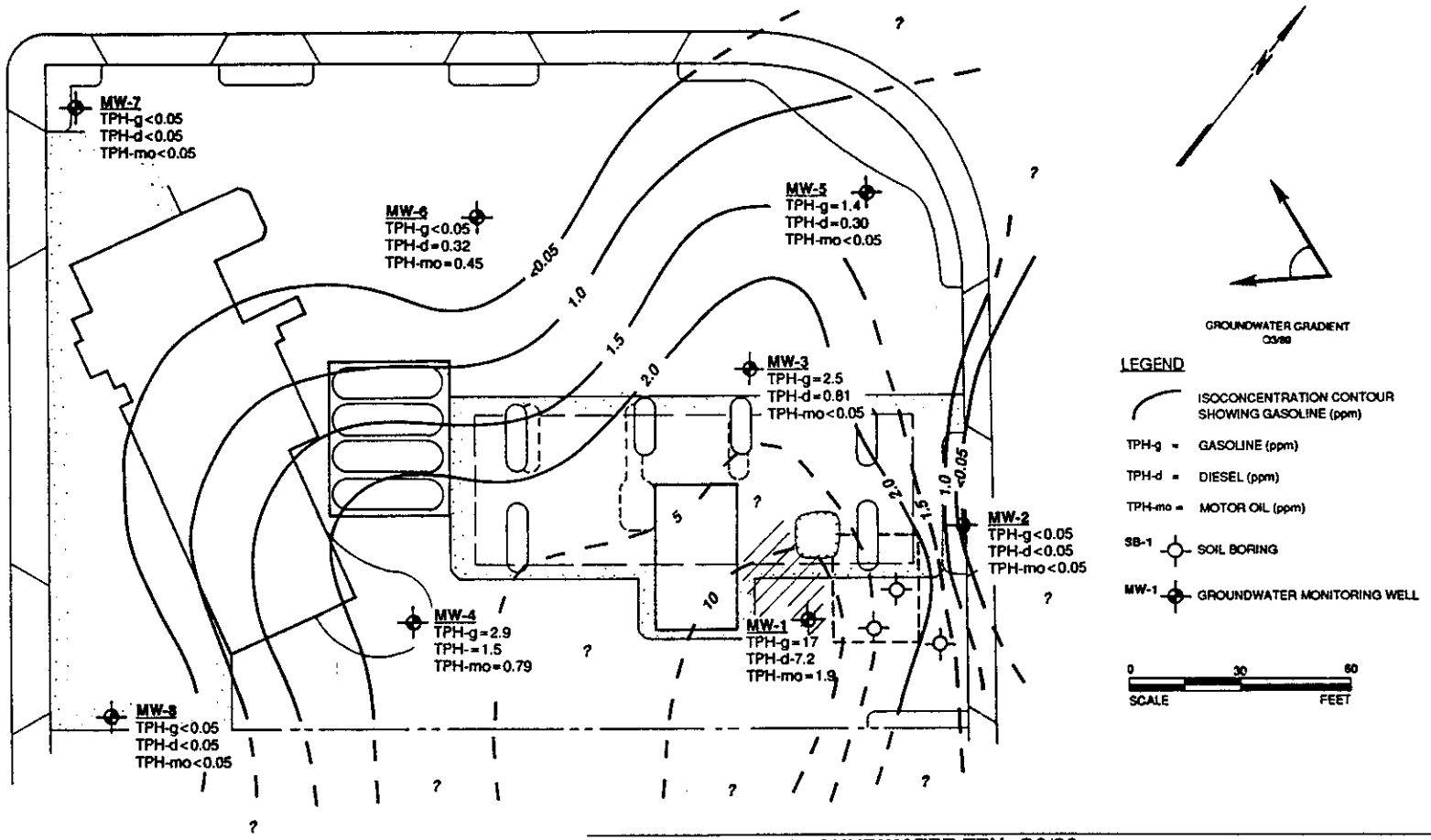
PLAN: SOIL BTEX AT (-10') Q3/89

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/25/89
Prepared By	MRS
Checked By	MIY
Approved By	DWC
Project No	88-44-369-01
Drawing No.	8

Base Map: after Robert H. Lee & Ass. Inc. 1986.



Base Map: after Robert H. Lee & Ass. Inc.1986.

PLAN: GROUNDWATER TPH Q3/89

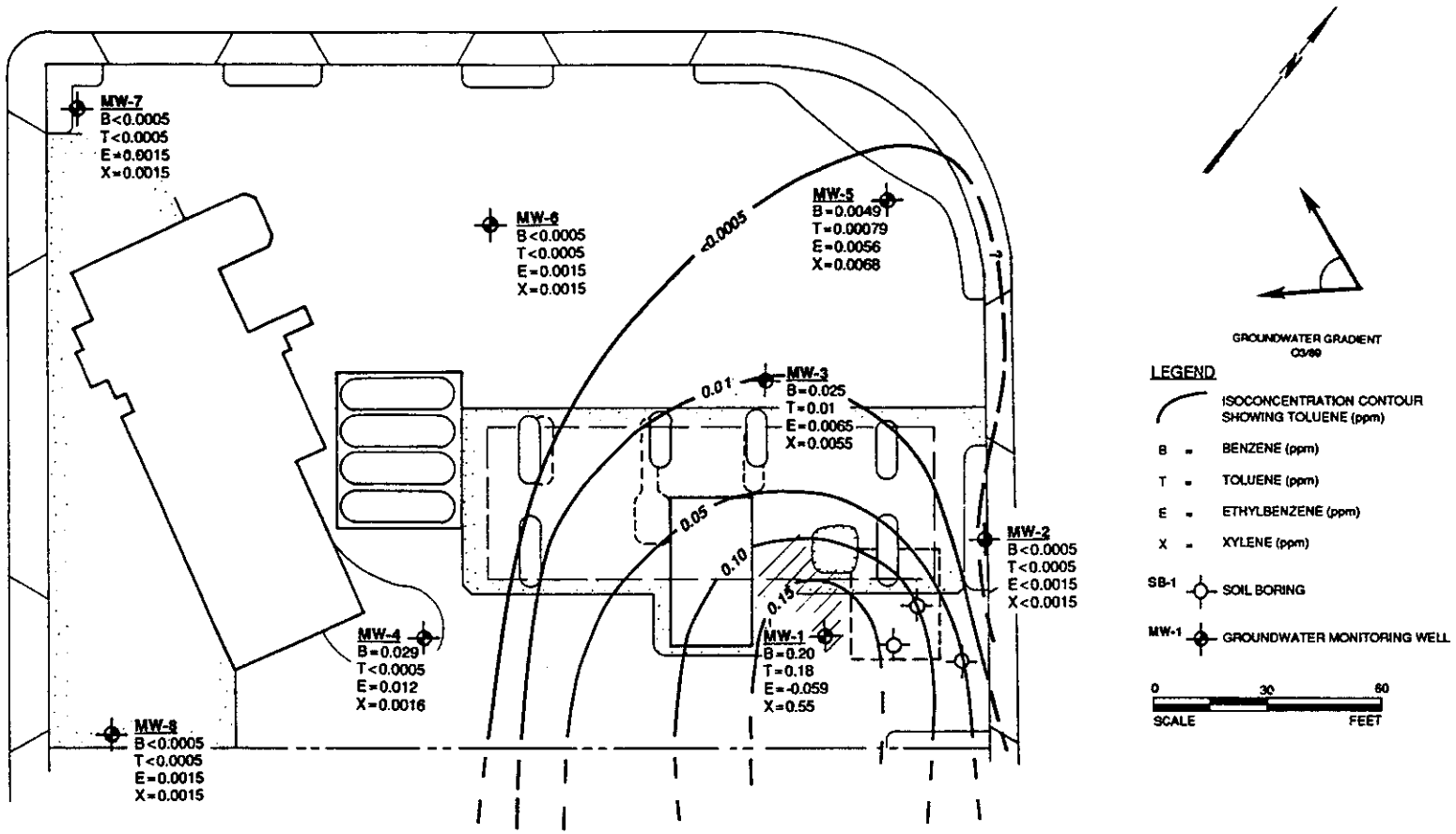
SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/25/89
Prepared By	MRS
Checked By	MIY
Approved By	DWC

Project No. 88-44-369-01

Drawing No. 9



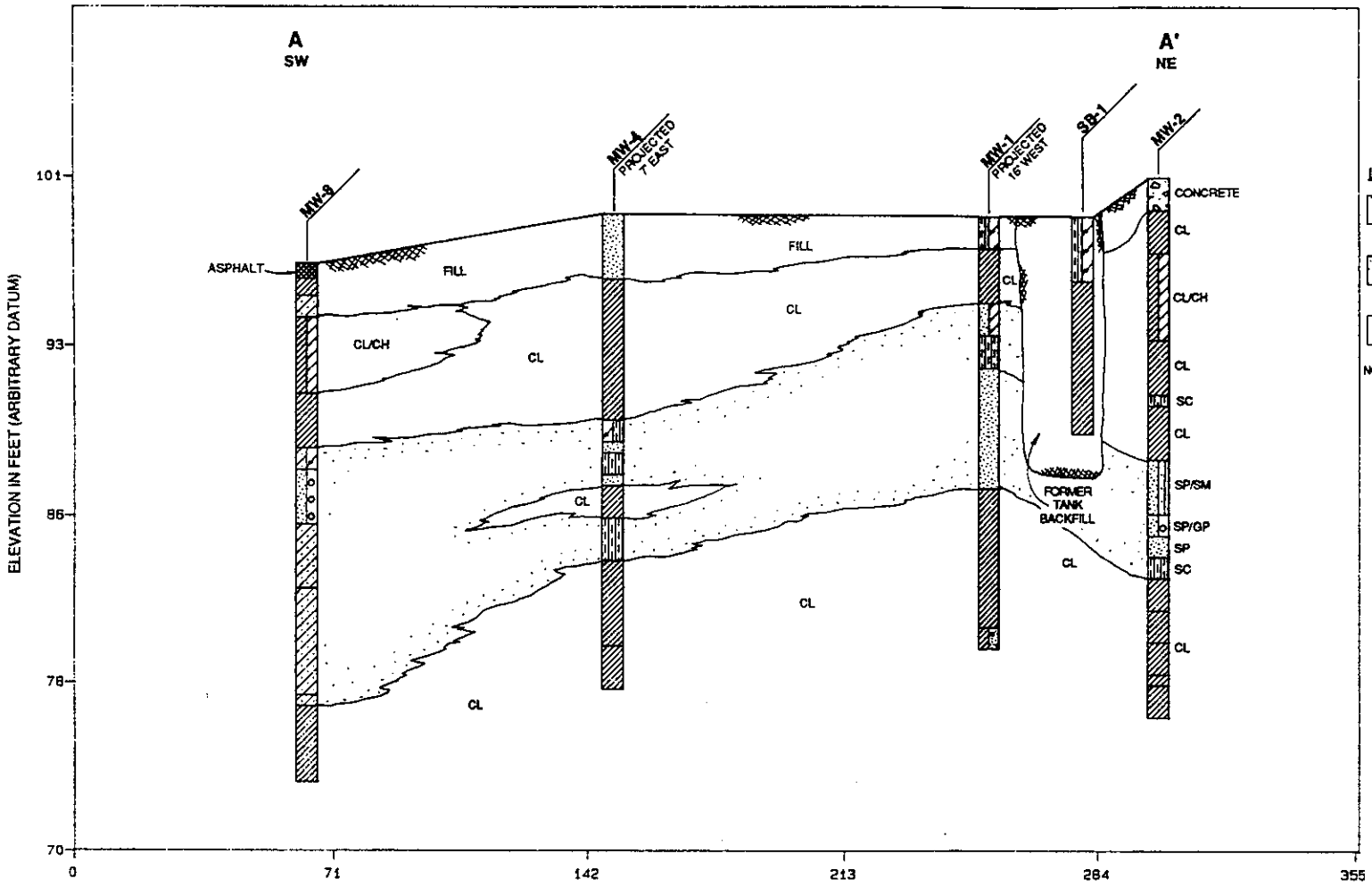
PLAN: GROUNDWATER BTEX Q3/89

SHELL OIL COMPANY
630 High Street
Oakland, California

Scale	AS SHOWN
Date	9/25/89
Prepared By	MRS
Checked By	MIY
Approved By	DWC
Project No.	88-44-389-01
Drawing No.	10

Converse Environmental Consultants California

Base Map: after Robert H. Lee & Ass., Inc. 1986.



LEGEND

- FILL: MIXED GRAVEL, SAND AND CLAY
- SC/GC/SP — RELATIVELY PERMEABLE SOIL: GRAVEL AND SAND
- CL/CH — RELATIVELY IMPERMEABLE SOIL: CLAY-RICH SOILS

NOTE: FOR EXPLANATION OF SOIL CLASSIFICATIONS SEE APPENDIX A FIGURE A-1.

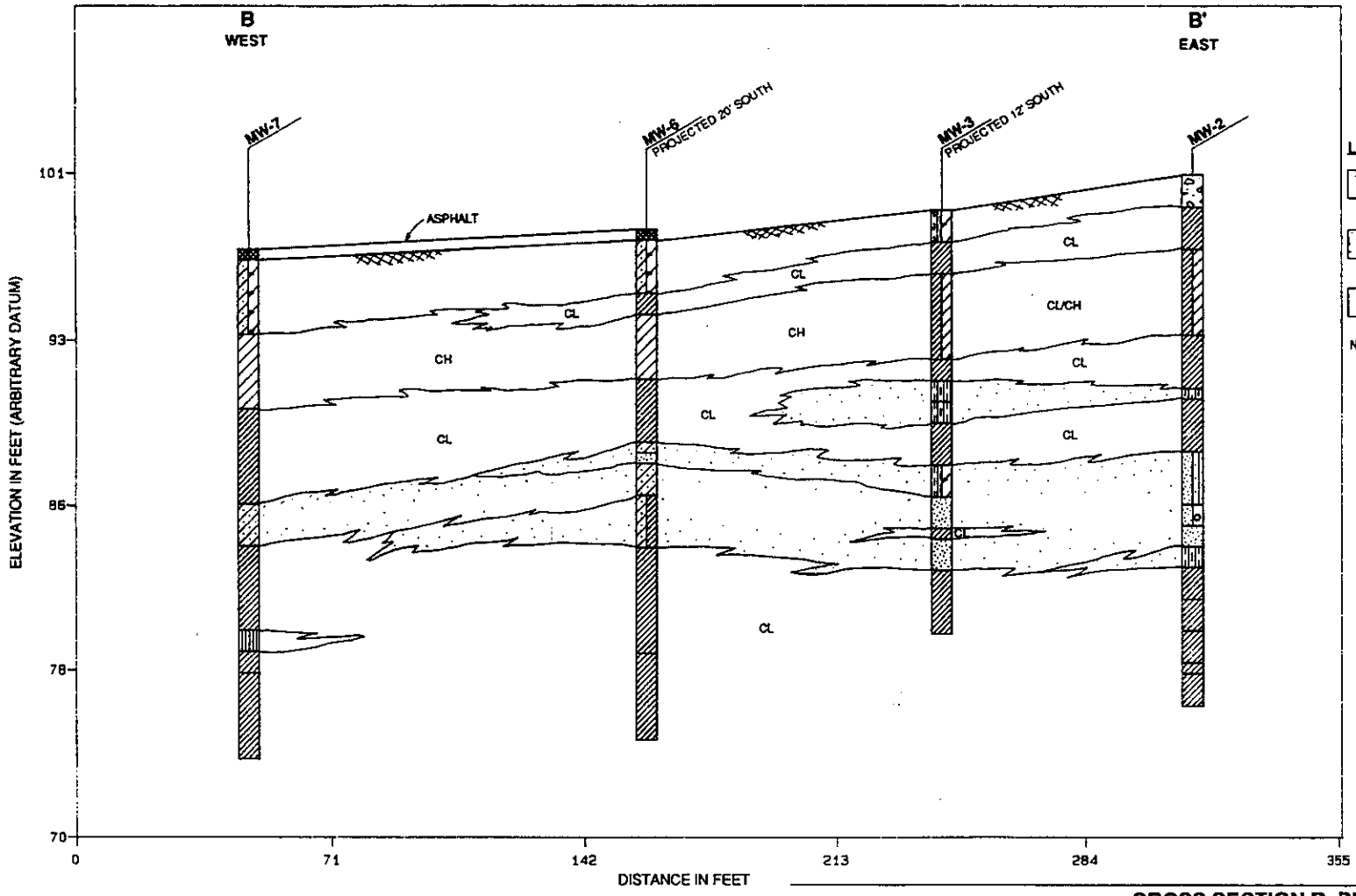
0 30 60
SCALE FEET

CROSS SECTION A-A'

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/28/89
Prepared By	MLL
Checked By	MIY
Approved By	
Project No	88-44-369-01
Drawing No	11



LEGEND

FILL: MIXED GRAVEL, SAND AND CLAY

SC/GC/SP — RELATIVELY PERMEABLE SOIL: GRAVEL AND SAND

CL/CH — RELATIVELY IMPERMEABLE SOIL: CLAY-RICH SOILS

NOTE: FOR EXPLANATION OF SOIL CLASSIFICATIONS SEE APPENDIX A FIGURE A-1.

0 30 60
SCALE FEET

CROSS SECTION B -B'

SHELL OIL COMPANY
630 High Street
Oakland, California

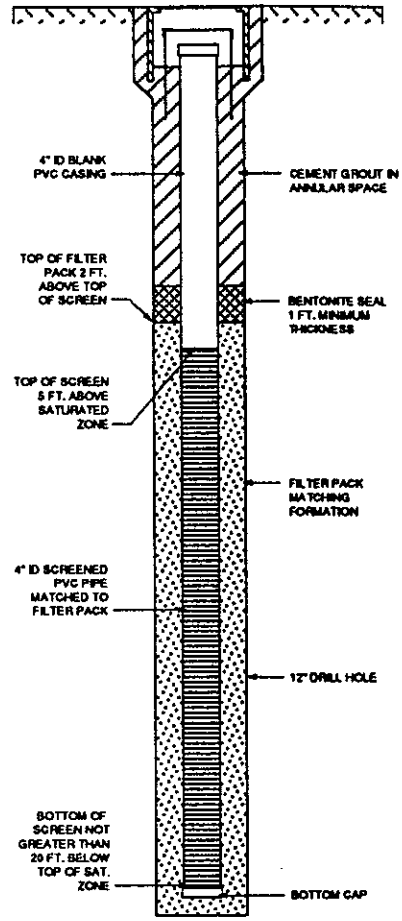
Converse Environmental Consultants California

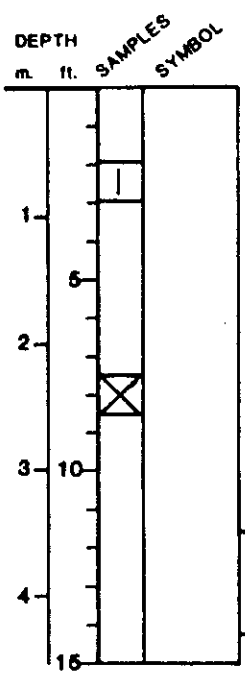
Scale	AS SHOWN
Date	9/28/89
Prepared By	MLL
Checked By	MIY
Approved By	DWC
Project No	88-44-369-01
Drawing No.	12

ATTACHMENT 1

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVELS More than half coarse fraction is larger than No. 4 sieve	Clean gravels with little or no fines	GW	Well graded gravels, gravel - sand mixtures
			GP	Poorly graded gravels, gravel - sand mixtures
		Gravels with over 12% fines	GM	Silty gravels, poorly graded gravel - sand - silt mixtures
			GC	Clayey gravels, poorly graded gravel - sand - clay mixtures
	SANDS More than half coarse fraction is smaller than No. 4 sieve	Clean sands with little or no fines	SW	Well graded sands, gravelly sands
			SP	Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM	Silty sands, poorly graded sand - silt mixtures
			SC	Clayey sands, poorly graded sand - clay mixtures
FINE GRAINED SOILS > half is smaller than No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic clays and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous fine, sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

WELL CONSTRUCTION





SAMPLE TYPE

DRIVE SAMPLE, 2.5" ID Sampler, driven with 140 lb. weight, 30" drop

NO RECOVERY

Water level at time of drilling

Stabilized water level on date noted

Note:

Soil conditions indicated by boring logs apply only at the location of the particular boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at the boring location with the passage of time. Data presented in the logs represent a simplification of the actual conditions encountered.

UNIFIED SOIL CLASSIFICATION AND BORING LOG SYMBOLS

SHELL OIL COMPANY
630 High Street
Oakland, California

Converse Environmental Consultants California

Scale: N/A	Project No.: 88-44-369-01
Prepared by: DRS/LQL	Date: 9-27-89
Checked by: MCC	Drawing No.: A-1
Approved by: MCC	

LOG OF BORING NO. MW-5

DATE DRILLED: 8-16-89	ELEVATION: 99.91	WL TAKEN: 8-17-89	EQUIPMENT: 3-3/4"x 8" Hollow Auger

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION		WELL CONSTRUCTION	BLOWS/FT.	O.V.M. (ppm)	T.P.H. (ppm)
				moist		yellow brown	ASPHALT and BASE ROCK, Clayey SAND and Rock fragments					
				very moist	medium dense	brown	Clayey SAND and fine size Rock fragments, pieces Asphalt, trace brick (Fill)	SC				
				moist	medium		Sandy CLAY (Fill)	CL				
5	1			slightly moist	medium dense	brown	Clayey SAND and fine crush ROCK (Fill)	SC/GC		17	0	
				moist	stiff	black	Silty CLAY (Native)	CH				
10	2			moist	medium dense	yellow to brown	Sandy CLAY, grading to Clayey SAND, trace fine Gravel	SC		8	0	
				v moist		gray	Clayey SANDS, some fine Gravel Strong odor					
	SPT			moist						33		
				very moist								
15				moist	medium	gray mottled tan and black	Silty CLAY, some Sand, Sand lenses Strong odor	CL				
					medium to stiff	tan with mottled black	Silty CLAY Less odor					
	SPT			very moist	medium	tan				18		
20							Total Depth of Boring 20 ft.					

REGISTERED PROFESSIONAL ENGINEER Douglas W. Charlton No. 4110 STATE OF CALIFORNIA

SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

Converse Environmental Consultants California

Drawing No.
A-2

LOG OF BORING NO. MW-6

DATE DRILLED: 8-16-89	ELEVATION: 98.56	WL TAKEN: 8-16-89	EQUIPMENT: 3-3/4"x 8" Hollow Auger

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	WELL CONSTRUCTION	BLOWS/FT.	O.V.M. (ppm)	T.P.H. (ppm)
							ASPHALT 3-1/2 BASE ? red-brown Clayey SAND and crushed ROCK fine course size (Fill) SC/GC				
						brown	Clayey SAND and fine crushed rock (Fill)				
						gray	Very Sandy CLAY (Fill) CL				
5	1			moist	stiff	black	Silty CLAY (Native) CH		7	0	
						dark gray to gray brown	Sandy CLAY CL				
10	2					mottled gray and rust	Clayey medium SAND SC		9	0	
							Fine SAND lens 3" thick SP				
				v moist			Clayey fine and medium SAND SC				
	SPT			moist			Alternate Clayey SAND and Sandy CLAY SC/CL		28		
	3								10		
15		▽		wet			Silty CLAY, trace fine Sand CL				
	SPT			very moist	medium		Silty CLAY		14	0	
20											

REGISTERED PROFESSIONAL ENGINEER Douglas W. Charlton No. 4110 STATE OF CALIFORNIA

SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

Converse Environmental Consultants California

Drawing No.
A-3

LOG OF BORING NO. MW-6

continued - page 2

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	WELL CONSTRUCTION	BLOWS/FT.	O.V.H. (ppm)	T.P.H. (ppm)
				very moist	medium	mottled gray and brown	Silty CLAY CL				
	S-1						Fine Sandy CLAY		17		
							Total Depth of Boring 24 ft.				
25											
30											
35											
40											

REGISTERED GEOLOGIST
Douglas W. Charlton
No. 4110
STATE OF CALIFORNIA

SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

Converse Environmental Consultants California

Drawing No.
A-4

LOG OF BORING NO. MW-7

DATE DRILLED: 8-15-89	ELEVATION: 97.64	WL TAKEN: 8-15-89	EQUIPMENT: 3-3/4"x 8" Hollow Auger

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	WELL CONSTRUCTION	BLOWS/FT.	O.V.M. (ppm)	T.P.H. (ppm)
							ASPHALT 3" NO BASE				
				moist	medium dense	brwn and green	Clayey SANDS and ROCK fragments to cobble size (Fill) SC/GC				
				very moist		dark gray	Clayey SAND, trace fine size Rock fragments (Fill)				
	1			moist	stiff	black	Silty CLAY CH		11	0	
5											
				moist	stiff	dark brown	Sandy CLAY CL				
	2								9	0	
10							Clayey SAND, trace fine Gravel SC				
	3			moist	very stiff	mottled gray and brown	Silty CLAY CL		10	0	
15		▽									
				wet			Clayey SILT, trace to little very fine Sand ML				
	4						Silty CLAY, trace fine Sand CL		9	0	
20											

REGISTERED PROFESSIONAL ENGINEER Douglas W. Charlton No. 4310 STATE OF CALIFORNIA

SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

Converse Environmental Consultants California

Drawing No.
A-5

LOG OF BORING NO. MW-7

continued - page 2

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	WELL CONSTRUCTION	BLOWS/FT.	O.V.M. (ppm)	T.P.H. (ppm)
				very moist	medium	mottled gray and brown	Silty CLAY CL				
					stiff						
	P						Little fine Sand		19		
25							Total Depth of Boring 24 ft.				
30											
35											
40											

REGISTERED PROFESSIONAL ENGINEER
Douglas W. Sherman
No. 4110
STATE OF CALIFORNIA

SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

Converse Environmental Consultants California

Drawing No.
A-6

LOG OF BORING NO. MW-8

DATE DRILLED: 8-15-89	ELEVATION: 97.14	WL TAKEN: 8-15-89	EQUIPMENT: 3-3/4"x 8" Hollow Auger

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION		WELL CONSTRUCTION	BLOWS/FT.	O.V.M. (ppm)	T.P.H. (ppm)
						black and brown	ASPHALT 2" BASE 4" Mix of Silty and Sandy CLAY, Rock fragments	CL				
							Clayey SAND and Rock fragments	SC				
				moist	stiff	black	Silty CLAY	CL/CH				
5	1									13	0	
						gray	Fine Sandy CLAY, trace decayed organics	CL			0	
	P			moist to wet	medium dense	mottled gray and rust	Clayey SAND and GRAVEL	SC/GC		28	0	
	2									25	0	
10							SAND and GRAVEL, trace Clay Occasional Sand lenses Grading:	SP/GP				
	P				medium dense	brown to mottled brown	Clayey fine SAND	SC		11		
15							CLAY and SAND, trace fine Gravel	SC				
	P				medium dense	gray brown	Clayey fine SAND and pockets of clean SAND	SC		28		
	3									22		
20												

REGISTERED PROFESSIONAL GEOLOGIST
Douglas W. Charlton
No. 4110
STATE OF CALIFORNIA

SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

Converse Environmental Consultants California

Drawing No.
A-7

LOG OF BORING NO. MW-8

continued - page 2

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	WELL CONSTRUCTION	BLOWS/FT.	O.V.M. (ppm)	T.P.H. (ppm)
	P			wet	medium dense	gray brown	Clayey fine SAND SC		21		
					stiff		Silty CLAY CL				
							Trace Gravel				
25							Total Depth of Boring 24 ft.				
30											
35											
40											

REGISTERED PROFESSIONAL GEOLOGIST
Douglas W. Charlton
No. 4110
STATE OF CALIFORNIA

SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

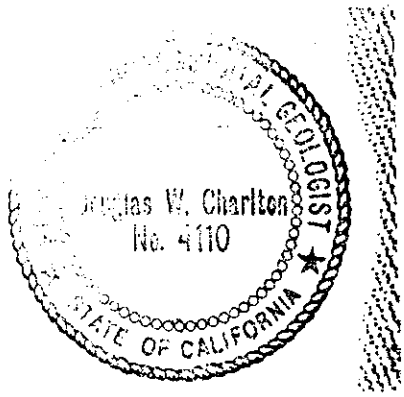
Converse Environmental Consultants California

Drawing No.
A-8

LOG OF BORING NO. SB-3

DATE DRILLED: 8-17-89	ELEVATION:	WL TAKEN: N/A	EQUIPMENT: 3-3/4"x 8" Hollow Auger

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	BLOWS/FT.	O.V.M. (ppm)	DRY DENSITY lb/ft³	TESTS
				slightly moist	medium dense	brown	Silty SAND and GRAVEL (Fill)				
					stiff	tan	Silty CLAY (Fill) CL				
					medium dense	gray and black	Sandy fine rounded GRAVEL (Fill) GP Odor				
5	1			slightly moist	medium	black	Silty CLAY, CL trace fine SAND, redwood fragments (Fill)	9	1300		
						mixed blue gray tan mottled gray and black					
10	2							10	60		
							Total Depth of Boring at 10 ft.				
15											
20											



SHELL OIL COMPANY
630 High Street
Oakland, California

Project No.
88-44-369-01

Converse Environmental Consultants California

Drawing No.
A-9

ATTACHMENT 2

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

Mark Yalom
Converse Consultants
55 Hawthorne St, Ste 500
San Francisco, CA 94105

08-31-89
NET Pacific Log No: 7469
Series No: 212
Client Ref: Proj# 88-44-369-01

Subject: Analytical Results for "Shell - 630 High Street" Received 08-18-89.

Dear Mr. Yalom:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Brian Fiet
Group Leader
Atomic Spectroscopy

Approved by:

Susan Joy Griffin
Group Leader
Gas Chromatography

/sm
Enc: Sample Custody Document

KEY TO ABBREVIATIONS and METHOD REFERENCES

Abbreviations

mean : Average; sum of measurements divided by number of measurements.

mg/Kg (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).

mg/L : Concentration in units of milligrams of analyte per liter of sample.

mL/L/hr : Milliliters per liter per hour.

MPN/100 mL : Most probable number of bacteria per one hundred milliliters of sample.

N/A : Not applicable.

NA : Not analyzed.

ND : Not detected; the analyte concentration is less than applicable listed reporting limit.

NR : Not requested.

NTU : Nephelometric turbidity units.

RPD : Relative percent difference, 100 [Value 1 - Value 2]/mean value.

SNA : Standard not available.

ug/Kg (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).

ug/L : Concentration in units of micrograms of analyte per liter of sample.

umhos/cm : Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the acutal reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

Parameter	Reporting Limit (ppm)	Descriptor, Lab No. and Results MW8A 1@ 5' 08-15-89 (-33193)	MW8A 2@ 10' 08-15-89 (-33194)	MW7 #1@ 5' 08-15-89 (-33195)	MW7 #2@ 10' 08-15-89 (-33196)	MW6 #1@ 5' 08-16-89 (-33197)
METHOD 503D						
Oil & Grease (total)	50	ND	ND	ND	ND	220
METHOD 503E						
Oil & Grease (non-polar)	100	ND	ND	ND	ND	ND
METHOD 7421						
Lead	0.2	5.1	2.6	9.8	3.7	5.6
PETROLEUM HYDROCARBONS VOLATILE (SOIL)						
DILUTION FACTOR *		1	1	1	1	1
DATE ANALYZED		08-24-89	08-24-89	08-24-89	08-24-89	08-24-89
METHOD GC FID/5030						
as Gasoline	10	ND	ND	ND	ND	ND
METHOD 8020						
Benzene	0.025	ND	ND	ND	ND	ND
Ethylbenzene	0.075	ND	ND	ND	ND	ND
Toluene	0.025	ND	ND	0.040	ND	0.057
Xylenes, total	0.075	ND	ND	ND	ND	ND
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)						
DILUTION FACTOR *		1	1	1	1	1
DATE EXTRACTED		08-22-89	08-22-89	08-22-89	08-22-89	08-22-89
DATE ANALYZED		08-24-89	08-24-89	08-24-89	08-24-89	08-24-89
METHOD GC FID/3550						
as Diesel	10	ND	ND	ND	ND	ND
as Motor Oil	10	ND	ND	ND	ND	ND

Parameter	Reporting Limit (ppm)	Descriptor, Lab No. and Results MW6 #2@ 10' 08-16-89 (-33198)	 MW5 #1@ 5' 08-16-89 (-33199)	 MW5 #2@ 9.5' 08-16-89 (-33200)
METHOD 503D				
Oil & Grease (total)	50	ND	ND	ND
METHOD 503E				
Oil & Grease (non-polar)	100	ND	ND	ND
METHOD 7421				
Lead	0.2	4.3	14	5.9
PETROLEUM HYDROCARBONS VOLATILE (SOIL)				
DILUTION FACTOR *		1	1	1
DATE ANALYZED		08-24-89	08-24-89	08-24-89
METHOD GC FID/5030				
as Gasoline	10	ND	ND	ND
METHOD 8020				
Benzene	0.025	ND	ND	ND
Ethylbenzene	0.075	ND	ND	ND
Toluene	0.025	ND	ND	ND
Xylenes, total	0.075	ND	ND	ND
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)				
DILUTION FACTOR *		1	1	1
DATE EXTRACTED		08-22-89	08-22-89	08-22-89
DATE ANALYZED		08-24-89	08-24-89	08-24-89
METHOD GC FID/3550				
as Diesel	10	ND	ND	ND
as Motor Oil	10	ND	ND	ND

Converse Consultants

CHAIN OF CUSTODY RECORD

After Mark

Project No.	Project Name
8844-369-01	630 Main St

Samplers: (signature) Charles Brown

Station No.	Date	Time	Comp.	Grab	Station Location	Number of Containers	TPH-G	TPH-D	BTEX	PD	QTG 503 DCE for Doug Clutter 8/21 gw		Remarks
MW8A	8-15			✓	DRIVE 1 @ 5 FT	1	X	X	X	X	X		7469
↓	↓			✓	2 @ 10 FT	1	↓	↓	↓	↓	X		
MW7				✓	1 @ 5	1					X		
↓	↓			✓	2 @ 10	1	↓	↓	↓	↓	X		
↓	↓			✓	3 @ 15	1	—	—	—	—	—		Hold. Below Water
MW6	8/16/01			✓	1 @ 5	1	X	X	X	X	X		
				✓	2 @ 10	1	↓	↓	↓	↓	X		
				✓	3 @ 15	1	—	—	—	—	—		Hold at water level
MW5				✓	1 @ 5	1	X	X	X	X	X		
↓	↓			✓	2 @ 10	1	↓	↓	↓	↓	X		

Relinquished by: (signature) Charles Brown	Date/Time 8/18 1315	Received by: (signature) Jeff Wickham 8/18 13:25	Relinquished by: (signature) Jeff Wickham	Date/Time 8/18 2100	Received by: (signature)
Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by Courier: (signature)	Date/Time	Received by Mobile Lab: (signature)	Relinquished by Mobile Lab: (signature)	Date/Time	Received by Courier: (signature)
Method of Shipment		Shipped by: (signature)	Courier from Airport: (signature) (VIA NCS)	Received for Laboratory: (signature) K Temple	Date/Time 8/18/01 2100

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

Robin Breuer
Converse Consultants
55 Hawthorne St, Ste 500
San Francisco, CA 94105

08 31-89
NET Pacific Log No: 7471
Series No: 212
Client Ref: Proj # 88-44-369-11

Subject: Analytical Results for "Shell - 630 High Street" Received 08-18-89.

Dear Ms. Breuer:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Brian Fies
Group Leader
Atomic Spectroscopy

Approved by:

Susan Joy Griffin
Group Leader
Gas Chromatography

/sm
Enc: Sample Custody Document

KEY TO ABBREVIATIONS and METHOD REFERENCES

Abbreviations

mean : Average; sum of measurements divided by number of measurements.

ppm (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).

mg/L : Concentration in units of milligrams of analyte per liter of sample.

mL/L/hr : Milliliters per liter per hour.

MPN/100 mL : Most probable number of bacteria per one hundred milliliters of sample.

N/A : Not applicable.

NA : Not analyzed.

ND : Not detected; the analyte concentration is less than applicable listed reporting limit.

NR : Not requested.

NTU : Nephelometric turbidity units.

RPD : Relative percent difference, 100 [Value 1 - Value 2]/mean value.

SNA : Standard not available.

ppm (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).

ug/L : Concentration in units of micrograms of analyte per liter of sample.

umhos/cm : Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the acutal reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

SAMPLE DESCRIPTION: SB3 10 5' 08-17-89
LAB NO.: (-33203)

Parameter	Reporting Limit	Results	Units
METHOD 503D			
Oil & Grease (total)	50	290	ppm
METHOD 503E			
Oil & Grease (non-polar)	100	ND	ppm
METHOD 7421			
Lead	0.2	66	ppm
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			
DILUTION FACTOR *		1	
DATE ANALYZED		08-24-89	
METHOD GC FID/5030			
as Gasoline	10	ND	ppm
METHOD 8020			
Benzene	0.025	ND	ppm
Ethylbenzene	0.075	ND	ppm
Toluene	0.025	0.22	ppm
Xylenes, total	0.075	ND	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			
DILUTION FACTOR *		1	
DATE EXTRACTED		08-22-89	
DATE ANALYZED		08-24-89	
METHOD GC FID/3550			
as Diesel	10	ND	ppm
as Motor Oil	10	ND	ppm

SAMPLE DESCRIPTION: S83 2@ 10' 08-17-89
LAB NO.: (-33204)

Parameter	Reporting Limit	Results	Units
METHOD 503D			
Oil & Grease (total)	50	ND	ppm
METHOD 503E			
Oil & Grease (non-polar)	100	ND	ppm
METHOD 7421			
Lead	0.2	4.2	ppm
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			
DILUTION FACTOR *		1	
DATE ANALYZED		08-24-89	
METHOD GC FID/5030			
as Gasoline	10	ND	ppm
METHOD 8020			
Benzene	0.025	ND	ppm
Ethylbenzene	0.075	ND	ppm
Toluene	0.025	0.045	ppm
Xylenes, total	0.075	ND	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			
DILUTION FACTOR *		1	
DATE EXTRACTED		08-22-89	
DATE ANALYZED		08-24-89	
METHOD GC FID/3550			
as Diesel	10	ND	ppm
as Motor Oil	10	ND	ppm

Converse Consultants

PM : RMB

CHAIN OF CUSTODY RECORD

Project No.	Project Name
88-44-369-11	630 High

Samplers: (signature)

Station No.	Date	Time	Comp.	Grab	Station Location	Number of Containers	TPH-G	TPH-D	BTEX	Pb	SO3 DTE	oil + grease	Remarks
SB3	8/17/89				Drive 1 @ 5	1	X	X	X	X	X		std time
;3					2 @ 10	1	X	X	X	X	X		

7471

Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
D. Coy	8/17/89 17:00	Jeff Winkler 8/18 13:25	Jeff Winkler	8/18 2100	SSL
Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by Courier: (signature)	Date/Time	Received by Mobile Lab: (signature)	Relinquished by Mobile Lab: (signature)	Date/Time	Received by Courier: (signature)
Method of Shipment		Shipped by: (signature)	Courier from Airport: (signature) (VIA NCS)	Received for Laboratory: (signature) K Temple	Date/Time 8/18/89 2100

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

Robin Breuer
Converse Consultants
55 Hawthorne St, Ste 500
San Francisco, CA 94105

09-18-89
NET Pacific Log No: 7598
Series No: 212
Client Ref: Proj# 88-4-369-11

Subject: Analytical Results for "Shell - 630 High Street" Received 08-31-89.

Dear Ms. Breuer:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Susan Joy Griffin
Group Leader
Gas Chromatography

Approved by:

Brian Fies
Group Leader
Atomic Spectroscopy

/sm

KEY TO ABBREVIATIONS and METHOD REFERENCES

Abbreviations

mean : Average; sum of measurements divided by number of measurements.

mg/Kg (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).

mg/L : Concentration in units of milligrams of analyte per liter of sample.

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NTU : Nephelometric turbidity units.

RPD : Relative percent difference, 100 [Value 1 - Value 2]/mean value.

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Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

Parameter	Reporting Limit (ppm)	Descriptor, Lab No. and Results: SB3 1@ 5' 08-17-89 (-34017)	SB3 2@ 10' 08-17-89 (-34018)
Cadmium	5	ND	ND
Chromium	5	31	77
Zinc	5	38	43

Parameter	Reporting Limit (ppm)	Descriptor, Lab No. and Results: SB3 1@ 5' 08-17-89 (-34017)	SB3 2@ 10' 08-17-89 (-34018)
DILUTION FACTOR*		1	1
Bromodichloromethane	0.002	ND	ND
Bromoform	0.002	ND	ND
Bromomethane	0.002	ND	ND
Carbon tetrachloride	0.002	ND	ND
Chlorobenzene	0.002	ND	ND
Chloroethane	0.002	ND	ND
2-Chloroethylvinyl ether	0.005	ND	ND
Chloroform	0.002	ND	ND
Chloromethane	0.002	ND	ND
Dibromochloromethane	0.002	ND	ND
1,2-Dichlorobenzene	0.002	ND	ND
1,3-Dichlorobenzene	0.002	ND	ND
1,4-Dichlorobenzene	0.002	ND	ND
Dichlorodifluoromethane	0.002	ND	ND
1,1-Dichloroethane	0.002	ND	ND
1,2-Dichloroethane	0.002	ND	ND
1,1-Dichloroethene	0.002	ND	ND
trans-1,2-Dichloroethene	0.002	ND	ND
1,2-Dichloropropane	0.002	ND	ND
cis-1,3-Dichloropropene	0.002	ND	ND
trans-1,3-Dichloropropene	0.002	ND	ND
Methylene chloride	0.05	ND	ND
1,1,2,Tetrachloroethane	0.002	ND	ND
Tetrachloroethene	0.002	ND	ND
1,1,1-Trichloroethane	0.002	ND	ND
1,1,2-Trichloroethane	0.002	ND	ND
Trichloroethene	0.002	ND	ND
Trichlorofluoromethane	0.002	ND	ND
Vinyl chloride	0.002	ND	ND

ATTACHMENT 3

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

Marc Yalom
Converse Consultants
55 Hawthorne St, Ste 500
San Francisco, CA 94105

09-18-89
NET Pacific Log No: 7741
Series No: 212
Client Ref: Project# 88-44-369-02

Subject: Analytical Results for "Shell - 630 High Street" Received 09-14-89.

Dear Mr. Yalom:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Sue J. Long
Group Leader
Classical Chemistry

Approved by:

Brian Fies
Group Leader
Atomic Spectroscopy

/sm
Enc: Sample Custody Document

KEY TO ABBREVIATIONS and METHOD REFERENCES

Abbreviations

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Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

SAMPLE DESCRIPTION: MW-6 09-12-89 0900
LAB NO.: (-34899)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS VOLATILE (WATER)			
DILUTION FACTOR *		1	
DATE ANALYZED		09-14-89	
METHOD GC FID/5030			
as Gasoline	0.05	ND	ppm
METHOD 602			
Benzene	0.0005	ND	ppm
Ethylbenzene	0.0015	ND	ppm
Toluene	0.0005	ND	ppm
Xylenes, total	0.0015	ND	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (WATER)			
DILUTION FACTOR *		1	
DATE EXTRACTED		09-14-89	
DATE ANALYZED		09-15-89	
METHOD GC FID/3510			
as Diesel	0.05	0.32	ppm
as Motor Oil	0.05	0.45	ppm

7741

Converse Consultants

CHAIN OF CUSTODY RECORD

P.M. Mark. Y

Project No.	Project Name
88-44-3161.02	Shell: 630 High st

Samplers: (signature) Thomas Smith

Station No.	Date	Time	Comp.	Grab	Station Location	Number of Containers	3 litre 4 VOAs	TPH GAS	TPH Diesel	BTEX	Remarks
MW-6	9/12/88	9:00		✓	630 High St	7					Shell Rapped turn around time ATTN: Judy

Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Thomas Smith	9/12/88 11:01	Jeff Wickl 9/13 13:45	Jeff Wickl		
Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by Courier: (signature)	Date/Time	Received by Mobile Lab: (signature)	Relinquished by Mobile Lab: (signature)	Date/Time	Received by Courier: (signature)
Method of Shipment		Shipped by: (signature)	Courier from Airport: (signature) (VIA NCS)	Received for Laboratory: (signature) K Temple	Date/Time 9-14-88 0730

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
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Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

Marc Yalom
Converse Consultants
55 Hawthorne St, Ste 500
San Francisco, CA 94105

09-14-89
NET Pacific Log No: 7585
Series No: 212
Client Ref: Proj # 88-44-369-03

Subject: Analytical Results for "Shell-630 High St" Received 08-31-89.

Dear Mr. Yalom:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Jules Skamarack
Laboratory Manager

Approved by:

Gregg P. Oakes
Group Leader
Mass Spectroscopy

/ma
Enc: Sample Custody Document

KEY TO ABBREVIATIONS and METHOD REFERENCES

Abbreviations

mean : Average; sum of measurements divided by number of measurements.

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NTU : Nephelometric turbidity units.

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Method References

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Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

Parameter	Reporting Limit (ppm)	Descriptor, Lab No. and Results MW-2 08-30-89 1026 (-33941)	MW-3 08-30-89 1003 (-33942)	MW-4 08-30-89 1054 (-33943)	MW-8 08-30-89 1126 (-33944)	MW-7 08-30-89 1151 (-33945)
Lead (HGA)	0.002	ND	ND	ND	ND	ND
PETROLEUM HYDROCARBONS VOLATILE (WATER)						
DILUTION FACTOR *		1	1	1	1	1
DATE ANALYZED		09-02-89	09-08-89	09-02-89	09-02-89	09-02-89
METHOD GC FID/5030 as Gasoline	0.05	ND	2.5	2.9	ND	ND
METHOD 602						
Benzene	0.0005	ND	0.025	0.029	ND	ND
Ethylbenzene	0.0015	ND	0.0065	0.012	ND	ND
Toluene	0.0005	ND	0.010	ND	ND	ND
Xylenes, total	0.0015	ND	0.0055	0.0016	ND	ND
PETROLEUM HYDROCARBONS EXTRACTABLE (WATER)						
DILUTION FACTOR *		1	1	1	1	1
DATE EXTRACTED		09-05-89	09-05-89	09-05-89	09-05-89	09-05-89
DATE ANALYZED		09-05-89	09-05-89	09-05-89	09-05-89	09-05-89
METHOD GC FID/3510 as Diesel	0.05	ND	0.81	1.5	ND	ND
as Motor Oil	0.05	ND	ND	0.79	ND	ND

Parameter	Reporting Limit (ppm)	Descriptor, Lab No. and Results MW-6 08-30-89 1215 (-33946)	MW-5 08-30-89 1304 (-33947)
Lead (HGA)	0.002	ND	ND
PETROLEUM HYDROCARBONS VOLATILE (WATER)			
DILUTION FACTOR *		1	1
DATE ANALYZED		09-02-89	09-02-89
METHOD GC FID/5030			
as Gasoline	0.05	ND	1.4
METHOD 602			
Benzene	0.0005	ND	0.0049
Ethylbenzene	0.0015	ND	0.0056
Toluene	0.0005	ND	0.00079
Xylenes, total	0.0015	ND	0.0068
PETROLEUM HYDROCARBONS EXTRACTABLE (WATER)			
DILUTION FACTOR *		1	1
DATE EXTRACTED		NA	09-05-89
DATE ANALYZED		NA[a]	09-05-89
METHOD GC FID/3510			
as Diesel	0.05	NA	0.30
as Motor Oil	0.05	NA	ND

[a]Unable to analyze due to laboratory accident.

SAMPLE DESCRIPTION: MW-1 08-30-89 1330
LAB NO.: (-33948)

Parameter	Reporting Limit	Results	Units
Oil & Grease (Non-polar)	5	ND	ppm
Cadmium	0.02	ND	ppm
Chromium, total	0.02	ND	ppm
Lead (HGA)	0.002	0.020	ppm
Zinc	0.02	0.09	ppm
PETROLEUM HYDROCARBONS VOLATILE (WATER)			
DILUTION FACTOR *		10	
DATE ANALYZED		09-02-89	
METHOD GC FID/5030			
as Gasoline	0.05	17	ppm
METHOD 602			
Benzene	0.0005	0.200	ppm
Ethylbenzene	0.0015	0.059	ppm
Toluene	0.0005	0.180	ppm
Xylenes, total	0.0015	0.550	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (WATER)			
DILUTION FACTOR *		1	
DATE EXTRACTED		09-05-89	
DATE ANALYZED		09-05-89	
METHOD GC FID/3510			
as Diesel	0.05	7.2	ppm
as Motor Oil	0.05	1.9	ppm

SAMPLE DESCRIPTION: MW-1 08-30-89 1330
LAB NO.: (-33948)

Parameter	Reporting Limit	Results	Units
METHOD 624			
DATE ANALYZED		08-31-89	
DILUTION FACTOR *		1	
Benzene	0.0044	0.240	ppm
Bromodichloromethane	0.0022	ND	ppm
Bromoform	0.0047	ND	ppm
Bromomethane	0.0050	ND	ppm
Carbon tetrachloride	0.0028	ND	ppm
Chlorobenzene	0.0060	ND	ppm
Chloroethane	0.0050	ND	ppm
2-Chloroethylvinyl ether	0.0070	ND	ppm
Chloroform	0.0016	ND	ppm
Chloromethane	0.0050	ND	ppm
Dibromochloromethane	0.0031	ND	ppm
1,2-Dichlorobenzene	0.0060	ND	ppm
1,3-Dichlorobenzene	0.0060	ND	ppm
1,4-Dichlorobenzene	0.0060	ND	ppm
1,1-Dichloroethane	0.0047	ND	ppm
1,2-Dichloroethane	0.0028	ND	ppm
1,1-Dichloroethene	0.0028	ND	ppm
trans-1,2-Dichloroethene	0.0016	ND	ppm
1,2-Dichloropropane	0.0060	ND	ppm
cis-1,3-Dichloropropene	0.0050	ND	ppm
trans-1,3-Dichloropropene	0.0050	ND	ppm
Ethylbenzene	0.0072	0.620	ppm
Methylene chloride	0.010	ND	ppm
1,1,2,2-Tetrachloroethane	0.0069	ND	ppm
Tetrachloroethene	0.0041	ND	ppm
Toluene	0.0060	ND	ppm
1,1,1-Trichloroethane	0.0038	ND	ppm
1,1,2-Trichloroethane	0.0050	ND	ppm
Trichloroethene	0.0019	ND	ppm
Trichlorofluoromethane	0.0050	ND	ppm
Vinyl chloride	0.0050	ND	ppm
Xylenes, total	0.015	0.730	ppm

P.M. MARC YALOM

7585

Converse Consultants

CHAIN OF CUSTODY RECORD

Project No. 88-44-369-03 | Project Name SHELL

Samplers: (signature)

Station No.	Date	Time	Comp.	Grab	Station Location	Number of Containers (68 total, 34 VOA, 34 Litre)	TPH-GAS	TPH-D	BTEX	LEAD	624	503E	METALS (Zn, Cd, Cr)	Remarks
MW-2	8/30/89	10:26		X	630 HIGH ST - OAKLAND	8	X	X	X	X				STANDARD T.A.T.
MW-3	"	10:03		X	" " " "	8	X	X	X	X				
MW-4	"	10:54		X	" " " "	8	X	X	X	X				
MW-8	"	11:26		X	" " " "	8	X	X	X	X				
MW-7	"	11:51		X	" " " "	8	X	X	X	X				
MW-6	"	12:15		X	" " " "	8	X	X	X	X				
MW-5	"	1:04		X	" " " "	8	X	X	X	X				
MW-1	"	1:30		X	" " " "	12	X	X	X	X	X	X	X	

Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
	8/30/89 12:56	8/30 16:10		8/31 0300	
Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by Courier: (signature)	Date/Time	Received by Mobile Lab: (signature)	Relinquished by Mobile Lab: (signature)	Date/Time	Received by Courier: (signature)
Method of Shipment		Shipped by: (signature)	Courier from Airport: (signature) (VIA NCS)	Received for Laboratory: (signature)	Date/Time 8/31/89 0710

APPENDIX A

Hollow-Stem Auger Drilling and Soil Sampling

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING

Borings shall be drilled with a hollow-stem auger and sampled with a modified California-type split-spoon sampler. Soil samples shall be of sufficient volume to perform the analyses which may be required, including replicate analyses. Aside from deionized water or distilled water, no fluids will be used in drilling.

Undisturbed (intact) soil samples shall be recovered from soil borings without introducing liquids into the borings. Soil samples as core or cuttings shall be taken continuously from ground surface to termination depth (TD), or through the aquifer zone of interest for lithologic logging.

Soils from all borings shall be described in detail using the Unified Soil Classification System and shall be logged by a professional geologist, civil engineer, or engineering geologist who is registered or certified by the State of California and who is experienced in the use of the Unified Soil Classification System. A technician trained and experienced in the use of the Unified Soil Classification System who is working under the direct supervision of one of the aforementioned professionals shall be qualified to log borings, provided the aforementioned professional reviews the logs and assumes responsibility for the accuracy and completeness of the logs.

All wet zones above the free water zone shall be noted and accurately logged.

If evidence of contamination is detected by sight, smell, or other field analytical methods, drilling shall be halted until the responsible professional determines if drilling deeper is advisable.

All drilling tools shall be thoroughly decontaminated with trisodium phosphate (TSP) or steam cleaner immediately before starting each boring.

Soil samples shall be taken in decontaminated brass sampling tubes in the split-spoon. The brass sleeves will be cut apart using a clean knife. The ends of the tubes will be covered tightly with teflon wrap, capped with tight-fitting plastic caps, wrapped with plastic electricians' tape, and properly labeled.

APPENDIX B

Standards for Backfilling Borings and Sealing Wells

STANDARDS FOR BACKFILLING BORINGS AND SEALING WELLS

INTRODUCTION

As standard practice, all borings and observation and monitoring wells shall be backfilled or sealed with "relatively impervious" grout to prevent surface contamination or cross-contamination between aquifers. Borings will be sealed from termination depth to the surface and observation and monitoring wells shall be backfilled and sealed above the water table. This practice will reduce liability if it is determined and proven that groundwater contamination occurred along a "vertical pathway" in an improperly sealed or filled boring or well.

In hazardous and potentially hazardous waste sites where deep borings or wells are installed, appropriate geologic information will be reviewed to determine if multiple aquifer system(s) exist(s). If such system(s) exist(s), drilling and sealing techniques will be used to prevent contamination of a lower aquifer by upper, potentially contaminated aquifer(s). Grout seals will be installed according to the following techniques through all thicknesses of impermeable zones which separate aquifer.

Borehole grouting shall consist of backfilling with bentonite pellets, cement/bentonite grout, or a thick bentonite slurry, depending upon the depth of the boring, depth to ground water, and type of drilling equipment used. Details of currently acceptable sealing methods are outlined below.

GENERAL SPECIFICATIONS

- All grouting and well construction and sealing and abandonment of borings shall be consistent with local ordinances.

- Cement/bentonite grout used to seal wells will be of a hard consistency that can resist traffic loads, but not installed to create a "concrete pile" that will obstruct further earthwork. Bentonite slurry, which does not support surface loads, will not be used for sealing wells.

GROUTING/SEALING TECHNIQUES

Dry Holes and Borings Containing Less Than 5 Feet of Water

Option 1: Backfill boring with bentonite pellets or granules in about 2-foot lifts. Add a gallon of water to hole after each lift.

Option 2: Pour in a mixture of cement/bentonite group (9 parts cement, 1 part bentonite powder plus water as needed to make mixture consistency of pancake batter).

Option 3: Pour in a thick mixture of bentonite and water. Soil cuttings can be used to bulk this mixture is soil is not contaminated and chunks are small and well-mixed in slurry.

Borings Containing More Than 5 Feet of Water

Option 1: Pump out water and use criteria for "dry hole."

Option 2: Pump cement/bentonite grout to bottom of hole or use tremie. Do not pour grout through water.

Option 3: Pump or tremie bentonite slurry. This alternative is particularly efficient if you are using rotary wash equipment since all you have to do is thicken the drilling mud and pump it through the drill rod.

Monitoring/Observation Well Sealing (Single Aquifer)

A. Place sand pack around well casing to about 2 feet above slotted interval. Anticipate fluctuation of water level so screened interval covers maximum water elevation.

B. Place 2-foot thick bentonite pellet seal above sand pack. Add a bucket of clean water to swell pellets.

C. Pour cement/bentonite grout or bentonite slurry above pellet seal to ground surface.

APPENDIX C

Groundwater Monitoring Well Construction

GROUNDWATER MONITORING WELL CONSTRUCTION

Groundwater monitoring wells shall be constructed according to the general specifications described in the EPA Technical Enforcement Guidance Document (TEGD, 1986) and shown on the attached well construction diagram.

Groundwater monitoring wells shall be installed through hollow stem augers in borings drilled and sampled per Appendix A. Groundwater monitoring wells shall extend to the base of the upper aquifer, as defined by the first consistent (>5-foot thick) clay layer below the upper aquifer, or at least 15 feet below the top of the upper aquifer, whichever is shallower. The wells shall not extend through the laterally extensive clay layer below the upper aquifer. The wells shall be terminated 1 to 2 feet into such a clay layer.

The groundwater monitoring wells shall be single-cased wells which extend to the bottom of the boring or into a bentonite plug, if one is used at the bottom of the boring as a hydraulic seal. The screens shall be factory-perforated from the bottom of the upper blank casing at least 5 feet above the top of the upper aquifer as defined by boring lithology and/or geophysics. The base of the screen shall be the bottom of the well, or above a 2-5 foot long silt trap in the bottom of the well.

Groundwater monitoring wells shall be constructed as filter-packed wells that will prevent the migration of the surrounding formation into the well. Wells shall have 4-inch diameter factory-perforated casing with slots which match formation grain size as determined by field grain-size distribution analysis. Well casings shall have a threaded bottom cap or plug, and may have a silt trap below the screened zone.

All casing and screen shall be flush threaded, and no adhesive shall be used. PVC casing screen shall be steam-cleaned prior to installation. Filter pack shall be washed, graded sand.

Filter packs shall extend at least 2 feet above the top of the perforated interval. A layer of bentonite pellets 1 to 2 feet thick shall be placed on top of the filter pack. Approximately 2 gallons of water shall be added to hydrate the bentonite pellets. The wells shall then be sealed from the top of the bentonite seal to the surface with neat cement. All sand, bentonite and cement shall be placed using a tremie pipe.

Wellheads shall be installed in flush-mounted watertight structures and provided with watertight caps. Wellheads shall be provided with locked security devices that protect the wells from the entry of surface water, accidental damage, unauthorized access, and vandalism.

Soil and water sampling equipment and materials used to construct the wells shall not donate, capture, mask, nor alter the chemical composition of the soils and ground water.

All well casings, casing fittings, screens, and all other components that are installed in the well shall be thoroughly decontaminated immediately before starting each well installation.

APPENDIX D

Well Development

WELL DEVELOPMENT

For all newly installed groundwater monitoring wells, the well casing, filter pack and adjacent formation shall be cleared of disturbed sediment and water before representative water samples are collected. A field geologist shall supervise such development work.

Before well development begins, the grout and bentonite seals shall set at least 24 hours and one pre-development water sample will be taken for each well. These water samples will be collected and analyzed for possible contaminants present according to CECC groundwater sampling protocol and QA/QC. These samples will be stored in the laboratory pending a decision to analyze, if required. If analyzed, standard laboratory procedures will be used. Samples not analyzed will be discarded.

All well development tools shall be thoroughly cleaned immediately before each well development. Well development shall begin with bailing using either a stainless steel or teflon bailer. This procedure will remove heavy sediments from within each well casing, reducing the possibility of the well screen abrasion and pump damage during subsequent pumping. Wells shall be bailed until water samples contain only trace amounts of fine to coarse sand, as measured in sampling jars after 15 minutes of settling.

The wells will be mechanically surged with a surge or flapper block for 15 strokes or 30 minutes, whichever is less. The block will be lowered to the well plug and then carefully drawn up to the top of the well screen or until it emerges from the water. For wells in moderate soils, the rate of surging will be progressively increased with each stroke. When working in areas of loose sediments, surging will be at a constant, slow stroke rate. Areas of dense or over-compacted sediments may require more vigorous surging. Between surging episodes, the wells will be bailed and/or pumped to remove the sediment-rich water generated.

After surging, wells under development will be pumped using stainless steel 3-inch positive displacement development pumps, 2-inch bladder pumps or other appropriate equipment. In this procedure, the pumps will operate at maximum rate which is less than the recharge rate of the pumped well. For complete development, the wells will be pumped until: (1) the discharge is clear or nearly clear; and (2) the turbidity has not noticeably changed with one-half hour.

All water and sediment generated by well development shall be collected in clean, 55-gallon steel drums unless only a small volume (less than 100 gallons) is produced. Drums of this development water will be temporarily contained onsite, pending sampling and laboratory analysis. Non-hazardous development waters shall be disposed of by surface dumping (small volumes) or sewerage. Potentially hazardous development water shall be properly disposed of at a suitable hazardous waste disposal site or properly treated for non-hazardous discharge. Small volumes of development water may be disposed of by surface dumping if, in the opinion of the onsite geologist, potential contamination to the environment is minimal.

APPENDIX E

Groundwater Sampling

GROUNDWATER SAMPLING

Groundwater samples shall be collected for laboratory analysis by the following procedures:

1. Before sampling or purging begins, all bailers, pumps, cables and lines will be steam-cleaned. An established and designated cleaning area will be kept clean by lining with visqueen or using a cleaning rack.

2. A pre-purge sample shall first be obtained with a bailer from as deep in the well as possible. Standard "Water Sampling Field Survey Forms" will be filled out for this and all future samples, to include the following information:

   - Depth to water and total depth of water column, measured and recorded before purging begins;

   - Conductivity, checked and recorded for every 5 gallons of purged water (for small volumes); and

   - Purged volume (as appropriate), with stabilized readings for pH, conductivity and temperature.

The well shall then be bailed or pumped to remove four to ten well volumes prior to sampling. The well will be purged until conductivity has been stabilized. "Stabilized" is defined as three consecutive readings within 15% of one another. A casing volume will be based on actual measurements made on the day of sampling, i.e., the total depth minus depth to water on day of sampling, time the cross-sectioned area of the casing.

If the well is emptied before four to ten well volumes are removed, the sample shall be taken when the water level in the well recovers to 80% of its initial water level or better.

Whenever possible, samples will be collected within 24 hours after purging; ideally, samples will be collected immediately after purging.

Following the required volume of evacuation from the well, the sample shall be obtained with a teflon or stainless steel bailer on a 60-pound monofilament or polypropylene (washed) line. Care will be taken to properly clean cables with braided stainless steel cable or plastic coverings, if used. Air lift sampling and bladder pumps shall not be used.

Unless specifically waived or changed by the local, prevailing regulatory agency, water samples shall be handled and preserved according to the latest EPA methods as described in the Federal Register (Volume 44, No. 233, Monday, December 3, 1979, Page 69544, Table II) for the type of analysis to be performed.

Purge water will be properly disposed of or temporarily contained in steel barrels pending chemical analysis to designate proper disposal procedure.

APPENDIX F

Chain-of-Custody

CHAIN-OF-CUSTODY

SAMPLE COLLECTION, HANDLING AND IDENTIFICATION

Sample collection, handling, and identification will follow the guidelines set by the California Department of Health Services. Field records will be completed when the sample is collected and will be signed or initialed, including the date and time, by the sample collector(s). Field records will contain the following information:

1. Unique sample or log number;
2. Date and time;
3. Source of sample (including name, location and sample type);
4. Preservative used;
5. Analyses required;
6. Name of collector(s);
7. Pertinent field data (pH, DO, C1, residual, etc.); and
8. Serial number on seals and transportation cases.

Each sample will be identified by affixing a pressure sensitive, gummed label, or standardized tag on the container(s). This label will contain the sample identification number, date and time of sample collection, source of sample preservative used, and the collector(s) initial(s). Analysis required will be identified. Where a label is not available, the same information will be affixed to the sample contained with an indelible, waterproof, marking pen.

The sample container will be placed in a transportation case along with the chain-of-custody record form, pertinent field records, and analyses request form. The transportation case will then be sealed and labeled. Records will be filled out legibly in pen.

TRANSFER OF CUSTODY AND SHIPMENT

When transferring the possession of the samples, the transferee will sign and record the date and time on the chain-of-custody record. Custody transfer, if made to a sample custodian in the field, will account for each individual sample, although samples may be transferred as a group.

The field custodian or field inspector will be responsible for properly packaging and dispatching samples to the appropriate laboratory for analysis. This responsibility includes filling out, dating, and signing the appropriate portion of the chain-of-custody record.

All packages sent to the laboratory will be accompanied by the chain-of-custody record and other pertinent forms. A copy of these forms will be retained by the originating office.

Mailed packages can be registered with return receipt requested. If packages are sent by common carrier, receipts should be retained as part of the permanent chain-of-custody documentation.

Samples to be shipped will be sealed locked so evidence of tampering may be readily detected.

LABORATORY CUSTODY PROCEDURES

Chain-of-custody procedures will be followed in the laboratory from the time of sample receipt to the time the sample is discarded.

The sample control officer (SCO) will be the designated custodian, and an alternate is designated to act as custodian in the custodian's absence. All incoming samples are received by the SCO, who shall indicate receipt by signing the accompanying custody forms and who shall retain the signed forms as permanent records.

The SCO will maintain a permanent log book to record, for each sample, the person delivering the sample, the person receiving the sample, date and time received, source of sample, sample identification or log number, how transmitted to the laboratory, and condition received (sealed, unsealed, broken container, or other pertinent remarks). A standardized format will be established for log book entries.

A clean, dry, isolated room, building, and/or refrigerated space that can be securely locked from the outside, will be designated as a "sample storage security area."

The SCO will ensure that heat-sensitive, light-sensitive samples, radioactive, or other sample materials having unusual physical characteristics, or requiring special handling, are properly stored and maintained prior to analysis.

Only the custodian will distribute samples to the section leaders who are responsible for the laboratory performing the analysis.

The laboratory area will be maintained as a secured area, restricted to authorized personnel only.

Laboratory personnel will be responsible for the care and custody of the sample once it is received by them. These personnel shall be prepared to testify that the sample was in their possession and view, or secured in the laboratory at all times, from the moment it was received from the SCO, until the time that the analyses are completed.

Once the sample analyses are completed, the unused portion of the sample, together with all identifying labels, will be returned to the SCO. The returned tagged sample will be retained in the custody room until permission to destroy the sample is received by the SCO.

Samples will be destroyed only upon the order of the Laboratory Director, in consultation with previously-designated Project Manager, and/or client, or when it is certain that the information is no longer required or the samples have deteriorated. The same procedure will apply to tags and laboratory records.

APPENDIX G

Drum Handling Procedures

OUTLINE OF DRUM HANDLING PROCEDURES

1. Complete drummed worksheets onsite, forward a copy to Shell.

2. Test material per Shell's site-specific test requirements.

3. Classify Material as: Clean/Non-Hazardous/Hazardous

4. Labeling of Drums

   - Pending Label: Used to describe material pending final analytical testing. Labels must be immediately affixed to drum during field work.

   - Non-Hazardous Label: Required within 48 hours after analytical results are received.

   - Hazardous Label: Required within 48 hours after analytical results are received.

   - For Pick-Up Label: Must be affixed to drum prior to Shell Hazardous Waste Coordinator arranged pick-up date.

5. Remove within 14 days of date of generation. Empty drums, where material was disposed in bulk, must be removed the same day they are emptied.

6. Dispose of Material:

   - Clean: Any local landfill
   - Non-Hazardous: Class III landfill. If a Class III landfill will not accept, contact Shell Hazardous Waste Coordinator for assistance
   - Hazardous: Class I landfill arranged by Shell Hazardous Waste Coordinator.

   Mail or FAX completed Hazardous Waste Pick-Up Forms to the Shell Hazardous Waste Coordinator with a copy of the analytical results and worksheets.

7. If required, contact the Shell Hazardous Waste Coordinator:

   Shell Oil Company
   Hazardous Waste Coordinator
   Anna Sampson
   P.O. Box 6249
   Carson, California 90749
   Phone: (213) 816-2037
   FAX: (213) 816-2114

8. Manifests may be signed by the onsite contractor or consultant, station dealer, or other authorized Shell Oil representatives. The transporter CAN NOT sign the manifest.

   IT IS THE RESPONSIBILITY OF THE CONTRACTOR/CONSULTANT TO ARRANGE FOR A PERSON TO SIGN THE MANIFEST ON THE DAY OF PICK-UP.

9. Reporting

   All reports must be received by the Shell Hazardous Waste Coordinator within 7 working days of disposal. Reports shall include the following:

   - Completed drummed soil and water worksheets.
   - Attach a copy of the analytical results.
   - State how and where material was disposed.
   - If drums are emptied and material was disposed in bulk, state how empty drums were handled.
   - The signed blue and yellow copies of the hazardous waste manifest.

SOIL:

1. Test Requirements and Methods: Per Shell's site-specific test requirements

   - TPH: EPA Method 8015

   - BTEX: EPA Method 8020

   - Lead:

     -One composite sample from each boring
     -See attached decision tree
     -Total Lead - EPA Method 7421
     -Inorganic (soluble) Lead - DOS Title 22, Waste Extraction Test, §22-66700

   - Ignitable:

     -One composite sample from each boring
     -Bunsen Burner Test Flame Test

2. Classification:

   - Clean: TPH, BTEX, and Lead non-detectable

   - Non-Hazardous if any are true:

     -TPH less than 1000 ppm

-Lead -Inorganic (soluble) Lead less than 5 ppm (STLC)
or less than 100 ppm (TTLC)
-Organic Lead less than 13 ppm (TTLC)

-Ignitable - If TPH < 1000 ppm do not conduct test

- Hazardous if any are true:

-TPH greater than 1000 ppm

-Lead -Inorganic (soluble) Lead greater than 5 ppm (STLC)
or greater than 1000 ppm (TTLC)
-Organic Lead greater than 13 PPM (TTLC)

-Ignitable -If TPH >1000 ppm, then conduct Bunsen Burner Test
-If soil burns vigorously and persistently, soils are RCRA D001

3. Responsibility for Disposal:

- Clean: Consultant/Contractor
- Non-Hazardous: Consultant/Contractor or Shell Hazardous Waste Coordinator
- Hazardous: Shell Hazardous Waste Coordinator

4. Types of Drums: DOT-17H for a solid, solidified, or sludge material.

5. Disposal Facility:

- Clean: Any local landfill
- Non-Hazardous: Class III landfill. If a Class III landfill will not accept, contact Shell Hazardous Waste Coordinator for assistance
- Hazardous: Class I landfill arranged by Shell Hazardous Waste Coordinator

WATER:

1. Test Requirements and Methods: Per Shell's site-specific test requirements.

- TPH: EPA Method 8015
- BTEX: EPA Method 602

2. Classification:

- Clean Water: TPH and BTEX non-detectable

- Non-Hazardous:

  -Water with dissolved product and detectable TPH and BTEX
  -Water with free product
  -Free product only

3. Responsibility for Disposal:

   - Clean: Consultant/Contractor

   - Non-Hazardous: Consultant/Contractor or Shell Hazardous Waste Coordinator

4. Types of Drums: DOT-17C or DOT-17E for liquid or slurry

5. Disposal Facility:

   - Clean Water: Into dealer's sanitary sewer or with proper approval from Water Board to storm sewer

   - Non-Hazardous:

     Water with TPH and BTEX only -

     -Into dealer's sanitary sewer with approval from the POTW
     -Contact Shell Hazardous Waste Coordinator to arrange disposal

     Water with free product -

     -Contact Shell Hazardous Waste Coordinator to arrange disposal

   - Hazardous:

     Free product only -

     -Contact Shell Hazardous Waste Coordinator to arrange disposal