Chevron

April 22, 1999

Chevron Products Company
6001 Bollinger Canyon Road
Building L, Room 1110
PO Box 6004
San Ramon, CA 94583-0904

Philip R. Briggs
Project Manager
Site Assessment & Remediation
Phone 925 842-9136
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Mr. Larry Seto
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Former Chevron Service Station #9-0100
2428 Central Avenue
Alameda, California

Dear Mr. Seto:

Enclosed is a copy of a Risk Management Plan (RMP), including a typical Health and Safety Plan, dated April 19, 1999, that was prepared by our consultant Gettler-Ryan, Inc. for the above noted site. This RMP was prepared as requested in your letter of December 17, 1999, and is to be used in the event that petroleum hydrocarbon impacted soil is disturbed at this site.

This RMP is to be used to provide protection for workers in the event of future construction or excavation activities. As noted in the RMP, before any development takes place at the site, development plans and a health and safety plan shall be submitted to the Alameda County Health Environmental Services for review and approval. The purpose of this measure is to assure that workers and the general public are protected from the potential hazards associated with subsurface petroleum hydrocarbon impact.

With receipt of the RMP, Chevron requests that the site be submitted to the Regional Board for closer. If you have any questions, call me at (925) 842-9136.

Sincerely,
CHEVRON PRODUCTS COMPANY

Philip R. Briggs
Site Assessment and Remediation Project Manager

Enclosure

GETTLER-RYAN INC.

RISK MANAGEMENT PLAN

for
Former Chevron Service Station #9-0100
2428 Central Avenue
Alameda, California

Project No. 345178.03-1

Prepared for:

Mr. Phil Briggs
Chevron Products Company
P.O. Box 6004
San Ramon, California

Prepared by:

Gettler-Ryan Inc.
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REGISTERED GEOLOGIST
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Project Manager

April 19, 1999

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APPENDIXES

1.0 INTRODUCTION

A corrective action evaluation was done for the site of the Former Chevron Service Station #9-0100 located at 22428 Central Avenue, Alameda, California. The evaluation was completed on behalf of Chevron Products Company by Gettler-Ryan Inc. (GR), and presented in documents titled *Risk-Based Corrective Action Applied At Former Chevron Service Station 9-0100, 2428 Central Avenue, Alameda, California* (GR Report #CH5178.02-1, dated April 17, 1997) and *Response to ACEHS Comments Regarding the Risk-Based Corrective Action (RBCA) Evaluation dated April 20, 1997, for the Former Chevron Service Station No. 9-0100, located at 2428 Central Avenue, Alameda, California* (GR Report #345178.02, dated March 3, 1998). Copies of these documents are included in Appendix A.

This document provides the Risk Management Plan (RMP) for the site as well as an example health and safety plan. In Section 2, the compounds of concern (COCs), risk, and sources of risk are summarized. In Section 3, risk management measures are developed. The RBCA evaluation that serves as a basis for this work is given in Appendix A, and figures showing the site location and relevant site features are provided in Appendix B. Appendix C contains the example health and safety plan.

2.0 RISK SUMMARY

2.1 Data

Data considered in preparing this RMP were summarized by GR in their document titled *Risk-Based Corrective Action Applied At Former Chevron Service Station 9-0100, 2428 Central Avenue, Alameda, California* (Appendix A). The summarized data were generated by Weiss Associates, GR, and others. Figures showing the hydrocarbon-affected areas are provided in Appendix B. Observations regarding the data are listed below.

- Soil samples collected above the water table do not appear to have been impacted by residual petroleum hydrocarbons. Soil samples collected from well borings MW-1 and MW-2 in 1994 contained detectable concentrations of petroleum hydrocarbons, but these samples were collected from below the historic groundwater low and reflect groundwater conditions, not unsaturated soil conditions.

- Dissolved hydrocarbons are present in groundwater beneath the site. Concentrations of Total Petroleum Hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene and total xylenes (BTEX) and methyl tert-butyl ether (MtBE) are detected in wells MW-1 and MW-2 at relatively consistent concentrations. Dissolved petroleum hydrocarbons have not been detected in upgradient well MW-3 or downgradient wells MW-4 through MW-6. This indicates that the plume configuration has been relatively stable for an extended period of time. Further, it suggests that biodegradation might be occurring at the leading edge of the plume, restricting downgradient migration.

- Evaluation of risks associated with MtBE are not included in the RBCA evaluation. USTs were removed in 1970 prior to the introduction of MtBE as a fuel additive.

2.2 Risk Summary

Risks at the site were evaluated by GR using Groundwater Services, Inc.'s RBCA Spreadsheet (version 1.01), based on American Society for Testing and Materials (ASTM) Standard E1739 for Risk-Based Corrective Action at Petroleum Release Sites (Appendix C). Risks identified by this evaluation are summarized:

- The RBCA evaluation identified exposure to hydrocarbon-impacted groundwater as the only complete risk pathway.
- Available analytical data indicate unsaturated soil is not impacted. The RBCA evaluation indicated there was not a risk of exposure to COCs due to dermal contact with or ingestion of soil.
- The RBCA evaluation indicated there was not a risk of exposure to COCs due to inhalation of soil vapor or dust.

Possible scenarios associated with public health and safety concerns include:

- Construction workers engaged in subsurface piping at the site could be exposed to hydrocarbon-impacted groundwater if excavations intersect the water table;
- Construction dewatering could take place at or near the site. Untreated groundwater could be inadvertently discharged to the street;
- A groundwater extraction well could be installed for the purpose of providing an irrigation supply. Residents at the site could be exposed to untreated groundwater, or the irrigation well could act as a conduit to a deeper groundwater supplies;
- Saturated soil excavated from the site as a result of construction activities could be used as fill for landscaping. Workers and residents could be exposed to the soil and/or vapor from soil containing impacted groundwater;
- If construction excavations are deep enough to intersect the water table, atmospheric conditions, such as pressure and temperature, could create a situation where vapor phase hydrocarbons accumulate at the bottom of a trench or excavation. Workers might then be exposed to vapor phase hydrocarbons, or the mixture of air and vapor phase hydrocarbons could reach the lower explosive limit, and an ignition source could cause a fire or explosion.

Several factors suggest that the scenarios listed above have a low probability of taking place; nevertheless, the least probable event must be considered in the effort to protect public health and safety. To show the conservative nature of the risk assessment, and thus this RMP, it is useful to review the factors that make the risk assessment and RMP conservative.

1. As indicated in the *Response to Comment Number 3* section on page 2 of the *Response to ACEHS Comments Regarding the Risk-Based Corrective Action (RBCA) Evaluation dated April 20, 1997, for the Former Chevron Service Station No. 9-0100, located at 2428 Central Avenue, Alameda, California*, GR used the most conservative data for the RBCA evaluation.

2. Data used to perform the RBCA evaluation are site-specific.

3. Petroleum hydrocarbons have not been detected in unsaturated soil beneath the site.

3.0 RISK MANAGEMENT

In the previous section, data were reviewed, risks were summarized, and possible public health and safety scenarios were identified. Risk management concerns controlling the identified risks, to the extent that all possible risks were identified. Although petroleum hydrocarbon impact at the site is characterized according to specific source areas, there is a chance that records identifying the locations of source areas may be lost or misplaced. As such, risk management measures should apply to the entire site. Below, risk management measures are recommended along with justification for each measure.

1. The ACEHS shall be notified before any general construction takes place at the site where soil and/or groundwater might be handled. This measure will assure that aspects of any construction project for the site are reviewed in light of the fact that residual hydrocarbons have been left in-place at the site.

2. The ACEHS shall be consulted for approval regarding uses or disposal of soils from the site. This measure is meant to place controls on the use or disposal of soils from the site that may contain petroleum hydrocarbons.

3. The ACEHS shall be consulted for approval regarding construction dewatering at the site. The purpose of this measure is to assure extracted groundwater is handled properly given the potential that it may be impacted with petroleum hydrocarbons.

4. Groundwater from beneath the site shall not be used for any purpose unless approved by the ACHES. This measure will assure that any proposed uses are reviewed by the appropriate regulating authority.

5. Wells shall not be installed at the site unless approved by the ACHES. The purpose of this measure is to mitigate the possibility that vertical conduits to deeper groundwater sources are introduced at the site.

6. Before any additional development takes place at the site, development plans and a health and safety plan shall be submitted to the ACHES for review and approval. The purpose of this measure is to assure that workers and the general public are protected from the potential hazards associated with subsurface petroleum hydrocarbon impact. An example health and safety plan is presented in Appendix C.

NO!

ACHES should be notified if any env. concern arises during development

7. If necessary, dust control measure shall be used during grading or excavation activities at the site. A contingency plan for such measures shall be included in site development plans reviewed by the ACHES.

8. The atmosphere in trenches and/or excavations at the site deeper than 2 feet below grade surface shall be monitored using a flame ionization or photo-ionization detector before manual work in the trenches and/or excavation begins. This activity shall happen each day work is to take place in trenches and/or excavations. Monitoring shall occur once in the morning and once in the afternoon, and records shall be kept. Conditions under which work shall stop and mitigation measure take place shall be considered in the site health and safety plan (see Appendix C for example). This measure is meant to protect workers from inhalation risk.

9. The atmosphere in trenches and/or excavations at the site deeper than 2 feet below grade surface shall be monitored for an explosive atmosphere each day work is to take place in trenches and/or excavations. Monitoring shall occur in the morning prior to beginning work and at other times when conditions might be conducive to the formation of explosive atmospheres (e.g. hot afternoons on sunny days). Monitoring records shall be kept. Mitigation measures shall take place (e.g.; ventilate trenches and/or excavation) if it is noted that an explosive atmosphere exists. A contingency plan for such measures shall be included in site development plans reviewed by the ACHES. The purpose of this measure is to mitigate the potential for fire/explosion.

10. Records for the site, including investigative reports and the attached *Risk-Based Corrective Action Applied At Former Chevron Service Station 9-0100, 2428 Central Avenue, Alameda, California* and *Response to ACEHS Comments Regarding the Risk-Based Corrective Action (RBCA) Evaluation dated April 20, 1997, for the Former Chevron Service Station No. 9-0100, located at 2428 Central Avenue, Alameda, California*, shall be kept on file with the ACHES. Proper documentation can help all parties control potential risks associated with the site.

4.0 LIMITATIONS

Evaluations of the geological conditions at the site that serve as a basis for this RMP are inherently limited due to the limited number of observation points. There may be variations in subsurface conditions in areas away from the sample points. There are no representations, warranties, or guarantees that the points selected for sampling are representative of the entire site. The recommendations provided herein reflect the sample conditions at specific locations at a specific point in time. No other interpretations, representations, warranties, guarantees, express or implied, are included or intended in this RMP. Additional work, including further subsurface investigation, might reduce the inherent uncertainties associated with this RMP.

APPENDIX A

GETTLER-RYAN INC.

April 18, 1997

Mr. Phil Briggs
Chevron Products Company
P.O. Box 5004
San Ramon, California 94583

Subject: **Risk-Based Corrective Action Applied At Former Chevron Service Station 9-0100, 2428 Central Avenue, Alameda, California.**

Mr. Briggs:

At the request of Chevron Products Company (Chevron), Gettler-Ryan, Inc. (G-R) is submitting this report of the Risk-Based Corrective Action (RBCA) analysis, as described in ASTM E-1739 "Standard Guide for Risk-Based Corrective Action Applied at Petroleum Sites" for the Former Chevron Service Station 9-0100 at 2428 Central Avenue, Alameda, California (Figures 1 and 2). The purpose of the work was to evaluate whether implementation of further environmental investigations and/or remediation related to groundwater was warranted or if Risk Based Screening Levels (RBSLs) may be applied as remediation target levels. This report describes site conditions and the RBCA model results for the site.

BACKGROUND

The former Chevron Service Station is located on the southern corner of the intersection of Central and Park Avenues in the City of Alameda, California. A multi-story hotel and office building currently occupy the site (Figure 2). Properties to the north and east are developed for commercial uses. A residential neighborhood is situated to the west. According to the data provided by Chevron, a service station operated at the site from 1947 until 1970. The station facilities were abandoned and demolished on January 27, 1970. One 7,500 gallon and three 3,000 gallon underground storage tanks (USTs) were removed from the site along with the associated product piping. Compliance soil sampling during the UST removals was not a regulatory requirement in 1970 and therefore was not performed.

The subject property was leased to the post office from early 1970 until Chevron sold the site to the current property owner, Stahl Wooldridge Construction Company in February 1971. According to Chevron's records and aerial photographs taken during this time period indicate that the Post Office utilized the site to park vehicles.

In 1973, a multi-story hotel was constructed at the site. The structure currently occupies approximately 50% of the subject site. A parking garage is located directly over the location of the former USTs, product piping and dispenser island. The hotel currently occupies the site.

According to Chevron files, the Stahl Wooldrige Construction Company filed for refinancing as part of bankruptcy proceedings. This action prompted the Alameda County Health Care Services to write letters to both Chevron and the property owner asking for a work plan for a Preliminary Site Assessment and subsequent investigations.

PREVIOUS INVESTIGATIONS

In June 1993, two soil borings (EB-1 and EB-2) were drilled near the former dispenser island and former UST pit, respectively. Groundwater was encountered at approximately 10 feet below ground surface (bgs). Soil samples collected from borings EB-1 at 5 feet bgs and EB-2 at 5 feet bgs did not contain detectable concentrations of Total Petroleum Hydrocarbons calculated as gasoline (TPHg), Total Petroleum Hydrocarbons calculated as diesel (TPHd), or benzene, toluene, ethylbenzene and xylenes (BTEX). The soil sample collected from boring EB-1 at 10 feet bgs contained 211 parts per million (ppm) of TPHd, and 7.94 ppm benzene. The grab groundwater sample collected from boring EB-1 contained 27,870 parts per billion (ppb) TPHd, and 1,782 ppb benzene. The groundwater grab sample collected from EB-2 did not contain detectable concentrations of TPHg, TPHd, or BTEX compounds.

Groundwater monitoring wells MW-1 through MW-3 were installed by Weiss Associates in April 1994. Groundwater was encountered at approximately 7 feet bgs. Soil samples collected from borings MW-1 through MW-3 at 5 feet bgs and MW-3 at 10 feet bgs did not contain detectable concentrations of TPHg, TPHd, or BTEX. The soil sample collected from the boring MW-1 at 10 feet bgs contained TPHg (1,300 ppm), and TPHd (3,000 ppm). The soil sample collected from boring MW-2 at 10 feet bgs contained detectable concentrations of TPHg (3,000), TPHd (340 ppm), and benzene (8 ppm). These soil samples were collected below the static groundwater elevation at the time of installation. The groundwater sample collected from well MW-1 contained detectable concentrations of TPHg (7,400 ppb), TPHd (840 ppb), and benzene (120 ppb). The groundwater sample collected from well MW-2 contained detectable concentrations of TPHg (6,400 ppb), and TPHd (920 ppb). The laboratory concluded that the TPHd chromatogram pattern was indicative of weathered gasoline, not diesel. Based on

available records, Chevron never distributed diesel at this site. TPHg, TPHd, or BTEX were not detected in groundwater sample collected from well MW-3.

Three off site groundwater wells (MW-4, MW-5 and MW-6) were installed by G-R in August 1996. Groundwater was encountered at 7.5 feet bgs. Soil samples collected from borings MW-4 through MW-6 were did not contain detectable concentrations of TPHg, TPHd, BTEX, or Methyl t-Butyl Ether (MTBE). Groundwater samples collected from the newly installed wells did not contain TPHg, TPHd, BTEX or MTBE compounds.

Quarterly monitoring and sampling was initiated at the site in March 1994. During the most recent monitoring and sampling event (September 1996), the groundwater sample from well MW-1 contained 7,600 ppb TPHg and 270 ppb benzene, and the groundwater sample collected from well MW-2 contained 2,700 ppb TPHg and 64 ppb benzene. Historical data indicate that the hydrocarbon concentrations in groundwater monitoring wells MW-1 and MW-2 have not changed significantly since the quarterly monitoring begun. Hydrocarbons have never been detected in groundwater samples from wells MW-3 through MW-6. Groundwater flow at the site appears to fluctuate from the north to the east with an approximate hydraulic gradient of 0.003 ft/ft. Historical groundwater monitoring data indicate that groundwater elevations fluctuate from approximately 5 to 9 feet bgs. Historical soil and groundwater analytical data are summarized in Appendix A. Boring logs and well construction details are presented in Appendix B.

A review of historical air-photos for the area conducted by Gen-Tech Environmental (1993), identified a second service station located across Central Avenue. An excerpt from the Gen-Tech report describing the air-photo review is presented in Appendix C.

GEOLOGY AND HYROGEOLOGY

The site is located at the western margin of the East Bay Plain, at the southern end of Alameda Island. San Francisco Bay is situated approximately ½ mile to the west, San Leandro Bay is situated approximately ½ mile to the south, and the Oakland Inner Harbor is situated approximately ¼ mile to the north and west. Local topography is flat at an elevation of approximately 10 feet above mean sea level. Soil in the vicinity is mapped as Pleistocene beach and dune sands deposits (Merit sand) that consist of loose well-sorted fine to medium sand (E.J. Helley and others, 1979).

Soils encountered during the previous investigations were described as silty sand and sand to the total explored depth of 21.5 feet bgs (Gen-Tech, 1993 and G-R 1996). Soil samples collected from MW-4 by G-R were analyzed for physical parameters and were used in the preparation of this RBCA evaluation. Soil samples from the vadose zone contained 4% moisture and 0.073% organic carbon, and the saturated zone soil sample contain 0.030% organic carbon. Total porosity in both of these samples was 37%. Bulk

dry and natural densities of the sample collected in the vadose zone were 1.69 grams per cubic centimeter (gm/cc) and 1.76 gm/cc, respectively. Bulk dry and natural densities of the saturated sample were 1.70 gm/cc and 2.01 gm/cc, respectively.

The City of Alameda imports their drinking water via the East Bay Aqueduct. No municipal water wells are located within a ½-mile radius of the subject site (Appendix C). One domestic well was identified approximately 1000 feet to the northwest (cross gradient of the site), located at the Alameda High School. Alameda County Well Inventory File has listed this well as part of the Alameda County Flood Control monitoring network. The depth of this well is listed at 325 feet bgs and consists of a 16-inch diameter well casing. This well is completed in a deeper water bearing zone than the monitoring wells at the subject site. A second well listed by Alameda County as a irrigation well and completed to 20 feet deep, is located approximately 400 feet north of the subject site. This well does not comply with the current well construction requirements regulated by the State of California or Alameda County. Groundwater from this shallow zone is typically not found to be potable (Alameda County, Information, 1997). The current status of this well is not known by Alameda County.

A groundwater velocity calculation based on the current site conditions indicates that it would take approximately 234 years to reach the identified domestic well and approximately 155 years to reach the identified irrigation well. The calculation sheet is attached in Appendix C.

RISK-BASED CORRECTIVE ACTION (RBCA)

Tier 1 of the RBCA process (ASTM E 1739-95; Risk-Based Corrective Action Applied at Petroleum Release Sites, 1995) involves comparison of site constituent concentrations to generic Risk-Based Screening Levels (RBSL) to evaluate whether further evaluation and/or active remediation is required. RBSLs are derived from standard exposure equations and reasonable maximum exposure (RME) estimates per U.S. EPA guidelines. RBSL concentrations limits are designed to be protective of human health even if exposure occurs directly within the on-site area of affected soil or groundwater and inherently provide conservative estimates of potential threats to human health and the environment. According to the RBCA process, if Tier 1 limits are not exceeded, the user may proceed directly to compliance monitoring and/or no further action. However, if these generic screening levels are exceeded, the affected media may be addressed by 1) remediating to the generic Tier 1 limits, if practicable, 2) conducting a Tier 2 evaluation to develop site-specific remediation goals, or 3) implement an interim action to abate risk "hot spots". RBCA Input and Output Files are presented in Appendix D.

SITE PARAMETERS

In review of the site specific information from the site, the RBCA evaluation was prepared with the following understanding:

1) **Surface and subsurface soils have not been impacted.** Soil samples were collected at 5 and 10 feet bgs. Ground water has been recorded to range from approximately 5 to 9 feet bgs. Therefore, the sample collected at 10 feet bgs was from the saturated zone, and not representative of soil conditions beneath the site.

2) **Groundwater beneath the site has been impacted by petroleum hydrocarbons that exceed the State Maximum Contaminate levels:** Benzene concentrations have been identified in two of the six monitoring wells and is primarily located beneath the site's northern and western boundaries.

3) **The Chevron facility was demolished in 1970 and a Hotel with parking on the ground floor was constructed on the site in 1973.** Petroleum hydrocarbons have not been distributed or stored at the site for the last 27 years. The site is currently paved with asphalt and concrete, therefore, infiltration and soil gas volatility are limited.

4) **Sentry groundwater wells are located down and cross-gradient of the site:** Historical groundwater monitoring data has indicated that the off-site sentry wells have never contained detectable concentrations of petroleum hydrocarbons or associated constituents.

5) **Low permeability asphalt and concrete cover the site:** Concentrations of hydrocarbons volatilizing to indoor and outdoor air do not exceed applicable RBSL's.

RESULTS OF THE RBCA ANALYSIS

Based on the analytical data and site conditions, surface and subsurface soils are not at issue, nor is the leaching of petroleum hydrocarbons into the groundwater. The initial concern was the potential for volatilization of hydrocarbon compounds to the atmosphere and enclosed spaces at the subject site. G-R evaluated the potential risk of groundwater volatilization into buildings, enclosed spaces and to the atmosphere. As demonstrated by the RBCA analysis (Appendix D; Worksheet 9.3), and the fact that the site is completely covered with asphalt, this route was not identified as an area of concern and is below the Tier 1 RBSL's.

The RBCA process identified one complete pathway that may pose a risk. This identified risk is the ingestion of groundwater at the site. Groundwater beneath the site contains benzene above the state MCL and Tier 1 RBSL's for groundwater ingestion of petroleum hydrocarbons (Appendix D; Tier 1 RBSL Look-Up Table and Worksheet 9.3). The applicable SSTL concentration computed by the analytical RBCA program for benzene in groundwater is 0.005 ppm (Appendix D; Worksheet 9.3). Current benzene levels in groundwater are as high as 0.270 ppm. On-site residential carcinogenic risk for groundwater pathways was computed as 9.2E-5 and the hazard index as 1.8E-3 (below the target level of 1.0). It is highly unlikely that the ingestion of groundwater would occur at the site based on the current land use, Alameda 's water supply is imported with no municipal wells on the island, and State of California and Alameda County well standards for domestic drinking water well installations. The nearest off-site receptor is located approximately 1,000 feet away and is completed in a much deeper water bearing zone.

DISCUSSION

G-R performed the RBCA decision-making process for the assessment and response to petroleum hydrocarbons in the groundwater beneath the site. The RBCA decision making process indicated the following:

- Based on the concentration of petroleum hydrocarbons in groundwater and the low permeability asphalt and concrete that covers the site, volatilizing hydrocarbons do not exceed applicable RBSL's and do not pose a health risk.

- Dissolved hydrocarbons in groundwater exceed the states Maximum Contaminate Levels (MCLs) and Tier 1 RBSL's for ingestion. However, the gradient is relatively flat and 27 years after the former UST's were removed from the site, no evidence of these hydrocarbon compounds have been identified in the off-site down gradient sentry wells. The impacted groundwater has been defined and the dissolved hydrocarbon plume appears to be stable and of limited lateral extent. This is demonstrated by the analytical results from the off-site sentry wells. With the nearest receptor located approximately 1,000 feet northwest of the site, and based on the observed migration of the impacted groundwater, it would be unlikely that the dissolved hydrocarbons, given the natural attenuation process, would impact the well.

Methyl t-Butyl-Ether (MTBE) has been included in the semi-annual groundwater sampling analysis, beginning in March 1996. Analytical results indicate that detectable concentrations of MTBE are present in well MW-1 and MW-2. These concentrations show an increase in the concentration level for the two sampling periods in 1996 (see attached Historical Groundwater Analytical Table). MTBE was initially manufactured and used in gasoline products in the early 1980's as an oxygenation additive. The subject

site has not stored petroleum products since the USTs were removed approximately 27 years ago (approximately 1970), nor was MTBE being used at that time. Therefore, this presence of MTBE is not from the former Chevron operations and would suggest a second, more recent source that has impacted the site.

Although the RBCA analysis presented a SSTL of 0.005ppm for benzene in groundwater, other site specific conditions need review. It is Gettler-Ryan's opinion that this site is a candidate for low risk status for groundwater cases, as per the RWQCB Interim Guidance document (Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low Risk Fuel Sites, dated January 5, 1996). Site specific criteria for Low Risk Closure is presented below.

LOW RISK GROUNDWATER CASE

The following rational addresses the criteria for low risk groundwater cases as described in the RWQCB Interim Guidance on Required Cleanup at Low Risk Fuel Sites.

Has the leak stopped?
Yes. The USTs, lines and all other structures were removed during demolition activities that took place over twenty-seven (27) years ago. The site was re developed as a motel and petroleum products have not been stored at the site since the original USTs were removed.

Has the source been removed?
Yes. Based on investigation data, the primary source of the petroleum hydrocarbons were removed during the UST removal over 27-years ago. Residual hydrocarbons (secondary source) have shown to be naturally degrading and are not negatively contributing to the current groundwater conditions found at the site.

Has the site been adequately characterized?
Yes. Based on the previous investigations performed by Gettler-Ryan and others, the site has been adequately characterized. Investigation findings indicate that only groundwater has been impacted above action levels. The impacted groundwater is limited to the site's northern and western property boundaries. Off site sentry wells have been non detected for petroleum hydrocarbons. Off-site migration of petroleum hydrocarbons appears to be limited. The primary source has been removed over 27-years ago, and the impacted groundwater has not migrated to enough off-site to impact the sentry wells. Any significant migration of the impacted groundwater to an off-site receptor is not likely to occur, given the rate at which groundwater has historically migrated.

There is little or no impact to groundwater, or the plume is not migrating?
Groundwater has been impacted, however, the plume is limited in area and has not migrated. Off-site sentry wells located in the down gradient direction have always been ND. Based on the previous investigations the feasibility of additional active remediation

is not practical. The petroleum hydrocarbon-impacted groundwater is defined and the concentrations are stable. The site discontinued to store and distribute petroleum products over 27 years ago, at which time the USTs and associated product piping were removed. With the primary and secondary sources removed, groundwater will not be further impacted by the past activities of this site. Natural attenuation and bio-degradation will continue to occur.

Are there any potential receptors? Is there a significant risk to human health or the environment?

The site is located primarily in a commercial area with some residential nearby. However, based on the site specific data and results of a RBCA evaluation, humans or potentially sensitive environmental receptors will most likely not be exposed to any remaining hydrocarbons. Also, based on the limited extent of impacted groundwater and the lack of any significant migration, the remaining dissolved hydrocarbons should degrade and attenuate over time.

RECOMMENDATIONS

Based on the available information, no additional investigation is warranted at this site. Although the RBCA analysis identified the groundwater above the RBSL's, the site appears to meet the RWQCB's Interim Guidance Criteria for a low risk groundwater case.

It is recommended that ORC be considered for use in the on- and off-site monitoring wells and to continue groundwater monitoring on a semi-annual basis. With the known natural biodegradation processes and the benefits of ORC for enhancement of these processes, remaining hydrocarbons should degrade and attenuate.

DISTRIBUTION

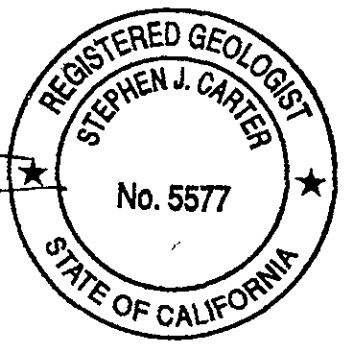
Gettler-Ryan recommends that a copy of this Risk-Based Corrective Action evaluation be forwarded to Ms. Juliet Shin of the Alameda County Health Care Services-Department of Environmental Health, located at 1131 Harbor Bay Parkway, Suite 250, Alameda, California, 94502-6577.

If you have any questions regarding this document, please call David J. Vossler at (510) 551-7555.

Sincerely,

David J. Vossler
Senior Geologist

Stephen J. Carter
Senior Geologist
R.G. No. 5577



Attachments: References

Figure 1: Vicinity Map
Figure 2: Site Plan
Figure 3: Potentiometric Map

Attachment A: Historical Soil and Groundwater Analytical Tables
Attachment B: Exploratory Soil Boring Logs
Attachment C: Air-Photo Review, Well Survey Data Base and Groundwater Flow Velocity Calculation Sheet
Attachment D: RBCA Input and Output Files

REFERNCES

California Regional Water Quality Control Board, San Francisco Bay Region, January 5, 1996. Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Low Risk Fuel Sites.

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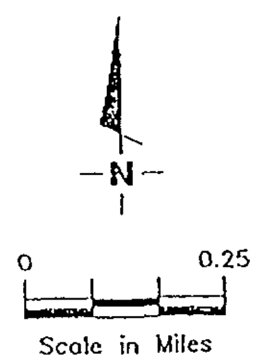


Source: Street Atlas USA, Delorme (1995).

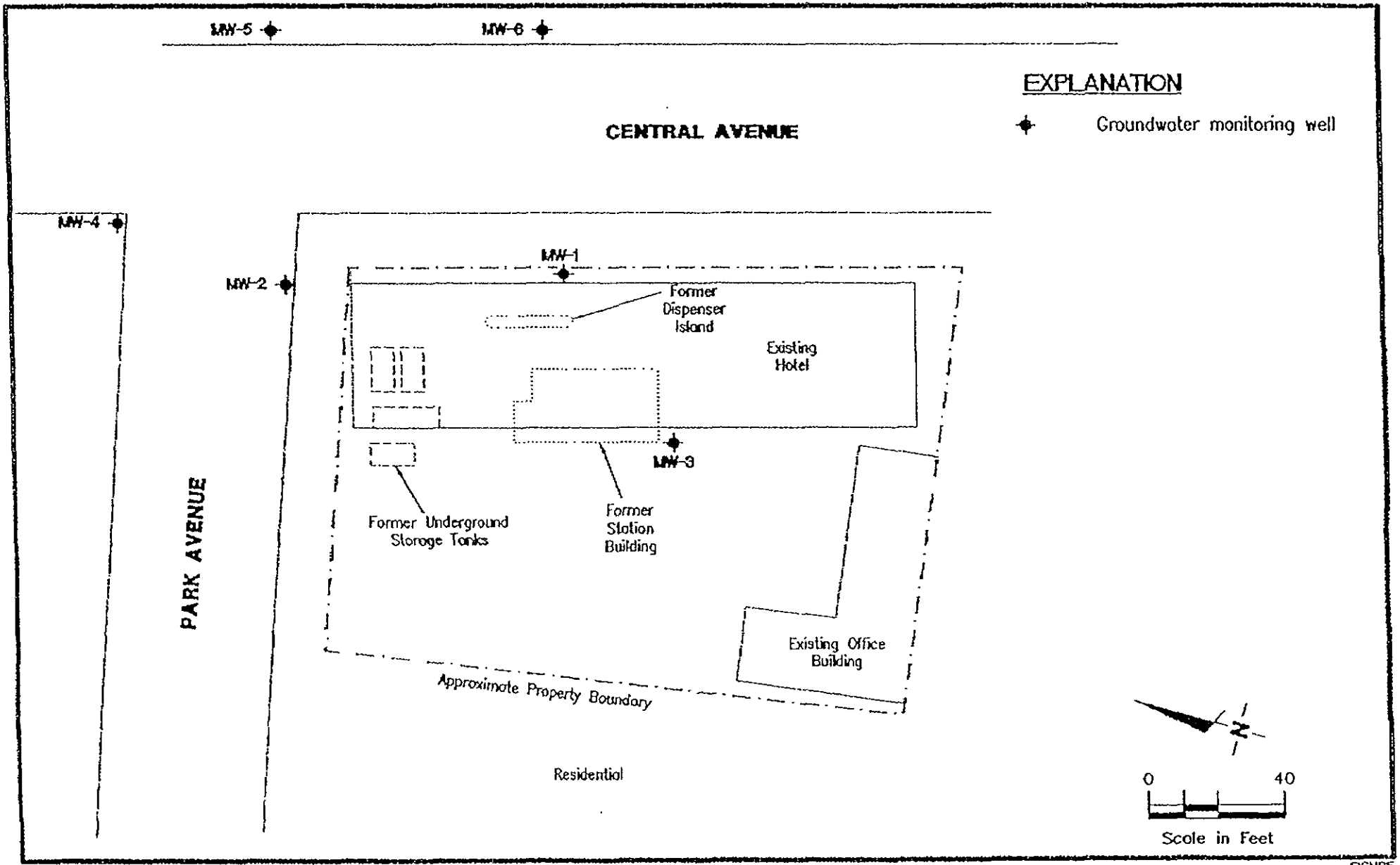
Gettler - Ryan Inc.

6747 Sierra Ct., Suite J (510) 551-7555
Dublin, CA 94568

VICINITY MAP
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

FIGURE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
5178		6/96	

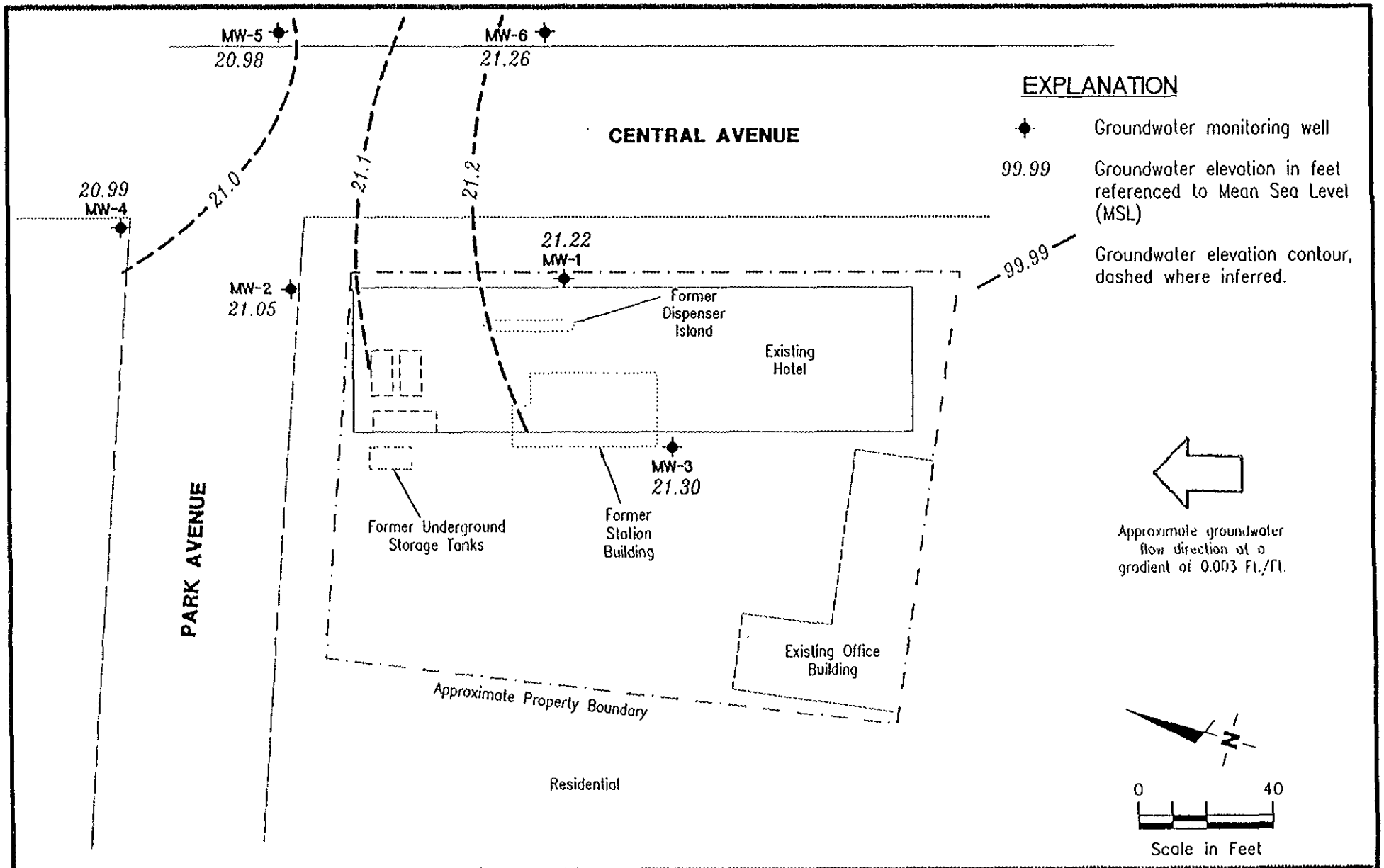


Gettler - Ryan Inc.
6747 Sierra Ct., Suite J (510) 551-7555
Dublin, CA 94568

SITEPLAN
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

FIGURE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
5178		September, 1996	



Gettler - Ryan Inc.
6747 Sierra Ct., Suite J (510) 551-7555
Dublin, CA 94568

POTENTIOMETRIC MAP
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

FIGURE
3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
5178.02		August 30, 1996	

ATTACHMENT A

Historical Soil and Groundwater Analytical Tables

Soil
(Results reported in ppm)

Boring	TPH-G	B	T	E	X	TPH-D
EB-1 @ 5'	ND	ND	ND	ND	ND	ND
EB-1 @ 10'	ND	7.94	7.91	8.38	7.71	211
EB-2 @ 5'	ND	ND	ND	ND	ND	ND
EB-2 @ 10'	ND	ND	ND	ND	ND	ND

Water
(Results reported in ppb)

Boring	TPH-G	B	T	E	X	TPH-D
EB-1	ND	1782	1093	176	798	27870
EB-2	ND	ND	ND	ND	ND	ND

ND - Not detected
Groundwater was encountered at approximately 10 feet below grade

TABLE 3. Analytic Results for Ground Water - Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California

(Well ID)	Date Sampled	Ground Water Depth (ft)	TPH-G	TPH-D	B	T	E	X	Organic Lead	EDB
			<----------parts per billion (µg/ℓ)---------->							
MW-1	03-10-94	6.79	7400	840[a]	120	120	33	72	<4	<0.02
MW-2	03-10-94	6.94	6400	920[a]	<5	64	58	17	<4	<0.02
MW-3	03-10-94	7.30	<50	<50	<0.5	<0.5	<0.5	<0.5	<4	<0.02
Travel Blank	03-10-94		<50	NA	<0.5	0.7	<0.5	<0.5	NA	NA
DTSC MCLs			NE	NE	1.0	100[b]	680	1750	NE	0.02

Abbreviations:

TPH-G - Total Petroleum Hydrocarbons as Gasoline by Modified EPA Method 8015
TPH-D - Total Petroleum Hydrocarbons as Diesel by Modified EPA Method 8015
B - Benzene by EPA Method 8020
E - Ethyl benzene by EPA Method 8020
T - Toluene by EPA Method 8020
X - Xylenes by EPA Method 8020
Organic Lead - Organic Lead by LUFT Method
EDB - Ethylene dibromide by EPA Method 504
<n - Not detected at detection limits of n ppm
DTSC MCL - Department of Toxic Substances Control maximum contaminant level for drinking water
NA - Not analyzed
NE - Not established

Analytical Laboratory:

Superior Precision Analytic, Inc of San Francisco, California

Notes:

a - Does not match typical Diesel pattern
b - DTSC recommended action level for drinking water: MCL not established

TABLE 2. Analytic Results for Soil - Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California

Soil Boring (Well ID)	Sample Depth (ft)	Date Sampled	Static Ground Water Depth (ft)	TPH-G	TPH-D	B	T	E	X
				<----------parts per million (mg/kg)---------->					
BH-A	5.0	02-24-94	9.8	<1	<1	<0.005	<0.005	<0.005	<0.005
(MW-1)	10.0			1300	150[a]	<2.5	9.1	13	19
BH-B	5.0	02-25-94	7.3	<1	<1	<0.005	<0.005	<0.005	<0.005
(MW-2)	10.0			3000	340[a]	8	<5	56	70
BH-C	5.0	02-25-94	7.8	<1	<1	<0.005	<0.005	<0.005	<0.005
(MW-3)	10.0			<1	<1	<0.005	<0.005	<0.005	<0.005

Abbreviations:

TPH-G - Total Petroleum Hydrocarbons as Gasoline by Modified EPA Method 8015
TPH-D - Total Petroleum Hydrocarbons as Diesel by Modified EPA Method 8015
B - Benzene by EPA Method 8020
E - Ethyl benzene by EPA Method 8020
T - Toluene by EPA Method 8020
X - Xylenes by EPA Method 8020
<n - Not detected at detection limits of n ppm

Analytical Laboratory:

Superior Precision Analytic, Inc of San Francisco, California

Notes:

a - Does not match typical Diesel pattern

Table 1. Water Level Data and Groundwater Analytical Results - Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California

Well ID/ TOC (ft)	Date	DTW (ft)	GWE (msl)	Product Thickness* (ft)	TPHg	B	T	E	X	MTBE
					<----------ppb---------->					
MW-1/	3/10/94[1,2]	6.79	22.44	0	7,400	120	120	33	72	—
29.23	6/21/94	7.74	21.49	0	5,300	140	60	21	43	—
	9/26/94	8.94	20.29	0	9,500	<250[5]	<250[5]	<250[5]	<250[5]	—
	12/16/94	6.57	22.66	0	4,700	<0.5	46	15	48	—
	3/22/95	5.16	24.07	0	8,800	55	14	11	<10	—
	6/13/95	5.84	23.39	0	2,100	130	29	9.5	15	—
	9/15/95	7.65	21.58	0	8,100	110	26	6.0	13	—
	3/8/96	5.36	23.87	0	5,600	250	<5.0	<5.0	<5.0	60
29.25**	9/3/96	8.03	21.22	0	7,600	270	5.6	3.4	4.9	120
MW-2/	3/10/94[2,3]	6.94	22.24	0	6,400	<5	64	58	17	—
29.18	6/21/94	7.89	21.29	0	1,800	23	12	6.9	32	—
	9/26/94	8.98	20.20	0	8,400	<100[5]	<100[5]	<100[5]	<100[5]	—
	12/16/94	6.65	22.53	0	2,300	<0.5	29	8.9	33	—
	3/22/95	5.15	24.03	0	1,500	0.6	4.5	<0.5	2.5	—
	6/13/95	6.06	23.12	0	880	<0.5	<0.5	2.2	10	—
	9/15/95	7.72	21.46	0	2,700	<0.5	17	4.8	13	—
	3/8/96	5.38	23.80	0	1,300	42	2.0	0.7	2.2	10
29.19**	9/3/96	8.14	21.05	0	2,700	64	4.6	1.6	4.6	35
MW-3/	3/10/94[2,4]	7.30	22.79	0	<50	<0.5	<0.5	<0.5	<0.5	—
30.09	6/21/94	8.53	21.56	0	<50	<0.5	<0.5	<0.5	<0.5	—
	9/26/94	9.80	20.29	0	<50	<0.5	<0.5	<0.5	<0.5	—
	12/16/94	7.11	22.98	0	<50	<0.5	<0.5	<0.5	<0.5	—
	3/22/95	5.54	24.55	0	<50	<0.5	<0.5	<0.5	<0.5	—
	6/13/95	6.48	23.61	0	<50	<0.5	<0.5	<0.5	<0.5	—
	9/15/95	8.40	21.69	0	<50	<0.5	<0.5	<0.5	<0.5	—
	3/8/96	5.69	24.40	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
30.10**	9/3/96	8.80	21.30	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
MW-4										
29.31**	9/3/96	8.32	20.99	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
MW-5										
28.88**	9/3/96	7.90	20.98	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
MW-6										
29.24**	9/3/96	7.98	21.26	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0

Table 1. Water Level Data and Groundwater Analytical Results - Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California

Well ID/ TOC (ft)	Date	DTW (ft)	GWE (msl)	Product Thickness* (ft)	TPHg	B	T	E	X	MTBE
					<----------ppb---------->					
Trip Blank	3/10/94	—	—	—	<50	<0.5	0.7	<0.5	<0.5	—
TB-LB	6/21/94	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	—
	9/26/94	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	—
	12/16/94	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	—
	3/22/95	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	—
	6/13/95	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	—
	9/15/95	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	—
	3/8/96	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/3/96	—	—	—	<50	<0.5	<0.5	<0.5	<0.5	<5.0

EXPLANATION:

DTW = Depth to water
TOC = Top of casing elevation
GWE = Groundwater elevation
msl = Measurements referenced relative to mean sea level
TPHg = Total Purgeable Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
MTBE = Methyl t-Butyl Ether
EDB = Ethylene Dibromide
ppb = Parts per billion
— = Not analyzed/Not applicable

ANALYTICAL METHODS:

EPA Method 8015/5030 for TPHg
EPA Method 8020 for BTEX & MTBE

NOTES:

Water level elevation data and laboratory analytic results prior to March 22, 1995 were compiled from Quarterly Monitoring Reports prepared for Chevron by Sierra Environmental Services.

* Product thickness was measured on and after June 21,1994 with a MMC Flexi-Dip interface probe.

** Wells MW-1 through MW-6 were surveyed on September 17, 1996, by Virgil Chavez of Vallejo, California (PLS 6323).

1 TPHd was also analyzed and detected at 840 ppb. However, chromatogram does not match typical diesel pattern.

2 Organic lead and EDB were also analyzed but not detected at detection limits of 4 and 0.02 ppb, respectively.

3 TPHd was also analyzed and detected at 920 ppb. However, chromatogram does not match typical diesel pattern.

4 TPHd was also analyzed but not detected at detection limits of 50 ppb.

5 Detection limits raised due to the dilution required by a high amount of foaming in the sample.

Table 2. Soil Analytical Results - Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California.

Sample ID	Depth (ft)	Date	Analytic Method	TPHg	B	T	E	X	MTBE	Organic Carbon %	Bulk Density Dry gm/cc	Bulk Density Wet gm/cc	Porosity %	Moisture %
				<----------ppm---------->										
Soil Samples														
MW4-4	4	08/26/96	API RP-40	—	—	—	—	—	—	0.073	1.69	1.76	37.0	4.0
MW4-6	6	08/26/96	8015/8020	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	—	—	—	—	—
MW4-16	16	08/26/96	API RP-40	—	—	—	—	—	—	0.030	1.70	2.01	37.0	—
MW5-6	6	08/26/96	8015/8020	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	—	—	—	—	—
MW6-6	6	08/26/96	8015/8020	<1.0	<0.0050	<0.0050	<0.0050	<0.050	<0.025	—	—	—	—	—
SP-(A-D)COMP	—	08/26/96	8015/8020	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	—	—	—	—	—	—

EXPLANATION:

TPHg - Total Petroleum Hydrocarbons as gasoline
B - Benzene
T - Toluene
E - Ethylbenzene
X - Xylenes
MTBE - Methyl t-Butyl Ether
ppm - Parts per million
gm/cc - Grams per cubic centimeter
— - Not analyzed/not applicable

ANALYTICAL METHODS:

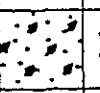
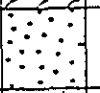
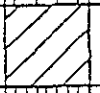
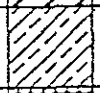
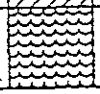
8015 - EPA Method 8015Mod for TPHg.
8020 - EPA Method 8020 for BTEX and MTBE
API RP-40 - API Recommended Practice for Core-Analysis Procedure, 1960.

ANALYTICAL LABORATORY:

Sequoia Analytical of Redwood City, California.

ATTACHMENT B

Exploratory Soil Boring Logs

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LL - Liquid Limit (%)

PI - Plastic Index (%)

PID - Volatile Vapors in ppm

MA - Particle Size Analysis

2.5 YR 6/2 - Soil Color according to Munsell Soil Color Charts (1975 Edition)

5 GY 5/2 - GSA Rock Color Chart

- No Soil Sample Recovered
- "Undisturbed" Sample
- Bulk or Classification Sample
- First Encountered Ground Water Level
- Piezometric Ground Water Level

Penetration - Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

Unified Soil Classification - ASTM D 2488-85
and Key to Test Data

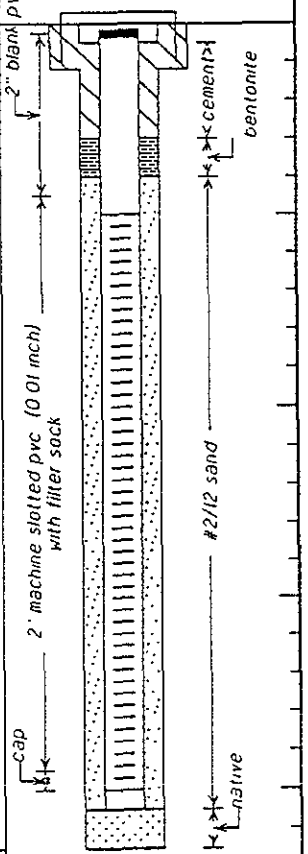
Gettler-Ryan, Inc.

Log of Boring MW-4

PROJECT: *Former Chevron SS# 9-0100*	LOCATION: *2428 Central Avenue, Alameda, CA*
G-R PROJECT NO. : *5178.02*	SURFACE ELEVATION: *29.31 feet MSL*
DATE STARTED: *08/26/96*	WL (ft. bgs): *8.0* DATE: *08/26/96* TIME: *10:10*
DATE FINISHED: *08/26/96*	WL (ft. bgs): *8.0* DATE: *08/26/96* TIME: *12:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *21.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *B. Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
							PAVEMENT - concrete over baserock.
						SP	SAND (SP) - yellowish brown (10YR 5/6), damp, medium dense; 100% fine sand.
			MW4-4				Becomes moist; with up to 5% silt.
5	42	16	MW4-6				
	3.5	26	MW4-7.5				Becomes saturated.
10		26					
15	1.1	34	MW4-16				Becomes dense; color change to light olive brown (2.5Y 5/6); flowing sand.
20	0	38	MW4-21				
25							(* = converted to equivalent standard penetration blows/ft.)
30							
35							

WELL DIAGRAM



JOB NUMBER: *5178.02*

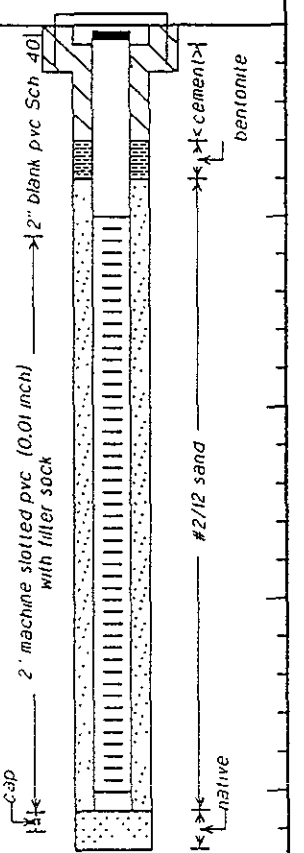
Gettler-Ryan, Inc.

Log of Boring MW-5

PROJECT: *Former Chevron SS# 9-0100*	LOCATION: *2428 Central Avenue, Alameda, CA*
G-R PROJECT NO.: *5178.02*	SURFACE ELEVATION: *28.88 feet MSL*
DATE STARTED: *08/26/96*	WL (ft. bgs): *7.5* DATE: *08/26/96* TIME: *15:10*
DATE FINISHED: *08/26/96*	WL (ft. bgs): *7.5* DATE: *08/26/96* TIME: *16:30*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *21.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *B. Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
							PAVEMENT - concrete over baserock.
						SP	SAND (SP) - yellowish brown (10YR 5/6), damp, medium dense; 95% fine sand, 5% silt.
5	25	13	MW5-5.5 MW5-6				Becomes moist.
	111	25	MW5-7				Becomes saturated.
10	8.3	26	MW5-11				
15	9.7	26	MW5-16				Color change to light olive brown (2.5Y 5/4); 100% fine to medium sand; flowing sand.
20	0	36	MW5-21				Becomes dense.
25							(* = converted to equivalent standard penetration blows/ft.)
30							
35							

WELL DIAGRAM



JOB NUMBER: *5178.02*

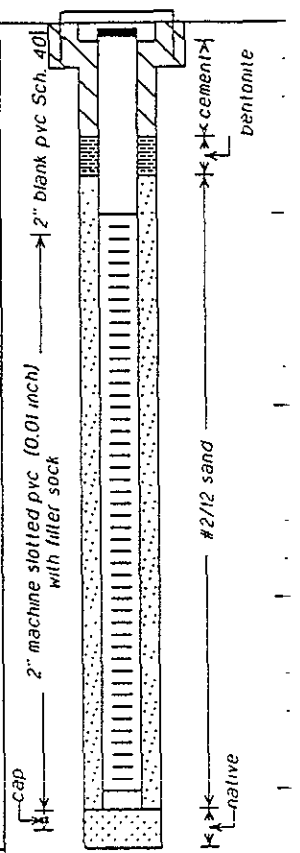
Gettler-Ryan, Inc.

Log of Boring MW-6

PROJECT: *Former Chevron SS# 9-0100*	LOCATION: *2428 Central Avenue, Alameda, CA*
G-R PROJECT NO.: *5178.02*	SURFACE ELEVATION: *29.24 feet MSL*
DATE STARTED: *08/26/96*	WL (ft. bgs): *7.9* DATE: *08/26/96* TIME: *12:30*
DATE FINISHED: *08/26/96*	WL (ft. bgs): *7.9* DATE: *08/26/96* TIME: *14:55*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *21.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *B. Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
							PAVEMENT - concrete over baserock.
						SP	SAND (SP) - yellowish brown (10YR 5/6), damp, medium dense; 95% fine sand, 5% silt.
5			MW6-5.5				
	45	10	MW6-6				Becomes moist.
	48	20	MW6-7				
							▽ Becomes saturated.
10							
	35	38	MW6-11				Becomes dense.
15							
	25	38	MW6-16				Color changes to light olive brown (2.5Y 5/4); 100% fine to medium sand; flowing sand.
20							
	0	34	MW6-21				
25							(* = converted to equivalent standard penetration blows/ft.)
30							
35							

WELL DIAGRAM



JOB NUMBER: *5178.02*

ATTACHMENT C

Air-Photo Review, Well Survey Data Base and Groundwater Flow Velocity Calculation Sheet

SITE LOCATION

The site is located at the corner of Central and Park Avenues in Alameda, California. (see Figure 1). The site is currently occupied by the Alameda Islander Hotel. The site was previously occupied by a gasoline service station.

AERIAL PHOTOGRAPHY REVIEW

An aerial photograph review was done for air photos dating from 1947 through 1975 at the Pacific Aerial Photography Inc. library in Oakland, California. A summary for each referenced stereo pair is presented below. The site is first visible in 1947.

AV-11-06-07, 08 dated 7-3-47, Stereo Pair
The area is developed and the site is visible as an active service station. Vehicles are parked onsite and the tank area appears to be a light colored area on the northern (Park Avenue) side of the site. The pump island area occurs on the Central Avenue side roughly near the center of the site. Another service station occurs opposite of the site across Central Avenue.

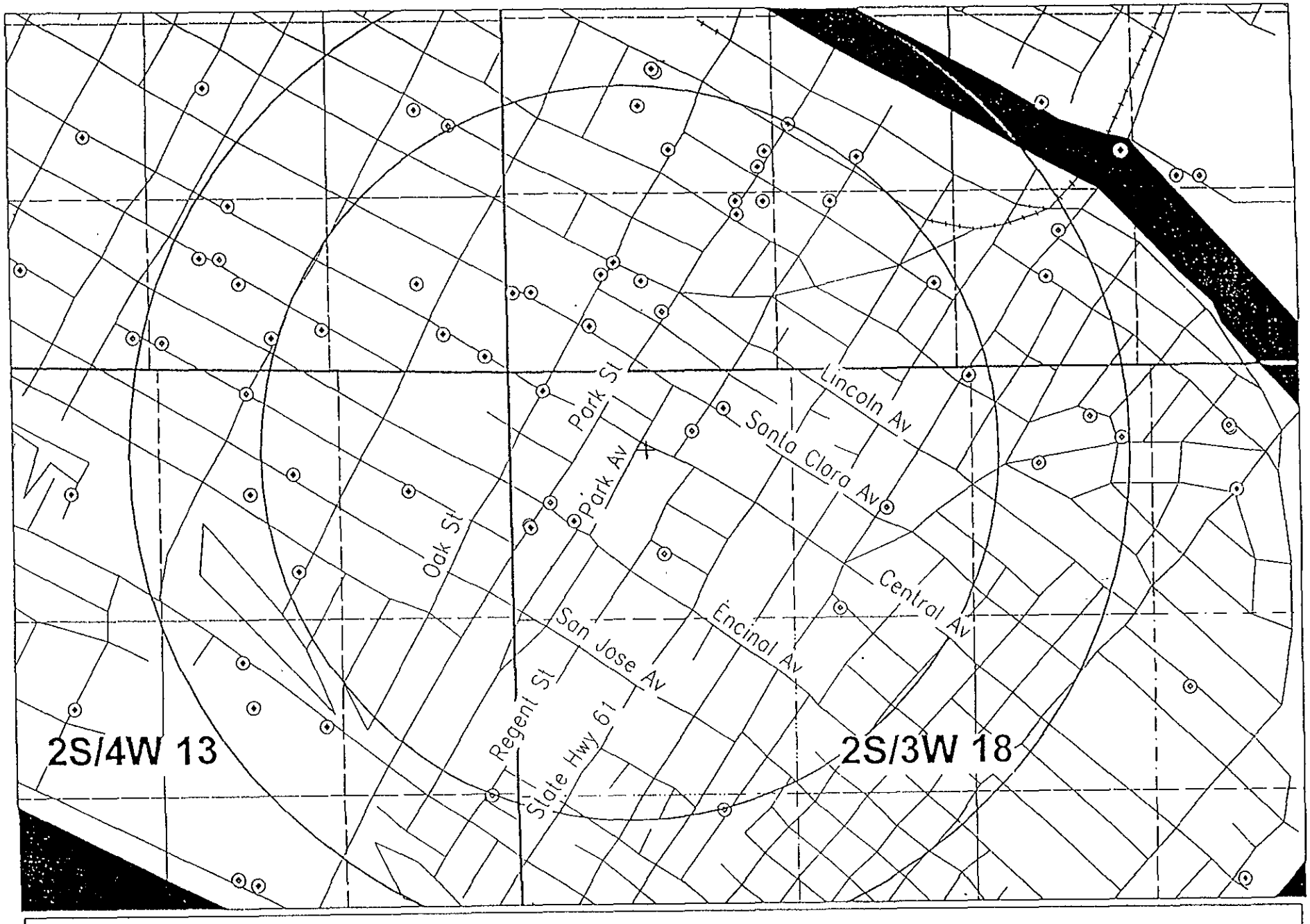
The site appears essentially the same in the following air photos:

AV-28-15-28, 29 dated 3-24-50, Stereo Pair
AV-337-05 33, 34 dated 7-3-59, Stereo Pair
AV-550-38-22, 23, dated 7-25-63, Stereo Pair
AV-710-09-26, 27, dated 4-20-66, Stereo Pair
AV-844-13-33, 34, dated 4-20-68, Stereo Pair
AV-903-05-21, 22, dated 5-2-69, Stereo Pair

AV-995-03-16, 17 dated 5-19-71, Stereo Pair
The station has been removed and the site is a flat lot. It appears that the demolition was completed prior to this photography. Several parked vehicles occur on the site.

AV-1100-05-22, 23, dated 4-24-73, Stereo Pair
A multistory structure has been built on the site. The construction appears completed by the time of this photography. The service station is still located opposite of the site across Central Avenue.

AV-1193-05-19, 20, dated 5-29-75, Stereo Pair
The site appears the same as in the 1973 photographs.



.5 mile radius from 2428 Central Ave.
04/05/1994

.5 mile radius from 2428 Central Ave. (Page 2)

WELL #	CITY	ADDRESS	OWNER	PHONE	USE	DR.DATE	DIAM	TOT.DEPTH	DTW	ST.ELEV	WA.ELEV	YIELD	LOG	WQ	WL	DATAORGN	MARGIN
2S/3W 18D	ALA	2425 Encinal	Steve Chrissanthos	0	BOR	12/92	0	14	13	0	0	0	G	0	0	D	
2S/3W 18D 1	ALA	2518 CHESTER ST	A.E. SLIGH	0	IRR	5/77	6	20	10	0	0	0	D	0	0	L	
2S/3W 18D 2	ALA	EVERETT & ALAMEDA	PG&E	0	CAT	7/76	0	120	0	0	0	0	D	0	0	L	
2S/3W 18D 3	ALA	1300 PARK ST	CITY OF ALAMEDA (F/H #1)	5224100	MON	6/86	2	23	9	0	0	0	G	0	0	L	
2S/3W 18D 4	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	4	13	13	0	0	0	D	0	0	D	
2S/3W 18D 5	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	4	12	11	0	0	0	D	0	0	D	
2S/3W 18D 6	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	4	13	13	0	0	0	D	0	0	D	
2S/3W 18D 7	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	4	30	12	0	0	0	D	0	0	D	
2S/3W 18D 8	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	3	30	13	0	0	0	D	0	0	D	
2S/3W 18D 9	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	3	30	12	0	0	0	D	0	0	D	
2S/3W 18D10	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	3	30	12	0	0	0	D	0	0	D	
2S/3W 18D11	ALA	1260 Park St	ARCO PRODUCTS	0	MON	10/91	6	30	13	0	0	0	D	0	0	D	
2S/3W 18D12	ALA	1260 Park St	ARCO Prod Co AV-7	0	MON	1/92	4	13	12	0	0	0	DD	0	0	D	
2S/3W 18D13	ALA	1260 Park St	ARCO Prod Co AV-4	0	MON	1/92	4	13	12	0	0	0	D	0	0	D	
2S/3W 18D14	ALA	1260 Park St	ARCO Prod Co AV-5	0	MON	1/92	4	13	12	0	0	0	D	0	0	D	
2S/3W 18D15	ALA	1260 Park St	ARCO Prod Co AV-6	0	MON	1/92	4	13	12	0	0	0	D	0	0	D	
2S/3W 18D16	ALA	1260 Park St.	Arco Products Co.	0	MON	6/92	3	30	11	0	0	0	D	0	0	D	
2S/3W 18D17	ALA	1260 Park St.	Arco Products Co.	0	MON	6/92	6	30	12	0	0	0	D	0	0	D	
2S/3W 18D18	ALA	2501 Santa Clara Ave.	Goodman Property MW2	0	MON	4/93	2	25	5	0	0	0	G	0	0	D	
2S/3W 18D19	ALA	2425 Encinal	Steve Chrissanthos MW-1	0	MON	12/92	2	18	7	0	0	0	G	0	0	D	
2S/3W 18D20	ALA	2425 Encinal	Steve Chrissanthos MW-2	0	MON	12/92	2	18	13	0	0	0	G	0	0	D	
2S/3W 18D21	ALA	2425 Encinal	Steve Chrissanthos MW-3	0	MON	12/92	2	15	7	0	0	0	G	0	0	D	
2S/3W 18D22	ALA	2425 Encinal	Steve Chrissanthos MW-2a	0	MON	12/92	2	15	7	0	0	0	G	0	0	D	
2S/3W 18D23	ALA	2501 Santa Clara Ave.	Goodman Property MW1	0	MON	10/92	2	25	8	0	0	0	G	0	0	D	
2S/3W 18D24	ALA	2501 Santa Clara Ave.	Goodman Property MW2	0	MON	10/92	2	25	9	0	0	0	G	0	0	D	
2S/3W 18D25	ALA	2501 Santa Clara Ave.	Goodman Property MW3	0	MON	10/92	2	25	10	0	0	0	G	0	0	D	
2S/3W 18F 1	ALA	2806 VAN BUREN ST	CARTER STROUD	0	IRR	5/77	4	20	8	0	0	0	D	0	0	L	
2S/3W 30D 2	ALA	1506 VERSAILLES AVE	SOARES	0	IRR	?	0	180	0	0	0	0	?	+	0	L	
2S/4W 12J 2	OAK	PACIFIC AND WILLOW	PG&E	0	CAT	6/76	0	120	0	0	0	0	D	0	0	L	Yes
2S/4W 12Q 4	ALA	2059 SAN ANTLNIO	DELDINE	0	IRR	/40	0	21	3	0	0	0	?	0	2	L	Yes
2S/4W 12R	ALA	2200 Central Ave.	Alameda School Dist.	0	BOR	6/92	2	15	9	0	0	0	G	0	0	D	
2S/4W 12R 1	ALA	CENTRAL AV & OAK ST	ALA. HIGH SCHOOL	0	DOM+	?	16	325	0	30	0	0	D	+	+	L	
2S/4W 12R 2	ALA	2121 ALMEDA AVE	PAR PAYNE	0	IRR	2/77	4	19	9	0	0	0	D	0	0	L	
2S/4W 12R 3	ALA	2120 ALAMEDA AVE	BERT JOHNSON	0	IRR	2/77	4	19	9	0	0	0	D	0	0	L	
2S/4W 12R 6	ALA	2200 CENTRAL	ALAMEDA SCHOOL DISTRICT	0	TBS	6/92	2	15	9	0	0	0	D			D	
2S/4W 12R 6	ALA	2200 Central Ave.	Alameda School Dist. MW1	0	MON	7/92	2	15	10	0	0	0	G	0	0	D	
2S/4W 12R 7	ALA	2200 CENTRAL	ALAMEDA SCHOOL DISTRICT	0	TBS	6/92	2	15	10	0	0	0	D			D	
2S/4W 12R 7	ALA	2200 Central Ave.	Alameda School Dist. MW2	0	MON	7/92	2	15	11	0	0	0	G	0	0	D	
2S/4W 12R 8	ALA	2200 CENTRAL	ALAMEDA SCHOOL DISTRICT	0	TBS	6/92	2	15	9	0	0	0	D			D	
2S/4W 12R 8	ALA	2200 Central Ave.	Alameda School Dist. MW3	0	MON	7/92	2	15	10	0	0	0	G	0	0	D	
2S/4W 12R 9	ALA	2200 Central Ave	Alameda School Dist MW1	0	MON	8/93	2	15	0	0	0	0	D	0	0	D	
2S/4W 12R10	ALA	2200 Central Ave	Alameda School Dist MW2	0	MON	8/93	2	15	0	0	0	0	D	0	0	D	
2S/4W 12R11	ALA	2200 Central Ave	Alameda School Dist MW3	0	MON	8/93	2	15	0	0	0	0	D	0	0	D	
2S/4W 13A 1	ALA	2242 SAN ANTONIO	JAMES SMALLMAN	0	IRR	2/77	4	20	9	0	0	0	D	0	0	L	
2S/4W 13B 1	ALA	2163 SAN JOSE AVE	MRS.H. KEIM	0	ABN	/21	5	127	63	0	0	0	?	0	2	L	
2S/4W 13B 2	ALA	871 WALNUT ST	DENNIS HEITMAN	0	IRR	4/77	4	25	11	0	0	0	D	0	0	L	
2S/4W 13B 4	ALA	?	ALAMEDA GENERAL HOSP.	0	IRR	/25	0	300	0	10	0	60	?	0	0	L	Yes
2S/4W 13G 1	ALA	2160 OTIS & PRIVATE	SHELL SERVICE STATION	0	MON	9/87	3	19	4	0	0	0	G	0	0	L	Yes

WELL #	CITY	ADDRESS	OWNER	PHONE	USE	DR.DATE	DIAM	TOT DEPTH	DTW	ST.ELEV	WA.ELEV	YIELD	LOG	WQ	WL	DATAORGN	MARGIN	
2S/3W 7L 2	ALA	1819 EVERETT ST	A.T. GHILLIER		0 IRR	/06	4	0	5	0	0	0	?	0	2		L	
2S/3W 7L 3	ALA	1801 PARK ST & EAGLE	CHEVRON SERVICE STATION		0 MON	2/85	8	20	7	0	0	0	G	0	0		L	
2S/3W 7L 4	ALA	1801 PARK ST & EAGLE	CHEVRON SERVICE STATION		0 MON	2/85	8	16	7	0	0	0	G	0	0		L	
2S/3W 7L 5	ALA	1801 PARK ST & EAGLE	CHEVRON SERVICE STATION		0 MON	2/85	8	17	7	0	0	0	G	0	0		L	
2S/3W 7L 6	ALA	1801 PARK ST & EAGLE	CHEVRON SERVICE STATION		0 MON	2/85	8	17	7	0	0	0	G	0	0		L	
2S/3W 7L 7	ALA	1801 PARK ST & EAGLE	CHEVRON SERVICE STATION		0 MON	2/85	8	17	7	0	0	0	G	0	0		L	
2S/3W 7L 8	ALA	1725 PARK ST	EXXON RS 7-0104		0 MON	06/88	4	16	7	0	0	0	D	0	0		L	
2S/3W 7L 9	ALA	1725 PARK ST	EXXON RS 7-0104		0 MON	06/88	4	15	7	0	0	0	D	0	0		L	
2S/3W 7L10	ALA	1725 PARK ST	EXXON RS 7-0104		0 MON	06/88	4	22	7	0	0	0	D	0	0		L	
2S/3W 7L11	ALA	1725 PARK ST.	EXXON		0 MON	02/89	4	20	0	0	0	0	G	0	0		L	
2S/3W 7L12	ALA	1725 PARK ST.	EXXON		0 MON	02/89	4	20	0	0	0	0	G	0	0		L	
2S/3W 7L13	ALA	1725 PARK ST.	EXXON		0 MON	02/89	4	20	0	0	0	0	G	0	0		L	
2S/3W 7L14	ALA	1725 Park Street	Exxon Corporation		0 MON	1/90	4	20	9	0	0	0	D	0	0		D	
2S/3W 7L15	ALA	1725 Park Street	Exxon USA EW-1		0 EXT	12/91	4	40	7	0	0	0	D	0	0		D	
2S/3W 7L16	ALA	1725 Park Street	Exxon USA EW-2		0 EXT	12/91	4	40	7	0	0	0	D	0	0		D	
2S/3W 7L17	ALA	1725 Park Street	Exxon USA EW-3		0 EXT	12/91	4	41	7	0	0	0	D	0	0		D	
2S/3W 7L18	ALA	1725 Park Street	Exxon USA EW-4		0 EXT	12/91	4	41	7	0	0	0	D	0	0		D	
2S/3W 7L19	ALA	1725 Park Street	Exxon USA EW-5		0 EXT	12/91	4	40	7	0	0	0	D	0	0		D	
2S/3W 7L20	ALA	1911 Park St.	Alameda Collision Rep.MW1		0 MON	12/92	4	20	10	0	0	0	D	1	1		D	
2S/3W 7M 1	OAK	2307 CLEMENT AVE	BOB TENNANT	5237532	IND	4/77	6	72	0	0	0	7	D	0	0		L	
2S/3W 7M 2	OAK	2307 CLEMENT AVE	BOB TENNANT		0 IND	4/77	6	82	6	0	0	0	D	0	0		L	
2S/3W 7M 3	ALA	1849 OAK STREET	LINCOLN PROPERTY CO		0 MON	06/89	2	16	10	13	0	0	G	0	0		L	
2S/3W 7M 4	ALA	1849 OAK STREET	LINCOLN PROPERTY COMPANY		0 MON	06/89	2	15	10	12	0	0	G	0	0		L	
2S/3W 7M 5	ALA	1849 OAK STREET	LINCOLN PROPERTY COMPANY		0 MON	06/89	2	19	10	8	0	0	G	0	0		L	
2S/3W 7M 6	ALA	1825 Park St.	Goode Toyota MW-4		0 MON	4/93	2	15	6	0	0	0	G	1	1		D	
2S/3W 7N	ALA	Oak at Lincoln Street	Alameda Free Library		0 BOR	04/90	0	0	0	0	0	0	G	0	0		D	
2S/3W 7N 1	OAK	2235 LINCOLN AVE	ALAMEDA STEAM LAUNDRY		0 IRR	/16	0	206	0	0	0	0	?	0	3		L	
2S/3W 7N 2	ALA	1555 OAK STREET	CITY OF ALAMEDA (POLICE)	5224100	MON	6/86	2	23	7	0	0	0	G	0	0		L	
2S/3W 7N 3	ALA	2263 SANTA CLARA AVE	CITY OF ALAMEDA (C. HALL)	5224100	MON	06/86	2	23	7	0	0	0	G	0	0		L	
2S/3W 7N 4	ALA	2263 SANTA CLARA AVE	CITY OF ALAMEDA (C. HALL)	5224100	MON	6/86	2	23	7	0	0	0	G	0	0		L	
2S/3W 7N 5	ALA	1541 PARK ST	MOBIL SERVICE STATION		0 MON	02/88	2	25	10	0	0	0	G	1	0		L	
2S/3W 7N 6	ALA	1541 PARK ST	MOBIL SERVICE STATION		0 MON	02/88	2	25	11	0	0	0	G	1	0		L	
2S/3W 7N 7	ALA	1541 PARK ST	MOBIL SERVICE STATION		0 MON	02/88	2	25	13	0	0	0	G	1	0		L	
2S/3W 7N 8	ALA	1541 PARK STREET	MOBIL OIL CORPORATION		0 MON	03/89	2	25	11	0	0	0	D	0	0		L	
2S/3W 7N 9	ALA	1541 PARK STREET	SHELL OIL CORPORATION		0 MON	03/89	2	25	11	0	0	0	G	0	0		L	
2S/3W 7N10	ALA	1541 PARK STREET	SHELL OIL CORPORATION		0 MON	03/89	2	25	12	0	0	0	G	0	0		L	
2S/3W 7N11	ALA	1541 PARK ST	MOBIL OIL CORP.		0 MON	03/89	2	25	12	0	0	0	G	0	0		L	
2S/3W 7N12	ALA	1541 PARK ST	MOBIL OIL CORP.		0 MON	03/89	2	25	11	0	0	0	G	0	0		L	
2S/3W 7N13	ALA	1541 PARK ST	MOBIL OIL CORP.		0 MON	03/89	2	25	12	0	0	0	G	0	0		L	
2S/3W 7N14	ALA	1700 Park Street	Mr.Dave Cavanaugh		0 MON	05/90	4	15	0	0	0	0	G	0	0		D	
2S/3W 7N15	ALA	1700 Park Street	Mr.Dave Cavanaugh		0 MON	05/90	4	15	0	0	0	0	G	0	0		D	
2S/3W 7N16	ALA	1700 Park Street	Mr.Dave Cavanaugh		0 MON	05/90	4	15	0	0	0	0	G	0	0		D	
2S/3W 7N17	ALA	1700 Park Street	Mr.Dave Cavanaugh		0 MON	05/90	4	15	0	0	0	0	G	0	0		D	
2S/3W 7N18	ALA	Oak St. and Lincoln St.	Alameda Free Library		0 DBS	7/90	6	70	0	0	0	0	D	0	0		D	
2S/3W 7N19	ALA	2244 Santa Clara	Fowler-Anderson Mortuary		0 DBS	4/91	0	43	0	0	0	0	?				D	
2S/3W 7N20	ALA	2244 Santa Clara	Fowler-Anderson Mortuary		0 DBS	4/91	0	0	0	0	0	0	?				D	
2S/3W 7N21	ALA	2244 Santa Clara	Fowler-Anderson Mortuary		0 MON	2/91	2	20	9	14	5	0	G	1	1		D	
2S/3W 7N23	ALA	1726 Park St	John B. Henry Estate		0 MON	5/92	2	20	7	0	0	0	D	0	0		D	
2S/3W 7N24	ALA	1700 Park St	Cavanaugh Motors MW5		0 MON	6/91	2	21	8	0	0	0	D	0	0		D	
2S/3W 7N25	ALA	1700 Park St	Cavanaugh Motors MW6		0 MON	6/91	2	21	8	0	0	0	D	0	0		D	
2S/3W 7N27	ALA	2301 Santa Clara Ave.	Chun's Service Center MW1		0 MON	1/93	2	25	16	31	15	0	G	0	0		D	
2S/3W 7N28	ALA	2301 Santa Clara Ave.	Chun's Service Center MW2		0 MON	1/93	2	25	15	31	16	0	G	0	0		D	
2S/3W 7N29	ALA	2301 Santa Clara Ave.	Chun's Service Center MW3		0 MON	1/93	2	25	16	31	15	0	G	0	0		D	
2S/3W 7N30	ALA	1541 PARK STREET	BP Oil Company		0 REC	4/92	6	30	10	0	0	0	D	0	0		D	
2S/3W 7N31	ALA	2301 Santa Clara Ave.	Chun's Service Center MW4		0 MON	9/93	2	25	10	0	0	0	G	0	0		D	
2S/3W 7N32	ALA	2301 Santa Clara Ave.	Chun's Service Center MW5		0 MON	9/93	2	25	10	0	0	0	G	0	0		D	
2S/3W 7N33	ALA	2301 Santa Clara Ave.	Chun's Service Center MW6		0 MON	9/93	2	25	11	0	0	0	G	0	0		D	
2S/3W 7N34	ALA	2301 Santa Clara Ave.	Chun's Service Center MW7		0 MON	9/93	2	25	11	0	0	0	G	0	0		D	
2S/3W 7P 1	ALA	2623 EAGLE AVE.	PG&E		0 CAT	6/76	0	120	0	0	0	0	D	0	0		L	
2S/3W 7Q 1	OAK	1819 VERSAILLES AV	LESTER CABRAL		0 IRR	9/77	4	24	5	0	0	12	D	0	0		L	Yes
2S/3W 7Q 7	ALA	2100A VERSAILLES AVE	KING PETROLEUM		0 MON	04/85	8	35	5	0	0	0	G	0	N		L	Yes
2S/3W 7Q 8	ALA	1708 VERSAILLES AVE	MARK RATTO		0 IRR	07/88	5	60	10	0	0	0	?	0	0		L	

PREPARED BY	CHECKED BY	DATE	PAGE
DJV		2-28-97	1 OF 1

SUBJECT: Estimate of Groundwater Velocity

W O/A F E NO:

Reference: Driscoll; 1987 - Groundwater and Wells, pg.

$$V_a = \frac{K(0.003)}{7.35(n)} \cdot \frac{1\ ft}{1\ ft} \cdot \frac{365\ days}{1\ yr}$$

Where: $K = 10$

$n = .35$

Gradient = 0.003

Thus:

$$V_a = \frac{(10)(0.003)}{(7.35)(.35)} \cdot \frac{1\ ft}{1\ ft} \cdot \frac{365\ days}{1\ year}$$

$$= \frac{10.95}{2.57}$$

$$= 41.26\ ft/year$$

Distance to Receptor:

Alameda Flood Control Well: 1000 ft
Private irrigation well: 400 ft

Thus:

234.7 yrs to reach the Alameda County Well
155.6 yrs to reach the Private irrigation well

Note: Calculations do not account for natural attenuation and/or bio-degradation

ATTACHMENT D

RBCA Input and Output Files

DRAFT Example ASTM RBCA (E1739-95) Tier 1 Risk-Based Screening Level (RBSL) Look-Up Table-*Modified*

(modifications shown in ***bold italics*** 2/5/96 for California Maximum Concentration Limits, etc. by SIM/RA @ SFBRWQCB Feb 26, 1996)

	Exposure Pathway	Receptor Scenario	Target Level	Benzene	Ethylbenzene	Toluene	Xylene(mixed)	Naphthalene	Benzo(a)pyrene
AIR	Indoor Air Screening Levels for Inhalation Exposure ($\mu g/m^3$)	Residential	Cancer Risk = 1E-06	***1.14E-01***					1.86E-03
			Cancer Risk = 1E-04	***1.14E+01***					1.86E-01
			Chronic HQ = 1		1.39E+03	5.56E+02	9.73E+03	1.95E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	***1.43E-01***					2.35E-03
			Cancer Risk = 1E-04	***1.43E+01***					2.35E-01
			Chronic HQ = 1		1.46E+03	5.84E+02	1.02E+04	2.04E+01	
	Outdoor Air Screening Levels for Inhalation Exposure ($\mu g/m^3$)	Residential	Cancer Risk = 1E-06	***8.53E-02***					1.40E-03
			Cancer Risk = 1E-04	***8.53E+00***					1.40E-01
			Chronic HQ = 1		1.04E+03	4.17E+02	7.30E+03	1.46E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	***1.43E-01***					2.35E-03
			Cancer Risk = 1E-04	***1.43E+01***					2.35E-01
			Chronic HQ = 1		1.46E+03	5.84E+02	1.02E+04	2.04E+01	
	OSHA TWA PEL ($\mu g/m^3$)			***3.20E+03***	4.35E+05	7.53E+05	4.35E+06	5.00E+04	2.00E+02[1]
	Mean Odor Detection Threshold ($\mu g/m^3$)[2]			***1.95E+05***		6.00E+03	8.70E+04	2.00E+02	
	National Indoor Background Concentration Range ($\mu g/m^3$)[3]			***3.25E+00 - 2.15E+01***	2.20E+00 - 9.70E+00	9.60E-01 - 2.91E+01	4.85E+00 - 4.76E+01		
SOIL	Soil - Volatilization to Outdoor Air (mg/kg)	Residential	Cancer Risk = 1E-06	***7.89E-02***					RES
			Cancer Risk = 1E-04	***7.89E+00***					RES
			Chronic HQ = 1		RES	RES	RES	RES	
		Commercial/ Industrial	Cancer Risk = 1E-06	***1.33E-01***					RES
			Cancer Risk = 1E-04	***1.33E+01***					RES
			Chronic HQ = 1		RES	RES	RES	RES	
	Soil - Vapor Intrusion from Soil to Buildings (mg/kg)	Residential	Cancer Risk = 1E-06	***1.55E-03***					RES
			Cancer Risk = 1E-04	***1.55E-01***					RES
			Chronic HQ = 1		4.27E+02	2.06E+01	RES	4.07E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	***4.90E-03***					RES
			Cancer Risk = 1E-04	***4.90E-01***					RES
			Chronic HQ = 1		1.10E+03	5.45E+01	RES	1.07E+02	
	Surficial Soil (0-3 ft.) Ingestion/ Dermal/ Inhalation (mg/kg)	Residential	Cancer Risk = 1E-06	***1.68E+00***					1.30E-01
			Cancer Risk = 1E-04	***1.68E+02***					1.30E+01
			Chronic HQ = 1		7.83E+03	1.33E+04	1.45E+06	9.77E+02	
		Commercial/ Industrial	Cancer Risk = 1E-06	***2.90E+00***					3.04E-01
			Cancer Risk = 1E-04	***2.90E+02***					3.04E+01
			Chronic HQ = 1		1.15E+04	1.87E+04	2.08E+05	1.90E+03	
	Soil - Leachate to Protect Groundwater Ingestion Target Level (mg/kg)	MCL's		***5.86E-03***	1.10E+02	***2.65E+00***	***5.33E+01***	N/A	9.42E+00
		Residential	Cancer Risk = 1E-06	***4.99E-03***					5.90E-01
			Cancer Risk = 1E-04	***4.99E-01***					RES
			Chronic HQ = 1		5.75E+02	1.29E+02	RES	2.29E+01	
		Commercial/ Industrial	Cancer Risk = 1E-06	***1.68E-02***					1.85E+00
			Cancer Risk = 1E-04	***1.68E+00***					RES
			Chronic HQ = 1		1.61E+03	3.61E+02	RES	6.42E+01	
GROUND WATER	Groundwater - Volatilization to Outdoor Air (mg/l)	Residential	Cancer Risk = 1E-06	***3.19E+00***					>S
			Cancer Risk = 1E-04	***3.19E+02***					>S
			Chronic HQ = 1		>S	>S	>S	>S	
		Commercial/ Industrial	Cancer Risk = 1E-06	***5.34E+00***					>S
			Cancer Risk = 1E-04	***>S***					>S
			Chronic HQ = 1		>S	>S	>S	>S	
	Groundwater Ingestion (mg/L)	MCL's		***1.00E-03***	7.00E-01	***1.50E-01***	***1.75E+02***	N/A	2.00E-04
		Residential	Cancer Risk = 1E-06	***8.52E-04***					1.17E-05
			Cancer Risk = 1E-04	***8.52E-02***					1.17E-03
			Chronic HQ = 1		3.65E+00	7.30E+00	7.30E+01	1.46E-01	
		Commercial/ Industrial	Cancer Risk = 1E-06	***2.86E-03***					3.92E-05
			Cancer Risk = 1E-04	***2.86E-01***					>S
			Chronic HQ = 1		1.02E+01	2.04E+01	>S	4.09E-01	
	Groundwater - Vapor Intrusion from Groundwater to Buildings (mg/l)	Residential	Cancer Risk = 1E-06	***6.90E-03***					>S
			Cancer Risk = 1E-04	***6.90E-01***					>S
			Chronic HQ = 1		7.75E+01	3.28E+01	>S	4.74E+00	
		Commercial/ Industrial	Cancer Risk = 1E-06	***2.14E-02***					>S
			Cancer Risk = 1E-04	***2.14E+00***					>S
			Chronic HQ = 1		>S	8.50E+01	>S	1.23E+01	

[A] As benzene soluble coal tar pitch volatiles.
[B] American Industrial Hygiene Association, *Odor Thresholds for Chemicals with Established Occupational Health Standards*, 1989.
[C] From: Shah and Singh, *Environmental Science Technology* Vol 22, No. 12; ATSDR, 1988, Toxilogical Profiles, U.S. Public Health Services, 1988, and Wallace L.A., *Journal of Occupational Medicine*, Vol 28, No. 5, 1986.
[D] "RES" – selected risk level is not exceeded for pur compound present at any concentration.
[E] ">S" – selected risk level is not exceeded for all possible dissolved levels (≤ pure compound solubility).
for [1] [2] [3] see original document ASTM E 1739.

For Discussion only purpose

RBCA SUMMARY REPORT

☐ TIER 1 / ☐ TIER 2 RBCA SITE EVALUATION

P R E P A R E D F O R

Former Chevron Service Station No. 9-0100
SITE NAME

2428 Central Avenue
Alameda, California
LOCATION

Gettler-Ryan, Inc.
David J. Vossler
PREPARED BY

April 18, 1997
DATE ISSUED

REVIEWED BY Stephen J. Carter, RG 5577

DATE April 18, 1997

Site Name: Former Chevron No. 9-0100 | Date Completed: February 28, 1997

Site Location: 2428 Central Avenue, Alameda, California | Completed By: David J. Vossler | *Page 1 of 1*

TIER 1 EXECUTIVE SUMMARY CHECKLIST

VISUAL/HISTORICAL ASSESSMENT (■ TO SELECT)

Site size (acres)	■ <1	☐ <10	☐ >10
Site setting	☐ undeveloped	☐ industrial	■ residential
Site access	☐ capped	☐ fenced-in	■ open
Visual evidence of environmental impact	■ none	☐ limited	☐ extensive
Current site land use	☐ undeveloped	■ indust./comm.	☐ residential
Contaminant sources	■ tanks/spills	☐ trench/drums	☐ ponds/pits
Affected environmental media	☐ soil (>3 ft BGS)	■ groundwater	☐ surficial soil (≤3 ft BGS)
Types of compounds likely to be present	■ petroleum hydrocarbons	☐ metals	
	☐ inorganic (nitrates)	☐ other:(pesticides)	

BASELINE RECEPTOR IDENTIFICATION

Reasonable potential receptors (greatest concern)	☐ none	☐ ecological	■ human
Distance from fenceline to nearest off-site receptor (ft)	■ >500	☐ 100 - 500	☐ <100
Travel time to closest groundwater receptor (yr)	■ >10	☐ 2 - 10	☐ <2
Depth to first encountered groundwater (ft)	☐ >150	☐ 50 - 150	■ <50
Complete exposure pathways	☐ none	■ ingestion	☐ inhalation
	☐ ecological	☐ dermal	☐ absorption

TIER 1 TASKS COMPLETED

■ Visual / historical assessment	■ Initial (screening) site assessment	☐ Site prioritization / classification
■ Detailed site characterization	■ RBSL comparison	☐ Initial ecological assessment
☐ Corrective action planned or implemented		

TIER 1 CLASSIFICATION EVALUATION

Classification No.	Scenario Description	Prescribed Interim Action	Date Implemented
4	Non-potable aquifer with no existing local use impacted, and Groundwater is impacted but stablized.	Monitot groundwater and evaluate effect of natural attenuation on dissolved plume migration.	

TIER 1 CORRECTIVE ACTION CRITERIA

Affected Medium	Screening Level Criteria Exceeded? (■ if yes) Risk-Based	Other (MCL)	Others: (specify)				None Exceeded
• Surface Soil (< 3ft BGS)	☐	☐	☐	☐	☐	☐	■
• Subsurface Soil (>3ft BGS)	☐	☐	☐	☐	☐	☐	■
• Groundwater (potable/nonpotable)	■	☐	☐	☐	☐	☐	☐
• Surface waters	☐	☐	☐	☐	☐	☐	■

NOTES: (List and discuss chemicals for which a Tier 1 exceedance is found.)

Benzene

PROPOSED TIER 1 ACTION

☐ ***No Action:*** Site does not exceed Tier 1 criteria. - Apply for closure.

☐ ***Interim Corrective Action:*** Site exceeds some Tier 1 criteria. - Propose interim corrective action and reprioritize site.

☐ ***Final Corrective Action:*** Site exceeds some Tier 1 criteria. - Propose corrective action to achieve Tier 1 criteria.

■ ***Tier 2 Evaluation:*** Site exceeds some Tier 1 criteria. - Re-evaluate corrective action goals per Tier 2 risk assessment.

NOTE:
Rationale for proposed action documented on Worksheets 1.3 and 10.1-10.3.

ALL WORKSHEETS ENCLOSED IN THIS REPORT ARE IDENTIFIED ON THE TABLE OF CONTENTS FORM.

Site Name: Former Chevron Service Station No. 9-0100 Date Completed: February 28, 1997

Site Location: 2428 Central Avenue, Alameda, California Completed By: David J. Vossler

TIER 2 EXECUTIVE SUMMARY CHECKLIST

TIER 2 SSTL CALCULATION METHOD (■ OR ● TO SELECT)

SSTL Calculation Option

- ■ Option 1: Site-Specific Screening Levels
- ☐ Option 2: Individual Constituent SSTL Values
- Option 3: Cumulative Constituent SSTL Values

NAF Calculation Method

- ■ Fate and Transport Modeling:
  - ● RBCA Spreadsheet System
  - ○ Other Model(s)
- ☐ Empirical NAF Calculation

SITE DATA INVENTORY

Source Zone Investigation Complete:

- ■ Surface Soil (e.g., ≤ 3 ft BGS)
- ■ Subsurface Soil (e.g., > 3 ft BGS)
- ■ Groundwater

Exposure Pathway Information Compiled:

- ■ Air Pathway
- ■ Groundwater Pathway
- ■ Soil Pathway
- ☐ Surface Water Pathway
- ☐ Land Use Classification (on-site and off-site)

TIER 1 WORKSHEETS 1.3 - 4.2 AND 5.2 - 5.6 HAVE BEEN UPDATED TO INCLUDE NEW TIER 2 INFORMATION.

TASKS COMPLETED

- ☐ Tier 1 Evaluation
- ☐ Tier 1 Interim Corrective Action
- ☐ Tier 2 Evaluation
- ☐ Tier 2 Interim Corrective Action
- ☐ Tier 2 Final Corrective Action
- ☐ Tier 3 Evaluation

CURRENT SITE CLASSIFICATION

Classification No.	Scenario Description	Prescribed Interim Action	Date Implemented
4	Groundwater impacted, non-potable wells located down gradient outside the known extent of COCs. Imported drinking water. Groundwater plume is stablized.	Monitor groundwater and evaluate effectes of natural attenuation on the dissolved plume migration.	

TIER 2 CORRECTIVE ACTION CRITERIA

Affected Medium	Tier 2 SSTL Exceeded ?		Applicable Excess Risk Limits (specify value)				Other Applicable Exposure Limit
	Yes	No	Indiv. Risk	Total Risk	Hazard Index	Hazard Quotent	*(specify, if any)*
• Surface Soil (≤ 3ft BGS)	☐	■					
• Subsurface Soil (>3ft BGS)	☐	■					
• Groundwater	■	☐	9.2E-5	9.2E-5	1.8E-5	9.3E-4	

PROPOSED ACTION

Apply Low Risk Closure (RWQCB)

- ■ ***No Action:*** Tier 2 SSTLs not exceeded. Apply for closure.
- ☐ ***Interim Corrective Action:*** Address principal, near-term risks sources.
- ☐ ***Final Corrective Action:*** Remediate/control site to meet Tier 2 criteria.
- ☐ ***Tier 3 Evaluation:*** Improve baseline risk and SSTL estimates.

NOTE:

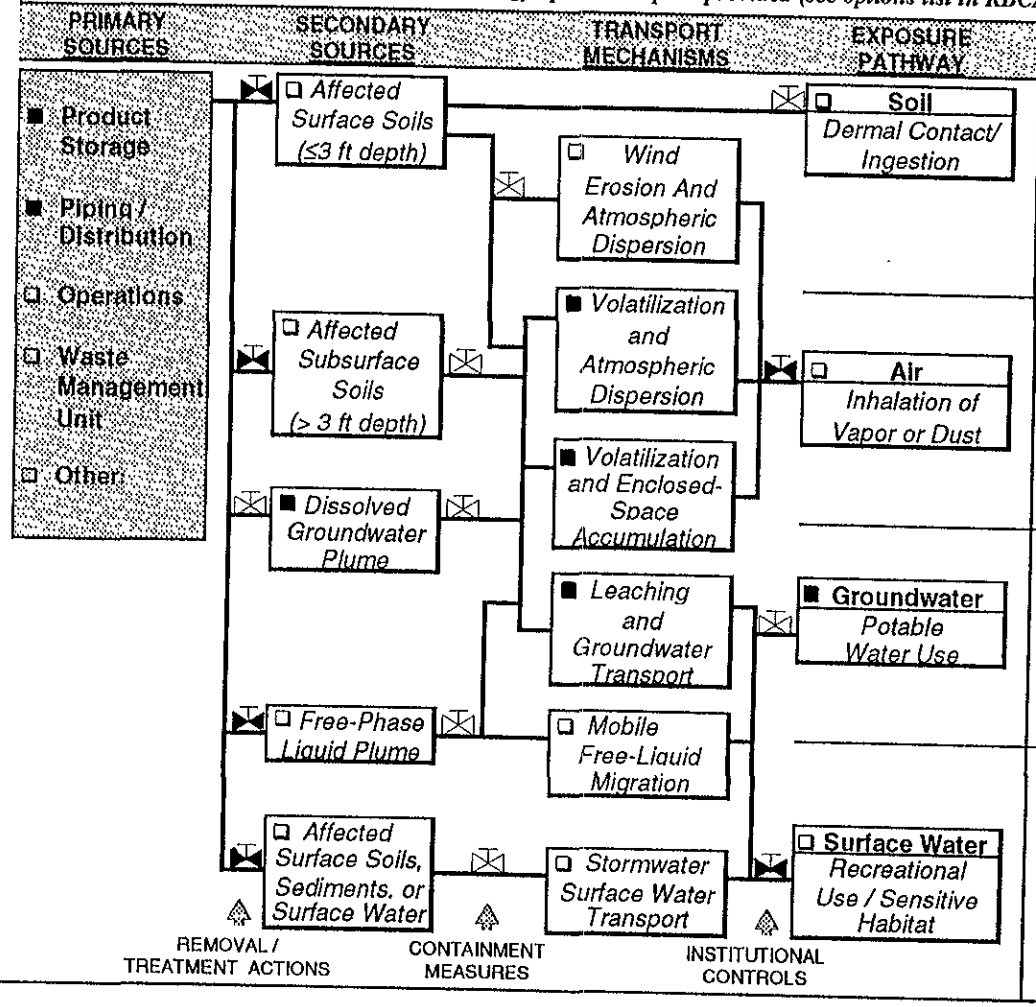
Rationale for proposed action documented on Worksheets 1.3 and 10.1-10.3.

ALL WORKSHEETS ENCLOSED IN THIS REPORT ARE IDENTIFIED ON THE TABLE OF CONTENTS FORM

Site Name: Former Chevron Service Station No. 9-0100
Site Location: 2428 Central Avenue, Alameda, California
Date Completed: February 28, 1997
Completed By: David J. Vossler

EXPOSURE CONTROL FLOWCHART

Instructions: *Identify remedial measures to be implemented to prevent exposure, as follows:* • Step 1 – *Baseline Exposure: Identify applicable sources, transport mechanisms, and receptors as shown on Worksheet 4.2 (■ = applicable to site).* • Step 2 – *Remedial Measures: Fill in shut-off valves (⋈) to indicate removal / treatment action, containment measure, or institutional controls to be used to "shut off" exposure pathway.* • Step 3 – *Remedial Technology Options: For each complete pathway, identify category of corrective measure to be applied and list possible technology options in space provided (see options list in RBCA Guidance Manual).*



POTENTIAL RECEPTORS

Exposed Receptors

On-Site: ❑ Residential ■ Non-Resid. ■ N/A ❑ Sensitive ❑ Recreation Habitat

Off-Site: ❑ Residential ■ Non-Resid. ■ N/A ❑ Sensitive ❑ Recreation Habitat

Exposed Persons

On-Site: ■ Residential ❑ Non-Resid. ❑ N/A

Off-Site: ■ Residential ❑ Non-Resid. ❑ N/A

Groundwater Users

On-Site: ■ Residential ❑ Non-Resid. ❑ N/A

Off-Site: ■ Residential ❑ Non-Resid. ❑ N/A

Surface Water Users

On-Site: ❑ Residential ❑ Non-Resid. ■ N/A ❑ Sensitive ❑ Recreation Habitat

Off-Site: ❑ Residential ❑ Non-Resid. ■ N/A ❑ Sensitive ❑ Recreation Habitat

REMEDIAL ACTION TECHNOLOGY OPTIONS

❑ Complete Pathway: ○ *Current* ○ *Potential*
⋈ Action Required: ❑ Yes ■ No
If yes, list technology options for ⋈

❑ Complete Pathway: ○ *Current* ● *Potential*
⋈ Action Required: ❑ Yes ■ No
If yes, list technology options for ⋈:

■ Complete Pathway: ○ *Current* ● *Potential*
⋈ Action Required: ■ Yes ❑ No
If yes, list technology options for ⋈
Apply Low RiskGroundwater Case Closure (RWQCB Interim Guidance Document dated January 5, 1997).

❑ Complete Pathway: ○ *Current* ○ *Potential*
⋈ Action Required: ❑ Yes ❑ No
If yes, list technology options for ⋈

(■ OR ● OR ⋈ TO SELECT)

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Former Chevron 9-0100 Job Identification: 5178.02
Site Location: 2428 Central Avenue, Alameda Date Completed: 12/29/96
Completed By: David J. Vossler

Software: GSI RBCA Spreadsheet
Version: v 1.0

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined.

DEFAULT PARAMETERS

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (l/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg*yr/kg*d)	1.1E+02			9.4E+01	
IRa.In	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2*yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)	***FALSE***				
gwMCL?	Use MCL as exposure limit in groundwater?	TRUE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Groundwater Pathways:				
GW.i	Groundwater Ingestion	TRUE	FALSE	
GW.v	Volatilization to Outdoor Air	TRUE	FALSE	
GW.b	Vapor Intrusion to Buildings	TRUE	FALSE	
Soil Pathways				
S.v	Volatiles from Subsurface Soils	FALSE	FALSE	
SS.v	Volatiles and Particulate Inhalation	FALSE	FALSE	FALSE
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
S.l	Leaching to Groundwater from all Soils	FALSE	FALSE	
S.b	Intrusion to Buildings - Subsurface Soils	FALSE	FALSE	

Matrix of Receptor Distance and Location on- or off-site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)		TRUE		TRUE
S	Inhalation receptor (cm)		TRUE		TRUE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	1.0E-06	
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	
Opt	Calculation Option (1, 2, or 3)	1	
Tier	RBCA Tier	2	

Surface Parameters	Definition (Units)	Residential	Commercial/Industrial Chronic	Commercial/Industrial Construction
t	Exposure duration (yr)	30	25	1
A	Contaminated soil area (cm^2)	2.2E+06		1.0E+06
W	Length of affected soil parallel to wind (cm)	1.5E+03		1.0E+03
W.gw	Length of affected soil parallel to groundwater (cn	1.5E+03		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
delta	Air mixing zone height (cm)	2.0E+02		
Lss	Definition of surficial soils (cm)	1.0E+02		
Pe	Particulate areal emission rate (g/cm^2/s)	2.2E-10		

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	***2.4E+02***
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	***9.1E+00***
Ugw.tr	Groundwater Transport velocity (cm/yr)	***2.4E+01***
Ks	Saturated Hydraulic Conductivity(cm/s)	1.0E-04
grad	Groundwater Gradient (cm/cm)	3.0E-03
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	FALSE
phi.eff	Effective Porosity in Water-Bearing Unit	3.7E-01
foc.sat	Fraction organic carbon in water-bearing unit	***3.0E-02***

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	5.0E+00		
hv	Vadose zone thickness (cm)	***2.4E+02***		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	***0.073***		
phi	Soil porosity in vadose zone	***0.37***		
Lgw	Depth to groundwater (cm)	***2.5E+02***		
Ls	Depth to top of affected soil (cm)			
Lsubs	Thickness of affected subsurface soils (cm)	***3.0E+02***		
pH	Soil/groundwater pH	6.5		
		capillary	vadose	foundation
phi.w	Volumetric water content	***0.337***	0.12	0.12
phi.a	Volumetric air content	***0.033***	***0.25***	***0.25***

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	***0.001***	

Dispersive Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersion coefficient (cm)		
ay	Transverse dispersion coefficient (cm)		
az	Vertical dispersion coefficient (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

CAS Number	Constituent	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) (l/kg) Koc	ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3/mol)	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg) Pure Component	ref	Solubility (@ 20 - 25 C) (mg/l) Pure Component	ref
71-43-2	Benzene	A	78.1	5	9.30E-02	A	1.10E-05	A	1.58	A	5.29E-03	2.20E-01	A	9.52E+01	4	1.75E+03	A
100-41-4	Ethylbenzene	A	106.2	5	7.60E-02	A	8.50E-06	A	1.98	A	7.69E-03	3.20E-01	A	1.00E+01	4	1.52E+02	5
108-88-3	Toluene	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	A	6.25E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29
1330-20-7	Xylene (mixed isomers)	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	A	6.97E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5

Site Name: Former Chevron 9-010(Site Location: 2428 Central Avenue, / Completed By: David J. Vossler Date Completed: 12/29/1996

Software version: v 1.0

[redacted]rty Data

CAS Number	Constituent	acid pKa	base pKb	ref
71-43-2	Benzene			
100-41-4	Ethylbenzene			
108-88-3	Toluene			
1330-20-7	Xylene (mixed isomers)			

Site Name: Former Chevron

Software version: v 1.0

CAS Number	Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Inhalation RfD_Inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Inhalation SF_Inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
71-43-2	Benzene	-	R	1.70E-03	R	2.90E-02	A	2.90E-02	A	A	TRUE
100-41-4	Ethylbenzene	1.00E-01	A	2.86E-01	A	-	R	-	R	D	FALSE
108-88-3	Toluene	2.00E-01	A,R	1.14E-01	A,F	-	R	-	R	D	FALSE
1330-20-7	Xylene (mixed isomers)	2.00E+00	A,R	2.00E+00	A	-	R	-	R	D	FALSE

Site Name: Former Chevron Site Location: 2428 Central Avenue, Alar Completed By: David J. Vossler Date Completed: 12/29/1996

Software version: v 1.0

CAS Number	Constituent	Maximum Contaminant Level MCL (mg/L)	Maximum Contaminant Level reference	Permissible Exposure Limit PEL/TLV (mg/m3)	PEL/TLV ref	Relative Absorption Factors Oral	Relative Absorption Factors Dermal	Detection Limits Groundwater (mg/L)	Groundwater ref	Detection Limits Soil (mg/kg)	Soil ref	Half Life (First-Order Decay) (days) Saturated	Half Life (First-Order Decay) (days) Unsaturated
71-43-2	Benzene	5.00E-03	52 FR 25690	3.20E+00	OSHA	1	0.5	0.002	C	0.005	S	720	720
100-41-4	Ethylbenzene	7.00E-01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.002	C	0.005	S	228	228
108-88-3	Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	1	0.5	0.002	C	0.005	S	28	28
1330-20-7	Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.005	C	0.005	S	360	360

Site Name: Former Chevron Site Location: 2428 Central Avenue, Alameda, CA Completed By: David J. Vossler Date Completed: 12/29/199

Software version: v 1.0

[redacted]

CAS Number	Constituent	ref
71-43-2	Benzene	H
100-41-4	Ethylbenzene	H
108-88-3	Toluene	H
1330-20-7	Xylene (mixed isomers)	H

Site Name: Former Chevron #6

Software version: v 1.0

Site Name: Former Chevron 9-0100
Site Location: 2428 Central Avenue, Alameda, CA

Completed By: David J. Vossler
Date Completed: 12/29/1996

SURFACE SOIL SSTL VALUES (< 3 FT BGS)

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
■ PEL exposure limit?

Calculation Option: 1

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Soil Leaching to Groundwater			Ingestion, Inhalation and Dermal Contact		Construction Worker	Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (PEL) (on-site)	Commercial: (on-site) (PEL)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene	0.0E+0	NA	NA	NA	NA	NA	NA	>Res	☐	<1
100-41-4	Ethylbenzene	0.0E+0	NA	NA	NA	NA	NA	NA	>Res	☐	<1
108-88-3	Toluene	0.0E+0	NA	NA	NA	NA	NA	NA	>Res	☐	<1
1330-20-7	Xylene (mixed isomers)	0.0E+0	NA	NA	NA	NA	NA	NA	>Res	☐	<1

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.2

Site Name: Former Chevron 9-0100
Site Location: 2428 Central Avenue, Alameda, CA

Completed By: David J. Vossler
Date Completed: 12/29/1996

SUBSURFACE SOIL SSTL VALUES (> 3 FT BGS)

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
■ PEL exposure limit?

Calculation Option: 1

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	Soil Leaching to Groundwater			Soil Volatilization to Indoor Air		Soil Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/kg)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site) (PEL)	Residential: (on-site)	Commercial: (PEL) (on-site)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Res	☐	<1
100-41-4	Ethylbenzene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Res	☐	<1
108-88-3	Toluene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Res	☐	<1
1330-20-7	Xylene (mixed isomers)	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Res	☐	<1

Software: GSI RBCA Spreadsheet
Version: v 1.0

Serial: G-225-ZRX-486

Site Name: Former Chevron 9-0100
Site Location: 2428 Central Avenue, Alameda, CA

Completed By: David J. Vossler
Date Completed: 12/29/1996

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-6
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
■ PEL exposure limit?

Calculation Option: 1

SSTL Results For Complete Exposure Pathways ("x" if Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	X Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		X Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site) (PEL)	Residential (on-site)	Commercial: (on-site) (PEL)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	2.7E-1	2.9E-3	NA	5.0E-3	1.3E-1	NA	1.3E+1	NA	5.0E-3	■	5.4E+01
100-41-4	Ethylbenzene	3.4E-3	3.7E+0	NA	7.0E-1	>Sol	NA	>Sol	NA	7.0E-1	☐	<1
108-88-3	Toluene	5.6E-3	7.3E+0	NA	1.0E+0	1.7E+2	NA	>Sol	NA	1.0E+0	☐	<1
1330-20-7	Xylene (mixed isomers)	4.9E-3	7.3E+1	NA	1.0E+1	>Sol	NA	>Sol	NA	1.0E+1	☐	<1

Site Name: Former Chevron 9-0100

Site Location: 2428 Central Avenue, Alameda, CA

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALC

AIR EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE

SURFACE SOILS: VAPOR AND DUST INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Surface Soil Conc (mg/kg)	2) NAF Value (m^3/kg) Receptor		3) Exposu Air. POE Conc. (
Benzene	0.0E+0			
Ethylbenzene	0.0E+0			
Toluene	0.0E+0			
Xylene (mixed isomers)	0.0E+0			

NOTE: ABS = Dermal absorption factor (dim)
AF = Adherance factor
AT = Averaging time (days)
BW = Body Weight (kg)
CF = Units conversion factor
ED = Exp. duration (yrs)

[redacted] [redacted] **Tier 2 Worksheet 8.1**

Completed By: David J. Vossler Date Completed: 12/29/1996 *1 OF 6*

:ULATION

[redacted]

re Medium 'mg/m^3) (1) / (2)	4) Exposure Multiplier (IRxETxEFxED)/(BWxAT) (m^3/kg-day)		5) Average Daily Intake Rate (mg/kg-day) (3) X (4)	

EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Intake rate (L/day or mg/day)
POE = Point of exposure
SA = Skin surface area (cm^2)

Site Name: Former Chevron 9-0100

Site Location: 2428 Central Avenue, Alameda, CA

TIER 2 EXPOSURE CONCENTRATION AND INT

AIR EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS: VAPOR

INHALATION

Exposure Concentration

Constituents of Concern	1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg): Receptor		3) Exposure Medium: Air. POE Conc. (mg/m^3) (1) / (2)	
Benzene	0.0E+0				
Ethylbenzene	0.0E+0				
Toluene	0.0E+0				
Xylene (mixed isomers)	0.0E+0				

NOTE: ABS = Dermal absorption factor (dim)
AF = Adherance factor
AT = Averaging time (days)
BW = Body Weight (kg)
CF = Units conversion factor
ED = Exp. duration (yrs)

[redacted] Tier 2 Worksheet 8.1

Completed By: David J. Vossler Date Completed: 12/29/1996

AKE CALCULATION

4) Exposure Multiplier (IRxETxEFxED)/(BWxAT) (m^3/kg-day)		5) Average Daily Intake Rate (mg/kg-day) (3) X (4)		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from surface & subsurface routes)	

EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Intake rate (L/day or mg/day)

POE = Point of exposure
SA = Skin surface area (cm^2)

Site Name: Former Chevron 9-0100 | Site Location: 2428 Central Avenue, Alameda, CA | Completed By: David J. V

TIER 2 PATHWAY RISK CALCULATION

AIR EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAYS ARE

CARCINOGENIC RISK

Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day)		(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3)	
Benzene	A			2.9E-2		
Ethylbenzene	D					
Toluene	D					
Xylene (mixed isomers)	D					
Total Pathway Carcinogenic Risk =					0.0E+0	0.0E+0

[redacted] **Tier 2 Worksheet 8.2**

'ossler Date Completed: 12/29/1996 *1 OF 3*

ACTIVE

TOXIC EFFECTS

(5) Total Toxicant Intake Rate (mg/kg/day)		(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6)	
		1.7E-3		
		2.9E-1		
		1.1E-1		
		2.0E+0		
	Total Pathway Hazard Index =		**0.0E+0**	**0.0E+0**

Site Name: Former Chevron 9-0100 Site Location: 2428 Central Avenue, Al Completed By: David J. Vossler Date Completed: 12/29/1996 3 OF 6

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

DERMAL CONTACT

Constituents of Concern	Exposure Concentration 1) Source Medium: Surface Soil Conc. (mg/kg)	4) Exposure Multiplier (SAxAFxABSxCFxEFxED)/(BWxAT) (1/day): On-Site Residential	4) Exposure Multiplier (SAxAFxABSxCFxEFxED)/(BWxAT) (1/day): On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day): On-Site Residential	5) Average Daily Intake Rate (mg/kg-day): On-Site Commercial
Benzene	0.0E+0				
Ethylbenzene	0.0E+0				
Toluene	0.0E+0				
Xylene (mixed isomers)	0.0E+0				

NOTE: ABS = Dermal absorption factor (dim); AF = Adherance factor; AT = Averaging time (days); BW = Body Weight (kg); CF = Units conversion factor; ED = Exp. duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Intake rate (L/day or mg/day); POE = Point of exposure; SA = Skin surface area (cm^2)

Site Name: Former Chevron 9-0100 Site Location: 2428 Central Avenue, Alameda Completed By: David J. Vossler Date Completed: 12/29/1996

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ☒ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

INGESTION

Exposure Concentration

Constituents of Concern	1) Source Medium: Surface Soil Conc. (mg/kg)	4) Exposure Multiplier (IRxCxEFxED)/(BWxAT) (1/day): On-Site Residential	4) Exposure Multiplier (IRxCxEFxED)/(BWxAT) (1/day): On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day): On-Site Residential	5) Average Daily Intake Rate (mg/kg-day): On-Site Commercial	TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from dermal & ingestion routes.): On-Site Residential	TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from dermal & ingestion routes.): On-Site Commercial
Benzene	0.0E+0						
Ethylbenzene	0.0E+0						
Toluene	0.0E+0						
Xylene (mixed isomers)	0.0E+0						

NOTE:

ABS = Dermal absorption factor (dim)
AF = Adherance factor
AT = Averaging time (days)
BW = Body Weight (kg)
CF = Units conversion factor
ED = Exp. duration (yrs)
EF = Exposure frequency (days/yr)
ET = Exposure time (hrs/day)
IR = Intake rate (L/day or mg/day)
POE = Point of exposure
SA = Skin surface area (cm^2)

Site Name: Former Chevron 9-0100 Site Location: 2428 Central Avenue, Alarr Completed By: David J. Vossler Date Completed: 12/29/1996 2 OF 3

TIER 2 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAYS ARE ACTIVE)

		CARCINOGENIC RISK					TOXIC EFFECTS				
	(1) EPA	(2) Total Carcinogenic Intake Rate (mg/kg/day)		(3) Oral Slope Factor	(4) Individual COC Risk (2) x (3)		(5) Total Toxicant Intake Rate (mg/kg/day)		(6) Oral Reference Dose	(7) Individual COC Hazard Quotient (5) / (6)	
Constituents of Concern	Carcinogenic Classificati	On-Site Residential	On-Site Commercial	(mg/kg-day)^-1	On-Site Residential	On-Site Commercial	On-Site Residential	On-Site Commercial	(mg/kg-day)	On-Site Residential	On-Site Commercial
Benzene	A			2.9E-2							
Ethylbenzene	D								1.0E-1		
Toluene	D								2.0E-1		
Xylene (mixed isomers)	D								2.0E+0		
Total Pathway Carcinogenic Risk =					0.0E+0	0.0E+0	*Total Pathway Hazard Index =*			0.0E+0	0.0E+0

Site Name: Former Chevron 9-0100 | Site Location: 2428 Central Avenue, Alameda, C/Completed By: David J. Vossler | Date Completed: 12/29/1996 | 5 OF 6

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SOIL: LEACHING TO GROUNDWATER/ INGESTION

Constituents of Concern	Exposure Concentration: 1) Source Medium — Soil Concentration (mg/kg)	2) NAF Value (L/kg) — Receptor		3) Exposure Medium — Groundwater POE Conc. (mg/L) (1)/(2)		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (L/kg-day)		5) Average Daily Intake Rate (mg/kg-day)	
Benzene	0.0E+0								
Ethylbenzene	0.0E+0								
Toluene	0.0E+0								
Xylene (mixed isomers)	0.0E+0								

NOTE: AT = Averaging time (days) | BW = Body Weight (kg) | CF = Units conversion factor | ED = Exp. duration (yrs) | EF = Exposure frequencey (days/yr) | IR = Intake rate (L/day) | POE = Point of exposure

Site Name: Former Chevron 9-0100 | Site Location: 2428 Central Avenue, Alameda, CA | Completed By: David J. Vossler | Date Completed: 12/29/1996 | *6 OF 6*

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: INGESTION

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Concentration (mg/L)	2) NAF Value (dim) Receptor: On-Site Residential		3) Exposure Medium: Groundwater POE Conc (mg/L) (1)/(2) On-Site Residential		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (L/kg-day) On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) On-Site Residential		MAX. PATHWAY INTAKE (mg/kg-day) (Maximum intake of active pathways soil leaching & groundwater routes) On-Site Residential	
Benzene	2.7E-1	1.0E+0		2.7E-1		1.2E-2		3.2E-3		3.2E-3	
Ethylbenzene	3.4E-3	1.0E+0		3.4E-3		2.7E-2		9.3E-5		9.3E-5	
Toluene	5.6E-3	1.0E+0		5.6E-3		2.7E-2		1.5E-4		1.5E-4	
Xylene (mixed Isomers)	4.9E-3	1.0E+0		4.9E-3		2.7E-2		1.3E-4		1.3E-4	

NOTE: AT = Averaging time (days) | BW = Body Weight (kg) | CF = Units conversion factor | ED = Exp. duration (yrs) | EF = Exposure frequencey (days/yr) | IR = Intake rate (L/day or mg/day) | POE = Point of exposure

Serial: G-225-ZRX-486 | Software: GSI RBCA Spreadsheet Version: v 1.0

Site Name: Former Chevron 9-0100 | Site Location: 2428 Central Avenue, Alam | Completed By: David J. Vossler | Date Completed: 12/29/1996 | 3 OF 3

TIER 2 PATHWAY RISK CALCULATION

GROUNDWATER EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAYS ARE ACTIVE)

	CARCINOGENIC RISK					TOXIC EFFECTS				
Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential		(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential		(5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential		(6) Oral Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene	A	3.2E-3		2.9E-2	9.2E-5						
Ethylbenzene	D						9.3E-5		1.0E-1	9.3E-4	
Toluene	D						1.5E-4		2.0E-1	7.7E-4	
Xylene (mixed isomers)	D						1.3E-4		2.0E+0	6.7E-5	

Total Pathway Carcinogenic Risk = 9.2E-5 | 0.0E+0

Total Pathway Hazard Index = 1.8E-3 | 0.0E+0

Site Name: Former Chevron 9-0100
Site Location: 2428 Central Avenue, Alameda, CA

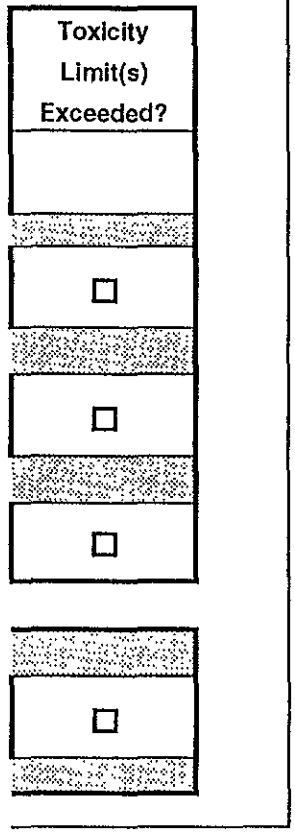
Completed By: David J. Vossler
Date Completed: 12/29/1996

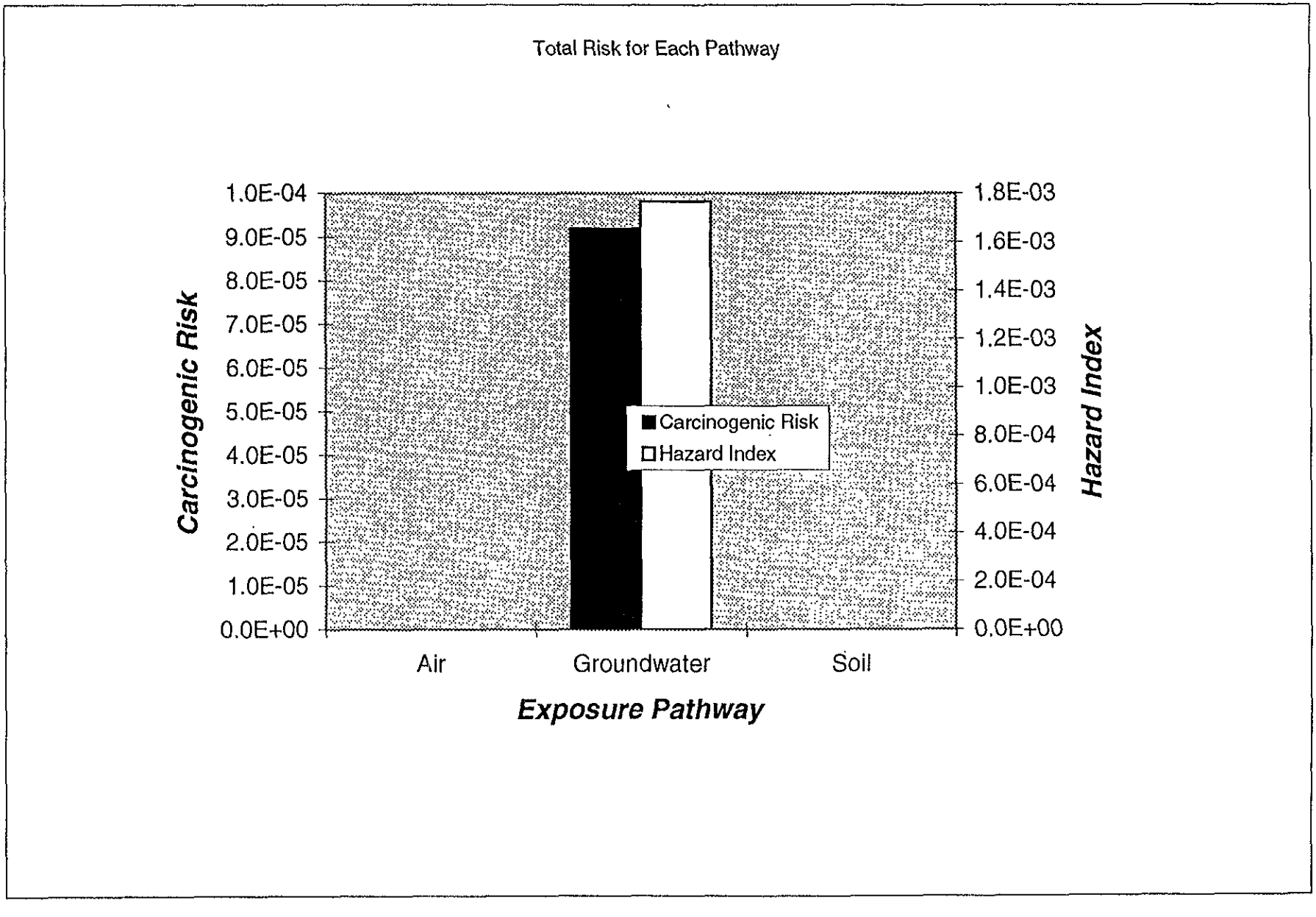
TIER 2 BASELINE RISK SUMMARY TABLE

EXPOSURE PATHWAY	BASELINE CARCINOGENIC RISK: Individual COC Risk – Maximum Value	Individual COC Risk – Target Risk	Cumulative COC Risk – Total Value	Cumulative COC Risk – Target Risk	Risk Limit(s) Exceeded?	BASELINE TOXIC EFFECTS: Hazard Quotient – Maximum Value	Hazard Quotient – Applicable Limit	Hazard Index – Total Value	Hazard Index – Applicable Limit
AIR EXPOSURE PATHWAYS									
Complete:	0.0E+0	1.0E-6	0.0E+0	N/A	☐	0.0E+0	1.0E+0	0.0E+0	N/A
GROUNDWATER EXPOSURE PATHWAYS									
Complete:	9.2E-5	1.0E-6	9.2E-5	N/A	■	9.3E-4	1.0E+0	1.8E-3	N/A
SOIL EXPOSURE PATHWAYS									
Complete:	0.0E+0	1.0E-6	0.0E+0	N/A	☐	0.0E+0	1.0E+0	0.0E+0	N/A
CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)									
	9.2E-5	1.0E-6	9.2E-5	N/A	■	9.3E-4	1.0E+0	1.8E-3	N/A

Serial: G-225-ZRX-4I
Software:
Version:

sheet 8.3




Total Risk for Each Pathway
1.0E-04
9.0E-05
8.0E-05
7.0E-05
6.0E-05
5.0E-05
4.0E-05
3.0E-05
2.0E-05
1.0E-05
0.0E+00
Carcinogenic Risk
1.8E-03
1.6E-03
1.4E-03
1.2E-03
1.0E-03
8.0E-04
6.0E-04
4.0E-04
2.0E-04
0.0E+00
Hazard Index
Carcinogenic Risk
Hazard Index
Air
Groundwater
Soil
Exposure Pathway

GETTLER-RYAN INC.

March 3, 1998

Ms. Madula Logan
Alameda County
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: Response to ACEHS Comments Regarding the Risk-Based Corrective Action (RBCA) Evaluation dated April 20, 1997, for the Former Chevron Service Station No. 9-0100, located at 2428 Central Avenue, Alameda, California.

Ms. Logan:

This letter was prepared at the request of Chevron Products Company (Chevron) to address concerns expressed in the letter from Alameda County Environmental Health Services (ACEHS) dated December 15, 1997 (copy attached) This letter requests clarification of three points discussed in Gettler-Ryan Inc's. (GR) Risk-Based Corrective Action (RBCA) evaluation dated April 20, 1997. The following responses correlate with the numeric sequence in your letter.

Response to Comment Number 1. ACEHS is concerned that "significant" soil contamination still exists near the former underground storage tanks (USTs). This concern is based on a saturated soil sampled collected from boring MW-2 at 10 feet below ground surface (bgs). As mentioned in the letter, historical monitoring data indicate groundwater fluctuates from between 5 and 9 feet bgs. We believe it is improper to evaluate soil conditions based on saturated soil samples, as it is not feasible to differentiate between contaminants adsorbed to the soil particles and contaminants dissolved in the groundwater filling the pore spaces of the soil sample. Soil samples collected at the site from 5 feet bgs in all of the borings were reported as non detect (ND) for petroleum hydrocarbons, including soil samples from the borings EB-2 and MW-2, located immediately down gradient of the former USTs. Soil samples from this depth (5 feet bgs) are indicative of the soil conditions at the site. Groundwater at the time soil sample MW-2 at 10 feet bgs was collected was documented at 7.3 feet bgs.

The former USTs penetrated groundwater while in operation, therefore, any release would be found to have impacted the groundwater directly. Petroleum products that enter the saturated zone would then migrate through the groundwater and capillary fringe. The capillary fringe is also considered to be part of the saturated zone.

Unsaturated (vadose zone) soils at this site have not been impacted. The soil sample referred to in your letter, MW-2 at 10 feet bgs, is from the saturated zone and is not appropriate for representation of the soils beneath the site. This site is a groundwater only case, based on the depth to groundwater, soil and groundwater sampling results and specific site conditions.

Response to Comment Number 2. ACEHS has recommended that Chevron evaluate the possibility of performing soil excavation in the area of the former USTs. The former USTs were located primarily beneath the existing structure, prohibiting the excavation of capillary fringe soils. In addition, backfill placed after over excavation would be re-impacted by the localized groundwater problem, thus, creating a never ending cycle. The excavation of soils from this site is not warranted nor feasible.

The amount of soil removal during the UST removal in January 1970 is not known, nor was it a requirement for UST closures at the time of the UST removal. Once again, all soil samples collected from the unsaturated/vadose zone, including those collected adjacent to the former USTs, were reported as ND for petroleum hydrocarbons. Unsaturated/vadose zone soils at this site are not impacted.

Response to Comment Number 3. As requested by the ACEHS, GR has re-done the RBCA Worksheet 9.3, earlier prepared and submitted with the specific attention to the exposure pathway of *groundwater volatilization to indoor air*. For the preparation and re-calculation of the RBCA Worksheet 9.3, GR used the updated version of the GSI RBCA Program v1.0.1, ACEHS's acceptable risk of 10-5, the shallowest (most conservative) recorded depth to groundwater for the site (5 feet bgs), and the most current groundwater analytical results (September 30, 1997, attached). Other site specific parameters remained the same. The re-computed RBCA Worksheet 9.3 along with the accompanying Output Table 1 is attached.

The results of this revised RBCA calculation, specifically for the exposure pathway of *groundwater volatilization to indoor air*, indicates that the current groundwater concentration for the represented COC are below the applicable Site Specific Target Levels (SSTL) (see attached Worksheet 9.3). These findings, according the approved RBCA spreadsheet method for determining health risks, indicate that there is not a health risk at this site.

Groundwater ingestion at the site was computed for commercial purposes. These findings also indicated that the COC's in groundwater were below the set SSTL for the site. As stated previously, the City of Alameda is entirely serviced by an imported water supply and does not allow the use the shallow groundwater (less than 25 feet bgs), on the island for domestic use.

Chevron and G-R are aware that the ACEHS bases their decisions regarding RBCA evaluations on current and future land use of the property. Currently the site usage is commercial, consisting of a motel. Potential future land use would most likely be commercial based on its location, property values and the development trend in the vicinity of the site.

As requested in our telephone conversation of February 18, 1998, a revised Site Plan (Figure 2) showing the locations of the exploratory borings of EB-1 and EB-2 in relationship to the existing structure and former USTs is also attached.

Based on the current computation of the RBCA Spreadsheet System v1.0.1 and the most current groundwater data, it appears that there is not a health risk present at the site. Groundwater concentrations as reported in the most recent semi-annual groundwater monitoring report show a continual decrease in BTEX concentrations while the sentry wells remain non-detect. This suggests that the natural bio-degradation and attenuation of the BTEX is occurring. With the results of the RBCA evaluation and completion of the Regional Water Quality Control Board (RWQCB) Interim Guidance on Required Cleanup at Low Risk Fuel Sites (January 5, 1996), it is our opinion that remedial efforts are not warranted and that the site should be granted case closure.

If you have any questions regarding the contents of this letter or attachments, please call us in our Novato office at (415) 893-1515.

Sincerely,

David J. Vossler
Senior Geologist

Stephen J. Carter
Senior Geologist
R.G. No. 5577

REGISTERED GEOLOGIST
STEPHEN J. CARTER
No. 5577
STATE OF CALIFORNIA

Attachments: ACEHS Letter Dated December 15, 1997
Historical Groundwater Analytical Table
RBCA Spreadsheet System - Output Table 1
RBCA Spreadsheet System - Worksheet 9.3
Figure 2. Site Plan (revised)

cc: Mr. Phil Briggs, Chevron Products Company, San Ramon, California

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

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

December 15, 1997

Phil Briggs
Chevron Products Company
6001 Bollinger Canyon Road, P.O. Box 5004
San Ramon, CA 94583-0804

Re: Chevron Station, 2428 Central Avenue, Alameda, California

Dear Mr. Briggs:

This Department is in receipt of the Risk Based Corrective Action (RBCA) report, dated April 18, 1997 and the Semi-Annual Groundwater Monitoring Report, dated April 20, 1997, prepared by Gettler-Ryan, Inc for the above referenced property.

According to the information provided to this Department, a service station operated at the site from 1947 until 1970. The Station facilities were abandoned and demolished in January 1970. In the process, one 7500 and three 3000 gallon underground storage tanks were removed from the site along with their associated product piping. Currently, a multi-story hotel, constructed in 1973 occupies the site and the area over the former underground storage tank areas are being used as a parking lot.

Based on the review of the risk assessment, this Department has identified the following concerns:

1. In June 1993, two soil borings EB-1 and EB-2 were drilled near the former dispenser area and the former UST Pit. The soil sample collected from EB-1 at the 10 feet depth near the pump island area contained about 7.94 ppm of benzene. Also, in April 1994, groundwater monitoring wells MW-1 to MW-3 were installed on site. The soil sample collected from monitoring well MW-2, which is down gradient to the former UST area contained 3000 ppm of gasoline and 8 ppm of benzene. However, the risk assessment report mentioned that the exposure pathway, " soil to indoor air" was not evaluated since all the benzene identified in the soil samples was found was in the saturated zone (groundwater appears to fluctuate between 5 to 9 feet). This Department is concerned that significant soil contamination still exists near the UST area.

2. This Department recommends you evaluate soil excavation and/or defining the current soil contamination around the UST area as an option. This is being recommended since during the time of the UST removal in the 1970"s wherein compliance soil sampling was not a regulatory requirement, no soil sampling results were documented. Hence, this Department is concerned (based on the soil sampling results) as to the adequacy of the soil excavation conducted as part of the tank closure process.

3. According to the report, the results of the RBCA indicate that the pathway "groundwater to indoor air" does not pose a risk, although Appendix D, Worksheet 9.3, indicates the presence of a risk. Please note that a risk of 10-5 is acceptable both for commercial and residential scenario as long as the appropriate values are used for the different parameters in the equations. Please re-do the worksheet.

Also please note that this Department makes risk based decisions based on both the current and the future potential use of the property. If a risk assessment is approved just based on the current use, like for eg., the current use of the area above the former UST location as a parking lot, then a deed restriction may be required on the property, which would then require a re-evaluation of risk in case the use of the property changes.

Please submit an addendum within 30 days from the date of the letter, clarifying the above listed issues.

If you have any questions, you may reach me at (510) 567-6764

Sincerely,

Madhulla Logan

Madhulla Logan
Hazardous Material Specialist

C: David Vossler, Gettlar Ryan, Inc., - 6747 Sierra Court, Suite J, Dublin, California - 94568.

Table 1. Water Level Data and Groundwater Analytical Results - Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California (continued)

Well ID/ TOC (ft)	Date	DTW (ft)	GWE (msl)	Product Thickness* (ft)	TPH(G)	B	T	E	X	MTBE
						<---------- ppb ---------- >				
MW-5										
28.88**	9/3/96	7.90	20.98	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/5/97	5.70	23.18	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/30/97	8.73	20.15	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
MW-6										
29.24**	9/3/96	7.98	21.26	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/5/97	5.61	23.63	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/30/97	8.88	20.36	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
Trip Blank	3/10/94	---	---	---	<50	<0.5	0.7	<0.5	<0.5	---
TB-LB	6/21/94	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	9/26/94	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	12/16/94	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	3/22/95	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	6/13/95	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	9/15/95	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
	3/8/96	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/3/96	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/5/97	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/30/97	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0

Table 1. Water Level Data and Groundwater Analytical Results - Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California

Well ID/ TOC (ft)	Date	DTW (ft)	GWE (msl)	Product Thickness* (ft)	TPH(G)	B	T	E	X	MTBE
						<----------ppb---------->				
MW-1/	3/10/94[1,2]	6.79	22.44	0	7,400	120	120	33	72	--
29.23	6/21/94	7.74	21.49	0	5,300	140	60	21	43	--
	9/26/94	8.94	20.29	0	9,500	<250[5]	<250[5]	<250[5]	<250[5]	--
	12/16/94	6.57	22.66	0	4,700	<0.5	46	15	48	--
	3/22/95	5.16	24.07	0	8,800	55	14	11	<10	--
	6/13/95	5.84	23.39	0	2,100	130	29	9.5	15	--
	9/15/95	7.65	21.58	0	8,160	110	26	6.0	13	--
	3/8/96	5.36	23.87	0	5,600	250	<5.0	<5.0	<5.0	60
29.25**	9/3/96	8.03	21.22	0	7,600	270	5.6	3.4	4.9	120
	3/5/97	5.33	23.92	0	5,000	130	5.2	3.7	5.7	31
	9/30/97	8.86	20.39	0	3,500	53	2.4	2.8	6.4	26
MW-2/	3/10/94[2,3]	6.94	22.24	0	6,400	<5	64	58	17	--
29.18	6/21/94	7.89	21.29	0	1,800	23	12	6.9	32	--
	9/26/94	8.98	20.20	0	8,400	<100[5]	<100[5]	<100[5]	<100[5]	--
	12/16/94	6.65	22.53	0	2,300	<0.5	29	8.9	33	--
	3/22/95	5.15	24.03	0	1,500	0.6	4.5	<0.5	2.5	--
	6/13/95	6.06	23.12	0	880	<0.5	<0.5	2.2	10	--
	9/15/95	7.72	21.46	0	2,700	<0.5	17	4.8	13	--
	3/8/96	5.38	23.80	0	1,300	42	2.0	0.7	2.2	10
29.19**	9/3/96	8.14	21.05	0	2,700	64	4.6	1.6	4.6	35
	3/5/97	5.43	23.76	0	1,200	25	3.0	<0.5	3.6	<5.0
	9/30/97	9.01	20.18	0	2,400	12	1.0	1.4	5.8	6.9
MW-3/	3/10/94[2,4]	7.30	22.79	0	<50	<0.5	<0.5	<0.5	<0.5	--
30.09	6/21/94	8.53	21.56	0	<50	<0.5	<0.5	<0.5	<0.5	--
	9/26/94	9.80	20.29	0	<50	<0.5	<0.5	<0.5	<0.5	--
	12/16/94	7.11	22.98	0	<50	<0.5	<0.5	<0.5	<0.5	--
	3/22/95	5.54	24.55	0	<50	<0.5	<0.5	<0.5	<0.5	--
	6/13/95	6.48	23.61	0	<50	<0.5	<0.5	<0.5	<0.5	--
	9/15/95	8.40	21.69	0	<50	<0.5	<0.5	<0.5	<0.5	--
	3/8/96	5.69	24.40	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
30.10**	9/3/96	8.80	21.30	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/5/97	5.89	24.21	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/30/97	9.68	20.42	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
MW-4										
29.31**	9/3/96	8.32	20.99	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	3/5/97	5.80	23.51	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	9/30/97	9.18	20.13	0	<50	<0.5	<0.5	<0.5	<0.5	<5.0

Table 1. Water Level Data and Groundwater Analytical Results - Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California
(continued)

EXPLANATION:

TOC = Top of casing elevation
(ft) = feet
DTW = Depth to water
GWE = Groundwater elevation
msl = Measurements referenced relative to mean sea level
TPH(G) = Total Purgeable Petroleum Hydrocarbons as Gasoline
TPH(D) = Total Petroleum Hydrocarbons as Diesel
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
MTBE = Methyl tertiary butyl ether
EDB = Ethylene Dibromide
ppb = Parts per billion
— = Not analyzed/Not applicable

ANALYTICAL METHODS:

EPA Method 8015/5030 for TPPH(G)
EPA Method 8020 for BTEX & MTBE

NOTES:

Water level elevation data and laboratory analytic results prior to March 22, 1995, were compiled from Quarterly Monitoring Reports prepared for Chevron by Sierra Environmental Services.

\+ Product thickness was measured on and after June 21,1994 with a MMC Flexi-Dip interface probe.

\++ Wells MW-1 through MW-6 were surveyed on September 17, 1996, by Virgil Chavez of Vallejo, California (PLS #6323).

1 TPH(D) was also analyzed and detected at 840 ppb. However, chromatogram does not match typical diesel pattern.

2 Organic lead and EDB were also analyzed but not detected at detection limits of 4 and 0.02 ppb, respectively.

3 TPH(D) was also analyzed and detected at 920 ppb. However, chromatogram does not match typical diesel pattern.

4 TPH(D) was also analyzed but not detected at detection limits of 50 ppb.

5 Detection limits raised due to the dilution required by a high amount of foaming in the sample.

5178.TQM

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Former Chevron Service Station Job Identification: 345178.02
Site Location: 2428 Central Avenue, Alameda Date Completed: 3/3/98
Completed By: David J. Vossler

Software: GSI RBCA Spreadsheet
Version: 1.0.1

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined.

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
t	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (L/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil Ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.In	Inhalation rate Indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2-yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)?	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Outdoor Air Pathways:				
SS.v	Volatiles and Particulates from Surface Soils	FALSE	FALSE	FALSE
S.v	Volatilization from Subsurface Soils	FALSE	FALSE	
GW.v	Volatilization from Groundwater	FALSE	FALSE	
Indoor Air Pathways:				
S.b	Vapors from Subsurface Soils	FALSE	FALSE	
GW.b	Vapors from Groundwater	FALSE	TRUE	
Soil Pathways:				
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	TRUE	
S.l	Leaching to Groundwater from all Soils	FALSE	TRUE	

Matrix of Receptor Distance and Location On- or Off-Site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)		TRUE		TRUE
S	Inhalation receptor (cm)		TRUE		TRUE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	*1.0E-05*	
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	
Opt	Calculation Option (1, 2, or 3)	1	
Tier	RBCA Tier	2	

Surface Parameters	Definition (Units)	Residential	Constrctn
A	Contaminated soil area (cm^2)	2.2E+06	1.0E+06
W	Length of affect. soil parallel to wind (cm)	1.5E+03	1.0E+03
W.gw	Length of affect. soil parallel to groundwater (cm)	1.5E+03	
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02	
delta	Air mixing zone height (cm)	2.0E+02	
Lss	Thickness of affected surface soils (cm)	1.0E+02	
Pe	Particulate areal emission rate (g/cm^2/s)	6.9E-14	

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	*1.7E+02*
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	*9.4E+00*
Ugw.tr	Groundwater seepage velocity (cm/yr)	*2.5E+01*
Ks	Saturated hydraulic conductivity(cm/s)	1.0E-04
grad	Groundwater gradient (cm/cm)	3.0E-03
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
phi.eff	Effective porosity in water-bearing unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	FALSE
BC	Biodegradation Capacity (mg/L)	

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	5.0E+00		
hv	Vadose zone thickness (cm)	*1.5E+02*		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	*0.073*		
phi	Soil porosity in vadose zone	*0.37*		
Lgw	Depth to groundwater (cm)	*1.5E+02*		
Ls	Depth to top of affected subsurface soil (cm)	1.0E+02		
Lsubs	Thickness of affected subsurface soils (cm)	2.0E+02		
pH	Soil/groundwater pH	6.5		
		capillary	vadose	foundation
phi.w	Volumetric water content	*0.337*	0.12	0.12
phi.a	Volumetric air content	*0.033*	*0.25*	0.25

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersivity (cm)		
ay	Transverse dispersivity (cm)		
az	Vertical dispersivity (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Former Chevron Service Station No. 9-0100
Site Location: 2428 Central Avenue, Alameda, California

Completed By: David J. Vossler
Date Completed: 3/3/1998

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-5
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

☐ MCL exposure limit?
☐ PEL exposure limit?

Calculation Option: 1

SSTL Results For Complete Exposure Pathways ("x" If Complete)

CONSTITUENTS OF CONCERN		Representative Concentration	X Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	4.7E-2	NA	9.9E-2	NA	NA	7.9E-1	NA	NA	9.9E-2	☐	<1
100-41-4	Ethylbenzene	2.7E-3	NA	1.0E+1	NA	NA	>Sol	NA	NA	1.0E+1	☐	<1
108-88-3	Toluene	2.2E-3	NA	2.0E+1	NA	NA	9.3E+1	NA	NA	2.0E+1	☐	<1
1330-20-7	Xylene (mixed isomers)	6.4E-3	NA	>Sol	NA	NA	>Sol	NA	NA	>Sol	☐	<1

>Sol Indicates risk-based target concentration greater than constituent solubility

Software: GSI RBCA Spreadsheet
Version: 1.0.1

Serial: G-225-ZRX-486

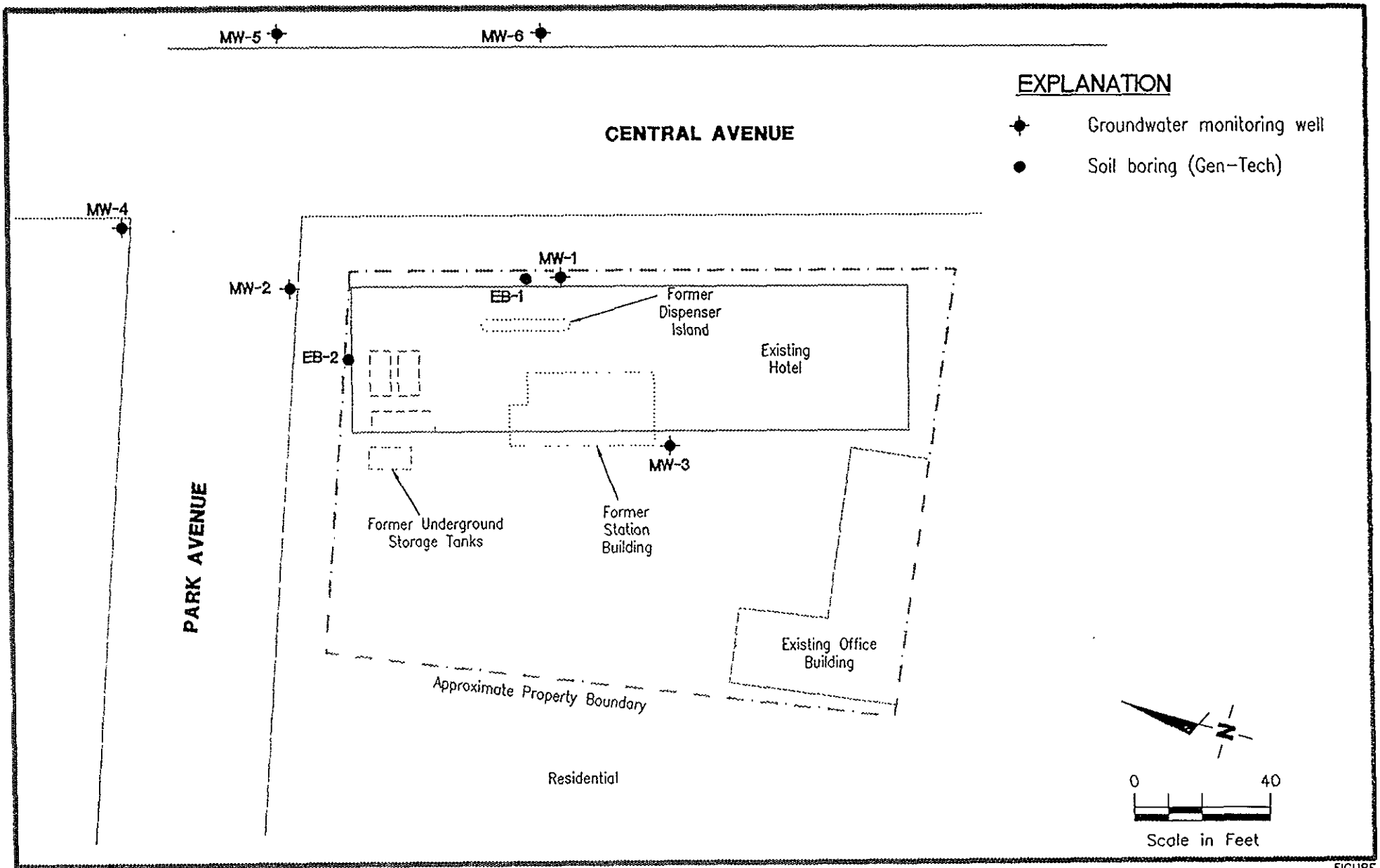


FIGURE 2

Gettler - Ryan Inc.

6747 Sierra Ct., Suite J
Dublin, CA 94568
(510) 551-7555

SITE PLAN
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
5178.02		February, 1998	

APPENDIX B

Source: Street Atlas USA, Delorme (1995).

N

0 0.25

Scale in Miles

Gettler - Ryan Inc.

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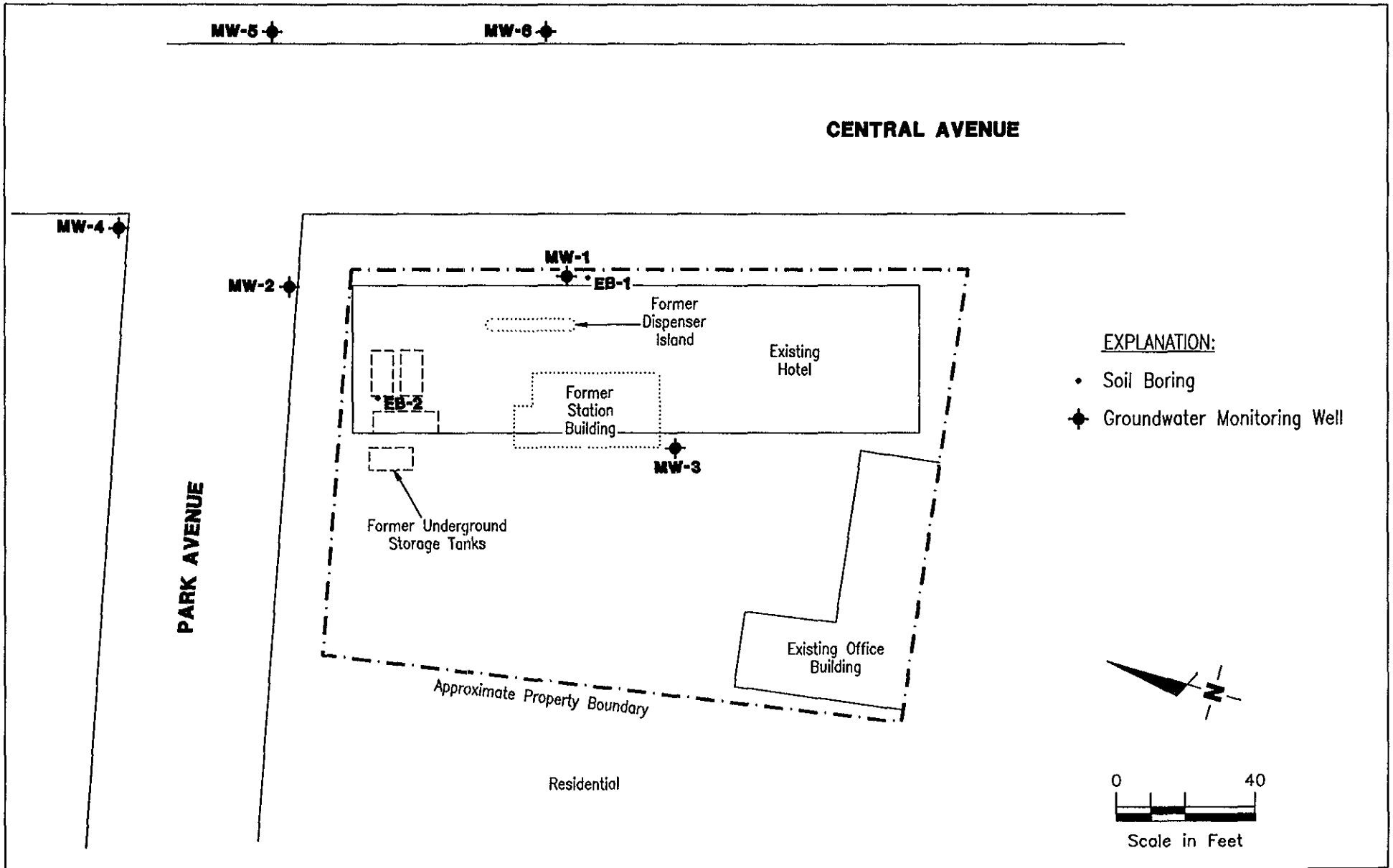
Dublin, CA 94568

VICINITY MAP
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

FIGURE 1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
5178		6/96	

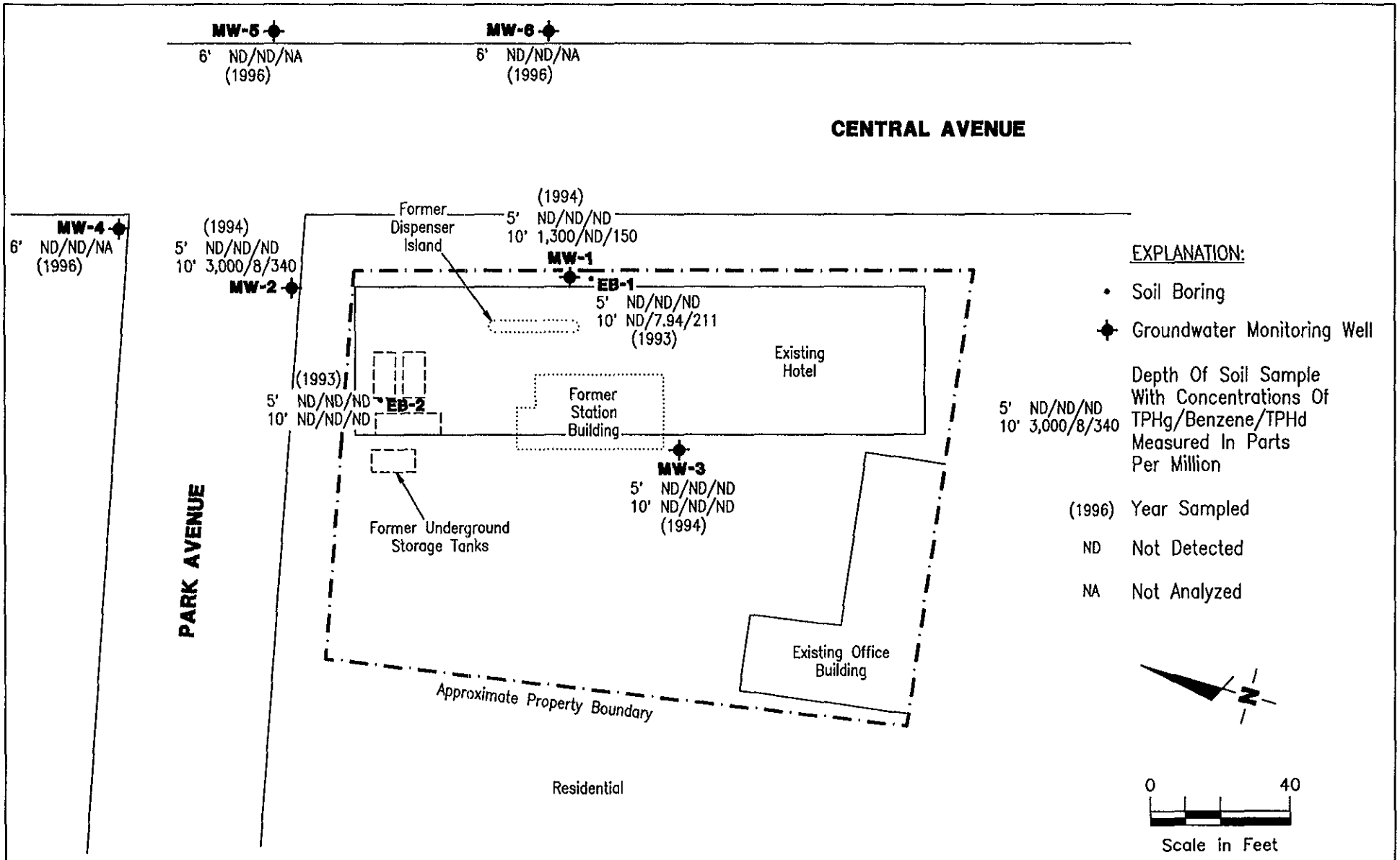


Gettler - Ryan Inc.
6747 Sierra Ct., Suite J (510) 551-7555
Dublin, CA 94568

SITE PLAN
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

FIGURE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
345178		06/96	



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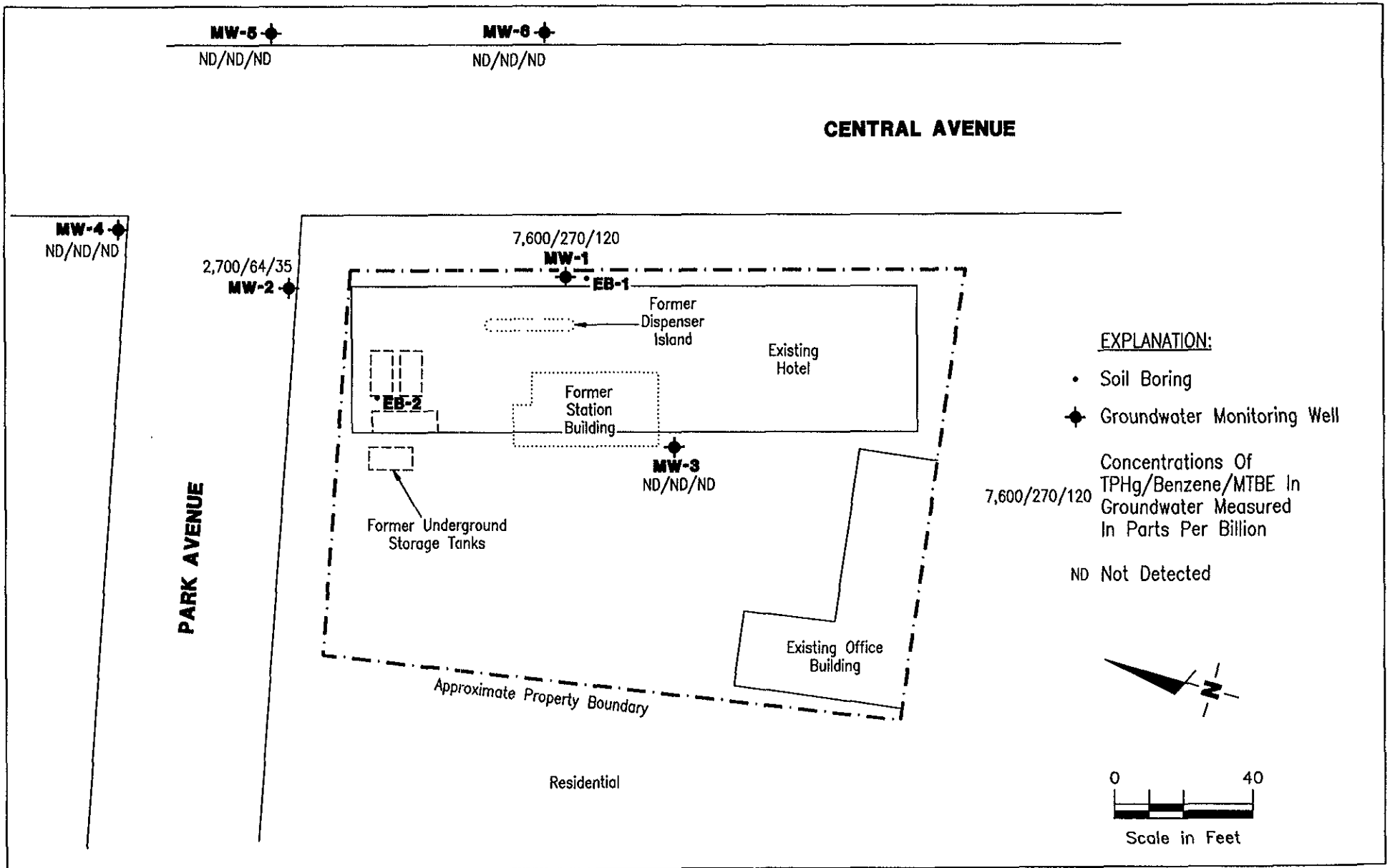
Dublin, CA 94568

SOIL CONCENTRATION MAP
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

FIGURE
3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
345178		04/99	



Gettler - Ryan Inc.
6747 Sierra Ct., Suite J
Dublin, CA 94568
(510) 551-7555

GROUNDWATER CONCENTRATION MAP
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

FIGURE
4

JOB NUMBER
345178

REVIEWED BY

DATE
September 3, 1996

REVISED DATE

APPENDIX C

SITE HEALTH AND SAFETY PLAN

Former Chevron Service Station #9-0100
2428 Central Avenue
Alameda, California

Prepared for:

_____
_____
_____

Date: _____

TABLE OF CONTENTS

1.0 INTRODUCTION

A. Overview

The contractor is providing this site safety plan in order to address various health and safety issues regarding work at the site and to disseminate information about the contractor's health and safety goals, procedures, and policies.

B. Scope of Work

This Site Health and Safety Plan was created for field work being performed at the Former Chevron Service Station #9-0100, 2428 Central Avenue, Alameda, California. The scope of the investigation includes: (1) soil excavation, (2) soil, groundwater, and concrete disposal, and (3) excavation backfill and surfacing.

Subcontractors will be utilized to perform the work associated soil excavation; soil, groundwater, and concrete disposal; and excavation backfilling. Entry into site excavations by site personnel will be expressly prohibited.

C. Site Description

The subject property is located on the southern corner of the intersection of Central and Park Avenues in Alameda, California. A multi-story hotel and office building currently occupy the site.

2.0 PROJECT SAFETY AUTHORITY

A. On-Site Project Safety

Personnel responsible for the project safety are:

Mr. Foreman	Project Safety Officer (The Contractor)
Mr. Assistant	Company Safety Officer (The Contractor)

The Project Safety Officer and Company Safety Officer have the authority to upgrade or downgrade the provisions of this Site Safety Plan as site conditions change. In addition, the Project Safety Officer shall be responsible for the following:

- Safety Supplies & Equipment Inventory for the Project Site
- Accident/Incident Reporting
- Decontamination/Contamination Reduction Procedures.

B. Safety Officer

The Company Safety Officer is responsible for assuring on-site safety and loss prevention functions. These responsibilities include:

- Health surveillance of all Contractor employees.
- Assuring that safety procedures in effect are in compliance with all appropriate federal, state, and company regulations.
- Maintenance of personnel exposure monitoring records.
- Assuring appropriate personal protective equipment is adequate for actual hazards of on-site conditions.
- Assuring appropriate exclusion areas are identified and delineated.

3.0 JOB HAZARD ANALYSIS

A. Inhalation Hazards

Contaminants that have been documented to occur in groundwater at the site include gasoline. Site specific hazard indentification with regards to the inhalation of these contaminanants are discussed below.

Gasoline

Gasoline is a clear liquid with a characteristic odor. Inhalation or absorption of gasoline can cause irritation of the eyes, skin, and mucous membranes, dermatitis, headache, fatigue, slurred speech, confusion, and convulsions.

The California Occupational Safety and Health Administration (Cal-OSHA) Permissible Exposure Limit (PEL) (the maximum permitted 8-hour time-weighted average concentration of an airborne contaminant) for gasoline is 300 parts per million (ppm). The Short Term Exposure Limit (STEL) (the maximum permitted 15 minute time weighted exposure) for gasoline is 500 ppm.

Benzene

Benzene is a colorless to light-yellow liquid with an aromatic odor. Inhalation or absorption of benzene can cause irritation of the eyes, skin, nose and respiratory system. Prolonged exposure can cause giddiness, headache, nausea, staggered gait, and fatigue.

The Cal-OSHA PEL for benzene is 1 ppm; the STEL for benzene is 5 ppm.

Toluene

Toluene is a colorless liquid with a sweet, pungent odor. Inhalation or absorption of toluene can cause irritation to the eyes and nose, fatigue, weakness, dizziness, headache, dermatitis, liver, and kidney damage.

The Cal-OSHA PEL for toluene is 100 ppm; the STEL for toluene is 150 ppm. The ceiling limit (The maximum concentration of an airborne contaminant to which an employee may be exposed at any time) for toluene is 500 ppm.

Ethylbenzene

Ethylbenzene is a colorless liquid with an aromatic odor. Inhalation or absorption of ethylbenzene can cause irritation to the eyes, skin, mucous membranes, headache, dermatitis, narcosis, and coma.

The Cal-OSHA PEL for ethylbenzene is 100 ppm; the STEL for ethylbenzene is 125 ppm.

Xylene Compounds

Xylene compounds (ortho-, meta-, and para-xylene) are colorless liquids with aromatic odors. Inhalation or absorption of xylene compounds can cause irritation to the eyes, skin, nose, throat, dizziness, drowsiness, nausea, vomiting, and dermatitis.

The Cal-OSHA PEL for xylene compounds is 100 ppm; the STEL for xylene compounds is 300 ppm.

4.0 RISK ASSESSMENT SUMMARY

It is anticipated that there will be no significant or major potential source of exposures due to the scope of work to be performed on this project. An analyses of site specific hazards with respect to chemical and physical hazards are discussed below.

In general, the principal routes of exposure on any site include inhalation, absorption, dermal contact, and ingestion. With respect to the scope of work to be performed, the potential routes of exposure include inhalation, absorption, and dermal contact. General safe work practices should adequately address the potential for exposure via absorption or dermal contact.

The potential for exposure due to inhalation would probably originate from airborne vapors, gas, or dusts. Due to the nature of this project, it is necessary to perform excavation activities at the site. Dust suppression measures may be required if it is deemed that airborne materials pose a hazard. These measures will include slowing the pace of work to minimize agitation of possible airborne materials and water saturation to minimize airborne materials.

With respect to direct contact, personal protective equipment such as gloves, eye protection, and skin protection will provide protection from potential exposure. Further, the amount of direct contact with potential contaminants, other than airborne dusts, will be limited.

Should respiratory irritation occur, appropriate air-purifying respiratory protective devices will be worn, with organic vapor cartridges and dust pre-filters, or with high efficiency organic vapor/HEPA stack-type cartridge. Typically, the cartridge will require replacement daily. Should direct contact occur in excess of what is anticipated through sample preservation procedures, appropriate protective clothing will be worn.

Physical hazards on-site have been identified as hazards associated with soil and groundwater sampling, soil excavation, and soil disposal activities; fire and explosion due to the presence of petroleum hydrocarbons; and general safety hazards

5.0 AIR MONITORING PLAN

A. General

An air quality monitoring program shall be implemented to provide baseline and on-going air quality data for site operations. This program shall include an on-going evaluation of on-site atmospheric contaminant concentrations during work site activities that involve significant surface disturbances using organic vapor detection instruments and detector tubes.

Additionally, the program will include a preliminary survey of existing air quality conditions, prior to any surface disturbances and, if possible, under anticipated "worst case" weather conditions, to be used to establish baseline levels for input into the respiratory protection selection process. The Project Safety Officer may also decide to perform perimeter monitoring of downwind air quality conditions during significant surface disturbances.

B. Action Levels

Photo-ionization detector (PID) readings will be taken and recorded once every hour (minimum) during the performance of these work activities. If it is determined, based on PID readings, that organic vapor concentrations in the work area reach 10 ppm in the breathing zone for 5 minutes, half mask respirators with organic vapor cartridges will be required.

If PID readings indicate total hydrocarbon levels reach 20 ppm in the breathing zone for 5 minutes, work activities will be suspended until the airborne hydrocarbon concentrations decrease to less than 10 ppm. If airborne levels remain at 20 ppm or more, all work activities will cease until the Company Safety Officer can be notified, and these levels can be ameliorated.

6.0 PERSONAL PROTECTIVE EQUIPMENT

A. Introduction

It is important that personal protective equipment and safety requirements be appropriate to protect against the potential hazards at the site. Protective equipment will be selected based on the contaminant type(s), concentration(s), and route of entry. In situations where the type of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the personal protective equipment.

A minimum of modified Level D Safety equipment and clothing will be required for all workers and visitors on the site. All personnel must be prepared to step up to higher levels of protective equipment as conditions warrant.

B. Levels of Protection

The basic required work uniform for the site is modified Level D protection which will include :

- hard hat
- steel toed boots
- safety glasses
- polyvinyl gloves for handling soil or liquid samples
- neoprene over gloves for handling augers or other contaminated items

If Level C protection is deemed necessary by the Site Safety Officer based on field conditions, the protective equipment will include:

- modified Level D equipment including gloves and polycoated Tyvek coveralls
- respiratory protection which may include half face respirator with organic vapor cartridges depending on respiratory action levels listed above

The necessity for Level A or Level B protection is not expected to be encountered on this site. If site conditions indicate that Level C protection is inadequate, all site activities are to be ceased pending further review by the Company Safety Officer and the Contractor Senior Management.

7.0 WORK ZONES AND SECURITY MEASURES

A. General

A site must be controlled to reduce the possibility of exposure to any contaminants present and their transport by personnel or equipment from the site.

The possibility of exposure or translocation of contaminants can be reduced or eliminated in a number of ways, including:

- Setting up security or physical barriers to exclude unnecessary personnel from the general area
- Minimize the number of personnel and equipment on-site consistent with effective operations
- Establishing work zones within the site
- Conducting operations in a manner to reduce the exposure of personnel and equipment
- Minimizing the airborne dispersion of contaminants
- Implementing the appropriate personnel and equipment decontamination procedures

B. Field Operations Work Area

Work areas (zones) will be established based on anticipated contamination. Within these zones prescribed operations will occur utilizing appropriate personal protective equipment. The planned zones are:

1. Exclusion Area (contaminated). The actual areas where work is being performed are considered to be the exclusion areas. Access to these areas will be strictly limited to the personnel needed to conduct the work being performed.

2. Contamination Reduction Area. An area near each active work zone will be designated as the contamination reduction area. Disposable protective gear will be removed and placed in garbage bags prior to leaving the reduction zone. Heavy equipment and non-disposable gear will be cleaned at a decontamination area within this zone.

3. Support Area (non-contaminated). Areas located away from active work areas and out of the zone of potential impact of hazards will be used for staging and support of the work being performed on site. Any materials, equipment, or clothing of personnel must be fully decontaminated prior to entering these areas.

8.0 DECONTAMINATION PROCEDURES

As part of the system to prevent or reduce the physical transfer of contaminants by people and/or equipment from on-site, procedures will be instituted for decontaminating anything leaving the Exclusion Area and Contamination Reduction Areas. These procedures include the decontamination of personnel, protective equipment, monitoring equipment, clean-up equipment, etc. In cases where the Contamination Reduction Zone is not directly adjacent to the Exclusion Area, gross decontamination will occur in the Exclusion Area, followed by more detailed cleaning in the Contaminant Reduction Area. This gross decontamination will be performed to the extent necessary to keep contaminants from spreading to other "clean" areas of the site. In general, decontamination at the site consists of rinsing equipment, personnel, etc., with copious amounts of water and washing with detergent water solutions. The spent solution, brushes, sponges, containers, stands, etc., used in the decontamination process must be properly disposed.

9.0 GENERAL SAFE WORK PRACTICES

The project operations shall be conducted with the following minimum safety requirements employed:

1. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of materials is prohibited in any area where the possibility of contamination exists.

2. Hands must be thoroughly washed upon leaving a contaminated or suspected contaminated area before eating, drinking, or any other activities transpire.

3. Legible and understandable precautionary labels shall be prominently affixed to containers of raw materials, intermediates, products, mixtures, scrap, waste, debris, and contaminated clothing.

4. Contaminated protective equipment shall not be removed from the regulated area until it has been cleaned or properly packaged and labeled.

5. Removal of materials from protective clothing or equipment by blowing, shaking, or any other means which may disperse materials into the air is prohibited.

6. Personnel on-site must use the "buddy" system when wearing any respiratory protective devices. Communication between members must be maintained at all times. Emerency communications shall be prearranged in case of encountering unexpected situations. Visual contact must be maintained between "pairs" on-site, and each team should remain in closed proximity to assist each other if necessary.

7. Personnel should be cautioned to inform each other of subjective symptoms of chemical exposure such as headache, dizziness, nausea, and irritation of the respiratory tract.

8. No excessive facial hair which interferes with a satisfactory fit of the facepiece-to-face seal, will be allowed on personnel required to wear respiratory protective equipment.

9. All respiratory protection selection, use, and maintenance shall meet the requirements of established procedures, recognized consensus standards (AIHA, ANSI, NIOSH,), and shall comply with the requirements set forth in CCR, Title 8, Section 5144 et. seq.

10. Contact with the surface and groundwater shall be minimized.

In addition, the following precautions shall be implemented for all personnel working on the project:

- Gross decontamination and removal of all personal protective equipment shall be performed prior to exiting the facility. Contaminated personal protective clothing will be removed and collected in a drum for disposal.

- Field operations personnel shall be cautioned to inform each other of non-visual effects of the presence of toxics, such as: headaches, dizziness, or nausea.

- On-site personnel shall be aware of symptoms related to heat and cold stress.

10.0 STANDARD OPERATING PROCEDURES

A. Respiratory Protection Program Guidelines

Respirators will be provided by the Contractor when such equipment is deemed necessary to protect the health of employees. The Contractor shall provide respirators which are applicable and suitable for the purpose intended. The employer shall be responsible or the establishment and maintenance of this respiratory protection program. The Company Safety Officer will approve the selection, purchase, and inspection of the models and types of respiratory protective devices.

A medical evaluation is required prior to wearing any respirator, except where emergency escape respirators are provided. The contract physician shall determine if any health or physical conditions exist which would prohibit a worker from being assigned to an area requiring respiratory protection.

Respirators shall not be worn when conditions prevent a facepiece-to-face seal. Such conditions as facial hair, scars, wrinkles, facial diseases, dentures removal, or other disorders could prevent a proper facepiece-to-face seal. In these cases, corrective action will be taken to ensure a proper seal.

For the safe use of any respirator, it is essential that the user be properly instructed in its operation and maintenance. Both supervisors and employees shall be so instructed. Employees shall be instructed and trained in the proper selection and use of respirators and their limitations. The employee shall use the provided respirator in accordance with instructions and training received. All training shall be documented with records retained in the employee's training files.

11.0 EMERGENCY PROCEDURES

A. Site Emergency Warnings

Several warning systems may be utilized depending on the work site conditions or emergency involved:

1. Verbal Communications

2. Vehicle Horns

Verbal instructions between crew members are typically adequate to communicate steps that are required in emergency situations. In cases where parts of the crew are distant from the center of activity, vehicle horns may be necessary to indicate site emergencies. This type of communication needs to be followed by verbal instructions on necessary emergency actions.

In cases where a field worker is alone, verbal communication with the company safety officer should be established upon arrival to and exit from the site. The field worker should also present any other field personnel with the Contractor's telephone number and address. Location of the nearest telephone should be within reasonable distance of the field worker. The Contractor will provide the field worker with a field phone if the nearest telephone is not readily available.

B. Emergency Equipment

The following equipment comprises the basic elements for emergency preparedness. All or some of these items will be available at the work site:

1. Fire extinguishers - dry chemical

2. First aid kits

C. General Emergency Procedures

In case of an emergency or hazardous situation, the person that observes this condition shall immediately sound the alarm.

1. Upon hearing an alarm, all non-emergency communications will cease and the person giving the alarm will proceed to give the Project Safety Officer all pertinent information.

2. Power equipment will be shut down and operators will stand by for instruction.

3. Injured personnel will be transported outside of the Exclusion Zone (if possible).

4 The Contractor's office will be notified immediately.

5. In case of a fire, explosion, or hazard alarm, personnel will immediately proceed to assigned pre-arranged safe locations.

6. Upon arrival at the safe locations, a complete head count will be taken by the Project Safety Officer and personnel will stay at the safe locations until the area is secured.

7. Directions to the nearest medical clinic or hospital as well as their telephone numbers will be made available to on-site personnel.

When a field worker is alone in an emergency or hazardous situation, outside contact should be made immediately. The field worker should then attempt to deactivate power equipment, and contact the Company Safety Officer.

D. Personal Injury

If an injury occurs due to an accident or exposure to a hazardous substance, the Contractor's office will be notified. The Company Safety Officer will be given all appropriate information concerning the nature and cause of the injury so that treatment preparations can be initiated. The injured person will be transported to the Contamination Reduction line where appropriate first aid and treatment can begin. The Project Manager will be informed and will investigate the cause of the injury and make any necessary changes in work procedures.

In the event of an accident resulting in physical injury, first aid will administered, and the injured worker will be transported for emergency treatment.

Hospital **Alameda Hospital**
2070 Clinton Avenue
Alameda, California

Directions From Site to Alameda Hospital:
Go south for 2 blocks on Park Avenue
Turn Right (West) on Encinal Avenue for 4 blocks
Turn Left (South) on Willow Avenue for 3 blocks
Turn Right (West) on Clinton Ave.
Hospital is on the Left

EMERGENCY CONTACT LISTING

Nature of Emergency	**Phone Number**
Ambulance	911
Fire	911
Police	911
Poison Control Center	(900) 662-9886
Office of Emergency Services	(510) 646-5908
Chemical Spills	(800) 852-7550
Hospital	(510) 522-3700
The Contractor	( )___-____

12.0 TRAINING REQUIREMENTS

All personnel assigned to this project will be required to demonstrate that they have completed the Initial Training Requirements (40 hours). An annual 8 hour refresher course is also required in accordance with CCR Title 8, General Industry Safety Orders, Sections 5192.

Field personnel from the Contractor and their sub-contractors will attend a project briefing for safety issues and project work task review before beginning work. All Contractor site personnel shall have completed training relative to the project operations plans, and the materials to be encountered during the project.

13.0 MEDICAL SURVEILLANCE

The Contractor personnel and sub-contractors engaged in project operations shall be participants in the Medical Surveillance program, and must be cleared by the examining physician(s) to wear protection devices and protective clothing for working with hazardous materials. The applicable requirements under CCR, Title 8, General Industry Safety Orders, Sections 5192 and 29 CFR 1910 will be observed.

A. Examination Requirements

All Contractor personnel on-site shall have successfully completed a pre-placement or periodic medical examination in accordance with established Contractor policies and procedures, and consistent with the provisions of the OSHA standards. This examination shall include a complete medical and occupational history, physical examination, and selected biological sampling. Laboratory studies include a complete blood count (CBC), urinalysis, chemistry panel (SMAC), pulmonary function (FEV and FVC), chest X-ray, audiometry, and vision screening.

14.0 RECORDKEEPING

A. General

Recordkeeping shall be consistent with OSHA regulations in all respects. The following permanent records will be maintained in the company offices:

1. Safety Inspection Reports

2. Personnel Exposure Monitoring Records

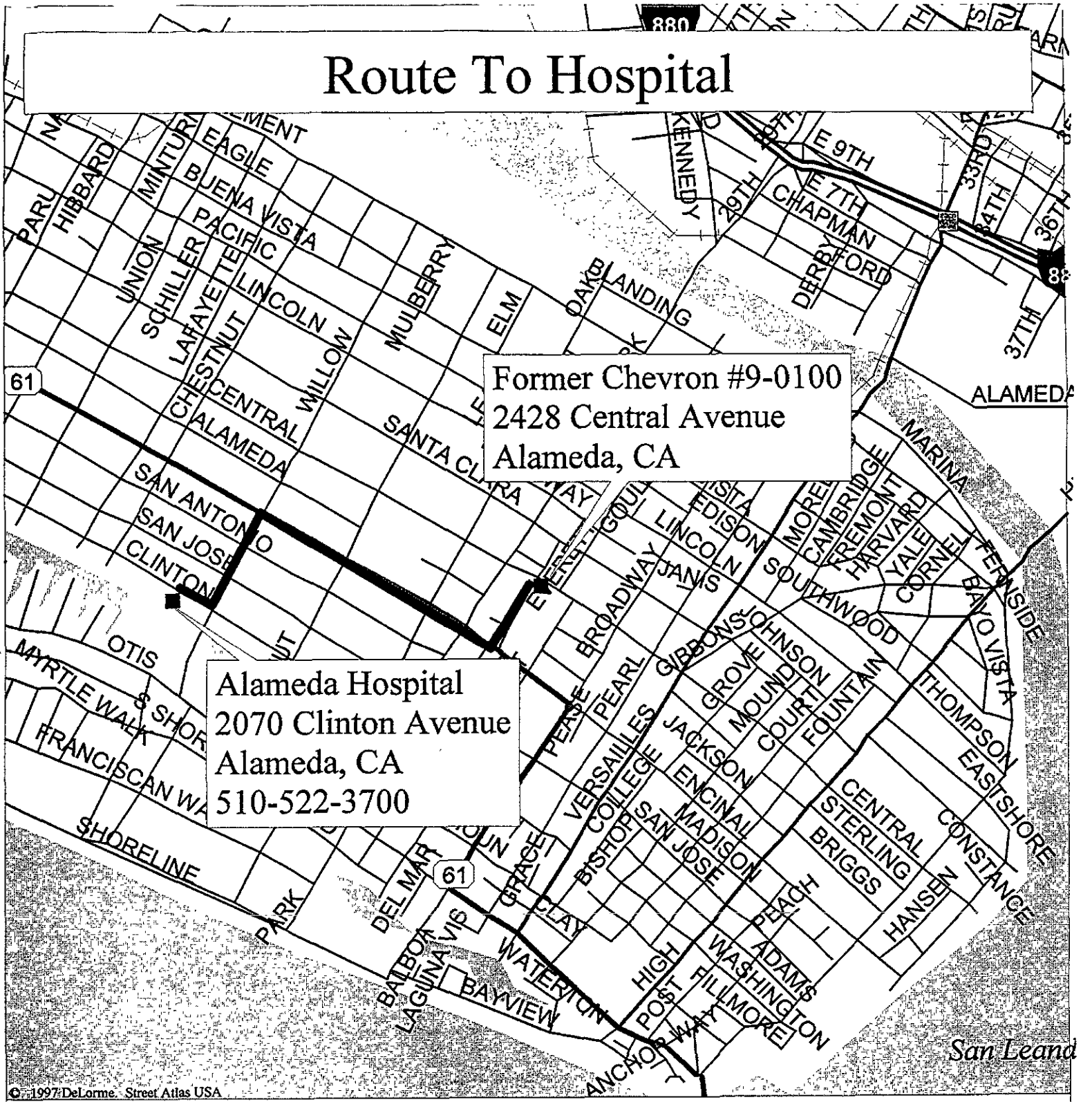
3. OSHA 200 Form - Current to within 90 days

4. Accident reports consistent with established company procedures

B. Medical Records

Permanent medical records shall be maintained in confidential files by the contract physician/medical clininc. The physician will supply the company with a medical status document, certifying that the personnel assigned to the project are physically capable of performing their individual work tasks.

Route To Hospital



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1000 Feet
500 Meters

- Local Road
- Interstate/Limited Access
- Major Connector
- State Route
- Exit
- Railroad
- Lake
- Land
- Water
- River/Canal