Chevron

May 9, 1997

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Ms. Juliet Shin
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 Ms. Shin:

Enclosed is a copy of the Risk-Based Corrective Action (RBCA) analysis, that was prepared by our consultant Gettler-Ryan Inc. for the above noted site. The purpose of this analysis was to evaluate whether 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.

Based on the analytical data and site conditions, surface and subsurface soils are not a issue, nor is the leaching of petroleum hydrocarbons into the groundwater. Gettler-Ryan evaluated the potential risk of volatilization of hydrocarbon compounds to the atmosphere and enclosed spaces at the subject site. As noted in 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 completed 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). It is highly unlikely that the ingestion of groundwater would occur at the site, since Alameda's water supply is imported with no municipal wells on the island. One domestic well is located approximately 1000 feet to the northwest (crossgradient of the site), at the Alameda High School and is completed in a deeper water bearing zone than the monitoring wells at the site. Alameda County Well inventory File has listed this well as part of the Alameda County Flood Control monitoring network.

ok ✓ Checked out in map Info.

Based on the available information, it appears that no additional investigation is warranted and the site appears to meet the RWQCB's Interim Guidance Criteria for a low risk groundwater case. The leak and source has been stopped and removed. The site has been adequately characterized and there is minimal impact to the groundwater. The plume is limited in area and is not migrating. With the sources removed, the groundwater will not be impacted further and natural attenuation will continue to occur.

It is recommended that groundwater monitoring be reduced to a semi-annual basis, with ORC be considered for use in the onsite impacted wells, which should enhance the natural attenuation process.

If you have any questions, call me at (510) 842-9136.

Sincerely,
CHEVRON PRODUCTS COMPANY

Philip R. Briggs
Site Assessment and Remediation Project Manager

Enclosure

GETTLER-RYAN INC.

April 18, 1997

letter dated 12/15/97 sent in response to the RA - requesting modification

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.

concern

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.

Conner, J., Nevin, P., Fisher, R.T., Bowers, R., and Newell, C. 1995. Guidance Manual For Risk-Based Corrective Action and Overview of the Process and RBCA Spreadsheet System and Modeling Guidelines Version 1.0. Groundwater Services, Inc., Houston, Texas.

Driscoll, F.G. 1986. Groundwater and Wells. Johnson Filtration Systems, Minneapolis, MN.

Fetter, C.W. 1988. Applied Hydrogeology. Merril Publishing Company. Columbus, Ohio.

Freeze, A. and Cherry, J. 1979. Groundwater. Prentice Hall, New York.

Gen-Tech Environmental. June 22, 1993. Reconnaissance Soil and Groundwater Assessment Site, 2428 Avenue, Alameda, California.

Gettler-Ryan, Inc. October 14, 1996. Well Installation Report, Chevron Service Station No. 9-0100, 2428 Central Avenue, Alameda, California. Report No. 5178.02-3.

Gettler-Ryan, Inc. Various Reporting Dates. Groundwater Monitoring Report(s), Chevron Service Station No. 9-0100, 2428 Central Avenue, Alameda, California.

Weiss Associates. April 13, 1994. Subsurface Investigation Report, Chevron Service Station No. 9-0100, 2428 Central Avenue, Alameda, California.

Todd, D.K.. 1980. Groundwater Hydrology. John Wiley and Sons, New York, NY.

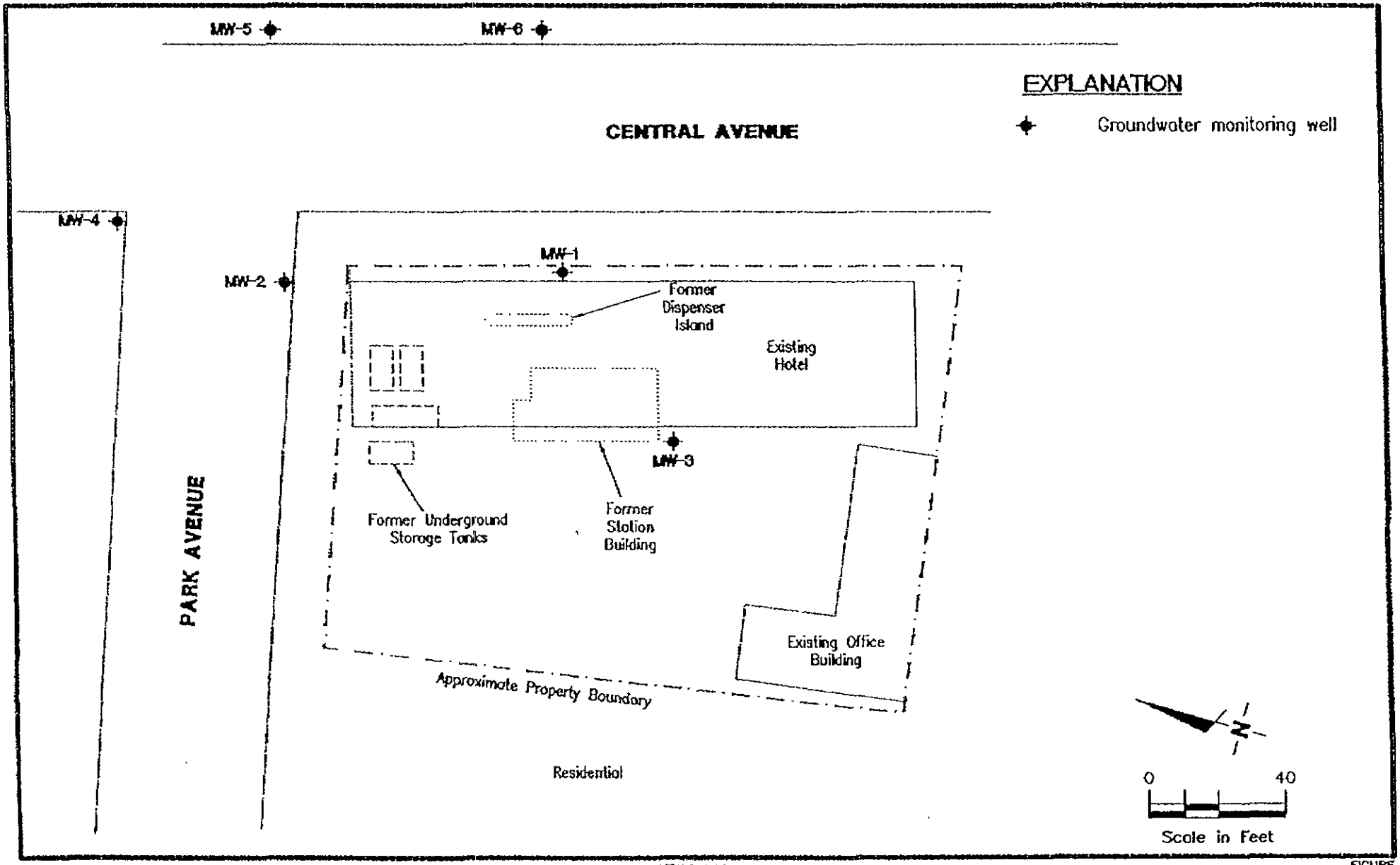
FIGURE 1

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

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
5178		6/96	



Gettler - Ryan Inc.

6747 Sierra Ct., Suite J
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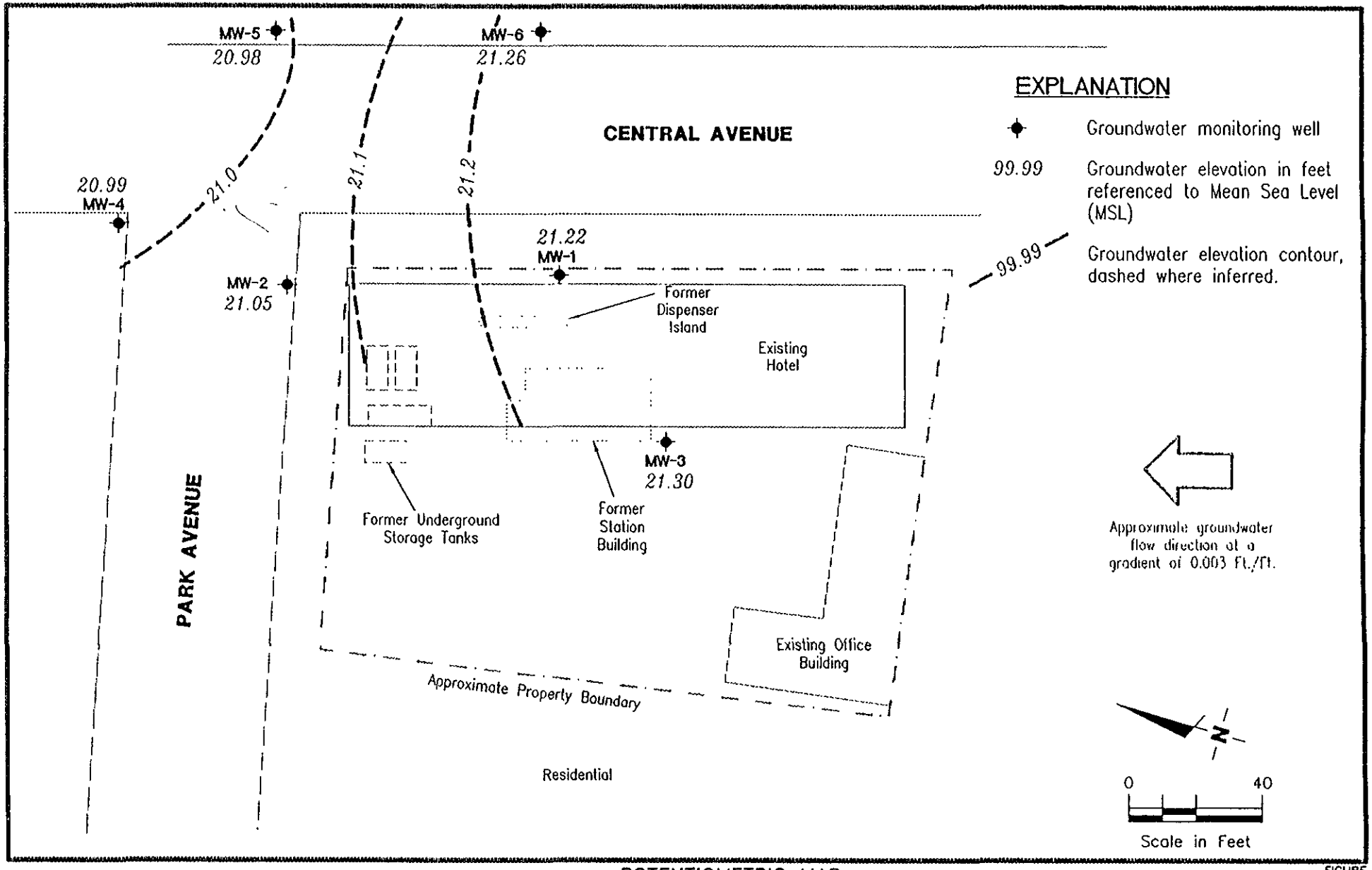
SITEPLAN
Former Chevron Service Station No. 9-0100
2428 Central Avenue
Alameda, California

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'	<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'	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

Weiss Associates

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:

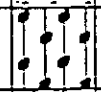
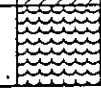
8015 = EPA Method 8015Mod for TPHg.
8020 = EPA Method 8020 for BTEX and MTBE
API RP-40 = API Recommended Practice for Core-Analysis Procedure, 1960.

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

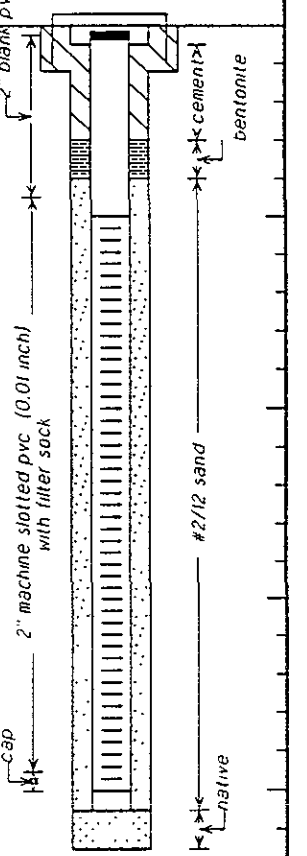
Gettler-Ryan, Inc.

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

WELL DIAGRAM



JOB NUMBER: *5178.02*

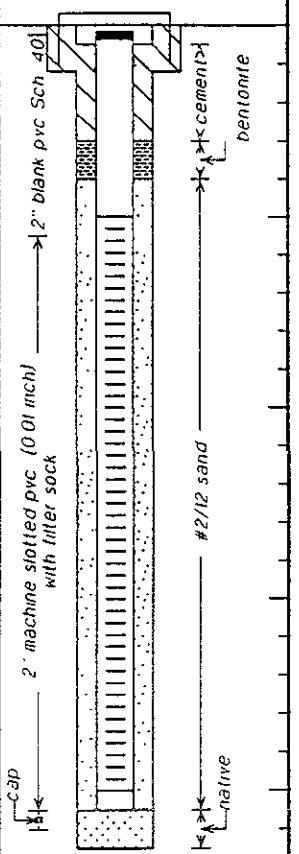
Gettler-Ryan, Inc.

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*

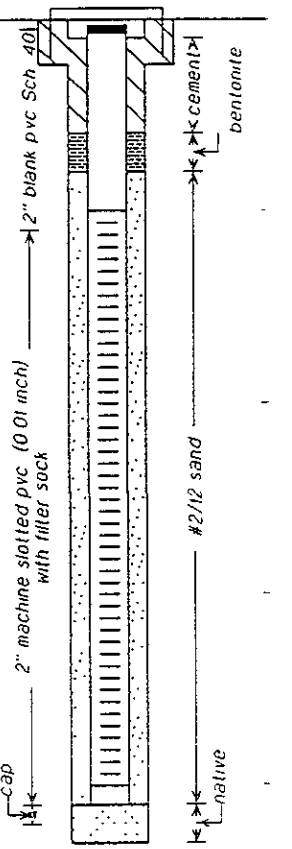
Gettler-Ryan, Inc.

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	36	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.

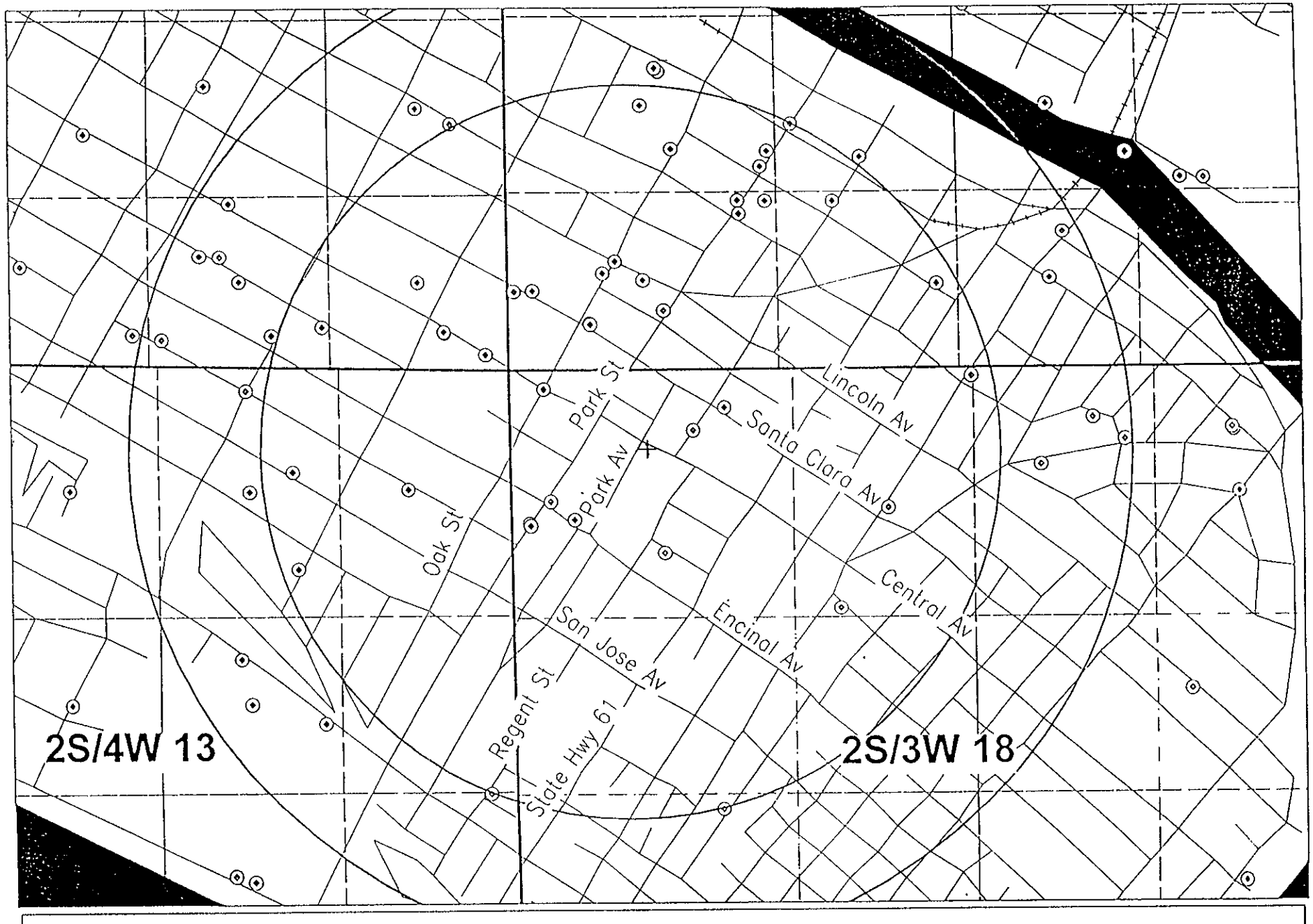
The site appears essentially the same in the following air photos:

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

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 Bncinal	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 Bncinal	Steve Chrissanthos MW-1	0	MON	12/92	2	18	7	0	0	0	G	0	0	D		
2S/3W 18D20	ALA	2425 Bncinal	Steve Chrissanthos MW-2	0	MON	12/92	2	18	13	0	0	0	G	0	0	D		
2S/3W 18D21	ALA	2425 Bncinal	Steve Chrissanthos MW-3	0	MON	12/92	2	15	7	0	0	0	G	0	0	D		
2S/3W 18D22	ALA	2425 Bncinal	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	DELDING	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	TES	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	TES	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	TES	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. GHILLIES		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	L		
2S/3W 7N 1	OAK	2235 LINCOLN AVE	ALAMEDA STEAM LAUNDRY		0	IRR	/16	0	206	0	0	0	0	?	0	1	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	RBC	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:

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

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

$$= 4.26\ ft/year$$

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* ~~E-0032~~					RES
			Cancer Risk = 1E-04	*4.90E-01* ~~.32~~					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

	Screening Level Criteria Exceeded? (■ if yes)						
Affected Medium	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., ² 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 dissoived plume migration.	

TIER 2 CORRECTIVE ACTION CRITERIA

Affected Medium	Tier 2 SSTL Exceeded ? Yes	No	Applicable Excess Risk Limits (specify value) Indiv. Risk	Total Risk	Hazard Index	Hazard Quotent	Other Applicable Exposure Limit *(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

- ■ ***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.

Apply Low Risk Closure (RWQCB)

NOTE:

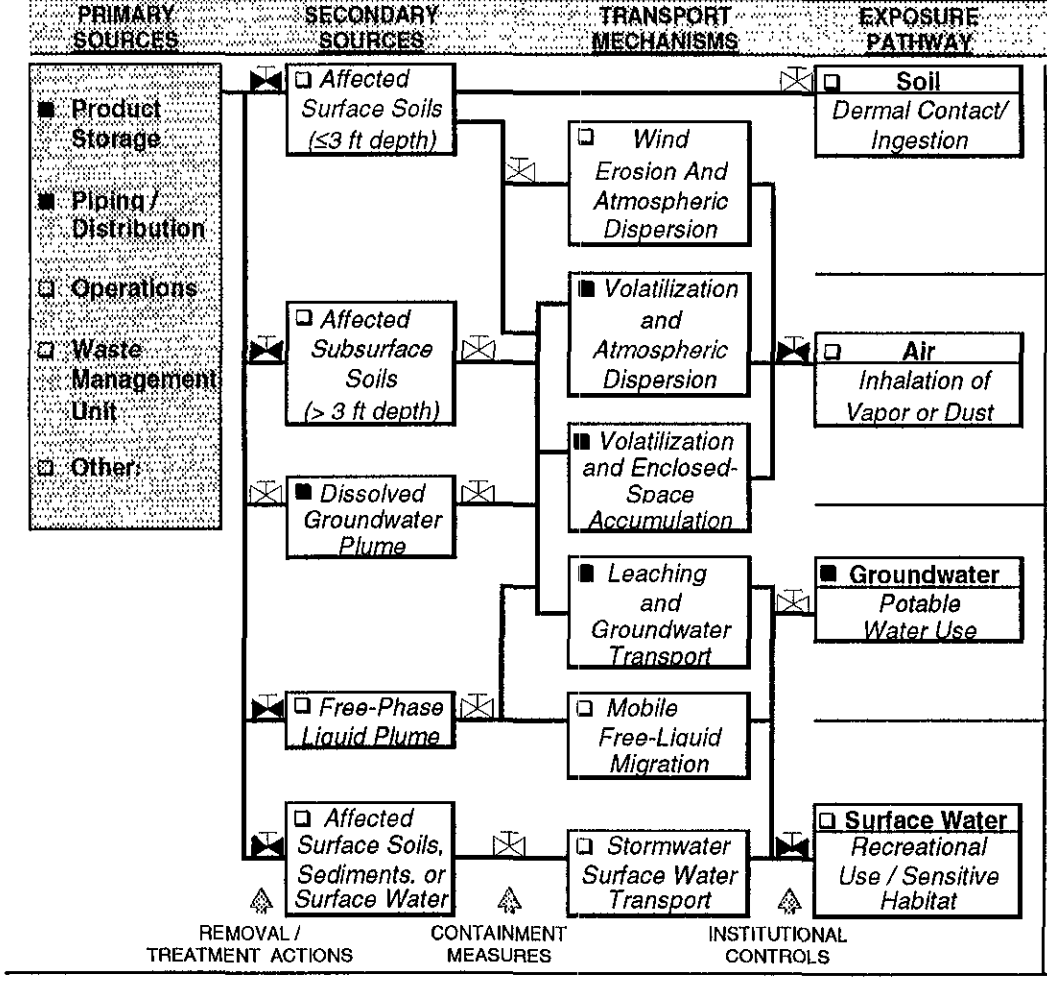
Rationale for proposed action documented on Worksheets 1.3 and 10.1-10.3.

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

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).*



Exposed Receptors

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

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

Exposed Persons

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

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

Groundwater Users

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

■ 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).

Surface Water Users

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

❑ 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				

31 x 4 / 100

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*** = 7.87'
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	capillary	vadose	foundation
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			
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

0.19 = $\frac{m^3}{m^3}$ = unitless

.0019

[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	Reference Dose (mg/kg/day) Inhalation RfD_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Slope Factors 1/(mg/kg/day) 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, Alai Completed By: David J. Vossler Date Completed: 12/29/1996

Different from RBCA reference 5.

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

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.1

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

Software: GSI RBCA Spreadsheet
Version· v 1.0

Serial: G-225-ZRX-486

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 Serial: G-225-ZRX-486
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

GROUNDWATER SSTL VALUES

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	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

OK!

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

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALC

AIR EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE

SURFACE SOILS: VAPOR AND DUST INHALATION

Exposure Concentration

Constituents of Concern	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] **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 (IFxETxEFxED)/(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)

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

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 *4 OF 6*

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS: INGESTION

Constituents of Concern	Exposure Concentration 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 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)

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

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, CA | 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 TPC 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

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

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)

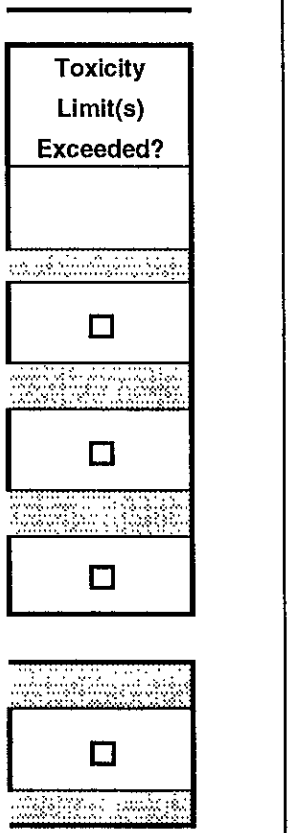
	CARCINOGENIC RISK						TOXIC EFFECTS				
Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential		(3) Oral Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential		(5) Total Toxicant Intake Rate (mg/kg/day) 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

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS			
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index	
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	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


Toxicity
Limit(s)
Exceeded?