PES Environmental, Inc.
Engineering & Environmental Services

April 23, 1998

618.0101.001

Mr. Barney Chan
Alameda County Health Care Services
1131 Harbour Bay Parkway, Suite 250
Alameda, California 94502-6577

EVALUATION OF RESIDUAL HEALTH RISKS
PACIFIC ELECTRIC MOTOR COMPANY
1009 66th AVENUE
OAKLAND, CALIFORNIA
StID #565

Dear Mr. Chan:

This letter report has been prepared by PES Environmental, Inc. ("PES") on behalf of Pacific Electric Motor Company (PEM) to present an evaluation of human health risks associated with a former gasoline underground storage tank (UST) at the above-referenced site (Plate 1). The former UST and most of the petroleum hydrocarbon affected soil in the vicinity of the tank were removed in early 1995 by W.A. Craig, Inc. (WAC, 1995). However, residual petroleum hydrocarbon contamination remains in the soil. Evaluation of human health risks was requested by Alameda County Health Care Services (ACEHS) in a letter to PEM dated August 19, 1997.

BACKGROUND INFORMATION

The site is located in a residential and light industrial area in Oakland, California, and is presently used to repair large electric motors. PEM formerly operated a 2,000-gallon steel gasoline underground storage tank (UST) east of the warehouse building (Plate 2). The tank was reportedly installed in approximately 1975 (ENVIRON, 1997). In February 1995, the UST was removed by WAC. Observations at the time of removal indicated that the tank was in good condition and no holes were evident (WAC, 1995). However, free-phase gasoline product was observed on the water surface in the tank excavation. Soil samples collected from the UST excavation and associated piping trenches detected total petroleum hydrocarbons as gasoline (TPH-g) at concentrations up to 10,000 milligrams per kilogram.

In April 1995, WAC performed a soil investigation consisting of nine soil borings to delineate the lateral and vertical extent of the petroleum hydrocarbons in soil. Subsequent to the soil

investigation, WAC prepared and implemented a remediation program to remove soil affected by petroleum hydrocarbons. Approximately 1,500 cubic yards of soil were excavated and disposed offsite, and 116,000 gallons of petroleum hydrocarbon-affected water were pumped from the excavation and disposed offsite. A dewatering sump installed by WAC during soil excavation was later converted to groundwater monitoring well WAC-1 (Plate 2). WAC summarized the results of their remediation program in a report entitled *Excavation and Sampling Report*, dated May 12, 1997.

ENVIRON, Inc. installed and sampled three shallow monitoring wells (MW-1, MW-2, MW-3) in June 1997 to evaluate groundwater conditions in the vicinity of the former UST. Well MW-1 was installed adjacent to the former UST, and Wells MW-2 and MW-3 were installed in the anticipated down-gradient direction of groundwater flow. The well installation program and associated soil and groundwater sampling program were summarized in the ENVIRON report *Soil and Ground Water Investigation, Summary Report, Pacific Electric Motor Co., 1009-66th Avenue, Oakland, California*, dated July 17, 1997. ENVIRON concluded that the remediation performed had successfully removed the source of the petroleum hydrocarbons (i.e., the former UST), and that residual concentrations of petroleum hydrocarbons in soil and groundwater were present only in the immediate vicinity of the former UST.

Since June 1997, PES performed three additional quarters of groundwater monitoring of the three wells to evaluate the distribution of petroleum hydrocarbon compounds in groundwater. At the request of ACEHS, PES expanded the analytical program to include inorganic parameters to assess whether natural bioremediation of the groundwater is occurring. In the most recent quarterly monitoring report, dated April 8, 1998 (PES, 1998), we concluded the following:

- Groundwater flow direction has been consistently to the southwest, except during December 1997 when flow was to the west.
- Concentrations of petroleum hydrocarbons in Well MW-1 decreased significantly between June 1997 and March 1998.
- No petroleum hydrocarbons were detected in Wells MW-2 and MW-3 during the four quarters of groundwater monitoring.
- The results of inorganic analyses indicate that natural bioremediation appears to be occurring in Well MW-1, in the vicinity of the former UST.

EVALUATION OF RESIDUAL HEALTH RISKS

To assess the potential risk to human health from residual petroleum fuel components in the soil, a Tier 2 Risk-Based Correction Action ("RBCA") evaluation was performed. The RBCA process is described in ASTM E-1739 *Standard for Risk-Based Corrective Action Applied at Petroleum Release Sites*. Tier 2 of the RBCA process involves development of site-specific target levels (SSTLs), which are then compared to concentrations of the chemical(s) of concern for the subject site. The SSTL values are derived from standard exposure equations and reasonable maximum exposure estimates per U.S. Environmental Protection Agency (USEPA) guidelines. These values are designed to be protective of human health, even if exposure occurs within the onsite area of impacted soil or groundwater.

For the former UST at the subject site, there are two primary exposure scenarios: (1) volatilization of residual petroleum hydrocarbon constituents from soil and/or groundwater to the air inside the warehouse located north of the former UST; and (2) volatilization of residual petroleum hydrocarbon constituents from groundwater to the air inside residential apartments located offsite just east of the site. To perform the RBCA evaluation, PES used the *Tier 1 and Tier 2 RBCA Spreadsheet System* Version 1.0.1 software package by Groundwater Services, Inc. The worksheets listing input data and output results used for this model are presented in Appendix A.

These data are not complete + may be inaccurate.

As soil and groundwater input concentrations for the RBCA model, PES used the highest concentrations in the soil vadose zone (collected from 4.5 feet below ground surface at Boring GP-4) and the most recent quarterly groundwater monitoring results (collected on March 10, 1998 from Well MW-1), respectively. Excerpts from the May 16, 1995 WAC report showing the results and sampling location for GP-4 are presented in Appendix B. The corresponding WAC and PES data are as follows:

Soil

- Benzene – 0.024 micrograms per kilogram (µg/kg)
- Toluene – 0.007 µg/kg
- Ethylbenzene – 0.006 µg/kg
- Total xylenes – 0.180 µg/kg

Groundwater

- Benzene – 2.0 micrograms per liter (µg/L)
- Toluene – 0.25 µg/L (compound not detected; used one-half of reporting limit)
- Ethylbenzene – 5.7 µg/L
- Total xylenes – 1.7 µg/L

Tier 2 of the RBCA process involves comparison of site component concentrations to generic Risk-Based Screening Levels ("RBSL") to assess whether further risk evaluation of the site is

required. The RBSL values are derived from standard exposure equations and reasonable maximum exposure estimates per U.S. EPA guidelines. These values are designed to be protective of human health, even if exposure occurs within the onsite area of impacted soil or groundwater.

For onsite workers (assuming continued commercial use of the site), the RBCA site assessment calculates a carcinogenic risk of 2.7×10^{-7} and a total pathway Hazard Index (HI) of 0.015. EPA guidance documents typically specify that carcinogenic risks of 1×10^{-6} and lower are generally acceptable. A HI equivalent to 1.0 indicates that there may be endangerment of human health and/or the environment. A HI of less than 1.0 indicates no endangerment. For offsite residents, the RBCA site assessment calculates a carcinogenic risk of 4.3×10^{-8} and a total pathway HI of 0.0021.

The calculated carcinogenic risks and HIs for the onsite commercial scenario and offsite residential scenario resulting from the residual petroleum hydrocarbons in soil and groundwater beneath the site are well below the acceptable threshold values. In accordance with RBCA protocol, it is our opinion that no further action is required at the site.

DISCUSSION AND REQUEST FOR CLOSURE

Four quarters of groundwater monitoring have been successfully performed. The results of petroleum hydrocarbon analyses indicate a significant decrease in concentrations in groundwater adjacent to the former tank site and no migration to down gradient monitoring wells. The results of inorganic analyses suggest that natural bioremediation of the groundwater near the former UST is occurring. A Tier 2 RBCA evaluation of residual petroleum-related chemicals in soil and groundwater demonstrates that there is no unacceptable risk to human health of onsite workers or offsite residents.

On the basis of: (1) successful implementation of four quarters of groundwater monitoring, (2) the decrease in concentrations of residual TPH and BTEX compounds in the recent groundwater samples near the former UST, and (3) the results of the RBCA assessment indicating that no health risks exist from residual petroleum hydrocarbons, PES concludes that remedial action at this site has been completed and no further action is recommended. Therefore, on behalf on Pacific Electric Motor Company, PES respectfully requests that case closure be granted for this site.

Please call us at (415) 899-1600 if you have any questions.

Yours very truly,

PES ENVIRONMENTAL, INC.

William W. Mast, R.G.
Senior Engineer

William F. Frizzell, P.E.
Principal Engineer

Attachments: Plates 1 & 2
Appendix A - Tier 2 RBCA Worksheets
Appendix B – Excerpts from W.A. Craig Report, dated May 16, 1995

cc: Mr. Rand Perry – Pacific Electric Motor Company

REFERENCES

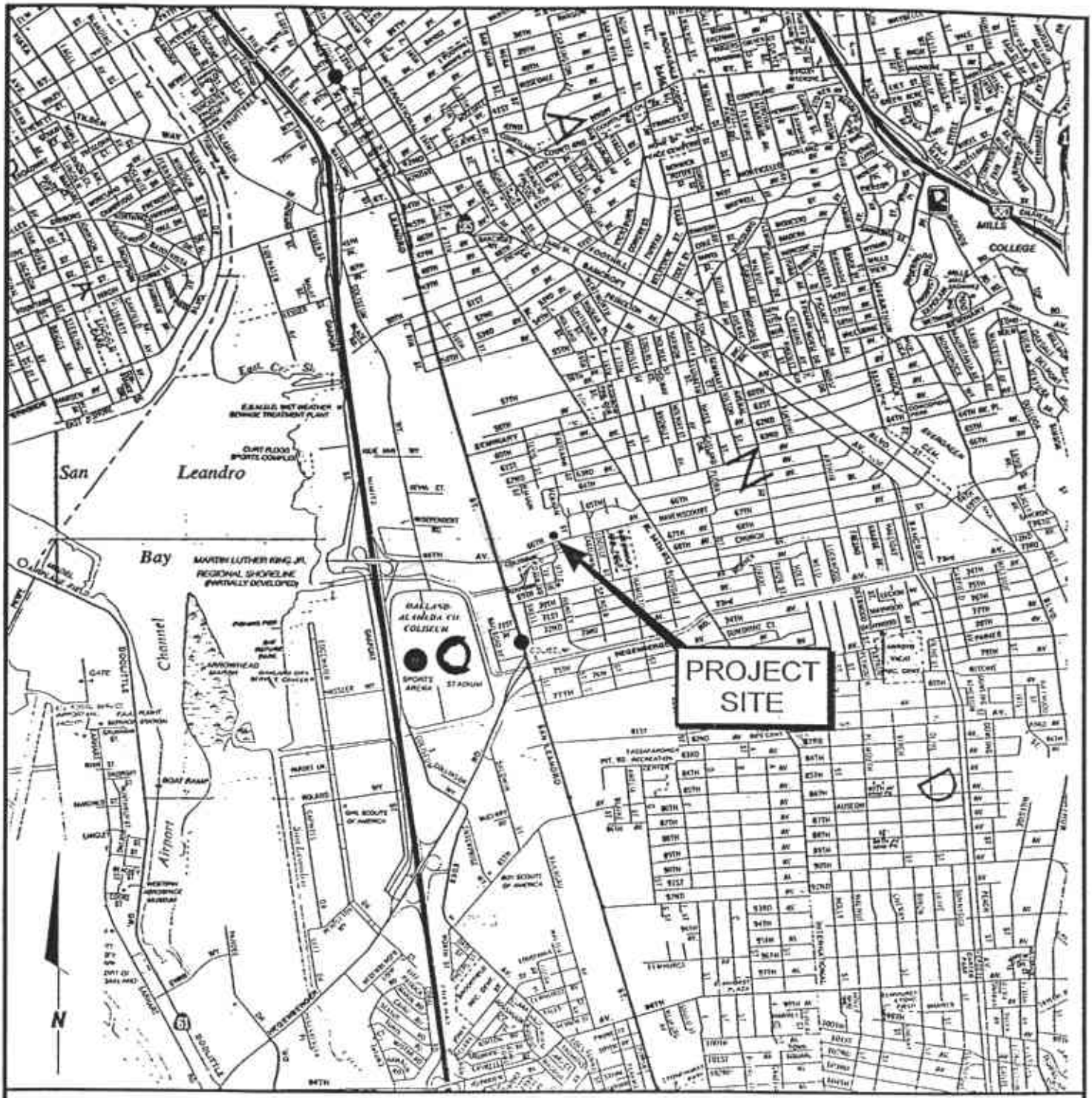
ENVIRON, 1997. *Soil and Ground Water Investigation, Summary Report, Pacific Electric Motor Co., 1009 - 66th Avenue, Oakland, California.* July 9.

Alameda County Environmental Health Services (ACEHS), 1997. *Soil and Groundwater Investigation for Pacific Electric Motor Co., 1009-66th Ave., Oakland, CA 94601.* August 19.

PES Environmental, Inc., 1998. *Quarterly Monitoring Report, Pacific Electric Motor Company, 1009 66th Avenue, Oakland, California.* April 8.

W.A. Craig, 1995. *Subsurface Investigation At 1009 66th Street, Oakland, California.* May 16.

W.A. Craig, 1997. *Excavation and Sampling Report, 1009 66th Street, Oakland, California.* May 12.



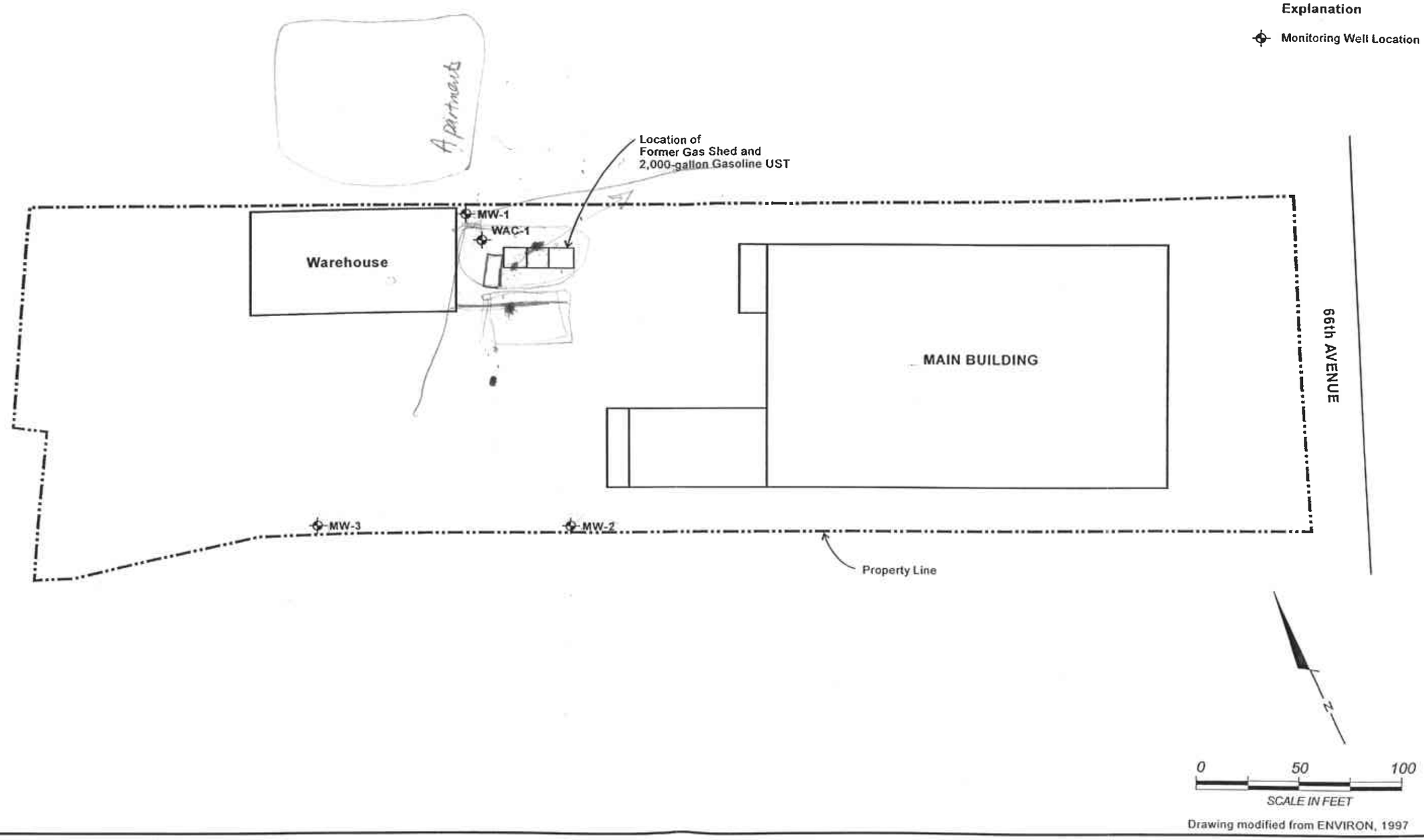
Oakland Map, California State Automobile Association, 1997.

PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California

PLATE 1

618.0101.001	61801_V1.CDR		3/98
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Drawing modified from ENVIRON, 1997

PES Environmental, Inc.
Engineering & Environmental Services

Site Plan and Monitoring Well Locations
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California

PLATE
2

618.0101.001	61601_S1.CDR	JWM	3/98
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

APPENDIX A

TIER 2 RBCA WORKSHEETS

ONSITE COMMERCIAL SCENARIO

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Pacific Electric Motor Compan Job Identification: 618.0101.001
Site Location: 1009 66th Avenue, Oakland Date Completed: 4/13/98
Completed By: Elizabeth Large

Software: GSI RBCA Spreadsheet
Version: 1.0.1

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

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

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Outdoor Air Pathways:				
SS.v	Volatiles and Particulates from Surface Soils	FALSE	FALSE	FALSE
S.v	Volatilization from Subsurface Soils	FALSE	FALSE	
GW.v	Volatilization from Groundwater	FALSE	FALSE	
Indoor Air Pathways:				
S.b	Vapors from Subsurface Soils	FALSE	TRUE	
GW.b	Vapors from Groundwater	FALSE	TRUE	
Soil Pathways:				
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	FALSE	
S.l	Leaching to Groundwater from all 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	Constrctn
A	Contaminated soil area (cm^2)	***4.6E+06***	1.0E+06
W	Length of affect. soil parallel to wind (cm)	1.5E+03	1.0E+03
W.gw	Length of affect. soil parallel to groundwater (cm	1.5E+03	
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02	
delta	Air mixing zone height (cm)	2.0E+02	
Lss	Thickness of affected surface soils (cm)	1.0E+02	
Pe	Particulate areal emission rate (g/cm^2/s)	6.9E-14	

Groundwate	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	***3.0E+02***
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03
Ugw.tr	Groundwater seepage velocity (cm/yr)	6.6E+03
Ks	Saturated hydraulic conductivity(cm/s)	
grad	Groundwater gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
phi.eff	Effective porosity in water-bearing unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	FALSE
BC	Biodegradation Capacity (mg/L)	

Soil	Definition (Units)	Value	capillary	vadose	foundation
hc	Capillary zone thickness (cm)	***1.5E+01***			
hv	Vadose zone thickness (cm)	***1.8E+02***			
rho	Soil density (g/cm^3)	1.7			
foc	Fraction of organic carbon in vadose zone	0.01			
phi	Soil porosity in vadose zone	0.38			
Lgw	Depth to groundwater (cm)	***2.0E+02***			
Ls	Depth to top of affected subsurface soil (cm)	***1.4E+02***			
Lsubs	Thickness of affected subsurface soils (cm)	***1.7E+02***			
pH	Soil/groundwater pH	6.5			
phi.w	Volumetric water content		0.342	0.12	0.12
phi.a	Volumetric air content		0.038	0.26	0.26

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

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

Site Name: Pacific Electric Motor Company | Site Location: 1009 66th Avenue, Oakland | Completed By: Elizabeth Large | Date Completed: 4/13/1998 | 4 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Commercial	3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2) On-Site Commercial	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day) On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day) (3) X (4) On-Site Commercial
Benzene	2.4E-2	1.9E+2	1.3E-4	7.0E-2	8.8E-6
Ethylbenzene	6.0E-3	1.9E+2	3.1E-5	2.0E-1	6.2E-6
Toluene	7.0E-3	1.9E+2	3.7E-5	2.0E-1	7.2E-6
Xylene (mixed isomers)	1.8E-1	1.9E+2	9.4E-4	2.0E-1	1.8E-4

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Pacific Electric Motor Company | Site Location: 1009 66th Avenue, Oakland | Completed By: Elizabeth Large | Date Completed: 4/13/1998 | 5 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR INTRUSION TO BUILDINGS Constituents of Concern	Exposure Concentration 1) Source Medium Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor On-Site Commercial	3) Exposure Medium Indoor Air: POE Conc. (mg/m^3) (1) / (2) On-Site Commercial	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day) On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day) (3) X (4) On-Site Commercial	TOTAL PATHWAY INTAKE (mg/kg-day) *(Sum intake values from subsurface & groundwater routes.)* On-Site Commercial
Benzene	2.0E-3	3.0E+2	6.7E-6	7.0E-2	4.7E-7	9.3E-6
Ethylbenzene	5.7E-3	2.8E+2	2.0E-5	2.0E-1	3.9E-6	1.0E-5
Toluene	2.5E-4	3.0E+2	8.4E-7	2.0E-1	1.7E-7	7.3E-6
Xylene (mixed isomers)	1.7E-3	3.2E+2	5.4E-6	2.0E-1	1.0E-6	1.9E-4

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Pacific Electric Motor Company Site Location: 1009 66th Avenue, Oakland Completed By: Elizabeth Large Date Completed: 4/13/1998

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED = PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK: (2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site	Commercial	(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site	Commercial	TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site	Commercial	(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site	Commercial
Benzene	A		9.3E-6	2.9E-2		2.7E-7		2.6E-5	1.7E-3		1.5E-2
Ethylbenzene	D							1.0E-5	2.9E-1		3.5E-5
Toluene	D							7.3E-6	1.1E-1		6.4E-5
Xylene (mixed isomers)	D							1.9E-4	2.0E+0		9.3E-5
Total Pathway Carcinogenic Risk =					0.0E+0	2.7E-7	***Total Pathway Hazard Index =***			0.0E+0	1.5E-2

RBCA CHEMICAL DATABASE

Physical Property Data

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) log(l/kg)	ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3) mol	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	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: Pacific Electric Motor Company Site Location: 1009 66th Avenue, Oakla Completed By: Elizabeth Large Date Completed: 4/13/1998

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Toxicity Data

CAS Number	Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Inhalation RfD_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Inhalation SF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
71-43-2	Benzene	-		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	-		-		D	FALSE
108-88-3	Toluene	2.00E-01	A,R	1.14E-01	A,R	-		-		D	FALSE
1330-20-7	Xylene (mixed isomers)	2.00E+00	A,R	2.00E+00	A	-		-		D	FALSE

Site Name: Pacific Electric Motor Compa Site Location: 1009 66th Avenue, Oa Completed By: Elizabeth Large Date Completed: 4/13/1998

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level MCL (mg/L)	reference	Permissible Exposure Limit PEL/TLV (mg/m3)	ref	Relative Absorption Factors Oral	Dermal	Detection Limits Groundwater (mg/L)	ref	Soil (mg/kg)	ref	Half Life (First-Order Decay) (days) Saturated	Unsaturated	ref
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	H
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	H
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	H
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	H

Site Name: Pacific Electric Motor Compa Site Location: 1009 66th Avenue, Oakland Completed By: Elizabeth Large Date Completed: 4/13/1998

Software version: 1.0.1

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

(Complete the following table)

CONSTITUENT	Representative COC Concentration in Groundwater value (mg/L)	note	in Surface Soil value (mg/kg)	note	in Subsurface Soil value (mg/kg)	note
Benzene	2.0E-3				2.4E-2	
Ethylbenzene	5.7E-3				6.0E-3	
Toluene	2.5E-4				7.0E-3	
Xylene (mixed isomers)	1.7E-3				1.8E-1	

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

RBCA SITE ASSESSMENT | Input Screen 6.3

CONSTITUENT MOLE FRACTIONS

(Complete the following table)

CONSTITUENT	Mole Fraction of Constituent in Source Material
Benzene	
Ethylbenzene	
Toluene	
Xylene (mixed isomers)	

Site Name: Pacific Electric Motor Compa Completed By: Elizabeth Large
Site Location: 1009 66th Avenue, Oaklan Date Completed: 4/13/1998

RBCA SITE ASSESSMENT | Input Screen 9.4

GROUNDWATER DAF VALUES

(Enter DAF values in the grey area of the following table)

CONSTITUENT	Dilution Attenuation Factor (DAF) in Groundwater	
	Residential Receptor	Comm./Ind. Receptor
Benzene	1.0E+0	1.0E+0
Ethylbenzene	1.0E+0	1.0E+0
Toluene	1.0E+0	1.0E+0
Xylene (mixed isomers)	1.0E+0	1.0E+0

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

RBCA SITE ASSESSMENT | Input Screen 9.1

CONSTITUENT HALF-LIFE VALUES

(Complete the following table)

CONSTITUENT	Half-Life of Constituent (day)
Benzene	720
Ethylbenzene	228
Toluene	28
Xylene (mixed isomers)	360

Site Name: Pacific Electric Motor Compan Completed By: Elizabeth Large
Site Location: 1009 66th Avenue, Oakland Date Completed: 4/13/1998

RBCA SITE ASSESSMENT

EXPOSURE LIMITS IN GROUNDWATER AND AIR

CONSTITUENT	Exposure Limits Applied to Receptors	
	Groundwater (MCL) (mg/L)	Air (Comm. only) (PEL/TLV) (mg/m^3)
Benzene		
Ethylbenzene		
Toluene		
Xylene (mixed isomers)		

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

Site Name: Pacific Electric Motor Company | Site Location: 1009 66th Avenue, Oakland | Completed By: Elizabeth Large | Date Completed: 4/13/1998 | 4 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Commercial	3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Commercial	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day): On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day) (3) X (4): On-Site Commercial
Benzene	2.4E-2	1.9E+2	1.3E-4	7.0E-2	8.8E-6
Ethylbenzene	6.0E-3	1.9E+2	3.1E-5	2.0E-1	6.2E-6
Toluene	7.0E-3	1.9E+2	3.7E-5	2.0E-1	7.2E-6
Xylene (mixed isomers)	1.8E-1	1.9E+2	9.4E-4	2.0E-1	1.8E-4

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Pacific Electric Motor Company | Site Location: 1009 66th Avenue, Oakland | Completed By: Elizabeth Large | Date Completed: 4/13/1998 | 5 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS — ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Commercial	3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2): On-Site Commercial	4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day): On-Site Commercial	5) Average Daily Intake Rate (mg/kg-day) (3) X (4): On-Site Commercial	TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from subsurface & groundwater routes.): On-Site Commercial
Benzene	2.0E-3	2.9E+2	6.8E-6	7.0E-2	4.8E-7	9.3E-6
Ethylbenzene	5.7E-3	2.8E+2	2.0E-5	2.0E-1	4.0E-6	1.0E-5
Toluene	2.5E-4	2.9E+2	8.6E-7	2.0E-1	1.7E-7	7.3E-6
Xylene (mixed isomers)	1.7E-3	3.1E+2	5.4E-6	2.0E-1	1.1E-6	1.9E-4

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK: (2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site	Commercial	(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site	Commercial	TOXIC EFFECTS: (5) Total Toxicant Intake Rate (mg/kg/day) On-Site	Commercial	(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site	Commercial
Benzene	A		9.3E-6	2.9E-2		2.7E-7		2.6E-5	1.7E-3		1.5E-2
Ethylbenzene	D							1.0E-5	2.9E-1		3.5E-5
Toluene	D							7.3E-6	1.1E-1		6.4E-5
Xylene (mixed isomers)	D							1.9E-4	2.0E+0		9.3E-5

Total Pathway Carcinogenic Risk = 0.0E+0 | 2.7E-7

Total Pathway Hazard Index = 0.0E+0 | 1.6E-2

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 9.2**

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

SUBSURFACE SOIL SSTL VALUES (> 3.3 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			X	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)		Residential: (on-site)	Commercial: (on-site)	(mg/kg)	"■" If yes	Only if "yes" left
71-43-2	Benzene	2.4E-2	NA	NA	NA		NA	9.4E-2		NA	NA	9.4E-2	☐	<1
100-41-4	Ethylbenzene	6.0E-3	NA	NA	NA		NA	>Res		NA	NA	>Res	☐	<1
108-88-3	Toluene	7.0E-3	NA	NA	NA		NA	1.1E+2		NA	NA	1.1E+2	☐	<1
1330-20-7	Xylene (mixed isomers)	1.8E-1	NA	NA	NA		NA	>Res		NA	NA	>Res	☐	<1

>Res indicates risk-based target concentration greater than constituent residual saturation value

Software: GSI RBCA Spreadsheet
Version: 1.0.1

Serial: G-353-LXX-890

RBCA SITE ASSESSMENT

Tier 2 Worksheet 9.3

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

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		Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only If "yes" left
71-43-2	Benzene	2.0E-3	NA	NA	NA	NA	1.4E-1	NA	NA	1.4E-1	☐	<1
100-41-4	Ethylbenzene	5.7E-3	NA	NA	NA	NA	>Sol	NA	NA	>Sol	☐	<1
108-88-3	Toluene	2.5E-4	NA	NA	NA	NA	1.7E+2	NA	NA	1.7E+2	☐	<1
1330-20-7	Xylene (mixed isomers)	1.7E-3	NA	NA	NA	NA	>Sol	NA	NA	>Sol	☐	<1

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

Software: GSI RBCA Spreadsheet
Version: 1.0.1

Serial: G-353-LXX-890

OFFSITE RESIDENTIAL SCENARIO

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: Pacific Electric Motor Company Job Identification: 618.0101.001 Software: GSI RBCA Spreadsheet
Site Location: 1009 66th Avenue, Oakland Date Completed: 4/13/98 Version: 1.0.1
Completed By: Elizabeth Large

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

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

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Outdoor Air Pathways:				
SS.v	Volatiles and Particulates from Surface Soils	FALSE	FALSE	FALSE
S.v	Volatilization from Subsurface Soils	FALSE	FALSE	
GW.v	Volatilization from Groundwater	FALSE	FALSE	
Indoor Air Pathways:				
S.b	Vapors from Subsurface Soils	FALSE	FALSE	
GW.b	Vapors from Groundwater	TRUE	FALSE	
Soil Pathways:				
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	FALSE
Groundwater Pathways:				
GW.i	Groundwater Ingestion	FALSE	FALSE	
S.l	Leaching to Groundwater from all 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	Constrctn
A	Contaminated soil area (cm^2)		
W	Length of affect. soil parallel to wind (cm)		
W.gw	Length of affect. soil parallel to groundwater (cm		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02	
delta	Air mixing zone height (cm)	2.0E+02	
Lss	Thickness of affected surface soils (cm)		
Pe	Particulate areal emission rate (g/cm^2/s)	6.9E-14	

Groundwate	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	***3.0E+02***
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03
Ugw.tr	Groundwater seepage velocity (cm/yr)	6.6E+03
Ks	Saturated hydraulic conductivity(cm/s)	
grad	Groundwater gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
phi.eff	Effective porosity in water-bearing unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	FALSE
BC	Biodegradation Capacity (mg/L)	

Soil	Definition (Units)	Value		
hc	Capillary zone thickness (cm)	***1.5E+01***		
hv	Vadose zone thickness (cm)	***1.8E+02***		
rho	Soil density (g/cm^3)	1.7		
foc	Fraction of organic carbon in vadose zone	0.01		
phi	Soil porosity in vadose zone	0.38		
Lgw	Depth to groundwater (cm)	***2.0E+02***		
Ls	Depth to top of affected subsurface soil (cm)			
Lsubs	Thickness of affected subsurface soils (cm)			
pH	Soil/groundwater pH	6.5		
		capillary	vadose	foundation
phi.w	Volumetric water content	0.342	0.12	0.12
phi.a	Volumetric air content	0.038	0.26	0.26

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

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

RBCA CHEMICAL DATABASE

Physical Property Data

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) log(l/kg)	ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3/mol)	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	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: Pacific Electric Motor Company Site Location: 1009 66th Avenue, Oakla Completed By: Elizabeth Large Date Completed: 4/13/1998

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Toxicity Data

CAS Number	Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Inhalation RfD_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Inhalation SF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
71-43-2	Benzene	-		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	-		-		D	FALSE
108-88-3	Toluene	2.00E-01	A,R	1.14E-01	A,R	-		-		D	FALSE
1330-20-7	Xylene (mixed isomers)	2.00E+00	A,R	2.00E+00	A	-		-		D	FALSE

Site Name: Pacific Electric Motor Compa Site Location: 1009 66th Avenue, Oa Completed By: Elizabeth Large Date Completed: 4/13/1998

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

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	ref
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	H
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	H
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	H
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	H

Site Name: Pacific Electric Motor Compa Site Location: 1009 66th Avenue, Oakland Completed By: Elizabeth Large Date Completed: 4/13/1998

Software version: 1.0.1

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

(Complete the following table)

CONSTITUENT	Representative COC Concentration in Groundwater value (mg/L)	note	in Surface Soil value (mg/kg)	note	in Subsurface Soil value (mg/kg)	note
Benzene	2.0E-3					
Ethylbenzene	5.7E-3					
Toluene	5.0E-4					
Xylene (mixed isomers)	1.7E-3					

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

RBCA SITE ASSESSMENT | Input Screen 6.3

CONSTITUENT MOLE FRACTIONS

(Complete the following table)

CONSTITUENT	Mole Fraction of Constituent in Source Material
Benzene	
Ethylbenzene	
Toluene	
Xylene (mixed isomers)	

Site Name: Pacific Electric Motor Compa Completed By: Elizabeth Large
Site Location: 1009 66th Avenue, Oaklan Date Completed: 4/13/1998

RBCA SITE ASSESSMENT | Input Screen 9.4

GROUNDWATER DAF VALUES

(Enter DAF values in the grey area of the following table)

CONSTITUENT	Dilution Attenuation Factor (DAF) in Groundwater	
	Residential Receptor	Comm./Ind. Receptor
Benzene	1.0E+0	1.0E+0
Ethylbenzene	1.0E+0	1.0E+0
Toluene	1.0E+0	1.0E+0
Xylene (mixed isomers)	1.0E+0	1.0E+0

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

RBCA SITE ASSESSMENT | Input Screen 9.1

CONSTITUENT HALF-LIFE VALUES

(Complete the following table)

CONSTITUENT	Half-Life of Constituent (day)
Benzene	720
Ethylbenzene	228
Toluene	28
Xylene (mixed isomers)	360

Site Name: Pacific Electric Motor Compan Completed By: Elizabeth Large
Site Location: 1009 66th Avenue, Oakland Date Completed: 4/13/1998

RBCA SITE ASSESSMENT

EXPOSURE LIMITS IN GROUNDWATER AND AIR

CONSTITUENT	Exposure Limits Applied to Receptors	
	Groundwater (MCL) (mg/L)	Air (Comm. only) (PEL/TLV) (mg/m^3)
Benzene		
Ethylbenzene		
Toluene		
Xylene (mixed isomers)		

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

Site Name: Pacific Electric Motor Company | Site Location: 1009 66th Avenue, Oakland | Completed By: Elizabeth Large | Date Completed: 4/13/1998 | 4 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration: 1) Source Medium — Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor		3) Exposure Medium — Indoor Air: POE Conc. (mg/m^3) (1) / (2)		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day)		5) Average Daily Intake Rate (mg/kg-day) (3) X (4)	
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 (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Pacific Electric Motor Company | Site Location: 1009 66th Avenue, Oakland | Completed By: Elizabeth Large | Date Completed: 4/13/1998 | *4 OF 9*

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ☑ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS: **Exposure Concentration**

VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor		3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2)		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day)		5) Average Daily Intake Rate: (mg/kg-day) (3) X (4)	
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 (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: Pacific Electric Motor Company | Site Location: 1009 66th Avenue, Oakland | Completed By: Elizabeth Large | Date Completed: 4/13/1998 | 5 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Residential		3) Exposure Medium: Indoor Air: POE Conc. (mg/m^3) (1) / (2) — On-Site Residential		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day) — On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) (3) X (4) — On-Site Residential		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from subsurface & groundwater routes.) — On-Site Residential	
Benzene	2.0E-3	1.2E+2		1.7E-5		8.8E-2		1.5E-6		1.5E-6	
Ethylbenzene	5.7E-3	1.1E+2		5.0E-5		2.1E-1		1.0E-5		1.0E-5	
Toluene	5.0E-4	1.2E+2		4.2E-6		2.1E-1		8.7E-7		8.7E-7	
Xylene (mixed isomers)	1.7E-3	1.3E+2		1.3E-5		2.1E-1		2.7E-6		2.7E-6	

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: Pacific Electric Motor Company Site Location: 1009 66th Avenue, Oakland Completed By: Elizabeth Large Date Completed: 4/13/1998 2 OF 4

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR 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) Inhalation 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) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene	A	1.5E-6		2.9E-2	4.3E-8		3.5E-6		1.7E-3	2.0E-3	
Ethylbenzene	D						1.0E-5		2.9E-1	3.6E-5	
Toluene	D						8.7E-7		1.1E-1	7.6E-6	
Xylene (mixed isomers)	D						2.7E-6		2.0E+0	1.4E-6	
Total Pathway Carcinogenic Risk =					4.3E-8	0.0E+0	***Total Pathway Hazard Index =***			2.1E-3	0.0E+0

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 9.3**

Site Name: Pacific Electric Motor Company
Site Location: 1009 66th Avenue, Oakland

Completed By: Elizabeth Large
Date Completed: 4/13/1998

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		Groundwater Ingestion			X Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable SSTL	SSTL Exceeded ?	Required CRF
CAS No.	Name	(mg/L)	Residential: (on-site)	Commercial: (on-site)	Regulatory(MCL): (on-site)	Residential: (on-site)	Commercial: (on-site)	Residential (on-site)	Commercial: (on-site)	(mg/L	"■" If yes	Only if "yes" left
71-43-2	Benzene	2.0E-3	NA	NA	NA	4.7E-2	NA	NA	NA	4.7E-2	☐	<1
100-41-4	Ethylbenzene	5.7E-3	NA	NA	NA	>Sol	NA	NA	NA	>Sol	☐	<1
108-88-3	Toluene	5.0E-4	NA	NA	NA	6.6E+1	NA	NA	NA	6.6E+1	☐	<1
1330-20-7	Xylene (mixed isomers)	1.7E-3	NA	NA	NA	>Sol	NA	NA	NA	>Sol	☐	<1

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

Software: GSI RBCA Spreadsheet
Version: 1.0.1

Serial: G-353-LXX-890

APPENDIX B

EXCERPTS FROM W.A. CRAIG REPORT DATED MAY 16, 1995

W. A. CRAIG, INC.

Environmental Consulting and Contracting
P. O. Box 448
Napa, California 94559-0448
Contractor and Hazardous Substances License #455752
Cal/OSHA Statewide Annual Excavation Permit #559351
(800) 522-7244
Phone: (510) 525-2780 Berkeley **Napa (707) 252-3353**
Fax: (707) 252-3385

SUBSURFACE ENVIRONMENTAL INVESTIGATION

AT

1009 66th Street - Oakland, California

by

W.A. Craig, Inc.
Napa, California

Submitted to

Mr. Terry Knox
Pacific Electric Motor
1009 66th Avenue
Oakland, CA 94621-3535

REGISTERED ENVIRONMENTAL ASSESSOR
WILLIAM A. CRAIG, II
No. 01414
Expires 6-96
STATE OF CALIFORNIA

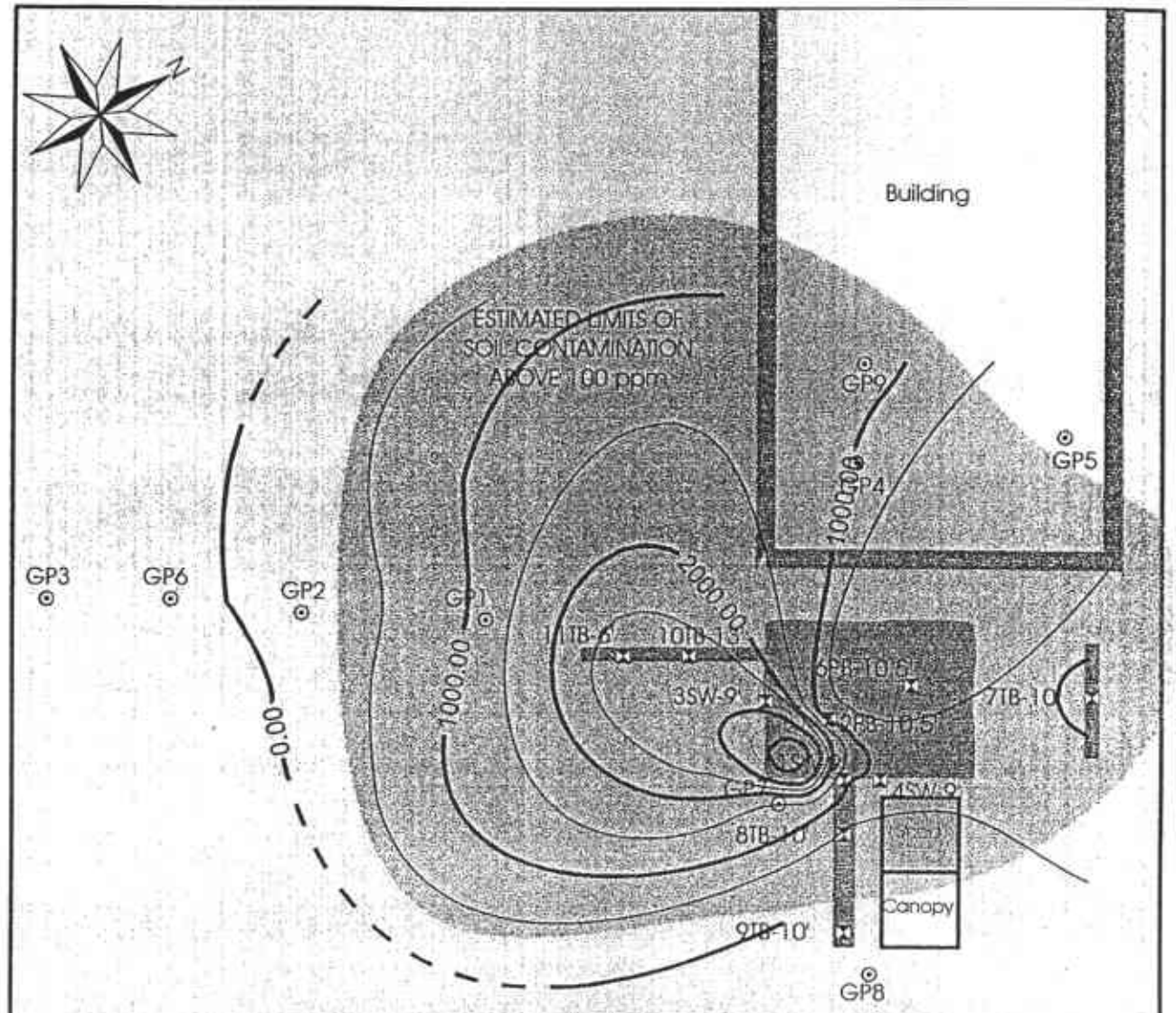
W. A. Craig II, R.E.A. 0414

Frank Goldman, R.G. 5557

5557

W.A. Craig, Inc.
Project No. 3471C

May 16, 1995



W.A. CRAIG, INC.

P.O. BOX 448, NAPA, CALIFORNIA 94559-0448

DRAWING NO. 1
P.E.M. SAMPLE LOCATIONS AND PLUME MAP

JOB # 3471C

1009 66th Avenue
Oakland, California

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

W.A. Craig, Inc. P.O. Box 448 Napa, CA 94559-0448	Client Project ID: PEM	Date Sampled: 04/24-04/25/95
		Date Received: 04/25/95
	Client Contact: Bill Craig	Date Extracted: 04/25-04/26/95
	Client P.O:	Date Analyzed: 04/25-04/26/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
51957	GP1-4.5'-5'	S	130,b,d	0.33	3.1	2.2	13	97
51958	GP1-9.5'-10'	S	1100,b,d	13	72	28	150	101
51959	GP1-16.5'-17'	S	ND	ND	ND	ND	ND	105
51960	GP2-7.5'-8'	S	1900,b,d	ND< 0.2	6.0	40	220	103
51961	GP2-12.5'-13'	S	530,b,d	ND< 0.04	12	1.4	53	100
51962	GP2-17.5'-18'	S	ND	ND	0.005	ND	0.012	104
51963	GP2-22.5'-23'	S	5.2,b,d	0.010	0.083	0.034	0.14	100
51964	GP3-4'-4.5'	S	ND	ND	ND	ND	ND	109
51965	GP3-10.5'-11'	S	ND	ND	ND	ND	ND	104
51966	GP3-15'-15.5'	S	ND	ND	ND	ND	ND	108
51967	GP3-19.5'-20'	S	ND	ND	ND	ND	ND	107
51968	GP4-4.5'-5'	S	1.3,b,d	0.024	0.007	0.006	0.18	104
51969	GP4-10'-10.5'	S	970,b,d	11	47	23	130	106
51970	GP4-15'-15.5'	S	ND	ND	0.006	ND	0.013	104
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

W.A. Craig, Inc. P.O. Box 448 Napa, CA 94559-0448	Client Project ID: PEM	Date Sampled: 04/24-04/25/95
		Date Received: 04/25/95
	Client Contact: Bill Craig	Date Extracted: 04/25-04/26/95
	Client P.O:	Date Analyzed: 04/25-04/26/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylben-zene	Xylenes	% Rec. Surrogate
51971	GP4-19.5'-20'	S	ND	ND	ND	0.007	0.008	107
51972	GP5-4.5'-5'	S	ND,b,d	ND	0.006	0.006	0.049	106
51973	GP5-12'-12 1/4'	S	230,b,d	0.97	10	4.9	27	96
51974	GP5-19.5'-20'	S	ND	ND	ND	ND	ND	111
51975	GP6-4.5'-5'	S	ND	ND	ND	ND	ND	112
51976	GP6-10'-10.5'	S	ND	ND	ND	ND	ND	109
51977	GP6-15'-15.5'	S	ND	ND	ND	ND	ND	110
51978	GP6-19.5'-20'	S	ND	ND	ND	ND	ND	101
51979	GP6-24.5'-25'	S	ND	ND	ND	ND	ND	102
51980	GP7-7.5'-8'	S	1300,b,d	16	99	31	170	103
51981	GP7-13.5'-14'	S	260,b,d	1.5	8.9	5.1	27	102
51982	GP7-18.5'-19'	S	ND	ND	ND	ND	ND	101
51983	GP7-23.5'-24'	S	6.5,b,d	0.030	0.18	0.086	0.44	108
51984	GP7-28.5'-29'	S	ND,b	ND	0.017	ND	0.012	105
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

W.A. Craig, Inc. P.O. Box 448 Napa, CA 94559-0448	Client Project ID: PEM	Date Sampled: 04/24-04/25/95
		Date Received: 04/25/95
	Client Contact: Bill Craig	Date Extracted: 04/25-04/26/95
	Client P.O:	Date Analyzed: 04/25-04/26/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylben-zene	Xylenes	% Rec. Surrogate
51985	GP8-4.5'-5'	S	ND	ND	0.012	ND	0.023	103
51986	GP8-11.5'-12'	S	ND	ND	ND	ND	ND	93
51987	GP8-18.5'-19'	S	ND	ND	ND	ND	ND	98
51988	GP9-4.5'-5'	S	1.2,b,d	0.016	ND	0.10	0.17	105
51989	GP9-14.5'-15'	S	32,a	1.5	2.2	0.85	4.4	105
51990	GP9-19'-19.5'	S	1.3,a	0.011	0.020	0.027	0.13	101
51991	GP9-9.5'-10'	S	1300,b,d	14	75	28	160	101
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director