SITE CLOSURE REPORT
AUTO PRO
5200 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

DUPLICATE

QST ENVIRONMENTAL

Formerly Environmental Science & Engineering, Inc.

SITE CLOSURE REPORT

AUTO PRO

5200 TELEGRAPH AVENUE

OAKLAND, CALIFORNIA

PREPARED FOR:

TRI-STAR PARTNERSHIP

PREPARED BY:

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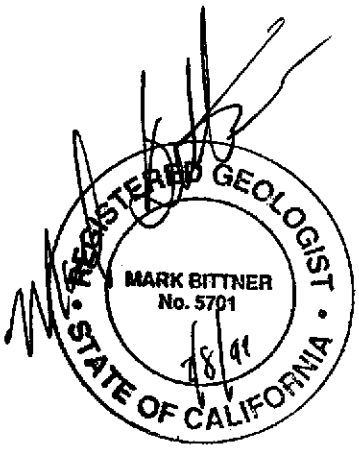
JULY 1999

QST PROJECT NO. 6595219



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This report has been prepared by QST Environmental for the exclusive use of Tri_Star partnership, as it pertains to the Auto-Pro property located at 5200 Telegraph Avenue in Oakland, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists, engineers, and environmental professionals practicing in this field. No other warranty, express or implied, is made as to the professional opinions in this report.

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7/8/99
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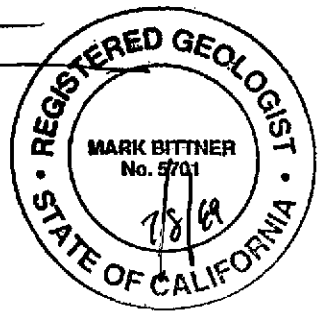

7/8/99
Date

Abbreviations and Acronyms

ACHCSA	Alameda County Health Care Services Agency
amsl	above mean sea level
ASTM	American Society for Testing and Materials
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
Cal/EPA	California Environmental Protection Agency
COC	Chemical of Concern
CSM	Conceptual Site Model
DCA	1,2-Dichloroethane
DTSC	Cal/EPA Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
ESE	Environmental Science & Engineering, Inc. (now, QST Environmental)
HVOC	Halogenated Volatile Organic Chemical
ILCR	Incremental Lifetime Cancer Risk
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
mg/L	milligram per liter
mg/L	microgram per liter
MW	monitor well
MTBE	methyl *tertiary*-butyl ether
PCE	Perchloroethylene
ppm	parts-per-million
PRG	Preliminary Remediation Goal
QST	QST Environmental (formerly, Environmental Science & Engineering, Inc.)
RAGS	Risk Assessment Guidance for Superfund
RAP	Remedial Action Plan
RfC	Reference Concentration
RfD	Reference Dose
RWQCB	California Regional Water Quality Control Board
SB	soil boring
TCE	Trichloroethylene

TPH	Total Petroleum Hydrocarbons
TPH-g	TPH as Gasoline
VOC	Volatile Organic Chemical

1.0 INTRODUCTION

QST Environmental (QST) was retained by Tri-Star Partnership to prepare this Closure Report for the Auto-Pro facility (site) located at 5200 Telegraph Avenue in Oakland, California (Figure 1-Location Map). This Closure Report will be submitted to the Alameda County Health Care Services Agency (ACHCSA) and the Regional Water Quality Control Board (RWQCB), San Francisco Region for review and approval. This report describes the site conditions prior to and after implementation of remediation activities and demonstrates the reduction in hydrocarbon concentrations in the onsite groundwater. Based on the reduction in hydrocarbon concentration and the risk assessment of the site, QST believes the site to be an acceptable low environmental and human health risk and respectfully requests case closure from the ACHCSA and RWQCB on behalf of Tri-Star.

1.1 Site Description

This site is located on the northwest corner of the intersection of Telegraph and Claremont Avenues in Oakland, California (Figure 1). The vicinity is a mixed commercial and residential area within the northern portion of the City of Oakland. Regionally topography slopes west-southwest from the Oakland hills toward the San Francisco Bay. The site elevation is approximately 120 feet above mean sea level (USGS, 1980).

The regional geology is dominated by the Temescal Formation. This formation consist of an alluvial-fan deposit brought down from the Berkeley Hills comprising interfingering lenses of clayey gravel, sandy silty clay and sandy-clay-silt mixtures. The deposits cover most of the area between the Berkeley Hills and the shore at a thickness of 5 to 60 feet (USGS, 1957).

The depth to groundwater was found ranging from 8.9 to 10.14 feet, bgs with a flow direction generally toward the south-southeast at an approximate gradient of 0.005 to 0.023 feet per foot. Historical groundwater elevations are shown in Table 1. Groundwater transport modeling was used at the neighboring Chevron site to predict the probability of site related constituent concentrations reaching the San Francisco Bay, which is the nearest surface water to both sites. Benzene was used as a representative compound. The study indicated the constituent concentrations will not discharge into the bay (Weiss, 1992).

1.2 Project Background

Five underground storage tanks (USTs) were removed from the three separate excavations at the site in December 1990 prior to QST's involvement. The USTs previously contained gasoline, diesel, and waste oil. Soil and groundwater samples were collected from the UST excavations during the removal and the subsequent report reported detectable concentrations of gasoline, waste oil, gasoline constituents, and lead. A summary of the analytical results from the UST removal are included in Appendix A-1 (Streamborn, 1991). Some overexcavation of soils containing these constituents was apparently conducted in July 1991, prior to QST's involvement.

In April 1993, Environmental Science & Engineering (ESE, the former name of QST) performed a limited soil and groundwater investigation at the site (ESE, 1993). The investigation included drilling one soil boring through the backfill material of each of the former UST excavations at the site, into native materials beneath at a depth of 12 feet (B-1@12) and 11 feet (B-2@11), and collecting groundwater samples using a temporary sampling probe (samples B-1 and B-2). The samples were analyzed using EPA Method 8270 C7 - C12. In soil sample B-1@12, a total semi-volatile petroleum hydrocarbons (TSVPH) concentration of 31 milligrams per Kilogram (mg/Kg) or parts per million (ppm) was reported. According to the lab, the constituents appeared to be in the motor oil range. In soil sample B-2@11, a TSVPH concentration of 37 ppm was reported and appeared to be in the C7 - C12 light petroleum hydrocarbon range. According to Kiff Analytical Laboratories, TSVPH in the C7 -C12 range is comparable to Total Petroleum Hydrocarbons as gasoline (TPH-G). Groundwater sample B-1 was reported to have a TSVPH concentration of 1,700 micrograms per Liter (ug/L) and the TSVPH concentration in B-2 was below laboratory detection limits of 200 ug/L (ESE, 1993). The analytical results of soil and groundwater samples collected during this limited investigation are summarized in Appendix A-2.

In April 1994, ESE conducted a site assessment at the site which consisted of drilling four soil borings and installing four groundwater monitoring wells in the borings (MW-1 through MW-4; Figure 2), and collecting soil and groundwater samples from these borings and wells. The conclusions of this 1994 investigation were that the native soils beneath the site consist of silty clay from surface to approximately 10 to 13 feet below ground surface (bgs). The silty clay is generally underlain by saturated sand gravel. Groundwater was found ranging

from 8.9 to 10.14 feet bgs with an apparent groundwater flow direction to the southwest. Soil and groundwater sample reported detectable concentrations of petroleum hydrocarbons. TPH-G and benzene, toluene, ethylbenzene and xylenes (BTEX) constituents were detected in only one sample (MW-3 @ 15 feet bgs), Total Petroleum Hydrocarbons as diesel (TPH-D) was not detected in any of the samples, and Total Oil and Grease (O & G) was detected in three samples (MW-1 @ 10, MW-4 @ 10, and MW-4 @ 15 feet bgs). Metals detected in soil samples were each significantly below applicable total threshold limit concentrations (TTLCs) established under Title 26 of the California Code of Regulations. Sample MW-3 @ 10 feet bgs reported TPH quantifiable in the kerosene range. Analytical results of the soil and groundwater samples collected during this investigation are summarized in Appendices A-3 and A-4, respectively. The lateral extent of the petroleum hydrocarbons in the soil on site was not defined during this investigation. The lateral extent of petroleum hydrocarbons in groundwater off site to the southwest was not delineated during this 1994 investigation.

ESE performed further site investigation in 1996. In the 1996 site investigation seven Geoprobe soil borings off site, designated AP-1 through AP-7 (Figure 2), were completed. The Geoprobe is a direct push method of obtaining soil samples. Groundwater samples were collected in each of the borings using temporary PVC well-screen casing and bailers. During this investigation, ESE obtained data from the adjacent, downgradient Chevron Station and cooperatively performed groundwater monitoring. The results of the investigation were that the soil off site and between the Auto-Pro facility and the Chevron facility did not appear to be impacted (Figure 3 Map of compiled soil data 1993/1994/1996). Only one soil sample of 14 submitted contained detectable concentration of petroleum hydrocarbons (sample AP2-10 at 10 feet depth with 1.5 mg/Kg TPH-G, See Appendix A-5 "Table 1 Analytical Results for Soil Samples" July 2, 1996). The grab groundwater samples from the 1996 investigation indicated that groundwater had been impacted with TPH-G and TPH-D, BTEX, and Methyl tertiary butyl ether (MTBE). Appendix A-6 presents the analytical results of this grab groundwater sampling. The highest TPH-G in groundwater was 74 mg/Kg in location AP-2 located within 60 feet of the Chevron site. TPH-D, benzene, and MTBE in groundwater followed a similar pattern, however, the Auto-Pro plume intermingles with the Chevron plume and the downgradient concentration and extent cannot be accurately ascertained. Groundwater flow direction can be seen in Figures 4 and 5, Groundwater Elevation Contour Map June 26, 1996 and Groundwater Elevation Contour Map December 15, 1998, respectively. The plume was defined in 1996 (Figure 6 Groundwater TPH-G Plume Data

1996). The plume of impacted groundwater on site appears to have degraded. Laboratory analysis from this 1996 sampling event indicated that the petroleum hydrocarbons in the samples might be aging.

On January 21, 1998, Mr. Thomas D. Dalzell and Mr. Micah Rapoport of QST met with Mr. Ondrej Kojnok of Tri-Star Partnership and Ms. Susan L. Hugo, Hazardous Materials Specialist with the ACHCSA to discuss the San Francisco Bay Regional Water Quality Control Board's guidelines for evaluating sites as a low risk soil and groundwater case (ACHCSA, 1998, Appendix B).

During the January 21, 1998 meeting, the discussion included the continued groundwater monitoring of the wells, at a minimum, on a quarterly basis for one year to establish that the groundwater plume is stable and/or shrinking. Also discussed was the introduction of oxygen releasing compounds (ORCs) on wells MW-3 and MW-4 to enhance biodegradation of the petroleum hydrocarbon plume at the site (ACHCSA, 1998). During the first quarter groundwater monitoring event for 1998 on March 23, QST placed ORCs in wells MW-3 and MW-4. Subsequent to the March 23, 1998 quarterly groundwater monitoring event and placing the ORCs, a letter, dated May 15, 1998, was received from Susan L. Hugo which stated that the use of ORCs was acceptable to the ACHCSA office (ACHCSA, 1998).

2.0 REMEDIATION ACTIVITIES

2.1 Groundwater Monitoring Well Sampling

Groundwater monitoring has occurred at the site since 1994 with some gaps in the quarterly regimen. The most recent monitoring included four quarters in 1998. The wells consistently monitored in 1998 were the four wells MW-1 through MW-4 onsite and offsite well MW-5 (former Chevron well MW-4). Groundwater elevation data has shown a southwest gradient throughout the monitoring periods (Table 1 Historical Groundwater Elevation Data).

Table 2 Summary of Analytical Results Groundwater Samples, presents data from 1994 through 1998. These analytical results of groundwater samples indicate that the concentrations of petroleum hydrocarbons in the groundwater have been reduced significantly in all wells, with the exception of well MW-5. This historical concentrations of TPH-G and Benzene from wells MW-1, MW-3, MW-4, and MW-5 have been plotted on graphs and are shown in Figures 7 and 8, respectively. The onsite wells TPH-G concentrations have decreased to a maximum of 3.3 mg/L in the latest monitoring. The benzene concentrations have been reduced in onsite wells to below analytical detection levels. Offsite well, MW-5 began to be monitored in 1998 and has the highest concentration of TPH-G at 5.0 mg/L and benzene concentration of 9.3 ug/L in the last monitoring. MTBE was not detected in any of the groundwater from on or off-site wells in 1998.

2.2 Passive Groundwater Remediation

QST conducted the first quarter groundwater monitoring event for 1998 on March 23 and placed ORCs in wells MW-3 and MW-4. The ORCs were left undisturbed until June 16, 1998, the second quarter groundwater monitoring event, when an unsuccessful attempt was made to remove them due to a damaged well casing. All ORCs were removed by September 16, 1998 and the well casing was repaired on September 23, 1998.

3.0 REMEDIAL TREATMENT EFFECTIVENESS

To date, QST has monitored the passive ORC groundwater treatment at the site for a period of approximately 7 months. Due to the limited time that the ORC has been monitored at the site, it appears that the effectiveness of the treatment cannot be determined. This conclusion is based upon the marginal increase in both TPH and BTEX concentrations immediately subsequent to the instillation of the ORC. However, QST believes that the increase in these indicator parameters is likely the result of an increase in the shallow groundwater table (approximately two to three ft.) which appeared to coincide with the installation of the ORC treatment. QST understands that this increase in groundwater elevations has likely mobilized additional petroleum constituents in the capillary fringe, accounting for the slight increase in concentrations. (Table 1 Groundwater Elevations).

QST believes it is appropriate to put this occurance in perspective. We believe that the increase in groundwater elevation provides a realistic example of a "mobilization event" for the site. As such, constituent levels have since gradually declined (benzene) or stabilized (TPH-g), indicating that constituent reduction and degradation possibly enhanced by the ORC is continuing to occur (Table 1 and 2, respectively).

4.0 RISK SUMMARY

4.1 Chemicals of Concern

The chemicals for which the remediation program was designed and implemented are related to petroleum.

4.1.1 Petroleum-Based COCs

The site-specific COCs are related to petroleum, namely TPH-g, BTEX and MTBE. Historically, regulation by the RWQCB has been based on these COCs, with benzene serving as an indicator chemical for incremental lifetime cancer risk (ILCR). In this case, concentrations of the COCs are compared to risk-based regulatory concentrations as an indicator of compliance. Monitoring during the remedial action program was based on these COCs.

4.2 Conceptual Site Model

The preparation of a risk assessment is tied to the identification of 1) COCs, 2) potential pathways in environmental media by which migration can occur, and 3) potential receptors of exposure, usually associated with a particular land use and default exposure conditions. The objectives of a conceptual site model (CSM) diagram have been realized through the identification of soil and groundwater as the environmental media for remedial action via soil vapor extraction and water entrainment. Designation of receptors of potential exposure is implied in the site cleanup criteria designated in the remedial action plan (ESE, 1995b). Those criteria are based on residential land use and use of the groundwater, and they constitute the most restrictive exposure conditions. They are presented in detail in section 4.4 on risk characterization.

QST evaluation also focuses on MW-1 thru MW-4, as these wells are closest to the source, and in our opinion, most likely represent conditions of the release at the site. MW-5 (formerly Chevron's MW-4) indicates that the plume has stabilized in the downgradient direction. In addition, the laboratory analytical results from samples collected from July 1998 through December 1998, along with historical results from Chevron for MW-5

(formerly Chevron's MW-4) indicate that hydrocarbon concentrations have decreased over time.

4.3 Exposure and Toxicity Assessments

Exposure assessment is conducted to identify the appropriate land use and the location of the receptors that could complete an exposure pathway. A release of the COCs from the source is evaluated for the concentration at the location of potential exposure in the designated land use. A quantification of the exposure intake of each COC is usually the product of the exposure assessment. In this case, concentrations of the COCs are compared directly to risk-based concentrations.

The land use for the Auto-Pro facility is commercial-industrial. A change in land use would require a change in zoning, an unlikely occurrence. Because the entire property is capped with asphalt and concrete, repeated exposure to soil consistent with an exposure scenario is unlikely. Therefore, the industrial soil PRG for benzene was used for risk-based evaluation. Benzene exceeded the PRG of 1.4 mg/kg in only one sample by a slight margin (.1 mg/kg). This marginal accedence was noted in the most recent 1996 soil sampling event as presented in Table 1, Appendix A-5. This sample was collected at a depth of 10 feet BGS and due to likely degradation over time, QST opinion is that it meets the intent of the industrial soil PRGs. The absence of benzene in groundwater at the site, also eliminates the possibility of vertical migration upward into soil vapor. The asphalt/concrete cap over the site and the fill over the location of the soil sample precludes exposure to possible occurrence of benzene in soil.

The protection of groundwater is based on maximum contaminant levels (MCLs), and the remedial action has been conducted for the recovery of groundwater quality beneath the property. Where an exposure assessment would normally result in the determination of an intake rate per chemical, the proper criteria for closure in this case are MCLs. The criteria for groundwater quality are the BTEX MCLs as follows:

California MCLs* for BTEX	
Chemical	Maximum Contaminant Level (MCL, mg/L)
Benzene	0.001
Ethylbenzene	0.700
Toluene	0.15
Xylenes (total)	1.750

*Cal/DHS, 1997; MCLs updated from RAP (ESE, 1995b).

Toxicity assessment includes compiling the toxicity reference values for each of the COCs. Data gaps (missing toxicity values) that leave the final risk assessment incomplete must be identified, especially for the uncertainty in the risk and hazard that are calculated in the risk characterization step. The toxicity assessment also allows the identification of special evaluations that might need to be conducted as part of risk characterization. For instance, TPH and TPH-g do not have toxicity values. For this case, the toxicity values for BTEX are, in effect, incorporated into the respective MCLs so that direct comparison of the analyte concentration in groundwater to the MCL constitutes the proper comparison for compliance. For TPH, the methodology of the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG, 1998) allows determination of risk-based criteria values for both soil and groundwater (Appendix C).

4.4 Risk Characterization

The case for closure has been evolving over the course of the remedial action based on the declining COC concentrations. Table 2 (see also Figures 7 & 8) lists the concentrations of the COCs as they have been compiled over time. MCL's are as follows:

California MCLs and Analytical Detection Limits for BTEX			Other Risk-Based Criteria	
Chemical	Maximum Contaminant Level (MCL, mg/L)	Analytical Detection Limit (mg/L)	Tap Water PRG (mg/L)	DTSC Action Level (mg/L)
Benzene	0.001	0.0005	0.00039	N/A
Ethylbenzene	0.700	0.0005	1,300	N/A
Toluene	0.15	0.0005	720	N/A
Xylenes (total)	1.750	0.0005	1,400	N/A
MTBE	N/A	0.0002	0.0020	0.0035*
TPH-g (see Appendix A)	N/A	0.0050	30.1	N/A

N/A = not available

Analyses for methyl teriary-butyl ether (MTBE) in the samples from well MW-1 thru MW-5 for the most recent groundwater sampling event gave results of not detected (ND) for less than 1.0 ug/L. Either of the results is less than the current EPA tap water PRG of 20 ug/L or the DTSC action level for MTBE in drinking water of 35 ug/L based on taste and odor criteria and not risk-based criteria. Further, both of these results are less than the more stringent standard of 13 ug/L, currently appearing in proposed legislation in the California legislature. The benzene ND result may exceed the tap water PRG due to limitation of quantification but complies with the MCL which also considers technical and economic feasibility and is the operative criterion. **The concentration criteria for BTEX and MTBE have been met for closure of the Auto-Pro facility.**

Table 2 also lists results for petroleum hydrocarbons as gasoline. In Appendix C, the risk-based concentration for gasoline petroleum hydrocarbons (C5-C8) in drinking water is 30,100 ug/L (30.1 mg/L). **The risk-based criteria for petroleum hydrocarbons as gasoline have also been met for closure of the Auto-Pro Facility.**

- Extent of plume not fully delineated.

- Creek / storm drain / culvert under street ⇒ Indicates preferential pathway — Bay — permeable layer

- What basis used to state that degradation is occurring - e.g. Can run bioparameters for evidence of aerobic / anaerobic degradation

- TPHd and TPHg potential impact to Bay? Prove it.

5.0 CONCLUSIONS AND RECOMMENDATIONS

QST, on behalf of Tri-Star Partnership, respectfully requests that the Alameda County Health Care Services grant site closure based on the following.

- The leak has been stopped and ongoing sources have been removed, remediated or degraded.
- The site has been characterized.
- Evaluation of historic groundwater monitoring data indicates that the plume is stable and is not migrating.
- No sensitive features are likely to be impacted.
- Soil exposure pathways were determined to be incomplete based on natural degradation and possibly the application of ORC, the initial concentrations of COCs, the reduction of COCs in groundwater, the depth to the occurrence of soil formerly containing COCs, the industrial use designation of the property and the asphalt/concrete surface cap which acts as a vapor migration/water infiltration barrier at the site;
- TPH-g, BTEX and MTBE concentrations in wells MW-1 thru MW-4 are below applicable regulatory thresholds and have decreased or stabilized during the last three monitoring events.
- All the laboratory results now attained for groundwater under the site are less than closure criteria for all the COCs at their respective detection limits.

6.0 REFERENCES

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TABLE 1

HISTORICAL GROUND WATER ELEVATION DATA

Tri-Star Partnership
Autopro Facility
5200 Telegraph Avenue
Oakland, California

Well I.D.	Date	Datum	Depth to Water (feet)	Ground Water Elevation (ft AMSL)
MW-1	04/26/94	115.44	12.69	102.75
	07/20/94		12.39	103.05
	10/21/94		13.06	102.38
	01/18/95		10.14	105.30
	06/26/96		11.90	103.54
	09/24/96		12.53	102.91
	12/11/96		9.95	105.49
	12/12/97		10.28	105.16
	03/23/98		5.12	110.32
	06/16/98		10.15	105.29
	08/25/98	96.11*	13.10	83.01
	09/30/98		13.33	82.78
	10/19/99		13.52	82.59
	11/19/66		12.70	83.41
	12/15/98		11.78	84.33
MW-2	04/26/94	114.62	11.15	103.47
	07/20/94		11.44	103.18
	10/21/94		12.30	102.32
	01/18/95		9.21	105.41
	06/26/96		11.16	103.46
	09/24/96		11.81	102.81
	12/11/96		9.17	105.45
	12/12/97		9.39	105.23
	03/23/98		4.32	110.30
	06/16/98		9.23	105.39
	08/25/98	95.3*	12.25	83.05
	09/30/98		12.42	82.88
	10/19/99		12.53	82.77
	11/19/99		11.67	83.63
	12/15/98		10.93	84.37

TABLE 1

HISTORICAL GROUND WATER ELEVATION DATA

Tri-Star Partnership
Autopro Facility
5200 Telegraph Avenue
Oakland, California

Well I.D.	Date	Datum	Depth to Water (feet)	Ground Water Elevation (ft AMSL)
MW-3	04/26/94	113.90	10.97	102.93
	07/20/94		11.21	102.69
	10/21/94		11.92	101.98
	01/18/95		8.90	105.00
	06/26/96		10.88	103.02
	09/24/96		12.53	101.37
	12/11/96		8.17	105.73
	12/12/97		8.81	105.09
	03/23/98		3.65	110.25
	06/16/98		8.90	105.00
	08/25/98	94.45*	12.35	82.10
	09/30/98		12.11	82.34
	10/19/99		12.17	82.28
	11/19/99		11.38	83.07
	12/15/98		10.53	83.92
MW-4	04/26/94	114.25	10.97	103.28
	07/20/94		11.16	103.09
	10/21/94		11.68	102.57
	01/18/95		9.02	105.23
	06/26/96		10.77	103.48
	09/24/96		11.51	102.74
	12/11/96		8.85	105.40
	12/12/97		8.95	105.30
	03/23/98		3.49	110.76
	06/16/98		9.05	105.20
	08/25/98	94.91*	12.05	82.86
	09/30/98		12.22	82.69
	10/19/99		12.67	82.24
	11/19/99		11.47	83.44
	12/15/98		10.68	84.23

TABLE 1

HISTORICAL GROUND WATER ELEVATION DATA

Tri-Star Partnership
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Oakland, California

Well I.D.	Date	Datum	Depth to Water (feet)	Ground Water Elevation (ft AMSL)
MW-5	07/18/98	93.70*	10.77	82.93
	08/25/98		11.20	82.50
	09/30/98		11.32	82.38
	10/19/99		11.41	82.29
	11/19/99		10.52	83.18
	12/15/98		9.92	83.78

Note:
ft AMSL = feet above mean sea level.
*** = Relative casing elevation based upon resurveyed measurement point.**

TABLE 2

HISTORICAL GROUND WATER ANALYTICAL DATA

Tri-Star Partnership
Autopro Facility
5200 Telegraph Avenue
Oakland, California

Well I.D.	Date Sampled	TPH-D (µg/L)	TPH-MO (µg/L)	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	VOCs (µg/L)	Metals (mg/L)				
											cadmium	chromium	lead	nickel	zinc
MW-1	04/26/94	<50	--	1,400	<0.50	<0.50	4.5	2.1	--	<0.50	0.001	<0.05	<0.005	0.120	<0.10
	07/20/94	100	--	1,200	19	2.5	2.4	1.6	--	--	<0.010	0.220	0.044	0.360	0.350
	10/21/94	130	--	560	8.4	1.1	0.90	1.8	--	--	<0.010	<0.010	<0.020	0.041	0.077
	01/18/95	240	--	620	8.5	2.1	1.3	2.3	--	--	<0.010	0.026	<0.020	0.024	0.067
	06/26/96	56[b,d]	<250	180[a]	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	09/24/96	150[d]	<250	170[c,b]	3.7	0.92	0.54	0.63	6.5	--	--	--	--	--	--
	12/11/96	300[d]	<250	520[j]	<0.50	0.8	0.59	0.81	<5.0	--	--	--	--	--	--
	12/12/97	280	<250	360	<0.50	0.8	0.82	0.9	<5.0	--	--	--	--	--	--
	03/23/98	96[g,d]	<250	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	08/25/98	110[b]	<250	740[j]	<0.50	<0.50	<0.50	2.40	ND<10	--	--	--	--	--	--
	09/30/98	<50	<250	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--
	12/15/98	380[b]	<250	560,[b,j]	<0.5	1.80	0.66	1.50	ND<1.0	--	--	--	--	--	--
MW-2	04/26/94	<50	--	<50	<0.50	<0.50	<0.50	<0.50	--	<0.50	<0.001	<0.05	<0.005	0.060	<0.10
	07/20/94	<50	--	<50	<0.50	<0.50	<0.50	<0.50	--	--	<0.010	0.022	<0.020	0.045	0.068
	10/21/94	<50	--	<50	<0.50	<0.50	<0.50	<0.50	--	--	<0.010	0.031	<0.020	0.027	0.044
	01/18/95	<50	--	<50	<0.50	<0.50	<0.50	<0.50	--	--	<0.010	0.014	<0.020	0.023	0.045
	06/26/96	<50	<250	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	09/24/96	<50	<250	<50	<0.50	<0.50	<0.50	<0.50	9.6	--	--	--	--	--	--
	12/11/96	<50	<250	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	12/12/97	58	<250	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
(Dup)	12/12/97	<50	<250	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	03/23/98	200[b,j]	<250	200[j]	<0.50	0.09	<0.50	<0.50	<5.0	--	--	--	--	--	--
	08/25/98	<50	<250	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--
	09/30/98	<50	<250	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--
	12/15/98	<50	<250	<50	<0.5	<0.5	<0.5	<0.5	ND<1.0	--	--	--	--	--	--

TABLE 2

HISTORICAL GROUND WATER ANALYTICAL DATA

Tri-Star Partnership
Autopro Facility
5200 Telegraph Avenue
Oakland, California

Well I.D.	Date Sampled	TPH-D (µg/L)	TPH-MO (µg/L)	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	VOCs (µg/L)	Metals (mg/L)				
											cadmium	chromium	lead	nickel	zinc
MW-3	04/26/94	<3,000	--	10,000	70	40	40	50	--	<30	<0.001	<0.05	0.043	0.100	0.100
	07/20/94	1,400	--	7,500	120	38	36	39	--	--	<0.010	0.099	0.140	0.120	0.250
	10/21/94	1,200	--	6,300	69	37	29	38	--	--	<0.010	<0.010	<0.020	0.036	0.140
	01/18/95	1,600	--	8,000	84	16	48	49	--	--	<0.010	0.046	0.049	0.040	0.110
	06/26/96	2,800[d,f]	<250	6,600[a]	15	17	23	40	53	--	--	--	--	--	--
(Dup)	06/26/96	2,700[d,f]	<250	6,600[a]	14	16	21	37	49	--	--	--	--	--	--
	09/24/96	2,600[b,d]	290	4,800[b,d]	12	11	18	43	42	--	--	--	--	--	--
	12/11/96	2,900[d]	<250	6,700[j]	20	19	32	44	70	--	--	--	--	--	--
	12/12/97	3,300	<250	7,400	32	37	46	90	<160	--	--	--	--	--	--
	03/23/98	1900[d]	<250	2500[b,j]	<0.50	3.2	3.5	7.7	<20	--	--	--	--	--	--
(Dup)	3/23/98	1600[d]	<250	2400[b,j]	<0.50	4.0	3.4	4.4	<18	--	--	--	--	--	--
	8/25/98	--	--	--	0.8	1.1	0.77	2.3	ND<10	--	--	--	--	--	--
	9/30/98	2,800[b,d]	<250	4,000[e,j]	6.8	7.3	6.9	19	<5.0	--	--	--	--	--	--
	12/15/98	2,100[b,d]	<250	3300[b,j]	<0.5	8.3	6.2	15	ND<1.0	--	--	--	--	--	--
MW-4	04/26/94	<300	--	6,800	<3.0	<3.0	3.0	4.0	--	<3.0	<0.001	<0.05	0.007	0.060	<0.10
	07/20/94	1,500	--	5,600	35	11	12	17	--	--	<0.010	0.023	<0.020	0.048	0.060
	10/21/94	870	--	4,300	26	19	12	20	--	--	<0.010	0.013	<0.020	<0.020	0.092
	01/18/95	1,300	--	5,700	19	15	13	16	--	--	<0.010	0.020	<0.020	0.021	0.036
	06/26/96	2,500[d,f]	<250	4,700[b,d]	<0.25	4.8	11	19	30	--	--	--	--	--	--
	09/24/96	2,200[b]	<250	5,300[b,d]	<1.0	5.3	8.2	8.3	<35	--	--	--	--	--	--
(Dup)	09/24/96	2,200[b]	<250	5,500[b,d]	<1.0	6.6	9.4	8.4	<35	--	--	--	--	--	--
	12/11/96	2,400[d]	<250	4,000[j]	<0.25	4.0	7.6	9.2	22	--	--	--	--	--	--
(Dup)	12/11/96	2,800[d]	<250	7,000[j]	18	20	34	49	73	--	--	--	--	--	--
	12/12/97	2,700	<250	3,100	<0.5	3.3	7.6	8.9	<41	--	--	--	--	--	--
	03/23/98	740[d,g]	500	950[j]	<0.50	2.7	1.0	1.3	<17	--	--	--	--	--	--
	08/25/98	1800[d,b]	<250	2,700[b,j]	<0.5	3.0	4.2	11	ND<30	--	--	--	--	--	--
	09/30/98	1700[b,d]	<250	3300[b,j]	2.1	7.0	5.9	<0.5	<5.0	--	--	--	--	--	--
	12/15/98	1800[b,d]	<250	3300[b,j]	<0.5	3.9	4.9	12	ND<1.0	--	--	--	--	--	--

TABLE 2

HISTORICAL GROUND WATER ANALYTICAL DATA

Tri-Star Partnership
Autopro Facility
5200 Telegraph Avenue
Oakland, California

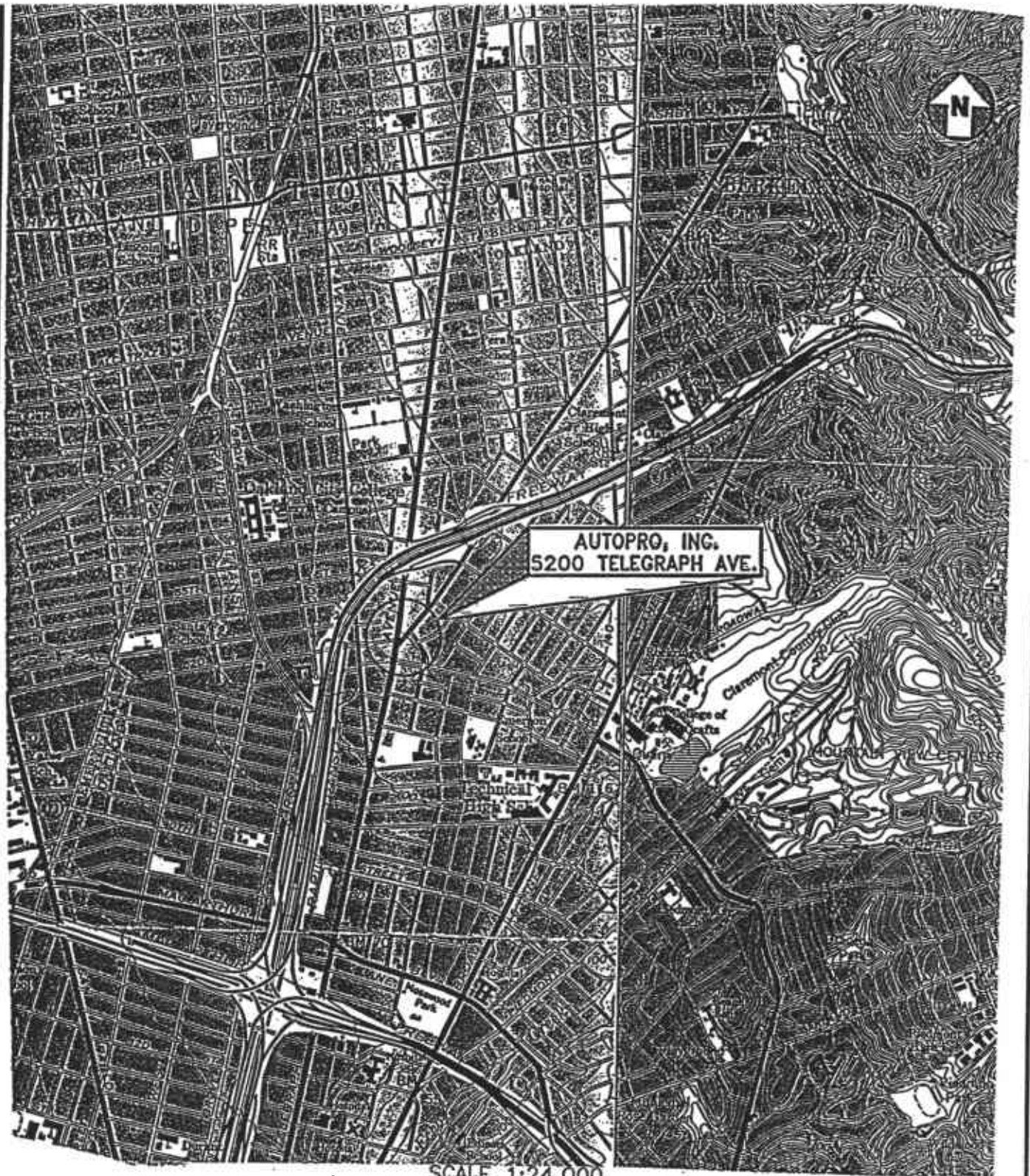
Well I.D.	Date Sampled	TPH-D (µg/L)	TPH-MO (µg/L)	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	VOCs (µg/L)	Metals (mg/L)				
											cadmium	chromium	lead	nickel	zinc
MW-5	07/18/98	3800, [a,b,h]	ND	5900, [a,h]	7.40	9.50	17.00	29.00	ND<60	--	--	--	--	--	--
	08/25/98	2800[d,b]	<250	5,800[b,c]	6.1	7.9	16	33	ND<70	--	--	--	--	--	--
	09/30/98	3600[b,j]	<250	6300[b,j]	13	10	14	4.4	<5.0	--	--	--	--	--	--
	12/15/98	2800[b,d]	<250	5900[b,j]	9.3	11	13	23	ND<1.0	--	--	--	--	--	--
TRIP	06/26/96	--	--	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	09/24/96	--	--	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	12/11/96	--	--	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	12/12/97	--	--	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
	3/23/98	--	--	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--	--	--	--	--	--
MCL	--	--	--	--	1	150	700	1,750	35*	--	0.005	0.05	0**	0.1	5***

Notes:

TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
MTBE = methyl tertiary butyl ether.

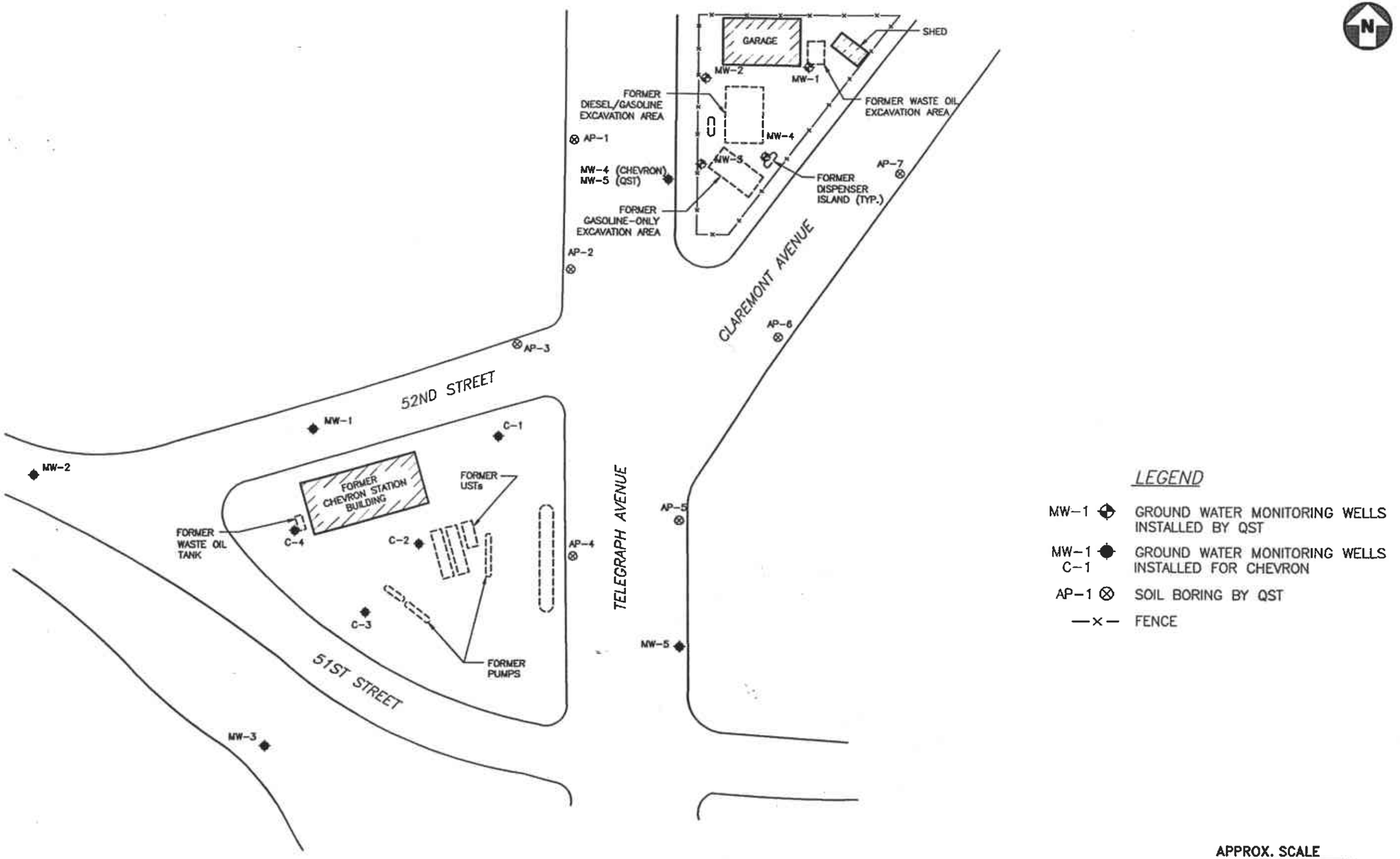
VOCs = Volatile Organic Compounds.
µg/L = micrograms per liter or parts per billion (ppb).
mg/L = milligrams per liter or parts per million (ppm).
< = less than listed detection limits.
-- = not applicable.

[a] = unmodified or weakly modified is significant.
[b] = heavier gasoline range compounds are significant (aged gasoline?).
[c] = lighter gasoline range compounds (the most mobile fraction) are significant.
[d] = gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?
[g] = oil range compounds are significant.
[f] = one to a few isolated peaks present.
[h] = lighter than water immiscible sheen is present.
[j] = no recognizable pattern.
MCL = primary Maximum Contaminant Limit as defined by the California Department of Health Services (DHS) Drinking Water Standards.
* = DHS Action Level.
** = regulated by the Federal Lead and Copper Rule.
*** = secondary MCL.



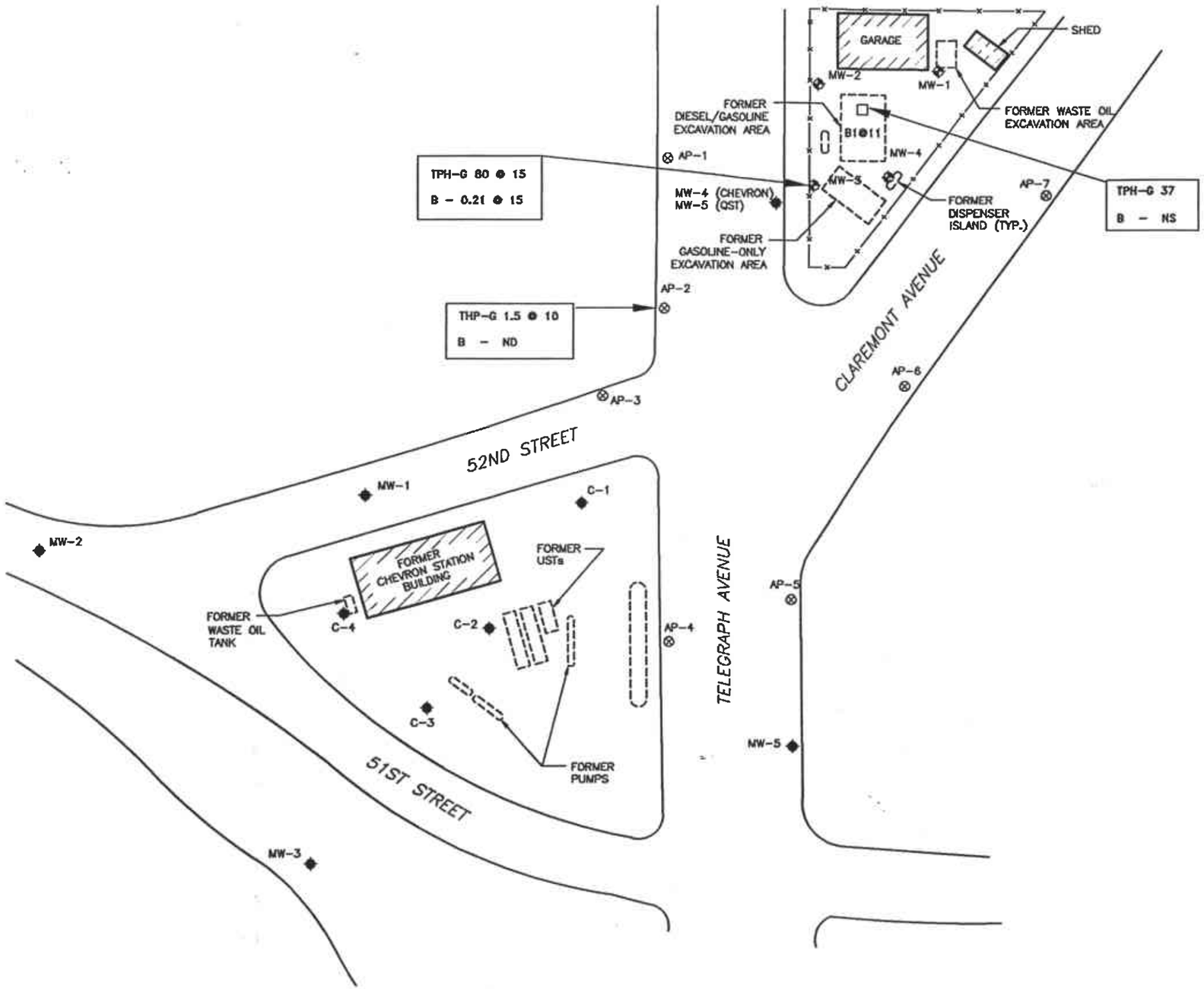
ADAPTED FROM U.S.G.S. OAKLAND EAST AND OAKLAND WEST, CALIFORNIA, 7.5 MINUTE TOPO QUADRANGLE, 1959, PHOTOREVISED 1980

QST ENVIRONMENTAL	DATE 10/14/96	SITE LOCATION MAP	FIGURE NO. 1
1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA 94553	REVISED	AUTOPRO, INC. 5200 TELEGRAPH AVENUE OAKLAND, CALIFORNIA	PROJ. NO. 65-95-219
	CAD FILE 65521901		



CHEVRON SITE BASE MAP FROM CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.

QST ENVIRONMENTAL 1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA. 94553	DATE 2/12/96 REVISED 9/15/98 CAD FILE 65521902	SITE MAP AUTOPRO, INC. 5200 TELEGRAPH AVENUE OAKLAND, CALIFORNIA	FIGURE NO. 2 PROJ. NO. 65-95-219



LEGEND

MW-1 ⊕	GROUND WATER MONITORING WELLS INSTALLED BY QST
MW-1 ◆ C-1	GROUND WATER MONITORING WELLS INSTALLED FOR CHEVRON
AP-1 ⊗	SOIL BORING BY QST (1996)
—×—	FENCE
B1 @ 11 □	SOIL BORING BY QST (1993)

TPH-G – TOTAL PETROLEUM HYDROCARBONS AS BASELINE

B – BENZENE

ND – NOT DETECTED

NS – NOT SAMPLED

APPROX. SCALE
0 60 FEET

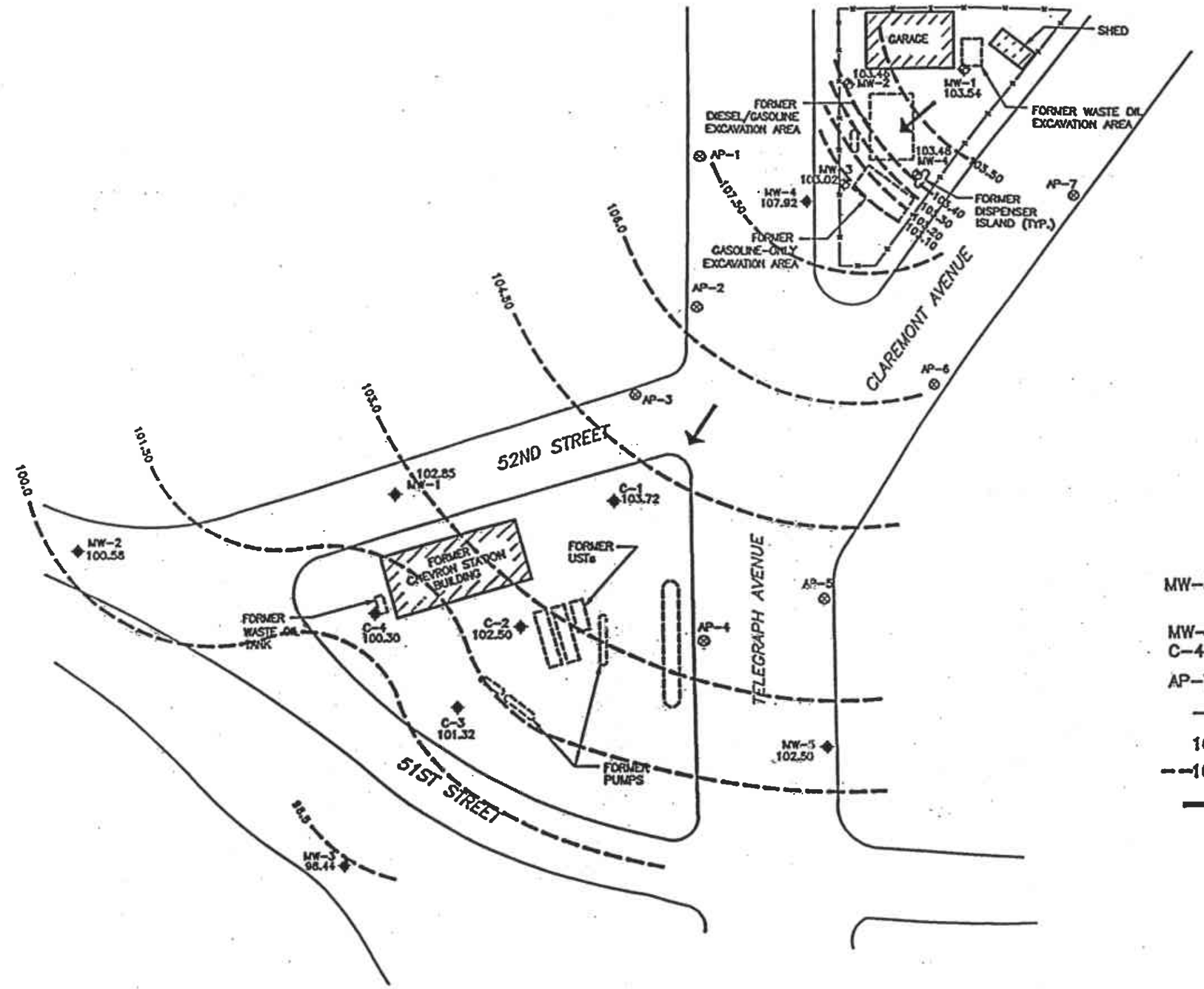
CHEVRON SITE BASE MAP FROM CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.

QST ENVIRONMENTAL
1340 ARNOLD DRIVE, SUITE 126
MARTINEZ, CA. 94553

DATE 7/12/99
REVISED
CAD FILE 65521902

MAP OF COMPILED SOIL DATA (TPH-G AND BENZENE) 1993, 1994, 1996
AUTOPRO, INC.
5200 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

FIGURE NO. 3
PROJ. NO. 65-95-219



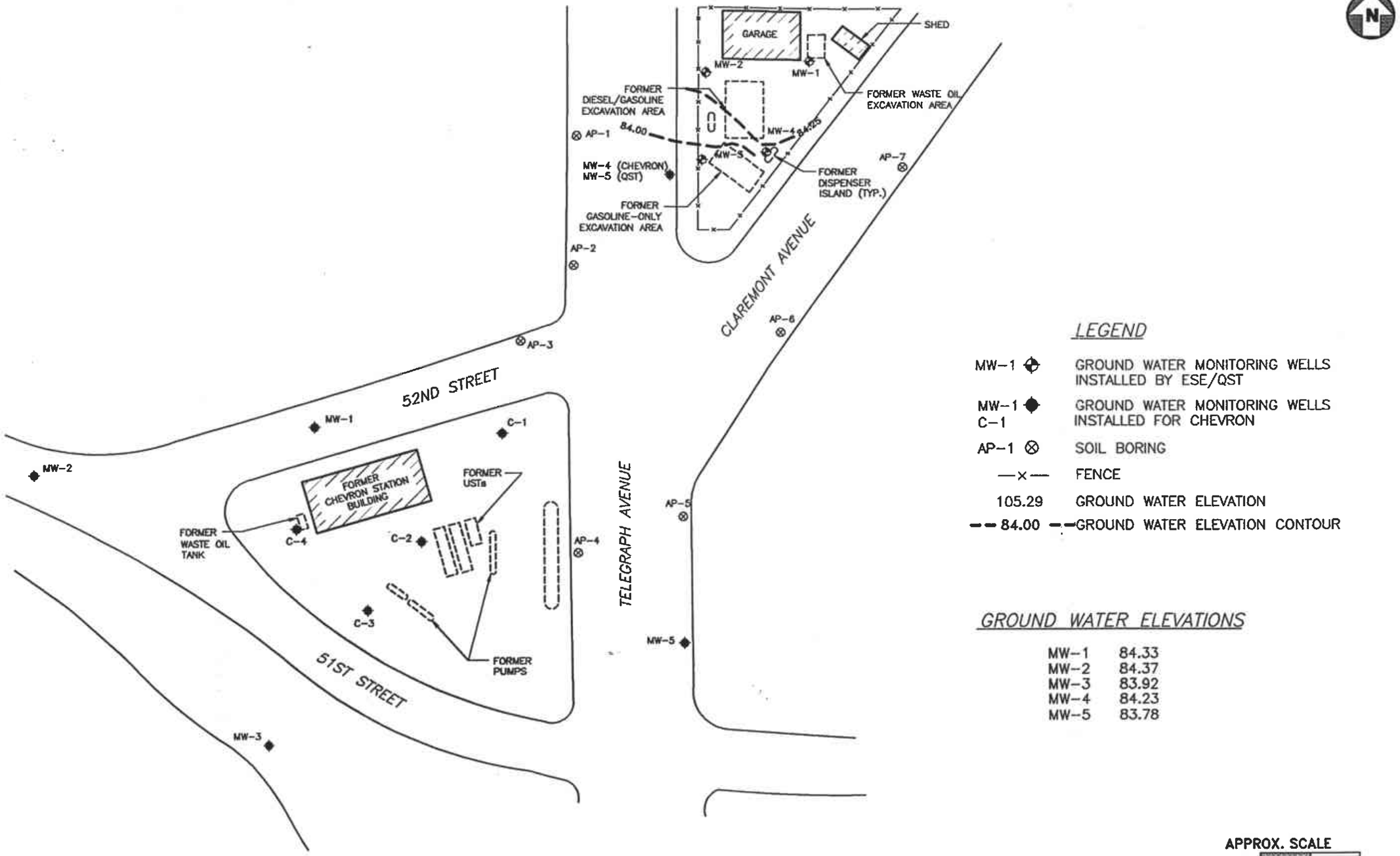
LEGEND

MW-3 ◇	GROUND WATER MONITORING WELLS INSTALLED BY ESE
MW-5 ◆ C-4	GROUND WATER MONITORING WELLS INSTALLED FOR CHEVRON
AP-7 ⊗	SOIL BORING
—x—	FENCE
103.02	GROUND WATER ELEVATION
--103.30--	GROUND WATER ELEVATION CONTOUR
→	ESTIMATED GROUND WATER FLOW DIRECTION

APPROX. SCALE
0 60 FEET

CHEVRON SITE BASE MAP FROM CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.
CHEVRON SITE GROUND WATER ELEVATIONS FROM BLAINE TECH SERVICES, INC.
GROUND WATER ELEVATIONS FOR AUTOPRO SITE ARE DERIVED FROM AN ASSUMED DATUM.

QST ENVIRONMENTAL 1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA. 94553	DATE 07/12/99 REVISED CAD FILE 6521903R	GROUND WATER ELEVATION CONTOUR MAP JUNE 26, 1996 AUTOPRO 5200 TELEGRAPH AVENUE OAKLAND, CALIFORNIA	FIGURE NO. 4 PROJ. NO. 6595219



LEGEND

MW-1 ⊕	GROUND WATER MONITORING WELLS INSTALLED BY ESE/QST
MW-1 ◆ C-1	GROUND WATER MONITORING WELLS INSTALLED FOR CHEVRON
AP-1 ⊗	SOIL BORING
—×—	FENCE
105.29	GROUND WATER ELEVATION
--84.00--	GROUND WATER ELEVATION CONTOUR

GROUND WATER ELEVATIONS

MW-1	84.33
MW-2	84.37
MW-3	83.92
MW-4	84.23
MW-5	83.78

APPROX. SCALE
0 60 FEET

CHEVRON SITE BASE MAP FROM CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.

QST ENVIRONMENTAL
1340 ARNOLD DRIVE, SUITE 126
MARTINEZ, CA. 94553

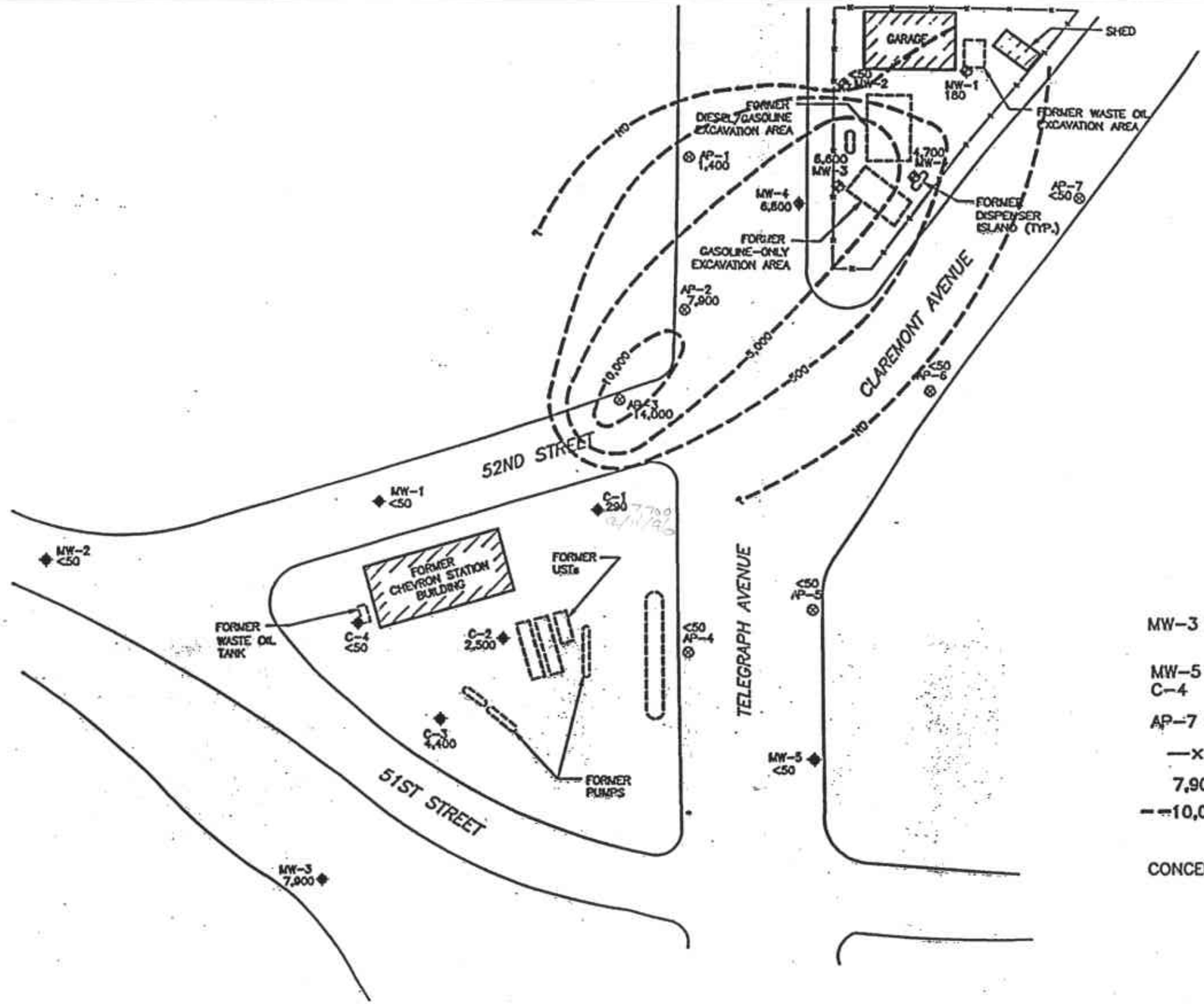
DATE 5/22/99
REVISED 5/22/99
CAD FILE 655219S3

GROUND WATER ELEVATION CONTOUR MAP
DECEMBER 15, 1998

AUTOPRO, INC.
5200 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

FIGURE NO. 5

PROJ. NO. 65-95-219



LEGEND

MW-3 ◈	GROUND WATER MONITORING WELLS INSTALLED BY ESE
MW-5 ◆ C-4	GROUND WATER MONITORING WELLS INSTALLED FOR CHEVRON
AP-7 ⊗	SOIL BORING WITH GRAB GROUND WATER SAMPLE
—x—	FENCE
7,900	CONCENTRATION OF TPH-G IN GROUND WATER
--10,000--	CONCENTRATION ISOPLETH

CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L) or PARTS PER BILLION (ppb).

APPROX. SCALE
0 60 FEET

CHEVRON SITE BASE MAP FROM CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.
CHEVRON WELLS ANALYTICAL DATA FROM BLAINE TECH SERVICES, INC.

QST ENVIRONMENTAL
1340 ARNOLD DRIVE, SUITE 126
MARTINEZ, CA. 94553

DATE 07/12/99
REVISED
CAD FILE 6521904R

ESTIMATED EXTENT OF TPH-G IN GROUND WATER

AUTOPRO
5200 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

FIGURE NO. 6
PROJ. NO. 6595219

Figure 7 - Concentration of TPH-G in Groundwater over Time

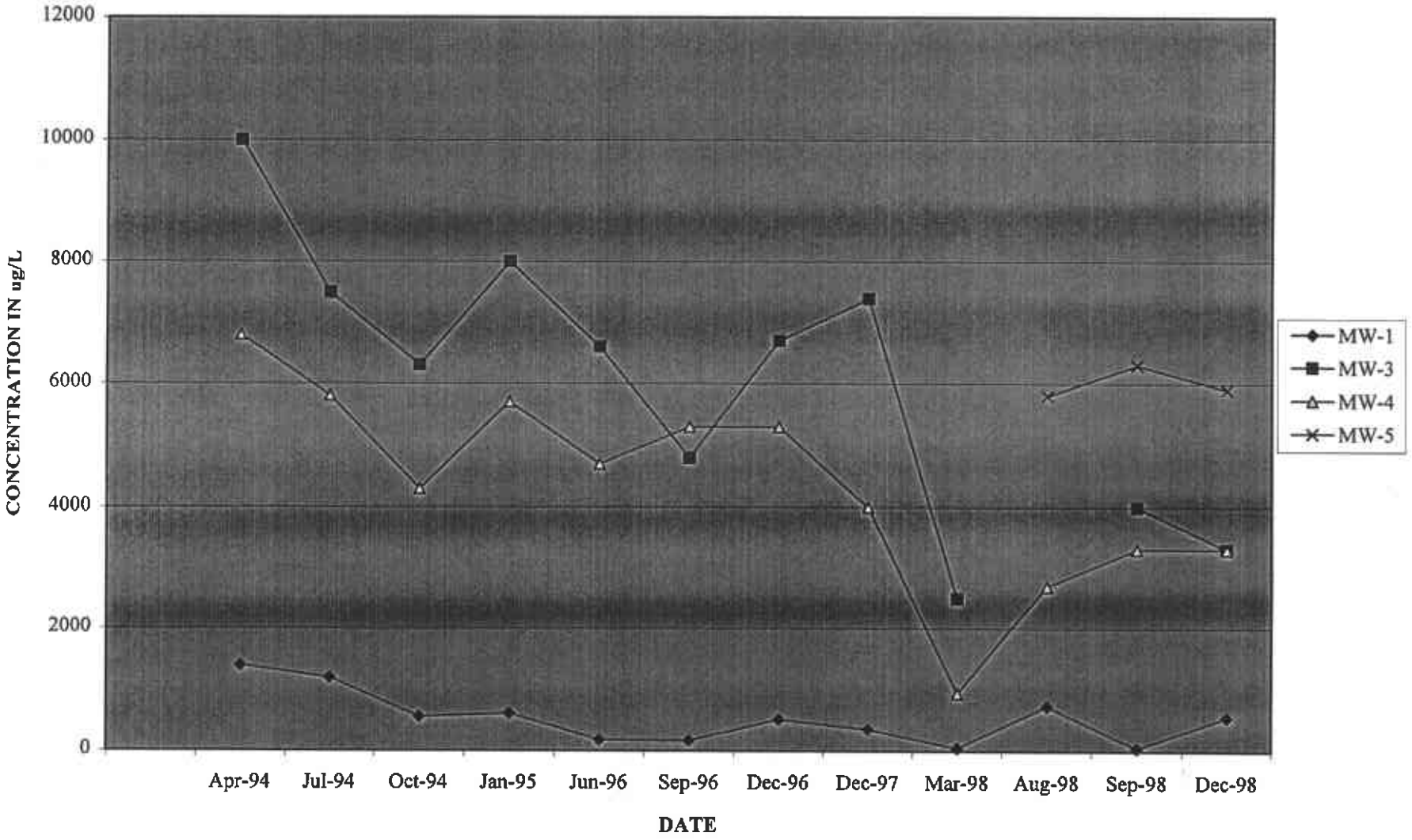
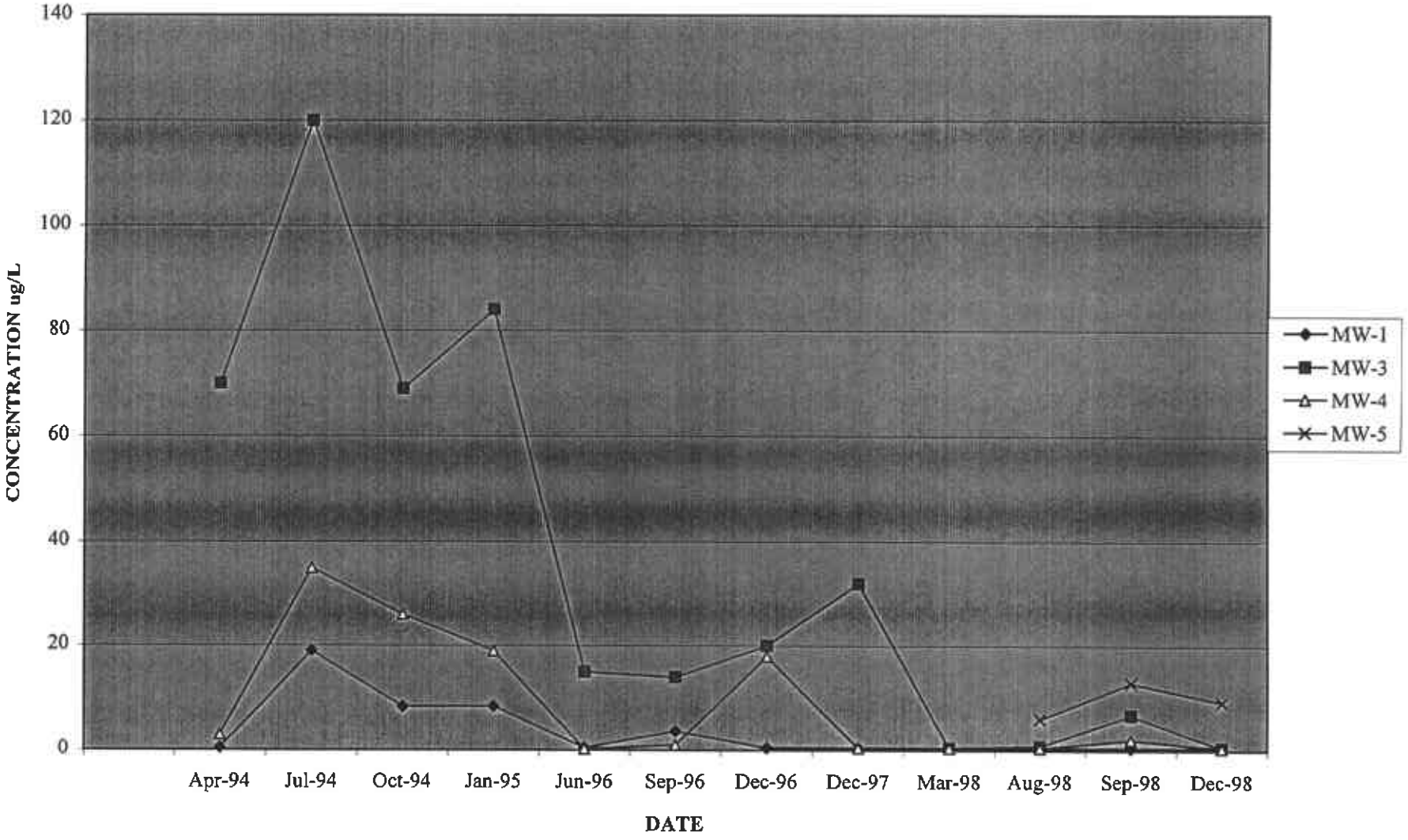


Figure 8 - Concentration of Benzene in Groundwater over Time



APPENDIX A
SUMMARY OF ANALYTICAL RESULTS DURING PREVIOUS UST REMOVAL & INVESTIGATION ACTIVITIES

APPENDIX A-1

"TABLE 2 SOIL ANALYTICAL RESULTS FROM SAMPLES COLLECTED DURING TANK REMOVAL"

Table 2

Soil Analytical Results From Samples Collected During Tank Removal

Sample Location	Sample Designation	Sample Date	Sampled By	Sample Type	Sample Depth (feet)	Soil Classification	Oil & Grease (mg/kg)	Total Petroleum Hydrocarbons as Gasoline (mg/kg)	Total Petroleum Hydrocarbons as Diesel (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)	Purgeable Halocarbons (mg/kg)
Waste Oil Excavation - south end	AP-1	19 December 1990	SS	Grab	±6	not recorded	8,000	36	32	<0.005	0.034	0.12	0.37	NM	<0.005
Waste Oil Excavation - north end	AP-2	19 December 1990	SS	Grab	±6	not recorded	12,000	19	47	<0.005	<0.005	0.066	0.12	NM	NM
Waste Oil Excavation stockpiles	AP-3 & 18	19 December 1990	SS	Composite ?	NM	not recorded	240	<1	<1	<0.005	<0.005	<0.005	<0.005	NM	NM
Diesel/Gasoline Excavation - east end of diesel tank	AP-4	19 December 1990	SS	Grab	±11	not recorded	NM	2,300	4,500	0.059	0.57	2.7	30	39.6	NM
Diesel/Gasoline Excavation - west end of diesel tank	AP-5	19 December 1990	SS	Grab	±11	not recorded	NM	320	<1	<0.005	0.19	1.5	0.22	15.3	NM
Diesel/Gasoline Excavation - east end of northern gasoline tank	AP-6	19 December 1990	SS	Grab	±11	not recorded	NM	2,900	NM	4.5	2.4	0.36	2.9	47.1	NM
Diesel/Gasoline Excavation - west end of northern gasoline tank	AP-7	19 December 1990	SS	Grab	±11	not recorded	NM	540	NM	<0.005	<0.005	3.4	13	18.4	NM
Diesel/Gasoline Excavation - east end of southern gasoline tank	AP-8	19 December 1990	SS	Grab	±11	not recorded	NM	38	NM	<0.005	<0.005	0.23	0.11	11.6	NM
Diesel/Gasoline Excavation - west end of southern gasoline tank	AP-9	19 December 1990	SS	Grab	±11	not recorded	NM	1,100	NM	0.073	0.67	11	4.9	23.2	NM
Gasoline-Only Excavation - east end	AP-10	19 December 1990	SS	Grab	±11	not recorded	NM	340	NM	0.0078	0.13	0.17	0.19	17.1	NM
Gasoline-Only Excavation - west end	AP-11	19 December 1990	SS	Grab	±11	not recorded	NM	8.8	NM	<0.005	<0.005	<0.005	<0.005	9.38	NM
Diesel/Gasoline Excavation stockpile	AP-12	19 December 1990	SS	Grab	NM	not recorded	NM	<1	NM	<0.005	<0.005	<0.005	<0.005	NM	NM
Diesel/Gasoline Excavation stockpile	AP-14	19 December 1990	SS	Grab	NM	not recorded	NM	130	56	<0.005	<0.005	0.11	1.1	NM	NM
Gasoline-Only Excavation stockpile	AP-17	19 December 1990	SS	Grab	NM	not recorded	NM	<1	NM	<0.005	<0.005	<0.005	<0.005	5.32	NM

General Notes

(a) SS = Sampling Specialists, Pacheco CA

(b) NM = not measured

(c) Laboratory analyses by Chromalab, San Ramon CA

(d) Purgeable Halocarbons = EPA Method 8010

Table 3

Groundwater Analytical Results From Samples Collected During Tank Removal

Sample Location	Sample Designation	Sample Date	Sampled By	Sample Type	Total Petroleum Hydrocarbons as Gasoline (mg/l)	Total Petroleum Hydrocarbons as Diesel (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethyl-benzene (mg/l)	Xylenes (mg/l)	Lead (mg/l)
Diesel/Gasoline Excavation	APGW-1	19 December 1990	SS	Grab	110	NM	0.13	0.071	0.19	0.18	1.61
Diesel/Gasoline Excavation	APGW-2	19 December 1990	SS	Grab	NM	68	NM	NM	NM	NM	NM

General Notes

(a) SS = Sampling Specialists, Pacheco CA

(b) NM = not measured

(c) Laboratory analyses by Chromalab, San Ramon CA

APPENDIX A-2

"TABLE 1 SOIL AND GROUNDWATER ANALYTICAL RESULTS"
APRIL 8, 1993

TABLE 1

SOIL AND GROUNDWATER ANALYTICAL RESULTS

Autopro Facility
5200 Telegraph Avenue
Oakland, CA

Sample Identification	Date Sampled	TSVPH mg/Kg
B-1 @ 12	4/8/93	31
B-2 @ 11	4/8/93	37
B-1	4/8/93	1,700
B-2	4/8/93	not detected

APPENDIX A-3

"TABLE 1 ANALYTICAL RESULTS FOR SOIL SAMPLES" APRIL 11, 1994

TABLE 1

ANALYTICAL RESULTS FOR SOIL SAMPLES

Autopro
5200 Telegraph Avenue
Oakland, California

Sample I.D.	Depth Sampled (ft.bgs)	Date Sampled	TPH-G	TPH-D	TPH-K	Oil & Grease	Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2-Dichloroethane	Ethylene dibromide	Metals				
													Cd	Cr	Pb	Ni	Zn
MW-1	10	04/11/94	<1.0	<1.0	--	110	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	36	11	37	56
MW-1	20	04/11/94	<1.0	<1.0	--	<50	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	43	10	51	67
MW-2	10	04/11/94	<1.0	<1.0	--	<50	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	28(31)[1]	10	15	30
MW-2	15	04/11/94	<1.0	<1.0	--	<50	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	30	10	26	71
MW-3	10	04/11/94	<200	<200	2,500	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	26	26	30	52
MW-3	15	04/11/94	80	<10	--	<50	0.21	0.87	<0.05	0.18	<0.05	<0.05	<0.5	37	42	31	49
MW-4	10	04/12/94	<1.0	<1.0	--	70	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	24	8	26	45
MW-4	15	04/12/94	<1.0	<1.0	--	1,100	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.5	21	8	31	51

Notes:

All concentrations in milligrams per kilogram or parts per million (ppm)
ft. bgs = feet below ground surface
TPH-G = Total Petroleum Hydrocarbons as Gasoline
TPH-D = Total Petroleum Hydrocarbons as Diesel
TPH-K = Total Petroleum Hydrocarbons as Kerosene
< = Less than listed detection limits
(31)[1] = Q.C. duplicate result reported by CCAS
-- = Not reported in analyses
Cd = Cadmium
Cr = Chromium
Pb = Lead
Ni = Nickel
Zn = Zinc

APPENDIX A-4

"TABLE 2 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES"
APRIL 11, 1994

TABLE 2

ANALYTICAL RESULTS FOR GROUND WATER SAMPLES

Autopro
5200 Telegraph Avenue
Oakland, California

Sample I.D.	Date Sampled	TPH-G (µg/L)	TPH-D (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	1,2-Dichloroethane (µg/L)	Ethylene dibromide (µg/L)	Metals (mg/L)				
										Cd	Cr	Pb	Ni	Zn
MW-1	04/26/94	1,400	<50	<0.50	<0.50	4.5	2.1	<0.50	<0.50	0.001	<0.05	<0.005	0.12	<0.10
MW-2	04/26/94	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.001	<0.05	<0.005	0.06	<0.10
MW-3	04/26/94	10,000	<3,000	70	40	40	50	<30	<30	<0.001	<0.05	0.043	0.10	0.10
MW-4	04/26/94	6,800	<300	<3.0	<3.0	3.0	4.0	<3.0	<3.0	<0.001	<0.05	0.007	0.06	<0.10
TRIP	04/26/94	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	–

Notes:

TPH-G = Total Petroleum Hydrocarbons as Gasoline
TPH-D = Total Petroleum Hydrocarbons as Diesel
µg/L = Micrograms per liter or parts per billion (ppb)
mg/L = Milligrams per liter or parts per million (ppm)
Cd = Cadmium
Cr = Chromium
Pb = Lead
Ni = Nickel
Zn = Zinc
< = Less than listed detection limits
– = Not analyzed

APPENDIX A-5

"TABLE 1 ANALYTICAL RESULTS FOR SOIL SAMPLES" JULY 2, 1996

TABLE 1

ANALYTICAL RESULTS FOR SOIL SAMPLES

Tri-Star Partnership
Autopro Facility
5200 Telegraph Avenue
Oakland, California

Sample I.D.	Depth Sampled (ft bgs)	Date Sampled	TPH-D (mg/kg)	TPH-G (mg/kg)	TPH-MO (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)
AP-1-5	5	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-1-10	10	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-2-5	5	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-2-10	10	07/02/96	<1.0	1.5[d]	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-3-5	5	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-3-10	10	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-4-5	5	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-4-10	10	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-5-5	5	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-5-10	10	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-6-5	5	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-6-10	10	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-7-5	5	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05
AP-7-10	10	07/02/96	<1.0	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	<0.05

NOTES:

ft bgs = feet below ground surface.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
MTBE = methyl tertiary butyl ether.

mg/kg = milligrams per kilogram or parts per million (ppm).
< = less than listed detection limit.
[d] = gasoline-range compounds are significant.

APPENDIX A-6

"TABLE 2 ANALYTICAL RESULTS FOR GRAB GROUNDWATER SAMPLES"
JULY 2, 1996

TABLE 2

ANALYTICAL RESULTS FOR GRAB GROUND WATER SAMPLES

Tri-Star Partnership
Autopro Facility
5200 Telegraph Avenue
Oakland, California

Sample I.D.	Date Sampled	TPH-D (µg/L)	TPH-G (µg/L)	TPH-MO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
AP-1	07/02/96	190[d,i]	1,400[b,d,i]	<250	<0.5	2.9	<0.5	3.1	<5.0
AP-2	07/02/96	74,000[d,h,i]	7,900[b,d,h,i]	<250	69	12	20	43	60
AP-3	07/02/96	47,000[d,h,i]	14,000[b,d,h,i]	<250	130	16	45	44	100
AP-4	07/02/96	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<5.0
AP-5	07/02/96	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<5.0
AP-6	07/02/96	410[g,i]	<50	1,900	<0.5	<0.5	<0.5	<0.5	<5.0
AP-7	07/02/96	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<5.0
MCL	--	--	--	--	1.0	150	700	1,750	35*

Notes:

TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-G = Total Petroluem Hydrocarbons as Gasoline.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
MTBE = methyl tertiary butyl ether.
µg/L = micrograms per liter or parts per billion (ppb).
< = less than listed detection limit.
-- = not applicable.
*** = DHS Action Level.**
MCL = primary Maximum Contaminant Limit as defined by the California Department of Health Services (DHS) Drinking Water Standards.
[b] = heavier gasoline-range compounds are significant (aged gasoline?).
[d] = gasoline-range compounds having broad chromatographic peaks are significant; biologically altered gasoline?
[g] = strongly aged gasoline or diesel-range compounds are significant.
[h] = lighter than water immiscible sheen is present.
[i] = liquid sample that contains greater than ~ 5 vol. % sediment.
[j] = no recognizable pattern.

APPENDIX B
MAY 15, 1998 LETTER FROM ACHCSA

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

MAY 19

May 15, 1998

ENVIRONMENTAL HEALTH SERVICES
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
(510) 337-9335 (FAX)

Mr. George Tuma
AutoPro
5200 Telegraph Avenue
Oakland, California 94609

Mr. Ondrej Kojnok
Tri-Star Partnership
2 North Second St., Suite 1390
San Jose, California 95113

RE: AutoPro Facility - 5200 Telegraph Avenue, Oakland, California 94609 (STID #12)

Dear Mr. Tuma & Mr. Kojnok:

This office has recently reviewed the case file regarding the removal of five underground storage tanks at the above referenced site.

On January 21, 1998, I met with Mr. Kojnok, Mr. Thomas Dalzell and Mr. Micah Rapoport of QST Environmental to discuss the status of the soil and groundwater investigation and additional work required to facilitate closure of the site as a low risk soil and groundwater case. During this meeting, we discussed the San Francisco Bay Regional Water Quality Control Board's guidelines for evaluating sites as a low risk soil and groundwater case and the criteria are as follows:

1) The leak has been stopped and on-going sources have been removed or remediated.
2) The site has been adequately characterized.
3) The dissolved hydrocarbon plume is not migrating. (stable)
4) No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.
5) The site presents no significant risk to human health.
6) The site presents no significant risk to the environment.

Review of the previous reports submitted to this agency showed that eight groundwater sampling events have been conducted at the site since the tanks were removed in 1990. Three of the four on-site monitoring wells showed varying concentrations of dissolved petroleum hydrocarbons since 1994 when the wells were installed.

During the January 1998 meeting, we discussed that continued groundwater monitoring of the wells must be conducted at the site, at a minimum on a quarterly basis for one year to establish that the groundwater plume is stable and/or shrinking. We also discussed the introduction of oxygen releasing compounds (ORC) on wells MW-3 and MW-4 to enhance biodegradation of the petroleum hydrocarbon plume at the site. The use of oxygen releasing compounds is acceptable to this office. Collection of groundwater data during this period is critical and must indicate that the entire plume is shrinking and not in just one hot area. Additional sampling points maybe required to show that the site has a stable and /or shrinking groundwater plume.

If you have any questions concerning this letter or the subject site, please contact me at (510) 567-6780.

Sincerely,

Susan L. Hugo

Susan L. Hugo, Hazardous Materials Specialist

c: Mee Ling Tung, Director, Environmental Health
Dick Pantages, Chief, Hazardous Materials / SH / files
Charles Headlee, San Francisco Bay RWQCB
Thomas Dalzell, QST Environmental, 1340 Arnold Dr., Suite 126, Martinez, CA 94553

APPENDIX C
PRELIMINARY CLEANUP LEVELS FOR PETROLEUM HYDROCARBONS IN SOIL AND GROUNDWATER

APPENDIX C
Preliminary Cleanup Levels for Petroleum Hydrocarbons in Soil and Groundwater

The Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) is publishing five key volumes on the Internet (http://voyager.wpafb.af.mil) about their work since 1993. That work has been directed to establishing risk-based cleanup levels for petroleum hydrocarbons. In the process, they have had to profile the complex mixture of hydrocarbons making up the various petroleum products, to develop new methodology for analyzing petroleum hydrocarbon mixtures, and to assign toxicity factors for the fractions of petroleum hydrocarbons that are analyzed. The result is that concentrations of petroleum hydrocarbon fractions can be evaluated against the toxicity standards to obtain a risk assessment. The reverse process, using target risk and health hazard standards and the new toxicity standards to solve for the allowable concentrations of petroleum hydrocarbons in environmental media, makes possible the calculation of risk-based cleanup levels for petroleum hydrocarbon fractions. Of the volumes designated by the TPHCWG and currently available, the following is the publication status of the information.

TPHCWG Documents Status (July, 1998)		
Volume	Title	Status
Technical Overview	A Risk-Based Approach for the Management of Total Petroleum Hydrocarbons in Soil, March, 1997	On-line
Draft Analysis Procedure	DRAFT: Characterization of C_6 to C_{28} Petroleum Hydrocarbons in Soil, 2/25/97	On-line
1	Petroleum Hydrocarbon Analysis of Soil and Water in the Environment	In press
2	Composition of Petroleum Mixtures	In press
3	Selection of Reprntative Total Petroleum Hydrocarbon (TPH) Fractions Based on Fate and Transport Considerations	On-line & In press
4	Development of Fraction-Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH)	On-line & In press

5	Application of the TPHCWG Methodology Within the ASTM Risk Based Corrective Action Framework	In preparation
Amherst Scientific Publishers will publish volumes 1-5.		

The volume on the determination of soil cleanup levels by the TPHCWG (volume 5) is not yet available, but the methodology from the other available volumes permits a preliminary calculation of what the final cleanup level to be calculated is likely to be. A preliminary calculation is included herein.

As the basis of calculating a risk-based cleanup level for TPH, the EPA has published equations for such calculations keyed to exposure scenarios associated with particular land use (EPA, 1991a; also called RAGS, Part B). The standard land uses cited by EPA are *residential* and *commercial-industrial.* Agricultural land use is handled as a variant of commercial-industrial land use for farm workers. EPA advises against evaluating agricultural land use as a variant of residential land use unless it is known that families reside in the agricultural setting (EPA, 1991b). EPA has utilized the RAGS, Part B equations to compile a standard list of preliminary remediation goals (PRGs, EPA, 1998) for several hundred chemicals, but a similar calculation for TPH has yet to be published.

In the current case, the property is commercial-industrial land use. That has implications for what the applicable cleanup level should be. Since the EPA considers residential land use as the evergreen standard for unrestricted land use, it is likely that residential land use would be the basis for a soil cleanup value for TPH.

Cleanup levels for TPH must include consideration of both cancer-causing (carcinogenic) and non-cancer health effects. Current practice involves the assessment of carcinogenic effects via specific "indicator" chemicals, namely *benzene* and *benzo(a)pyrene*. PRGs already exist for these compounds, and analytical methods for soil measurement of the concentrations of these chemicals directly permits attaining those cleanup standards. Thanks to the work of the TPHCWG, non-cancer health effects of TPH can now be addressed by using the new toxicity reference values for specific fractions of the petroleum hydrocarbon mixture, denoted by their equivalent carbon number (ECN), to calculate risk-based cleanup concentrations. New

analytical methodology to measure these TPH fractions in soil supports attaining the cleanup levels.

PRELIMINARY CALCULATION OF CLEANUP LEVEL FOR TPH FRACTIONS

The calculation of risk-based cleanup levels can be achieved using the standard equations of RAGS, Part B (EPA, 1991).

Soil

The equation for the calculation is abstracted from EPA, 1991a, page 25. The full description of the equation may be found in RAGS, Part B (EPA, 1991a), but considering consolidation of the component numerical default exposure factors in that equation, the operative equation for calculation of a PRG for residential soil, noncarcinogenic effects is as follows:

PRG (mg/kg) = 2.7×10^5 (RfD_o) [based on Target Hazard Index of 1.0]

The appropriate reference dose (oral; RfD_o) is derived from the TPHCWG work, volume 4 (see also, Weisman, 1998). Based on ECNs, there are three categories and three RfD_os. The following table lists the ECNs, RfD_os, and the calculated preliminary PRG.

Reference Doses and Preliminary PRGs for TPH Fractions in Soil		
Equivalent Carbon Number (ECN) Fraction	Reference Dose, Oral (RfD_o) (mg/kg-day)	Preliminary PRG, Residential Soil, Noncarcinogenic Effects (mg/kg)
C5 - C8	2	540,000
C8 - C16	0.1	27,000
C16 - C35	1	270,000

If only TPH analysis results are used, the final cleanup value for TPH in soil would be the most stringent of the PRGs for the ECNs as a conservative measure to represent the entire TPH mixture which contains the particular ECN fraction as a component. If cleanup were monitored for each ECN fraction, the preliminary PRGs above would be operative for

cleanup, or they may be modified by further refinement of the calculation for protection of Groundwater (if appropriate) or negotiation with the administering agency.

Groundwater

The risk-based PRG for TPH fractions in Groundwater may be calculated from the reduced equation from RAGS, Part B (EPA, 1991) for a PRG for noncarcinogenic effects as follows:

$$\text{PRG (mg/L)} = \frac{73}{[(7.5/RfD_i) + (2/RfD_o)]}$$

The values for RfD_i and RfD_o are given in (Weisman, 1998). Incorporating these in the equation above for each of the ECN fractions yields the results in the following table.

Reference Doses and Preliminary PRGs for TPH Fractions for Groundwater			
Equivalent Carbon Number (ECN) Fraction	Reference Dose, Oral (RfD_o) mg/kg-day	Reference Dose, Inhalation (RfD_i) mg/kg-day	Preliminary PRG, Groundwater, Noncarcinogenic Effects (mg/L)
C5 - C8	2	5.26	30.1
C8 - C16	0.1	0.28	1.6
C16 - C35	1	NA	NA

NA = not available

REFERENCES

EPA, see United States Environmental Protection Agency.

United States Environmental Protection Agency, 1991a, Human Health Evaluation Manual, Part B: "Development of Risk-based Preliminary Remediation Goals," OSWER Directive 9285.7-01B, Office of Solid Waste and Emergency Response, Washington, DC 20460, December 13.

United States Environmental Protection Agency, 1991b, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors," OSWER Directive 9285.6-03, Office of Solid Waste and Emergency Response, Washington, DC 20460, March 25.

United States Environmental Protection Agency, 1998, Region 9 Preliminary Remediation Goals (PRGs) 1998, Stanford J. Smucker, Ph.D., Regional Toxicologist, San Francisco, CA 94105-3901.

Weisman, W., 1998, Total Petroleum Hydrocarbon Criteria Working Group: A Risk-Based Approach for the Management of Total Petroleum Hydrocarbons in Soil, Journal of Soil Contamination, Vol. 7, No. 1, pp. 1-15.