



73 Digital Drive
Novato, CA 94949
Phone: (415) 382-7400
Fax: (415) 382-7415

**REPORT
ADDITIONAL SUBSURFACE ENVIRONMENTAL INVESTIGATION**

at

Former Chevron Service Station No. 9-4930
3369 Castro Valley Boulevard
Castro Valley, California

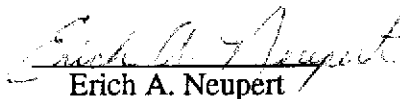
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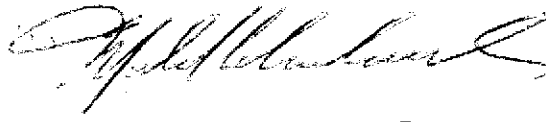
Mr. Kenneth Kan
Chevron U.S.A. Products Company
P.O. Box 5004
San Ramon, CA 94583

Prepared by:

RESNA Industries Inc.
73 Digital Drive
Novato, CA 94949

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Erich A. Neupert
Staff Geologist


Michael L. Siembieda, R.G. 4007
Geoscience Manager



December 13, 1993

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1.0 INTRODUCTION

At the request of Chevron U.S.A. Products Company (Chevron), RESNA Industries (RESNA) performed an additional subsurface environmental investigation at Former Chevron Service Station No. 9-4930 located at 3369 Castro Valley Boulevard in Castro Valley, California. The site is on the southeast corner of the intersection of Castro Valley Boulevard and Wilbeam Avenue. The approximate location of the site is shown on the Site Vicinity Map (Plate 1). The purpose of the investigation was to evaluate soil and groundwater conditions at the site.

Work RESNA conducted for the investigation included:

- Drilling four soil borings (B-11 through B-14) into first encountered groundwater at locations selected by Chevron.
- Collecting soil samples from the borings at approximately five-foot intervals, changes in lithology, where subjective evidence of petroleum hydrocarbons were observed, and just above first encountered groundwater.
- Constructing two-inch-diameter monitoring wells (MW-1 through MW-4) in the borings.
- Developing, purging and sampling the monitoring wells.
- Submitting selected soil and groundwater samples for analysis to Chevron's contracted laboratory for total petroleum hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (BTEX).

- Contracting a licensed land surveyor to measure the top-of-casing elevations of the wells relative to mean sea level.
- Evaluating the direction of groundwater flow and gradient beneath the site.
- Preparing a report presenting our findings.

1.1 Site Description

Former Chevron Service Station No. 9-4930 is located at 3369 Castro Valley Boulevard in Castro Valley, California. The site is currently vacant. The approximate locations of the former station building, pump islands, and underground storage tanks (USTs) are shown on the generalized site plan (Plate 2).

2.0 BACKGROUND

It is our understanding that Chevron has had two different station configurations at the site. RESNA conducted a previous environmental investigation at the site in November 1992. During the previous investigation RESNA personnel observed the drilling of 16 soil borings. Four of the soil borings were drilled into groundwater and temporary wells were constructed in the borings. Soil and groundwater samples were collected from the temporary wells. Six soil borings were drilled to just above groundwater and soil samples were collected from these borings. In addition six soil borings were hand-augered to depths ranging from approximately five to ten feet below grade, and soil samples were collected from the hand-augered borings. Results of the previous investigation indicated that soil beneath the site has been impacted by petroleum hydrocarbons. Also, petroleum hydrocarbons were detected in the groundwater "grab" samples collected from each of the temporary groundwater monitoring wells. (RESNA Industries, December 1992).

In February 1993 Chevron demolished the service station building and car wash located at the site. On March 10, 1993 Touchstone Developments, of Santa Rosa, California observed the removal of three 10,000 gallon underground storage tanks (UST's) and associated lines by Gettler-Ryan Inc. (Gettler-Ryan) of Hayward, California. Petroleum hydrocarbons were detected in soil samples collected from the UST pits and product lines. On March 15, 1993 Touchstone observed Gettler-Ryan remove the underground waste water reclaim vault which was associated with the former car wash. Touchstone observed and managed the excavation of additional soil from the UST pits by Gettler-Ryan in late March and April, 1993 (Touchstone, June 1993).

3.0 FIELD INVESTIGATION

3.1 Site-Specific Health and Safety Plan/ Permitting

RESNA prepared a Site-Specific Health and Safety Plan required by the Occupational Health and Safety Administration (OSHA) Standard "Hazardous Waste Operations and Emergency Response" guidelines (29 CFR 1910.120). The Site-Specific Health and Safety Plan (HSP) was prepared by RESNA personnel, following a review of site conditions. The HSP was reviewed by the project manager, RESNA field personnel, and subcontractor personnel before beginning field operations at the site.

All applicable permits pertaining to drilling soil borings and installing groundwater monitoring wells were obtained from the Zone 7 Water Agency. Copies of permits obtained by RESNA are in Appendix A.

3.2 Soil Borings and Sampling

At Chevron's request, a geologist from RESNA was at the site on October 25, 1993 to observe Kvilhaug Well Drilling and Pump of Concord, California drill four soil borings (B-11 through B-14) into first encountered groundwater at locations selected by Chevron, using a Mobile B-53 truck-mounted drill rig equipped with 8-inch hollow-stem augers, and install 2-inch-diameter monitoring wells (MW-1 through MW-4) in the borings. The locations of the wells are shown on Plate 2. During field operations, RESNA personnel followed RESNA's standard operating procedures for drilling soil borings and installing groundwater monitoring wells. RESNA's standard operating procedures are presented in Appendix B.

During drilling of borings B-11 through B-14, soil samples were collected at approximately five-foot intervals, at obvious changes in sediment type, where subjective evidence of petroleum hydrocarbons was observed, and just above first encountered groundwater. Samples were collected using a 2.0 inch diameter California-modified split-spoon sampler, lined with cleaned 2-inch-diameter by 6-inch-long brass sample tubes. At the selected sampling depths the sampler was driven 18 inches ahead of the augers. Soil samples were screened in the field using a photoionization detector (PID), and readings were recorded on the boring logs. One sample from

each sample interval was sealed with aluminum foil, capped, secured with teflon tape, labeled, placed on ice in an insulated container, and delivered under chain-of-custody protocol to a California-certified laboratory selected by Chevron for chemical analysis. Soil sampling equipment was decontaminated with a solution of phosphate-free soap between sampling to minimize the possibility of cross-contamination. The field geologist logged the earth materials encountered during drilling using the Unified Soil Classification System. Logs of borings are in Appendix C. Drill cuttings from each boring were placed on plastic sheeting pending characterization, and were subsequently removed from the site for disposal by Chevron's contractor, Balch Petroleum, of Milpitas, California.

3.3 Monitoring Well Construction

Monitoring wells MW-1 through MW-4 were constructed of schedule 40, flush-threaded, 2-inch diameter blank casing and well screen with 0.020-inch slots. The well screen was installed between approximately 5 and 20 feet below grade in each boring. A sand filter was placed around the well screen to a height of approximately one foot above the top of the screen. A hydrated bentonite plug about one foot thick was placed above the sand pack and the remaining annular space was filled with a cement/bentonite slurry to grade. The wellhead was protected by a locking cap and a traffic-rated utility box with a water-tight, bolted lid. Well construction details are presented in the boring logs (Appendix C).

3.4 Monitoring Well Development and Sampling

The monitoring wells were developed by surging and bailing on October 28, 1993. Well development removes fine-grained sediments from the well and sand pack, produces a relatively evenly distributed sand filter pack, and improves well efficiency. Prior to well development, a RESNA technician used a bailer to collect groundwater samples for subjective analysis of hydrocarbon sheen or free product. No subjective evidence of hydrocarbons was noted in the groundwater removed from monitoring wells MW-1 through MW-4 prior to development. Following subjective analysis, the technician bailed approximately ten well volumes of groundwater from each well. Well development water was placed into a Department of Transportation (DOT) approved water trailer and transported to Chevron's Richmond, California refinery for recycling.

On October 29, 1993, a RESNA technician measured depths-to-water in each newly installed well to an accuracy of 0.01 foot using an interface probe. The interface probe incorporates an optical sensor and electrical conductivity probe which distinguishes between water and petroleum products. No free product was detected in monitoring wells MW-1 through MW-4. Before collecting groundwater samples from monitoring wells MW-1 through MW-4, RESNA personnel purged approximately three well casing volumes of water from the wells. Following groundwater recovery, groundwater samples were collected and placed in appropriate containers using a Teflon bailer cleaned with a solution of Alconox and rinsed with tap water and distilled water. Samples were labeled and placed on ice in an insulated container for delivery under chain-of-custody protocol to a Chevron contracted laboratory. Purge water generated during groundwater sampling was placed into a DOT approved water trailer and transported to Chevron's Richmond, California refinery for disposal.

4.0 SITE CONDITIONS

4.1 Geology and Hydrogeology

During drilling of borings B-11 through B-14, unconsolidated sediments consisting of silty-clay and clayey-silt were encountered. Descriptions of the materials encountered are shown on the boring logs (Appendix C). Groundwater was first encountered during drilling at approximate depths ranging between 8.5 and 10.0 feet.

4.2 Groundwater Gradient

The elevation of each newly installed wellhead was surveyed to within 0.01 foot with respect to a known benchmark and mean sea level by Ron Archer Civil Engineering of Pleasanton, California, a licensed land surveyor. Well survey data are in Appendix E. These data were combined with the depths to groundwater measured on October 29, 1993 to evaluate the elevation of the groundwater surface in each well and the groundwater gradient beneath the site. A map of the potentiometric surface at the site is presented in Plate 3. Data used to compile the Potentiometric Map are presented in Table 1. Based on these data, the interpreted groundwater flow direction at the site is to the southwest. The evaluated hydraulic gradient on October 29, 1993 was approximately 0.006.

5.0 LABORATORY ANALYSES

Selected soil samples collected from each boring were submitted to Chevron's contract laboratory for analysis for total petroleum hydrocarbons as gasoline (TPHg) using modified Environmental Protection Agency (EPA) Method 8015, and benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8020.

Groundwater samples collected from wells MW-1 through MW-4 were analyzed for TPHg and using EPA Modified Method 8015, and BTEX using EPA Method 8020.

6.0 ANALYTICAL RESULTS

6.1 Soil

Results of soil sample analyses are summarized in table 2. Concentrations of TPHg and BTEX were not detected in soil samples collected from borings B-11, B-13, and the 5.8 foot sample collected from boring B-12. Concentrations of TPHg and toluene, ethylbenzene, and total xylenes were detected in the 8.0 foot soil sample collected from boring B-12, and the 6.0 foot soil sample collected from boring B-14. Benzene concentrations were not detected in those samples.

6.2 Groundwater

Results of groundwater analyses are summarized in Table 3. Concentrations of TPHg and BTEX were detected in water samples collected from monitoring wells MW-1, MW-2, and MW-4. A compound not matching a typical gasoline pattern was detected in the water sample collected from monitoring well MW-3. BTEX were not detected in the water sample collected from monitoring well MW-3.

7.0 LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological practice in California at the time this investigation was performed. This investigation was conducted solely for the purpose of evaluating environmental conditions of soil and ground water beneath the site. No soil engineering or geotechnical recommendations are implied or should

be inferred. Evaluation of the geologic conditions at the site for the purpose of this investigation is made from a limited number of observation points. Subsurface conditions may vary away from the data points available.

8.0 REFERENCES

United States Geological Survey, 1980. Hayward, California, 7.5-Minute Topographic Quadrangle Map.

RESNA Industries, December 16, 1992. Report: Subsurface Environmental Investigation, Chevron Station 9-4930, 3369 Castro Valley Boulevard, Castro Valley, California. 17068.02.

Touchstone Developments, June 5, 1993. Tank/Line Removal and Over-Excavation Report, Former Chevron Service Station No. 9-4930, 3369 Castro Valley Boulevard, Castro Valley, California.

Table 1

GROUNDWATER ELEVATION DATA
Former Chevron Service Station No. 9-4930
3369 Castro Valley Boulevard
Castro Valley, California

WELL NUMBER	DATE MEASURED	TOC	DTW	ELEV./P.S.
MW-1	10-29-93	172.90	6.75	166.15
MW-2	10-29-93	173.91	7.86	166.05
MW-3	10-29-93	172.60	7.64	164.96
MW-4	10-29-93	170.68	5.50	165.18

Notes:

- TOC = Top-of-Casing elevation feet above sea level (feet)
- DTW = Depth to Water (feet)
- ELEV./P.S. = Groundwater/Potentiometric Surface elevation above mean sea level (feet)

Table 2

SOIL ANALYTICAL RESULTS
Former Chevron Service Station No. 9-4930
3369 Castro Valley Boulevard
Castro Valley, California

Sample	Date	TPHg	B	T	E	X
S-6.0-B11	10/25/93	<1	<0.005	<0.005	<0.005	<0.015
S-5.8-B12	10/25/93	<1	<0.005	<0.005	<0.005	<0.015
2 S-8.0-B12	10/25/93	100	<0.05	0.18	0.45	3.6
S-5.8-B13	10/25/93	<1	<0.005	<0.005	<0.005	<0.015
S-8.0-B13	10/25/93	<1	<0.005	<0.005	<0.005	<0.015
4 S-6.0-B14	10/25/93	530	<0.25	0.48	4.5	18

Notes:

All results in parts per million (ppm)

- S = Soil sample
- 6.5 = Sample depth in feet
- B-11 = Boring 11
- TPHg = Total petroleum hydrocarbons as gasoline.
- B = Benzene
- T = Toluene
- E = Ethyl-benzene
- X = Total xylenes
- < = Less than indicated detection limit established by the laboratory

Table 3

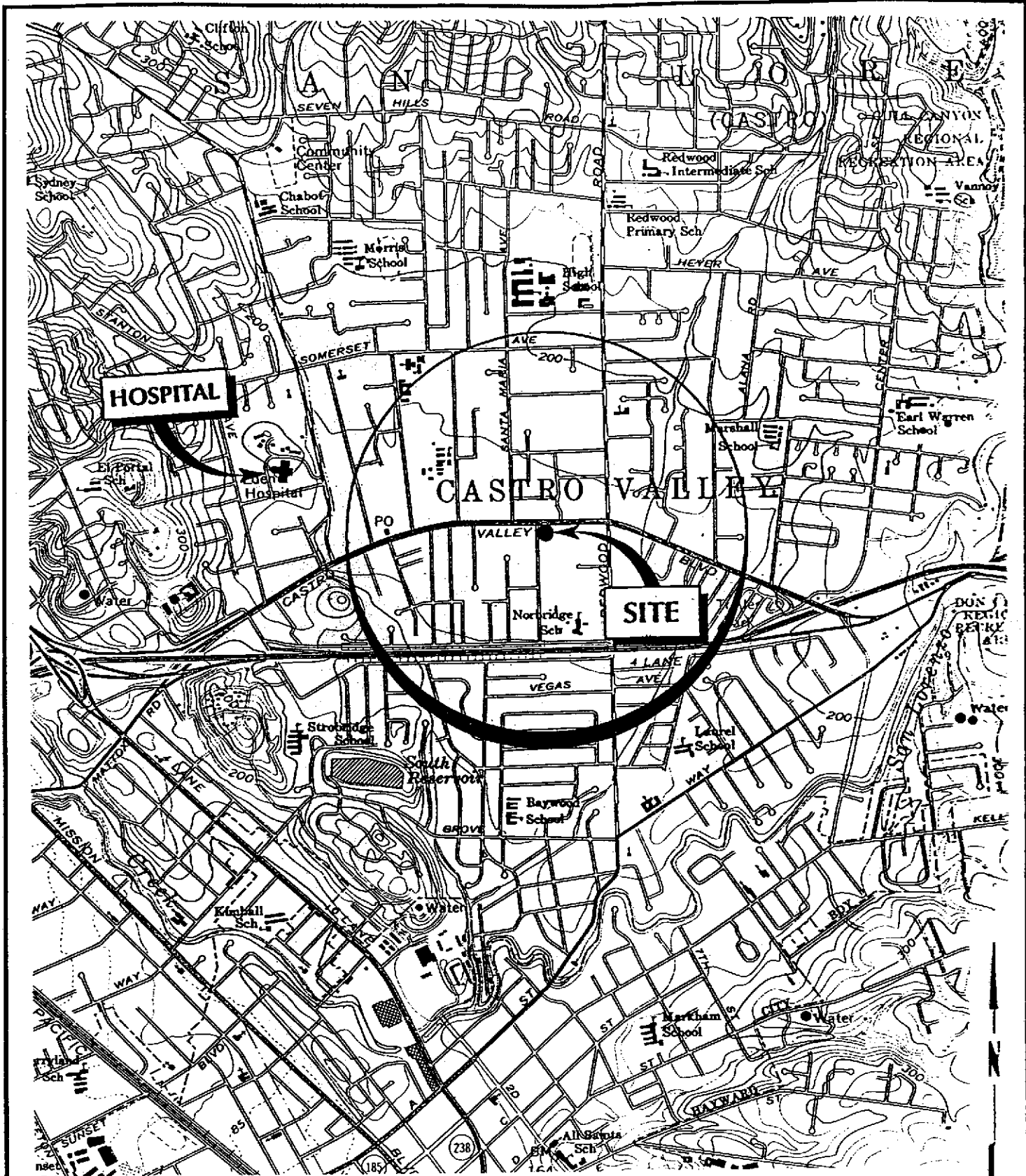
GROUNDWATER ANALYTICAL RESULTS
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

Sample Number	Date Sampled	TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes
MW1	9/23/93	1,000	11	17	32	110
MW2	9/23/93	5,600	140	3.2	17	330
MW3	9/23/93	110	<0.5	<0.5	<0.5	<1.5
MW4	9/23/93	640	6.7	3.3	0.6	6.7
TB-LB	9/23/93	<50	<0.5	<0.5	<0.5	<1.5

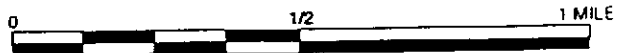
Notes:

All results in parts per billion (ppb)

- MW1 = Monitoring Well MW-1
- TPHg = Total petroleum hydrocarbons as gasoline.
- < = Less than detection limit established by the laboratory
- TB-LB = Travel blank
- = Laboratory reported that compound does not match typical gasoline pattern



Source: USGS Topographic Map, 7.5 minute series, Hayward, Calif. quadrangle, 1980



RESNA

PROJECT NO. 17068.01

11/92

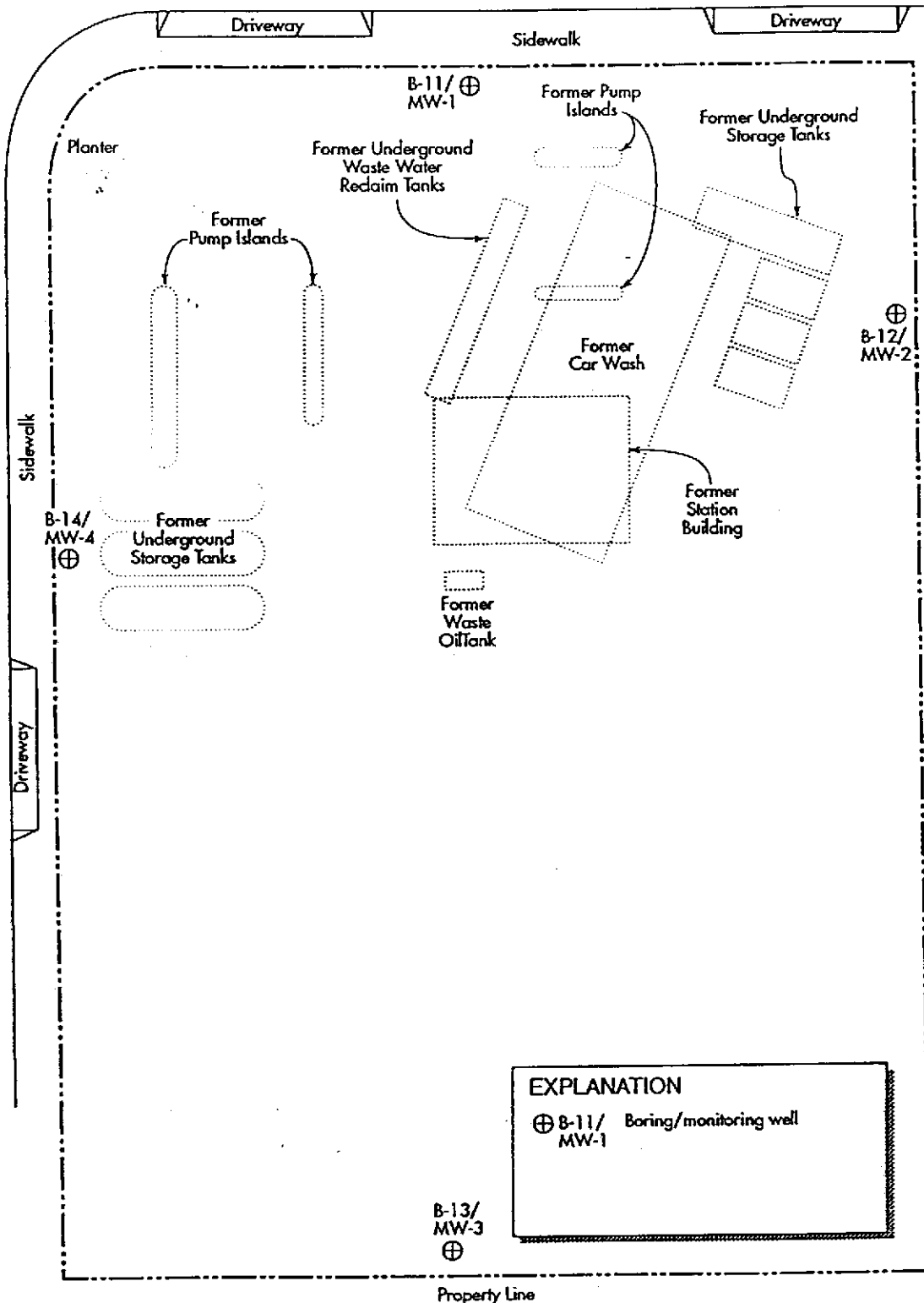
SITE VICINITY MAP
 Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

PLATE

1

CASTRO VALLEY BOULEVARD

WILBEAM AVENUE



EXPLANATION
 ⊕ B-11/
 MW-1 Boring/monitoring well

B-13/
 MW-3
 ⊕



Source: site plans by Chevron USA, Inc.



PROJECT NO. 17068.02

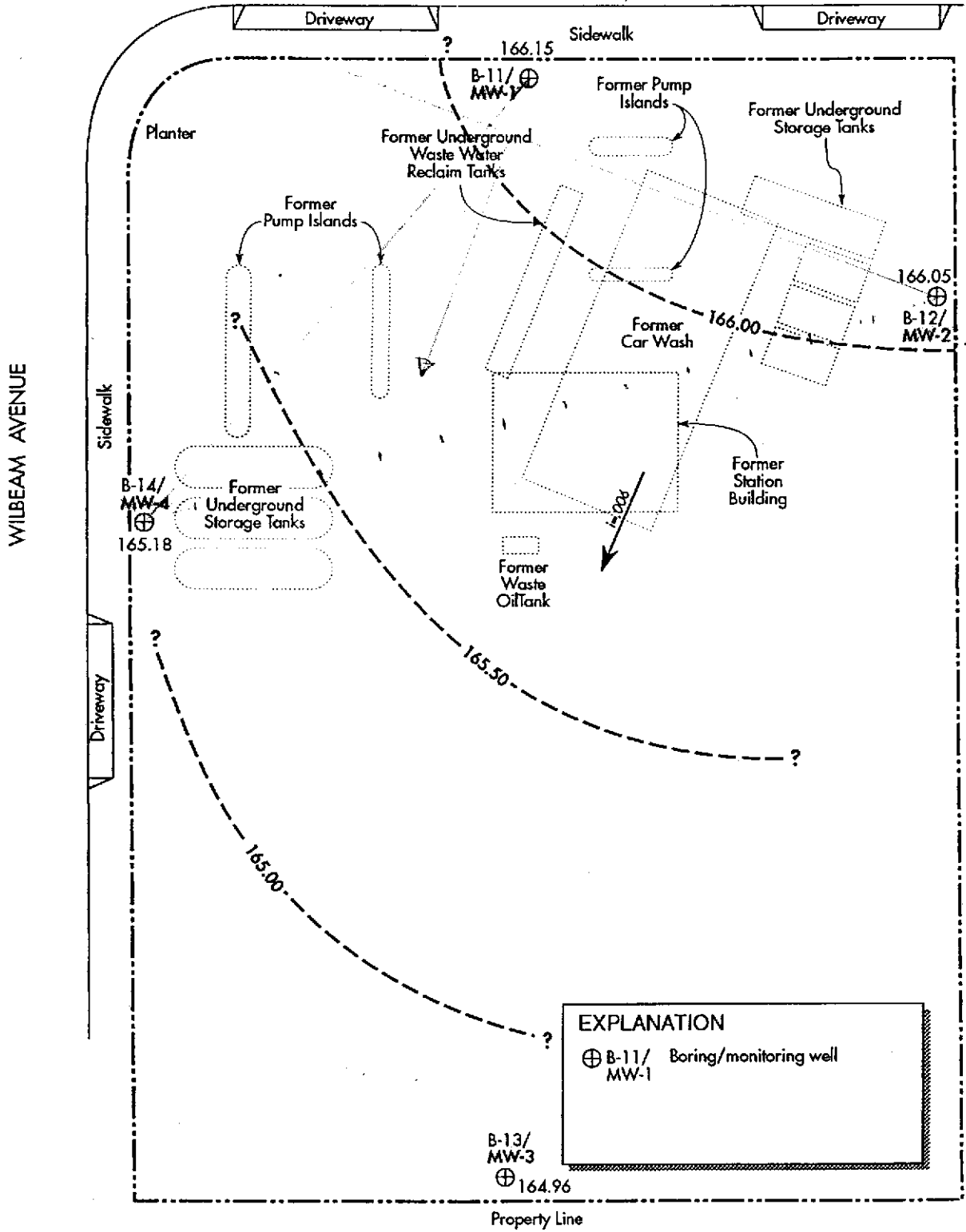
8/93

GENERALIZED SITE PLAN
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

PLATE

2

CASTRO VALLEY BOULEVARD



EXPLANATION
 ⊕ B-11/ MW-1 Boring/monitoring well



Source: site plans by Chevron USA, Inc.

RESNA

PROJECT NO. 17068.02 8/93

POTENTIOMETRIC SURFACE OF SHALLOW GROUNDWATER 10/29/93
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard

PLATE
3



ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE

PLEASANTON, CALIFORNIA 94588

VOICE (510) 484-2600

FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT

3369 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CA.

PERMIT NUMBER 93433

LOCATION NUMBER _____

CLIENT

Name CHEVRON USA
Address 2410 CAMINO RAMON Voice _____
City SAN RAMON, CA Zip 94583

PERMIT CONDITIONS

Circled Permit Requirements Apply

APPLICANT

Name RESNA INDUSTRIES Fax (415) 382-7415
Address 73 DIGITAL DR. Voice (415) 382-7400
City NOVATO, CA. Zip 94949

A. GENERAL

1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

TYPE OF PROJECT

Well Construction	Geotechnical Investigation
Cathodic Protection _____	General <input checked="" type="checkbox"/>
Water Supply _____	Contamination _____
Monitoring <input checked="" type="checkbox"/>	Well Destruction _____

B. WATER WELLS, INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

PROPOSED WATER SUPPLY WELL USE

Domestic _____	Industrial _____	Other _____
Municipal _____	Irrigation _____	

- C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.
- D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.
- E. WELL DESTRUCTION. See attached.

DRILLING METHOD:

Mud Rotary _____ Air Rotary _____ Auger

Cable _____ Other _____

DRILLER'S LICENSE NO. #482390

WELL PROJECTS

Drill Hole Diameter	<u>8"</u> in.	Maximum	
Casing Diameter	<u>2"</u> in.	Depth	<u>20</u> ft.
Surface Seal Depth	<u>5</u> ft.	Number	<u>4</u>

GEOTECHNICAL PROJECTS

Number of Borings	_____	Maximum	
Hole Diameter	_____ in.	Depth	_____ ft.

ESTIMATED STARTING DATE 8/23/93

ESTIMATED COMPLETION DATE 8/24/93

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

Approved Wyman Hong Date 4 Aug 93
Wyman Hong

APPLICANT'S SIGNATURE

[Signature]

APPENDIX B

FIELD PROCEDURES

FIELD PROTOCOLS

The following presents RESNA Industries' field protocol for a typical site investigation involving gasoline hydrocarbon-impacted soil and/or groundwater.

Site Safety Plan

The Site Safety Plan describes the safety requirements for the evaluation of gasoline hydrocarbons in soil, groundwater, and the vadose-zone at the site. The site Safety Plan is applicable to personnel of RESNA Industries and its subcontractors. RESNA Industries personnel and subcontractors of RESNA Industries scheduled to perform the work at the site are briefed on the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is available for reference by appropriate parties during the work. A site Safety Officer is assigned to the project.

Soil Borings

Prior to the drilling of borings and construction of monitoring wells, permits are acquired from the appropriate regulatory agency. In addition to the above-mentioned permits, encroachment permits from the City or State are acquired if drilling of borings offsite on City or State property is necessary. Copies of the permits are included in the appendix of the project report. Prior to drilling, Underground Service Alert (USA) is notified of our intent to drill, and known underground utility lines and structures are approximately marked.

The borings are drilled by a truck-mounted drill rig equipped with 8- or 10-inch-diameter, solid-stem or hollow-stem augers. Other methods such as rotary or casing hammer may be used if special conditions are encountered. The augers, sampling equipment and other equipment that comes into contact with the soil are steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. Sampling equipment is cleaned with a trisodium phosphate solution and rinsed with clean water between samples. After drilling the borings, monitoring wells are constructed in the borings, or neat-cement grout with bentonite is used to backfill the borings to the ground surface.

Borings for groundwater monitoring wells are drilled to a depth of no more than 20 feet below the depth at which a saturated zone is first encountered, or a short distance into a stratum beneath the saturated zone which is of sufficient texture, moisture, and consistency to be judged as a perching layer by the field geologist, whichever is shallower. Drilling into a deeper aquifer below the shallowest aquifer is begun only after a conductor casing is properly installed and allowed to set, to seal the shallow aquifer.

Drill Cuttings

Drill cuttings subjectively evaluated as containing gasoline hydrocarbons at levels greater than 100 parts per million (ppm) are separated from those subjectively evaluated as containing gasoline hydrocarbons at levels less than 100 ppm. Evaluation is based either on subjective evidence of soil discoloration, or on measurements made using a field calibrated OVM. Readings are taken by placing a soil sample into a ziplock-type plastic bag and allowing volatilization to occur. The intake probe of the OVM is then inserted into the headspace created in the plastic bag immediately after opening it. The drill cuttings from the borings are placed in labeled 55-gallon drums approved by the Department of Transportation, or on plastic at the site, and covered with plastic. The cuttings remain the responsibility of the client.

Soil Sampling in Borings

Soil samples are collected at no greater than 5-foot intervals from the ground surface to the total depth of the borings. The soil samples are collected by advancing the boring to a point immediately above the sampling depth, and then driving a California-modified, split-spoon sampler containing brass sleeves through the hollow center of the auger into the soil. (A standard penetrometer, which does not contain liners, may be used to collect samples when laboratory analysis for volatile components is not an issue. The sampler and brass sleeves are laboratory-cleaned, steam-cleaned, or washed thoroughly with Alconox® and water, prior to each use. The sampler is driven with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive six inches are counted and recorded to evaluate the relative consistency of the soil. When necessary, the sampler may be pushed by the drill rig hydraulics. In this case, the pressure exerted (in pounds per square inch) is recorded.

The samples selected for laboratory analysis are removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and plastic zip-lock bags or aluminized duct tape. The samples are then labeled, promptly placed in iced storage, and delivered to a laboratory certified by the State of California to perform the analyses requested.

One of the samples in brass sleeves not selected for laboratory analysis at each sampling interval is tested in the field using an OVM that is field calibrated at the beginning of each day it is used. This testing is performed by inserting the intake probe of the OVM into the headspace in the plastic bag containing the soil sample as described in the Drill Cuttings section above. The OVM readings are presented in Logs of Borings included in the project report.

Logging of Borings

A geologist is present to log the soil cuttings and samples using the Unified Soil Classification System. Samples not selected for chemical analysis, and the soil in the sampler shoe, are extruded in the field for inspection. Logs include texture, color, moisture, plasticity, consistency, blow counts, and any other characteristics noted. Logs also include subjective evidence for the presence of gasoline hydrocarbons; such as soil staining, noticeable or obvious product odor, and OVM readings.

Sampling of Stockpiled Soil

One composite soil sample is collected for each 50 cubic yards of stockpiled soil, and for each individual stockpile composed of less than 50 cubic yards. Composite soil samples are obtained by first evaluating relatively high, average, and low areas of hydrocarbon concentration by digging approximately one to two feet into the stockpile and placing the intake probe of a field calibrated OVM against the surface of the soil; and then collecting one sample from the "high" reading area, and three samples from the "average" areas. Samples are collected by removing the top one to two feet of soil, then driving laboratory-cleaned brass sleeves into the soil. The samples are sealed in the sleeves using aluminum foil, plastic caps, and plastic zip-lock bags or aluminized duct tape; labeled; and promptly placed in iced storage for transport to the laboratory, where compositing is performed.

Monitoring Well Construction

Monitoring wells are constructed in selected borings using clean 2- or 4-inch-diameter, thread-jointed, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents are used in well construction. Each casing bottom is sealed with a threaded end-plug, and each casing top with a locking plug. The screened portions of the wells are constructed of machine-slotted PVC casing with 0.020-inch-wide (typical) slots for initial site wells. Slot size for subsequent wells may be based on sieve analysis and/or well development data. The screened sections in groundwater monitoring wells are placed to allow monitoring during seasonal fluctuations of groundwater levels.

The annular space of each well is backfilled with No. 2 by 12 sand or similar sorted sand (groundwater monitoring wells), or pea gravel (vapor extraction wells) to approximately two feet above the top of the screened casing for initial site wells. The sand pack grain size for subsequent wells may be based on sieve analysis and/or well development data. A 1- to 2-foot-thick bentonite plug is placed above the sand as a seal against cement entering the filter pack. The remaining annulus is then backfilled with a slurry of water, neat cement, and bentonite to approximately one foot below the ground surface.

An aluminum utility box with a PVC apron is placed over each wellhead and set in concrete placed flush with the surrounding ground surface. Each wellhead cover has a seal to protect the monitoring well against surface-water infiltration and requires a special wrench to open. The design discourages vandalism and reduces the possibility of accidental disturbance of the well.

Groundwater Monitoring Well Development

The monitoring wells are developed by bailing or over-pumping and surge-block techniques. The wells are either bailed or pumped, allowed to recharge, and bailed or pumped again until the water removed from the wells is determined to be clear. Turbidity measurements (in NTUs) are recorded during well development and are used in evaluating well development. The development method used, initial turbidity measurement, volume of water removed, final turbidity measurement, and other pertinent field data and observations are recorded. The wells are allowed to equilibrate for at least 48 hours after development prior to sampling. Water generated by well development is stored in 17E Department of Transportation (DOT) 55-gallon drums on site, and remains the responsibility of the client.

Groundwater Sampling

The static water level in each well is measured to the nearest 0.01-foot using a Solinst® electric water-level sounder or oil/water interface probe (if the wells contain floating product) cleaned with Alconox® and water before use in each well. The depth of each well is also measured. The liquid in the wells is examined for visual evidence of gasoline hydrocarbons by gently lowering approximately half the length of a Teflon® bailer (cleaned with Alconox® and water) past the air/water interface. The sample is then retrieved and inspected for floating product, sheen, emulsion, color, sediment, and clarity. Obvious product odor is recorded if noted. If floating product is present in the well, the thickness of floating product is measured using an oil/water interface probe and is recorded to the nearest 0.01 foot. Floating product is removed from wells on site visits.

Groundwater samples from the wells are collected in approximate order of increasing product concentration, as best known or estimated. Wells which do not contain floating product are purged using a submersible pump. Equipment which comes in contact with the interior of the well or the groundwater is cleaned with Alconox® and deionized or distilled water prior to use in each well.

The wells are purged until withdrawal is of sufficient duration to result in stabilized pH, temperature, and electrical conductivity of the water. These parameters are measured to the nearest 0.1 pH unit, 0.1 degree F, and 10 umhos/cm, respectively, using portable meters calibrated daily to a buffer and conductivity standard, according to the manufacturer's specifications. A minimum of four well volumes is purged from each well. If the well becomes dewatered, the water level is allowed to recover to at least 80 percent of the initial water level. When recovery of the water level has not reached at least 80 percent of the static water level after two hours, a groundwater sample will be collected when sufficient volume is available to fill the sample container. Prior to the collection of each groundwater sample, the Teflon® bailer is cleaned with Alconox® and rinsed with tap water and deionized water, and the latex gloves worn by the sampler changed. Hydrochloric acid is added to the sample vials as a preservative (when applicable). Sample containers remain sealed until usage at the site. A sample method blank is collected by pouring distilled water into the bailer and then into sample vials. Method blanks are analyzed periodically to verify effective cleaning procedures. A sample of the formation water is then collected from the surface of the water in each of the wells using the Teflon® bailer. The water samples are then gently poured into laboratory-cleaned, 40-milliliter (ml) glass vials, 500 ml plastic bottles or 1-liter glass bottles (as required for specific laboratory analysis), sealed with Teflon®-lined caps, and inspected for air bubbles to check for headspace, which would allow volatilization to occur. If a bubble is evident, the cap is removed, more sample is added, and the bottle resealed. The samples are then labeled and promptly placed in iced storage, and the wellhead is secured. A field log documenting sampling procedures and parameter monitoring is maintained. Water generated by the purging of wells is stored in 17E DOT 55-gallon drums, and floating product bailed from the wells is stored in double containment onsite; this water and product remains the responsibility of the client.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, unique sample location, depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record is initiated by the field geologist and updated throughout handling of the samples, and accompanies the samples to a laboratory certified by the State of California for the analyses requested. Samples are transported to the laboratory promptly to help ensure that recommended sample holding times are not exceeded. Samples are properly disposed of after their useful life has expired.

Quality Assurance/Quality Control

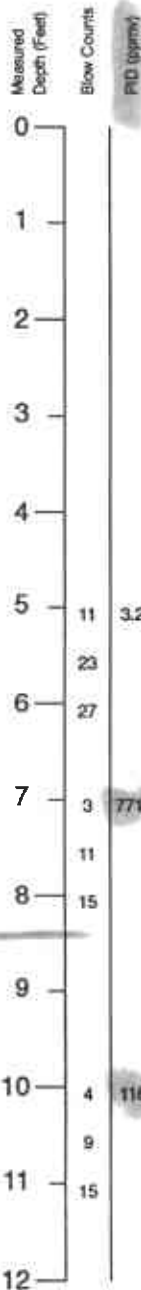
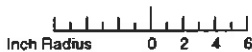
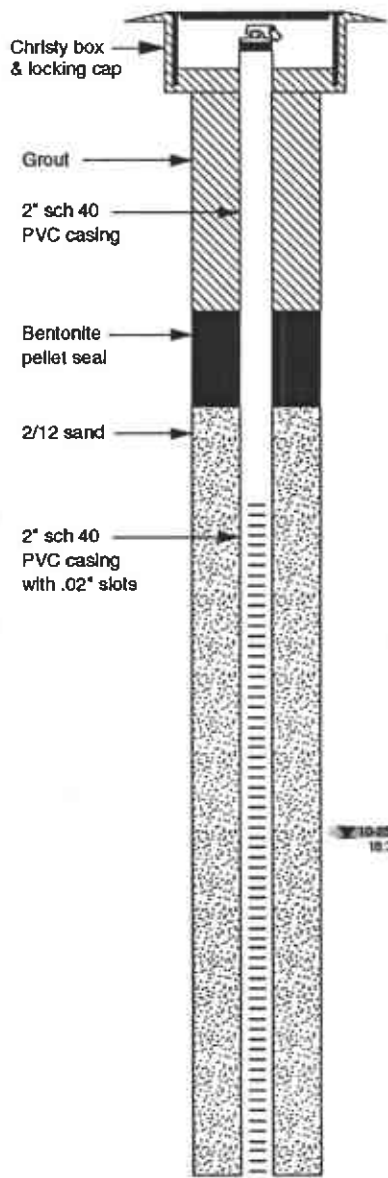
The sampling and analysis procedures employed by RESNA for groundwater sampling and monitoring follow regulatory guidance for quality assurance/quality control (QA/QC). Quality control is maintained by site-specific field protocols and quality control checks performed by the laboratory. Laboratory and field handling of samples may be monitored by including QC samples for analysis. QC samples may include any combination of the following. The number and types of QC samples are selected and analyzed on a project-specific basis.

Trip blanks - Trip blanks are sent to the project site, and travel with project site samples. They are not opened, and are returned from a project site with the samples for analysis.

Field blank - Prepared in the field using organic-free water. Field blanks accompany project site samples to the laboratory and are analyzed periodically for specific chemical compounds present at the project site where they were prepared.

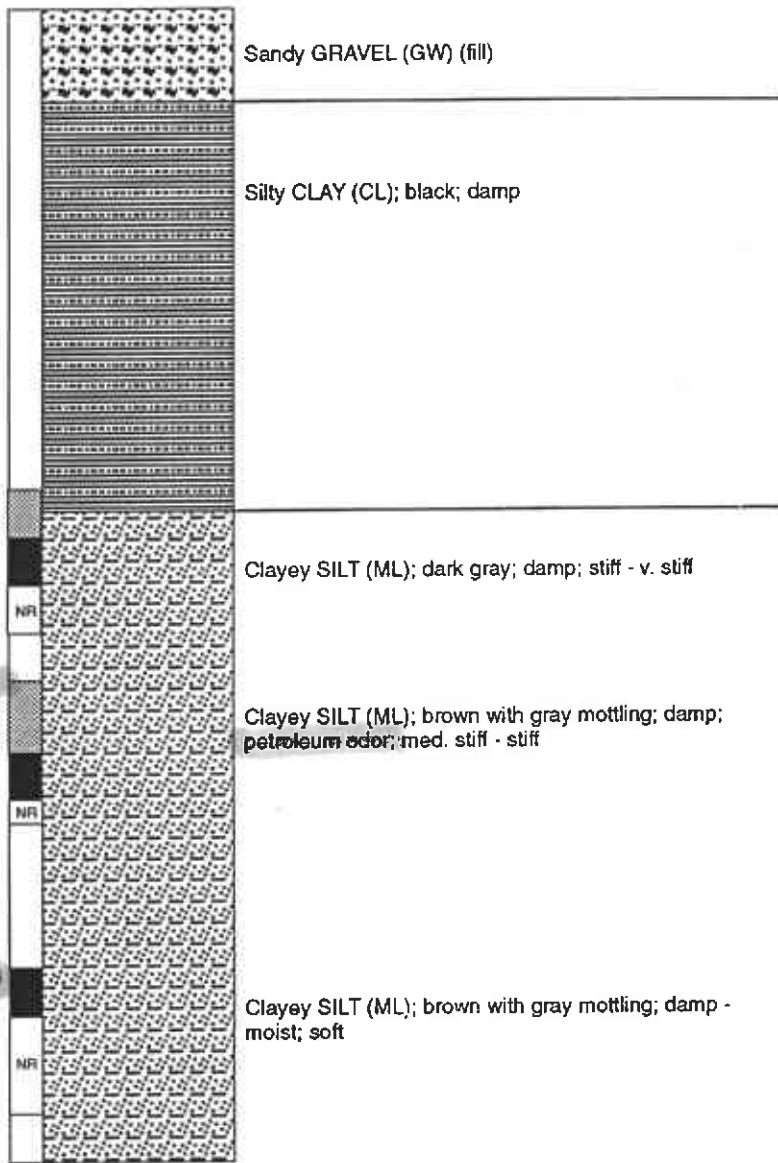
Duplicates - Duplicate samples are collected from a selected well and project site. They are analyzed at two different laboratories, or at the same laboratory under different labels.

Equipment blank - Periodic QC samples are collected from field equipment rinsate to verify adequate cleaning procedures.



GRAPHIC LOG

DESCRIPTION



continues

EXPLANATION

- Recovered drill sample
- Sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Core sample
- est K Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR No recovery
- Water level during drilling
- Water level in completed well

CONTACTS:

- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

Logged by: Erich Neupert
 Project Mgr: Justin Power
 Dates Drilled: 10/25/93

Drilling Company: Kvilhaug
 Drilling Method: 8" Hollow Stem Auger
 Driller: Paul Santos

Well Head Completion: Christy box & locking cap
 Type of Sampler: 1 1/2" 2 1/2" split spoon
 TD (Total Depth): 20.5 feet



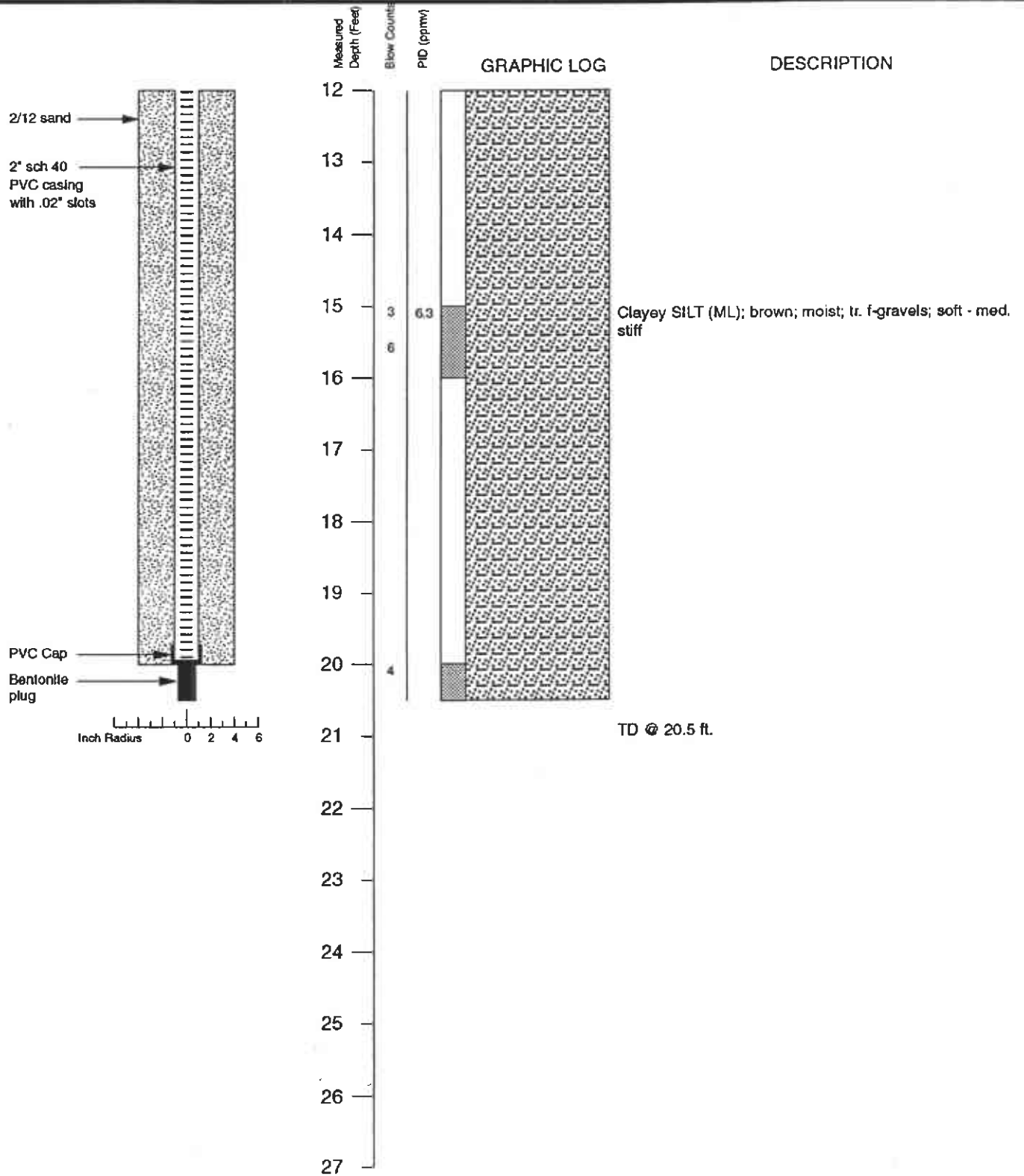
PROJECT NO. 17068.02

11/93

BORING LOG—Boring B-11 (Monitoring Well) Former Chevron Service Station No. 9-4930 3369 Castro Valley Boulevard Castro Valley, California

BORING

B-11



EXPLANATION

	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity)	CONTACTS:
	Sample sealed for chemical analysis	1K = primary 2K = secondary		
	Sieve sample	NR	No recovery Dotted where approximate
	Grab sample		Water level during drilling	- - - Dashed where uncertain
	Core sample		Water level in completed well	////// Hachured where gradational

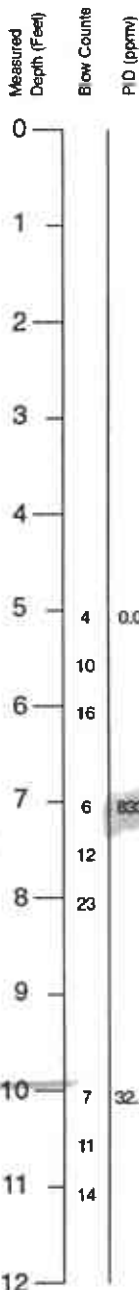
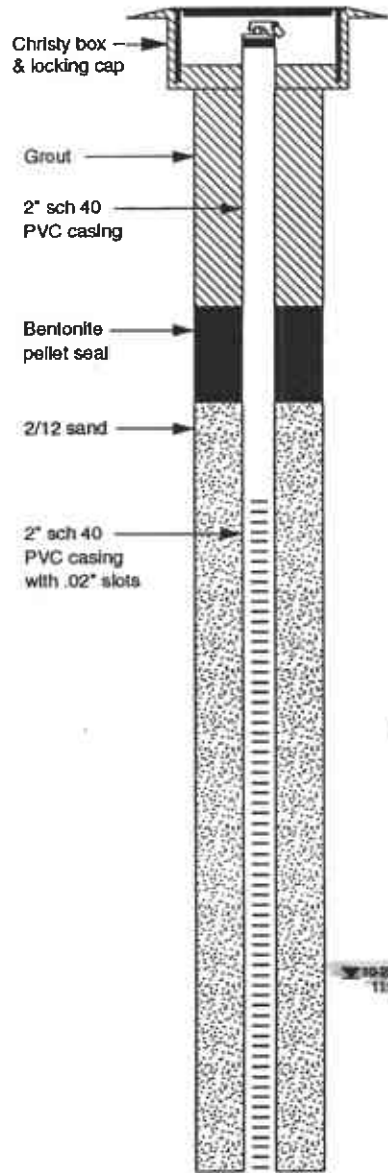


BORING LOG—Boring B-11 (Monitoring Well MW-1)
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

BORING
B-11

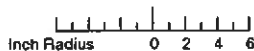
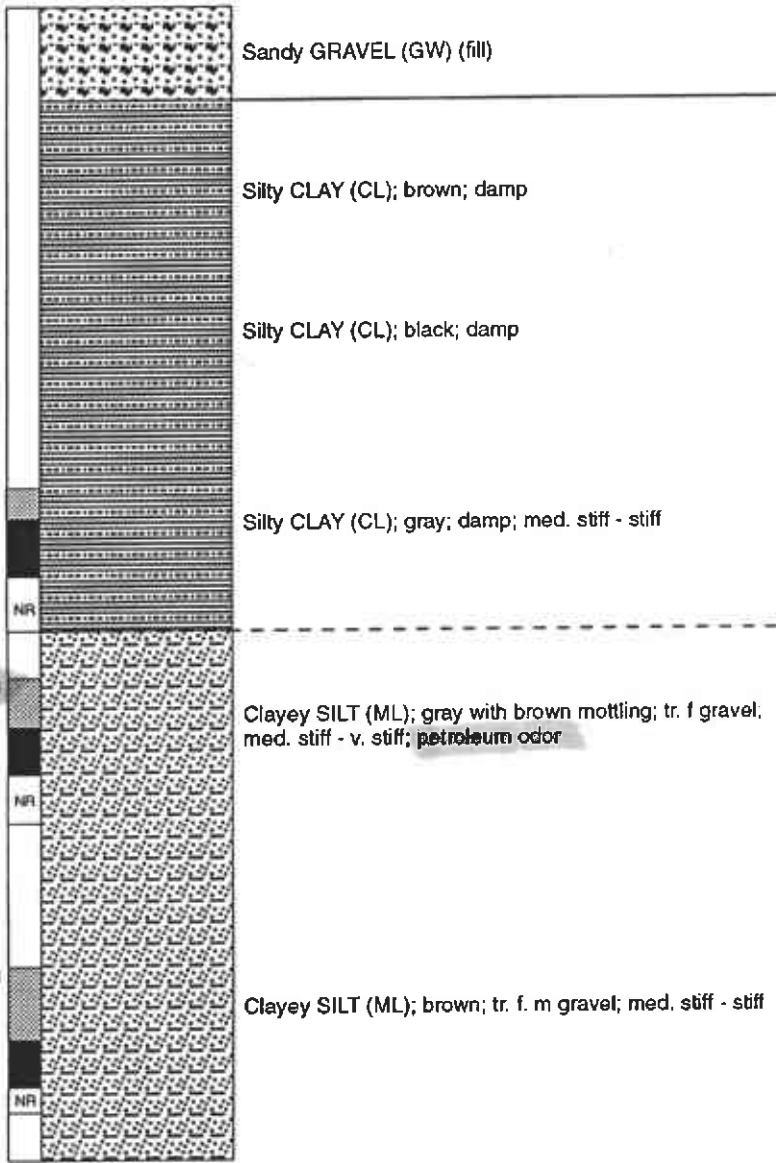
PROJECT NO. 17068.02

11/93



GRAPHIC LOG

DESCRIPTION



continues

EXPLANATION

	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
	Sample sealed for chemical analysis		
	Sieve sample	NR	No recovery
	Grab sample	∇	Water level during drilling
	Core sample	∇	Water level in completed well

CONTACTS:

	Solid where certain
	Dotted where approximate
	Dashed where uncertain
	Hachured where gradational

Logged by:	Erich Neupert
Project Mgr:	Justin Power
Dates Drilled:	10/25/93
Drilling Company:	Kvilhaug
Drilling Method:	8" Hollow Stem Auger
Driller:	Paul Santos
Well Head Completion:	Christy box & locking cap
Type of Sampler:	1 1/2" 2 1/2" split spoon
TD (Total Depth):	21.5 feet



PROJECT NO. 17068.02

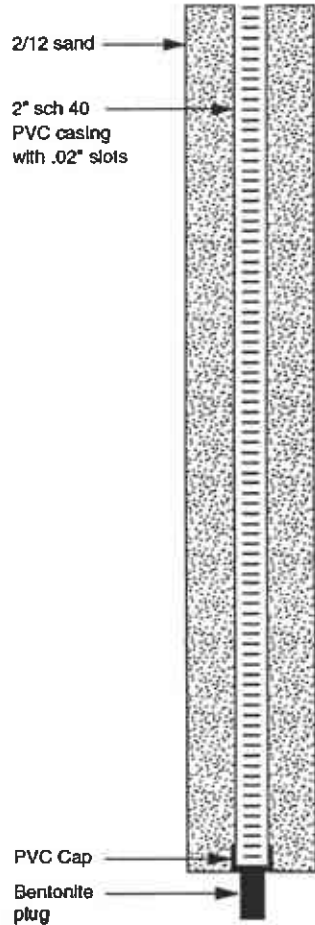
11/93

BORING LOG—Boring B-12 (Monitoring Well MW-2)

Former Chevron Service Station No. 9-4930
3369 Castro Valley Boulevard
Castro Valley, California

BORING

B-12

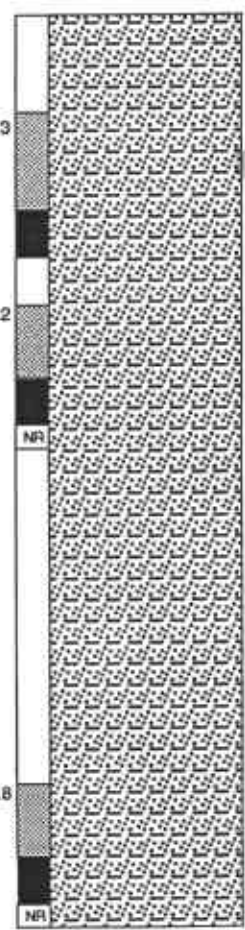


Measured Depth (feet)
 Blow Count
 PID (ppmv)

12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27

GRAPHIC LOG

DESCRIPTION



Clayey SILT (ML); brown; damp; stiff - hard; trace fine-gravel

Clayey SILT (ML); brown; damp - moist on bottom; stiff - v. stiff

Clayey SILT (ML); brown; moist; stiff - v. stiff

10.25-21
16.05

TD @ 21.5 ft.

EXPLANATION		CONTACTS:	
	Recovered drill sample	—	Solid where certain
	Sample sealed for chemical analysis	Dotted where approximate
	Sieve sample	- - -	Dashed where uncertain
	Grab sample	////	Hachured where gradational
	Core sample		
est K	Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary		
NR	No recovery		
	Water level during drilling		
	Water level in completed well		

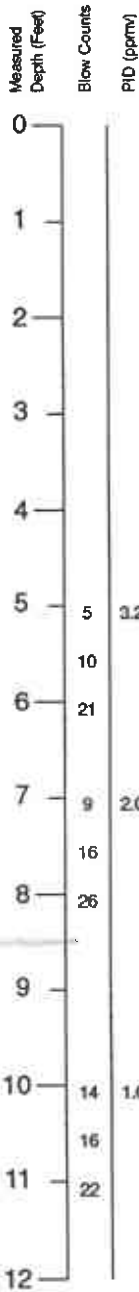
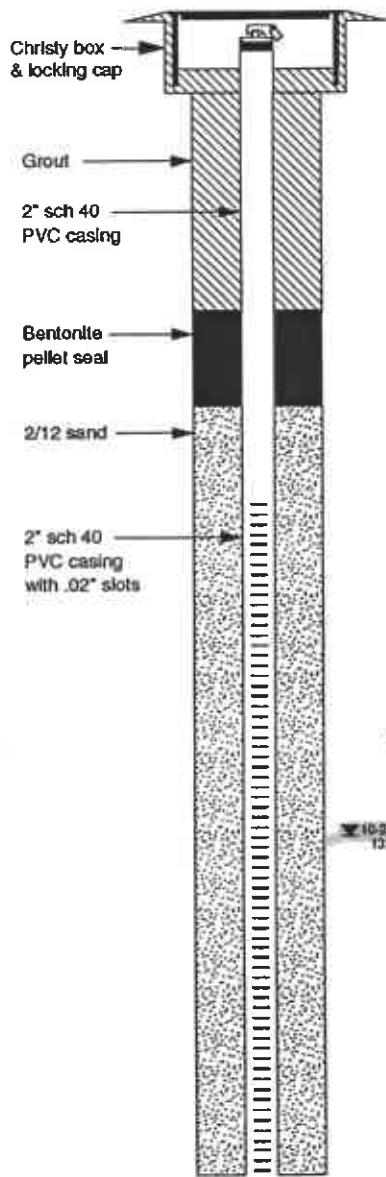


BORING LOG—Boring B-12 (Monitoring Well MW-2)
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

BORING
B-12

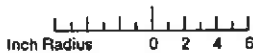
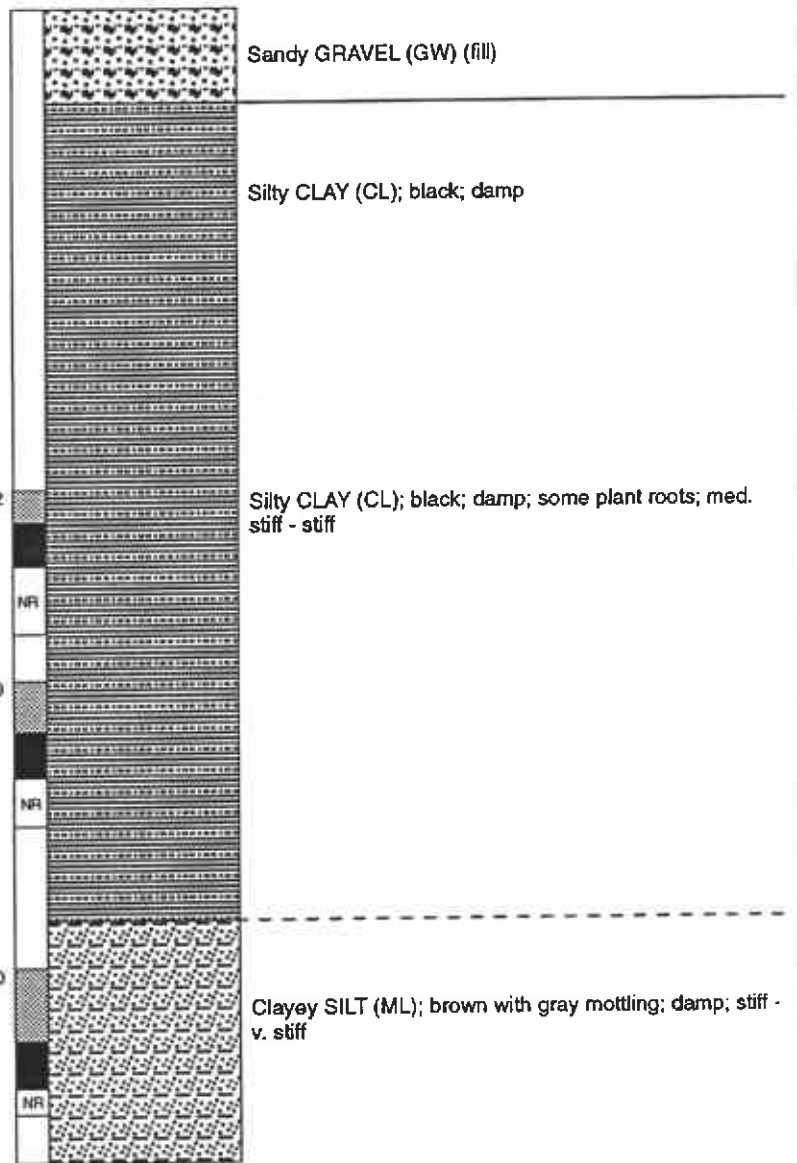
PROJECT NO. 17068.02

11/93



GRAPHIC LOG

DESCRIPTION



continues

EXPLANATION

- Recovered drill sample
- Sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Core sample
- est K Estimated permeability (hydraulic conductivity)
1K = primary 2K = secondary
- NR No recovery
- Water level during drilling
- Water level in completed well

CONTACTS:

- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

Logged by: Erich Neupert
Project Mgr: Justin Power
Dates Drilled: 10/25/93

Drilling Company: Kvilhaug
Drilling Method: 8" Hollow Stem Auger
Driller: Paul Santos

Well Head Completion: Christy box & locking cap
Type of Sampler: 1 1/2" 2 1/2" split spoon
TD (Total Depth): 21.5 feet



BORING LOG—Boring B-13 (Monitoring Well MW-3)

Former Chevron Service Station No. 9-4930
3369 Castro Valley Boulevard
Castro Valley, California

BORING

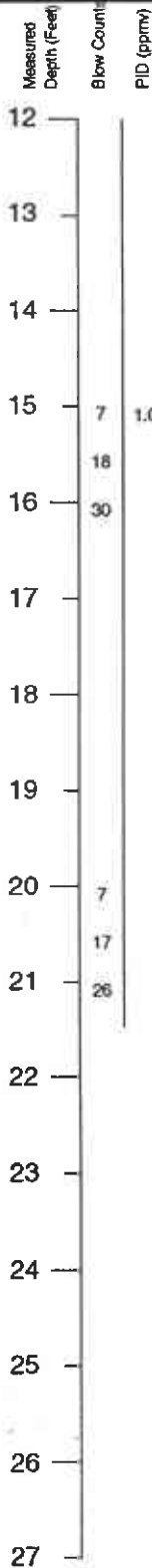
B-13

PROJECT NO. 17068.02

11/93

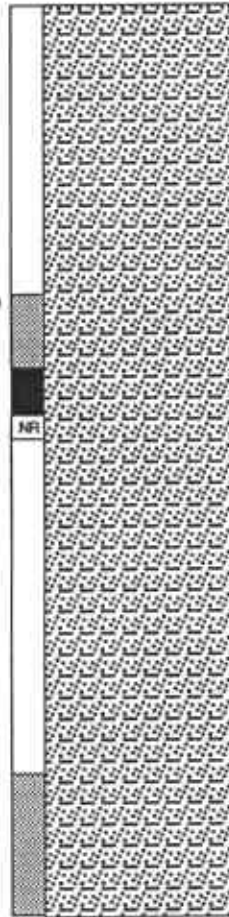
2/12 sand
 2" sch 40
 PVC casing
 with .02" slots

PVC Cap
 Bentonite
 plug



GRAPHIC LOG

DESCRIPTION



Clayey SILT (ML); brown with gray mottling; damp - moist; med. stiff - v. stiff

TD @ 21.5 ft.

EXPLANATION

	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity)	CONTACTS: ——— Solid where certain Dotted where approximate - - - Dashed where uncertain // // // Hachured where gradational
	Sample sealed for chemical analysis	1K = primary 2K = secondary		
	Sieve sample	NR	No recovery	
	Grab sample	∇	Water level during drilling	
	Core sample	∇	Water level in completed well	

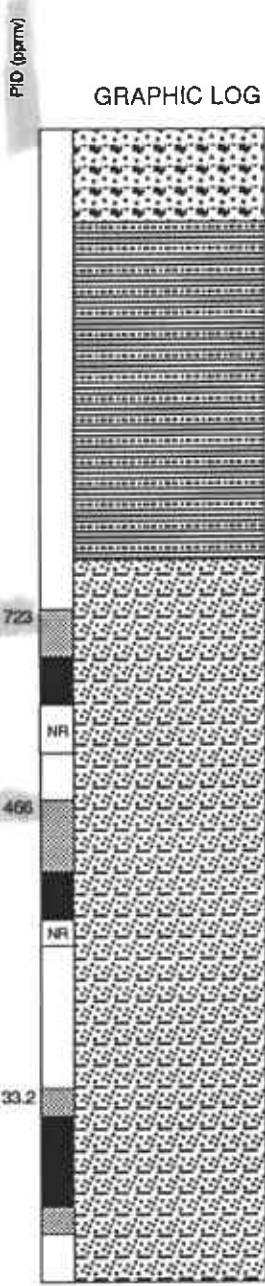
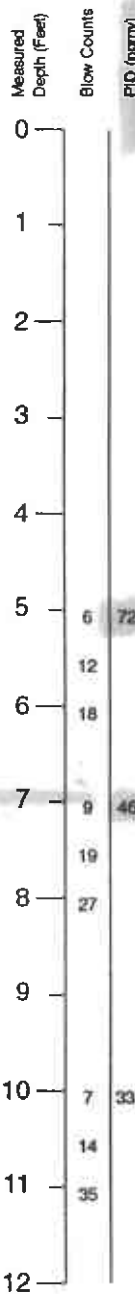
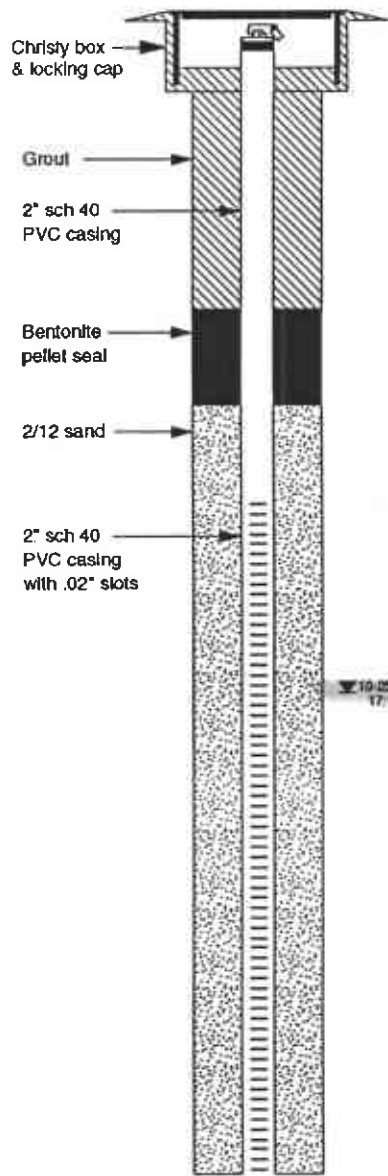


BORING LOG—Boring B-13 (Monitoring Well MW-3)
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

BORING
B-13

PROJECT NO. 17068.02

11/93



DESCRIPTION

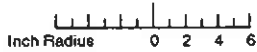
0 - 1 Sandy GRAVEL (GW) (fill)

1 - 3 Silty CLAY (CL); black; damp

3 - 6 Clayey SILT (ML); gray; med. stiff - stiff; petroleum odor

6 - 8 Clayey SILT (ML); brown with gray mottling; mid. stiff - v. stiff

8 - 10 Clayey SILT (ML); brown with gray mottling; damp; stiff - v. stiff



continues

EXPLANATION

- Recovered drill sample
- Sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Core sample
- est K Estimated permeability (hydraulic conductivity)
1K = primary 2K = secondary
- NR No recovery
- Water level during drilling
- Water level in completed well

CONTACTS

- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

Logged by: Erich Neupert
 Project Mgr: Justin Power
 Dates Drilled: 10/25/93

Drilling Company: Kvilhaug
 Drilling Method: 8" Hollow Stem Auger
 Driller: Paul Santos

Well Head Completion: Christy box & locking cap
 Type of Sampler: 1 1/2" 2 1/2" split spoon
 TD (Total Depth): 21.5 feet



PROJECT NO. 17068.02

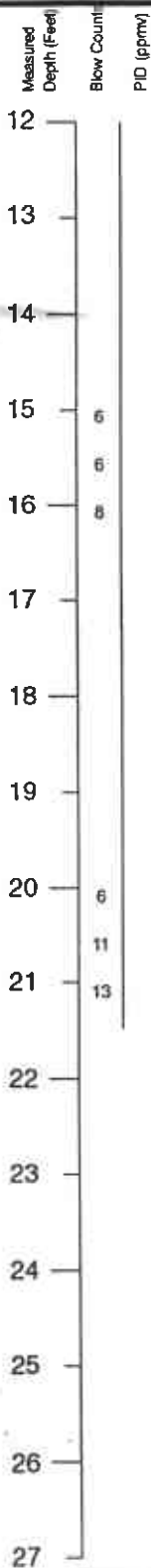
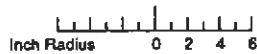
11/93

BORING LOG—Boring B-14 (Monitoring Well MW-4)
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

**BORING
B-14**

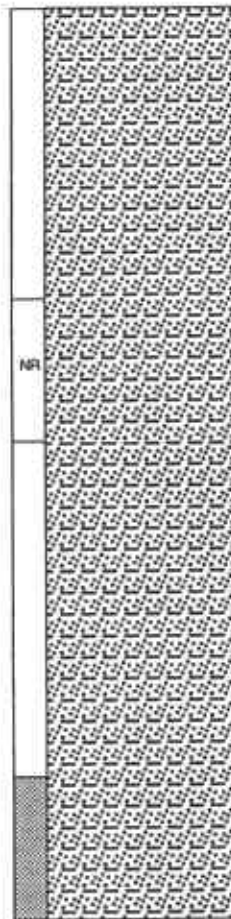
2/12 sand
 2" sch 40
 PVC casing
 with .02" slots

PVC Cap
 Bentonite
 plug



GRAPHIC LOG

DESCRIPTION



No Recovery

Clayey SILT (ML); brown; med. stiff - stiff

TD @ 21.5 ft.

EXPLANATION

- | | | | |
|--|-------------------------------------|-----------------------------|---|
| | Recovered drill sample | est K | Estimated permeability (hydraulic conductivity) |
| | Sample sealed for chemical analysis | 1K = primary 2K = secondary | |
| | Sieve sample | NR | No recovery |
| | Grab sample | | Water level during drilling |
| | Core sample | | Water level in completed well |

CONTACTS:

- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradual



BORING LOG—Boring B-14 (Monitoring Well MW-4)
 Former Chevron Service Station No. 9-4930
 3369 Castro Valley Boulevard
 Castro Valley, California

BORING
B-14

PROJECT NO. 17068.02

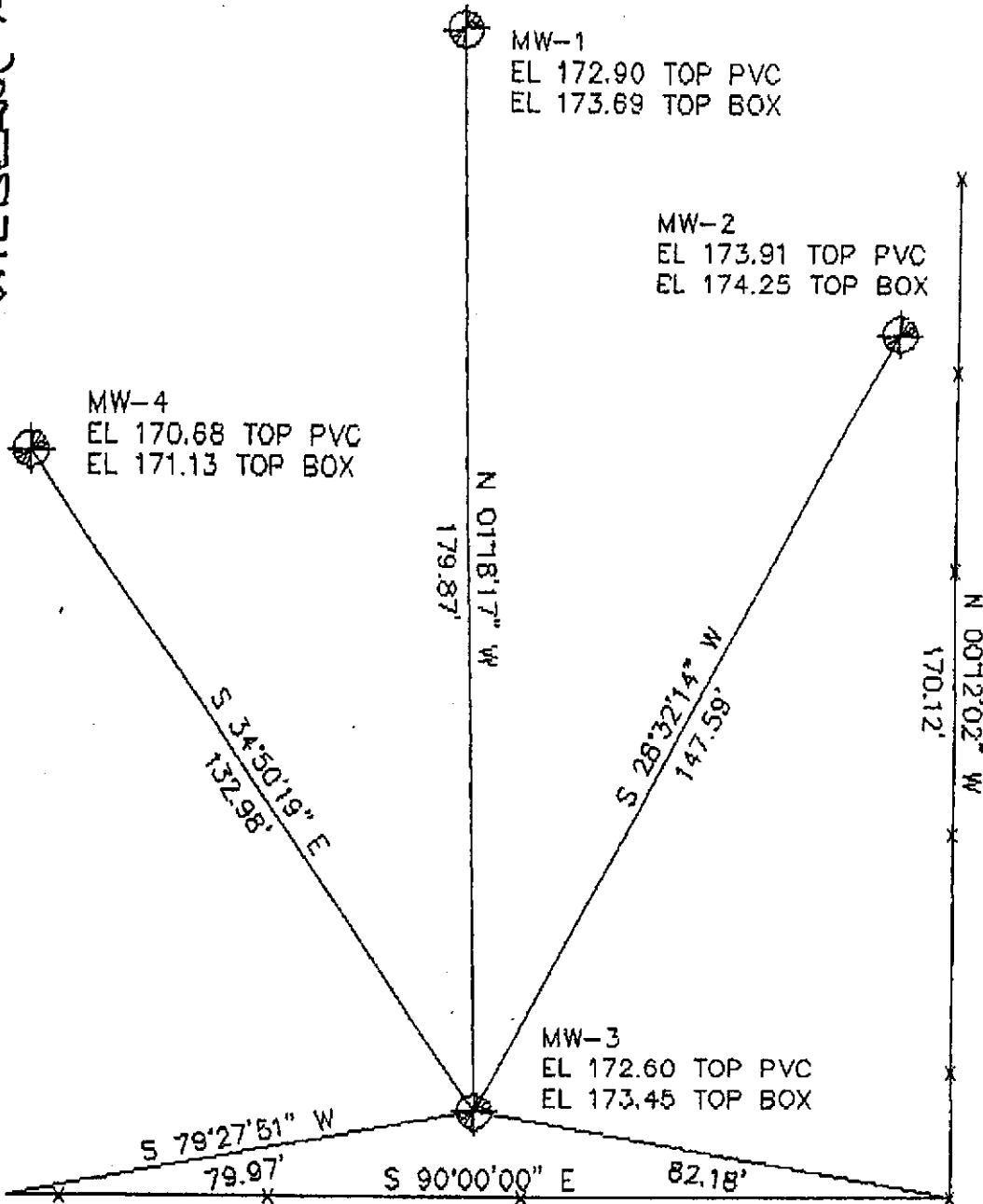
11/93

WORKSHEET

RSNA Proj 1706802 3369 C.V. BLVD
(FORMER CHEVRON STATION)

CASTRO VALLEY BLVD

WILBEAM AVE



SCALE 1" = 30'



APPENDIX E
LABORATORY ANALYTICAL REPORTS
AND CHAIN OF CUSTODY RECORDS



Superior Precision Analytical, Inc.

1555 Burke, Unit I • San Francisco, California 94124 • (415) 617-2081 / fax (415) 821-7123

Resna Industries
Attn: ERIC NEUPERT

Project 17068.02
Reported 11/09/93

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed Matrix
14907- 1	S6.0B11	10/25/93	11/05/93 Soil
14907- 4	S5.8B12	10/25/93	11/05/93 Soil
14907- 5	S8.0B12	10/25/93	11/08/93 Soil
14907- 9	S5.8B13	10/25/93	11/05/93 Soil
14907-10	S8.0B13	10/25/93	11/05/93 Soil
14907-13	S6.0B14	10/25/93	11/05/93 Soil

RESULTS OF ANALYSIS

Laboratory Number: 14907- 1 14907- 4 14907- 5 14907- 9 14907-10

Gasoline:	ND<1	ND<1	100	ND<1	ND<1
Benzene:	ND<.005	ND<.005	ND<0.05	ND<.005	ND<.005
Toluene:	ND<.005	ND<.005	0.18	ND<.005	ND<.005
Ethyl Benzene:	ND<.005	ND<.005	0.45	ND<.005	ND<.005
Total Xylenes:	ND<.015	ND<.015	3.6	ND<.015	ND<.015
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg

Laboratory Number: 14907-13

Gasoline:	530
Benzene:	ND<0.25
Toluene:	0.48
Ethyl Benzene:	4.5
Total Xylenes:	18
Concentration:	mg/kg



Superior Precision Analytical, Inc.

1555 Burke, Unit 1 • San Francisco, California 94124 • (415) 647 2081 / fax (415) 821 7123

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

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

Page 2 of 2
QA/QC INFORMATION
SET: 14907

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
mg/kg = parts per million (ppm)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Soil: 50mg/kg

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Soil: 1mg/kg

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Soil: 1mg/kg

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Soil: 0.005mg/kg

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	98/94	4%	75-111
Benzene:	107/115	7%	72-105
Toluene:	110/116	5%	75-111
Ethyl Benzene:	108/114	5%	78-110
Total Xylenes:	99/103	4%	69-117

Senior Chemist
Account Manager



Superior Precision Analytical, Inc.

1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

Resna Industries
Attn: ERIC NEUPERT

Project 17068.02
Reported 11/09/93

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed Matrix
14912- 1	MW-1	10/29/93	11/08/93 Water
14912- 2	MW-2	10/29/93	11/08/93 Water
14912- 3	MW-3	10/29/93	11/09/93 Water
14912- 4	MW-4	10/29/93	11/08/93 Water
14912- 5	TB-LB	10/29/93	11/08/93 Water

RESULTS OF ANALYSIS

Laboratory Number: 14912- 1 14912- 2 14912- 3 14912- 4 14912- 5

Gasoline:	1000	5600	*110	640	ND<50
Benzene:	11	140	ND<0.5	6.7	ND<0.5
Toluene:	17	3.2	ND<0.5	3.3	ND<0.5
Ethyl Benzene:	32	17	ND<0.5	0.6	ND<0.5
Total Xylenes:	110	330	ND<1.5	6.7	ND<1.5
Concentration:	ug/L	ug/L	ug/L	ug/L	ug/L



Superior Precision Analytical, Inc.

1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

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

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

Page 2 of 2
QA/QC INFORMATION
SET: 14912

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	107/102	5%	75-125
Benzene:	100/105	5%	75-125
Toluene:	105/107	2%	75-125
Ethyl Benzene:	106/111	5%	75-125
Total Xylenes:	97/100	3%	75-125

*Does not match typical gasoline pattern.

Janis A. Nwagor
Senior Chemist
Account Manager

Fax copy of Lab Report and COC to Chevron Contact: Yes No

Chain-of-Custody-Record ¹⁴⁷¹²

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number 9-4930
Facility Address 3369 CASTRO VALLEY BLVD. CASTRO VALLEY
Consultant Project Number 17068.02
Consultant Name RESNA FND.
Address 73 DIGITAL DR. NOVATO, CA. 94949
Project Contact (Name) ERICH NEUPERT
(Phone) (415)382-7400 (Fax Number) (415)382-7415

Chevron Contact (Name) KENNETH KAN
(Phone) (510) 842-8752
Laboratory Name SUPERIOR ANALYTICAL
Laboratory Release Number 9720771
Samples Collected by (Name) STEPHEN LEACH
Collection Date 10/29/93
Signature [Signature]

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil W = Water A = Air C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	Analyses To Be Performed										Remarks			
								BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd, Cr, Pb, Zn, Ni (ICAP or AA)						
MW-1		3	W		1:45	HCL	YES	X													
MW-2		3	W		2:25	HCL	YES	X													
MW-3		3	W		3:05	HCL	YES	X													
MW-4		3	W		3:45	HCL	YES	X													
TB-LB		1	W			HCL	YES	X													

Please Initial:
Samples Stored in Ice
Approved for Release
[Signatures]

Relinquished By (Signature) <u>[Signature]</u>	Organization <u>RESNA</u>	Date/Time <u>11/1/93 11:00</u>	Received By (Signature) <u>Doug Farnsworth</u>	Organization <u>AERO</u>	Date/Time <u>11/1/93 11:00 AM</u>	Turn Around Time (Circle Choice) 24 Hrs. 48 Hrs. 6 Days 10 Days <u>As Contracted</u>
Relinquished By (Signature) <u>Doug Farnsworth</u>	Organization <u>AERO</u>	Date/Time <u>11/1/93 2:30</u>	Received By (Signature)	Organization	Date/Time	
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature) <u>[Signature]</u>		Date/Time <u>11/1/93</u>	