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March 12, 2011

Ms. Barbara Jakub
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Re: Fuel Leak Case No: RO0000133

Enclosed please find the *Site Investigation Report* dated February 1, 2012, the *Natural Attenuation Analysis* dated February 1, 2012, the *Human Health Risk Assessment* dated February 1, 2012, and the *2011 Second Semi-Annual Monitoring Report* dated February 1, 2012. These reports were prepared by Taber Consultants of West Sacramento, California.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document are true and correct to the best of my knowledge.

Sincerely,



Paulette Satterley

HUMAN HEALTH RISK ASSESSMENT REPORT

Former City of Paris Cleaners
3516 Adeline Street
Oakland, California 94608

USTCF Claim #002192

Prepared For:

Ms. Paulette Satterley
14601 Guadalupe Drive
Rancho Murieta, CA 95683

Prepared By:

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Taber Project No. 2011-0107

February 1, 2012

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1.0 INTRODUCTION

On behalf of the Ms. Paulette Satterley, Taber Consultants has prepared this *Human Health Risk Assessment (HHRA)* for submittal to the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) and Alameda County Health Care Services Agency (ACHCSA). The scope of work conducted during this project complies with existing SFBRWQCB and ACHCSA directive letters.

The HHRA is part of investigation activities requested by the ACHCSA in a letter dated March 10, 2009. Taber Consultants prepared the following work plans and work plan addenda to address the ACHCSA request:

- *Additional Site Investigation Work Plan* dated January 22, 2010;
- *Additional Site Investigation Work Plan Addendum* dated September 13, 2010; and
- Two work plan revision letters dated January 7, 2011 and February 2, 2011.

The workplan and workplan addenda were approved by Ms. Barbara Jakub of the ACHCSA in a letter dated October 29, 2010 and email dated March 10, 2011.

1.1 Purpose

The purpose of this HHRA is to evaluate potential risks to human health associated with the subsurface release of Stoddard Solvent at the Former City of Paris Cleaners located at 3516 Adeline Street in Oakland, California (site). The site location is shown on Figure 1. This HHRA has been prepared using information obtained from the site investigations conducted in 2011 that were summarized in Taber Consultants *Site Investigation Report, Former City of Paris Cleaners, 3516 Adeline Street, Oakland, California* dated February 1, 2012. The investigation was conducted to assess the distribution and concentrations of total petroleum hydrocarbons (TPH) as Stoddard Solvent (TPH-SS), TPH as gasoline (TPH-G) as weathered stoddard solvent, and benzene, toluene, ethyl-benzene and xylenes (BTEX) in soil vapor, soil and groundwater. The site is shown on Figure 2. The locations of soil vapor, soil and groundwater samples are shown on Figure 3. For a history of groundwater monitoring results Tables 1 is attached for reference.

1.2 Site Location and Description

The former City of Paris Cleaners, located at 3516 Adeline St., Oakland, CA, is a former dry cleaning, laundry and dyeing operation currently owned by Mrs. Debra Runyon. The facility operated as City of Paris Cleaners and Dyers for about 40 years until the 1960's, but cleaning materials and tanks were not completely removed from the site until 1992. The site buildings remained vacant for a number of years following the closure of the dry cleaning, and then the owner converted them to residential and light commercial use.

The site lies at the southeastern corner of the intersection of 35th Street and Adeline Street at approximately 30 feet above mean sea level (amsl) in the northwest portion of the City of Oakland, California. The site buildings currently house on-site living quarters

and City of Paris Studios, a workshop for art, art restoration, collectibles and hobbies. Mrs. Runyon acquired the site in July 2000.

1.3 Site History

In 1987, Frank Champion, the owner at that time, applied for permits to remove underground storage tanks (USTs) at the site. Mr. Champion applied for five permits, obtaining permission to remove two 1000-gallon tanks, a 500-gallon tank, a 250-gallon tank and a 150-gallon tank. The USTs were used to store Stoddard Solvent, the dry cleaning solvent used during operation of the dry cleaning facility until the 1960s when the facility was closed.

On October 4, 1990, Semco Company of San Mateo excavated and reported removing one 750-gallon and two 1,000-gallon underground tanks used to store Stoddard Solvent. Six soil samples were collected in conjunction with the UST removal. The samples were collected at depths between 6.5 and 14 feet below ground surface (bgs) at the six locations in the tank excavation. The soil samples were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) and benzene, toluene, ethyl-benzene and xylenes (BTEX), and the results indicated that TPH-G was detected at concentrations ranging from 1 to 1000 milligrams per kilogram (mg/kg); toluene was detected in one sample at 54 micrograms per kilogram (ug/kg); ethyl-benzene was detected in one sample at 400 ug/kg; and xylenes were detected in six samples ranging from 9 to 19,000 ug/kg. Although the TPH was detected in the TPH-G range, the analytical report by Superior Analytical Laboratory, Inc. San Francisco, notes that the TPH could be weathered gasoline or diesel (total petroleum hydrocarbons as diesel, TPH-D).

On July 31 and August 1 and 2, 1991, Uriah Inc. (Uriah) of Livermore, California) performed a soil vapor survey at the site using a photo-ionization detector (PID) (a Photovac TIP I) to screen soil for the presence of organic vapors. The purpose was to identify the approximate boundaries of soil impacted by Stoddard Solvent. Soil vapor samples were collected from nine locations in the area of the former tanks at depths of 3, 6, 9 and/or 12 feet bgs. The soil vapor samples were screened using the PID. PID readings were observed in all of the samples. Due to structures, sidewalks and other site features, the full extent of impacted soil was not defined from the limited soil vapor survey. PID readings ranged from 5 to 110 parts per million (ppm).

On August 30, 1991, Uriah contracted with W.A. Craig to excavate soil from the eastern portion of the tank pit. Approximately 44 cubic yards of Stoddard Solvent-impacted soil were excavated and placed in a treatment cell constructed on site for bioremediation. During excavating, Uriah discovered a 250-gallon UST containing less than 50 gallons of unknown liquid. The UST location is shown on Figure 2. The tank liquid and a soil sample from 7 feet bgs (one foot below the bottom of the 250-gallon UST) were analyzed for TPH-D and BTEX. The liquid sample contained 130 milligrams per liter (mg/l) TPH-D, 6 micrograms per liter (ug/l) ethyl-benzene, and 32 ug/l xylenes. The soil sample contained 130 mg/kg TPH-D, 420 ug/kg toluene, 270 ug/kg ethyl-benzene, and 1,500 ug/kg xylenes. The UST was transported offsite on October 31, 1991 under manifest to Erickson, Inc., in Richmond, California for recycling. An additional 15 cubic yards of impacted soil was excavated from the tank pit on January 27, 1992 and added to the bioremediation cell. No

additional soil was excavated due to safety concerns regarding building foundation integrity. Characterization soil samples were collected from the north, east, south and west excavation sidewalls at depths of 9, 9, 7 and 9 feet bgs, respectively. Concentrations of TPH-SS in the samples were 14, 140, 9.8, and 47 mg/kg, respectively.

On March 31, 1992, composite samples of soil from the bioremediation cell were analyzed for total petroleum hydrocarbons as stoddard solvent (TPH-SS). The bioremediation reduced hydrocarbons to concentrations acceptable by ACHCSA. The ACHCSA approved use of the bioremediated soil as onsite backfill. W. A. Craig backfilled the tank pit with bioremediated soil and clean fill on April 21, 1992.

On October 29 and 30, 1992, Uriah supervised installation of ground water monitoring wells at the site. Soils Exploration Services of Vacaville, California, installed three 30-foot monitoring wells (MW-1, MW-2 and MW-3). The well locations are shown on Figure 2. Soil samples were collected at 5 and 10 feet bgs and analyzed for TPH-SS, TPH-D and BTEX. No TPH-SS was detected at or above the laboratory reporting limit in samples from 5 feet bgs, however soil samples from MW-1, MW-2 and MW-3 had TPH-SS concentrations of 210, 17 and 30 mg/kg, respectively. No TPH-D was detected at or above the laboratory reporting limit. Benzene was detected in the 5- and 10-foot samples from MW-1 at concentrations of 0.3 and 1.1 ug/kg, and in the 5- and 10-foot samples from MW-3 at concentrations of 2.5 and 26 ug/kg. Toluene, ethylbenzene and total xylenes were detected in the samples from MW-1, 2 and 3 at concentrations between 12 and 550 ug/kg.

The initial groundwater samples from MW-1, MW-2 and MW-3 were collected on November 18, 1992 and analyzed for TPH-SS, TPH-D, TPH-G, MTBE, and BTEX. TPH-SS concentrations were 1,800 ug/l in MW-1, 630 ug/l in MW-2 and 11,000 ug/l in MW-3. No TPH-D, TPH-G, MTBE and BTEX were detected at or above the laboratory reporting limits. The results are included in Table 1.

On March 19, 1998, Dugan Associates (Dugan) of San Jose, California advanced six soil borings (EB-1 through EB-6) to a depth of approximately 18 feet bgs to assess the Stoddard Solvent release. Soil boring EB-1 was advanced on-site to the northwest of the former UST locations. Borings EB-2 through EB-6 were advanced offsite on the north side of 35th Street in the direction projected at the time to be downgradient of the site. At each soil boring, soil samples were collected at 5, 10 and 15 feet bgs and a grab groundwater sample at 18 feet bgs. The samples were analyzed for TPH-SS, BTEX and MTBE. TPH-SS was detected in the groundwater samples from EB-1 and EB-5 at concentration of 270,000 ug/l and 780 ug/l, respectively. The groundwater sample from EB-1 had concentrations of toluene, ethyl-benzene and xylenes at 93 ug/l, 66 ug/l, and 1700 ug/l, respectively. The groundwater sample from EB-5 had 2 ug/l xylenes. No other analytes were detected in EB-1 and EB-5 at or above the laboratory reporting limits. No analytes were detected in groundwater samples from EB-2, EB-3 and EB-4. The 10-foot and 15-foot soil samples from EB-1 had TPH-SS concentrations of 310 and 340 mg/kg, respectively, and trace amounts of total xylenes and toluene. No analytes were detected in the soil samples from EB-2 through EB-5. The EB boring locations are shown on Figure 2. The analytical results are included in Table 1.

In September, 1999, ACHCSA issued a directive letter requesting that Dugan analyze groundwater samples for semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs). The purpose was to assess for solvents commonly associated with dry cleaning operations other than the Stoddard Solvent already identified at the site. In December 1999, the quarterly groundwater samples from the three monitoring wells (MW-1, MW-2 and MW-3) were additionally analyzed for SVOCs using EPA Method 8270 and VOCs using EPA Method 8010. In the February 5, 2000, *Groundwater Monitoring Report – Fourth Quarter 1999* Dugan reported that only a low concentration of 1,1-dichloroethane (1,1-DCA) was detected MW-1, low concentrations of 1,1-DCA and naphthalene were detected in MW-2 and low concentrations of 1,2-dichlorobenzene (1,2-DCB), 1,1-DCA, 2-methylnaphthalene and naphthalene were detected in MW-3. No other SVOCs or VOCs were detected in the samples. The results are included in Table 2. At that time Dugan defined a north-trending groundwater gradient at 0.003 ft./ft.

In their September 1999 letter, the ACHCSA also noted that according to a database search they believed a 97-foot industrial well had been drilled at the site. The well was identified and is located approximately 16 feet southeast of MW-3. The well is now referred to as well W-IND (Figure 2), and is now only used for monitoring purposes.

In March 2002, in compliance with an ACHCSA directive letter, Well Test, Inc. (formerly Dugan and Associates) redeveloped the three monitoring wells (by purging 10 well-volumes) and sampled the three wells pursuant to quarterly monitoring responsibilities. Well W-IND was also included in the sampling event. The analytical results of the sampling indicated up to 11,000 µg/l of TPH-SS in the sample from MW-1, no BTEX at or above laboratory reporting limits, up to 31 µg/l MTBE in the sample from MW-3, 0.61 µg/l DCB in the sample from MW-1, and 130 ug/l Naphthalene in MW-1. Well Test, Inc. reported a groundwater gradient of 0.14 ft/ft to the southeast.

Taber Consultants, formerly Western Resource Management (WRM), assumed environmental consulting responsibilities for the site commencing in June 2007. Taber performed groundwater monitoring at the site for the first and second semiannual periods of 2009. In response to a query by ACHCSA, Taber submitted a well completion report request to the California Department of Water Resources, in which undated well boring logs for a well at the City of Paris Cleaners, at 3516 Adeline Street, indicated a 97-foot industrial well on the site. Taber also found well drilling information for another industrial well drilled in 1927 for the "City of Paris Cleaners," drilled to 295 feet. The location of this well is unknown, and the original log has no address. It appears that the California Department of Water Resources contacted the owner during efforts to identify existing wells in Oakland. A handwritten note on the well log is mostly illegible but possibly states "Owner says he never had this well, only the 97' ".

On July 28, 2009, ACHCSA advised Responsible Parties that The California State Water Resources Control Board (SWRCB) had approved Resolution No. 2009-0042, which reduced quarterly groundwater monitoring requirements to semiannual or less frequent monitoring at all sites. In 2009, the monitoring frequency at the site was reduced to semiannual, during the first and third quarters.

In August 2009 Taber Consultants evaluated using the HydraSleeve® no-purge groundwater sampling method for the four site wells. With verbal authorization from Barbara Jakub of ACHCSA, on March 17, 2010, Taber Consultants implemented ongoing use of the HydraSleeve® sampling method at the site.

The analytical program for the groundwater samples collected from the wells includes TPH-SS, TPH-G, BTEX and MTBE. Reports summarizing monitoring results have previously been submitted to the ACHCSA and RWQCB. The groundwater monitoring results are summarized in Table 1.

In April and May, 2011, Taber Consultants performed site investigation activities to characterize the TPH-SS distribution in soil vapor, soil and groundwater. The scope of work included assessing well construction, performed hydrogeology investigations to characterize subsurface geology and groundwater distribution, and completing a natural attenuation analysis (NAA) and HHRA. Taber Consultants reported site investigation findings in the *Site Investigation Report (SIR)* and *NAA* report, with both reports dated February 1, 2012

2.0 HUMAN HEALTH RISK ASSESSMENT

The HHRA was completed using the *RISC4 – Risk Integrated Software for Clean-ups* (RISC4) software program developed by BP Oil International. Default chemical parameters were adjusted as needed to comply with values used by the California Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database. The Johnson and Ettinger model which is included in the RISC4 program was applied to predict levels of COCs in indoor air based upon site specific parameters and COC concentrations detected in soil and soil vapor.

2.1 Exposure Pathways And Receptors

The HHRA included an evaluation of risks associated with the following exposure pathways:

- Inhalation of indoor air,
- Ingestion of shallow soil, and
- Dermal contact with shallow soil.

Results from the *Water Well Survey*, summarized in Taber Consultants February 1, 2012 *Site Investigation Report* indicates that no domestic wells, irrigation wells or public water supply wells are located within a one-mile radius of the site. As such, exposure to impacted groundwater was not considered as a complete exposure pathway.

The HHRA includes an evaluation of risks to an adult worker, child resident, and adult resident.

2.2 Constituents Of Concern

Based on a review of historical soil and groundwater analytical results, the following COCs were included in the HHRA: TPH-SS; BTEX; and naphthalene. However, soil samples included in the evaluation were not analyzed for naphthalene. Furthermore, no benzene, toluene, xylenes, or MTBE were detected in any the soil samples included in the data set, and total xylenes was only detected in one soil sample at a low level. Therefore, BTEX, naphthalene and MTBE were only considered in the soil vapor risk calculations and not included in the calculations associated with exposure to soil

Risks associated with direct exposure to soil were calculated using analytical results of soil samples from borings GP-1 through GP-19, collected at a maximum depth of 20 feet bgs during the most recent soil investigation completed in May 2011. Although, direct exposure to soil at a depth greater than 10 feet below ground surface is unlikely, extending the depth of concern from 10 feet bgs to 20 feet bgs expanded the data set considerably and likely provided a more accurate representation of site conditions. The soil sample analytical results are summarized in Table 2.

Risks associated with inhalation of indoor air were calculated using BTEX and naphthalene concentrations detected in soil vapor samples VP-1 through VP-4 collected on May 4, 2011. Since the soil vapor samples were not analyzed for TPH-SS or TPH-G, risks associated with indoor air inhalation of these COCs were calculated based upon concentrations detected in soil during the May 2011 soil investigation. Soil vapor analytical results are summarized in Table 3.

Stoddard solvent is a mixture of hydrocarbons derived from refining crude oil. The mixture consists of three major components: 30% to 50% linear and branched alkanes, 30% to 40% cycloalkanes, and 20% aromatic hydrocarbons, all within the C7 through C12 carbon range. In addition to TPH-SS, Taber Consultants' review of chromatograms supports treating TPH-G detected in site soil as weathered Stoddard Solvent. Since linear alkanes, branched and cycloalkanes are all aliphatic compounds, it was assumed that TPH-SS concentrations are comprised of 80% aliphatic and 20% aromatic hydrocarbons.

The RISC4 database does not include TPH-SS a standard COC. To complete risk calculations, representative concentrations of TPH in soil were broken down into aliphatic and aromatic carbon fractions as follows:

Carbon Range	TPH Fraction
Aliphatic C8-C10	40%
Aliphatic C10-C12	40%
Aromatic C8-C10	10%
Aromatic C10-C12	10%

2.3 Threshold Risk Levels

The calculated carcinogenic risk represents the probability of developing a cancer over and above the existing background risk. For carcinogenic risks below one in one million or 1.0 E-6, the California Department of Toxic Substances Control (DTSC) does not consider potential risks cause for concern. Therefore, carcinogenic risks calculated as part of the HHRA were compared to a threshold value of one in one million.

A hazard quotient relates to non-carcinogenic risks and is defined as the ratio of the potential exposure to the substance and the level at which no adverse effects are expected. If the hazard quotient is calculated to be equal to or less than one, then no adverse health effects are expected as a result of exposure. If the HQ is greater than one, then adverse health effects are possible. Therefore, hazard quotients were compared to this threshold value of one.

2.4 RISC4 Assumptions And Input Parameters

In summary, the HHRA was completed based upon the following assumptions:

- A cumulative carcinogenic risk of one in one million and hazard index of one are the acceptable threshold risk levels.
- Dermal contact with soil, ingestion of soil, and inhalation of indoor air represent the exposure pathways of concern.
- An adult worker, child resident and adult resident represent the receptors of concern.
- Exposure parameters were set to the RISC4 default levels for reasonable maximum exposure (RME) for all receptors.
- Distance from the soil vapor source to the building foundation is 4.92 feet (1.5 meters) for the soil vapor to indoor air model. This distance is based on the soil vapor sample collection depth.
- Distance from the soil source to the building foundation is 16.4 feet (5 meters) for the soil to indoor air model, because maximum COC concentrations were detected in soil at an approximate depth of 16 feet or 4.9 meters bgs.
- Site specific values for soil porosity, percent moisture, fraction organic carbon, and bulk density were based on the average values from May 2011 soil analytical results. A value of 0.44 was applied for total porosity, 0.17 for moisture content, 0.03 for fraction organic carbon and 1.52 grams per cubic centimeter for bulk density. Applicable soil results are summarized in Table 4.
- TPH-SS, BTEX, and naphthalene represent the COCs.
- To evaluate risks associated with inhalation of indoor air, the maximum concentration of each COC detected in soil vapor samples V-1 through V-4 was selected as the representative concentration for that COC in soil vapor. However, since soil vapor samples were not analyzed for TPH-G or TPH-SS, risks associated with indoor air inhalation of these compounds were based upon maximum concentrations detected in soil samples collected from a maximum depth of 20 feet bgs from borings GP-1 through GP-19.
- Risks associated with dermal contact with soil and ingestion of soil were based on the maximum concentration of TPH detected in soil samples collected from a maximum depth of 20 feet bgs from borings GP-1 through GP-19.
- The Johnson and Ettinger model which is included in the RISC4 program was applied to predict COC concentrations in indoor air based on site specific parameters and COC concentrations in soil or soil vapor.
- Risks to commercial and residential receptors were evaluated assuming RISC4 default reasonable maximum exposure (RME) levels.
- To comply with EPA guidelines, a value of 83.3 cubic centimeters per second (cm^3/s) was selected for the Q_{soil} value which is the rate at which soil gas enters a building.

- For the commercial model, the RISC4 default building area of 150 square meters (m²) and building volume of 400 cubic meters (m³) were applied. For the residential model, a building area of 100 m² and building volume of 244 m³ were used.
- For the commercial model, 24 air exchanges per day was applied, whereas 12 exchanges per day were assumed for the residential model.

A summary of the representative COC concentrations in soil and soil vapor in the RISC4 model for the HHRA is provided in the following table.

COC	Representative Soil Concentration (mg/kg)	Representative Soil Vapor Concentration (µg/m³)
TPH-SS	690 (GP-12-16)	NA
Benzene	NA	21 (VP-4)
Toluene	NA	26 (VP-4)
Ethylbenzene	NA	3.9 (VP-4)
Xylenes	NA	13.6 (VP-2)
Naphthalene	NA	25 (VP-2)

A complete summary of RISC4 input parameters is provided in Appendix A.

2.5 RISC4 Results

Results from the RISC4 model indicate that cumulative cancer risks for a commercial worker, adult resident and child resident are all the below threshold level of one in one million. Furthermore, the hazard indexes for residential receptors are below the threshold level of one. RISC4 results are summarized in the following tables and complete program results are provided in Appendix A.

RISC4 Output for Commercial Worker at RME Levels		
Exposure Route	Cancer Risk (Target is 1.0 E-6)	Hazard Index (Target is 1.0)
Indoor air inhalation (TPH)	NA	4.3 E-3
Indoor air inhalation (BTEX+naphthalene)	3.2 E-8	5.1 E-4
Ingestion of soil	NA	8.8 E-3
Dermal contact with soil	NA	2.3 E-2
Cumulative	3.2 E-8	3.7 E-2

RISC4 Output for Child Resident at RME Levels		
Exposure Route	Cancer Risk (Target is 1.0 E-6)	Hazard Index (Target is 1.0)
Indoor air inhalation (TPH)	NA	1.4E-1
Indoor air inhalation (BTEX+naphthalene)	2.8 E-7	1.9 E-2
Ingestion of soil	NA	1.1 E-1
Dermal contact with soil	NA	4.6 E-2
Cumulative	2.8 E-7	3.1 E-1

RISC4 Output for an Adult Resident at RME Levels		
Exposure Route	Cancer Risk (Target is 1.0 E-6)	Hazard Index (Target is 1.0)
Indoor air inhalation (TPH)	NA	4.0 E-2
Indoor air inhalation (BTEX+naphthalene)	3.2 E-7	5.3 E-3
Ingestion of soil	NA	1.2 E-2
Dermal contact with soil	NA	1.4 E-2
Cumulative	3.2 E-7	7.1 E-2

RISC4 Output for On-Site Additive Risks at RME Levels	
Exposure Route	Cancer Risk (Target is 1.0 E-6)
Indoor air inhalation (TPH)	NA
Indoor air inhalation (BTEX+naphthalene)	6.0 E-7
Ingestion of soil	NA
Dermal contact with soil	NA
Cumulative	6.0 E-7

2.6 HHRA Conclusions

The HHRA results indicate that cancer risks associated with COCs remaining beneath the site for all potential receptors are below the threshold value of one in one million. In addition, the hazard indexes for child and adult residential receptors are both below the threshold value of one. Therefore, the results of this HHRA are supportive of closure as a low risk petroleum hydrocarbon site.

3.0 SCHEDULE OF UPCOMING ACTIVITIES

On behalf of Ms. Paulette Satterley, Taber Consultants conducted further site characterization and site investigation as requested by ACHCSA. The results of field activities were used for a preferential pathway assessment, NAA and this HHRA. Results of these investigative activities will provide the basis for the *Site Conceptual Model (SCM)*.

In August, 2011, Taber Consultants collected monitoring data for the Second Semi-Annual Groundwater Monitoring Report for 2011. Taber Consultants will continue the monitoring program and compile the data with historical data to further evaluate trends at the site.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The TPH taste and odor threshold of 100 ug/L is used by the San Francisco Bay RWQCB as an environmental screening level (ESL) for middle distillates. Concentrations of TPH-SS in MW-1, MW-2 and MW-3 groundwater samples exceed the TPH screening level. Historically, the concentrations of TPH-SS at the site have also exceeded the groundwater nuisance and odor concerns screening level of 5,000 ug/L for TPH.

However, the HHRA modeling above, using reasonable constituent of concern concentrations to evaluate the risk, has calculated carcinogenic risk and hazard quotient values below target threshold values. The Water Well Survey included in the *Site Investigation Report* (SRS) dated February 1, 2012 found no domestic wells, irrigation wells or public water supply wells located within a one-mile radius of the site, therefore exposure to impacted groundwater is not considered a complete exposure pathway.

Taber Consultants recommends a *Problem Assessment Report* (PAR) to identify what, if any, additional site investigation and/or remedial strategies are required and feasible at the site. If the site is suitable for a low risk closure, site closure and site restoration activities, including abandonment of the monitoring wells and the industrial well, would be appropriate.

5.0 REPORT DISTRIBUTION

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6.0 REMARKS AND SIGNATURE

The interpretations and/or conclusions contained in this report represent our professional opinions and are based in part on information supplied by the client. These opinions are based on currently available information and were developed in accordance with currently accepted geologic, hydrogeologic, and engineering practices in Alameda County, California in 2012. Other than this, no warranty is implied or intended.

This report has been prepared solely for the use of Ms. Paulette Satterley. Any reliance on this report by third parties shall be at such parties' sole risk. The work described herein was performed under the direct supervision of the professional geologist, registered with the State of California, whose signature appears below.

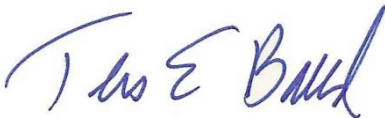
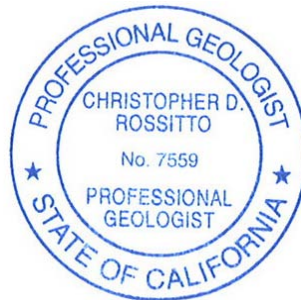
We appreciate the opportunity to provide you with geologic, engineering and environmental consulting services and trust this report meets your needs. If you have any questions or concerns, please call us at (916) 371-1690.

Sincerely,

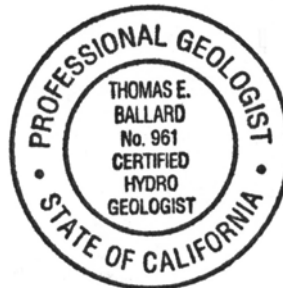
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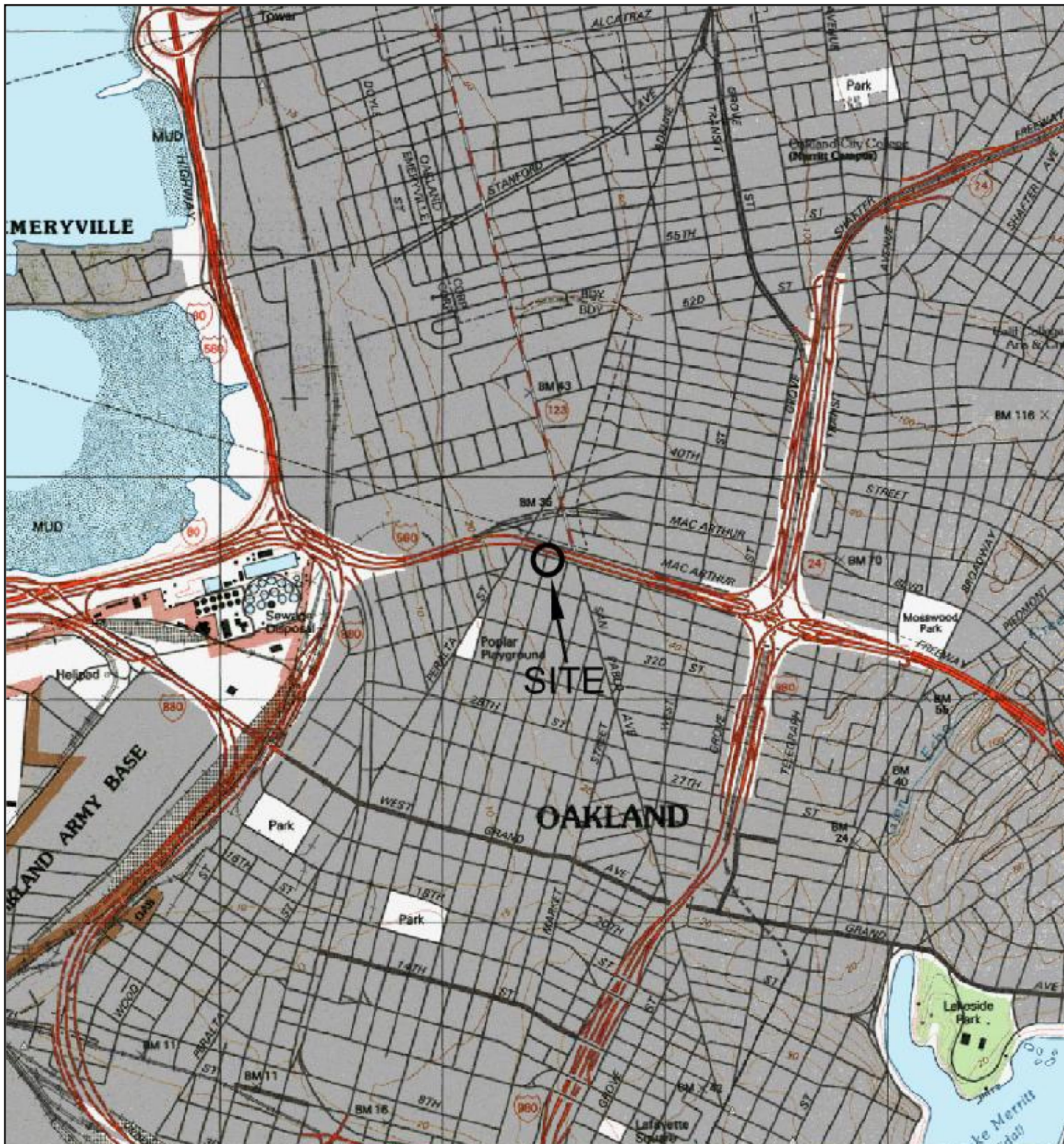
Chris Rossitto, P.G. #7559
Senior Geologist



Thomas E. Ballard, P.G. #7299, C.H.G. #961
Principal Geologist



FIGURES



Scale: 1:24,000

Source:
 USGS West Oakland
 Quadrangle Topographic Map
 Report, 7.5 Minute Series
 (topographic), dated 1993

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Former City of Paris Cleaners

3516 Adeline Street
 Oakland, California

Vicinity Map

2011-0107

February 2012

Figure 1

EB-2



EB-3



EB-4



EB-5

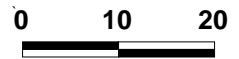
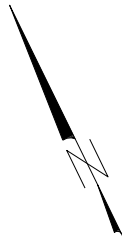
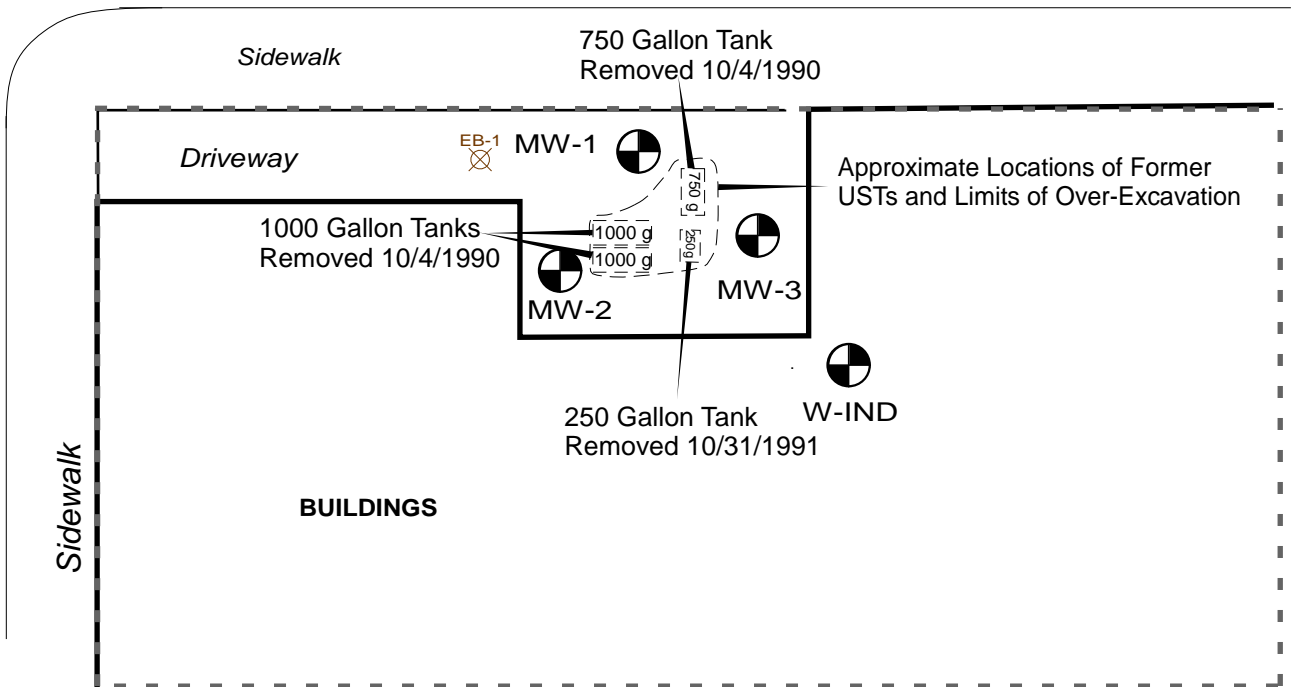


EB-6



35TH STREET

ADELINE STREET



Approximate Scale in Feet
1 inch = 20 feet

LEGEND

- EB-1 Soil Boring (1998)
- MW-2 Groundwater Monitoring Well
- W-IND Industrial Well
- 1000 g Approximate Locations Former Underground Storage Tanks
- - - - Approximate Site Boundary (Assessor's Parcel Number 5-478-23)

Taber
Since 1954

**Taber Consultants
Engineers and Geologists**
3911 West Capitol Avenue
West Sacramento, CA 95691-2116
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Former City of Paris Cleaners

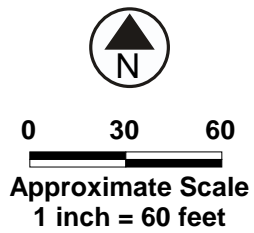
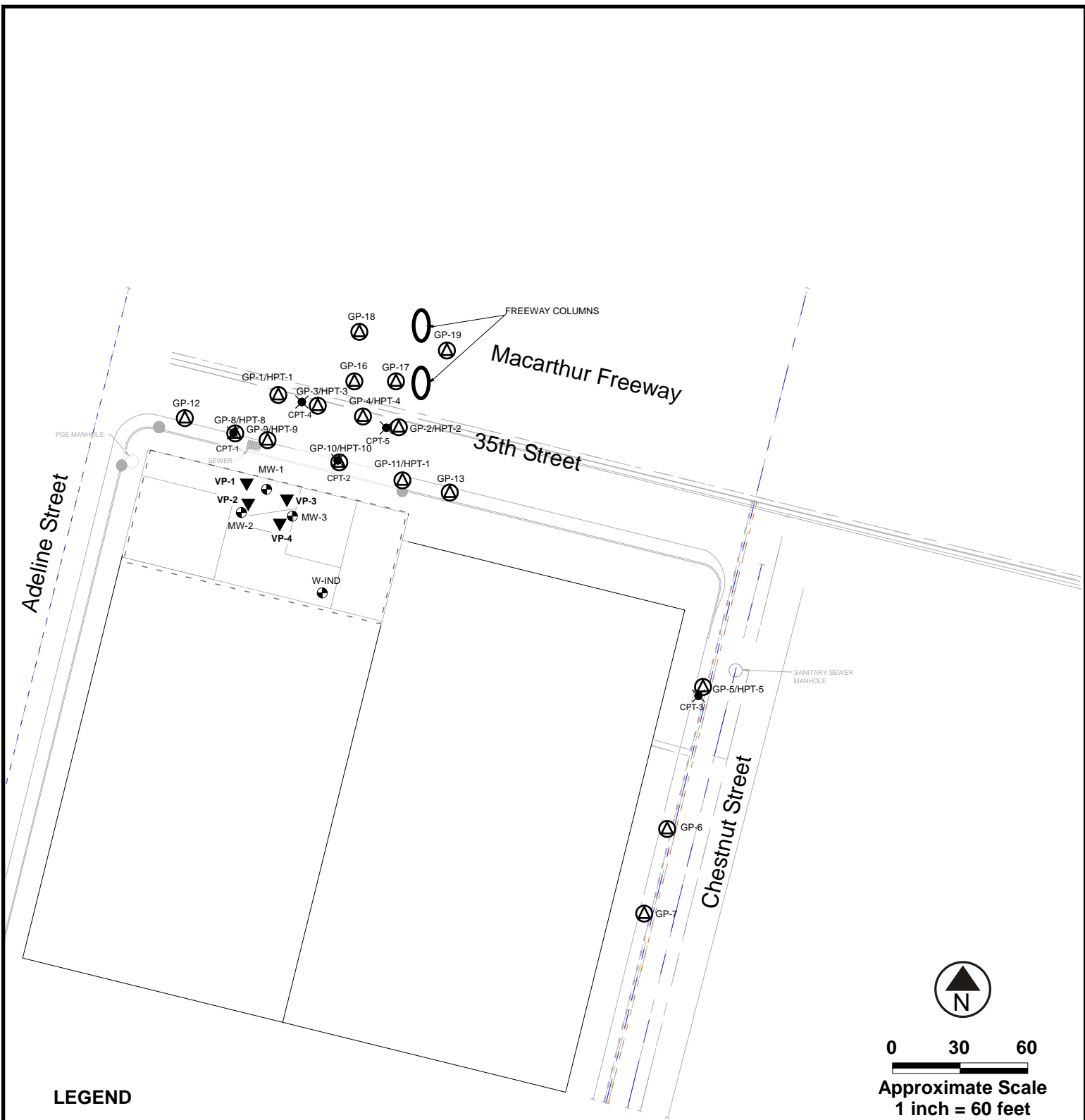
3516 Adeline Street
Oakland, California

Site Map

2011-0107

February 2012

Figure 2



LEGEND

- ✱ CPT-3 Cone Penetrometer Test Boring
- ⊗ GP-3/HPT-3 GeoProbe/Hydraulic Profiling Tool Boring
- ▼ Soil Vapor Sampling Point
- ⊕ MW-3 Groundwater Monitoring Well
- ⊕ W-IND Industrial Well
- - - Water/Sewer Underground Conduit
- - - Gas and/or Electric Underground Conduit
- - - Unknown Underground Conduit (Subdynamics Locating Service)
- Utility Access Cover
- - - Approximate Site Boundary (Assessor's Parcel Number 5-478-23)

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		FORMER CITY OF PARIS CLEANERS	
3516 Adeline Street Oakland, CA			
Sample Location Map			
2011-0107	February 2012	Figure 3	

TABLES

**TABLE 1
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY**

Former City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Well Identification	Sample Date	Elevation Summary			Analytical Summary										
		Top of Casing Elevation	Depth to Water	Groundwater Elevation	TPH-SS	TPH-G	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	1,2-DCB	1,1-DCA	2-Methyl-Naphthalene	Naphthalene
		(feet amsl)	(feet BTOC)	(feet amsl)	(ug/l)										
Groundwater Sample Locations															
EB1-18	03/19/98	18' bgs Groundwater Grab Sample			270,000	--	<5.0	93	66	1700	<100	--	--	--	--
EB2-18	03/19/98	18' bgs Groundwater Grab Sample			<1.0	--	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
EB3-18	03/19/98	18' bgs Groundwater Grab Sample			<1.0	--	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
EB4-18	03/19/98	18' bgs Groundwater Grab Sample			<1.0	--	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
EB5-18	03/19/98	18' bgs Groundwater Grab Sample			780	--	<0.5	<0.5	<0.5	2	<5.0	--	--	--	--
EB6-18	03/19/98	18' bgs Groundwater Grab Sample			<1.0	--	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
MW-1	11/18/92	17.44	13.99	3.45	1800	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1	11/4/1993	17.44	16.79	0.65	2000	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1	3/8/1994	17.44	14.14	3.3	150	NA	35	40	72	120	NA	--	--	--	--
MW-1	8/2/1994	17.44	13.18	4.26	2100	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1	2/8/1995	17.44	10.92	6.52	620	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--
MW-1**	7/8/1996	17.44	11.62	5.82	37000	110000	1.6	<0.5	<0.5	<0.5	74	7.9	--	--	--
MW-1	10/9/1996	17.44	14.11	3.33	42000	NA	<0.5	5	<0.5	<0.5	NA	--	--	--	--
MW-1	3/18/1997	17.44	12.37	5.07	2600	NA	<0.5	1.5	1.5	9.6	<6.0	--	--	--	--
MW-1	6/19/1997	17.44	13.26	4.18	660	NA	<0.5	<0.5	1.2	0.71	<5.0	--	--	--	--
MW-1	11/14/1997	17.44	11.45	5.99	10000	NA	<0.5	<0.5	110	1.2	<5.0	--	--	--	--
MW-1	12/15/1999	17.44	11.31	6.13	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	<0.5	0.59	<0.5	<0.5
MW-1	03/22/02	17.44	8.97	8.47	11000	--	--	--	--	--	<5.0	--	--	--	130
MW-1	04/15/03	17.44	9.23	8.21	3900	--	<2.5	<2.5	<2.5	3	9	--	--	--	--
MW-1	03/26/04	17.44	10.32	7.12	30000	24000	<50	<50	<50	<50	<500	--	--	--	--
MW-1	09/30/04	17.44	11.53	5.91	3800	2600	<0.5	<0.5	<0.5	2.7	<5	--	--	--	--
MW-1	09/09/05	17.44	13.63	3.81	15000	11000	c	<5	<5	15	<50	--	--	--	--
MW-1	11/30/07	17.44	13.95	3.49	--	--	--	--	--	--	--	--	--	--	--
MW-1	12/20/07	17.44	11.51	5.93	45000	110000	20	50	20	100	<5	--	--	--	--
MW-1	05/23/08	17.44	14.14	3.3	4200	<500	<1	<1	<1	20	<0.50	--	--	--	--
MW-1	08/12/08	17.44	13.78	3.66	4000	12000	<1	<1	<1	<1	<0.50	--	--	--	--
MW-1	12/18/08	17.44	10.71	6.73	9900	2700	<1	<1	<1	<1	<0.50	--	--	--	--
MW-1	02/19/09	17.44	8.91	8.53	500	3100	<10	<10	<10	<10	<5	--	--	--	--
MW-1	08/11/09	17.44	13.35	4.09	13000	7800	<10	<10	<10	<10	5.9	--	--	--	--
MW-1 NP	08/11/09	17.44	13.35	4.09	6000	10000	<10	<10	<10	<10	<5	--	--	--	--
MW-1	03/17/10	17.44	9.31	8.13	4000	12000	<20	<20	<20	20	<10	--	--	--	--
MW-1	08/18/10	17.44	12.65	4.79	2000	6900	<100	<100	<100	<100	<50	--	--	--	--
MW-1	03/23/11	31.30	6.75	24.55	8800	8100	<10	<10	<10	<10	<5	--	--	--	--
MW-1	08/25/11	31.30	11.35	19.95	2100	7200	<1	<1	<1	<1	2.1	--	--	--	--

TABLE 1
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY

Former City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Well Identification	Sample Date	Elevation Summary			Analytical Summary											
		Top of Casing Elevation	Depth to Water	Groundwater Elevation	TPH-SS	TPH-G	Benzene	Toluene	Ethyl			MTBE	1,2-DCB	1,1-DCA	2-Methyl-	
		(feet amsl)	(feet BTOC)	(feet amsl)					benzene	Xylenes	Naphthalene				Naphthalene	
(ug/l)																
MW-2	11/18/92	17.31	13.18	4.13	630	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-2	11/04/93	17.31	14.84	2.47	3200	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-2	03/08/94	17.31	11.5	5.81	45	NA	1.4	2	11	19	NA	--	--	--	--	
MW-2	08/02/94	17.31	13.14	4.17	170	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-2	02/08/95	17.31	8.18	9.13	570	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-2**	07/08/96	17.31	11.06	6.25	1800	2800	<0.5	2.6	15	24	6.3	--	--	--	--	
MW-2	10/09/96	17.31	12.38	4.93	4100	NA	<0.5	0.57	<0.5	<0.5	NA	--	--	--	--	
MW-2	03/18/97	17.31	10.61	6.7	240	<0.5	0.57	<0.5	<0.5	5.3	NA	--	--	--	--	
MW-2	06/19/97	17.31	11.68	5.63	2500	NA	<0.5	<0.5	9.1	<0.5	<5.0	--	--	--	--	
MW-2	11/14/97	17.31	10.61	6.7	130	NA	<0.5	<0.5	0.9	1.2	<5.0	--	--	--	--	
MW-2	12/15/99	17.31	10.97	6.34	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	<0.5	0.53	<0.5	49	
MW-2	03/22/02	17.31	8.82	8.49	170	13000	410	1000	210	1100	<5.0	--	--	--	<10	
MW-2	04/15/03	17.31	8.52	8.79	99	--	<0.5	<0.5	<0.5	0.76	10	--	--	--	--	
MW-2	03/26/04	17.31	9.32	7.99	120	93	<0.5	<0.5	<0.5	0.76	5.4	--	--	--	--	
MW-2	09/30/04	17.31	11.62	5.69	<50	<50	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--	
MW-2	09/09/05	17.31	12.75	4.56	120	98	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--	
MW-2	11/30/07	17.31	11.06	6.25	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/20/07	17.31	9.95	7.36	<50	3000	<1	1.6	<1	2.4	2.9	--	--	--	--	
MW-2	05/23/08	17.31	12.46	4.85	300	1100	<1	<1	<1	<1	3.5	--	--	--	--	
MW-2	08/12/08	17.31	12.08	5.23	2200	350	<1	<1	<1	<1	<0.50	--	--	--	--	
MW-2	12/18/08	17.31	10.58	6.73	300	<50	<1	<1	<1	<1	7.3	--	--	--	--	
MW-2	02/19/09	17.31	8.22	9.09	300	300	<1	<1	<1	<1	3.4	--	--	--	--	
MW-2	08/11/09	17.31	13.00	4.31	600	610	<1	<1	<1	<1	3.8	--	--	--	--	
MW-2	03/17/10	17.31	8.95	8.36	<50	<50	<1	<1	<1	<1	1.8	--	--	--	--	
MW-2	08/18/10	17.31	12.15	5.16	<50.0	70	<1.0	<1.0	<1.0	<1.0	2.4	--	--	--	--	
MW-2	03/23/11	31.03	6.22	24.81	200	<50	<1.0	<1.0	<1.0	<1.0	3.6	--	--	--	--	
MW-2	08/25/11	31.03	11.06	19.97	<50	<50	<1.0	<1.0	<1.0	<1.0	1.5	--	--	--	--	
MW-3	11/18/92	17.44	13.93	3.51	11000	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-3	11/04/93	17.44	15.16	2.28	320	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-3	03/08/94	17.44	13.43	4.01	45	NA	0.8	0.9	5	10	NA	--	--	--	--	
MW-3	08/02/94	17.44	12.82	4.62	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-3	02/08/95	17.44	7.62	9.82	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-3**	07/08/96	17.44	10.97	6.47	2500	2200	1	<0.5	8.8	8	10	--	--	--	--	
MW-3	10/09/96	17.44	11.84	5.6	2600	NA	<0.5	<0.5	<0.5	<0.5	NA	--	--	--	--	
MW-3	03/18/97	17.44	10.16	7.28	2500	NA	<0.5	0.61	0.63	5.2	NA	--	--	--	--	
MW-3	06/19/97	17.44	11.40	6.04	21000	NA	<0.5	<0.5	11	<0.5	<5.0	--	--	--	--	
MW-3	11/14/97	17.44	10.71	6.73	1,400	NA	<0.5	<0.5	28	28	<5.0	--	--	--	--	
MW-3	12/15/99	17.44	10.96	6.48	<20	<50	<0.5	<0.5	<0.5	<0.5	NA	0.87	0.57	25	88	

TABLE 1
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY

Former City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Well Identification	Sample Date	Elevation Summary			Analytical Summary											
		Top of Casing Elevation	Depth to Water	Groundwater Elevation	TPH-SS	TPH-G	Benzene	Toluene	Ethyl			MTBE	1,2-DCB	1,1-DCA	2-Methyl-	
		(feet amsl)	(feet BTOC)	(feet amsl)					benzene	Xylenes	Naphthalene				Naphthalene	
					(ug/l)											
MW-3	03/22/02	17.44	10.97	6.47	420	<50	<0.5	<0.5	<0.5	<0.5	31	--	--	--	<50	
MW-3	04/15/03	17.44	8.31	9.13	2700	--	<0.5	<0.5	<0.5	<0.5	40	--	--	--	--	
MW-3	03/26/04	17.44	8.61	8.83	2700	1900	<1.7	<1.7	<1.7	4.3	<17	--	--	--	--	
MW-3	09/30/04	17.44	11.1	6.34	3900	2600	<0.5	<0.5	<0.5	3.2	<10	--	--	--	--	
MW-3	09/09/05	17.44	13.75	3.69	4000	2600	<0.5	<0.5	0.57	2.7	12	--	--	--	--	
MW-3	11/30/07	17.44	13.9	3.54	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/20/07	17.44	10.79	6.65	18000	12000	<1	1.6	1.1	2.4	9.2	--	--	--	--	
MW-3	05/23/08	17.44	15.2	2.24	900	3000	<1	<1	<1	<1	9.1	--	--	--	--	
MW-3	08/12/08	17.44	14.14	3.3	1900	4300	<1	<1	<1	<1	6.5	--	--	--	--	
MW-3	12/18/08	17.44	12.53	4.91	5000	610	<1	1	<1	<1	20	--	--	--	--	
MW-3	02/19/09	17.44	11.11	6.33	1500	1300	<1	1	<1	<1	9	--	--	--	--	
MW-3	08/11/09	17.44	15.22	2.22	1000	2200	<10	<10	<10	<10	7.3	--	--	--	--	
MW-3 NP	08/11/09	17.44	15.22	2.22	3000	6700	<10	<10	<10	<10	<5	--	--	--	--	
MW-3	03/17/10	17.44	11.94	5.5	3000	4600	<10	<10	<10	<10	9.4	--	--	--	--	
MW-3	08/18/10	17.44	12.86	4.58	1000	3500	<50	<50	<50	<50	<25	--	--	--	--	
MW-3 ^a	03/23/11	31.13	3.58	27.55	500	<50	<1.0	<1.0	<1.0	<1.0	<0.50	--	--	--	--	
MW-3	08/25/11	31.13	11.85	19.28	1000	2300	<1.0	<1.0	<1.0	<1.0	4.5	--	--	--	--	
W-IND	03/22/02	NA	--	--	<50	190	<0.5	<0.5	<0.5	0.8	<5.0	--	--	--	--	
W-IND	04/15/03	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	
W-IND	03/26/04	NA	--	--	500	200	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--	
W-IND	09/30/04	NA	--	--	<50	<50	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--	
W-IND	09/09/05	NA	--	--	<50	<50	<0.5	<0.5	<0.5	<0.5	<5	--	--	--	--	
W-IND	11/30/07	NA	12.92	--	--	--	--	--	--	--	--	--	--	--	--	
W-IND	12/20/07	NA	11.68	--	<50	500	<1	1	<1	2.2	<.50	--	--	--	--	
W-IND	05/23/08	NA	12.72	--	300	250	<1	3.7	<1	2.4	<0.50	--	--	--	--	
W-IND	08/12/08	NA	13.42	--	<50.0	<50.0	<1	<1	<1	<1	<0.50	--	--	--	--	
W-IND	12/18/08	NA	12.65	--	<50	<50	<1	<1	<1	<1	0.7	--	--	--	--	
W-IND	02/19/09	NA	9.74	--	<50	<50	<1	<1	<1	<1	<0.5	--	--	--	--	
W-IND	08/11/09	NA	14.13	--	<50	<50	<1	<1	<1	<1	<0.5	--	--	--	--	
W-IND	03/17/10	NA	9.78	--	<50	<50	<1	<1	<1	<1	<0.5	--	--	--	--	
W-IND	08/18/10	NA	12.84	--	<50.0	<50	<1.0	<1.0	<1.0	<1.0	<0.50	--	--	--	--	
W-IND	03/23/11	32.48	8.32	24.16	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50	--	--	--	--	
W-IND	08/25/11	32.48	12.34	20.14	<50	<50	<1.0	<1.0	<1.0	<1.0	<0.50	--	--	--	--	

Explanation:

TPH-SS = Total petroleum hydrocarbons as stoddard solvent

TPH-G = Total petroleum hydrocarbons as gasoline

MTBE = Methyl tertiary-butyl ether

**TABLE 1
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
HISTORICAL SUMMARY**

Former City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Well Identification	Sample Date	Elevation Summary			Analytical Summary									
		Top of Casing Elevation	Depth to Water	Groundwater Elevation	Ethyl									
		(feet amsl)	(feet BTOC)	(feet amsl)	TPH-SS	TPH-G	Benzene	Toluene	benzene	Xylenes	MTBE	1,2-DCB	1,1-DCA	2-Methyl-Naphthalene

1,2-DCB = 1,2 - dichlorobenzene

1,1-DCA = 1,1 - dichloroethane

amsl = Above mean sea level

BTOC = Below top of casing

ug/l = Micrograms per liter

<1.0 = Not detected at or above indicated laboratory reporting limit

-- = not analyzed

NA = Data not available

TPH-SS and TPH-G were analyzed by EPA Test Method 8015B

Benzene, toluene, ethylbenzene, total xylenes, MTBE, 1,2-DCB, 1,1-DCA, 2-Methyl-Naphthalene and Naphthalene were analyzed by EPA Test Method 8260B

NP = HydraSleeve® no purge protocol

•• Components found in the gasoline range, however they are not characteristic of gasoline components.

On March 17, 2010, Taber Consultants implemented the HydraSleeve® no purge protocol for all wells.

On March 23, 2011, Taber Consultants resurveyed top of casing elevations for the wells.

^a - During the 3/23/11 monitoring event, Taber Consultants replaced the damaged well cap.

^b - During the 8/25/11 monitoring event, Taber Consultants removed a disposable bailer from MW-1 that was left by others.

TABLE 2
SOIL SAMPLE ANALYTICAL RESULTS
SITE INVESTIGATION 2011

Former City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Boring Identification	Sample Identification	Sample Date	TPH-SS	TPH-G	TPH-D	TPH-FO	TPH-MO	TPH-K	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE
			(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
GP-1	GP-1-17	5/2/2011	<1.0	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-1-32.5	5/2/2011	<1.0	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-2	GP-2-17	5/2/2011	<1.0	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-2-36	5/2/2011	<1.0	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-3	GP-3-16.5	5/6/2011	<10	<0.50	NA	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-4	GP-4-14	5/6/2011	<10	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-4-18	5/6/2011	<10	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-4-19-5 ^a	5/6/2011	<10	1.8	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-5	GP-5-6.5	5/5/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-5-28	5/5/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-6	GP-6-11.5	5/5/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-7	GP-7-8	5/6/2011	<10	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-7-16	5/6/2011	NA	<0.50	<1.0	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50
GP-8	GP-8-16.5 ^a	5/12/2011	30	5.3	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-8-34	5/12/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-9	GP-9-16.5 ^a	5/12/2011	<10	3.1	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-9-38.5	5/12/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-10	GP-10-16.5 ^a	5/13/2011	<10	3.3	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-10-33	5/13/2011	<10	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-11	GP-11-17	5/13/2011	<10	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-11-34	5/13/2011	<10	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-11-38.5	5/13/2011	<10	<0.50	NA	NA	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-12	GP-12-16 ^a	5/19/2011	<10	690	<1.0	<10	NA	NA	<1000	<1000	<1000	<1000	<500
	GP-12-34	5/19/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-13	GP-13-16.5	5/19/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-13-34	5/19/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-16	GP-16-19 ^a	5/17/2011	<10	20	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	3.0	<0.50

TABLE 2
SOIL SAMPLE ANALYTICAL RESULTS
SITE INVESTIGATION 2011
Former City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Boring Identification	Sample Identification	Sample Date	TPH-SS	TPH-G	TPH-D	TPH-FO	TPH-MO	TPH-K	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE
			(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
	GP-16-38	5/17/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-17	GP-17-23.5	5/17/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-17-38	5/17/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-18	GP-18-19	5/17/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-18-38	5/17/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
GP-19	GP-19-20	5/17/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50
	GP-19-38	5/17/2011	<10	<0.50	<1.0	<10	NA	NA	<1.0	<1.0	<1.0	<1.0	<0.50

Explanation:

TPH-SS = Total petroleum hydrocarbons as Stoddard Solvent

TPH-G = Total petroleum hydrocarbons as gasoline

TPH-D = Total petroleum hydrocarbons as diesel

TPH-FO = Total petroleum hydrocarbons as fuel oil

TPH-MO = Total petroleum hydrocarbons as motor oil

TPH-K = Total petroleum hydrocarbons as kerosene

MTBE = Methyl tertiary-butyl ether

mg/kg = milligrams per kilogram

ug/kg = micrograms per kilogram

<1.0 = Not detected at or above indicated laboratory reporting limit

NA = Not Analyzed.

TABLE 3
SOIL VAPOR SAMPLE ANALYTICAL RESULTS
SITE INVESTIGATION 2011
Former City of Paris Cleaners
3516 Adeline Street, Oakland, California 94608

Sample Identification	Sample Date	Ethyl						
		Benzene	Toluene	benzene	m,p-Xylene	O-Xylene	Naphthalene	1,1-Difluoroethane*
		(ug/m ³)						
VP-1	5/4/2011	1.7	4.4	1.2	4	1.7	5.7	<0.052
VP-2	5/4/2011	7.7	11	3.4	10	3.6	25	<32
VP-3	5/4/2011	11	11	2.2	5.7	2.4	8.4	<47
VP-4	5/4/2011	21	26	3.9	6.3	3.0	3.1	<4.7

Explanation:

ug/m³ = micrograms per cubic meter

Sample analysis by EPA Method TO15.

* = 1,1-Difluoroethane was the tracer gas applied prior to sample collection as a quality assurance/quality control leak detection measure

TABLE 4
SOIL PROPERTIES
SITE INVESTIGATION 2011
Former City of Paris Cleaners
3516 Adeline St, Oakland, CA 94608

Boring Identification	Sample Identification	Sample Date	Effective Porosity	Porosity	Moisture Content	Wet Unit Weight	Dry Unit Weight	Bulk Density	Organic Matter	Fraction Organic Carbon	Saturated Hydraulic Conductivity	Hydraulic Conductivity
			(%)	(%)	(%)	(pcf)	(pcf)	(kg/l)	(%)	(%)	(in/hr)	(cm/sec)
GP-1	GP-1-18	5/2/2011	24.0	65.3	30.5	76.4	58.5	0.94	1.38	0.80	0.063	4.4E-05
GP-2	GP-2-11	5/2/2011	17.9	56.8	17.8	85.8	72.9	1.17	0.68	0.40	0.29	2.0E-04
GP-3	GP-3-14.5	5/6/2011	12.73	38.3	14.4	119.0	104.0	1.67	4.34	2.52	8.42	5.9E-03
GP-5	GP-5-15	5/5/2011	28.20	50.9	13.0	93.6	82.8	1.33	5.61	3.26	4.79	3.4E-03
GP-8	GP-8-14	5/12/2011	3.74	42.7	17.8	113.8	96.6	1.55	3.94	2.29	0.0048	3.4E-06
GP-9	GP-9-15	5/12/2011	4.69	37.9	17.0	122.5	104.7	1.68	3.78	2.20	0.0015	1.1E-06
GP-10	GP-10-16	5/13/2011	13.97	37.9	14.6	119.9	104.6	1.68	3.83	2.23	0.019	1.3E-05
GP-11	GP-11-17	5/13/2011	8.34	24.8	8.7	137.8	126.7	2.03	4.10	2.38	0.0073	5.2E-06

Explanation:

% = percent
pcf = pounds per cubic foot
kg/l = kilograms per liter
in/hr = inches per hour
cm/sec = centimeters per second

Bulk density converted from dry unit weight, i.e. GP-1-18, $58.5 \text{ pcf} * 0.453592 \text{ kg/l} * 1/28.3168 \text{ pcf} = 0.94$
Fraction Organic Carbon (f_{oc})-- Method ASTM F1647 B -- Walkley-Black. $F_{oc} = \text{Percent Organic Matter} / 1.72$, i.e. GP-5-15, $5.61/1.72 = 3.26$
Hydraulic conductivity in cm/sec converted from saturated hydraulic conductivity (in/hr) i.e. GP-1-18, $0.063 \text{ in/hr} * 2.54 \text{ cm/in} * 1 \text{ hour}/60 \text{ minutes} * 1 \text{ minute}/60 \text{ seconds} = 4.4E-05$

APPENDIX A
RISC4 INPUT PARAMETERS

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Commercial

Title:

City of Paris - Soil Vapor to Indoor Air - Commercial - BTEX & Naphthalene

06/15/11 21:50

Scenarios:

Worker - RME

Routes:

INHALATION OF INDOOR AIR

Chemicals:

Benzene
Ethylbenzene
Naphthalene
Toluene
Xylenes

SCENARIO:

SUMMARY OF INPUT PARAMETERS

1

LIFETIME AND BODY WEIGHT

Body Weight (kg)	70.0
Lifetime (years)	70.0

INHALATION OF INDOOR AIR

Inhalation rate (m ³ /hr)	0.830
Time indoors (hours/day)	8.00
Lung Retention Factor (-)	1.00
Exp. Freq. Indoor Air (events/yr)	250.
Exp. Duration Indoor Air (yr)	25.0
Absorption Adjustment Factor for Inhalation (-)	
Benzene	1.0
Ethylbenzene	1.0
Naphthalene	1.0
Toluene	1.0
Xylenes	1.0

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Commercial

MEDIA CONCENTRATIONS

Concentration in Indoor Air (mg/m³)

Obtained from Fate and Transport output

AVERAGE Concentration (over exposure duration)

(used to calculate carcinogenic risk)

Exposure Duration (years)	25.
Benzene	6.45E-06
Ethylbenzene	1.12E-06
Naphthalene	5.96E-06
Toluene	7.93E-06
Xylenes	3.80E-06

Concentration used to calculate hazard index

(Averaged over 7 years or exposure duration, if less than 7 years)

Exposure Duration (years)	7.0
Benzene	6.45E-06
Ethylbenzene	1.12E-06
Naphthalene	5.96E-06
Toluene	7.93E-06
Xylenes	3.80E-06

SLOPE FACTORS AND REFERENCE DOSES

Inhalation Slope Factor [1/(mg/kg-day)]

Benzene	0.10
Ethylbenzene	8.70E-03
Naphthalene	0.12
Toluene	ND
Xylenes	ND

Inhalation Reference Dose (mg/kg-day)

Benzene	8.60E-03
Ethylbenzene	0.29
Naphthalene	8.60E-04
Toluene	8.60E-02
Xylenes	2.90E-02

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Commercial

SUMMARY OF RESULTS

INHALATION OF INDOOR AIR

Daily Doses and Risk for : Benzene

CADD (mg/kg-day)	4.19E-07
LADD (mg/kg-day)	1.50E-07
Cancer Risk (-)	1.497E-08
Hazard Index (-)	4.874E-05

Daily Doses and Risk for : Ethylbenzene

CADD (mg/kg-day)	7.24E-08
LADD (mg/kg-day)	2.59E-08
Cancer Risk (-)	2.251E-10
Hazard Index (-)	2.498E-07

Daily Doses and Risk for : Naphthalene

CADD (mg/kg-day)	3.87E-07
LADD (mg/kg-day)	1.38E-07
Cancer Risk (-)	1.659E-08
Hazard Index (-)	4.501E-04

Daily Doses and Risk for : Toluene

CADD (mg/kg-day)	5.15E-07
LADD (mg/kg-day)	1.84E-07
Cancer Risk (-)	0.000E+00
Hazard Index (-)	5.993E-06

Daily Doses and Risk for : Xylenes

CADD (mg/kg-day)	2.47E-07
LADD (mg/kg-day)	8.82E-08
Cancer Risk (-)	0.000E+00
Hazard Index (-)	8.518E-06

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Commercial

SUMMARY OF CARCINOGENIC RISK For Soil Gas Source

CASE 1:
Worker - RME

	Inhalation of Indoor Air	TOTAL
Benzene	1.5E-08	1.5E-08
Ethylbenzene	2.3E-10	2.3E-10
Naphthalene	1.7E-08	1.7E-08
TOTAL	3.2E-08	3.2E-08

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Commercial

SUMMARY OF HAZARD QUOTIENTS For Soil Gas Source

CASE 1:
Worker - RME

	Inhalation of Indoor Air	TOTAL
Benzene	4.9E-05	4.9E-05
Ethylbenzene	2.5E-07	2.5E-07
Naphthalene	4.5E-04	4.5E-04
Toluene	6.0E-06	6.0E-06
Xylenes	8.5E-06	8.5E-06
TOTAL	5.1E-04	5.1E-04

NOTE: A zero hazard index may indicate that a RfD was not entered for that chemical.

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Residential

Title:

City of Paris - Soil Vapor to Indoor Air - Residential - BTEX & Naphthalene
 06/16/11 21:51

Scenarios:

Child Resident - RME
 Adult Resident - RME

Routes:

INHALATION OF INDOOR AIR

Chemicals:

Benzene
 Ethylbenzene
 Naphthalene
 Toluene
 Xylenes

SUMMARY OF INPUT PARAMETERS	SCENARIO:	
	1	2

LIFETIME AND BODY WEIGHT		
Body Weight (kg)	15.0	70.0
Lifetime (years)	70.0	70.0
INHALATION OF INDOOR AIR		
Inhalation rate (m ³ /hr)	0.625	0.830
Time indoors (hours/day)	24.0	24.0
Lung Retention Factor (-)	1.00	1.00
Exp. Freq. Indoor Air (events/yr)	350.	350.
Exp. Duration Indoor Air (yr)	6.00	24.0
Absorption Adjustment Factor for Inhalation (-)		
Benzene	1.0	1.0
Ethylbenzene	1.0	1.0
Naphthalene	1.0	1.0
Toluene	1.0	1.0
Xylenes	1.0	1.0

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Residential

MEDIA CONCENTRATIONS

Concentration in Indoor Air (mg/m³)

Obtained from Fate and Transport output

AVERAGE Concentration (over exposure duration)
(used to calculate carcinogenic risk)

Exposure Duration (years)	6.0	24.
Benzene	1.63E-05	1.63E-05
Ethylbenzene	2.78E-06	2.78E-06
Naphthalene	1.46E-05	1.46E-05
Toluene	2.01E-05	2.01E-05
Xylenes	9.45E-06	9.45E-06

Concentration used to calculate hazard index

(Averaged over 7 years or exposure duration, if less than 7 years)

Exposure Duration (years)	6.0	7.0
Benzene	1.63E-05	1.63E-05
Ethylbenzene	2.78E-06	2.78E-06
Naphthalene	1.46E-05	1.46E-05
Toluene	2.01E-05	2.01E-05
Xylenes	9.45E-06	9.45E-06

SLOPE FACTORS AND REFERENCE DOSES

Inhalation Slope Factor [1/(mg/kg-day)]

Benzene	0.10	0.10
Ethylbenzene	8.70E-03	8.70E-03
Naphthalene	0.12	0.12
Toluene	ND	ND
Xylenes	ND	ND

Inhalation Reference Dose (mg/kg-day)

Benzene	8.60E-03	8.60E-03
Ethylbenzene	0.29	0.29
Naphthalene	8.60E-04	8.60E-04
Toluene	8.60E-02	8.60E-02
Xylenes	2.90E-02	2.90E-02

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Residential

SCENARIO:

SUMMARY OF RESULTS

1

2

Added

 INHALATION OF INDOOR AIR

Daily Doses and Risk for : Benzene

CADD (mg/kg-day)	1.57E-05	4.46E-06	
LADD (mg/kg-day)	1.34E-06	1.53E-06	2.87E-06
Cancer Risk (-)	1.342E-07	1.528E-07	2.870E-07
Hazard Index (-)	1.821E-03	5.181E-04	

Daily Doses and Risk for : Ethylbenzene

CADD (mg/kg-day)	2.67E-06	7.59E-07	
LADD (mg/kg-day)	2.29E-07	2.60E-07	4.89E-07
Cancer Risk (-)	1.989E-09	2.264E-09	4.252E-09
Hazard Index (-)	9.196E-06	2.617E-06	

Daily Doses and Risk for : Naphthalene

CADD (mg/kg-day)	1.40E-05	3.98E-06	
LADD (mg/kg-day)	1.20E-06	1.36E-06	2.56E-06
Cancer Risk (-)	1.437E-07	1.636E-07	3.073E-07
Hazard Index (-)	1.625E-02	4.623E-03	

Daily Doses and Risk for : Toluene

CADD (mg/kg-day)	1.92E-05	5.47E-06	
LADD (mg/kg-day)	1.65E-06	1.88E-06	3.53E-06
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	2.237E-04	6.365E-05	

Daily Doses and Risk for : Xylenes

CADD (mg/kg-day)	9.06E-06	2.58E-06	
LADD (mg/kg-day)	7.77E-07	8.84E-07	1.66E-06
Cancer Risk (-)	0.000E+00	0.000E+00	0.000E+00
Hazard Index (-)	3.125E-04	8.894E-05	

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Residential

SUMMARY OF CARCINOGENIC RISK For Soil Gas Source

CASE 1:

Child Resident - RME

	Inhalation of Indoor Air		TOTAL
Benzene	1.3E-07	1.3E-07	
Ethylbenzene	2.0E-09	2.0E-09	
Naphthalene	1.4E-07	1.4E-07	
TOTAL	2.8E-07	2.8E-07	

CASE 2:

Adult Resident - RME

	Inhalation of Indoor Air		TOTAL
Benzene	1.5E-07	1.5E-07	
Ethylbenzene	2.3E-09	2.3E-09	
Naphthalene	1.6E-07	1.6E-07	
TOTAL	3.2E-07	3.2E-07	

CASE 3:

Cases 1 and 2 Added Together

	Inhalation of Indoor Air		TOTAL
Benzene	2.9E-07	2.9E-07	
Ethylbenzene	4.3E-09	4.3E-09	
Naphthalene	3.1E-07	3.1E-07	
TOTAL	6.0E-07	6.0E-07	

Former City of Paris Cleaners – RISC4 – Soil Vapor to Indoor Air - Residential

SUMMARY OF HAZARD QUOTIENTS For Soil Gas Source

CASE 1:

Child Resident - RME

	Inhalation of Indoor Air		TOTAL
	<hr/>		
Benzene	1.8E-03		1.8E-03
Ethylbenzene	9.2E-06		9.2E-06
Naphthalene	1.6E-02		1.6E-02
Toluene	2.2E-04		2.2E-04
Xylenes	3.1E-04		3.1E-04
	<hr/>		
TOTAL	1.9E-02		1.9E-02

CASE 2:

Adult Resident - RME

	Inhalation of Indoor Air		TOTAL
	<hr/>		
Benzene	5.2E-04		5.2E-04
Ethylbenzene	2.6E-06		2.6E-06
Naphthalene	4.6E-03		4.6E-03
Toluene	6.4E-05		6.4E-05
Xylenes	8.9E-05		8.9E-05
	<hr/>		
TOTAL	5.3E-03		5.3E-03

NOTE: A zero hazard index may indicate that a RfD was not entered for that chemical.

Title:

City of Paris - Soil - Direct Contact- Commercial
 10/31/11 10:37

Scenarios:

Worker - RME

Routes:

INGESTION OF SOIL
 DERMAL CONTACT WITH SOIL
 INHALATION OF INDOOR AIR

Chemicals:

TPH Aliphatic C8-10
 TPH Aliphatic C10-12
 TPH Aromatic C8-10
 TPH Aromatic C10-12

SCENARIO:

SUMMARY OF INPUT PARAMETERS

1

LIFETIME AND BODY WEIGHT

Body Weight (kg)	70.0
Lifetime (years)	70.0

INGESTION OF SOIL

Soil Ingestion Rate (mg/day)	100.
Exp. Frequency Soil (events/year)	250.
Exp. Duration Soil (years)	25.0
Absorption Adjustment Factor for Ingestion of Soil (-)	
TPH Aliphatic C8-10	1.0
TPH Aliphatic C10-12	1.0
TPH Aromatic C8-10	1.0
TPH Aromatic C10-12	1.0

Soil Bioavailability (-)

TPH Aliphatic C8-10	1.0
TPH Aliphatic C10-12	1.0
TPH Aromatic C8-10	1.0
TPH Aromatic C10-12	1.0

DERMAL CONTACT WITH SOIL

Total Skin Surface Area (cm ²)	2.300E+04
Fraction Skin Exposed to Soil (-)	0.570
Adherence Factor for Soil (mg/cm ²)	0.200
Exposure Freq. Soil (events/year)	250.
Exposure Duration Soil (years)	25.0
Absorption Adjustment Factor for Dermal Exposure to Soil (-)	
TPH Aliphatic C8-10	0.10
TPH Aliphatic C10-12	0.10
TPH Aromatic C8-10	0.10
TPH Aromatic C10-12	0.10
Soil Bioavailability (-)	
TPH Aliphatic C8-10	1.0
TPH Aliphatic C10-12	1.0
TPH Aromatic C8-10	1.0
TPH Aromatic C10-12	1.0

INHALATION OF INDOOR AIR

Inhalation rate (m ³ /hr)	0.830
Time indoors (hours/day)	8.00
Lung Retention Factor (-)	1.00
Exp. Freq. Indoor Air (events/yr)	250.
Exp. Duration Indoor Air (yr)	25.0
Absorption Adjustment Factor for Inhalation (-)	
TPH Aliphatic C8-10	1.0
TPH Aliphatic C10-12	1.0
TPH Aromatic C8-10	1.0
TPH Aromatic C10-12	1.0

MEDIA CONCENTRATIONS

Concentration in Surficial Soil (mg/kg)

- Used to calculate risk and hazard index.

TPH Aliphatic C8-10	2.76E+02
TPH Aliphatic C10-12	2.76E+02
TPH Aromatic C8-10	69.
TPH Aromatic C10-12	69.

Concentration in Indoor Air (mg/m³)

Obtained from Fate and Transport output

AVERAGE Concentration (over exposure duration)

(used to calculate carcinogenic risk)

Exposure Duration (years)	25.
TPH Aliphatic C8-10	1.33E-02
TPH Aliphatic C10-12	1.36E-03
TPH Aromatic C8-10	5.20E-04
TPH Aromatic C10-12	1.37E-04

Concentration used to calculate hazard index

(Averaged over 7 years or exposure duration, if less than 7 years)

Exposure Duration (years)	7.0
TPH Aliphatic C8-10	1.33E-02
TPH Aliphatic C10-12	1.36E-03
TPH Aromatic C8-10	5.20E-04
TPH Aromatic C10-12	1.37E-04

SLOPE FACTORS AND REFERENCE DOSES

Ingestion Slope Factor [1/(mg/kg-day)]

TPH Aliphatic C8-10	ND
TPH Aliphatic C10-12	ND
TPH Aromatic C8-10	ND
TPH Aromatic C10-12	ND

Ingestion Reference Dose (mg/kg-day)

TPH Aliphatic C8-10	0.10
TPH Aliphatic C10-12	0.10
TPH Aromatic C8-10	4.00E-02
TPH Aromatic C10-12	4.00E-02

Inhalation Slope Factor [1/(mg/kg-day)]

TPH Aliphatic C8-10	ND
TPH Aliphatic C10-12	ND
TPH Aromatic C8-10	ND
TPH Aromatic C10-12	ND

Inhalation Reference Dose (mg/kg-day)

TPH Aliphatic C8-10	0.27
TPH Aliphatic C10-12	0.27
TPH Aromatic C8-10	5.50E-02
TPH Aromatic C10-12	5.50E-02

Dermal Slope Factor [1/(mg/kg-day)]

TPH Aliphatic C8-10	ND
TPH Aliphatic C10-12	ND
TPH Aromatic C8-10	ND
TPH Aromatic C10-12	ND

Dermal Reference Dose (mg/kg-day)

TPH Aliphatic C8-10	0.10
TPH Aliphatic C10-12	0.10
TPH Aromatic C8-10	4.00E-02
TPH Aromatic C10-12	4.00E-02

SUMMARY OF RESULTS

INGESTION OF SOIL

Daily Doses and Risk for : TPH Aliphatic C8-10

CADD (mg/kg-day)	2.70E-04
LADD (mg/kg-day)	9.64E-05
Cancer Risk (-)	0.000E+00
Hazard Index (-)	2.701E-03

Daily Doses and Risk for : TPH Aliphatic C10-12

CADD (mg/kg-day)	2.70E-04
LADD (mg/kg-day)	9.64E-05
Cancer Risk (-)	0.000E+00
Hazard Index (-)	2.701E-03

Daily Doses and Risk for : TPH Aromatic C8-10

CADD (mg/kg-day)	6.75E-05
LADD (mg/kg-day)	2.41E-05
Cancer Risk (-)	0.000E+00
Hazard Index (-)	1.688E-03

Daily Doses and Risk for : TPH Aromatic C10-12

CADD (mg/kg-day)	6.75E-05
LADD (mg/kg-day)	2.41E-05
Cancer Risk (-)	0.000E+00
Hazard Index (-)	1.688E-03

DERMAL CONTACT WITH SOIL

Daily Doses and Risk for : TPH Aliphatic C8-10

CADD (mg/kg-day)	7.08E-04
LADD (mg/kg-day)	2.53E-04
Cancer Risk (-)	0.000E+00
Hazard Index (-)	7.081E-03

Daily Doses and Risk for : TPH Aliphatic C10-12

CADD (mg/kg-day)	7.08E-04
LADD (mg/kg-day)	2.53E-04
Cancer Risk (-)	0.000E+00
Hazard Index (-)	7.081E-03

Daily Doses and Risk for : TPH Aromatic C8-10
CADD (mg/kg-day) 1.77E-04
LADD (mg/kg-day) 6.32E-05
Cancer Risk (-) 0.000E+00
Hazard Index (-) 4.426E-03

Daily Doses and Risk for : TPH Aromatic C10-12
CADD (mg/kg-day) 1.77E-04
LADD (mg/kg-day) 6.32E-05
Cancer Risk (-) 0.000E+00
Hazard Index (-) 4.426E-03

INHALATION OF INDOOR AIR

Daily Doses and Risk for : TPH Aliphatic C8-10
CADD (mg/kg-day) 8.66E-04
LADD (mg/kg-day) 3.09E-04
Cancer Risk (-) 0.000E+00
Hazard Index (-) 3.208E-03

Daily Doses and Risk for : TPH Aliphatic C10-12
CADD (mg/kg-day) 8.82E-05
LADD (mg/kg-day) 3.15E-05
Cancer Risk (-) 0.000E+00
Hazard Index (-) 3.265E-04

Daily Doses and Risk for : TPH Aromatic C8-10
CADD (mg/kg-day) 3.38E-05
LADD (mg/kg-day) 1.21E-05
Cancer Risk (-) 0.000E+00
Hazard Index (-) 6.145E-04

Daily Doses and Risk for : TPH Aromatic C10-12
CADD (mg/kg-day) 8.87E-06
LADD (mg/kg-day) 3.17E-06
Cancer Risk (-) 0.000E+00
Hazard Index (-) 1.612E-04

SUMMARY OF HAZARD QUOTIENTS
For Surface Soil

CASE 1:

Worker - RME

	Ingestion of Soil	Dermal Contact Soil	TOTAL
TPH Aliphatic C8-10	2.7E-03	7.1E-03	9.8E-03
TPH Aliphatic C10-12	2.7E-03	7.1E-03	9.8E-03
TPH Aromatic C8-10	1.7E-03	4.4E-03	6.1E-03
TPH Aromatic C10-12	1.7E-03	4.4E-03	6.1E-03
TOTAL	8.8E-03	2.3E-02	3.2E-02

SUMMARY OF HAZARD QUOTIENTS
For Vapor Model Soil Source

CASE 1:

Worker - RME

	Inhalation of Indoor Air	TOTAL
TPH Aliphatic C8-10	3.2E-03	3.2E-03
TPH Aliphatic C10-12	3.3E-04	3.3E-04
TPH Aromatic C8-10	6.1E-04	6.1E-04
TPH Aromatic C10-12	1.6E-04	1.6E-04
TOTAL	4.3E-03	4.3E-03

NOTE: A zero hazard index may indicate that a RfD
was not entered for that chemical.

Title:

City of Paris - Soil - Direct Contact- Residential
 10/31/11 10:40

Scenarios:

Child Resident - RME

Adult Resident - RME

Routes:

INGESTION OF SOIL

DERMAL CONTACT WITH SOIL

INHALATION OF INDOOR AIR

Chemicals:

TPH Aliphatic C8-10

TPH Aliphatic C10-12

TPH Aromatic C8-10

TPH Aromatic C10-12

	SCENARIO:	
SUMMARY OF INPUT PARAMETERS	1	2

LIFETIME AND BODY WEIGHT		
Body Weight (kg)	15.0	70.0
Lifetime (years)	70.0	70.0
INGESTION OF SOIL		
Soil Ingestion Rate (mg/day)	200.	100.
Exp. Frequency Soil (events/year)	350.	350.
Exp. Duration Soil (years)	6.00	30.0
Absorption Adjustment Factor for		
Ingestion of Soil (-)		
TPH Aliphatic C8-10	1.0	1.0
TPH Aliphatic C10-12	1.0	1.0
TPH Aromatic C8-10	1.0	1.0
TPH Aromatic C10-12	1.0	1.0
Soil Bioavailability (-)		
TPH Aliphatic C8-10	1.0	1.0
TPH Aliphatic C10-12	1.0	1.0
TPH Aromatic C8-10	1.0	1.0
TPH Aromatic C10-12	1.0	1.0

City of Paris

RISC4 Input-Output

TPH Soil Residential

DERMAL CONTACT WITH SOIL

Total Skin Surface Area (cm ²)	7.280E+03	2.300E+04
Fraction Skin Exposed to Soil (-)	0.550	0.250
Adherence Factor for Soil (mg/cm ²)	0.200	0.200
Exposure Freq. Soil (events/year)	350.	350.
Exposure Duration Soil (years)	6.00	30.0
Absorption Adjustment Factor for Dermal Exposure to Soil (-)		
TPH Aliphatic C8-10	0.10	0.10
TPH Aliphatic C10-12	0.10	0.10
TPH Aromatic C8-10	0.10	0.10
TPH Aromatic C10-12	0.10	0.10
Soil Bioavailability (-)		
TPH Aliphatic C8-10	1.0	1.0
TPH Aliphatic C10-12	1.0	1.0
TPH Aromatic C8-10	1.0	1.0
TPH Aromatic C10-12	1.0	1.0

INHALATION OF INDOOR AIR

Inhalation rate (m ³ /hr)	0.625	0.830
Time indoors (hours/day)	24.0	24.0
Lung Retention Factor (-)	1.00	1.00
Exp. Freq. Indoor Air (events/yr)	350.	350.
Exp. Duration Indoor Air (yr)	6.00	30.0
Absorption Adjustment Factor for Inhalation (-)		
TPH Aliphatic C8-10	1.0	1.0
TPH Aliphatic C10-12	1.0	1.0
TPH Aromatic C8-10	1.0	1.0
TPH Aromatic C10-12	1.0	1.0

MEDIA CONCENTRATIONS

Concentration in Surficial Soil (mg/kg)

- Used to calculate risk and hazard index.

TPH Aliphatic C8-10	2.76E+02	2.76E+02
TPH Aliphatic C10-12	2.76E+02	2.76E+02
TPH Aromatic C8-10	69.	69.
TPH Aromatic C10-12	69.	69.

Concentration in Indoor Air (mg/m³)

Obtained from Fate and Transport output

AVERAGE Concentration (over exposure duration)

(used to calculate carcinogenic risk)

Exposure Duration (years)	6.0	30.
TPH Aliphatic C8-10	2.91E-02	2.91E-02
TPH Aliphatic C10-12	2.97E-03	2.97E-03
TPH Aromatic C8-10	1.14E-03	1.14E-03
TPH Aromatic C10-12	2.99E-04	2.99E-04

Concentration used to calculate hazard index

(Averaged over 7 years or exposure duration, if less than 7 years)

Exposure Duration (years)	6.0	7.0
TPH Aliphatic C8-10	2.91E-02	2.91E-02
TPH Aliphatic C10-12	2.97E-03	2.97E-03
TPH Aromatic C8-10	1.14E-03	1.14E-03
TPH Aromatic C10-12	2.99E-04	2.99E-04

SLOPE FACTORS AND REFERENCE DOSES

Ingestion Slope Factor [1/(mg/kg-day)]

TPH Aliphatic C8-10	ND	ND
TPH Aliphatic C10-12	ND	ND
TPH Aromatic C8-10	ND	ND
TPH Aromatic C10-12	ND	ND

Ingestion Reference Dose (mg/kg-day)

TPH Aliphatic C8-10	0.10	0.10
TPH Aliphatic C10-12	0.10	0.10
TPH Aromatic C8-10	4.00E-02	4.00E-02
TPH Aromatic C10-12	4.00E-02	4.00E-02

Inhalation Slope Factor [1/(mg/kg-day)]

TPH Aliphatic C8-10	ND	ND
TPH Aliphatic C10-12	ND	ND
TPH Aromatic C8-10	ND	ND
TPH Aromatic C10-12	ND	ND

Inhalation Reference Dose (mg/kg-day)

TPH Aliphatic C8-10	0.27	0.27
TPH Aliphatic C10-12	0.27	0.27
TPH Aromatic C8-10	5.50E-02	5.50E-02
TPH Aromatic C10-12	5.50E-02	5.50E-02

Dermal Slope Factor [1/(mg/kg-day)]

TPH Aliphatic C8-10	ND	ND
TPH Aliphatic C10-12	ND	ND
TPH Aromatic C8-10	ND	ND
TPH Aromatic C10-12	ND	ND

City of Paris

RISC4 Input-Output

TPH Soil Residential

Dermal Reference Dose (mg/kg-day)

TPH Aliphatic C8-10	0.10	0.10
TPH Aliphatic C10-12	0.10	0.10
TPH Aromatic C8-10	4.00E-02	4.00E-02
TPH Aromatic C10-12	4.00E-02	4.00E-02

SCENARIO:

SUMMARY OF RESULTS

1

2

 INGESTION OF SOIL

Daily Doses and Risk for : TPH Aliphatic C8-10

CADD (mg/kg-day)	3.53E-03	3.78E-04
LADD (mg/kg-day)	3.02E-04	1.62E-04
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	3.529E-02	3.781E-03

Daily Doses and Risk for : TPH Aliphatic C10-12

CADD (mg/kg-day)	3.53E-03	3.78E-04
LADD (mg/kg-day)	3.02E-04	1.62E-04
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	3.529E-02	3.781E-03

Daily Doses and Risk for : TPH Aromatic C8-10

CADD (mg/kg-day)	8.82E-04	9.45E-05
LADD (mg/kg-day)	7.56E-05	4.05E-05
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	2.205E-02	2.363E-03

Daily Doses and Risk for : TPH Aromatic C10-12

CADD (mg/kg-day)	8.82E-04	9.45E-05
LADD (mg/kg-day)	7.56E-05	4.05E-05
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	2.205E-02	2.363E-03

DERMAL CONTACT WITH SOIL

Daily Doses and Risk for : TPH Aliphatic C8-10

CADD (mg/kg-day)	1.41E-03	4.35E-04
LADD (mg/kg-day)	1.21E-04	1.86E-04
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	1.413E-02	4.348E-03

Daily Doses and Risk for : TPH Aliphatic C10-12

CADD (mg/kg-day)	1.41E-03	4.35E-04
LADD (mg/kg-day)	1.21E-04	1.86E-04
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	1.413E-02	4.348E-03

Daily Doses and Risk for : TPH Aromatic C8-10

CADD (mg/kg-day)	3.53E-04	1.09E-04
LADD (mg/kg-day)	3.03E-05	4.66E-05
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	8.831E-03	2.717E-03

Daily Doses and Risk for : TPH Aromatic C10-12

CADD (mg/kg-day)	3.53E-04	1.09E-04
LADD (mg/kg-day)	3.03E-05	4.66E-05
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	8.831E-03	2.717E-03

INHALATION OF INDOOR AIR

Daily Doses and Risk for : TPH Aliphatic C8-10

CADD (mg/kg-day)	2.79E-02	7.95E-03
LADD (mg/kg-day)	2.40E-03	3.41E-03
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	1.035E-01	2.945E-02

Daily Doses and Risk for : TPH Aliphatic C10-12

CADD (mg/kg-day)	2.85E-03	8.10E-04
LADD (mg/kg-day)	2.44E-04	3.47E-04
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	1.054E-02	2.999E-03

Daily Doses and Risk for : TPH Aromatic C8-10

CADD (mg/kg-day)	1.09E-03	3.10E-04
LADD (mg/kg-day)	9.35E-05	1.33E-04
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	1.982E-02	5.641E-03

Daily Doses and Risk for : TPH Aromatic C10-12

CADD (mg/kg-day)	2.86E-04	8.15E-05
LADD (mg/kg-day)	2.45E-05	3.49E-05
Cancer Risk (-)	0.000E+00	0.000E+00
Hazard Index (-)	5.204E-03	1.481E-03

SUMMARY OF HAZARD QUOTIENTS
For Surface Soil

CASE 1:

Child Resident - RME

	Ingestion of Soil	Dermal Contact Soil	TOTAL
TPH Aliphatic C8-10	3.5E-02	1.4E-02	4.9E-02
TPH Aliphatic C10-12	3.5E-02	1.4E-02	4.9E-02
TPH Aromatic C8-10	2.2E-02	8.8E-03	3.1E-02
TPH Aromatic C10-12	2.2E-02	8.8E-03	3.1E-02
TOTAL	1.1E-01	4.6E-02	1.6E-01

CASE 2:

Adult Resident - RME

	Ingestion of Soil	Dermal Contact Soil	TOTAL
TPH Aliphatic C8-10	3.8E-03	4.3E-03	8.1E-03
TPH Aliphatic C10-12	3.8E-03	4.3E-03	8.1E-03
TPH Aromatic C8-10	2.4E-03	2.7E-03	5.1E-03
TPH Aromatic C10-12	2.4E-03	2.7E-03	5.1E-03
TOTAL	1.2E-02	1.4E-02	2.6E-02

SUMMARY OF HAZARD QUOTIENTS
For Vapor Model Soil Source

CASE 1:

Child Resident - RME

	Inhalation of Indoor Air	TOTAL
TPH Aliphatic C8-10	1.0E-01	1.0E-01
TPH Aliphatic C10-12	1.1E-02	1.1E-02
TPH Aromatic C8-10	2.0E-02	2.0E-02
TPH Aromatic C10-12	5.2E-03	5.2E-03
TOTAL	1.4E-01	1.4E-01

CASE 2:

Adult Resident - RME

	Inhalation of Indoor Air	TOTAL
TPH Aliphatic C8-10	2.9E-02	2.9E-02
TPH Aliphatic C10-12	3.0E-03	3.0E-03
TPH Aromatic C8-10	5.6E-03	5.6E-03
TPH Aromatic C10-12	1.5E-03	1.5E-03
TOTAL	4.0E-02	4.0E-02

NOTE: A zero hazard index may indicate that a RfD was not entered for that chemical.