CAMBRIA

January 19, 2000

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, #250
Alameda, California 94502

Re: **Tier 2 Risk-Based Corrective Action**
Former Shell-branded Service Station
2101 Park Boulevard
Oakland, California
Incident # 97088251

Dear Mr. Chan:

In response to Alameda County Health and Services Agency correspondence dated December 14, 1999, Cambria Environmental Technology, Inc. (Cambria) is submitting this report for the above-referenced site. The objective of the report was to use site-specific data from previous investigations, as well as recent monitoring data to support a Risk-Based Corrective Action (RBCA) for site closure. The site background, a summary of previous investigations, and the results of Cambria's RBCA analysis are presented below.

SITE DESCRIPTION

The subject site is located on the northeast corner of Park Boulevard and Newton Avenue in Oakland, California (Figure 1). The site currently contains an active Goodyear tire service store with a service building, seven hydraulic lifts, a waste oil tank, and a trash enclosure. The former site layout included three separate generations of underground fuel storage tanks (USTs), a total of three dispenser islands, and two separate generations of waste oil tanks (Figure 2). The site history is documented in Enviros' February 24, 1995 Site Assessment Report.

1995 SUBSURFACE INVESTIGATION

Nine exploratory soil borings were drilled and sampled on May 16, 1995, using the Geoprobe drilling system. Soil samples were collected at five-foot intervals for chemical analysis and lithologic description. One boring (S-G), located east of the former fuel UST, was continuously cored

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Selected soil samples from the borings were analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-G) according to EPA Method 8015 (Modified), and benzene, toluene, ethylbenzene and xylenes (BTEX) according to EPA Method 8020. In addition, the soil sample from Boring S-L was analyzed for volatile organic compounds (VOCs) by EPA Method 8010. Soil boring locations are shown on Figure 2.

Water samples were collected from exploratory borings S-D and S-L using the Geoprobe water sampling equipment. These samples were analyzed for TPH-G and BTEX. In addition, the water sample from Boring S-L was analyzed for VOCs. Because of limited groundwater yield from Boring S-L water samples for analysis for Total Petroleum Hydrocarbons calculated as Diesel (TPH-D), Oil and Grease, and ICAP Metals could not be collected.

Three additional exploratory soil borings were drilled on June 15, 1995 and completed as groundwater monitoring wells (Wells S-1, S-2, and S-3). The wells were constructed of 2-inch diameter threaded Schedule 40 PVC well casing. A well screen was placed from 3 to 18 feet below grade (fbg), in the first encountered water-bearing zone. Well locations are shown on Figure 2. Laboratory analytical results for this investigation are summarized in Attachment B. This investigation is summarized in Enviros' August 8, 1995 *Site Assessment Report.*

On June 20, 1995, Blaine Tech Services, Inc. (Blaine) in San Jose, California developed Wells S-1, S-2 and S-3 by surging and purging the wells. Water level measurements and groundwater samples were collected from Wells S-1 through S-3 by Blaine on June 22, 1995. Groundwater has been sampled quarterly since well installation. The most recent groundwater sampling event took place in July, 1999. Analytical results and a recent groundwater contour map are included as Attachment A and Figure 3, respectively.

LITHOLOGY AND HYDROGEOLOGY

Lithology encountered during the drilling of the exploratory soil borings consisted predominantly of clay (CL) with lesser amounts of silt (ML), clayey sand (SC), sand (SP), and gravel (GM) to a maximum explored depth of approximately 18 fbg. First encountered groundwater occurred in Borings S-1 and S-3 at approximately 5 to 5.5 fbg. Groundwater was not encountered in Well S-2 during drilling. Several hours after drilling S-2, groundwater was noted at approximately 17.5 fbg. Groundwater in all three wells later stabilized at approximately 3.5 to 5.5 fbg. Water level

data collected on June 22, 1995 was used to construct a groundwater contour map and to calculate groundwater flow direction and gradient. Groundwater flow direction was determined to be generally to the southwest with an approximate gradient of 0.03 ft/ft. Recent monitoring data show that this has not significantly changed since well installation.

RISK ASSESSMENT

To evaluate the potential health risk to on-site occupants, Cambria conducted a human health risk assessment following the guidelines set forth by the City of Oakland for petroleum release sites. The City of Oakland risk-based corrective action approach is consistent with the American Society for Testing and Materials (ASTM) E 1739-95[1], and general USEPA and Cal-EPA risk assessment guidance. Similar to USEPA or ASTM guidelines, the City of Oakland has established Site Specific Target Levels (SSTLs) for contaminants based on their own review of toxicological weight of evidence and local site conditions. Cambria's risk assessment consists of a conceptual site model (CSM) Figure 3, and a RBCA analysis.

CONCEPTUAL SITE MODEL

A CSM describes the relationship between the impacted sources and receptors that may be exposed to chemical constituents originating from the site. Cambria developed the CSM for the referenced site based on review of all available geological and analytical data, and on evaluation of potential transport and exposure pathways. Specifically, the following information is included in the site conceptual model: (a) sources and impacted media; (b) representative chemical of concern (COC) concentrations; (c) potentially exposed receptors and exposure pathways; and (d) protective target risk.

Sources and Impacted Media: Historical records of site activities and past release information indicate that soil and groundwater at the site are impacted with petroleum hydrocarbons, specifically BTEX compounds.

Potentially Exposed Receptors and Exposure Pathways: Land use in the vicinity of the site is mixed commercial and residential. The site formerly contained a Shell service station, and is bordered by both commercial and residential properties. It is unlikely that any nearby drinking

[1] Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Site, Designation E-1739-95, December 1996, American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428.

water wells draw water from shallow sediments impacted by petroleum release at the site. Therefore, we assumed no direct human exposure to shallow groundwater beneath the site in our risk assessment.

For purposes of the risk assessment, we assumed that COCs may volatilize from the impacted soil and underlying groundwater, and migrate to ambient air and to indoor air within on-site buildings via foundation cracks. Potentially exposed receptors of concern include on-site commercial workers and near-site residential receptors. The site is currently paved, hence we assumed ingestion/dermal contact/inhalation of surficial soil was not a complete pathway.

Hydrocarbon-impacted soil and groundwater appear to be contained on-site and groundwater flows away from the neighboring residential properties. We therefore did not consider inhalation of indoor air in offsite buildings as a complete pathway. However, to be conservative, we did evaluate the potential risk associated with inhalation of outdoor air under a residential scenario. A summary of our CSM and exposure pathways is presented in Figure 4.

Representative COC Concentrations: Site-related COCs consist of BTEX compounds. For our risk assessment, we assumed a conservative estimate of exposure by utilizing the 95% upper confidence level (UCL) of soil concentrations detected in the 14 samples collected from 3 to 10 fbg during the 1995 investigation. Depth to groundwater is currently about 5 ft bgs (Attachment A), hence soil samples collected below 10 fbg were not considered representative of the vadose zone.

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Representative groundwater concentrations are also conservative as we utilized the mean COC concentration over the last four monitoring events from source area well S-3 to account for seasonal fluctuations in the uppermost water-bearing zone. These assumptions are highly conservative, as they do not account for attenuation or biodegradation of contaminants. The representative BTEX concentrations used in our RBCA analysis are presented in Table 1. Groundwater monitoring data are presented as Attachment A. Results of our RBCA analysis are presented as Attachment B.

Protective Target Risk Levels: To be consistent with the City of Oakland and Cal-EPA policy on the evaluation of chemical carcinogenic effects under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), a commercial target carcinogenic risk level of 1×10^{-5} is proposed for on-site carcinogenic COCs and 1×10^{-6} is proposed for off-site residential risk.

This target risk level is consistent with USEPA acceptable excess cancer risk range of $1x10^{-4}$ and $1x10^{-6}$ for public health protection purposes. It is also consistent with the magnitude of health risks posed by background metals and based on common human activities (ASTM, 1996). A target carcinogenic risk level of $1x10^{-5}$ is also increasingly accepted by many states for setting risk-based screening levels.

Table 1 - Conceptual Site Model for Risk Assessment

Item	Selected Value	Comment
Contaminant Sources/Media	Soil and Groundwater	Petroleum hydrocarbons have been detected in soil and groundwater beneath the site.
Chemicals of Concern (COCs)	BTEX AND MTBE	These chemicals were detected in representative soil and/or groundwater samples.
Representative Concentrations for Subsurface Soil	**Soil Concentrations (mg/kg)** **COC** / **On-Site** Benzene 0.063 Toluene 0.14 Ethylbenzene 0.38 Xylenes 1.1 MTBE NA	**Upper 95% UCL**
Representative Concentration for Groundwater	**Groundwater Concentrations (mg/l)** **COC** / **On-Site** Benzene 0.49 Toluene 0.059 Ethylbenzene 0.33 Xylenes 1.1 MTBE 0.033***	**Mean conc. over last four sampling events.**
Target Carcinogenic Risk Level	On-Site: Commercial - $1x10^{-5}$ Off-Site: Residential - $1x10^{-6}$	Consistent with Cal-EPA policy (Proposition 65) and Oakland RBCA document (May 17,1999)
Non-Carcinogenic Hazard Quotient	1.0	Consistent with the USEPA and ASTM default value and Oakland RBCA document (May 17,1999)
Cancer Slope Factor	0.1 $(mg/kg\text{-}day)^{-1}$	As per Cal-EPA and Oakland RBCA document (May 17 1999)

BTEX = Benzene, toluene ethylbenzene, and xylenes.
MTBE = Methyl tertiary-butyl ether.
UCL = Upper Confidence Level
NA = Not analyzed
*** = MTBE representative concentration using EPA method 8020
When confirmed using EPA method 8260, MTBE results were below laboratory detection limits

RBCA ANALYSIS

Consistent with the RBCA approach adopted by the City of Oakland, Cambria estimated the potential human health risks associated with COCs present in unsaturated soil and groundwater beneath the site. Where available, we used site-specific data in place of ASTM Tier 1 default values to calculate Tier 2 site-specific target levels (SSTLs). Our assigned values for key input variables and our justification for use of these values are summarized in Table 2.

Table 2 - Assigned Key Parameter Values for Tier 2 Evaluation

Parameter	Units	Default Value ASTM Values	Value Used in Tier 2 Evaluation	Justification for Use of Value
Depth to Groundwater	cm	300	150 ✓	Approximate depth to groundwater beneath the site (5 ft bgs) (Attachment B).
Depth to Top of Affected Subsurface Soil	cm	100	100	No petroleum hydrocarbons have been detected in soil at depths less than 3.5 ft bgs (Attachment A).
Soil Bulk Density	g/cm^3	1.7	1.7	Default City of Oakland RBCA Value (Spence and Gomez, 1999).
Fraction of Organic Carbon	g/g	0.01	0.01	Default City of Oakland RBCA Value (Spence and Gomez, 1999).
Porosity	cm^3/cm^3	0.38	0.38	Default City of Oakland RBCA Value (Spence and Gomez, 1999).
Volumetric Water Content	cm^3/cm^3	0.12	0.12	Default City of Oakland RBCA Value (Spence and Gomez, 1999).
Volumetric Air Content	cm^3/cm^3	0.26	0.26	Default City of Oakland RBCA Value (Spence and Gomez, 1999).
Areal Fraction of Cracks in Building Foundation	cm^2/cm^2	0.01	0.001	Default City of Oakland RBCA Value (Spence and Gomez, 1999).

cm = centimeter
ft bgs = feet below ground surface

The results of our Tier 2 analysis for the site are presented below in Table 3. The calculated excess cancer risks to on-site commercial workers exposed to benzene volatilized from soil and subsequently migrating to indoor air is $6x10^{-8}$. The calculated risk for a residential receptor exposed to benzene volatilized from soil and subsequently migrating to the outdoor air is $2x10^{-}$ The calculated risk to on-site commercial workers exposed to vapors migrating from groundwater to indoor air is $3x10^{-}$ The calculated excess cancer risk to off-site residential receptors exposed

to benzene vapor, which has volatilized from groundwater and subsequently migrating to the outdoor air, is $9x10^{-8}$. The resulting risks are below the selected target risk levels set forth for the site (Table 3).

Table 3 – RBCA Results for Benzene

Exposure Scenario	Target Risk Level	Representative Benzene Concentration	SSTL	Calculated Risk	Result
Soil					
Volatilization from soil to indoor air (on-site commercial)	$1x10^{-5}$	0.063 mg/kg	11 mg/kg	6×10^{-8}	Potential health risk is below target level.
Volatilization from soil to outdoor air (off-site residential)	$1x10^{-6}$	0.063 mg/kg	0.29 mg/kg	2×10^{-7}	Potential health risk is below target level.
Groundwater					
Volatilization from groundwater to indoor air (on-site commercial)	$1x10^{-5}$	0.49 mg/l	18 mg/l	3×10^{-7}	Potential health risk is below target level.
Volatilization from groundwater to outdoor air (off-site residential)	$1x10^{-6}$	0.49 mg/l	5.2 mg/l	9×10^{-8}	Potential health risk is below target level.

SSTL = Site-specific target level

These calculated excess cancer risks are based on our assumed representative benzene concentrations and probably overestimate actual health risks to on-site workers and near-site residential receptors. This indicates that current site conditions do not pose a significant risk to human receptors working at the site or residing near the site.

CONCLUSIONS

Results of our RBCA analysis indicate that current site conditions do not pose a significant risk to on-site workers or near-site residents exposed to BTEX compound vapors migrating from the soil and groundwater. Although BTEX constituents exist beneath the site in both groundwater and in soil, our RBCA results indicate that risks resulting from all complete pathways (Figure 3) are below acceptable risks set forth by USEPA and are consistent with the May 17, 1999, Oakland RBCA guidelines.

RECOMMENDATIONS

Based on the findings of this Tier 2 RBCA Analysis, Cambria respectfully requests environmental case closure for the subject site.

CLOSING

We appreciate this opportunity to work with you on this project. Please call Ailsa Le May at (510) 420-3344 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

Eric Goldman
Senior Staff Scientist

Ailsa S. Le May, R.G.
Senior Geologist

Figures:

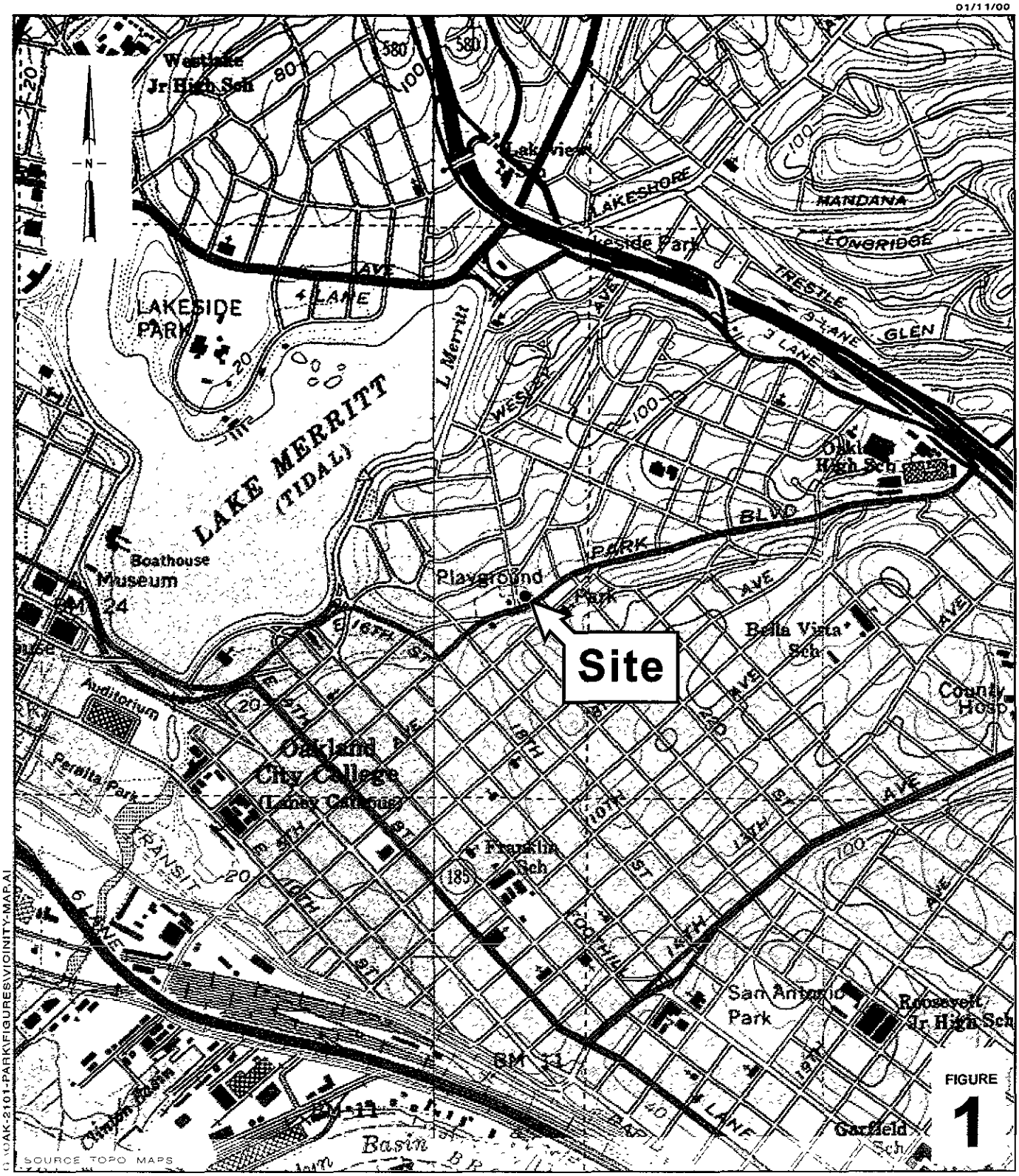
- Figure 1 - Site Vicinity Map
- Figure 2 - Soil Boring and Well location Map
- Figure 3 - Groundwater Elevation Contour Map
- Figure 4 - Conceptual Site Model Exposure Pathways

Attachments:

- Attachment A - Groundwater Analytical Reports
- Attachment B - Soil Analytical Summary
- Attachment C – Input Parameters for RBCA
- Attachment D - Oakland Risk Based Screening Levels

cc: Ms Karen Petryna, Equiva Services LLC, PO Box 7869 Burbank, CA 91501
Ms. Alice Heilman, 333 Keary Street, San Francisco, CA 94108
Mr. Frank Schlessinger, 333 Keary Street, San Francisco, CA 94108

01/11/00



0 1/8 1/4 1/2 1

SCALE 1 1/4 MILE

FIGURE 1

Former Shell Service Station
2101 Park Boulevard
Oakland, California
Incident # 97088251

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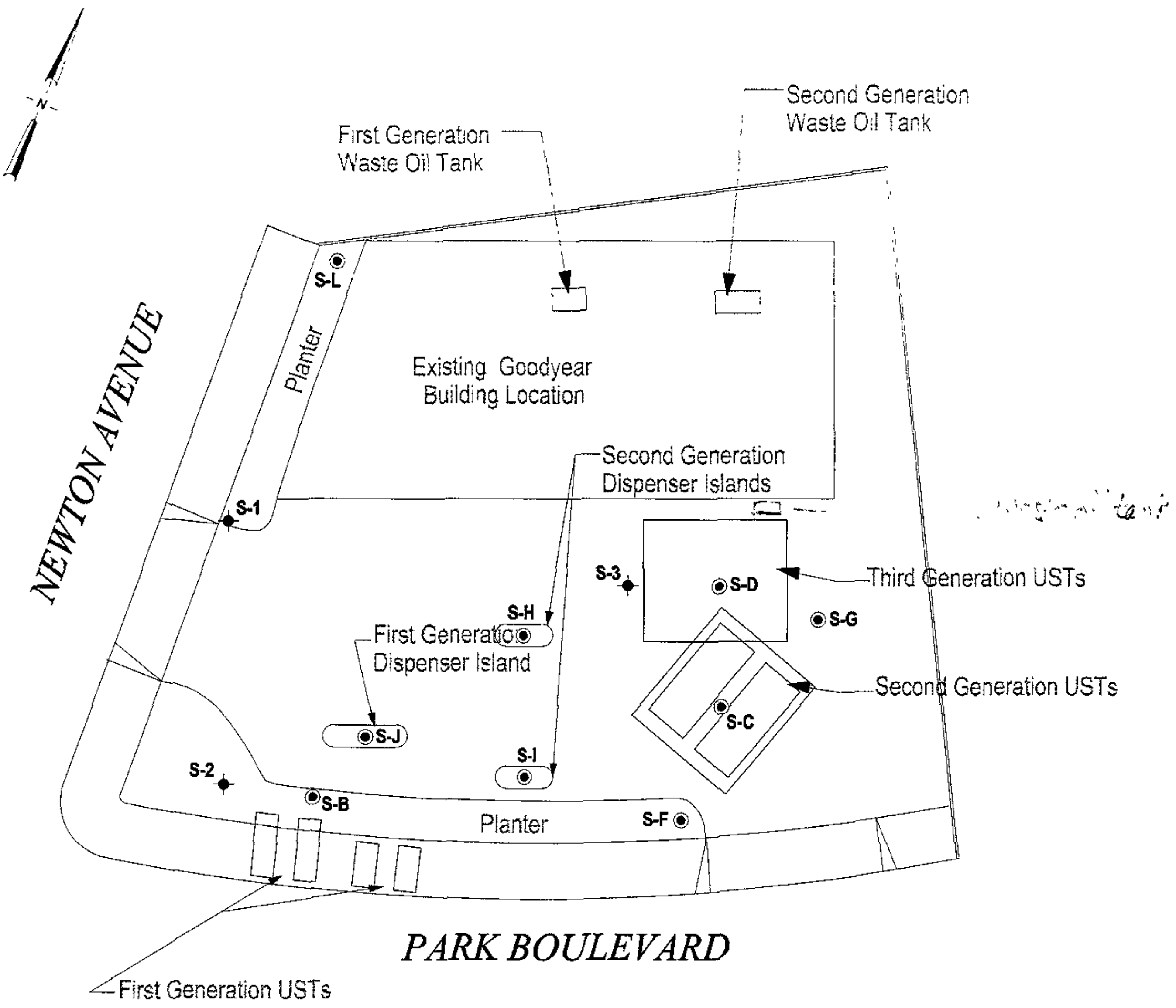
Vicinity Map



EXPLANATION

S-1 ● Monitoring well location (Installed June 15, 1995)

S-L ● Soil Boring Location (Installed May 16, 1995)

0 15 30
Scale (ft)

FIGURE
2

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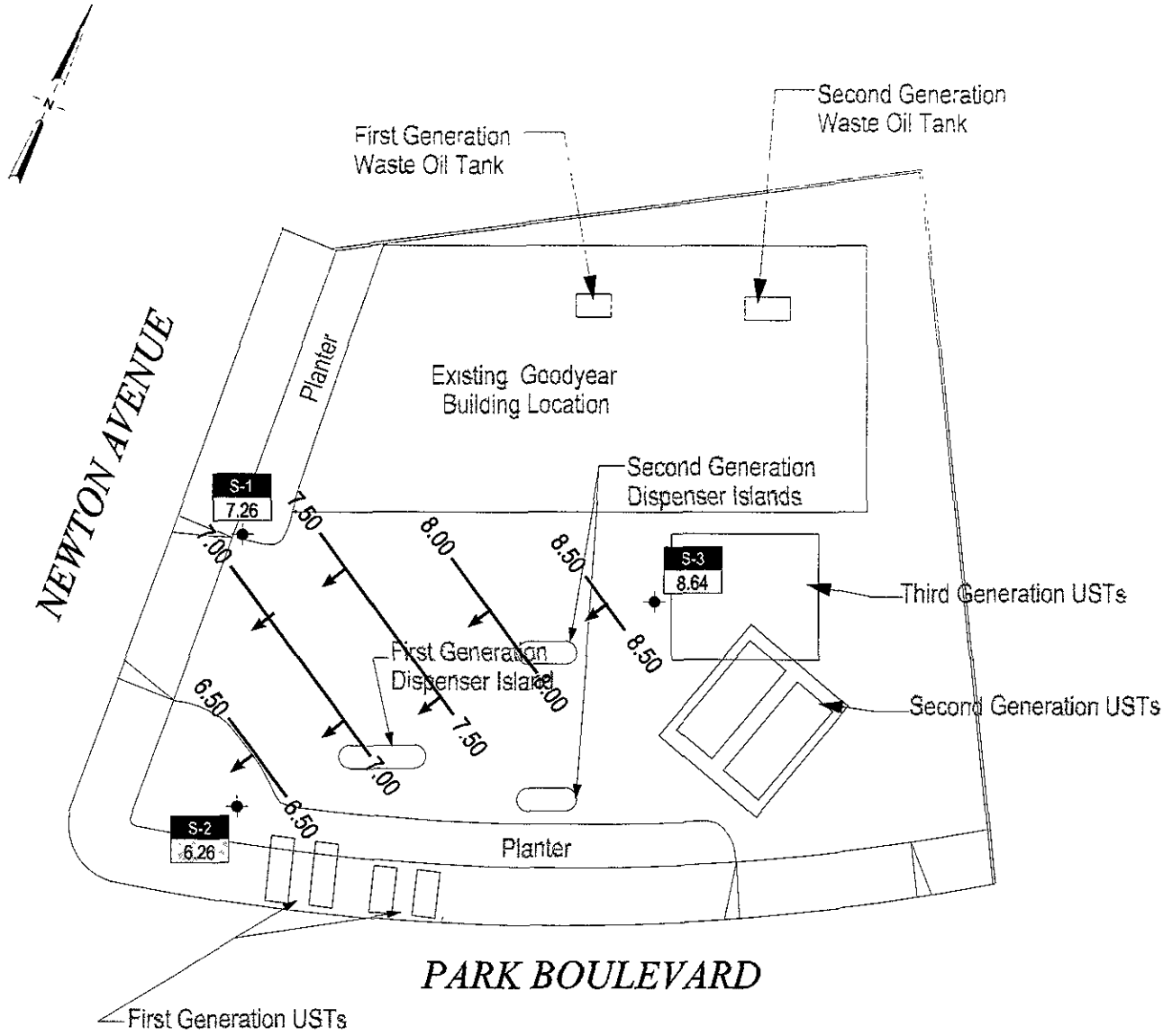
Site Plan



EXPLANATION

S-1 ✦	Monitoring well location
→	Ground water flow direction
XX.XX	Ground water elevation contour, in feet above mean sea level (msl), approximately located; dashed where inferred
Well ID / ELEV	Well designation / Ground water elevation (msl)

0 15 30

Scale (ft)

FIGURE

3

Former Shell Service Station
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Oakland, California
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Groundwater Elevation Contour Map

July 24, 1995

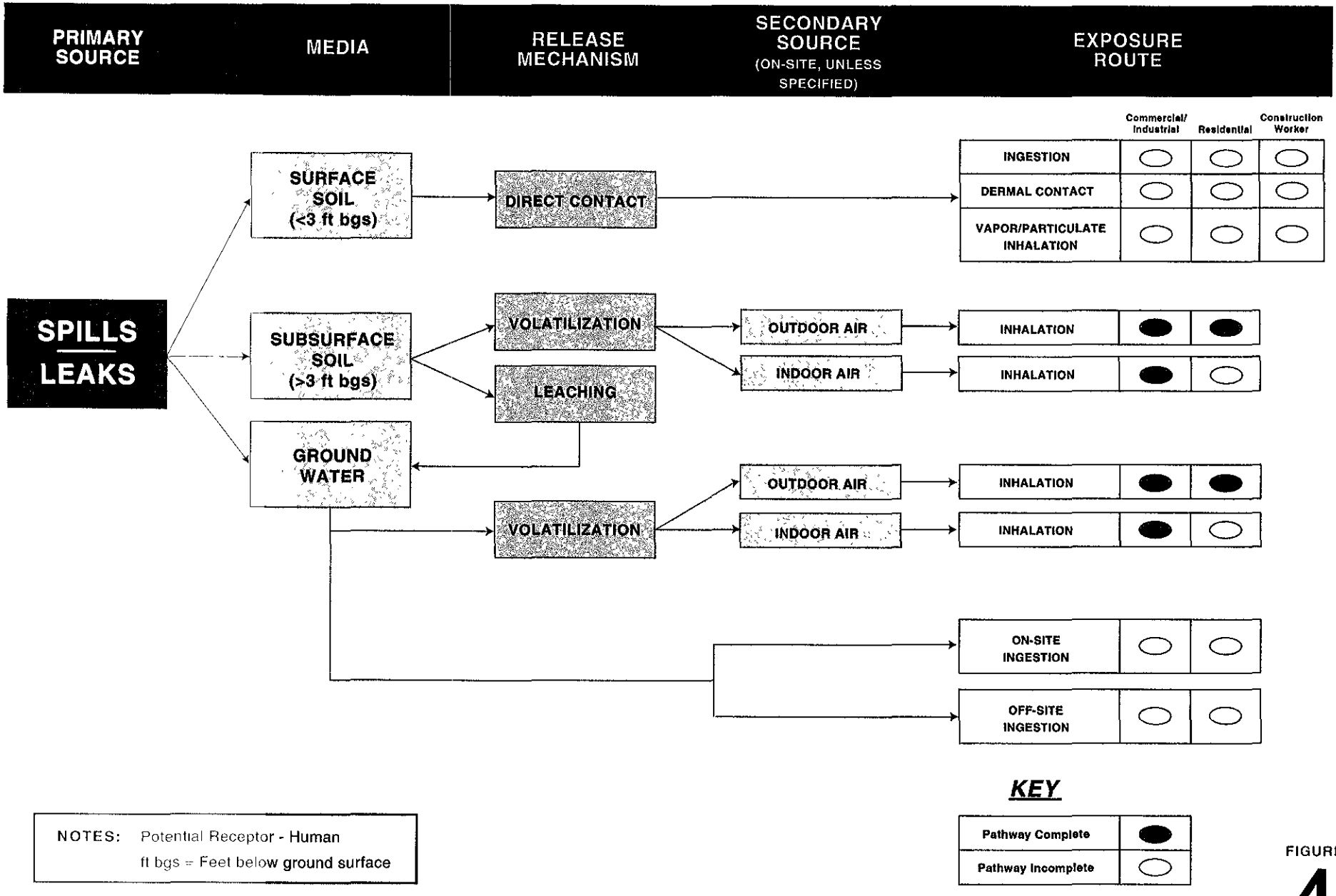

FIGURE
4

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Conceptual Site Model
Exposure Pathways

Attachment A

Groundwater Analytical Summary

WELL CONCENTRATIONS
Shell-branded Service Station
2101 Park Avenue
Oakland, CA
Wic #204-5508-1206

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOC (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)	DO Reading (ppm)
S-1	06/20/1995	160	NA	<0.5	<0.5	<0.5	<0.5	NA	NA	11.93	4.67	7.26	NA	NA
S-1	09/12/1995	<50	250	3.0	<0.5	<0.5	<0.5	NA	NA	11.93	4.19	7.74	NA	NA
S-1	12/28/1995	70	160	1.1	<0.5	<0.5	1.3	NA	NA	11.93	5.30	6.63	NA	NA
S-1	03/25/1996	70	220	<0.5	<0.5	<0.5	<0.5	<2.0	NA	11.93	3.44	8.49	NA	NA
S-1	06/27/1996	<50	140	0.59	<0.50	<0.50	<0.50	<2.5	NA	11.93	3.15	8.78	NA	NA
S-1	09/26/1996	<50	190	<0.50	<0.50	<0.50	<0.50	<2.5	NA	11.93	3.90	8.03	NA	NA
S-1	12/10/1996	<50	84	<0.50	<0.50	<0.50	<0.50	<2.5	NA	11.93	2.46	9.47	NA	NA
S-1	03/10/1997	<50	200	<0.50	<0.50	<0.50	<0.50	<2.5	NA	11.93	2.93	9.00	NA	NA
S-1	06/26/1997	<50	99	<0.50	<0.50	<0.50	<0.50	<2.5	NA	11.93	3.91	8.02	NA	NA
S-1	09/30/1997	<50	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA	11.93	4.00	7.93	NA	NA
S-1	12/15/1997	<50	99	<0.50	<0.50	<0.50	<0.50	<2.5	NA	11.93	2.83	9.10	NA	NA
S-1	03/12/1998	<50	100	<0.50	<0.50	<0.50	<0.50	<2.5	NA	11.93	1.73	10.20	NA	2.7
S-1	06/08/1998	NA	NA	NA	NA	NA	NA	NA	NA	11.93	6.05	5.88	NA	0.8
S-1	08/26/1998	NA	NA	NA	NA	NA	NA	NA	NA	11.93	3.61	8.32	NA	1.0
S-1	12/24/1998	NA	NA	NA	NA	NA	NA	NA	NA	11.93	4.45	7.48	NA	1.0
S-1	03/29/1999	NA	NA	NA	NA	NA	NA	NA	NA	11.93	4.17	7.76	NA	1.2
S-1	06/30/1999	NA	NA	NA	NA	NA	NA	NA	NA	11.93	3.53	8.40	NA	2.1
S-2	06/20/1995	180	NA	1.1	<0.5	<0.5	0.6	NA	NA	12.06	5.80	6.26	NA	NA
S-2	09/12/1995	190	NA	18	<0.5	1.2	0.6	NA	NA	12.06	5.78	6.28	NA	NA
S-2	12/28/1995	200	NA	11	1.0	1.0	4.0	NA	NA	12.06	4.02	8.04	NA	NA
S-2	03/25/1996	180	NA	12	0.8	1.4	1.0	<2.0	NA	12.06	5.56	6.50	NA	NA
S-2	06/27/1996	150	NA	7.7	0.79	0.93	0.5	<2.5	NA	12.06	6.00	6.06	NA	NA
S-2	09/26/1996	83	NA	<0.50	<0.50	<0.50	<0.50	<2.5	NA	12.06	5.73	6.33	NA	NA
S-2	12/10/1996	78	NA	1.4	<0.50	0.57	<0.50	<2.5	NA	12.06	4.57	7.49	NA	NA

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Wic #204-5508-1206

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOC (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)	DO Reading (ppm)
S-2	03/10/1997	61	NA	1.6	<0.50	<0.50	<0.50	<2.5	NA	12.06	5.38	6.68	NA	NA
S-2 (D)	03/10/1997	77	NA	2.0	<0.50	0.69	<0.50	<2.5	NA	12.06	NA	NA	NA	NA
S-2	06/26/1997	90	NA	1.5	<0.50	<0.50	<0.50	<2.5	NA	12.06	5.68	6.38	NA	NA
S-2 (D)	06/26/1997	<50	99	<0.50	<0.50	<0.50	<0.50	<2.5	NA	12.06	3.91	8.02	NA	NA
S-2	09/30/1997	<50	NA	<0.50	<0.50	<0.50	<0.50	<2.5	NA	12.06	5.75	6.31	NA	NA
S-2 (D)	09/30/1997	<50	NA	<0.50	<0.50	<0.50	<0.50	<2.5	NA	12.06	5.75	6.31	NA	NA
S-2	12/15/1997	<50	NA	4.1	<0.50	<0.50	<0.50	<2.5	NA	12.06	5.35	6.71	NA	NA
S-2	03/12/1998	<50	NA	<0.50	<0.50	<0.50	<0.50	<2.5	NA	12.06	4.71	7.35	NA	4.3
S-2	06/08/1998	NA	NA	NA	NA	NA	NA	NA	NA	12.06	8.41	3.65	NA	2.2
S-2	08/26/1998	NA	NA	NA	NA	NA	NA	NA	NA	12.06	5.23	6.83	NA	1.8
S-2	12/24/1998	NA	NA	NA	NA	NA	NA	NA	NA	12.06	5.94	6.12	NA	1.4
S-2	03/29/1999	NA	NA	NA	NA	NA	NA	NA	NA	12.06	5.75	6.31	NA	1.8
S-2	06/30/1999	NA	NA	NA	NA	NA	NA	NA	NA	12.06	5.85	6.21	NA	9.7
S-3	06/20/1995	5500	NA	240	34	120	840	NA	NA	13.54	4.90	8.64	NA	NA
S-3 (D)	06/20/1995	6300	NA	270	37	120	1100	NA	NA	13.54	NA	NA	NA	NA
S-3	09/12/1995	5200	NA	690	14	290	280	NA	NA	13.54	5.37	8.17	NA	NA
S-3 (D)	09/12/1995	4700	NA	620	13	260	240	NA	NA	13.54	NA	NA	NA	NA
S-3	12/28/1995	13000	NA	670	34	960	1400	NA	NA	13.54	3.90	9.64	NA	NA
S-3 (D)	12/28/1995	13000	NA	800	34	1000	1600	NA	NA	13.54	NA	NA	NA	NA
S-3	03/25/1996	7300	NA	560	65	540	820	<200	NA	13.54	4.30	9.24	NA	NA
S-3 (D)	03/25/1996	7400	NA	580	19	620	670	<20	NA	13.54	NA	NA	NA	NA
S-3	06/27/1996	17000	NA	1100	83	1200	2700	<250	NA	13.54	5.00	8.54	NA	NA
S-3 (D)	06/27/1996	1903	NA	13	1.0	14	34	7.2	NA	13.54	NA	NA	NA	NA
S-3	09/26/1996	8900	NA	920	43	400	1100	<125	NA	13.54	5.23	8.31	NA	NA
S-3 (D)	09/26/1996	9800	NA	960	41	450	1300	120	<16 a	13.54	NA	NA	NA	NA

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Wic #204-5508-1206

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOC (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)	DO Reading (ppm)
S-3	12/10/1996	6100	NA	470	25	290	640	<100	NA	13.54	3.88	9.66	NA	NA
S-3 (D)	12/10/1996	7700	NA	550	33	380	880	120	NA	13.54	NA	NA	NA	NA
S-3	03/10/1997	7000	NA	720	29	340	620	110	NA	13.54	4.10	9.44	NA	NA
S-3	06/26/1997	11000	NA	1100	63	470	1300	150	NA	13.54	5.23	8.31	NA	NA
S-3 (D)	06/26/1997	12000	NA	1100	62	480	1400	<100	NA	13.54	NA	NA	NA	NA
S-3	09/30/1997	25000	NA	970	170	1200	4600	<50	NA	13.54	5.36	8.18	NA	NA
S-3	09/30/1997	25000	NA	970	170	1200	4600	<50	NA	13.54	5.36	8.18	NA	NA
S-3	12/15/1997	9800	NA	840	55	420	1100	350	NA	13.54	3.81	9.73	NA	NA
S-3 (D)	12/15/1997	9800	NA	850	56	420	1100	360	<20	13.54	NA	NA	NA	NA
S-3	03/12/1998	2800	NA	260	21	140	600	<12	NA	13.54	4.79	8.75	NA	4.8
S-3 (D)	03/12/1998	2100	NA	200	15	110	450	<12	NA	13.54	NA	NA	NA	NA
S-3	06/08/1998	2500	420	220	23	170	600	<20	NA	13.54	5.60	7.94	NA	NA
S-3 (D)	06/08/1998	3200	NA	270	30	220	740	76	NA	13.54	NA	NA	NA	NA
S-3	06/17/1998	NA	NA	NA	NA	NA	NA	NA	NA	13.54	3.49	10.05	NA	NA
S-3	08/26/1998	4000	600	520	56	270	910	<50	NA	13.54	4.89	8.65	NA	1.9
S-3 (D)	08/26/1998	4100	500	550	65	320	1100	<2.5	NA	13.54	NA	NA	NA	NA
S-3	12/24/1998	3700	590	320	32	210	650	55	NA	13.54	4.93	8.61	NA	1.2
S-3	03/29/1999	5400	NA	530	62	400	1100	45	NA	13.54	4.61	8.93	NA	1.5
S-3	06/30/1999	5890	NA	589	83.4	406	1710	<50.0	NA	13.54	3.58	9.96	NA	1.5

Abbreviations

TPPH = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015
TEPH = Total petroleum hydrocarbons as diesel by modified EPA Method 8015
BTEX = benzene, toluene, ethylbenzene, xylenes by EPA Method 8020
MTBE = methyl-tertiary-butyl ether
TOC = Top of Casing Elevation

WELL CONCENTRATIONS
Shell-branded Service Station
2101 Park Avenue
Oakland, CA
Wic #204-5508-1206

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOC (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	SPH Thickness (ft.)	DO Reading (ppm)

Abbreviations

TPPH = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015
TEPH = Total petroleum hydrocarbons as diesel by modified EPA Method 8015
BTEX = benzene, toluene, ethylbenzene, xylenes by EPA Method 8020
MTBE = methyl-tertiary-butyl ether
TOC = Top of Casing Elevation
SPH = Separate-Phase Hydrocarbons
GW = Groundwater
DO = Dissolved Oxygen
ug/L = parts per billion
msl = Mean sea level
ft = Feet
<n = Below detection limit
(D) = Duplicate sample
NA = Not applicable

Note

(a) = The MTBE was analyzed by EPA method 8260 one day past hold time. The MTBE value did not confirm therefore, all MTBE results at this site should be considered estimated.

Attachment B

Soil Analytical Summary

TABLE 1

SOIL CHEMICAL ANALYTICAL DATA

FORMER SHELL SERVICE STATION
2101 PARK BOULEVARD
OAKLAND, CALIFORNIA
WIC 204-5508-1206

WELL NUMBER	SAMPLE NO.	DEPTH (FT.)	SAMPLE DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYL BENZENE (PPM)	XYLENES (PPM)
S-B	SB-3	3.0	16-May-95	<1	0.0031	<0.0025	<0.0025	0.0025
S-C	SC-6	6.0	16-May-95	<1	<0.0025	<0.0025	<0.0025	<0.0025
S-D	SD-6	6.0	16-May-95	<1	<0.0025	<0.0025	<0.0025	<0.0025
S-F	SF-5	5.0	16-May-95	<1	<0.0025	<0.0025	<0.0025	0.0076
S-G	SG-5	5.0	16-May-95	<1	<0.0025	<0.0025	<0.0025	<0.0025
S-H	SH-6.5	6.5	16-May-95	410	0.42	0.66	10	56
S-I	SI-3.5	3.5	16-May-95	170	0.74	5.7	4.5	26
S-J	SJ-4	4.0	16-May-95	380	0.78	0.68	5.1	23
S-L	SL-5.5	5.5	16-May-95	<1	<0.0025	<0.0025	<0.0025	<0.0025
S-1	S-1-5	5.0	15-Jun-95	<1	<0.0050	<0.0050	<0.0050	<0.0050
	S-1-10.5	10.5	15-Jun-95	<1	<0.0050	<0.0050	<0.0050	<0.0050
S-2	S-2-5	5.0	15-Jun-95	200	<0.12	2.4	2.1	3.3
	S-2-10	10.0	15-Jun-95	40	<0.025	0.30	0.15	0.46
	S-2-15	15.0	15-Jun-95	<1	<0.0050	<0.0050	<0.0050	<0.0050
S-3	S-3-5.5	5.5	15-Jun-95	550	<0.50	<0.50	7.3	27
	S-3-10.5	10.5	15-Jun-95	<1	<0.0050	<0.0050	<0.0050	<0.0050

Abbreviations:

FT = Measurements in feet
TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
PPM = Parts Per Million.
<x = Not Detected at detection limit of x

Attachment C
Input Parameters for RBCA

Input Parameters for Tier 1

		Risk Scenario		
		Residential		Commercial
TARGET RISK LEVELS:	**Units**	**Value for ADULT**	**Value for CHILD**	**Value for Industrial**
Target cancer risk (IELCR)	unitless	1.0E-06	*= adult res.*	1.0E-05
Target hazard quotient	unitless	1.0	*= adult res.*	1.0

		Residential		Commercial
EXPOSURE PARAMETERS	**Units**	**Value for ADULT**	**Value for CHILD**	**Value for Industrial**
Averaging time for carcinogens	yr	70	= adult res.	= adult res.
Averaging time for non-carcinogens	yr	24	6	25
Body weight	kg	70	15	70
Exposure duration	yr	24	6	25
Exposure frequency	d/yr	350	350	250
Exposure time to indoor air	hr/d	24	24	9
Exposure time to outdoor air	hr/d	16	16	9
Soil ingestion rate	mg/d	100	200	50
Indoor inhalation rate	m^3/d	15	10	20
Outdoor inhalation rate	m^3/d	20	10	20
Groundwater ingestion rate	L/d	2	1	1
Soil to skin adherence factor	mg/cm^2	0.5	0.5	0.5
Skin surface area exposed to soil	cm^2	5000	2000	5000
Exp. freq. to water used for recreation	d/yr	120	120	0
Exp. time to water used for recreation	hr/d	1.0	2	0
Skin surface area exposed to water used for recreation	cm^2	20000	8000	0
Ingestion rate of water used for recreation	L/hr	0.05	0.05	0

Input Parameters for Tier 1

		Residential		Commercial
SATURATED ZONE PARAMETERS:	**Units**	**Value for ADULT**	**Value for CHILD**	**Value for Industrial**
Groundwater Darcy velocity	cm/yr	6	*=adult res.*	*=adult res.*
Groundwater mixing zone thickness	cm	1524	*=adult res.*	*=adult res.*

		Residential		Commercial
VADOSE ZONE PARAMETERS:	**Units**	**Value for ADULT**	**Value for CHILD**	**Value for Industrial**
Lower depth of surficial soil zone	cm	100.0	*=adult res.*	*=adult res.*
Fraction organic carbon (FOC*)	g oc/g soil	0.01	*=adult res.*	*=adult res.*
Vadose zone thickness	cm	145	*=adult res.*	*=adult res.*
Infiltration rate through the vadose zone	cm/yr	3	*=adult res.*	*=adult res.*
Depth to groundwater	cm	150	*=adult res.*	*=adult res.*
Depth to subsurface soil sources	cm	150	*=adult res.*	*=adult res.*
Vadose zone air content	cm^3/cm^3	0.26	*=adult res.*	*=adult res.*
Total soil porosity	cm^3/cm^3	0.38	*=adult res.*	*=adult res.*
Vadose zone water content	cm^3/cm^3	0.12	*=adult res.*	*=adult res.*
Soil bulk density	g/cm^3	1.70	*=adult res.*	*=adult res.*
Capillary fringe thickness	cm	5	*=adult res.*	*=adult res.*
Capillary fringe air content	cm^3/cm^3	0.038	*=adult res.*	*=adult res.*
Capillary finge water content	cm^3/cm^3	0.342	*=adult res.*	*=adult res.*

Input Parameters for Tier 1

		Residential		Commercial
OUTDOOR AND INDOOR VOLATILIZATION/BUILDING PARAMETERS:	**Units**	**Value for ADULT**	**Value for CHILD**	**Value for Industrial**
Indoor air exchange rate	1/s	5.60E-04	*=adult res.*	1.40E-03
Building air volume/floor area	cm^3/cm^2	229	*=adult res.*	305
Foundation thickness	cm	15	*=adult res.*	15
Areal fraction of cracks in building foundation	cm^2/cm^2	0.001	*=adult res.*	0.001
Foundation air content	cm^3/cm^3	0.26	*=adult res.*	*=adult res.*
Foundation water content	cm^3/cm^3	0.12	*=adult res.*	*=adult res.*
Particulate emission rate	g/cm^2-s	1.38E-11	*=adult res.*	1.38E-11
Wind speed above ground surface in outdoor air mixing zone	cm/s	322	*=adult res.*	=adult res.
Width of source area parallel to wind or groundwater flow direction	cm	1500	*=adult res.*	*=adult res.*
Outdoor air mixing zone height	cm	200	*=adult res.*	*=adult res.*
Averaging time for vapor flux	s	9.46E+08	*=adult res.*	7.88E+08

Attachment D
Oakland Risk Based Screening Levels

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthra-cene	Arsenic	Barium	Benz(a)-anthracene	Benzene	Benzo(a)-pyrene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.2E-01		2.5E-01	2.7E+00	2.5E-02
			Hazard	3.1E+03	3.1E+03	4.8E+03	1.6E+04	2.0E+01	5.2E+03		8.1E+01	
		Commercial/ Industrial	Carcinogenic					1.5E+01		7.9E+00	8.5E+01	7.9E-01
			Hazard	2.0E+04	2.0E+04	3.0E+04	1.0E+05	2.5E+02	9.4E+04		5.1E+02	
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	2.9E-01	SAT
			Hazard	SAT	SAT	7.5E+03	SAT				1.1E+01	
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+01	SAT
			Hazard	SAT	SAT	4.3E+04	SAT				6.6E+01	
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	6.9E-02	SAT
			Hazard	SAT	SAT	1.5E+03	SAT				2.3E+00	
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+01	SAT
			Hazard	SAT	SAT	4.4E+04	SAT				6.6E+01	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					*4.4E+00*	*1.2E+02*	6.8E-01	*2.1E-03*	*6.2E+00*
			Hazard	2.0E+02	1.4E+02	3.6E-01	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*	*6.2E+00*
		Commercial/ Industrial	Carcinogenic					*4.4E+00*	*1.2E+02*	2.9E+01	*2.1E-03*	*6.2E+00*
			Hazard	SAT	SAT	2.4E+00	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*	*6.2E+00*
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic					*5.0E-02*	*1.0E+00*	5.6E-05	*1.0E-03*	*2.0E-04*
			Hazard	9.4E-01	9.4E-01	1.6E+00	>Sol	*5.0E-02*	*1.0E+00*		*1.0E-03*	*2.0E-04*
		Commercial/ Industrial	Carcinogenic					*5.0E-02*	*1.0E+00*	2.4E-03	*1.0E-03*	*2.0E-04*
			Hazard	>Sol	>Sol	1.0E+01	>Sol	*5.0E-02*	*1.0E+00*		*1.0E-03*	*2.0E-04*
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>Sol	1.1E-01	>Sol
			Hazard	>Sol	>Sol	2.0E+04	>Sol				3.7E+00	
		Commercial/ Industrial	Carcinogenic							>Sol	1.8E+01	>Sol
			Hazard	>Sol	>Sol	5.7E+05	>Sol				1.1E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>Sol	5.2E+00	>Sol
			Hazard	>Sol	>Sol	1.2E+05	>Sol				2.1E+02	
		Commercial/ Industrial	Carcinogenic							>Sol	2.0E+02	>Sol
			Hazard	>Sol	>Sol	6.8E+05	>Sol				1.2E+03	
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-03		1.6E-05	6.3E-03	1.1E-06
			Hazard	1.1E+00	1.7E+00	4.2E+01	>Sol	1.2E-01	2.8E+01		1.8E-01	

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis(2-ethylhexyl)-phthalate	Butyl benzyl phthalate	Cadmium	Carbon Disulfide
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E-01		2.5E-01	4.5E+03	3.6E+01		2.1E+03	
			Hazard		2.1E+02		3.7E+02	1.0E+03	1.0E+04	3.7E+01	1.2E+03
		Commercial/ Industrial	Carcinogenic	7.9E+00		7.9E+00	1.7E+05	1.1E+03		7.9E+04	
			Hazard		1.4E+03		6.8E+03	6.8E+03	6.8E+04	6.8E+02	6.4E+03
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			5.6E+00
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			3.3E+01
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			1.1E+00
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT			SAT			3.3E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	2.1E+00		2.1E+00	9.6E+00	3.7E+03		*1.1E+00*	
			Hazard		SAT		9.6E+00	SAT	SAT	*1.1E+00*	2.9E+00
		Commercial/ Industrial	Carcinogenic	SAT		SAT	9.6E+00	SAT		*1.1E+00*	
			Hazard		SAT		9.6E+00	SAT	SAT	*1.1E+00*	1.9E+01
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic	5.6E-05		5.6E-05	4.0E-03	8.0E-03		*5.0E-03*	
			Hazard		>Sol		4.0E-03	3.1E-01	>Sol	*5.0E-03*	1.6E+00
		Commercial/ Industrial	Carcinogenic	>Sol		>Sol	4.0E-03	>Sol		*5.0E-03*	
			Hazard		>Sol		4.0E-03	>Sol	>Sol	*5.0E-03*	1.0E+01
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>Sol		>Sol		>Sol			
			Hazard		>Sol			>Sol			2.1E+00
		Commercial/ Industrial	Carcinogenic	>Sol		>Sol		>Sol			
			Hazard		>Sol			>Sol			6.2E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>Sol		>Sol		>Sol			
			Hazard		>Sol			>Sol			1.6E+02
		Commercial/ Industrial	Carcinogenic	>Sol		>Sol		>Sol			
			Hazard		>Sol			>Sol			9.1E+02
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-05		1.2E-05		5.1E-02			
			Hazard		>Sol		2.0E+00	>Sol	>Sol	2.0E-01	9.4E+00

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)	Chrysene	Copper	Cresol(-m)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.8E+00		9.1E+00		1.3E+00	2.5E+00		
			Hazard	3.3E+01	7.9E+02	4.8E+02	7.4E+04	3.7E+02		2.8E+03	2.6E+03
		Commercial/ Industrial	Carcinogenic	5.6E+01		2.9E+02		8.7E+01	7.9E+01		
			Hazard	2.1E+02	4.7E+03	3.0E+03	1.4E+06	6.8E+03		5.0E+04	1.7E+04
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E-01		1.4E+00			SAT		
			Hazard	2.3E+00	3.1E+00	6.1E+01					SAT
		Commercial/ Industrial	Carcinogenic	4.3E+00		5.2E+01			SAT		
			Hazard	1.3E+01	1.8E+01	3.5E+02					SAT
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.7E-02		3.3E-01			SAT		
			Hazard	4.6E-01	6.3E-01	1.2E+01					SAT
		Commercial/ Industrial	Carcinogenic	4.3E+00		5.2E+01			SAT		
			Hazard	1.3E+01	1.8E+01	3.6E+02					SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*3.0E-03*	*6.6E-02*	*1.5E-01*		2.9E+00	SAT	*2.8E-01*	
			Hazard	*3.0E-03*	*6.6E-02*	*1.5E-01*	8.5E+07	2.9E+00		*2.8E-01*	2.2E+00
		Commercial/ Industrial	Carcinogenic	*3.0E-03*	*6.6E-02*	*1.5E-01*		2.9E+00	SAT	*2.8E-01*	
			Hazard	*3.0E-03*	*6.6E-02*	*1.5E-01*	5.6E+08	2.9E+00		*2.8E-01*	1.5E+01
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02	5.6E-04	*1.3E+00*	
			Hazard	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.6E+01	5.0E-02		*1.3E+00*	7.8E-01
		Commercial/ Industrial	Carcinogenic	*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02	>Sol	*1.3E+00*	
			Hazard	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.0E+02	5.0E-02		*1.3E+00*	5.1E+00
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.6E-02		7.4E-01			>Sol		
			Hazard	2.7E-01	2.4E+00	2.7E+01					>Sol
		Commercial/ Industrial	Carcinogenic	2.5E+00		1.2E+02			>Sol		
			Hazard	7.8E+00	6.8E+01	8.0E+02					>Sol
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+00		3.1E+01			>Sol		
			Hazard	2.1E+01	1.9E+02	1.4E+03					>Sol
		Commercial/ Industrial	Carcinogenic	4.0E+01		1.2E+03			>Sol		
			Hazard	1.2E+02	>Sol	>Sol					>Sol
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.1E-03		3.9E-02		6.8E-03	1.6E-04		
			Hazard	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00		1.5E+01	6.7E+00

*Italicized concentrations based on California MCLs
SAT RBSL exceeds saturated soil concentration of chemical
>SOL RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Cresol(-o)	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene	Dichloro ethane (1,1-)	Dichloro ethane (1,2-) (EDC)	Dichloro ethylene (1,1-)	Dichloro ethylene (cis 1,2-)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic				7.4E-02	4.7E+01	3.9E+00	4.9E-01	
			Hazard	2.6E+03	2.6E+02	3.0E+03		4.9E+03	1.4E+02	4.3E+02	4.8E+02
		Commercial/ Industrial	Carcinogenic				2.3E+00	1.5E+03	1.2E+02	1.5E+01	
			Hazard	1.7E+04	1.7E+03	5.5E+04		3.1E+04	8.8E+02	2.7E+03	3.0E+03
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				SAT	3.6E+00	7.1E-01	4.0E-02	
			Hazard	SAT	SAT			6.7E+02	3.4E+01	1.5E+01	7.1E+01
		Commercial/ Industrial	Carcinogenic				SAT	1.4E+02	2.7E+01	1.5E+00	
			Hazard	SAT	SAT			SAT	2.0E+02	8.7E+01	4.1E+02
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				SAT	8.6E-01	1.7E-01	9.4E-03	
			Hazard	SAT	SAT			1.3E+02	6.8E+00	3.0E+00	1.4E+01
		Commercial/ Industrial	Carcinogenic				SAT	1.4E+02	2.7E+01	1.5E+00	
			Hazard	SAT	SAT			SAT	2.0E+02	8.7E+01	4.1E+02
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic			6.0E+00	1.9E+00	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*
			Hazard	2.3E+00	2.1E-01	6.0E+00		6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*
		Commercial/ Industrial	Carcinogenic			6.0E+00	8.0E+01	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*
			Hazard	1.5E+01	1.4E+00	6.0E+00		6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic			2.0E-01	1.6E-05	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*
			Hazard	7.8E-01	7.8E-02	2.0E-01		5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*
		Commercial/ Industrial	Carcinogenic			2.0E-01	7.0E-04	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*
			Hazard	5.1E+00	5.1E-01	2.0E-01		5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				>Sol	2.3E+00	7.1E-01	1.3E-02	
			Hazard	>Sol	>Sol			3.5E+02	2.8E+01	4.3E+00	3.4E+01
		Commercial/ Industrial	Carcinogenic				>Sol	3.6E+02	1.1E+02	2.1E+00	
			Hazard	>Sol	>Sol			>Sol	8.2E+02	1.2E+02	1.0E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				>Sol	9.8E+01	1.5E+01	8.8E-01	
			Hazard	>Sol	>Sol			>Sol	7.2E+02	3.3E+02	1.5E+03
		Commercial/ Industrial	Carcinogenic				>Sol	3.7E+03	5.8E+02	3.3E+01	
			Hazard	>Sol	>Sol			>Sol	4.2E+03	1.9E+03	>Sol
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic				1.4E-06	2.1E-01	2.4E-02	1.3E-03	
			Hazard	6.4E+00	5.9E-01	7.0E+00		1.9E+01	7.2E-01	1.2E+00	1.8E+00

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Dichloro ethene (trans 1,2)	Dimethyl-benza(a) anthracene (7,12)	Dimethyl phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic						9.7E-01	1.0E+01		8.4E-02
			Hazard	9.5E+02	1.6E+03	1.0E+03	5.2E+03	1.0E+03			5.1E+03	2.7E+00
		Commercial/ Industrial	Carcinogenic						3.0E+01	3.1E+02		2.6E+00
			Hazard	6.1E+03	1.0E+04	6.7E+03	3.4E+04	6.8E+03			3.3E+04	1.7E+01
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic						SAT	SAT		1.2E+00
			Hazard	9.3E+01		SAT	SAT	SAT			SAT	3.9E+00
		Commercial/ Industrial	Carcinogenic						SAT	SAT		4.5E+01
			Hazard	5.4E+02		SAT	SAT	SAT			SAT	2.3E+01
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic						SAT	SAT		2.8E-01
			Hazard	1.9E+01		SAT	SAT	SAT			SAT	7.9E-01
		Commercial/ Industrial	Carcinogenic						SAT	SAT		4.5E+01
			Hazard	5.4E+02		SAT	SAT	SAT			SAT	2.3E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.0E-02*					6.7E-04	1.8E-03	*8.0E+00*	*7.8E-05*
			Hazard	*2.0E-02*	SAT	2.0E+00	3.9E+06	SAT			*8.0E+00*	*7.8E-05*
		Commercial/ Industrial	Carcinogenic	*2.0E-02*					2.9E-02	SAT	*8.0E+00*	*7.8E-05*
			Hazard	*2.0E-02*	SAT	1.3E+01	SAT	SAT			*8.0E+00*	*7.8E-05*
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-02*					2.2E-04	2.5E-03	*7.0E-01*	*5.0E-05*
			Hazard	*1.0E-02*	>Sol	3.1E-01	1.6E+00	>Sol			*7.0E-01*	*5.0E-05*
		Commercial/ Industrial	Carcinogenic	*1.0E-02*					9.2E-03	>Sol	*7.0E-01*	*5.0E-05*
			Hazard	*1.0E-02*	>Sol	2.0E+00	1.0E+01	>Sol			*7.0E-01*	*5.0E-05*
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic						>Sol	>Sol		5.6E-01
			Hazard	3.2E+01		>Sol	>Sol	>Sol			>Sol	1.6E+00
		Commercial/ Industrial	Carcinogenic						>Sol	>Sol		8.9E+01
			Hazard	9.3E+02		>Sol	>Sol	>Sol			>Sol	4.5E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic						>Sol	>Sol		6.4E+00
			Hazard	1.9E+03		>Sol	>Sol	>Sol			>Sol	2.1E+01
		Commercial/ Industrial	Carcinogenic						>Sol	>Sol		2.4E+02
			Hazard	>Sol		>Sol	>Sol	>Sol			>Sol	1.2E+02
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic						6.4E-03	>Sol		5.9E-04
			Hazard	3.5E+00	>Sol	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Flouran-thene	Fluorene	Indeno-(1,2,3-CD) pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-napthalene (2-)	MTBE
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			2.5E-01				2.1E+01		
			Hazard	2.1E+03	2.1E+03		4.7E+00	2.4E+04	2.6E+04	3.1E+03	2.0E+03	2.6E+02
		Commercial/ Industrial	Carcinogenic			7.9E+00				6.6E+02		
			Hazard	1.4E+04	1.4E+04		3.0E+01	1.5E+05	1.6E+05	2.0E+04	1.3E+04	1.7E+03
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT				5.3E+00		
			Hazard	SAT	SAT		6.0E+01	SAT	SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic			SAT				2.0E+02		
			Hazard	SAT	SAT		3.5E+02	SAT	SAT	SAT	SAT	SAT
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT				1.3E+00		
			Hazard	SAT	SAT		1.2E+01	4.5E+04	6.9E+03	7.4E+02	SAT	4.5E+03
		Commercial/ Industrial	Carcinogenic			SAT				2.0E+02		
			Hazard	SAT	SAT			SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic			SAT	*3.2E-01*			3.1E-03		*7.6E-03*
			Hazard	SAT	2.6E+02		*3.2E-01*	1.7E+00	3.3E+00	3.1E-03	1.6E+02	*7.6E-03*
		Commercial/ Industrial	Carcinogenic			SAT	*3.2E-01*			3.1E-03		*7.6E-03*
			Hazard	SAT	SAT		*3.2E-01*	1.1E+01	2.2E+01	3.1E-03	1.1E+03	*7.6E-03*
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic			>Sol	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	>Sol	6.3E-01		*2.0E-03*	7.8E+00	9.4E+00	5.0E-03	6.3E-01	*1.3E-02*
		Commercial/ Industrial	Carcinogenic			>Sol	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	>Sol	>Sol		*2.0E-03*	5.1E+01	6.1E+01	5.0E-03	4.1E+00	*1.3E-02*
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>Sol				6.7E+00		
			Hazard	>Sol	>Sol		2.6E-01	6.4E+05	6.0E+04	3.9E+03	>Sol	2.3E+04
		Commercial/ Industrial	Carcinogenic			>Sol				1.1E+03		
			Hazard	>Sol	>Sol		7.6E+00	>Sol	>Sol	>Sol	>Sol	>Sol
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>Sol				2.0E+02		
			Hazard	>Sol	>Sol		1.5E+01	>Sol	>Sol	>Sol	>Sol	>Sol
		Commercial/ Industrial	Carcinogenic			>Sol				7.7E+03		
			Hazard	>Sol	>Sol		8.8E+01	>Sol	>Sol	>Sol	>Sol	>Sol
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			7.0E-06				1.3E-01		
			Hazard	>Sol	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Naphthalene	Nickel	Nitro benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium	Silver
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		3.4E+04	5.5E+02	5.0E-02				2.8E+02		
			Hazard	2.0E+03	1.5E+03		1.2E+00	1.6E+04	3.1E+04	1.6E+03		3.7E+02	3.7E+02
		Commercial/ Industrial	Carcinogenic		1.3E+06	1.7E+04	1.8E+00				8.9E+03		
			Hazard	1.3E+04	2.7E+04		1.0E+01	1.0E+05	2.0E+05	1.0E+04		6.8E+03	6.8E+03
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	2.9E+02				1.2E+04		
			Hazard	SAT			SAT	SAT	SAT	SAT			
		Commercial/ Industrial	Carcinogenic			SAT	SAT				4.6E+05		
			Hazard	SAT			SAT	SAT	SAT	SAT			
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	6.9E+01				2.9E+03		
			Hazard	SAT			SAT	SAT	SAT	SAT			
		Commercial/ Industrial	Carcinogenic			SAT	SAT				4.6E+05		
			Hazard	SAT			SAT	SAT	SAT	SAT			
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.2E+00*	*2.0E+01*	2.9E-01	*4.7E+00*				1.2E-01	*7.7E-01*	*2.5E+00*
			Hazard	*1.2E+00*	*2.0E+01*		*4.7E+00*	SAT	1.0E+01	SAT		*7.7E-01*	*2.5E+00*
		Commercial/ Industrial	Carcinogenic	*1.2E+00*	*2.0E+01*	1.2E+01	*4.7E+00*				5.3E+00	*7.7E-01*	*2.5E+00*
			Hazard	*1.2E+00*	*2.0E+01*		*4.7E+00*	SAT	6.7E+01	SAT		*7.7E-01*	*2.5E+00*
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-02*	*1.0E-01*	1.3E-01	*5.0E-04*				6.7E-02	*5.0E-02*	*1.0E-01*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>Sol	9.4E+00	>Sol		*5.0E-02*	*1.0E-01*
		Commercial/ Industrial	Carcinogenic	*2.0E-02*	*1.0E-01*	5.7E+00	*5.0E-04*				2.9E+00	*5.0E-02*	*1.0E-01*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>Sol	6.1E+01	>Sol		*5.0E-02*	*1.0E-01*
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>Sol	2.3E-02				4.8E+03		
			Hazard	>Sol			>Sol	>Sol	>Sol	>Sol			
		Commercial/ Industrial	Carcinogenic			>Sol	>Sol				7.6E+05		
			Hazard	>Sol			>Sol	>Sol	>Sol	>Sol			
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>Sol	2.2E-01				2.1E+04		
			Hazard	>Sol			>Sol	>Sol	>Sol	>Sol			
		Commercial/ Industrial	Carcinogenic			>Sol	>Sol				7.9E+05		
			Hazard	>Sol			>Sol	>Sol	>Sol	>Sol			
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			2.8E+00	1.6E-06				2.6E+00		
			Hazard	1.5E+00	7.9E+00		4.4E-05	>Sol	1.5E+02	>Sol		2.0E+00	2.1E+00

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Stryene	Tetrachloro ethane (1,1,2,2 -)	Tetrachloro-ethylene (PCE)	Tetraethyl Lead	Toluene	Trichloro ethane (1,1,1-)	Trichloro ethane (1,1,2-)	Trichloro-ethylene (TCE)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		1.0E+00	5.7E+00				3.8E+00	1.9E+01
			Hazard	9.8E+03	1.2E+03	4.8E+02	5.2E-03	9.0E+03	1.8E+03	1.9E+02	2.9E+02
		Commercial/ Industrial	Carcinogenic		3.1E+01	1.8E+02				1.2E+02	5.9E+02
			Hazard	6.3E+04	7.9E+03	3.0E+03	3.4E-02	5.6E+04	1.2E+04	1.2E+03	1.8E+03
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		3.1E+00	1.3E+00				2.3E+00	4.5E+00
			Hazard	SAT	SAT	6.2E+01		SAT	1.3E+03	1.5E+02	6.3E+01
		Commercial/ Industrial	Carcinogenic		1.2E+02	4.8E+01				8.7E+01	1.7E+02
			Hazard	SAT	SAT	SAT		SAT	SAT	8.9E+02	3.6E+02
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		7.4E-01	3.0E-01				5.5E-01	1.1E+00
			Hazard	SAT	1.0E+03	1.2E+01		3.6E+02	2.6E+02	3.1E+01	1.3E+01
		Commercial/ Industrial	Carcinogenic		1.2E+02	4.8E+01				8.7E+01	1.7E+02
			Hazard	SAT	SAT	SAT		SAT	SAT	8.9E+02	3.6E+02
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*
			Hazard	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*
		Commercial/ Industrial	Carcinogenic	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*
			Hazard	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*
			Hazard	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*
		Commercial/ Industrial	Carcinogenic	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*
			Hazard	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		7.5E-01	2.0E-01				9.8E-01	6.8E-01
			Hazard	>Sol	1.0E+03	8.3E+00		2.1E+02	2.4E+02	5.5E+01	8.0E+00
		Commercial/ Industrial	Carcinogenic		1.2E+02	3.2E+01				1.6E+02	1.1E+02
			Hazard	>Sol	>Sol	>Sol		>Sol	>Sol	1.6E+03	2.3E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		7.8E+00	1.3E+01				1.8E+01	3.8E+01
			Hazard	>Sol	>Sol	>Sol		>Sol	>Sol	1.2E+03	5.3E+02
		Commercial/ Industrial	Carcinogenic		2.9E+02	>Sol				6.9E+02	>Sol
			Hazard	>Sol	>Sol	>Sol		>Sol	>Sol	>Sol	>Sol
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		4.5E-03	6.0E-03				1.8E-02	4.6E-03
			Hazard	9.3E+00	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01	7.2E-02

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Medium	Exposure Pathway	Land Use	Type of Risk	Vanadium	Vinyl Chloride	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		5.0E-01		
			Hazard	5.2E+02		5.4E+04	2.2E+04
		Commercial/ Industrial	Carcinogenic		1.6E+01		
			Hazard	9.5E+03		3.0E+05	4.1E+05
Subsurface Soil [mg/kg]	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		5.6E-03		
			Hazard			SAT	
		Commercial/ Industrial	Carcinogenic		2.1E-01		
			Hazard			SAT	
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		1.3E-03		
			Hazard			SAT	
		Commercial/ Industrial	Carcinogenic		2.1E-01		
			Hazard			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		*6.5E-04*	*1.3E+01*	
			Hazard	3.3E+02	*6.5E-04*	*1.3E+01*	8.8E+02
		Commercial/ Industrial	Carcinogenic		*6.5E-04*	*1.3E+01*	
			Hazard	2.2E+03	*6.5E-04*	*1.3E+01*	5.8E+03
Groundwater [mg/l]	Ingestion of Groundwater	Residential	Carcinogenic		*5.0E-04*	*1.8E+00*	
			Hazard	1.1E-01	*5.0E-04*	*1.8E+00*	4.7E+00
		Commercial/ Industrial	Carcinogenic		*5.0E-04*	*1.8E+00*	
			Hazard	7.2E-01	*5.0E-04*	*1.8E+00*	3.1E+01
	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		3.7E-03		
			Hazard			>Sol	
		Commercial/ Industrial	Carcinogenic		5.8E-01		
			Hazard			>Sol	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		2.4E-01		
			Hazard			>Sol	
		Commercial/ Industrial	Carcinogenic		9.1E+00		
			Hazard			>Sol	
Water for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		2.6E-03		
			Hazard	2.8E+00		6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs
SAT – RBSL exceeds saturated soil concentration of chemical
>SOL – RBSL exceeds solubility of chemical in water