11/14/91
reviewed
SOS

TANK PROTECT ENGINEERING
Of Northern California

TANK PROTECT ENGINEERING
2821 Whipple Road
Union City, CA 94587
(415) 429-8088 • (800) 523-8088
FAX (415) 429-8089

91 OCT 29 AM 9:39

October 22, 1991

Mr. Anthony Pettiti
Anthony's Auto Service
19592 Center Street
Castro Valley, CA 94546

RE: Third Quarterly Report, 1991, Anthony's Auto Service, 19592 Center Street, Castro Valley, CA 94546

Dear Mr. Pettiti:

This letter report is submitted to meet the quarterly reporting requirements of Mr. Seery's May 30, 1991 letter to you (attached). Previous work conducted at the site is summarized and work conducted during the subject quarter is presented in detail.

BACKGROUND

Work performed by Tank Protect Engineering (TPE) during fourth quarter 1990:

- Conducted overexcavation of contaminated soil on the sidewalls and base of the underground gasoline tank excavation.
- Conducted verification soil sampling of the sidewalls and base of the underground gasoline tank excavation after the above overexcavation was completed to document cleanup levels and remediation.
- Remediated soil stockpiled during tank removal and overexcavation activities by chemical oxidation.

Details of the above scope of work were presented in TPE's January 25, 1991 quarterly report.

Work performed by TPE during first quarter 1991:

- Collected 1 discrete verification soil sample from each 20 cubic yards of remediated stockpiled soil for chemical analysis for total petroleum hydrocarbons as gasoline (TPHG) and for benzene, toluene, ethylbenzene, and xylenes (BTEX).

- After verifying remediation, and with approval of the Alameda County Health Care Services Agency (ACHCSA), reused the remediated stockpiled soil for backfill and closed the underground fuel tank and waste oil tank excavations.

- Installed 3 groundwater monitoring wells.

- Developed, purged, and sampled groundwater from each monitoring well for chemical analysis for TPHG and BTEX and, additionally, for industrial solvents scan in well MW-1.

- Surveyed top-of-casings (TOC's) for elevation and determined groundwater flow direction and gradient.

- Wrote a Site Assessment Report (dated March 29, 1991) documenting work performed and analytical results with conclusions and recommendations, and delivered the report to the client for his submittal to the ACHCSA.

Details of the above scope of work were presented in TPE's March 29, 1991 Site Assessment Report.

Work performed by TPE during second quarter 1991:

- Began collecting 1 year of monthly groundwater elevation data on May 17, 1991. Collected second month of groundwater elevation data on June 14, 1991.

- Calculated groundwater flow direction and gradient for May 17 and June 14, 1991 and constructed 2 groundwater gradient maps.

- Collected 3 groundwater samples on May 17, 1991 and analyzed the samples for TPHG and BTEX.

Details of the above scope of work were presented in TPE's July 22, 1991 Second Quarterly Report.

WORK PERFORMED THIRD QUARTER 1991

Work performed by TPE during third quarter 1991:

- Collected monthly groundwater elevation data on July 15, August 23, and September 16, 1991.

- Calculated groundwater flow direction and gradient for July 15, August 23, and September 16, 1991 and constructed 3 groundwater gradient maps.

- Collected 3 groundwater samples from wells MW-1, MW-2, and MW-3 on August 19, 1991 and analyzed the samples for TPHG and BTEX.

- Redeveloped wells MW-2 and MW-3 in order to remove any contaminants which may have been introduced by moisture sensitive paste used to measure depth to water in the last sampling event.

- Collected 2 groundwater samples from wells MW-2 and MW-3 on September 9, 1991 to confirm that redevelopment of these wells successfully purged any contaminants which may have been introduced by the above moisture sensitive paste.

Details of the above scope of work are presented below.

Groundwater Gradient

On July 15, August 23, and September 16, 1991, depth to stabilized water was measured from TOC in wells MW-1, MW-2, and MW-3 to the nearest 0.01 foot using an electronic Solinst water level meter. A minimum of 3 repetitive measurements were made for each level determination to ensure accuracy. Depth to water was

subtracted from the TOC elevation, measured relative to mean sea level, to calculate the elevation of the stabilized water level for each well (see attached Table 1). Groundwater flow directions, gradients, average elevations, and changes in average elevation are tabulated in attached Table 2. Average groundwater elevations decreased .05 feet, .13 feet, and .12 feet in the months of July, August, and September, respectively (see attached Table 2).

Attached Figures 1, 2, and 3 are groundwater gradient maps constructed for the data collected on July 15, August 23, and September 16, 1991.

Groundwater flow direction for July 15, August 23, and September 16, 1991 is west-southwest; gradient is .0976 feet per foot, .1017 feet per foot, and .1015 feet per foot, respectively. All of these groundwater flow directions are consistent with each other and the flow directions determined in previous months.

Based on the above groundwater flow directions, well MW-3 is directly downgradient from the center of the former underground fuel tank complex; and wells MW-1 and MW-2 are, respectively, down and cross-gradient, and upgradient of the complex.

Groundwater Sampling and Analytical Results

On August 19, 1991, prior to collecting groundwater samples, TPE measured depth to water in wells MW-2 and MW-3 with a tape measure coated with a layer of moisture sensitive paste. Due to moisture on the walls of the well casings, which wetted the moisture sensitive paste, an accurate depth to water reading could not be made and was not attempted for well MW-1. Next, all 3 wells were purged a minimum of 3 wetted well volumes (the volume of well MW-1 was estimated based on the measured depth to water on May 17, 1991) and until the temperature, conductivity, and pH of the water in the wells had stabilized. The wells were sampled with dedicated polyethylene bailers to minimize the potential for cross contamination. Since dedicated bailers were used for each well sampled, no decontamination was necessary between sampling events. The water samples were collected in sterilized 40 milliliter glass vials; immediately sealed with teflon-lined screw caps; measured for turbidity; and labeled with project name, date, time collected, sample number, and sampler. The samples were immediately stored on ice for transport to State-certified Sequoia Analytical laboratory in Concord, California accompanied by chain-of-custody documentation. All samples were analyzed for TPHG and BTEX by EPA Methods GCFID 5030/8015 (Modified) and 5030/8020 (Modified), respectively.

Chemical analyses of the 3 groundwater samples detected TPHG concentrations of a chemical not appearing to be gasoline (see attached certified analytical report) of 280 parts per billion (ppb) and 320 ppb in samples MW-2 and MW-3, respectively. No BTEX chemicals were detected.

Because depth to water in wells MW-2 and MW-3 were measured with a moisture sensitive paste and because these wells had detected no TPHG in the previous sampling event, TPE suspected the paste as a source of contamination and redeveloped, and resampled these 2 wells again on September 9, 1991. Immediately after well development, groundwater samples were collected, in the manner described above, from wells MW-2 and MW-3. These samples were immediately stored on ice for transport to State-certified Trace Analysis Laboratory, Inc. in Hayward, California accompanied by chain-of-custody documentation. Both samples were analyzed for TPHG and BTEX by DHS Method and EPA Method 5030/8020 (Modified), respectively.

Chemical analyses of the above 2 groundwater samples detected no TPHG or BTEX. Based on these results, TPE concludes that redevelopment of wells MW-2 and MW-3 purged any contaminants which may have been introduced by the moisture sensitive paste.

Purge water is stored on site in labeled 55-gallon drums.

See attached protocols for TPE's sample handling, groundwater sampling, waste handling and decontamination, and quality assurance and quality control procedures.

Results of chemical analyses are summarized in attached Table 3 and documented in attached certified analytical reports and chain-of-custodies.

RECOMMENDATIONS FOR ADDITIONAL WORK

TPE recommends that quarterly groundwater monitoring for TPHG and BTEX be conducted until 4 consecutive quarters of nondetectable analytical results are documented. Also monthly determination of groundwater gradient is recommended to be conducted for 1 year.

The next quarterly sampling event will be in November, 1991.

An additional two copies of the report have been included for your delivery to:

Mr. Scott O. Seery
Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, CA 94612

Mr. Lester Feldman
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

Mr. Seery has requested that this quarterly report be submitted to him by November 1, 1991. We recommend that this letter report be submitted with a cover letter from Anthony's Auto Service and signed by an authorized representative.

If you have any questions, please call TPE at (510) 429-8088.

Sincerely,

John V. Mrakovich
Registered Geologist

Jeff Farhoomand
Civil Engineer

cc: file
Attachments

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

DEPARTMENT OF ENVIRONMENTAL HEALTH
Hazardous Materials Program
80 Swan Way, Rm. 200
Oakland, CA 94621
(415)

Certified Mailer #P 062 127 781

May 30, 1991

Mr. Anthony Pettiti
Anthony's Auto Service
19592 Center Street
Castro Valley, CA 94546

RE: RESULTS OF PRELIMINARY SITE ASSESSMENT

Dear Mr. Pettiti:

This Department is in receipt and has completed review of the March 31, 1991 Tank Protect Engineering (TPE) report entitled, "Site Assessment Report," and the April 19, 1991 TPE letter report which discussed activities occurring during the 4th quarter of 1990 and 1st quarter of 1991.

At this time, the following well sampling and water level monitoring shall be instituted:

- Water levels are to be measured and recorded monthly for the first year, beginning with the May 1991 measurement, and then quarterly thereafter.

- Water samples are to be collected quarterly until otherwise notified. This frequency may change due to the results of future analyses. Samples are to be analyzed presently for BTXE and TPH-G. Continue to record the presence of apparent "non-gasoline" peaks which have been characterized as iso-Octane in the March 1991 TPE report.

- Reports are to be submitted quarterly until this site qualifies for final RWQCB "sign-off." Such quarterly reports are due the first day of the second month of each subsequent quarter (i.e., August 1, November 1, February 1, and May 1). The next quarterly report is due August 1, 1991, and should describe activities occurring during the 2nd quarter of 1991.

  Among other elements, water level gradient maps for each month, free and dissolved product plume definition maps for target compounds, tabulated laboratory analyses results, QA/QC procedures, etc., are to be included in each report.

Please be advised that, based upon the apparent ground water flow direction identified during the preliminary stages of work at the site, additional wells downgradient of the present well network may be required in the future to determine the limit of the contaminant plume (i.e., to determine the "zero line" of contamination). Wells MW-1 and -3 are both impacted by contaminants, yet neither are directly downgradient of the perceived source (tank pit). The determination for additional wells can only be made after more data is collected and interpreted in the ensuing months.

Please feel free to call me at 415/271-4320 should you have any questions.

Sincerely,

Scott O. Seery, CHMM
Hazardous Materials Specialist

cc: Rafat A. Shahid, Assistant Agency Director, Environmental Health
Edgar Howell, Chief, Hazardous Materials Division
Gil Jensen, Alameda County District Attorney's Office
Howard Hatayama, DHS
Lester Feldman, RWQCB
Bob Bohman, Castro Valley Fire Department
Marc Zomorodi, Tank Protect Engineering
files

TABLE 1
GROUNDWATER ELEVATION

Well Name	Elevation TOC* (feet MSL**)	Date	Depth to Water from TOC	Groundwater Elevation (feet MSL)
MW-1	249.72	3/22/91	34.64	215.08
		5/17/91	33.77	215.95
		6/14/91	33.63	216.09
		7/15/91	33.68	216.04
		8/23/91	33.82	215.90
		9/16/91	33.95	215.77
MW-2	250.18	3/22/91	31.00	219.18
		5/17/91	30.29	219.89
		6/14/91	30.31	219.87
		7/15/91	30.41	219.77
		8/23/91	30.50	219.68
		9/16/91	30.60	219.58
MW-3	250.11	3/22/91	35.09	215.02
		5/17/91	34.22	215.89
		6/14/91	34.11	216.00
		7/15/91	34.12	215.99
		8/23/91	34.27	215.84
		9/16/91	34.40	215.71

* TOC = TOP OF CASING

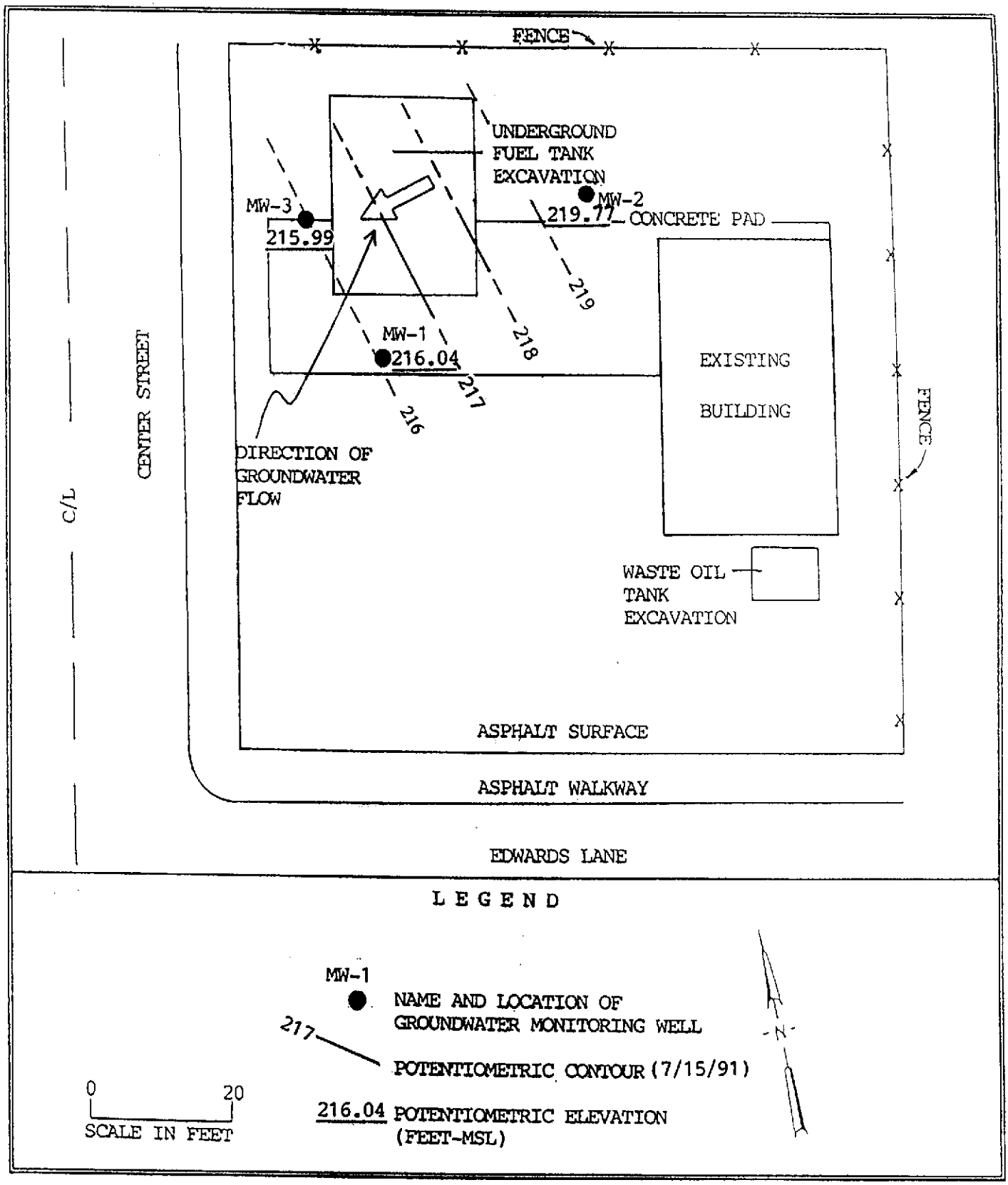
** MSL = MEAN SEA LEVEL

TABLE 2

GROUNDWATER GRADIENT, FLOW DIRECTION, AND ELEVATION DATA

Date	Average Groundwater Elevation (Feet-MSL*)	Change in Average Groundwater Elevation	Groundwater Flow Direction	Groundwater Gradient
03/22/91	216.43		SW	.109
05/17/91	217.24	+.81	WSW	.1053
06/14/91	217.32	+.08	WSW	.1000
07/15/91	217.27	-.05	WSW	.0976
08/23/91	217.14	-.13	WSW	.1017
09/16/91	217.02	-.12	WSW	.1015

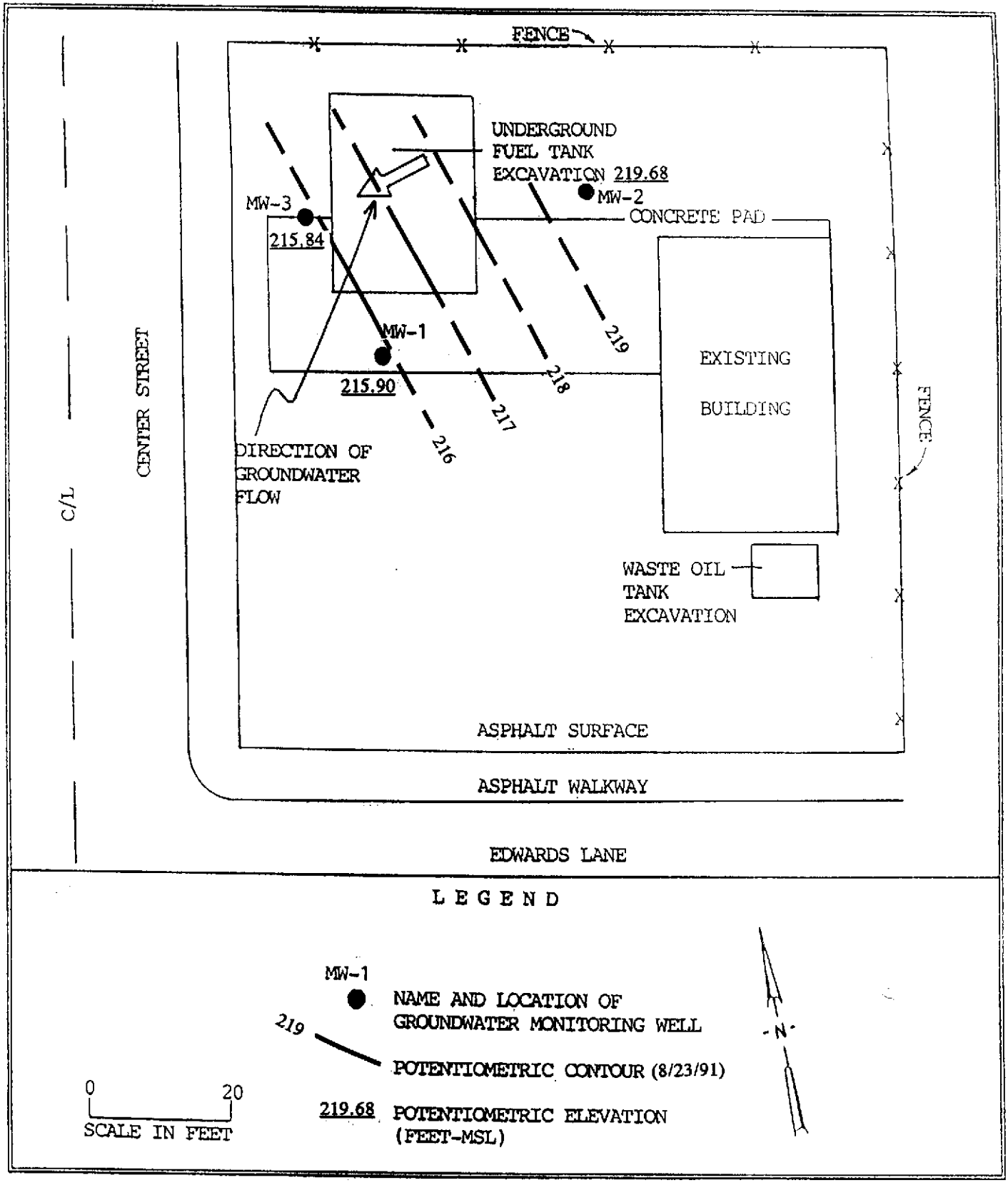
* MSL = MEAN SEA LEVEL



TANK PROTECT ENGINEERING
Of Northern California, Inc.

GROUNDWATER GRADIENT MAP
ANTHONY'S AUTO SERVICE
19592 CENTER STREET
CASTRO VALLEY, CALIFORNIA

FIGURE
1



LEGEND

MW-1 — NAME AND LOCATION OF GROUNDWATER MONITORING WELL

219 — POTENTIOMETRIC CONTOUR (8/23/91)

219.68 — POTENTIOMETRIC ELEVATION (FEET-MSL)

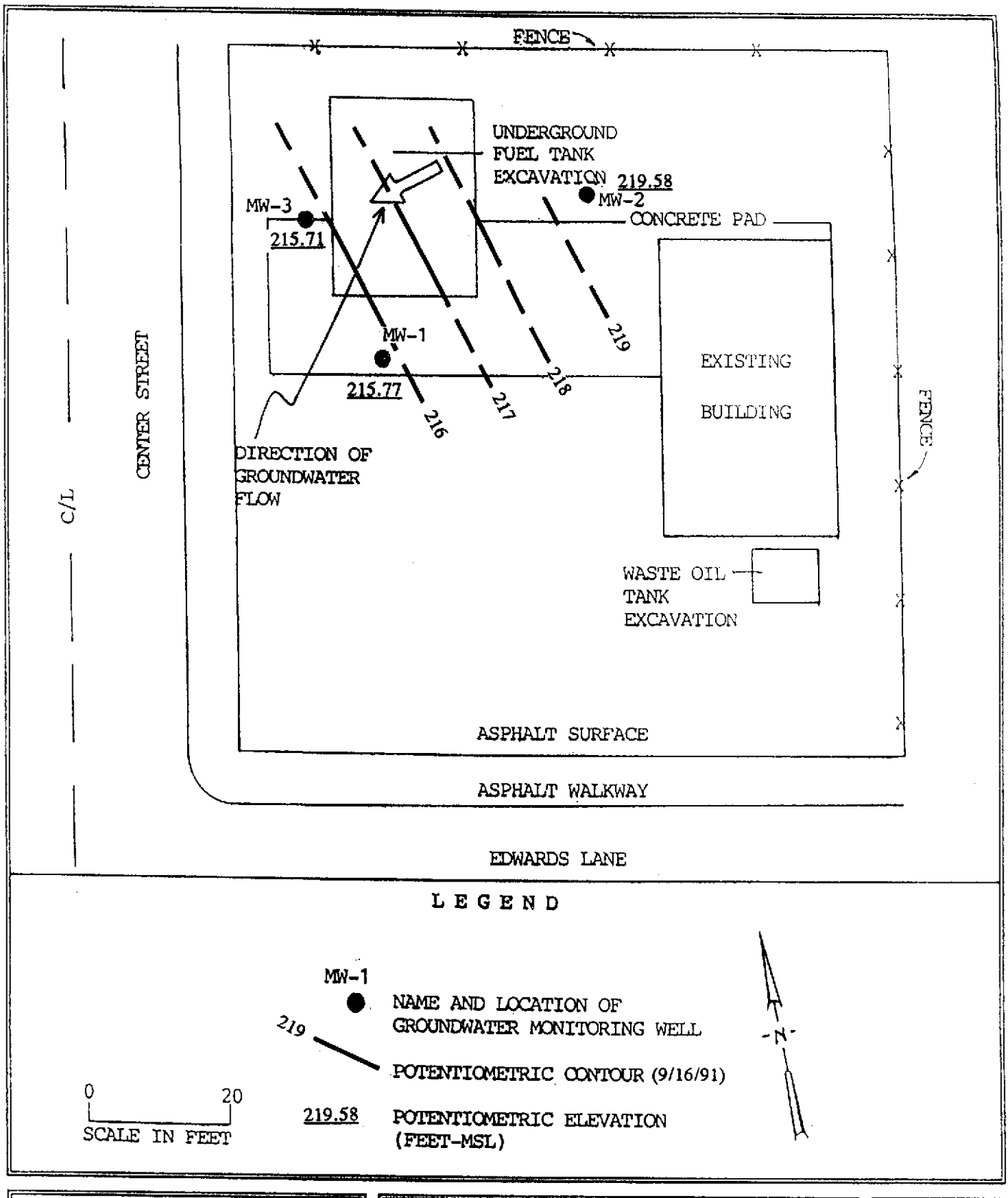
0 20
SCALE IN FEET

N

TANK PROTECT ENGINEERING
Of Northern California, Inc.

GROUNDWATER GRADIENT MAP
ANTHONY'S AUTO SERVICE
19592 CENTER STREET
CASTRO VALLEY, CALIFORNIA

FIGURE
2



TANK PROTECT ENGINEERING
Of Northern California, Inc.

GROUNDWATER GRADIENT MAP
ANTHONY'S AUTO SERVICE
19592 CENTER STREET
CASTRO VALLEY, CALIFORNIA

FIGURE
3

TABLE 3
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
(ppb)

Sample ID Name	Date Sampled	TPHG	Benzene	Toluene	Ethyl-Benzene	Xylenes	Organic Lead
MW-1	2/18/91	160*	<0.30	<0.30	<0.30	<0.30	<5
	5/17/91****	<30	<0.30	<0.30	<0.30	<0.30	NA***
	8/19/91	<30	<0.30	<0.30	<0.30	<0.30	NA
MW-2	2/18/91	<30	<0.30	<0.30	<0.30	<0.30	<5
	5/17/91	<30	<0.30	<0.30	<0.30	<0.30	NA
	8/19/91	280**	<0.30	<0.30	<0.30	<0.30	NA
	9/09/91	<50	<0.50	<0.50	<0.50	<1.5	NA
MW-3	2/18/91	120*	<0.30	<0.30	<0.30	<0.30	<5
	5/17/91	<30	<0.30	<0.30	<0.30	<0.30	NA
	8/19/91	320**	<0.30	<0.30	<0.30	<0.30	NA
	9/09/91	<50	<0.50	<0.50	<0.50	<1.5	NA

* ACCORDING TO SEQUOIA ANALYTICAL THESE SAMPLES DO NOT APPEAR TO CONTAIN GASOLINE. AN INDUSTRIAL SOLVENTS SCAN BY EPA MODIFIED METHOD 3810/8015 DETECTED ISO-OCTANE AT A CONCENTRATION OF 150 ppb. SEE CERTIFIED ANALYTICAL REPORT IN APPENDIX B OF TPE'S MARCH 29, 1991 SITE ASSESSMENT REPORT.

** ACCORDING TO SEQUOIA ANALYTICAL, THESE SAMPLES DO NOT APPEAR TO CONTAIN GASOLINE. SEE ATTACHED CERTIFIED ANALYTICAL REPORT. TPE BELIEVES THE SOURCE OF CONTAMINATION IS MOISTURE SENSITIVE PASTE USED FOR MEASURING DEPTH-TO-WATER; SEE DISCUSSION UNDER "GROUNDWATER SAMPLING AND ANALYTICAL RESULTS".

*** NA = NOT ANALYZED

**** CHAIN-OF-CUSTODY AND ANALYTICAL REPORTS ARE MISTAKENLY DATED 5/20/91.

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Tank Protect Engineering of N. Calif	Client Project ID:	121B-D81991, Anthony's Auto Service,		Sampled:	Aug 19, 1991
2821 Whipple Road	Matrix Descript:	Water	19592 Center St., Castro Valle	Received:	Aug 20, 1991
Union City, CA 94587	Analysis Method:	EPA 5030/8015/8020		Analyzed:	Sep 2, 1991
Attention: Ahmad Shah	First Sample #:	108-1054 AB		Reported:	Sep 5, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
108-1054 AB	WS-MW-1	N.D.	N.D.	N.D.	N.D.	N.D.
108-1055 AB	WS-MW-2	280	N.D.	N.D.	N.D.	N.D.
108-1056 AB	WS-MW-3	320	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

Please Note:
The above samples do not appear to contain gasoline.

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Tank Protect Engineering of N. Calif
2821 Whipple Road
Union City, CA 94587
Attention: Ahmad Shah

Client Project ID: 121B-D81991, Anthony's Auto Service, 19592 Center St., Castro Valley

QC Sample Group: 1081054-6

Reported: Sep 5, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020
Analyst:	RH	RH	RH	RH
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Sep 2, 1991	Sep 2, 1991	Sep 2, 1991	Sep 2, 1991
QC Sample #:	BLK090291	BLK090291	BLK090291	BLK090291
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60
Conc. Matrix Spike:	20	20	21	67
Matrix Spike % Recovery:	100	100	110	110
Conc. Matrix Spike Dup.:	21	21	23	70
Matrix Spike Duplicate % Recovery:	110	110	120	120
Relative % Difference:	4.9	4.9	9.1	4.4

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

TANK PROTECT ENGINEERING
Environmental Management

TANK PROTECT ENGINEERING
2821 WHIPPLE ROAD
UNION CITY, CA 94587
(415)429-8088
(800)523-8088
FAX(415)429-8089

LAB: SEQUOIA

TURNAROUND: NORMAL

P.O. #: 0281

PAGE 1 OF

CHAIN OF CUSTODY

PROJECT NO.	SITE NAME & ADDRESS
1218-081991	ANTHONY'S AUTO SERVICE 19592 CENTER ST CASTRO VALLEY

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER
AHMAD SHAH TANK PROTECT ENGINEERING
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8088

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CONTAINER	ANALYTES REQUESTED: TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER	REMARKS
WS-MW-1	08/19	1:45		✓	WATER SAMPLE FROM MW-1	2-40(ml)	✓	✓					1081054 AB
WS-MW-2	08/19	2:16		✓	WATER SAMPLE FROM MW-2	2-40(ml)	✓	✓					55
WS-MW-3	08/19	3:25		✓	WATER SAMPLE FROM MW-3	2-40(ml)	✓	✓					56

Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
J.D. Alvarado	8/20/91 9:15	Dan Sullivan	Dan Sullivan	8/20/91 9:30	Anupama 8/20 0940
Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
	8/21 1000				
Relinquished by : (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

DATE: 08/19/1991

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (415) 783-6960
Facsimile (415) 783-1512

TAL

September 16, 1991

Marc Zomorodi
Tank Protect Engineering
2821 Whipple Road
Union City, CA 94587

Dear Mr. Zomorodi:

Trace Analysis Laboratory received two water samples on September 9, 1991 for your Project No. 121B-090991, Antony's Auto Service (our custody log number 1280).

These samples were analyzed for Total Petroleum Hydrocarbons as Gasoline, Benzene, Toluene, Xylenes and Ethylbenzene. Our analytical report and the completed chain of custody form are enclosed for your review.

Trace Analysis Laboratory is certified under the California Environmental Laboratory Accreditation Program. Our certification number is 1199.

If you should have any questions or require additional information, please call me.

Sincerely yours,

Jennifer Pekol

Jennifer Pekol
Project Specialist

Enclosures

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (415) 783-6960
Facsimile (415) 783-1512

TAL

LOG NUMBER: 1280
DATE SAMPLED: 9/09/91
DATE RECEIVED: 9/09/91
DATE ANALYZED: 9/11/91 and 9/12/91
DATE REPORTED: 9/16/91

CUSTOMER: Tank Protect Engineering

REQUESTER: Marc Zomorodi

PROJECT: 121B-090991, Antony's Auto Service

Sample Type: Water

Method and Constituent:	Units	WS MW2 Concentration	WS MW2 Reporting Limit	WS MW3 Concentration	WS MW3 Reporting Limit	Method Blank Concentration	Method Blank Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50	ND	50	ND	50
EPA Method 8020 for:							
Benzene	ug/l	ND	0.50	ND	0.50	ND	0.50
Toluene	ug/l	ND	0.50	ND	0.50	ND	0.50
Ethylbenzene	ug/l	ND	0.50	ND	0.50	ND	0.50
Xylenes	ug/l	ND	1.5	ND	1.5	ND	1.5

QC Summary:

% Recovery: 63 and 79
% RPD: 3.2 and 8.6

Concentrations reported as ND were not detected at or above the reporting limit.

Louis W. DuPuis
Quality Assurance/ Quality Control Manager

TANK PROTECT ENGINEERING

2821 WHIPPLE ROAD
UNION CITY, CA 94587
(415)429-8088
(800)523-8088
FAX(415)429-8089

LAB: TAL

TURNAROUND: NORMAL / 5 DAYS

P.O. #: 0298

PAGE 1 OF 1

CHAIN OF CUSTODY

1280

PROJECT NO.	SITE NAME & ADDRESS
121B-090991	Antony's Auto Service

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER
Ahmad Shah TANK PROTECT ENGINEERING
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8088

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CONTAINER	TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER
WS MW2	09/09	12:30		✓	Water from monitoring Well No 2	2(40)ML	✓	✓				
WS MW3	09/09	14:40		✓	Water from monitoring Well No 3	2(40)ML	✓	✓				

ANALYTES REQUESTED

water, on ice
2-40ml ea, pick-up
white, 5-day TAT

Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
Ahmad Shah	09/09/91 4:45		9/9/91 4:15PM		

DATE: _____

SAMPLE HANDLING TECHNIQUES

Soil and groundwater samples will be packaged carefully to avoid breakage or contamination, and will be delivered to the laboratory at proper storage temperatures. The following sample packaging requirements will be followed.

- Sample bottle/sleeve lids will not be mixed. All sample lids will stay with the original containers and have custody seals affixed to them.

- Samples will be secured in coolers to maintain custody, control temperature, and prevent breakage during transportation to the laboratory.

- A chain-of-custody form will be completed for all samples and accompany the sample cooler to the laboratory.

- Ice, blue ice, or dry ice will be used to keep samples at a constant temperature during transport to the laboratory.

- 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, and the collector's initials.

All sample containers will be precleaned and will be obtained at from a State Department of Health Services certified analytical laboratory.

Sample Control/Chain-of-Custody: All field personnel will refer to this work plan to verify the methods to be employed during sample collection. All sample gathering activities will be recorded in the site logbook; all sample transfers will be documented in the site logbook; samples are to be identified with TPE labels and all sample bottles are to be custody-sealed. All information is to be recorded in waterproof ink. All TPE field personnel are personally responsible for sample collection and the care and custody of collected samples until the samples are transferred or properly dispatched.

The custody record will be completed by the field technician who has been designated by the TPE project manager as being responsible for sample shipment to the appropriate laboratory. The custody record will include, among other things, the following information: name of person collecting the samples; date samples were collected; type of sampling conducted (composite/grab);

location of sampling station; number and type of containers used; and signature of the TPE person relinquishing samples to a non-TPE person with the date and time of transfer noted. The relinquishing individual will also put all the specific shipping data on the custody record.

Site log books will be maintained by a designated TPE field employee to record, for each sample, sampling locations, station numbers, dates, times, sampler's name, designation of the samples as a grab or composite, notation of the type of sample (e.g. groundwater, soil boring, etc.), preservatives used, on-site measurement data, and other observations or remarks.

GROUNDWATER SAMPLING PROCEDURES

Groundwater monitoring wells will not be sampled until at least 48 hours after well development. Groundwater samples will be obtained using either a bladder pump, clear Teflon bailer, or dedicated polyethylene bailer. Prior to collecting samples, the sampling equipment will be thoroughly decontaminated to prevent introduction of contaminants into the well and to avoid cross-contamination. Monitoring wells will be sampled after 3 to 5 wetted casing volumes of groundwater have been evacuated and pH, electrical conductivity, and temperature have stabilized as measured with a Hydac Digital Tester. If the well is emptied before 3 to 5 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 more.

When a water sample is collected, turbidity of the water will be measured and recorded with a digital turbidimeter. Degree of turbidity will be measured and recorded in Nephelometric turbidity units (NTU).

Tank Protect Engineering will also measure the thickness of any floating product in the monitoring wells using a probe, clear Teflon, or polyethylene bailer. The floating product will be measured after well development but prior to the collection of groundwater samples. If floating product is present in the well, TPE will recommend to the client that product removal be commenced immediately and reported to the appropriate regulatory agency.

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, Page 69544, Table ll) for the type of analysis to be performed.

MEASUREMENTS

Purged Water Parameter: During purging, discharged water will be measured for the following parameters.

Parameter	Units of Measurement
pH	None
Electrical Conductivity	Micromhos
Temperature	Degrees F or C
Depth to Water	Feet/Tenths
Volume of Water Discharged	Gallons
Turbidity	NTU

Documentation: All parameter measurements shall be documented in writing on TPE development logs.

WASTE HANDLING AND DECONTAMINATION PROCEDURES

Decontamination: Any drilling, sampling or field measurement equipment that comes into contact with soils or groundwater will be properly decontaminated prior to its use at the site and after each incident of contact with the soils or groundwater being investigated. Proper decontamination is essential to obtain samples that are representative of environmental conditions and to accurately characterize the extent of soil and groundwater contamination. Hollow-stem auger flights and the drill bit will be steam-cleaned between the sampling of each well.

All sample equipment, including the split-tube sampler and brass tubes, will be cleaned by washing with tri-sodium phosphate detergent, followed by sequential rinsing with tap water, and deionized water.

Waste Handling: Waste materials generated during site characterization activities will be handled and stored as hazardous waste and will be stored on site in appropriately labeled containers. Waste materials anticipated include drill cuttings, development and purge water, water generated during aquifer testing, water generated during decontamination, and used personnel protection equipment such as gloves and Tyvek. The site owner will be responsible for providing the storage containers and will be responsible for the disposal of the waste materials. Drill cuttings from individual borings will be stored separately in drums or covered by visqueen and the appropriate disposal procedure will be determined by the site owner or TPE following receipt of the soil sample analytical results.

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The overall objectives of the field sampling program include generation of reliable data that will support development of a remedial action plan. Sample quality will be checked by the use of proper sampling, handling, and testing methods. Additional sample quality control methods may include the use of background samples, equipment rinsate samples, and trip and field blanks. Chain-of-custody forms, use of a qualified laboratory, acceptable detection limits, and proper sample preservation and holding times also provide assurance of accurate analytical data.

Tank Protect Engineering will follow a QA/QC program in the field to ensure that all samples collected and field measurements taken are representative of actual field and environmental conditions and that data obtained are accurate and reproducible. These activities and laboratory QA/QC procedures are described below.

Field Samples: Additional samples taken in the field are used to evaluate both sampling and analytical methods. Three basic categories of QA/QC samples that may be collected are trip samples, field blanks, and duplicate samples.

Trip blanks are a check for cross-contamination during sample collection, shipment, and in the laboratory. Analytically confirmed organic-free water shall be used for organic parameters and deionized water for metal parameters. Blanks will be prepared by the laboratory supplying the sample containers. The blank shall be numbered, packaged, and sealed in the same manner as the other samples. One trip blank will be used for each sample set of less than 20 samples. At least 5% blanks will be used for sets greater than 20 samples. The trip blank is a water sample that remains with the collected samples during transportation and is analyzed along with the field samples to check for residual contamination. The trip blank is not to be opened by either the sample collectors or the handlers.

The field blank is a water sample that is taken into the field and is opened and exposed at the sampling point to detect contamination from air exposure. The water sample is poured into appropriate containers to simulate actual sampling conditions. Contamination for air exposure can vary considerably from site to site.

The laboratory will not be informed about the presence of field and trip blanks and a false identifying number will be put on the label. Full documentation of these collection and decoy procedure will be made in the site logbook.

Duplicate samples are identical sample pairs (collected in the same place and at the same time), placed in identical containers. For soils, adjacent sample liners will be analyzed. For the purpose of data reporting, one is arbitrarily designated the sample, and the other is designated as a duplicate sample. Both sets of results are reported to give an indication of the precision of sampling and analytical methods.

The laboratory's precision will be assessed without the laboratory's knowledge by labeling one of the duplicates with false identifying information. Data quality will be evaluated on the basis of the duplicate results.

Laboratory QA/QC: Execution of a strict QA/QC program is an essential ingredient in high-quality analytical results. By using accredited laboratory techniques and analytical procedures, estimates of the experimental values can be very close to the actual value of the environmental sample. The experimental value is monitored for its precision and accuracy by preforming QC test designed to measure the amount of random and systematic errors and to signal when correction of these errors is needed.

The QA/QC program describes methods for performing QC tests. These methods involve analyzing method blanks, calibration standards, check standards (both independent and EPA-certified standards), duplicates, replicates, and sample spikes. Internal QC also requires adherence to written methods, procedural documentation, and record keeping, and the observance of good laboratory practices.