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SUBJECT:			RT CERTIFICATION
	County File # RO 33 California Linen Ren	ntal Company	
	989 41 <sup>st</sup> Street		
	Oakland, CA	N ·	
Dear Mr. Dette	eman:		
			and another D&D Environmental.
	enclosed one copy of	f the following docum	ent prepared by P&D Environmental,
Inc.:		, b(0-8	
Subsurf	ace Investigation Rep	port dated October 23,	, 2012 (document 0304.R19).
I declare, und above-mention	er penalty of perjury, ned report for the subj	, that the information a ject site is true and cor	and/or recommendations contained in th rect to the best of my knowledge.
Should you be	we any questions ple	ase do not hesitate to c	ali me at (925) 938-2491.
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# **P&D** ENVIRONMENTAL, INC.

55 Santa Clara Ave, Suite 240 Oakland, CA 94610 (510) 658-6916

October 23, 2012 Report 0304.R19

Mr. Donald Miller California Linen Rental Company 2104 Magnolia Way Walnut Creek, CA 94595-1619

SUBJECT: SUBSURFACE INVESTIGATION REPORT (GEOPHYSICAL PROFILE 4, GROUNDWATER SAMPLES B89 THROUGH B96, SOIL GAS SG61-SG72, AND VAPOR WELLS VW1-SS THROUGH VW3-SS, VW1-5 THROUGH VW7-5) County File # RO 337 California Linen Rental Company 989 41<sup>st</sup> Street Oakland, CA

Dear Mr. Miller:

P&D Environmental, Inc. (P&D) has prepared this report documenting subsurface investigation for offsite upgradient, onsite, and offsite downgradient locations. The offsite upgradient investigation consisted of gathering subsurface information with geophysical resistivity Profile 4 along the north side of 41<sup>st</sup> Street; collection of soil gas samples at a depth of 5 feet below the ground surface (bgs) primarily along the north side of 41<sup>st</sup> Street; and the collection of one groundwater grab sample on the north side of 41<sup>st</sup> Street. The onsite investigation included installation of three permanent sub-slab soil gas vapor wells; installation of three corresponding adjacent permanent soil gas vapor wells to a depth of 5 feet bgs; collection of soil gas samples from all of the new onsite soil gas vapor wells; and the statistical evaluation of onsite lead and arsenic concentrations in fill material. The offsite downgradient investigation consisted of

All work was performed under the direct supervision of a professional geologist in accordance with P&D's April 27, 2011 Subsurface Investigation Work Plan (document 0304.W8). The work plan was conditionally approved in a letter from the Alameda County Department of Environmental Health (ACDEH) dated May 18, 2011. Soil gas samples SG61 through SG67 were collected on July 27 and 28, 2011. Following receipt of soil gas sample results for locations SG61 through SG67 P&D proposed collection of additional soil gas samples at offsite upgradient locations SG62A and SG68 through SG72 in an e-mail dated September 6, 2011. The proposed additional soil gas samples were approved in an e-mail from Mr. Mark Detterman at the ACDEH in an e-mail dated September 7, 2011. The additional soil gas samples and one groundwater grab sample at location B89 were collected on September 16, 2011. Onsite permanent sub-slab soil gas wells and soil gas wells constructed to a depth of 5 feet bgs were constructed on July 28, 2011 at locations VW1 and VW2 and were sampled on August 10, 2011. Following review of the sample results with the ACDEH, onsite permanent sub-slab soil gas wells and soil gas wells constructed to a depth of 5 feet bgs were constructed on March 12, 2012 and were sampled on May 4, 2012. Offsite downgradient soil gas wells VW4 through VW8 were constructed between June 28 and July 18, 2012 and were sampled between July 5 and July 20, 2012. Groundwater grab samples were

collected at offsite downgradient locations B90 through B97 on June 28, 2012 through July 20, 2012.

A Site Vicinity Map showing the resistivity profile location is attached as Figure 1, and a Site Vicinity Map Detail showing the offsite temporary soil gas sample collection locations and the onsite permanent vapor well locations is attached as Figure 2.

# BACKGROUND

A detailed discussion of historical land use and investigations at the site is provided in a Subsurface Investigation Work Plan dated March 13, 2009 (document 0304.W6) prepared by RGA Environmental, Inc. (RGA), including summary tables of historical investigation sample results. Subsequent offsite downgradient groundwater quality investigation including geophysical Profiles 1 through 3, drilling at locations B67 through B88, onsite soil gas sample collection at locations SG6 through SG22, and onsite investigation of fill material is provided in RGA's May 8, 2009 Subsurface Investigation Report (document 0304.R16). Subsequent onsite soil gas investigation is also documented in RGA's August 12, 2009 Onsite Soil Gas Investigation Report (document 0304.R17) for soil gas samples SG23 through SG60.

# FIELD ACTIVITIES

Prior to performing subsurface investigation, drilling permits were obtained from the Alameda County Public Works Agency, encroachment and excavation permits were obtained from the City of Oakland for work in the public right-of-way, the drilling locations were marked with white paint, Underground Service Alert (USA) was notified for underground utility location, and a health and safety plan was prepared.

## Geophysical Resistivity Profile

Prior to drilling for sample collection, geophysical resistivity Profile 4 was surveyed in June 2011 by JR Associates (JRA) of San Jose, California. The location of Profile 4 is shown in Figure 1. A copy of the geophysical Investigation report provided by JRA that describes the procedures used to perform the survey is attached with this report as Appendix A. A portion of the profile is shown superimposed along the length of 41<sup>st</sup> Street on Figure 2. Based on the geophysical survey results, proposed soil gas sample collection locations SG62, SG63, SG64 and SG66 were modified to better correspond with coarser-grained materials identified on Profile 4. These revised locations were reviewed and approved by the ACDEH.

# Temporary Soil Gas Well Sample Collection

On July 27 and 28, 2011 soil gas samples were collected by P&D personnel at temporary locations designated as SG61 through SG67 as shown on Figure 2. In addition, one duplicate sample was collected at location SG62. Following review of the sample results and discussions with ACDEH, P&D personnel returned to the site on September 16, 2011 for collection of soil gas samples at temporary locations designated as SG62A and SG68 through SG72 as shown on Figure 2. In addition, one duplicate sample was collected at location SG62A. All of the samples were collected

in accordance with procedures set forth in the Department of Toxic Substances Control (DTSC) January 13, 2003 Advisory - Active Soil Gas Investigations.

Each of the temporary soil gas wells were constructed by Vironex, Inc. (Vironex) of Concord, California by driving a hollow 1-inch diameter Geoprobe drilling rod with an expendable tip to a depth of 5 feet bgs, dislodging the expendable tip, and then inserting a 0.250-inch outside diameter (0.187-inch inside diameter) Teflon tube to 8 inches above the bottom of the hollow rod. A 2-inch long porous high-density polyethylene (HDPE) filter was connected to the bottom of the tubing prior to inserting the tubing into the hollow rod. When the tubing was inserted into the drill rod, the bottom of the filter was placed 6-inches above the bottom of the hollow rod. A  $\frac{42}{16}$  Lonestar sack sand was added to the annular space between the hollow rod and the Teflon tubing as the hollow rod was withdrawn from the ground until the lowermost 12 inches of the hole was filled with sand. Granular bentonite (with grains measuring 1 to 2 millimeters in diameter) was placed in the annular space above the sand to a height of 12 inches above the sand, and the remaining annular space was filled with a bentonite slurry to the ground surface.

At least 30 minutes after construction of the temporary soil gas wells, soil gas samples were collected from each location. A soil gas sampling manifold with a 1-liter Summa canister as the sampling canister for each location (see Figure 4) was assembled in a 35-gallon Rubbermaid bin shroud that was modified by cutting viewing ports into the sides of the bin and covering the viewing ports with transparent polycarbonate sheets. The shroud was also modified to include a hole measuring approximately two inches square in the bottom of the shroud to allow the shroud to cover the soil gas well while still allowing access to the well through the bottom of the shroud. At the time that the sampling manifold was assembled, the vacuum for the sample canister was checked with a vacuum gauge and recorded.

Prior to sampling the soil gas, a 10 minute leak check of the sampling manifold was performed by closing the valve located between the filter and the pressure gauge, opening the purge canister valve, and recording the manifold system vacuum (see Figure 4). No purge testing for purge volume determination was performed because the samples were collected using Summa canisters. Following successful verification of the manifold leak check, a default of three purge volumes was extracted prior to sample collection. The purge time was calculated using a nominal flow rate provided by the flow controller of 200 milliliters per minute. A copy of the purge volume calculation sheet is attached with this report as Appendix B.

Following completion of the purging of three volumes, a tracer gas (2-Propanol) was placed in a dish adjacent to the purge canister in the shroud, and a lid for the shroud that had been modified to include two gauntlet nitrile gloves for adjustment of equipment inside the bin while the bin lid was in place and a viewing port covered with a transparent polycarbonate sheet was placed over the top of the shroud, enclosing the well, the sampling manifold, and the 1-liter sample canister.

The vapor concentration of the 2-Propanol was monitored with a Photoionization Detector (PID) until the 2-Propanol vapor concentration inside the shroud appeared to have equilibrated. The gloves in the lid of the bin were then used to open the sample canister valve. Once the vacuum for the sample canister valve had decreased to 5 inches of mercury, the gloves in the lid of the

bin were used to close the sample canister valve. The pressure gage on the inlet side of the flow controller (see Figure 4) was monitored during sample collection to ensure that the vacuum applied to the soil gas well did not exceed 100 inches of water.

During sample collection on July 28, 2011 an air sample of the shroud atmosphere was collected from the shroud into a Tedlar bag using a vacuum chamber for each of locations SG62 and SG63. During sample collection on September 16, 2011 an air sample of the shroud atmosphere was collected from the shroud into a Tedlar bag using a vacuum chamber for each of locations SG62A and SG69. The Tedlar bags were stored in a cooler pending delivery to the laboratory. Chain of custody procedures were observed for all sample handling.

One duplicate soil gas sample was collected into a Summa canister from the temporary soil gas wells using a stainless steel sampling tee for the Summa canisters using methods described above. Following soil gas sample collection, a PID was connected to the Teflon tubing to obtain a preliminary field value for the sample collection location. The soil gas Summa canister samples were stored in a box and promptly shipped to the laboratory for extraction and analysis. Chain of custody procedures was observed for all sample handling. Measurements of vacuums, purging and equilibration time intervals, and PID readings were recorded on Soil Gas Sampling Data Sheets that are attached with this report as Appendix B.

All drilling rods and associated drilling fittings were cleaned with an Alconox solution wash followed by a clean water rinse. New Teflon tubing and clean, unused vacuum gages and stainless steel sampling manifolds were used at each sample collection location. Following soil gas sample collection the Teflon tubing was pulled from each temporary soil gas sampling well and a 1-inch diameter solid steel rod was driven through the bentonite and sand to the total depth of the temporary soil gas sampling well. The solid steel rod was then removed, and the borehole was filled with neat cement.

## Permanent Soil Gas Well Construction and Sample Collection

On August 10, 2011 P&D personnel oversaw construction of onsite permanent sub-slab soil gas vapor wells VW1-SS and VW2-SS, and onsite permanent soil gas vapor wells VW1-5 and VW2-5 to a depth of five feet at adjacent onsite locations as shown on Figure 2. Following discussions with the ACDEH, P&D personnel returned to the site on March 12, 2012 and oversaw construction of onsite permanent sub-slab soil gas vapor well VW3-SS and at an adjacent location onsite soil gas vapor well VW3-5 to a depth of 5 feet bgs. Offsite downgradient soil gas wells VW4 through VW8 were constructed between June 28 and July 18, 2012. All of the permanent wells were constructed by Vironex.

Each of the permanent sub-slab soil gas vapor wells (VW1-SS through VW3-SS) was constructed using a rotohammer with a 1-inch diameter drill bit that was used to drill to a depth of approximately 3 inches below the bottom of the concrete floor slab. The sub-slab vapor sampling probes were constructed by pouring a #2/16 Lonestar sack sand into the lower 3 inches of the drilled hole until the hole was filled with sand to the bottom of the floor slab. A 2-inch long porous HDPE filter that was connected to a ¼-inch diameter 4-inch long stainless steel tube was inserted into the borehole so that the filter was pushed into the sand and the top of the stainless steel tube was located approximately 1 inch below the top of the concrete floor slab. A

Teflon disk was placed in the annular space surrounding the stainless steel tube on top of the sand, and a bentonite slurry was poured into the annular space to a height of two inches above the top of the Teflon separator. The remaining annular space in the borehole was filled with neat cement. The top of each steel tube was capped with a Swagelok cap and covered with a recessed threaded cap in the floor slab. Copies of the well construction diagrams are attached with this report as Appendix C.

Each of the onsite permanent soil gas vapor wells (VW1-5 through VW3-5) was constructed by driving a 1-inch diameter Geoprobe drilling rod with an expendable tip to a depth of 5 feet bgs, dislodging the expendable tip, and then inserting a 0.250-inch outside diameter (0.187-inch inside diameter) Teflon tube to 8 inches above the bottom of the hollow rod. A 2-inch long porous HDPE filter was connected to the bottom of the tubing prior to inserting the tubing into the hollow rod. When the tubing was inserted into the drill rod, the bottom of the filter was placed 6-inches above the bottom of the hollow rod. A #2/16 Lonestar sack sand was added to the annular space between the hollow rod and the Teflon tubing as the hollow rod was withdrawn from the ground until the lowermost 12 inches of the hole was filled with sand. Granular bentonite (with grains measuring 1 to 2 millimeters in diameter) was placed in the annular space above the sand to a height of 12 inches above the sand, a bentonite slurry was placed in the annular space above the granular bentonite to a height of 12 inches above the granular bentonite, and the remaining annular space was filled with a neat cement grout to the ground surface. The top of each well was covered with a well vault. The total tubing length was 7 feet for each well, and the upper 2-foot long portion of the tubing was coiled inside the well vault with the end of the tubing capped with a Swagelok cap. The permanent soil gas vapor wells VW1-5 through VW3-5 were each constructed at locations 5 feet horizontally from the corresponding permanent sub-slab soil gas well location.

On August 11, 2011 soil gas samples were collected from each of soil gas wells VW1-SS, VW1-5, VW2-SS and VW2-5. 2-Propanol was used as a tracer gas. Well VW1-SS was sampled again on April 23, 2012 and the remaining wells including VW3-SS and VW3-5 were sampled on May 4, 2012. Offsite downgradient soil gas wells VW4 through VW8 were sampled between July 5 and July 20, 2012. The tracer gas 1,1-Difluoroethane (1,1-DFA) was used during the 2012 sampling events. Soil gas collection from the permanent wells was performed using procedures described above for temporary soil gas sample collection with the exception that the flow rate from the sub-slab wells was 50 milliliters per minute, and a 2-foot long section of Teflon tubing was used to connect the top of each sub-slab well head to the stainless steel sampling manifold (see Figure 4). A duplicate soil gas sample was collected at location VW2-5 during each of the August, 10, 2011 and May 4, 2012 sampling events and a duplicate soil gas sample was collected at location VW4 on July 20, 2012 using procedures described above. Shroud samples were collected for soil gas samples VW4 through VW7 using methods described above for collection of 1,1-DFA tracer gas shroud samples. Measurements of vacuums, purging and equilibration time intervals, and PID readings were recorded on Soil Gas Sampling Data Sheets that are attached with this report as Appendix B. A copy of the purge volume calculation sheet for the permanent sub-slab wells is also attached with this report as Appendix B.

No shroud atmosphere air samples were collected during permanent soil gas vapor well sample collection on August 10, 2011. During permanent soil gas vapor well sample collection on May 4, 2012 an air sample of the shroud atmosphere was collected from the shroud into a Tedlar bag

using a vacuum chamber for each of locations VW1-5, VW2-5 and VW3-5. The Tedlar bags were stored in a cooler pending delivery to the laboratory. Chain of custody procedures were observed for all sample handling.

# Borehole Drilling and Groundwater Sample Collection

On September 16, 2011, one borehole designated as B89 was continuously cored using GeoProbe direct push technology by driving a 2.5-inch outside diameter GeoProbe macrocore barrel sampler lined with transparent PVC sleeves to a depth of 25.0 feet bgs for collection of a first-encountered groundwater sample. The purpose of the borehole was to evaluate water quality in the vicinity of where differential settling of surface cover materials was observed on the property immediately upgradient of borehole B89 to evaluate evidence of a potential Underground Storage Tank. In addition, groundwater grab samples were collected at offsite downgradient locations B90 through B97 on June 28, 2012 through July 20, 2012 to evaluate the presence of petroleum hydrocarbons in groundwater adjacent to the offsite downgradient residential structures. Boreholes B90 through B97 were hand augered using a 3.0-inch outside diameter stainless steel hand auger. The locations of the boreholes are shown on Figure 2.

The soil from the boreholes was logged in the field in accordance with standard geologic field techniques and the Unified Soil Classification System, and was evaluated with a Photoionization Detector (PID) equipped with a 10.6 eV bulb that was calibrated with a 100 ppm isobutylene standard. The soil was also evaluated for other evidence of petroleum hydrocarbon contamination such as odors, staining, and discoloration. No elevated PID values, odors, staining, or discoloration were detected in any of the boreholes with the following exceptions.

- In borehole B90 PID readings ranging from 18 to 540 were associated with bluishgray staining and a strong petroleum hydrocarbon odor in clayey sand immediately below the water table between the depths of 7.0 to 7.5 feet bgs. A strong petroleum hydrocarbon odor and sheen were present on the water sample. The borehole was extended to a depth of 9.0 feet bgs and the staining was observed to extend to a depth of 8.0 feet bgs. The clayey sand with the discoloration was located directly above a clayey gravel layer.
- In borehole B94 PID readings ranging from 6 to 94 were associated with a strong petroleum hydrocarbon odor in clayey gravel fill immediately beneath the concrete ground surface cover at a depth of approximately 0.5 to 1.0 feet bgs. In addition, PID readings ranging from 1.6 to 4.6 were encountered at depths of approximately 9.0 to 11.0 feet bgs in silty clay where bluish-gray mottling with a slight petroleum hydrocarbon odor was encountered. No odor or sheen were detected in the groundwater sample collected from the borehole.
- In borehole B95 PID readings ranging from 2 to 475 were associated with a strong petroleum hydrocarbon odor in clayey gravel fill immediately beneath the concrete ground surface cover at a depth of approximately 0.5 to 2.5 feet bgs. In addition, PID readings ranging from 0.6 to 12 were encountered at depths of approximately 9.0 to 12.0 feet bgs in silty clay where bluish-green mottling with a slight petroleum hydrocarbon odor was encountered. A slight petroleum hydrocarbon odor and no sheen were detected in the groundwater sample collected from the borehole.

Soil samples were also collected from hand augered borehole locations B90, B94, and B95 using a 2-inch diameter 6-inch long stainless steel tube in a stainless steel sampler driven by a slide hammer at intervals where elevated PID values were encountered. Following collection of the 6-inch sample, the ends of the sample were evaluated with the PID, and then sequentially covered with aluminum foil and plastic endcaps. The sample were then labeled and placed into a cooler with ice pending delivery to the laboratory. Chain of custody procedures were observed for all sample handling.

Attempts to collect a groundwater sample at drilling location B97 were made at three different locations in the vicinity of the northwest corner of 996 40<sup>th</sup> Street. However drilling refusal was encountered at a depth of 5.0 feet bgs at each location. The drilling refusal is interpreted to have been caused by a buried concrete slab.

Groundwater was initially encountered during drilling at borehole B89 at a depth of approximately 15.5 feet bgs. The borehole was extended to a depth of 20.0 feet bgs and a 1-inch diameter temporary PVC casing was placed in the borehole. When water did not enter the PVC casing the PVC casing was removed from the borehole and the borehole was continuously cored to a depth of 25.0 feet bgs. The PVC casing was placed back into the borehole and the water level was subsequently measured prior to groundwater sample collection at borehole B89 at a depth of 23.6 feet bgs two hours later.

Groundwater was initially encountered while hand augering in boreholes B90 through B96 at depths of 6.5, 10.5, 9.5, 11.0, 14.0, 10.5, and 6.5 feet bgs, respectively. The subsequent measured depth to water in boreholes B90 through B96 prior to groundwater sample collection was 6.4, 10.4, 7.8, 11.5, 12.7, 10.8, and 5.8 feet bgs, respectively. Copies of the boring logs are attached with this report as Appendix D.

Groundwater grab samples were collected from the continuously cored and the hand augered boreholes by placing a temporary slotted PVC pipe into each borehole and using a polyethylene tube attached to a peristaltic pump to draw the water to the ground surface. No petroleum hydrocarbon odor or sheen were detected for the water samples with the exception of location B90 where a strong petroleum hydrocarbon odor and sheen were observed, and at location B95 where a slight petroleum hydrocarbon odor and no sheen were observed on the water sample.

The groundwater samples were transferred from the discharge tubing into 40-milliliter VOAs and one-liter amber glass bottles preserved with hydrochloric acid and capped with Teflon-lined screw caps. All sample containers were clean and provided by the laboratory. The VOAs were overturned and tapped to ensure that no air bubbles were present. The samples were then stored in a cooler with ice, pending delivery to the laboratory. Chain of custody procedures were observed for all sample handling.

All drilling and sampling equipment was either previously unused clean material, or was cleaned with an Alconox solution followed by a clean water rinse prior to use in each borehole. Following groundwater sample collection the borehole was filled with neat cement grout using a tremie pipe. Soil generated during drilling was stored in a labeled drum at the site pending characterization and disposal.

## WEATHER INFORMATION

No rain fell during the two weeks preceding or on the dates of soil gas sampling for the soil gas wells at locations VW1 through VW3 (July 27 and July 28, 2011, August 10, 2011, and September 16, 2011). Approximately 1.65 inches of rain fell two weeks before the soil gas sampling date of April 23, 2012, but no rain fell the week before or on the sample collection date. Similarly, approximately 0.18 inches of rain fell within the two weeks before the soil gas sampling date of May 4, 2012, but no rain occurred on the sample collection date. Weather data, including precipitation and barometric pressure for the dates of sampling and also for the two weeks preceding or periods between sampling dates is provided as Appendix E.

No rain fell during the two weeks preceding the initiation of soil gas sampling for wells VW4 through VW7 and no rain fell on the days of soil gas sampling (July 5, July 6, and July 20 2012). Weather data, including precipitation and barometric pressure for the days of soil gas sampling and also for the two weeks preceding July 5 and the two weeks following July 20, 2012 is provided in Appendix E.

The weather station used for quantification of precipitation and barometric pressure is located on the north side of Peabody Lane to the west of the intersection of Peabody Lane and Marshall Street in Oakland at an elevation of 36 feet, approximately 1.25 mile to the north-northwest of the subject site. The subject site is located at an elevation of approximately 57 feet above sea level. An internet link to the weather station information is also provided in Appendix E.

## GEOLOGY AND HYDROGEOLOGY

A discussion of the site and site vicinity geology is provided in RGA's May 8, 2009 Subsurface Investigation Report. A figure showing the locations of paleochannels identified by others in the vicinity of the subject site is provided in P&D's April 27, 2011 Subsurface Investigation Work Plan.

Based on review of regional geologic maps from U. S. Geological Survey Professional Paper 943, "Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning," by E. J. Helley and K. R. Lajoie, 1979, the subject site is at the interface of underlying materials consisting of Late Pleistocene alluvium (Qpa) and Medium-Grained Alluvium (Qham). Late Pleistocene alluvium is described as weakly consolidated, slightly weathered, poorly sorted, irregularly interbedded clay, silt, sand, and gravel. Medium-Grained Alluvium is described as unconsolidated, moderately sorted, permeable fine sand, silt, and clayey silt with a few thin beds of coarse sand.

Review of the Geologic map and map database of the Oakland metropolitan area, Alameda, Contra Costa, and San Francisco Counties, California: A Digital Database that was compiled by R.W. Graymer (U. S. Geological Survey Miscellaneous Field Studies, MF-2342, Version 1.0 in 2000), shows the subsurface materials underlying the subject site as consisting of Holocene alluvial fan and fluvial deposits (Qhaf). Alluvial fan deposits are described as brown or tan, medium dense to dense, gravely sand or sandy gravel that generally grades upward to sandy or silty clay.

Based on the materials encountered in the borehole core at offsite drilling location B89, the subsurface materials encountered consisted predominantly of silt and silty clay. The subsurface materials correlate with the Holocene alluvial and fluvial deposits (Qhaf) described above. Groundwater was initially encountered while drilling in borehole B89 at a depth of 15.5 feet bgs, however it was necessary to deepen the borehole to a depth of 25.0 feet bgs to obtain a groundwater grab sample. The measured depth to groundwater in borehole B89 prior to groundwater sample collection was 23.6 feet bgs.

Based on the materials encountered in the borehole cores at offsite drilling locations B90 through B94, the subsurface materials encountered consisted predominantly of silt and silty clay. The subsurface materials correlate with the Holocene alluvial and fluvial deposits (Qhaf) which fines upward to silty clay. Groundwater was encountered while drilling in boreholes B90 through B96 at depths of 6.5, 10.0, 9.5, 11.0, 14.0, 10.5, and 6.5 feet bgs, respectively. The measured depth to water in boreholes B90 through B96 prior to groundwater sample collection was 6.4, 10.4, 7.8, 11.5, 12.7, 10.8, and 5.8 feet, respectively.

The surface elevation at the site is between 40 and 60 feet above Mean Sea Level. The topography in the site vicinity gently slopes to the west, and San Francisco Bay is located approximately one mile west of the site. Based on the surface topography, the regional groundwater flow direction is assumed to be westerly to southwesterly.

Review of an August 11, 2004 Quarterly Groundwater Monitoring Report prepared by Aqua Science Engineers, Inc. for the Kozel property located at 1001 42<sup>nd</sup> Street in Oakland (located across Linden Street and immediately to the northwest of the subject site) shows that the June 2004 groundwater flow direction was calculated to be to the southwest, based on water level information from 10 groundwater monitoring wells located at and near the Kozel property.

## LABORATORY RESULTS

All of the soil gas samples (SG61 through SG72, SG62, the duplicate soil gas samples collected at locations SG62A and SG67), and all of the soil gas well samples (VW1-SS through VW3-SS, VW1-5 through VW3-5, and VW4 through VW7) were analyzed at Air Toxics, Limited (Air Toxics) of Folsom, California. All of the soil gas samples were analyzed for Total Petroleum Hydrocarbons as Gasoline (TPH-G) using EPA Method TO-3 and for Methyl-tert butyl ether (MTBE), and for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and the compound used as a leak detector (2-Propanol for samples SG61 through SG67, and 1,1-DFA for samples SG62A, SG62A-DUP, SG68 through SG72, and all of the VW-series permanent soil gas wells) by EPA Method TO-15. The soil gas samples were also analyzed at Air Toxics for Oxygen, Nitrogen Methane, and Carbon Dioxide by Modified ASTM D-1946.

Soil gas sample shroud air samples collected from the shroud atmosphere at locations SG62 and SG63 were analyzed at Air Toxics for the leak detector compound 2-Propanol using EPA Method 5030B in conjunction with EPA Method 8260B.

The soil gas sample shroud air samples collected from the shroud atmosphere at locations SG62A, SG69, VW1-5, VW2-5, VW3-5, and VW4 through VW7 were analyzed at McCampbell

Analytical, Inc. (McCampbell) of Pittsburg, California for the leak detector compound 1,1-DFA using EPA Method 5030B in conjunction with EPA Method 8260B.

All of the soil and groundwater samples were analyzed at McCampbell for TPH-G, MTBE, and for BTEX using EPA Method 5030B in conjunction with EPA methods 8021B and modified EPA Method 8015B. Additionally, the groundwater sample from location B89 was analyzed for total petroleum hydrocarbons as diesel (TPH-D), total petroleum hydrocarbons as bunker oil (TPH-BO), and total petroleum hydrocarbons as motor oil (TPH-MO) using EPA Methods 3510C and 3630C in conjunction with EPA Method 8015B and using silica-gel cleanup.

The soil sample results from the temporary soil gas sample locations are summarized in Table 1A, and the associated shroud atmosphere tracer gas sample results are summarized in Table 1B. The permanent soil gas well sample results are summarized in Table 2A, and the associated shroud atmosphere tracer gas sample results are summarized in Table 2B. The soil sample results are summarized in Table 3, and the groundwater sample results are summarized in Table 4. Copies of the laboratory analytical reports and chain of custody documentation are attached with this report as Appendix F.

# ONSITE FILL MATERIAL STATISTICAL ANALYSIS

A statistical evaluation of residual arsenic and lead concentrations in fill at the subject site was performed to determine if the residual arsenic and lead concentrations statistically exceed regulatory agency guidance concentrations for each of these compounds. Sample results for samples at locations that were excavated and disposed of offsite were not included in the evaluation. The sample results that were included in the evaluation were selected by reviewing all boring logs for which metals analysis was performed on soil samples from the boreholes and selecting samples that were identified as having been collected from fill material. Several samples were identified on the boring logs as having been collected partially in fill and partially in native material, and these samples were not included in the statistical evaluation. Although several soil samples that were identified as native material on the boring logs exhibited total lead concentrations exceeding 40 mg/kg, these samples were not included in the evaluation because the subsurface materials identified on the boring log were not fill material. Soil samples collected from the perimeter of excavated areas following completion of all excavation in those areas were included in the evaluation.

The sample designations and associated arsenic and lead concentrations used in the evaluation are summarized in Tables G1 and G2 in Appendix G, respectively. Figures showing the locations of the samples are provided as Figures G1, G2 and G3 in Appendix G.

The selected sample results were statistically analyzed using ProUCL 4.0 Software (recommended by the United States Environmental Protection Agency (USEPA)). The mean, median, maximum and standard deviation and the 95% upper confidence limit (UCL) of the arsenic and lead concentrations were calculated using ProUCL. The USEPA (1992) recommends using the UCL of the arithmetic mean as a reasonable estimate of the concentrations likely to be contacted over time.

EPA guidance also suggests that, when outliers are suspected of being unreliable and statistical tests show them to be unrepresentative of the underlying data set, any subsequent statistical analyses should be conducted both with and without the outlier(s). Outliers are values in a data set that are not representative of the data set as a whole, usually because they are very large relative to the rest of the data. Therefore, the arsenic and lead data sets were also analyzed without outliers. All of the ProUCL calculation results are provided in Appendix G of this report.

#### Statistical Analysis for Arsenic in Fill Material

The arsenic data was analyzed using ProUCL and the data set of 34 samples summarized in Table G1. The 95% UCL for this data set was 15.94 mg/kg. The ProUCL printout is provided in Appendix G as Table G3, and the 95% UCL value recommended by ProUCL is hi-lited on the table.

The maximum arsenic concentration of 48 mg/kg (sample Pit 2f) was discarded as an outlier and the remaining data set of 33 samples was also analyzed using ProUCL. The 95% UCL for this data set was 9.978 mg/kg. The ProUCL printout is provided in Appendix G as Table G4. The ProUCL output also suggests two alternate 95% UCL values that may be appropriate for the data set, which have 95% UCL values of 10.05 and 9.719 mg/kg.

The two maximum arsenic concentrations of 48 mg/kg (sample Pit 2f) and 30 mg/kg (sample Pit 1g) were discarded as outliers and the remaining data set of 32 samples were analyzed using ProUCL. The 95% UCL for this data set was 8.804 mg/kg. The ProUCL printout is provided in Appendix G as Table G5.

The subject property is located in Oakland, California where arsenic is a naturally occurring metal in the soil.

In accordance with the December 2011 document 'Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region' an upper estimate for background arsenic concentrations within undifferentiated urbanized flatland soils in the San Francisco Bay Area was determined to be 11 mg/kg. This evaluation was conducted at the suggestion of the San Francisco Bay Area Regional Water Quality Control Board (RWQCB) in collaboration with the San Francisco State University.

In accordance with the March 2008 'Determination of a Southern California Regional Background Arsenic Concentration in Soil' document produced by the California Department of Toxic Substances Control (DTSC), the upper-bound concentration of 12 mg/kg was established for arsenic in southern California. The DTSC currently uses this value for both Northern and Southern California.

#### Statistical Analysis for Lead

The arsenic data was analyzed using ProUCL and the data set of 41 samples summarized in Table G2. The 95% UCL for this data set was 121.1 mg/kg. The ProUCL printout is provided

in Appendix G as Table G6, and the 95% UCL value recommended by ProUCL is hi-lited on the table.

The maximum lead concentration of 460 mg/kg (sample TP2-2.0) was discarded as an outlier and the remaining data set of 40 samples was also analyzed using ProUCL. The 95% UCL for this data set was 107.8 mg/kg. The ProUCL printout is provided in Appendix G as Table G7. The two maximum lead concentrations of 460 mg/kg (sample TP2-2.0) and 290 mg/kg (sample TP4-2.0) were discarded as outliers and the remaining data set of 39 samples were analyzed using ProUCL. The 95% UCL for this data set was 100.6 mg/kg. The ProUCL printout is provided in Appendix G as Table G5.

The RWQCB May 2008 Table A Environmental Screening Level (ESL) for lead in soil for residential land use is 200 mg/kg, and for commercial land use is 750 mg/kg.

The DTSC California Human Health Screening Level (CHHSL) for lead is 80 mg/kg.

# SOIL GAS RISK AND HAZARD EVALUATION

DTSC guidance for evaluation of vapor intrusion to indoor air indicates that if look-up table screening levels are exceeded, that a site-specific evaluation of the site should be conducted using appropriate fate and transport modeling. The DTSC has developed a California-specific spreadsheet for calculation of risk and hazard associated with exposure to chemicals based upon the Johnson and Ettinger (JE) model that has been adopted by the USEPA for vapor intrusion fate and transport modeling.

The DTSC screening-level JE vapor intrusion model spreadsheet (last modified December 6, 2011) was used to evaluate the hazard posed by vapor intrusion to indoor air from soil gas for detected concentrations of TPH-G, benzene, toluene, ethylbenzene, and total xylenes at locations VW4-5, VW5-5, VW6-6, VW7-7, and the duplicate collected at location VW4-5. It was not possible to model risk posed by TPH-G, toluene, and xylenes because they are not considered to be carcinogens.

The default values of the JE model spreadsheet DATAENTER page were used with the following exceptions.

- Soil type SI for silt was selected for the vadose zone soil type for sample VW4, and duplicate VW4-DUP.
- Soil type SC for sandy clay was selected for the vadose zone soil type for samples VW5, and VW7.
- Soil type CL for clay was selected for the vadose zone soil type for sample VW6.

Based on a molecular weight of less than 200 grams per mole and a Henry's Law constant greater than 0.0001, TPH-G was evaluated with the JE model spreadsheet as a volatile organic compound. The model VLOOKUP table of chemicals does not contain values for petroleum hydrocarbons. For evaluation of TPH-G the JE Model spreadsheet default chemical properties for ethyl ether on the VLOOKUP page were replaced with physical-chemical and toxicity properties for TPH-G obtained from Table J of the San Francisco Bay Regional Water Quality Control Board

(SFRWQCB) May 2008 guidance document "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater." Additional chemical properties were obtained from the DTSC Interim Guidance Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH), dated June 16, 2009 Table 1 for C5-C8 aliphatic compounds. The physical-chemical and toxicity parameters obtained from these sources are summarized in Table 5.

The modeled cumulative hazard (and risk for compounds where risk can be calculated) for vapor intrusion to indoor air was evaluated for soil gas samples VW4, VW4-DUP, VW5, VW6, and VW7 by using the BTEX concentrations that were detected in the samples and the corresponding physical-chemical and toxicity values that were present on the model VLOOKUP table of chemicals (p-xylene was used for m,p-xylenes). The same evaluation was performed for hazard for TPH-G using the physical-chemical and toxicity parameters summarized in Table 5 of this report. A scenario using the highest concentration for each detected chemical from all of the samples including the duplicate sample (VW4-DUP) was also performed. The spreadsheet RESULTS page output for the calculated hazard for the residential exposure scenario for each chemical are summarized in Table 6. The model input, intercalcs and output sheets for each calculation are attached with this report as Appendix H.

Sensitivity analysis of the soil gas model was performed using benzene for a total of eight different scenarios of varying temperature, soil type, sample depth and contaminant concentration. For scenario 1 a benzene concentration of 4.1 ug/m<sup>3</sup> was used and all of the DTSC spreadsheet default values were used except for the following default changes:

- Line 2-Vadose zone SCS soil type (used to estimate soil vapor permeability) was changed to SC (sandy clay); the default is blank.
- Line 2-User defined vadose zone soil vapor permeability was deleted; the default is 1.00E-8 (cm2).
- Line 3-Vadose zone SCS soil type (used to estimate soil vapor permeability) was changed to SC (sandy clay); the default is blank.

The results of the sensitivity analysis are summarized in Table 7, and the model input, intercalcs and output sheets for each calculation are attached with this report as Appendix I. Review of Table 7 shows that the model appears to be most sensitive to changes in contaminant concentration, is somewhat sensitive to changes in contaminant depth and soil type, and is insensitive to changes in temperature.

# DISCUSSION AND RECOMMENDATIONS

The geophysical survey results show that several zones of lower resistivity were identified as potential zones of higher permeability. These zones were subsequently investigated for evidence of offsite upgradient petroleum sources by collecting soil gas samples.

The offsite temporary soil gas well results showed that no offsite upgradient petroleum hydrocarbon sources were identified. Although 1,600,000  $ug/m^3$  TPH-G was detected at location SG62 (see Table 1A), comparison of the tracer gas concentration of 1,000,000  $ug/m^3$  detected

in the sample with the shroud tracer gas concentration of  $1,200,000 \text{ ug/m}^3$  (see Table 1B) shows that a leak in the sampling system caused the sample to not be representative of subsurface soil gas conditions at that location. Location SG62 was subsequently re-evaluated by collecting soil gas sample SG62A at approximately the same location. Although elevated TPH-G soil gas concentrations were detected at location SG62A, the results of a groundwater sample from adjacent borehole location B89 did not reveal detectable concentrations of petroleum hydrocarbons in groundwater at this location.

Borehole B89 was drilled adjacent to soil gas sample collection locations SG62 and SG62A, and also immediately downgradient of an area where differential settlement of the ground surface cover material was observed. The differential settlement was suspected of being related to either differential settlement of improperly compacted backfill material in a former UST pit or possibly the result of the collapse of an old corroded steel UST. No evidence of staining, discoloration, odor, or detectable PID readings were encountered in the borehole or for the water sample collected from the borehole. The laboratory analytical results for the sample showed that no detectable concentrations of petroleum hydrocarbons were detected in the sample. Based on the absence of detectable concentrations of petroleum hydrocarbons in groundwater, it was concluded that an offsite upgradient source was not identified. Based on the results of the upgradient soil gas samples and groundwater grab sample P&D recommends that no further investigation of potential offsite upgradient sources be performed.

Comparison of the tracer gas concentrations in all of the soil gas samples in Tables 1A and 2A with the corresponding shroud tracer gas concentrations in Tables 1B and 2B shows that none of the tracer gas concentrations detected in the samples exceeds 5 percent of the shroud tracer gas concentration with the exception of sample SG62 discussed above. For samples where a shroud sample was not collected, the shroud tracer gas concentration can be approximated from the shroud tracer gas concentrations that were collected. Based on this information, all of the samples with the exception of SG62 are considered to be valid with respect to sample equipment leaks and short circuiting of atmospheric air into the soil gas wells.

Following review of the initial onsite soil gas well results, soil gas wells were installed at location VW3 so that the locations where the three highest soil gas concentrations (with the exception of SG19) were detected during historical investigation could be evaluated with permanent wells. Location SG19 is considered to be anomalous based on soil gas and groundwater samples collected in the vicinity of SG19. In addition to evaluating potential naturally occurring conduits of higher permeability for soil gas migration, the soil gas wells at locations VW1, VW2 and VW3 were intended to provide a comparison of historical soil gas concentrations with current soil gas concentrations.

Review of Table 1A shows that TPH-G soil gas concentrations exceed the RWQCB May 2008 Table E soil gas ESL for residential land use at 7 locations and for commercial land use at 3 locations. The only other soil gas contaminant detected at a concentration exceeding a May 2008 Table E soil gas ESL is ethylbenzene at locations SG62A and SG64. Benzene was not detected in any of the offsite soil gas samples at a concentration exceeding the May 2008 Table E soil gas ESL value for residential land use.

Review of Table 2A shows that TPH-G soil gas concentrations exceed the residential RWQCB May 2008 Table E soil gas ESL for residential and also for commercial land use at location VW2 and only exceed the TPH-G Table E ESL for soil gas for residential land use at location VW3. The only other soil gas contaminant detected at a concentration exceeding a May 2008 Table E soil gas ESL is benzene at location VW2. Benzene was not detected in any of the other onsite soil gas samples at a concentration exceeding the May 2008 Table E soil gas ESL value for residential land use. The soil gas concentrations encountered in permanent soil gas wells at locations VW1 through VW3 are all substantially lower than soil gas concentrations encountered in temporary soil gas wells at the same locations approximately 3 years prior. The cause for the reduction in soil gas concentrations is unknown. Based on the detected soil gas concentrations is performed onsite.

Review of Table 2A also shows that all soil gas concentrations detected in offsite downgradient soil gas wells VW4-5 through VW7-5 were below their respective May 2008 Table E soil gas residential ESL values except for TPH-G at well VW5 which was detected at a concentration equal to the May 2008 Table E soil gas residential ESL. Figure 2 shows TPH-G soil gas concentrations and Figure 3 shows benzene soil gas concentrations for all soil gas locations sampled to date. Based on the offsite soil gas concentrations obtained to date in conjunction with the most recently obtained soil gas concentrations obtained from permanent onsite soil gas wells, the extent of soil gas in the vicinity of the site appears to be defined with the exception of TPH-G at locations SG62A, SG64, SG66 and SG72 on the north side of 41<sup>st</sup> Street. Based on the absence of benzene or any other soil gas analytes other than TPH-G at concentrations exceeding Table E soil gas ESLs at these locations, P&D recommends that no further investigation of soil gas be performed.

Review of the oxygen, methane, and carbon dioxide concentrations for the samples collected from the permanent soil gas wells (see Table 2A) shows that the oxygen concentrations are lower than the atmospheric oxygen concentration of approximately 21 percent for the majority of the soil gas wells that are located within the footprint of the building, and that all of the oxygen concentrations for permanent soil gas wells located outside the building footprint (VW4-5 through VW7-5) are either at or very close to the atmospheric oxygen concentration. This relationship indicates that where relatively impervious surface cover is present within the subject site building footprint, the movement of atmospheric air into the ground is inhibited. The relative absence of methane in all of the soil gas samples indicates that anaerobic metabolism of organic matter is not occurring at the site. Similarly, the presence of the highest carbon dioxide concentrations in samples obtained from wells located within the footprint of the building.

Review of the soil sample results in Table 3 shows that elevated TPH-G concentrations were encountered in borehole B90 at a depth of 7 feet bgs and in borehole B95 at a depth of 1 foot bgs, however benzene was not detected in any of the samples. Review of the borehole groundwater grab sample results in Table 4 shows that the only location where petroleum hydrocarbon concentrations were detected at concentrations exceeding May 2008 Table A ESLs is at location B90, where TPH-G, ethylbenzene and total xylenes were detected. No other analytes were detected at concentrations exceeding their respective Table A ESL values.

Figure 5 shows TPH-G concentrations and Figure 6 shows benzene groundwater concentrations in groundwater in the vicinity of the intersection of Linden Street and 40<sup>th</sup> Street. Review of historical water quality in the vicinity of the intersection of Linden and 40<sup>th</sup> Street shows that petroleum hydrocarbons have not been detected in groundwater at locations B7, B8, B71 and B73 (groundwater was not encountered in boreholes B72, B75, and B76). Review of RGA's November 16, 2005 Subsurface Investigation Report shows that the only petroleum hydrocarbon analytes detected in soil samples collected from the boreholes where groundwater was collected consisted of TPH-G at concentrations of 36 and 230 mg/kg in borings B7 and B8 at depths of 7.0 and 7.5 feet, bgs, respectively, and 0.049 and 0.81 mg/kg xylenes, respectively. Based on these historical results in conjunction with the absence of detectable concentrations of petroleum hydrocarbons detected in borehole B90 appear to be limited in extent primarily to the northwestern corner of the house at 996 40<sup>th</sup> Street.

Review of risk and hazard analysis results in Table 6 for the offsite downgradient wells (VW4 through VW7) shows that all of the calculated cumulated hazards for all of the samples are less than 1.0 and all of the calculated cumulative risk for all of the samples are less than 1 per million for all of the samples, including the scenario where the highest concentration from each sample are collectively evaluated for a worst-case scenario. Based on the acceptable hazard and risk for all of the offsite downgradient soil gas samples, P&D recommends that no further offsite downgradient soil gas or groundwater investigation be performed.

Based on the UCL analysis of the fill material at the site, the arsenic concentrations in the site fill are below regulatory guidance screening criteria concentrations of 11 or 12 mg/kg when one outlier is discarded from the 95% UCL analysis. The two highest arsenic concentrations were encountered on the north side of the excavated area at the west end of the facility (samples 1g and 2f at Pits 1 and 2, respectively). Based on arsenic concentrations encountered in test pits TP1, TP2 and TP3 located to the north of excavated areas Pit 1 and Pit 2 (see Tables 1C and 1D in RGA's May 8, 2009 Subsurface Investigation Report), the extent of elevated arsenic concentrations in the immediate vicinity of Pits 1 and 2 appears to be limited in extent. All 95% UCL analysis results for lead in fill at the site similarly show that lead concentrations are below the RWQCB Table A residential ESL of 200 mg/kg. Based on the results of the 95% UCL analysis, P&D recommends that no further evaluation of the fill at the site be performed. P&D recommends that excavation and disposal of soil containing elevated arsenic concentrations in the vicinity of samples1g and 2f be performed if no land use restrictions are to be required for the site based on fill arsenic or lead concentrations.

Based on defined extent of petroleum hydrocarbons in soil gas and groundwater P&D recommends that the offsite downgradient soil gas wells be sampled during seasonal wet weather conditions to confirm that soil gas concentrations are consistent during seasonal wet weather conditions with the results obtained during seasonal dry weather conditions at downgradient soil gas well locations VW4-5 through VW7-5.

## DISTRIBUTION

A copy of this report will be uploaded to the ACDEH website, in accordance with ACDEH requirements. In addition, a copy of this report will be uploaded to the GeoTracker database.

# **LIMITATIONS**

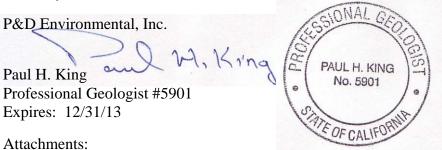
This report was prepared solely for the use of California Linen Rental Company. The content and conclusions provided by P&D in this assessment are based on information collected during our investigation, which may include, but not be limited to, visual site inspections; interviews with the site owner, regulatory agencies and other pertinent individuals; review of available public documents; subsurface exploration and our professional judgment based on said information at the time of preparation of this document. Any subsurface sample results and observations presented herein are considered to be representative of the area of investigation; however, geological conditions may vary between borings and may not necessarily apply to the general site as a whole. If future subsurface or other conditions are revealed which vary from these findings, the newly revealed conditions must be evaluated and may invalidate the findings of this report.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information contained herein is brought to the attention of the appropriate regulatory agencies, where required by law. Additionally, it is the sole responsibility of the owner to properly dispose of any hazardous materials or hazardous wastes left onsite, in accordance with existing laws and regulations.

This report has been prepared in accordance with generally accepted practices using standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature. P&D is not responsible for the accuracy or completeness of information provided by other individuals or entities which is used in this report. This report presents our professional judgment based upon data and findings identified in this report and interpretation of such data based upon our experience and background, and no warranty, either express or implied, is made. The conclusions presented are based upon the current regulatory climate and may require revision if future regulatory changes occur.

Should you have any questions or comments, please do not hesitate to contact us at (510) 658-6916.

Sincerely,



TABLES

- Table 1A
   Summary of Soil Gas Sample Analytical Results
- Table 1B Summary of Shroud Air Sample Analytical Results
- Table 2A Summary of Vapor Well Soil Gas Sample Analytical Results
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- Table 5 Physical-Chemical and Toxicity Parameters for TPH-Gasoline
- Table 6 Summary of Soil Vapor Well Soil Gas Sample Risk and Hazard Analysis
- Table 7 DTSC JE Model Sensitivity Analysis Calculations

# **FIGURES**

Figure 1 - Site Vicinity Aerial Photograph Showing Geophysical Survey Profile Locations

Figure 2 - Site Vicinity Aerial Photograph Showing Resistivity Profile and Sample Collection Locations with TPH-G Soil Gas Concentrations

Figure 3 - Site Vicinity Aerial Photograph Showing Resistivity Profile and Sample Collection Locations with Benzene Soil Gas Concentrations

Figure 4 - Typical Soil Gas Sampling Manifold

Figure 5 - Site Vicinity Aerial Photograph Showing Resistivity Profile and Sample Collection

Locations with TPH-G Groundwater Concentrations

Figure 6 - Site Vicinity Aerial Photograph Showing Resistivity Profile and Sample Collection Locations with Benzene Groundwater Concentrations

# **APPENDICES**

Appendix A - Geophysical Survey

Appendix B - Soil Gas Purge Volume Calculations and Soil Gas Sampling Data Sheets

- Appendix C Vapor Well Construction Diagrams
- Appendix D Boring Logs
- Appendix E Weather Information
- Appendix F Laboratory Analytical Reports and Chain of Custody Documentation
- Appendix G Onsite Fill Statistical Analysis

Appendix H - HERD December 2011 Vapor Intrusion Risk and Hazard Calculation Work Sheets

Appendix I - DTSC JE Soil Gas Model Sensitivity Analysis Risk and Hazard Calculation Work Sheets

PHK/mld/sjc/0304.R19

# **TABLES**

# Table 1A Summary of Soil Gas Sample Analytical Results

Sample Date	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	2-Propanol	1,1-Difluoroethane
7/28/2011	18,000	ND<4.1	51	370	21	70	19	9,900,a	NA
7/28/2011	<u>1,600,000</u>	ND<910	ND<800	ND<950	ND<1,100	ND<1,100	ND<1,100	1,000,000, a	NA
9/16/2011	<u>290,000</u>	ND<44	ND<39	18,000	1,300	5,000	1,500	NA	ND<130
9/16/2011	<u>390,000</u>	ND<60	ND<54	17,000	1,200	4,800	1,500	NA	ND<180
7/28/2011	23,000	ND<4.9	48	1,200	92	330	110	ND<13	NA
7/27/2011	<u>310,000</u>	ND<41	ND<36	13,000	1,100	3,800	1,400	ND<110	NA
7/27/2011	5,000	ND<4.4	6.9	220	16	55	19	240	NA
7/27/2011	13,000	ND<13	23	660	42	130	49	56	NA
7/27/2011	2,500	ND<4.5	9.7	78	7.6	30	10	57	NA
7/27/2011	2,700	ND<4.4	9.2	77	8.0	30	11	52	NA
9/16/2011	5,200	ND<4.3	4.9	150	17	82	26	NA	ND<13
9/16/2011	70,000	ND<14	ND<13	3,800	290	1,100	340	NA	ND<44
9/16/2011	5,800	ND<4.4	7.0	130	15	65	18	NA	ND<13
9/16/2011	3,200	ND<4.4	5.6	110	10	44	13	NA	ND<13
9/16/2011	13,000	ND<13	ND<11	250	26	94	27	NA	ND<38
	10.000	9.400	84	63.000	980	21.000 c	ombined	None	None
	29,000	31,000	280	180,000	3,300			None	None
l-tert-Butyl Ethe	er.		soil gas sample:	s collected on 7/	28/11.				
e = used as leak									
	strument Calib	ration Range.							
			nt of 2-Propanol	l inside sampling	g chamber.				
							), from Table E	(updated May 2	008) —
		,		6					
							), from Table E	(updated May 2	)08)–
			oil Gas Screenin	g Levels for Co	mmercial/Industri	ial Land Use.			
	A								
ues exceed their	respective ESL <sup>2</sup>	values.		1	1			1	
	7/28/2011         7/28/2011         9/16/2011         9/16/2011         7/28/2011         7/28/2011         7/27/2011         7/27/2011         7/27/2011         7/27/2011         9/16/2011	7/28/2011       18,000         7/28/2011       1,600,000         9/16/2011       290,000         9/16/2011       390,000         7/28/2011       23,000         7/28/2011       23,000         7/27/2011       310,000         7/27/2011       5,000         7/27/2011       2,500         7/27/2011       2,500         7/27/2011       2,500         9/16/2011       5,200         9/16/2011       5,200         9/16/2011       5,800         9/16/2011       3,200         9/16/2011       3,200         9/16/2011       3,200         9/16/2011       3,200         9/16/2011       3,000         10,000       29,000         2       2         9/16/2011       10,000         29,000       2         2       2         9/16/2011       3,000         9/16/2011       10,000         29,000       2         2       2         9/16/2011       3,000         2       2         9/16/2011       3,000         2       2	7/28/2011         18,000         ND<4.1           7/28/2011         1,600,000         ND<910	1         1 <th1< th="">         1         <th1< th=""> <th1< th=""></th1<></th1<></th1<>	7/28/2011         18,000         ND<4.1         51         370           7/28/2011         1,600,000         ND<910	7/28/2011         18,000         ND<4.1         51         370         21           7/28/2011         1.600,000         ND<910	1         1         1         1         1         1         1         1         7           7/28/2011         1,600,000         ND<41	1         1         370         21         70         19           728/2011         18,000         ND<310	728/2011         18,000         ND<4.1         51         370         21         70         19         9,900,a           7/28/2011         1,600,000         ND<910

 Table 1B

 Summary of Shroud Air Sample Analytical Results

Sample ID	Sample Date	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	2-Propanol	1,1-Difluoroethane
SG62, b	7/28/2011	NA	NA	NA	NA	NA	NA	NA	1,200,000	NA
SG63, b	7/28/2011	NA	NA	NA	NA	NA	NA	NA	1,200,000	NA
SG62-A, c	9/16/2011	NA	NA	NA	NA	NA	NA	NA	NA	51,000,000
SG69, c	9/16/2011	NA	NA	NA	NA	NA	NA	NA	NA	26,000,000
ESL <sup>1</sup>		10,000	9,400	84	63,000	980	21,000 c	ombined	None	None
ESL <sup>2</sup>		29,000	31,000	280	180,000	3,300	58,000 c	ombined	None	None
	lyzed. Note: Exceeds In samples collected samples collected	r. or during samp used as leak do strument Calib 1 from shroud t 1 from shroud t	ble collection for etector during so pration Range. to quantify amou o quantify amou	nt of 2-Propand nt of 1,1-DFA	ollection on 9/1	6/11. ng chamber. chamber.	and (SE DWOC	D) from Table 1		2008)
Indoor Air and	mental Screening Soil Gas (Vapor mental Screening	Intrusion Conc	erns) Shallow S	oil Gas Screeni	ng Levels for Re	esidential Land U	Jse.			
Indoor Air and	Soil Gas (Vapor exceed their res	Intrusion Conc	erns) Shallow S							
Underlined Val	lues exceed their t Ls in micrograms	respective ESL	$2^{2}$ values.	ess otherwise in	dicated.					

 Table 2A

 Summary of Vapor Well Soil Gas Sample Analytical Results

Sample ID	Sample Date	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	2-Propanol	1,1-DFA*	Oxygen	Nitrogen	Methane	Carbon
-	•					•					<u>(%)</u>	(%)	<u>(%)</u>	Dioxide
														<u>(%)</u>
VW1-SS	4/23/2012	480	ND<2.8	4.5	4.2	ND<3.4	3.9	ND<3.4	NA	280	5.9	90	ND<0.00020	3.7
VW1-SS	8/10/2011	390	ND<4.4	ND<3.9	ND<4.6	ND<5.2	ND<5.2	ND<5.2	100	NA	9.6	88	0.00084	2.3
VW1-5	5/4/2012	1,600	ND<6.0	ND<5.4	12	ND<7.3	ND<7.3	ND<7.3	NA	4,100, a	20	80	ND<0.00044	0.37
VW1-5	8/10/2011	6,200	ND<16	ND<14	63	30	86	25	760	NA	14	83	0.031	2.9
VW2-SS	5/4/2012	26,000	ND<3.0	ND<2.6	ND<3.1	ND<3.6	ND<3.6	ND<3.6	NA	19,000, a	11	80	ND<0.00020	8.6
VW2-SS	8/10/2011	ND<220	ND<3.9	ND<3.4	ND<4.1	ND<4.7	ND<4.7	ND<4.7	41	NA	8.5	80	0.00038	11
VW2-5	5/4/2012	2,200	ND<24	ND<21	ND<25	ND<29	ND<29	ND<29	NA	96	7.6	85	ND<0.0017	7.3
VW2-5	8/10/2011	<u>65,000</u>	ND<46	90	1,700	810	2,600	850	28,000, a	NA	5.7	91	0.00092	2.8
VW2-5 DUP	5/4/2012	610	ND<2.5	3.2	ND<6.9	ND<3.0	ND<3.0	ND<3.0	NA	ND<7.5	5.7	81	ND<0.00018	13
VW2-5 DUP	8/10/2011	<u>480,000</u>	ND<620	ND<550	1,100	ND<750	1,800	ND<750	400,000, a	NA	9.6	88	0.00084	2.3
VW3-SS	5/4/2012	16,000	ND<2.8	2.7	3.0	ND<3.4	5	ND<3.4	NA	100	15	80	ND<0.00022	5.0
VW3-5	5/4/2012	ND<100	ND<1.8	ND<1.6	ND<1.9	ND<2.2	ND<2.2	ND<2.2	NA	ND<5.4	ND<0.10	ND<0.10	ND<0.00010	ND<0.010
VW4	7/20/2012	3,400	ND<16	ND<14	180	33	110	39	NA	4,400	20	79	0.00018	1.2
VW4-DUP	7/20/2012	3,500	ND<27	ND<24	170	32	81	33	NA	4,100	20	79	0.00018	1.2
VW5	7/5/2012	10,000	ND<8.1	ND<7.2	240	24	130	70	NA	1,400	22	77	ND<0.00034	0.68
VW6	7/6/2012	7,400	ND<3.7	ND<3.3	120	10	31	32	NA	ND<11	20	78	ND<0.00032	2.2
VW7	7/5/2012	3,000	ND<3.5	4.1	15	5.9	16	6	NA	ND<10	18	77	ND<0.00026	4.6
$ESL^{1}$		10,000	9,400	84	63,000	980	21,000 co	mbined	None	None	None	None	None	None
ESL <sup>2</sup>		29,000	31,000	280	180,000	3,300	58,000 co	mbined	None	None	None	None	None	None
NOTES:														
TPH-G = Total	2		Gasoline.											
MTBE = Methy	,													
$\frac{1,1-\text{DFA}=1,1-1}{2-\text{Propanol}=us}$			1											
2-Propanol = us ND = Not Dete		ctor during se	imple colle	ction.										
ND = Not Determined NA = Not Anal														
* = Tracer Gas	yzeu.													
a = Laboratory	Note: Exceeds l	Instrument C	alibration R	lange.										
				U	co Bay – R	egional Water Q	uality Control E	Board (SF-R	WOCB), from	Table E (upo	lated May	2008)-		
		•	1 1			ing Levels for R				V-F		, í		
						egional Water Q				Table E (upo	lated May	2008)-		
				allow Soil	Gas Screen	ing Levels for C	ommercial/Indu	strial Land	Use.					
Values in bold		-												
Underlined Val		-												
Results and ESI	Ls in microgram	ns per cubic r	neter (µg/n	13), unless	otherwise i	ndicated.							L	

# Table 2B Summary of Shroud Air Sample Analytical Results

view         view <th< th=""><th>Sample ID</th><th>Sample Date</th><th>TPH-G</th><th>MTBE</th><th>Benzene</th><th>Toluene</th><th>Ethylbenzene</th><th>m,p-Xylenes</th><th>o-Xylenes</th><th>2-Propanol*</th><th>1,1-DFA*</th><th>Oxygen</th><th>Nitrogen</th><th>Methane</th><th>Carbon</th></th<>	Sample ID	Sample Date	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	2-Propanol*	1,1-DFA*	Oxygen	Nitrogen	Methane	Carbon
WI-5 Shroud         5/4/2012         NA												(%)	<u>(%)</u>	<u>(%)</u>	Dioxide
VW2-5 Shroud     S/4/2012     NA       VW3-5 Shroud     5/4/2012     NA       VW3-5 Shroud     5/4/2012     NA       VW4 Shroud     7/20/2012     NA       VW5 Shroud     7/5/2012     NA       VW6 Shroud     7/6/2012     NA       VW7 Shroud     7/5/2012     NA       VW7 Shroud     7/5/2012     NA       VT7 Shroud     7/5/2012     NA     NA     NA     NA     NA     NA     NA     NA     NA       VT75     10,000															<u>(%)</u>
VW3-5 Shroud5/4/2012NA	VW1-5 Shroud	5/4/2012	NA	NA	NA	NA	NA	NA	NA	NA	26,000,000	NA	NA	NA	NA
VW3-5 Shroud5/4/2012NA	VW2-5 Shroud	5/4/2012	NA	NA	NA	NA	NA	NA	NA	NA	11 000 000	NA	NA	NA	NA
VW4 Shroud       7/20/2012       NA	VW2 5 Shioud	5/4/2012	1011	1171	1111	1011	1111	1471	1011	1111	11,000,000	1171	1111	1171	1111
VW5 Shroud         7/5/2012         NA	VW3-5 Shroud	5/4/2012	NA	NA	NA	NA	NA	NA	NA	NA	9,000,000	NA	NA	NA	NA
VW6 Shroud       7/6/2012       NA       NA<	VW4 Shroud	7/20/2012	NA	NA	NA	NA	NA	NA	NA	NA	5,000,000	NA	NA	NA	NA
VW7 ShroudT/5/2012NA	VW5 Shroud	7/5/2012	NA	NA	NA	NA	NA	NA	NA	NA	12,000,000	NA	NA	NA	NA
ESL '       10.00       9,400       84       63,000       980       21,000 combined       None       N	VW6 Shroud	7/6/2012	NA	NA	NA	NA	NA	NA	NA	NA	8,900,000	NA	NA	NA	NA
LSL       29,000       31,000       280       180,000       3,300       58,000 combined       None       None <t< td=""><td>VW7 Shroud</td><td>7/5/2012</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>11,000,000</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></t<>	VW7 Shroud	7/5/2012	NA	NA	NA	NA	NA	NA	NA	NA	11,000,000	NA	NA	NA	NA
LSL       29,000       31,000       280       180,000       3,300       58,000 combined       None       None <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>															
Notes:       Image: Construction of the second	$ESL^{1}$		10,000	9,400	84	63,000	980	21,000 con	mbined	None	None	None	None	None	None
TPH-G = Total Petroleum Hydrocarbons as Gasoline. MTBE = Methyl-tert-Butyl Ether. 1,1-DFA = 1,1-Difluoroethane ND = Not Detected. NA = Not Analyzed. * = Tracer Gas a = Laboratory Note: Exceeds Instrument Calibration Range. ESL <sup>1</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use. ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use. ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use. ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use. Values in bold exceed their respective ESL <sup>1</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values.	ESL <sup>2</sup>		29,000	31,000	280	180,000	3,300	58,000 con	mbined	None	None	None	None	None	None
TPH-G = Total Petroleum Hydrocarbons as Gasoline. MTBE = Methyl-tert-Butyl Ether. 1,1-DFA = 1,1-Difluoroethane ND = Not Detected. NA = Not Analyzed. * = Tracer Gas a = Laboratory Note: Exceeds Instrument Calibration Range. ESL <sup>1</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use. ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use. ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use. ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use. Values in bold exceed their respective ESL <sup>1</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values.	NOTES														
MTBE = Methyl-tert-Butyl Ether.       Image: Construction of the second se		etroleum Hydro	carbons as	Gasoline.											
ND = Not Detected.       Image: Control Board (SF-RWQCB), from Table E (updated May 2008)-         NA = Not Analyzed.       Image: Control Board (SF-RWQCB), from Table E (updated May 2008)-         Image: ESL <sup>1</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)-         Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use.       Image: Concerns Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.         Values in bold exceed their respective ESL <sup>1</sup> values.       Image: Concerns Concerns Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.       Image: Concerns Concerns Concerns Concerns Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.         Values in bold exceed their respective ESL <sup>1</sup> values.       Image: Concerns Co															
NA = Not Analyzed.       Image:       I	1,1-DFA = 1,1-Di	fluoroethane													
* = Tracer Gas															
a = Laboratory Note: Exceeds Instrument Calibration Range. ESL <sup>1</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use. ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use. Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use. Values in bold exceed their respective ESL <sup>1</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values.	2	ed.													
ESL <sup>1</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)–       Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use.       ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)–         Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.       Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.         Values in bold exceed their respective ESL <sup>1</sup> values.       Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.       Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.         Values in bold exceed their respective ESL <sup>1</sup> values.       Indoor Air and Soil Gas Screening Levels for Commercial/Industrial Land Use.       Indoor Air and Use.				1'1 /' T											
Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use.  ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)– Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.  Values in bold exceed their respective ESL <sup>1</sup> values. Underlined Values exceed their respective ESL <sup>2</sup> values.					U						<b></b>		••••		
ESL <sup>2</sup> = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E (updated May 2008)–         Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.         Values in bold exceed their respective ESL <sup>1</sup> values.         Underlined Values exceed their respective ESL <sup>2</sup> values.										RWQCB), from	Table E (upo	lated May	2008)-		
Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.          Values in bold exceed their respective ESL <sup>1</sup> values.										RWOCB), from	n Table E (upo	lated May	2008)-		
Values in bold exceed their respective ESL <sup>1</sup> values.       Image: Constraint of the second sec											(up		,		
Underlined Values exceed their respective ESL <sup>2</sup> values.							0								
						otherwise	indicated.								

Table 3Summary of Borehole Soil Sample Analytical Results

			•		•					
Sample ID	Sample Date	Address	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes		
B90-7	7/18/2012	996 40th Street	770, a,b	ND<5.0	ND<0.50	ND<0.50	4.4	13		
B94-1.0	6/28/2012	940 40th Street	37, a,b	ND<0.05	ND<0.005	0.040	0.016	0.067		
B94-8.0	6/28/2012	940 40th Street	14, a	ND<0.05	ND<0.005	0.015	ND<0.005	0.018		
B95B-1	7/20/2012	940 40th Street	610, a	ND<1.7	ND<0.17	ND<0.17	ND<0.17	1.8		
ESL			83	0.023	0.044	2.9	2.3	2.3		
NOTES: TPH-G = Total I	Petroleum Hydro	carbons as Gasolin	e.							
MTBE = Methyl	•		••							
ND = Not Detec	ted.									
a = Laboratory N	Note: strongly age	ed gasoline or diese	el range compo	ounds are signifi	cant in the TPH	G chromatogram	m.			
b = Laboratory N	Note: no recogniz	able pattern.								
ESL = Environm	nental Screening	Level, developed b	y San Francis	co Bay – Region	al Water Quality	Control Board	d (SF-RWQCB)			
updated May 20	08, from Table A	A–Shallow Soil Scr	eening Levels	, Groundwater is	s a current or pot	tential source o	f drinking water.			
Residential Land Use										
Values in bold e	exceed their resp	pective ESL values	5.							
Results and ESL	s in milligrams p	er kilogram (mg/k	), unless other	wise indicated.						

 Table 4

 Summary of Borehole Groundwater Grab Sample Analytical Results

Sample ID	Sample Date	TPH-G	TPH-D	TPH-MO	TPH-BO	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes
B89-W	9/16/2011	ND<50	ND<50	ND<250	ND<100	ND<5.0	ND<0.5	0.76	ND<0.5	ND<0.5
B90-W	7/18/2012	30,000, b	NA	NA	NA	ND<500	ND<50	ND<50	420	2200
B91-W	7/2/2012	58, b	NA	NA	NA	ND<5.0	ND<0.5	2.3	0.55	4.5
B92-W	7/3/2012	ND<50	NA	NA	NA	ND<5.0	ND<0.5	5.7	0.56	3.3
B93-W	6/28/2012	ND<50	NA	NA	NA	ND<5.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5
B94-W	6/29/2012	53	NA	NA	NA	ND<5.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5
B95B-W	7/20/2012	65, a	NA	NA	NA	ND<5.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5
B96-W	7/20/2012	ND<50	NA	NA	NA	ND<5.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5
ESL		100	100	100	100	5.0	1.0	40	30	20
TPH-D = Total	Petroleum Hydr Petroleum Hydr tal Petroleum Hy	rocarbons as Die	esel.							
TPH-BO = Tot	al Petroleum Hy	drocarbons as B								
MTBE = Methyl-tert-Butyl Ether.       Image: Constraint of the second seco										
	mental Screening creening Levels,						ard (SF-RWQC	B) updated Ma	y 2008, from Tab	ble A–
	exceed their re	-			-					
Results and ES	Ls in microgram	s per Liter (µg/l	, unless other	wise indicated.						

Table 5 Physical-Chemical and Toxicity Parameters for TPH-Gasoline

																	Orią	ginal EPA Va	alues	
		Organic carbon partition coefficient,	Diffusivity in air,	Diffusivity in water,	Pure component water solubility,	Henry's law constant	Henry's law constant at reference temperature,	Henry's law constant reference temperature,	Normal boiling point,	Critical temperature,	Enthalpy of vaporization at the normal boiling point,	Unit risk factor,	Reference conc.,	Molecular weight,	URF	RfC	Unit risk factor,	Reference conc.,	URF	RfC
CAS No.	Chemical	K <sub>oc</sub> * (cm <sup>3</sup> /g)	D <sub>a</sub> * (cm <sup>2</sup> /s)	D <sub>w</sub> * (cm <sup>2</sup> /s)	S * (mg/L)	H' * (unitless)	H * (atm-m <sup>3</sup> /mol)	1 <sub>R**</sub> (°C)	(°K)	1 <sub>C**</sub> (°K)	DH <sub>v,b</sub> ** (cal/mol)	URF ** (mg/m <sup>3</sup> ) <sup>-1</sup>	RfC * (mg/m <sup>3</sup> )	MW * (g/mol)	extrapolated (X)	extrapolated (X)	URF (mg/m <sup>3</sup> ) <sup>-1</sup>	RfC (mg/m <sup>3</sup> )	extrapolated (X)	extrapolated (X)
None	TPH-G*	5.00E+03	7.00E-02	7.80E-06	1.50E+02	7.20E-04	3.00E-02	25	369.00	508.00	7,000	NA	4.9E+01	108	NA	NA	NA	NA	NA	NA

NOTES: TPH-G = Total Petroleum Hydrocarbons as Gasoline. NA = Not Available. \*\* = Data obtained from San Francisco Bay - Regional Water Quality Control Board (SF-RWQCB) Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, updated May 2008, from Table J - Physical-Chemical and Toxicity Values Used in Models. \*\* = Data obtained from the California Department of Toxic Substances Control (DTSC) document Interim Guidance Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH), dated June 16, 2009, where TPH-G is approximated by CS-C8 aliphatic compounds.

or Soil Gas Contam Former California L 189 41st Street Dakland, CA	Level Model ination (last modified 12/6/ inen Site	2011)		Incremental risk from vapor	Hazard quotient from vapor		
				intrusion to	intrusion to		
				indoor air,	indoor air,		
		Sample	Concentration	carcinogen	noncarcinogen		
hemical		Location	$(\mu g/m^3)$	(unitless)	(unitless)	NOTES	CAS#
W4	996 40th Street	VW4			-		
PH-G		silt	3,400	NA	6.1E-05		None
luene			180	NA	6.0E-04	_	10888
hylbenzene			33	3.2E-08	3.0E-05		10041
p-xylene			110	NA	1.0E-03	used p-xylene CAS #	10642
xylene			39	NA	3.9E-04		95476
			TOTALS	3.2E-08	2.1E-03		
W4-DUP	996 40th Street	VW4					
'H-G		silt	3,500	NA	6.2E-05	7	None
luene			170	NA	5.6E-04		10888
nylbenzene			32	3.1E-08	2.9E-05		1004
p-xylene			81	NA	7.5E-04	used p-xylene CAS #	10642
tylene			33	NA	3.3E-04		95476
			TOTALS	3.1E-08	1.7E-03		
<u>V5</u> H-G luene	990 40th Street	VW5 sandy clay	10,000 240 24	NA NA	6.6E-05 3.1E-04		None 1088
hylbenzene ,p-xylene			24 130	8.8E-09 NA	8.2E-06 4.5E-04	CAS#	10041 10642
ylene			70	NA	2.7E-04	used p-xylene CAS #	95476
			TOTALS	8.8E-09	1.1E-03		
W6	984 40th Street	VW6					
'H-G		clay	7,400	NA	1.1E-04	7	None
luene		-	120	NA	3.2E-04		10888
nylbenzene			10	7.8E-09	7.3E-06		10041
p-xylene			31	NA	2.3E-04	used p-xylene CAS #	10642
tylene			32	NA	2.6E-04		95476
			TOTALS	7.8E-09	9.3E-04		
<u>W7</u>	940 40th Street	VW7					<b></b>
		sandy clay	3,000	NA	2.0E-05	4	None
			4.1	2.0E-08	5.3E-05	4	71432
nzene			15	NA 2 2E 00	1.9E-05	-	10888
nzene luene			5.9 16	2.2E-09 NA	2.0E-06 5.6E-05	used a vulsas CAC #	10041 10642
nzene luene nylbenzene				INA	J.0E-03	used p-xylene CAS #	110047
enzene bluene hylbenzene p-xylene				NA		1 5	
PH-G enzene oluene hylbenzene p-xylene xylene			6.0 TOTALS	NA 2.2E-08	2.3E-05		95476

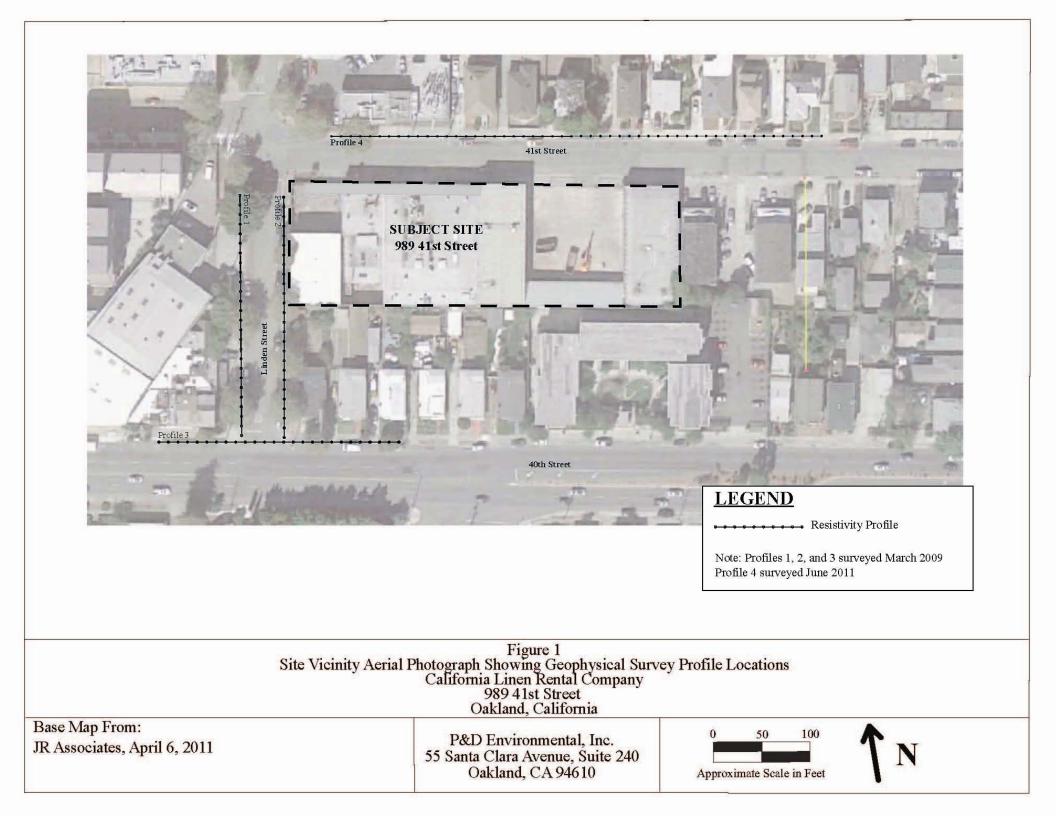
Report 0304.R19		Table 6				
1	of Soil Vapor	r Well Soil Gas Sa	ample Risk and	Hazard Analysi	is	
Cal/EPA Screening-Level Model			•			
for Soil Gas Contamination (last modified 12/6/20	11)					
Former Bytech Chemical Site	,					
1905-1991 Dennison Street			Incremental	Hazard		
Oakland, CA			risk from	quotient		
Sampled 5/9/12			vapor	from vapor		
			intrusion to	intrusion to		
			indoor air,	indoor air,		
	Sample	Concentration	carcinogen	noncarcinogen		
Chemical	Location	$(\mu g/m^3)$	(unitless)	(unitless)		
Highest Detected Concentrations						
TPH-G	VW5	10,000	NA	6.6E-05		None
Benzene	VW7	4.1	2.0E-08	5.3E-05		71432
Toluene	VW5	240	NA	3.1E-04		108883
Ethylbenzene	VW4	33	3.2E-08	3.0E-05		100414
m,p-xylene	VW5	130	NA	4.5E-04	used p-xylene CAS #	106423
o-xylene	VW5	70	NA	2.7E-04		95476
		TOTALS	5.2E-08	1.2E-03		

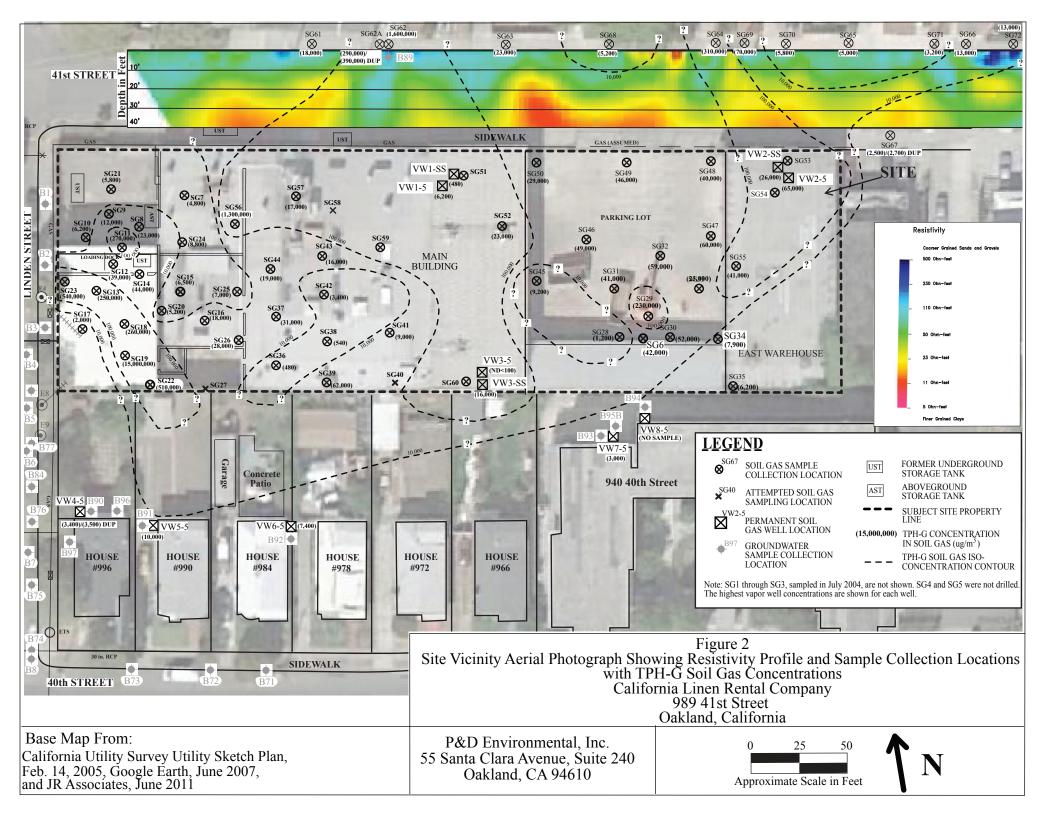
NOTES Spreadsheet default values were used, except for vadose zone soil type SI (silt) was selected for sample VW4 and duplicate VW4-DUP, sandy clay SC was selected for samples VW5 and VW7, and clay CL was selected for sample VW6; and a soil gas sampling depth of 152.4 cm (5.0 feet below slab) was selected.

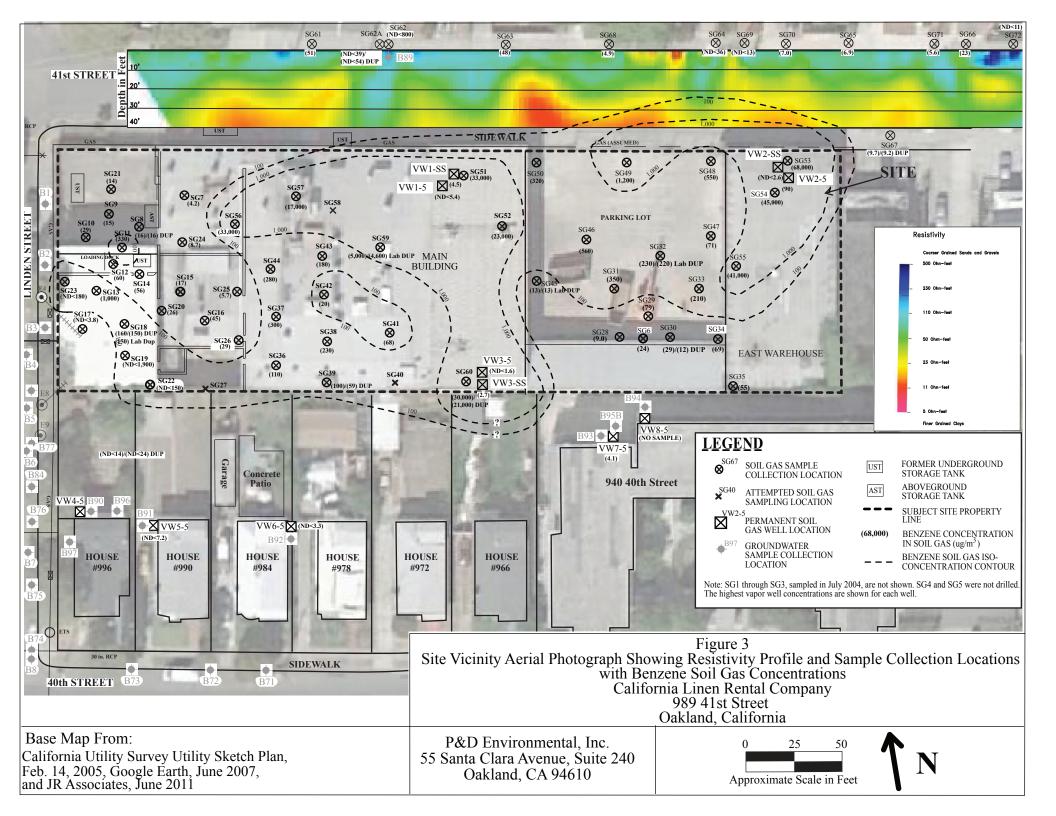
Table 7
DTSC JE Model Sensitivity Analysis Calculations

Johnson and Ettinger model		spreadsheet)		
Former Bytech Chemical Si	te			
1905-1991 Dennison Street			Incremental	Hazard
Oakland, CA			risk from	quotient
			vapor	from vapor
			intrusion to	intrusion to
			indoor air,	indoor air,
	Concentration	Sample Result	carcinogen	noncarcinogen
Chemical	$(ug/m^3)$	Location	(unitless)	(unitless)
Scenario 1 = Table 5 High	est Concentratio	on with Model De	fault Values Ex	<u>kcept for</u>
Soil = SC and S	Sample Depth =	152.4 cm (5.0 ft).		
Benzene	4.1	VW7	2.0E-08	5.3E-05
Scenario 2 = Scenario 1 va	lues except aver	age soil temperat	ture is 15 degre	es C.
Benzene	4.1	VW7	2.0E-08	5.3E-05
Scenario 3 = Scenario 1 va	lues except soil	type is S.		
Benzene	4.1	VW7	6.7E-08	1.8E-04
<u>Scenario 4 = Scenario 1 va</u>				
Benzene	4.1	VW7	5.1E-08	1.4E-04
Scenario 5 = Scenario 1 va	lues except soil	gas sampling dep	th is 76.2 cm (2	2.5 ft).
Benzene	4.1	VW7	3.7E-08	9.9E-05
Scenario 6 = Scenario 1 va	lues except soil :	gas sampling dep	th is 304.8 cm (	(10 ft).
Benzene	4.1	VW7	1.0E-08	2.8E-05
			L	
Scenario 7 = Scenario 1 va	lues except benz	zene concentratio	<u>n = 1.0 ug/m3.</u>	
Benzene	1.0	None	4.9E-09	1.3E-05
Scenario 8 = Scenario 1 va	lues except benz	zene concentratio	n = 100 ug/m3.	
Benzene	100	None	4.9E-07	1.3E-03

**FIGURES** 

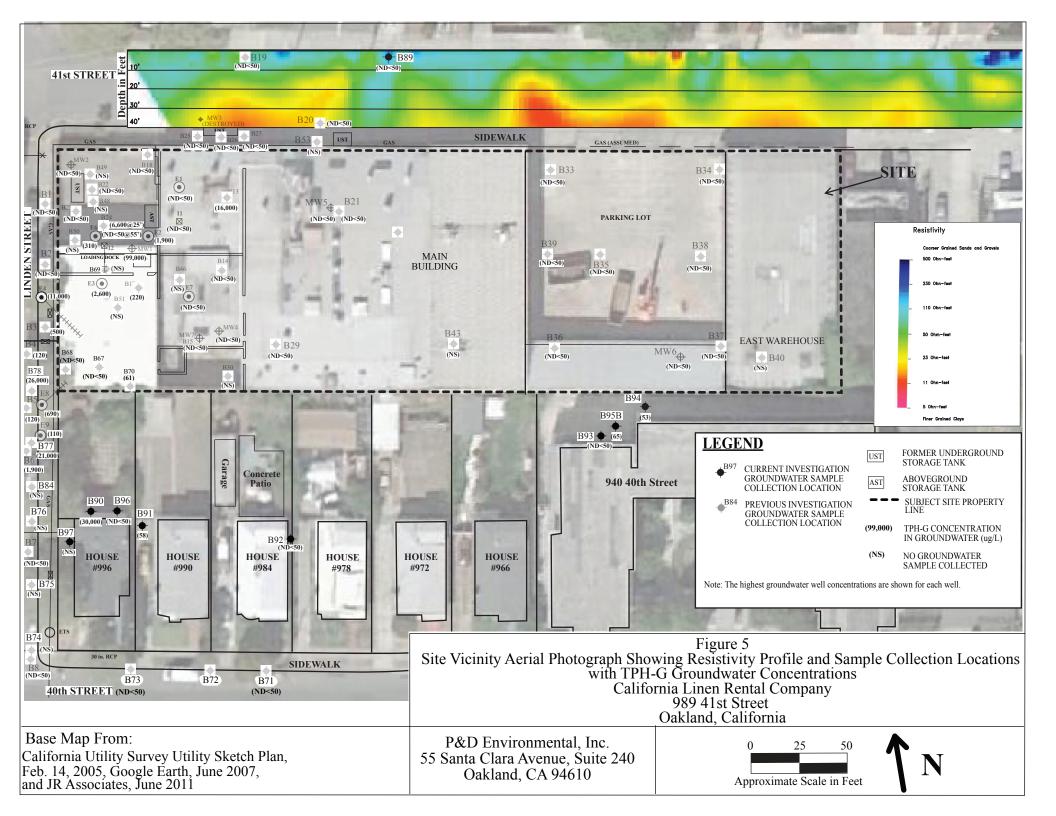


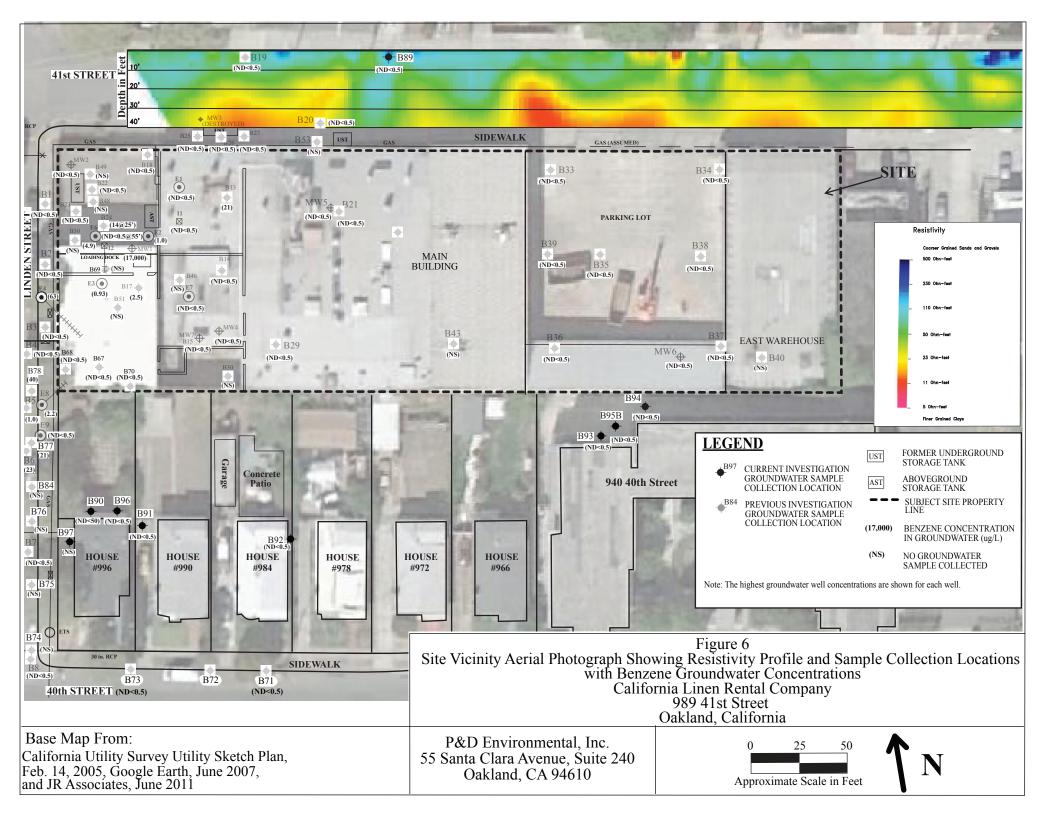






P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
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# **APPENDIX** A

**Geophysical Survey** 



Engineering Geophysics 1886 Emory Street San Jose, CA 95126 (408) 293-7390

## GEOPHYSICAL INVESTIGATION ALONG 41st STREET 989 41st STREET OAKLAND, CALIFORNIA

June 17, 2011

for

P&D Environmental, Incorporated 55 Santa Clara Avenue, Suite 240 Oakland, CA 94610

by

former 6

James Rezowalli California Registered Geophysicist, GP-921

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## IV DRAWINGS

## LIST OF ILLUSTRATIONS

- Drawing 1 Vicinity Map
- Drawing 2 Site Map
- Drawing 3 Resistivity Profiles
- Drawing 4 Resistivity Profiles Vs Geologic Cross Sections

## **I INTRODUCTION**

This report presents the results of a dipole-dipole resistivity geophysical investigation performed near 989 41st Street in Oakland, California (Drawing 1). The investigation was performed for P&D Environmental by J R Associates. The purpose of the investigation was to look for geophysical evidence of buried coarse grained channels and to help determine the geology under 41st Street. James Rezowalli, Principal Geophysicist, and Garret Rhett, Technician, of J R Associates performed the field work in June 2011.

## A. Site Conditions

The area of interest was along the sidewalk on the north side of 41st Street. P&D Environmental is investigating former underground storage tanks that were formerly buried at 989 41st Street. Part of the background information P&D provided us included an extensive environmental site characterization performed at the nearby Oak Walk Development. The Oak Walk data suggested that ground water flow is generally to the southwest and there are near surface coarse grained paleo stream beds in the area that may affect contaminate migration. Soil borings drilled along the east side of Linden Street and adjacent to 989 41st Street found two near surface sand deposits with strong petroleum odors and elevated concentrations of TPH-G. The purpose of our geophysical investigation was to help determine the geology surrounding 989 41st Street

In 2009 we performed a geophysical investigation along Linden and 40th Streets. In 2009 three resistivity profiles were collected, two on either side of Linden Street and one along 40th street (Drawing 2). This investigation added a resistivity profile along 41st Street..

### **II METHODOLOGY**

We performed a geophysical method called dipole-dipole resistivity profiling. Resistivity is a measurement of the soil's ability to conduct electricity. Resistivity profiling measures vertical and lateral changes in resistivity within the ground. Different soil types have different electrical resistivities. At the two extremes are gravels that have high electrical resistivity values and organic clays that have very low electrical resistivities. A resistivity profile can be thought of as a profile of the clay content of the soil. The lower the resistivity, the greater the clay content. Zones of high resistivity are indications of soils with little clay such as sand and gravel deposits and are indications of permeable stream channels. Along with clay content, a soil's resistivity is dependent on the saturation and the conductivity of the pore fluid. In this case we are assuming the conductivity of the pore fluid is constant throughout the site.

## A. Instrumentation

The resistivity equipment consisted of a Sorensen DCR 600-3B DC power supply, a Fluke 45 digital multimeter, and a Keithley KPCI-3116 data acquisition system. The DC power supply was used to inject current into the ground. The amount of current, typically around 0.5 amps, was measured with the multimeter. The electrical potential field developed by the injected current was measured with the Keithley data acquisition system. The potential field typically ranged from 1 to 500 millivolts. This type of resistivity measurement is sometimes referred to as a four-point method.

#### B. Field Procedures

Resistivity data were collected along a 500-foot profile along the north side of 41st Street (Drawing 2). The electrodes were planted a few inches into the soil at 10-foot intervals. A measurement began by injecting current between the first and second electrodes of the line. The potential field was simultaneously measured between the next eight consecutive electrodes. This process was repeated several times while alternating the current direction between readings. The current and potential readings were averaged and noted along with the current and potential electrode locations. For the next readings the current was injected into the second and third, then between the third and fourth, and so on until the end of the line was reached. The process was then repeated with the electrodes spaced 20 feet apart. The depth of investigation was approximately 40 feet below the surface of the street.

## C. Resistivity Inversion

The averaged current and potential readings along with the location of the current and potential electrodes for each reading were entered into a dipole-dipole resistivity inversion program. The program allows us to inspect the raw data for erroneous readings and invert the raw data into a profile showing changes in resistivity with depth. To do the inversion the program creates an initial two-dimensional model of the true electrical resistivity of the soil beneath the line based on the observed data. Next, the program predicts what the field data would look like based on the model. The program then adjusts the model iteratively until the predicted data closely matches the observed data.

## **III RESULTS**

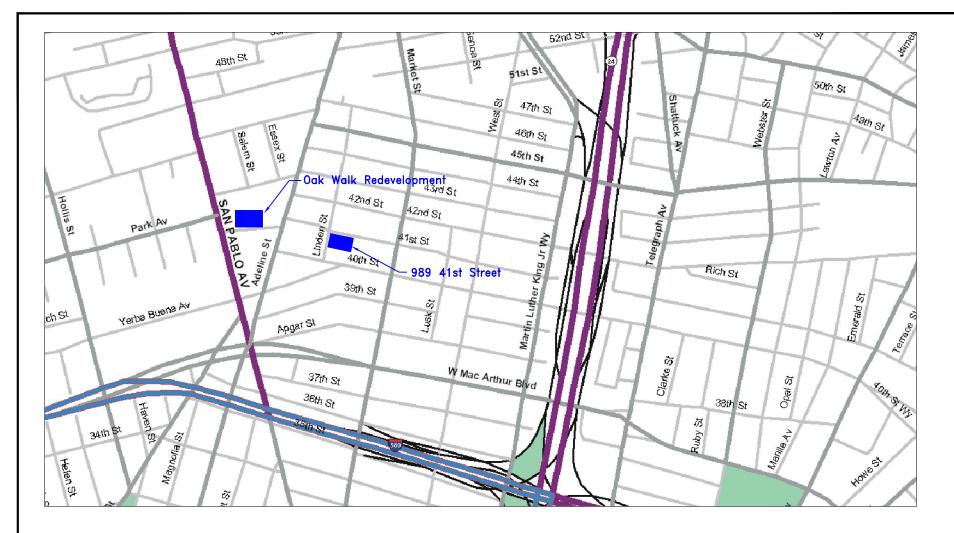
### A. Resistivity Profiles

The results of the dipole-dipole resistivity profile are shown in Drawings 4 and 5. Drawing 4 illustrates resistivity Profiles 1, 2, and 3 that were collected in 2009 and Profile 4 which was collect this year. In general, the blue and green areas in the profiles indicate sands to silts and the yellow and pink areas indicate silts to clays. Along with the profiles are geologic cross sections provided by P&D Environmental. Cross Section B-B' paralleled Profile 1 and Cross Section A-A' paralleled Profile 2. The location of the sand beds (SW) found in the geologic cross section were copied onto the profiles to help compare the resistivity values to the known geology. In general, the new data collected along Profile 4 indicates the soil consists mainly of silts and clays with the clay content increasing with depth.

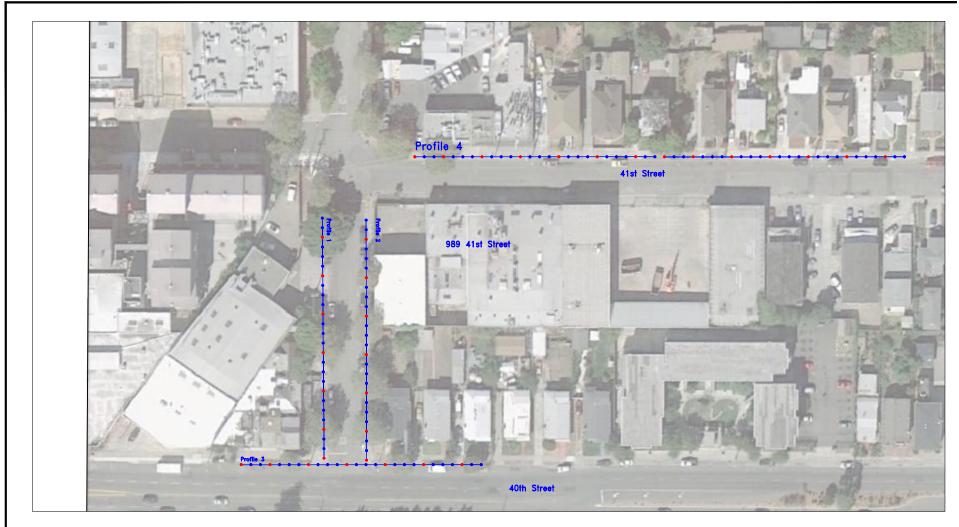
## B. Limitations

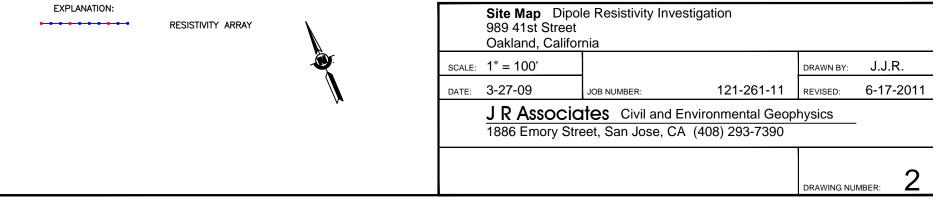
Many factors contribute to soil resistivity. Each soil type, sand, silt, or clay has a range of resistivity associated with it and there is overlap between the ranges. Trends in the resistivity data should be correlated to other data regarding the site's geology, hydrology, and history before conclusions are made.

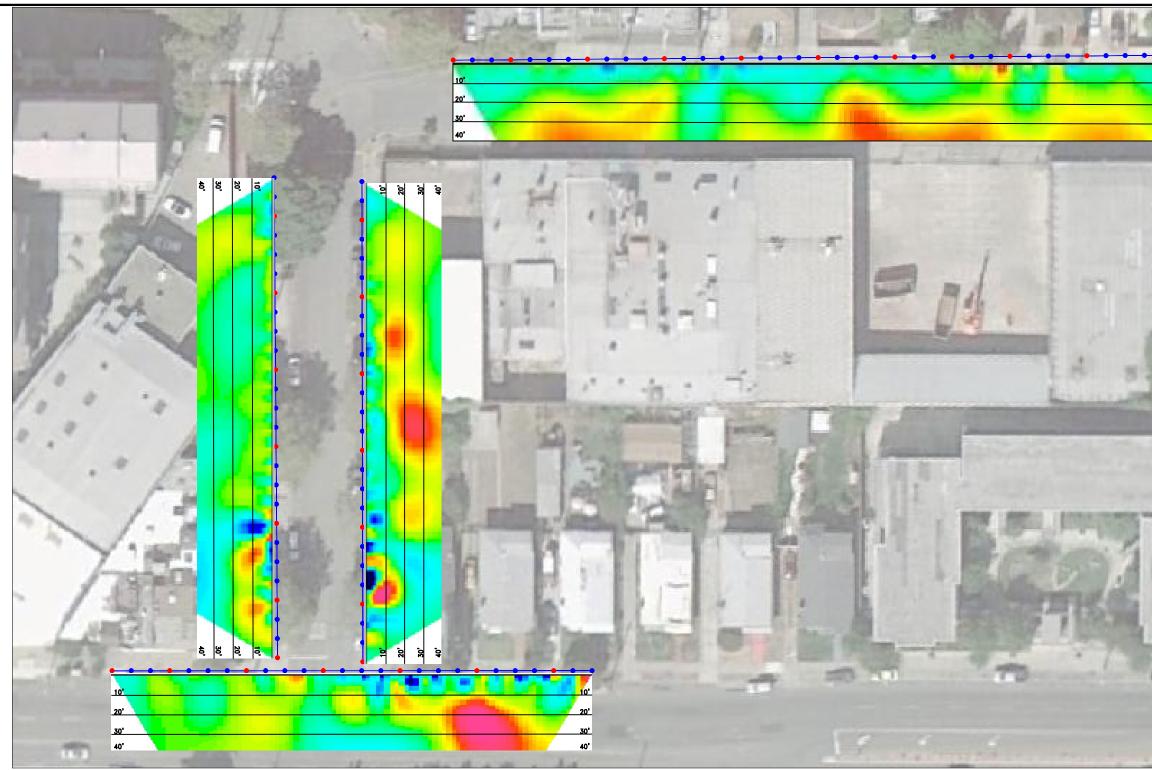
**IV DRAWINGS** 



	Vicinity Map 989 41st Street Oakland, Califor	Dipole Resistivit nia	y Investigation		
SCALE:	No Scale			DRAWN BY:	J.J.R.
DATE:	3-27-09	JOB NUMBER:	121-261-11	REVISED:	6-17-2011
			Environmental Geop A (408) 293-7390	hysics	
				DRAWING NU	MBER:







	Resistivity Pro 989 41st Street Oakland, Califor
SCALE:	1"=50'
DATE:	3-27-09
	J R Associo
	1886 Emory Str

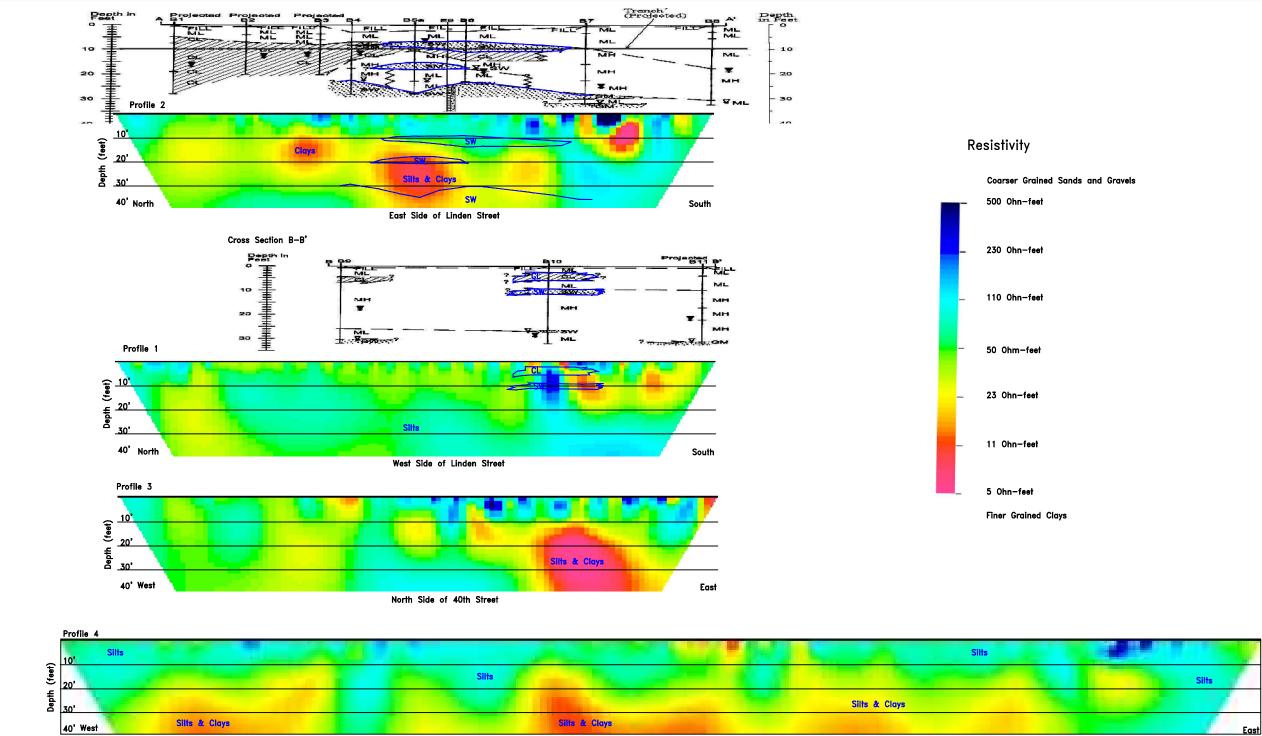
Scale 1" = 50'

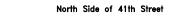
R	Resistivity Coarser Grained Sands of 500 Ohn-feet 230 Ohn-feet	Ind Gravels
-	110 Ohn-feet 50 Ohm-feet 23 Ohn-feet 11 Ohn-feet	
files Dipole Resistiv	5 Ohn-feet Finer Grained Clays ity Investigation	down
nia		DRAWN BY: J.J.R.
JOB NUMBER:	121-261-11	DRAWN BY: J.J.R. REVISED: 6-17-2011
	• • •	

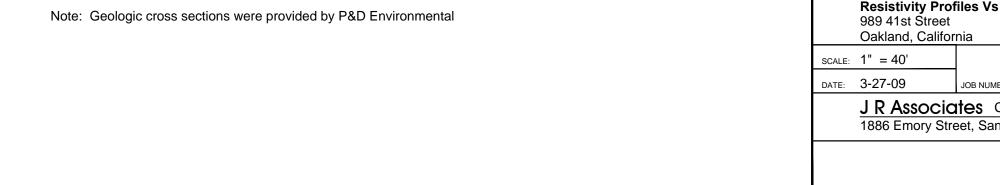
**The Second Seco** 

DRAWING NUMBER:

3







## **Resistivity Profiles Vs Geologic Cross Sections**

r	nia			
			DRAWN BY:	J.J.R.
	JOB NUMBER:	111-261-09	REVISED:	6-17-2011
	Ites Civil and E	Environmental Geop	hysics	
e	eet, San Jose, C	A (408) 293-7390		
			DRAWING NUI	MBER: <b>4</b>

## **APPENDIX B**

Soil Gas Purge Volume Calculations and Soil Gas Sampling Data Sheets

### Soil Gas Purge Volume Calculations

One Purge Volume is calculated as the volume of the tubing interior plus the volume of the sand interval of the borehole.

The tubing interior volume is calculated as follows:		
<b>V</b> tubing = pi x (r x r) x h, where pi = $3.14$ , r = $0.187$ in./2, and h = $2.6$ ft.		
V tubing = $3.14 \text{ x}$ ( 0.0935 x 0.0935 ) x ( 2.6 ft. x 12 in./ft.) =	0.86	cubic inches.
The sand interval volume is calculated as follows:		
V sand interval = pi x (r x r) x h x porosity, where pi = $3.14$ , r = $1$ in./2, h = $3$ in., and porosity = $0.35$		
V sand interval = $3.14 \times ($ 0.5       x       0.5       x       0.5       x       0.5       =	0.82	cubic inches.
The total volume for one purge volume is V tubing + V sand interval, where		
V total = 0.86 cubic inches + 0.82 cubic inches =	1.68	cubic inches.
To convert to cubic centimeters:		
V total = $1.68$ cubic inches x 16.39 cubic centimeters/cubic inches =	27.5	cubic centimeters.
The total volume for <u>3</u> purge volumes is calculated as follows:		
V purge total = 27.5 cubic centimeters x 3 =	83	cubic centimeters.
The flow controller has a nominal flow rate of 50 cubic centimeters per minute.		
The purge time is calculated as follows:		
T purge = 83 cubic centimeters/ 50 cubic centimeters per minute =	1.65	minutes.
Converting the purge time to seconds, <b>1.65</b> minutes x 60seconds/ minute =	99	seconds.
Notes: Yellow hi-lite indicates data entry required.		

Yellow hi-lite indicates data entry required. Blue hi-lite indicates values are calculated.

### Soil Gas Purge Volume Calculations

One Purge Volume is calculated as the volume of the tubing interior plus the volume of the sand interval of the borehole.

The tubing interior volume is calculated as follows:		
<b>V</b> tubing = pi x (r x r) x h, where pi = $3.14$ , r = $0.187$ in./2, and h = $7.0$ ft.		
V tubing = $3.14 \text{ x}$ ( 0.0935 x 0.0935 ) x ( 7.0 ft. x 12 in./ft.) =	2.31	cubic inches.
The sand interval volume is calculated as follows:		
V sand interval = pi x (r x r) x h x porosity, where pi = $3.14$ , r = $1$ in./2, h = $12$ in., and porosity = $0.35$		
V sand interval = $3.14 \text{ x}$ ( 0.5 x 0.5 ) x 12 x 0.35 =	3.30	cubic inches.
The total volume for one purge volume is V tubing + V sand interval, where		
V total = 2.31 cubic inches + 3.30 cubic inches =	5.60	cubic inches.
To convert to cubic centimeters:		
V total = $5.60$ cubic inches x 16.39 cubic centimeters/cubic inches =	91.8	cubic centimeters.
The total volume for         3         purge volumes is calculated as follows:		
V purge total = $91.8$ cubic centimeters x 3 =	275	cubic centimeters.
The flow controller has a nominal flow rate of 200 cubic centimeters per minute.		
The purge time is calculated as follows:		
T purge = 275 cubic centimeters/ 200 cubic centimeters per minute =	1.38	minutes.
Converting the purge time to seconds, <b>1.38</b> minutes x 60seconds/ minute =	83	seconds.
Notes: Vellow hi-lite indicates data entry required		

Yellow hi-lite indicates data entry required. Blue hi-lite indicates values are calculated.

SOIL GAS	AMPLING D	ата sheet <b>TSE. СДК</b> Дв/11													
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Date 7/3	7/11,7/	28/11		0 PRT	· · · · · · · · · · · · · · · · · · ·					· · · · · · · · · · · · · · · · · · ·					
Drilling Com	pany			Temp Well			:						·		
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	·· · · · · · · · · · · · · · · · · · ·			Sample Canister Initial	Start leak	End leak	ADDITIONAL			Start of	Time and conc. (ppm)	Begin sample collection	End sample collection		
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				time 1340	time 13D	time 1400	time	time/4 220	Citime / 424	<b>12</b> time	time		Ome 143418	1436
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SOIL GAS SAMPLING DA	ATA SHEET							· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·					
SOIL GAS SAMPLING DA Address Job # Date 8/10/11 P&D Sampler Drilling Company	112 Jr,	OAKIAND	Probe Method (ch	neck one)			·			· · · · ·					
Date 8/10/11	<b>S</b> .	· · · · · · · · · · · · · · · · · · ·	o PRT							····· · · · · · · · · ·		••••••			
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 	•	-	Sample Canister Initial	Start leak	End leak	ADDITIONAL			Start of	Time and conc. (ppm)	Begin sample collection	End sample collection			
Soil Gas Probe Location Depth Designation (Ft.)	Time Probe Installed	Canister #	Vacuum Check (In. Hg) and time	check vacuum (In. Hg) and time	check vacuum (In. Hg) and time	leak check vacuum (In. Hg) and time	Start PURGE	End PURGE	tracer gas equilibration	of tracer gas equilibration	vacuum (In. Hg) and time	vacuum (In. Hg) and time	NOTES		
SG			vac-30	vac "ilo	vac - 26	vac				conc 49	vac - 29	vac -5	PID: OF	Ary A	1514
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sg VW2-35		2190	time (030	time1035	time 1045	time		time <b>10238</b>		timet U5	time (336	0 time <b>i (.50</b> 10			
SG			vac - 30	vac - 23	vac -35	vac				conc54	vac - 30	vac * 11	PIDSJP	W 16	15
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VW2-5		33398	time	time	time	time	time	time	time	time	time	time			
.DUP SG															
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	<u>.</u>		time	time	time	time	time	time	time	time	time	time			
SG			vac	vac	vac	vac				conc.	vac	vac			·
······			time	time	time	time	time	time	time	time	time	time			
SG			vac	vac	vac	vac		-	· · · · · · · · · · · · · · · · · · ·	conc	vac	vac			
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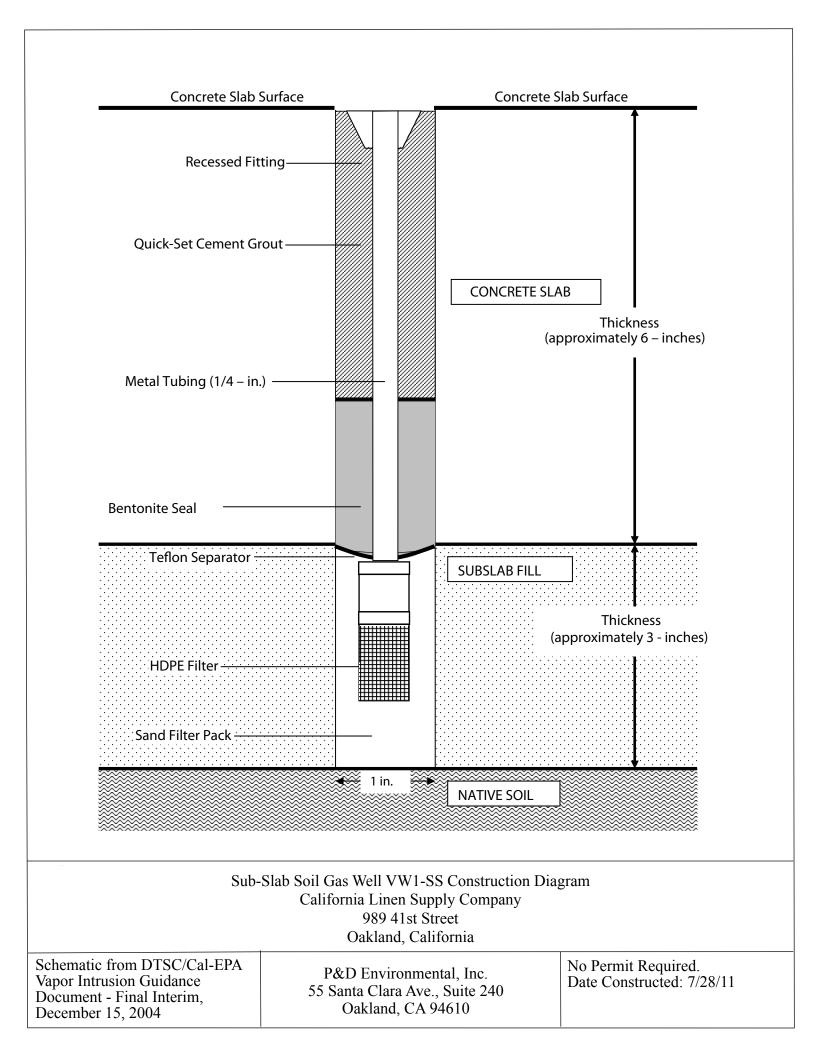
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				Sample		1					Time and	sample	End sample	
Soil Gas	Probe	Time		Canister Initial Vacuum	Start leak check	End leak check	ADDITIONAL		t t	Start of	conc. (ppm)	collection	collection	
ocation	Depth	Probe		Check (In. Hg)	vacuum (In,	vacuum (In.	leak check vacuum (In, Hg)	Start PURGE	End PURGE	tracer gas equilibration	of tracer gas	vacuum (In. Hg) and	vacuum (In Hg) and	
Designation	(Ft.)	Installed	Canister #	and time	Hg) and time	Hg) and time	and time	time	time	time	equilibration	time		TES
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wa-5	5	5/4/12	.37707	time 1000	time 12500	time] 30000	time	time) 3050	1 time 30 5	Stole	time	time 3150	1 time/42310	PID: Oppon
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P&D Sampler	MU	>/ 4/14	₹ ; <u>;</u>	o Temp Well	+		+	1			· + ·	· · · ·		÷ · · · · · · · · · · · · · · · · · · ·
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	Probe	Time		Sample Canister Initial Vacuum	Start leak check	End leak check	ADDITIONAL leak check			Start of tracer gas	Time and conc. (ppm) of tracer	Begin sample collection vacuum (in,	End sample collection vacuum (In.	· · · · · · · · · · · · · · · · · · ·
Location Designation	Depth (Ft)	Probe Installed	Canister #	Check (In. Hg) and time	vaçuum (In. Hg) and time	vacuum (In. Hg) and time	vacuum (In. Hg) and time	Start PURGE time	End PURGE time	equilibration time	gas equilibration	Hg) and time	Hg) and time	NOTES
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						12.12				-				
W8-5	5	6/28/12	33707	vac - 29	vac - 29	vac - 29	vac				conc.	vac - 29	vac - 29	OPPM
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VVV 6-9		400/1A	36477	vac - 29	vac -29	vac - 29	vac		·		CONC	vac 07	vac-29	No Flew
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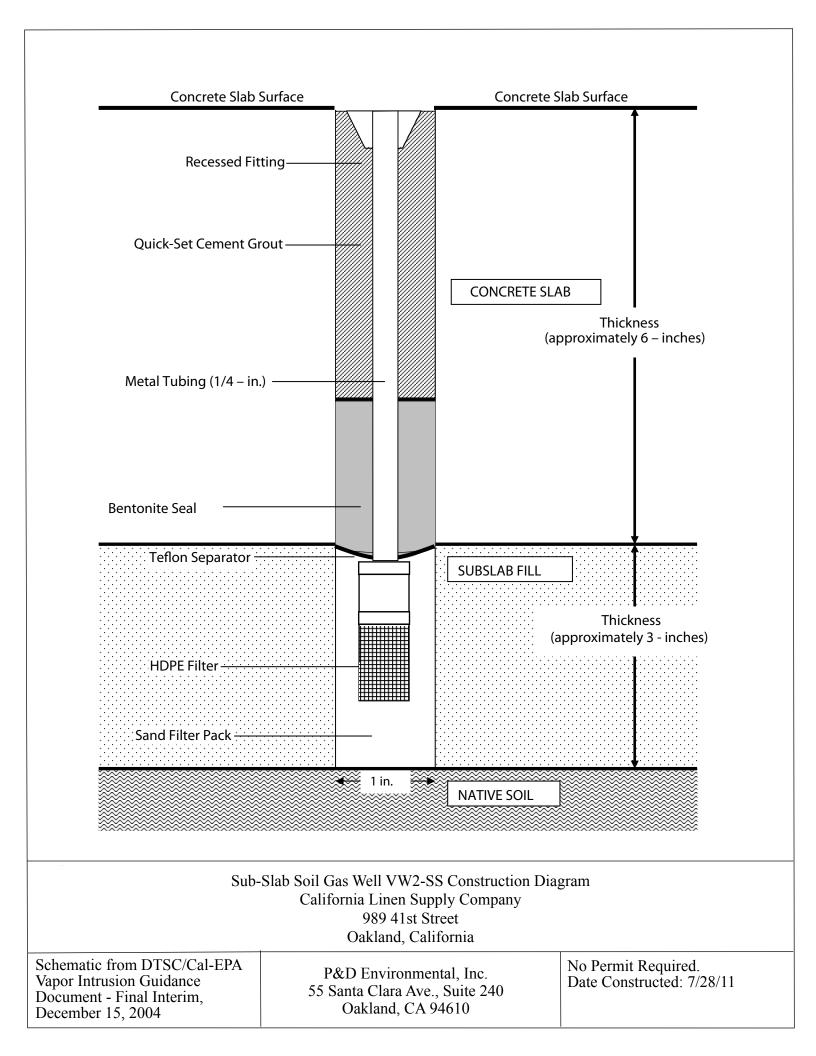
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Soil Gas Location Designatior	Probe Depth (Ft.)	Time Probe Installed		Sample Canister Initial Vacuum Check (In. Hg) and time	Start leak check vacuum (In. Hg) and time	End leak check vacuum (In. Hg) and time	ADDITIONAL leak check vacuum (In. Hg) and time	Start PURGE time	End PURGE time	Start of tracer gas equilibration time	Time and conc. (ppm) of tracer gas equilibration	sample collection vacuum (In. Hg) and time	End sample collection vacuum (in. Hg) and timeNOTES
W 4.	5 5	7/18/12	35681	vac - 29	vac * 39	vac - 39	vac		unie	une .	conc.	vac ~30	
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DUP	·	1-1-2		time	time 0 8 50	time 0900	time	time091000	time/9//3	44time	time	time#2270	Clime 931/8 PID: Uppm
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# **APPENDIX C**

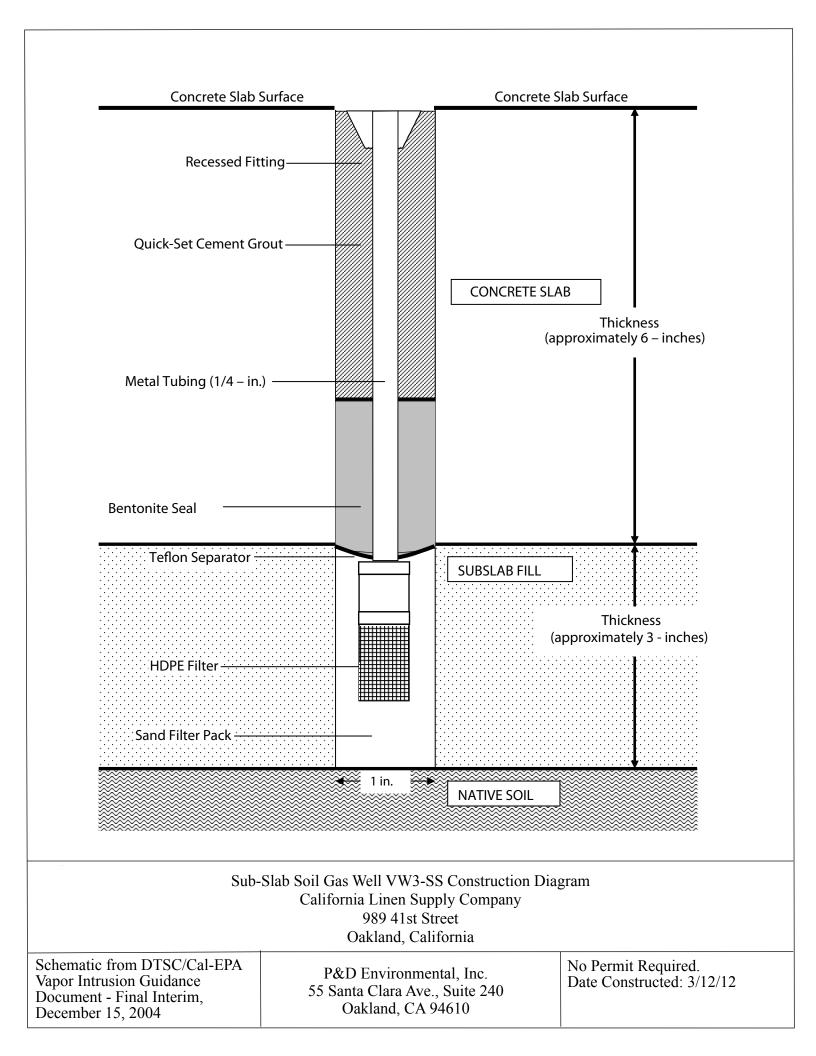
Vapor Well Construction Diagrams



PROJECT NUMBER0304	BORING/WELL NO VW1-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. Not Surveyed			
COUNTY Alameda	GROUND SURFACE ELEVATION <u>Not Survey</u> ed			
WELL PERMIT NO. <u>W2011-0590</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED 7/28/11			
Locking well plug	EXPLORATORY BORING			
Manual C. Samana	a. Total depth <u>5.0 ft.</u>			
	b. Diameter <u>1.0 in.</u>			
	Drilling method Slide Hammer			
	WELL CONSTRUCTION			
	c. Casing length 7.0 ft.			
	Material <u>Teflon Tubing</u>			
	d. Diameter 0.25 in.			
	e. Depth to top of perforations <u>4.5 ft</u> .			
	f. Perforated length0.08 ft.			
	Perforated interval from <u>4.5 to 4.6 ft.</u>			
	Perforation type <u>Porous HDPE Filter</u>			
	Perforation size			
Ĩ     <b>  ' : '</b> E <b>∃' : '</b> )	g. Surface sanitary seal <u>2.0 ft.</u>			
	Seal material <u>Neat Cement</u>			
	h. Sanitary seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite Slurry</u>			
	i. Filter pack seal <u>1.0 ft.</u>			
	Seal material Bentonite			
	j. Filter pack length <u>1.0 ft.</u>			
	Filter pack interval from 4.0 to 5.0 ft.			
	Pack material # 3 sand			
	k. Bottom seal <u>0 ft.</u>			
	Seal material <u>None</u>			
	l. Slough in bottom of borehole $0$ ft.			



PROJECT NUMBER0304	BORING/WELL NO VW2-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. Not Surveyed			
COUNTY Alameda	GROUND SURFACE ELEVATION <u>Not Survey</u> ed			
WELL PERMIT NO. <u>W2011-0590</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED 7/28/11			
Locking well plug	EXPLORATORY BORING			
Manual Commence	a. Total depth <u>5.0 ft.</u>			
	b. Diameter <u>1.0 in.</u>			
	Drilling method Slide Hammer			
	WELL CONSTRUCTION			
	c. Casing length7.0 ft.			
e d h	Material <u>Teflon Tubing</u>			
	d. Diameter <u>0.25 in.</u>			
	e. Depth to top of perforations <u>4.5 ft</u> .			
	f. Perforated length0.08 ft			
	Perforated interval from <u>4.5 to 4.6 ft.</u>			
	Perforation type <u>Porous HDPE Filter</u>			
	Perforation size			
	g. Surface sanitary seal <u>2.0 ft.</u>			
	Seal material <u>Neat Cement</u>			
	h. Sanitary seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite Slurry</u>			
	i. Filter pack seal <u>1.0 ft.</u>			
	Seal material Bentonite			
	j. Filter pack length <u>1.0 ft.</u>			
· · E = . ·	Filter pack interval from <u>4.0 to 5.0 ft.</u>			
	Pack material # 3 sand			
	k. Bottom seal <u>0 ft.</u>			
	Seal material <u>None</u>			
	I.Slough in bottom of borehole $0$ ft.			
b b				



PROJECT NUMBER0304	BORING/WELL NO. VW3-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. <u>Not Surveyed</u>			
COUNTY <u>Alameda</u>	GROUND SURFACE ELEVATION <u>Not Survey</u> ed			
WELL PERMIT NO. <u>W2012-0158</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED 3/12/12			
Locking well plug	EXPLORATORY BORING			
Manual Chances	a. Total depth <u>5.0 ft.</u>			
	b. Diameter <u>1.0 in.</u>			
	Drilling method Slide Hammer			
	WELL CONSTRUCTION			
e d h	c. Casing length <u>7.0 ft.</u>			
	Material <u>Teflon Tubing</u>			
	d. Diameter <u>0.25 in.</u>			
	e. Depth to top of perforations $4.5 \text{ ft}$ .			
	f. Perforated length $0.08 \text{ ft}$			
	Perforated interval from <u>4.5 to 4.6 ft.</u>			
	Perforation type <u>Porous HDPE Filter</u>			
a     <b>  • • E = • •  </b>	Perforation size			
	g. Surface sanitary seal <u>2.0 ft.</u>			
	Seal material <u>Neat Cement</u>			
\•••E = 1	h. Sanitary seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite Slurry</u>			
	i. Filter pack seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite</u>			
• 'E = '.•	j. Filter pack length $1.0 \text{ ft.}$			
	Filter pack interval from <u>4.0 to 5.0 ft.</u>			
	Pack material <u># 3 sand</u>			
	k. Bottom seal <u>0 ft.</u>			
	Seal material <u>None</u>			
	I.Slough in bottom of borehole $0$ ft.			

PROJECT NUMBER0304	BORING/WELL NO VW4-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. Not Surveyed			
COUNTY Alameda	GROUND SURFACE ELEVATION <u>Not Survey</u> e			
WELL PERMIT NO. <u>W2012-0471</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED       7/18/12         EXPLORATORY BORING         a. Total depth       5.0 ft.         b. Diameter       1.0 in.         Drilling method       Slide Hammer			
e d - h	WELL CONSTRUCTION         c.       Casing length       7.0 ft.         Material       Teflon Tubing         d.       Diameter       0.25 in.         e.       Depth to top of perforations       4.5 ft.			
	f.       Perforated length       0.08 ft.         Perforated interval from       4.5 to 4.6 ft.         Perforation type       Porous HDPE Filter         Perforation size			
	g.     Surface samilary scal     2.0 ft.       Seal material     Neat Cement       h.     Sanitary seal     1.0 ft.       Seal material     Bentonite Slurry			
	<ul> <li>i. Filter pack seal <u>1.0 ft.</u></li> <li>Seal material <u>Bentonite</u></li> <li>j. Filter pack length <u>1.0 ft.</u></li> </ul>			
	Filter pack interval from       4.0 to 5.0 ft.         Pack material       # 3 sand         k.       Bottom seal       0 ft.         Seal material       None			
	I.Slough in bottom of borehole $0$ ft.			

PROJECT NUMBER0304	BORING/WELL NO VW5-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. Not Surveyed			
COUNTY Alameda	GROUND SURFACE ELEVATION <u>Not Survey</u> ed			
WELL PERMIT NO. <u>W2012-0451</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED 7/2/12			
Locking well plug	EXPLORATORY BORING			
Manual C	a. Total depth <u>5.0 ft.</u>			
	b. Diameter <u>1.0 in.</u>			
	Drilling method Slide Hammer			
	WELL CONSTRUCTION			
e e h	c. Casing length <u>7.0 ft.</u> Material <u>Teflon Tubing</u>			
	d. Diameter 0.25 in.			
	e. Depth to top of perforations <u>4.5 ft</u>			
	f. Perforated length			
	Perforated interval from <u>4.5 to 4.6 ft.</u>			
	Perforation type <u>Porous HDPE Filter</u>			
	Perforation size			
	g. Surface sanitary seal2.0 ft. Seal materialNeat Cement			
	h. Sanitary seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite Slurry</u>			
	i. Filter pack seal <u>1.0 ft.</u>			
· E : 1· ·	Seal material <u>Bentonite</u>			
· 'E = '	j. Filter pack length $1.0 \text{ ft.}$			
	Filter pack interval from <u>4.0 to 5.0 ft.</u>			
	Pack material <u># 3 sand</u>			
	k. Bottom seal <u>0 ft.</u>			
	Seal material <u>None</u>			
	I.Slough in bottom of borehole $0$ ft.			

PROJECT NUMBER0304	BORING/WELL NO. VW6-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. <u>Not Surveyed</u>			
COUNTY <u>Alameda</u>	GROUND SURFACE ELEVATION <u>Not Survey</u> ed			
WELL PERMIT NO. <u>W2012-0453</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED 7/3/12			
Locking well plug	EXPLORATORY BORING			
many fragman	a. Total depth <u>5.0 ft.</u>			
	b. Diameter <u>1.0 in.</u>			
	Drilling method Slide Hammer			
	WELL CONSTRUCTION			
	c. Casing length <u>7.0 ft.</u>			
	Material <u>Teflon Tubing</u>			
	d. Diameter $0.25$ in.			
	e. Depth to top of perforations $4.5 \text{ ft}$ .			
	f. Perforated length0.08 ft.			
	Perforated interval from <u>4.5 to 4.6 ft.</u>			
	Perforation type <u>Porous HDPE Filter</u>			
	Perforation size			
	g. Surface sanitary seal <u>2.0 ft.</u>			
	Seal material <u>Neat Cement</u>			
	h. Sanitary seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite Slurry</u>			
	i. Filter pack seal <u>1.0 ft.</u>			
	Seal material Bentonite			
	j. Filter pack length <u>1.0 ft.</u>			
	Filter pack interval from 4.0 to 5.0 ft.			
	Pack material # 3 sand			
	k. Bottom seal <u>0 ft.</u>			
	Seal material <u>None</u>			
	1.Slough in bottom of borehole $0$ ft.			
b.,				

PROJECT NUMBER0304	BORING/WELL NO VW7-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. <u>Not Surveyed</u>			
COUNTY Alameda	GROUND SURFACE ELEVATION <u>Not Survey</u> ed			
WELL PERMIT NO. <u>W2012-0446</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED 6/28/12			
Locking well plug	EXPLORATORY BORING			
Manual C Parts and	a. Total depth <u>5.0 ft.</u>			
	b. Diameter <u>1.0 in.</u>			
	Drilling method Slide Hammer			
	WELL CONSTRUCTION			
	c. Casing length 7.0 ft.			
	Material <u>Teflon Tubing</u>			
	d. Diameter 0.25 in.			
	e. Depth to top of perforations <u>4.5 ft.</u>			
	f. Perforated length0.08 ft.			
	Perforated interval from <u>4.5 to 4.6 ft.</u>			
	Perforation type <u>Porous HDPE Filter</u>			
	Perforation size			
	g. Surface sanitary seal <u>2.0 ft.</u>			
	Seal material <u>Neat Cement</u>			
	h. Sanitary seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite Slurry</u>			
	i. Filter pack seal <u>1.0 ft.</u>			
	Seal material Bentonite			
	j. Filter pack length <u>1.0 ft.</u>			
	Filter pack interval from 4.0 to 5.0 ft.			
	Pack material # 3 sand			
	k. Bottom seal <u>0 ft.</u>			
	Seal material <u>None</u>			
	1.Slough in bottom of borehole $0$ ft.			
b				

PROJECT NUMBER0304	BORING/WELL NO. VW8-5			
PROJECT NAME California Linen, 989 41st Oakland.	TOP OF CASING ELEV. <u>Not Surveyed</u>			
COUNTY Alameda	GROUND SURFACE ELEVATION <u>Not Survey</u> ed			
WELL PERMIT NO. <u>W2012-0446</u>	DATUM None			
Locking water-tight well cover	DATE(S) CONSTRUCTED 6/28/12			
Locking well plug	EXPLORATORY BORING			
Manual C	a. Total depth <u>5.0 ft.</u>			
	b. Diameter <u>1.0 in.</u>			
	Drilling method <u>Slide Hammer</u>			
	WELL CONSTRUCTION			
e ( d ) h	c. Casing length <u>7.0 ft.</u>			
	Material <u>Teflon Tubing</u>			
	d. Diameter <u>0.25 in.</u>			
	e. Depth to top of perforations <u>4.5 ft</u> .			
	f. Perforated length0.08 ft.			
	Perforated interval from <u>4.5 to 4.6 ft.</u>			
	Perforation type <u>Porous HDPE Filter</u>			
	Perforation size			
	g. Surface sanitary seal <u>2.0 ft.</u>			
	Seal material <u>Neat Cement</u>			
	h. Sanitary seal <u>1.0 ft.</u>			
	Seal material <u>Bentonite Slurry</u>			
	i. Filter pack seal <u>1.0 ft.</u>			
	Seal material Bentonite			
	j. Filter pack length <u>1.0 ft.</u>			
	Filter pack interval from 4.0 to 5.0 ft.			
	Pack material # 3 sand			
	k. Bottom seal <u>0 ft.</u>			
	Seal material <u>None</u>			
	l.Slough in bottom of borehole $0$ ft.			
<b>b</b>				

## **APPENDIX D**

**Boring Logs** 

BC	RING		B89 PROJECT NO.: 0304 PROJECT N	AME: (	California Linen	, 989	41st St	., Oakland		
в	DRING	LOG	CATION: On north side of 41st St., approx. 172 ft. east of in	ntersecti	on with Linden	St	ELEVA	TION AND DA	тим: None	
DR	ILLING	G A(	GENCY: Vironex, Inc.	DRILLER	a: Joe	DATI	е <b>&amp; тімі</b> 9/16/	E STARTED:	DATE & TIME FINISHED: 9/16/11	
DF	RILLIN	G E	QUIPMENT: Geoprobe 6600				102		1600	
сс	OMPLE	TIO	м depth: 25.0 Feet веdrock depth: No	t Encou	ntered	LOGGED BY:			CHECKED BY:	
FII	FIRST WATER DEPTH: 15.5 Feet NO. OF SAMPLES: 1 Water						M	LD	PAK	
	DEPTH (FT.)		DESCRIPTION	<b>GRAPHIC</b> COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	]	REMARKS	
			0.0 to 0.6 ft. Asphalt and base rock.		No Well Constructed		0	using 5-foo Geoprobe M sampler. T	ontinuously cored ot long 2.0-inch O.D. Macrocore barrel he sampler was	
			0.6 to 8.0 ft. Olive-brown gravelly silty sand (FILL); medium dense, dry to moist, with brick fragments, and coarse angular gravel to 1.0-inch diameter	FILL				lined with 4.8-foot long 1.5-inch O.D. transparent PVC tubes.		
	5		No Petroleum Hydrocarbon (PHC) or solvent odor.				0	5 to 10 ft. 10 to 15 ft.	.3 ft. recovery 4.4 ft. recovery 4.6 ft. recovery	
									4.6 ft. recovery 4.8 ft. recovery	
	10		8.0 to 20.0 ft. Brown silt (ML); medium stiff to soft, moist to saturated. No PHC or solvent odor.	ML			0	at 15.5 ft. a terminated 1.0-inch dia casing plac was dry at casing rem	untered during drilling t 1245. Borehole at 20.0 ft. Temporary ameter slotted PVC ed in borehole. Casing 1310. Temporary PVC oved and borehole 0 25.0 ft. PVC casing	
	15		Wet at 15.0 ft. Saturated at 15.5 ft.		Ÿ		0	level meas Sample B8	c in borehole. Water ared at 23.6 ft. at 1511. 9-W collected at 1515; sheen on sample.	
	20						0			
			20.0 to 25.0 ft. Brown silty clay (CL); soft, saturated. No PHC or solvent odor.	CL	<b>T</b>					
	25			-			0			
								County Put site to obse grouting of	Miller with Alameda blic Works Agency on rve and document borehole using a tremie at cement grout on	
_	30	-								

BORING NO.: B90 PROJECT NO.: 0304 PROJECT NAME: California Linen, 989 41st St., Oakland											
В	ORING	LOC	CATION: 996 40th Street approximately 8 ft. east of nw cor	ner of h	nouse		ELEVA	TION AND DA	гим: None		
D	RILLIN	G AC	GENCY: Vironex, Inc.	DRILLEI	a: Joel, Alex	DAT	е <b>&amp; тімі</b> 7/18/	E STARTED:	DATE & TIME FINISHED: 7/18/12		
D	RILLIN	IG E	DUIPMENT: 3.0-inch O.D. Hand Auger				0900 1130				
С	OMPLI	TIO	N DEPTH: 9.0 Feet BEDROCK DEPTH: No	t Encou	ntered		LOGG		CHECKED BY:		
FI	RST W	ATEI	R DEPTH: 6.5 Feet NO. OF SAMPLES: 1 S	oil, 1 W	Vater		M	LD	PAK		
	DEPTH (FT.)		DESCRIPTION	<b>GRAPHIC</b> COLUMN	WELL CONSTRUCTION	BLOW COUNT PER 6"	UII		REMARKS		
F		_	0.0 to 4.0 ft. Dark brown clayey silt (ML);medium stiff,— moist, with coarse sand, and rootlets. No Petroleum —		No Well Constructed		0	Borehole ha inch O.D. h	and augered using a 3.0- and auger.		
			Hydrocarbon (PHC) or solvent odor. (0,5,95)	ML			0		ntered water during 6.5 ft. at 0930.		
F	_	_	4.0 to 5.0 ft. Grayish-brown clay (CL);medium stiff, moist, with some sand, orange mottling, and carbonate concretions. No PHC or solvent odor. (0,20,80)	CL							
	5		odor. (0,20,80) 5.0 to 7.5 ft. Dark brown clayey sand (SC);medium dense, moist to saturated, with some coarse angular gravel to 0.5-inch diameter, and orange mottling. No PHC or solvent odor. (10,70,20) 7.0 to 7.5 ft. Bluish-gray staining, strong PHC odor and increase in gravel content. (20,60,20) Wet at 6.0 ft. Saturated at 6.5 ft	SC	¥⊻ B90-7		0 18 296 540 38				
			Saturated at 6.5 ft. 7.5 to 9.0 ft. Dark brown clayey gravel (GC);saturated, with coarse sub- angular to rounded gravel to 3.0-inch diameter and orange mottling. Bluish-gray staining to 8.0 ft. No PHC or solvent odor. (65,5,30)	GC	-		0				
	10							7/18/12. Ter diameter slo in borehole. 6.6 ft. at 095 Water samp	minated at 7.5 ft. on nporary 1.0-inch tted PVC casing placed Water level measured at 50 and at 6.4 ft. at 1000. le B90-W collected at		
	15							polyethylen peristaltic p sheen on sa	new unused disposable e tubing attached to a ump. Strong odor and mple. Water level was y measured at 6.9 ft. at		
	20							(refusal dep	lvanced to 9.0 ft. th), to determine the ent of contamination.		
	20							neat cement pipe. Mr. St Alameda C Agency on	outed on 7/18/12 using grout and a tremie eve Miller with ounty Public Works site to observe and routing of the borehole.		
E	25										
E		_	_					Drilling Not			
									mates of percent gravel, les are shown in		
	30							2) Density d qualitative a quantitative	eterminations are nd are not based on evaluation.		

	RING		: B91 PROJECT NO.: 0304 PROJECT N	AME: (	California Linen	, 989	41st St	., Oakland		
во	ORING	LO	CATION: 990 40th Street approximately 7 ft. west of nw co	rner of	house		ELEVA	TION AND DA	тим: None	
-			GENCY: Vironex, Inc.	DRILLE	a: Brett, Alex	DATI	е <b>&amp; тімі</b> 7/2/1 0930		<b>DATE &amp; TIME FINISHED:</b> 7/2/12 1415	
			QUIPMENT: 3.0-inch O.D. Hand Auger			LOGGED BY:			1415 CHECKED BY:	
	COMPLETION DEPTH: 12.0 Feet BEDROCK DEPTH: Not				ntered	MLD			-	
FII		ATE	R DEPTH: 10.5 Feet NO. OF SAMPLES: 1 V	1				J-MK		
	DEPTH (FT.)		DESCRIPTION	GRAPHIC COLUMN	LOG CONSTRUCTION	BLOW COUNT PER 6"	PID	]	REMARKS	
		_	0.0 to 2.0 ft. Dark brown clayey silt (ML);medium stiff, moist, with coarse sand. No Petroleum Hydrocarbon (PHC) or solvent odor. (0,5,95)	ML	No Well Constructed		0	inch O.D. h	C	
		_	2.0 to 4.0 ft. Dark brown sandy clay (CL);medium stiff,— moist, with rootlets. No PHC or solvent odor. (0,5,95)	-			0	augering at	10.5 ft. at 1100.	
_	5	_	4.0 to 5.0 ft. Color change to grayish-brown with orange and gray mottling 5.0 to 7.0 ft. Color change to olive-brown with bluish			0	7/2/12. Ten diameter slo	rminated at 12.0 ft. on nporary 1.0-inch otted PVC casing placed . Casing was dry at 1130		
			gray mottling, and carbonate concretions. — 7.0 to 12.0 ft. Brown silty clay (CL); medium stiff to —	CL			0	Water level 1205 and at	measured at 11.6 ft. at 10.4 ft. at 1340. Water -W collected at 1350	
			soft, moist to saturated, with few coarse sand and orange mottling. No PHC or solvent odor. (0,5,95)		~		0	using new unused disposable polyethylene tubing attached to a peristaltic pump. No sheen or odo on sample. Water level was		
	10		Saturated at 10.5 ft. 10.0 to 11.0 ft. Increase in coarse angular gravel to 1.0-inch diameter. (5,10,85)		₹Ţ		0		Water level was ly measured at 10.5 ft. at	
	15			-				neat cement Mr. Steve M County Pub site to observe	routed on 7/2/12 using t grout and a tremie pipe Miller with Alameda blic Works Agency on rve and document the borehole.	
								Drilling No 1) Field esti	tes: imates of percent gravel	
								sand, and fi parentheses	nes are shown in	
	20	_		-				qualitative a	and are not based on evaluation.	
_	25	_								
				- - -						
_	30	_	=	•						

BORIN	NG NO	: B92 PROJECT NO.: 0304 PROJECT N	AME: (	California Linen	, 989 4	41st St	., Oakland			
BORI	NG LO	CATION: 984 40th Street approximately 4 ft. south of ne co	rner of	house		ELEVA	TION AND DA	тим: None		
DRILL	LING A	GENCY: Vironex, Inc.	DRILLER	a: Brett, Alex	DATE	е <b>&amp; тімі</b> 7/3/1	E STARTED:	DATE & TIME FINISHED: 7/3/12		
DRILI	LING E	QUIPMENT: 3.0-inch O.D. Hand Auger				103		1400		
СОМР	PLETIC	DN DEPTH: 10.0 Feet BEDROCK DEPTH: NO	t Encou	ntered				CHECKED BY:		
FIRST	WATE	R DEPTH: 9.5 Feet NO. OF SAMPLES: 1 V	Vater		MLD			THE		
	DEPTH (FT.)	DESCRIPTION	<b>GRAPHIC</b> COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	REMARKS			
		0.0 to 3.0 ft. Black clay(CL);medium stiff, moist. No Petroleum Hydrocarbon (PHC) or solvent odor. (0,0,100)		No Well Constructed		0	inch O.D. h First encour	and augered using a 3.0- and auger. htered water during 9.5 ft. at 1155.		
5		3.0 to 6.0 ft. Grayish-brown clay (CL); medium stiff, moist, with few coarse angular gravel to 0.25-inch diameter. No PHC or solvent odor. (5,0,95) 6.0 to 7.0 ft. Olive-brown clay (CL); medium stiff, moist, with	CL			0	7/3/12. Ten diameter slo in borehole	rminated at 10.0 ft. on porary 1.0-inch stted PVC casing placed Water level measured a 00 and at 7.9 ft. at 1210		
	-	some coarse sand, bluish-gray and orange mottling, and carbonate concretions. No PHC or solvent odor. (0,10,90) 7.0 to 10.0 ft. Brown Silty Clay (CL); medium stiff, moist to saturated, with some coarse sand, bluish-gray and orange mottling. No PHC or solvent odor. (0,10,90) Wet at 9.0 ft. Saturated at 9.5 ft.		₹ ∑		0	8.6 ft. at 1200 and at 7.9 ft. at 1210. Water sample B92-W collected at 1300 using new unused disposable polyethylene tubing attached to a peristaltic pump. No sheen or odor on sample.			
- 10 	0 -	9.0 to 10.0 ft. Increase in coarse angular gravel to 0.5-inch diameter. (10,10,80)						was subsequently t 7.8 ft. at 1320.		
  15							neat cemen Mr. Steve M County Pub site to observe	outed on 7/3/12 using t grout and a tremie pipe fuller with Alameda lic Works Agency on twe and document the borehole.		
	-							tes: mates of percent gravel, nes are shown in		
2(	0						qualitative a	determinations are and are not based on evaluation.		
2:	5 <u>-</u>  									
- 30	0 -									

BORING		B93 PROJECT NO.: 0304 PROJECT N	AME: (	California Linen	, 989 4	41st St	., Oakland		
BORING	G LOG	CATION: 940 40th Street approximately 25 ft. west of gate	entrance	e in back yard		ELEVA	TION AND DA	тим: None	
DRILLIN	iG AC	GENCY: Vironex, Inc.	DRILLER	e: Brett, Alex	DATI	е <b>&amp; тімі</b> 6/28/	E STARTED: 12	DATE & TIME FINISHED: 6/28/12	
DRILLIN	NG EO	QUIPMENT: 3.0-inch O.D. Hand Auger				100		1700	
COMPLI	ετιο	N DEPTH: 12.0 Feet BEDROCK DEPTH: NO	t Encou					CHECKED BY:	
FIRST W	ATE	R DEPTH: 11.0 Feet NO. OF SAMPLES: 1 V	Vater		MLD 7			1>MK	
DEPTH (FT.)		DESCRIPTION	<b>GRAPHIC</b> COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID		REMARKS	
		0.0 to 0.25 ft. Concrete. 0.25 to 1.0 ft. Dark reddish-brown sandy clay (FILL); medium stiff, moist, with brick fragments. No Petroleum Hydrocarbon (PHC) or solvent odor. 1.0 to 3.0 ft. Brown clayey gravel (FILL); moist, with abundant coarse angular gravel to 2.0-inch diameter. No PHC or solvent odor. (80,10,10) 3.0 to 5.0 ft. Black clay (CL); medium stiff, moist, with	FILL	No Well Constructed		0 0	inch O.D. h First encour augering at	ntered water during 11.0 ft. at 1150.	
5 5		some coarse sand. No PHC or solvent odor. (0,10,90)           5.0 to 7.0 ft. Olive-brown sandy clay (CL); medium stiff, moist with some coarse angular gravel to 1.0- inch diameter. No PHC or solvent odor. (5,10,85)	CL			0	6/28/12. Te diameter slo in borehole. 11.9 ft. at 1	ninated at 12.0 ft. on porary 1.0-inch ed PVC casing placed Water level measured at 05 and at 11.5 ft. at sample B93-W	
10		7.0 to 8.0 ft. Brown sandy clay (CL); medium stiff, moist, with bluish- gray mottling. No PHC or solvent odor. (0,10,90) 8.0 to 12.0 ft. Orange-brown silty clay (CL); medium stiff, moist to saturated, with orange mottling. No PHC or solvent. (0,10,90) Wet at 10.5 ft. Saturated at 11.0 ft.	-			0	collected at disposable j attached to	1330 using new unused polyethylene tubing a peristaltic pump. No or on sample.	
_	_	11.0 to 12.0 ft. Increase in coarse angular gravel to 1.0-inch diameter. (15,5,80)		₹		0			
15							neat cemen Mr. Steve M County Pub site to observe	outed on 6/28/12 using t grout and a tremie pipe. Ailler with Alameda blic Works Agency on rve and document the borehole.	
							Drilling No 1) Field esti sand, and fi parentheses	mates of percent gravel, nes are shown in	
20							qualitative a	determinations are and are not based on evaluation.	
25									

вс	DRING N	NO.:	B94 project no.: 0304 project na	ME: (	California Linen	, 989	41st St	., Oakland	
в	DRING	LOG	CATION: 940 40th Street approximately 2 ft. east of gate ent	rance i	n back yard		ELEVA	TION AND DA	тим: None
DF	RILLING	G AC	GENCY: Vironex, Inc.	DRILLEF	a: Brett	DAT	е <b>&amp; тімі</b> 6/28/	E STARTED:	DATE & TIME FINISHED: 7/2/12
DI	RILLING	G E(	QUIPMENT: 3.0-inch O.D. Hand Auger				140		1400
с	OMPLE	тю	N DEPTH: 15.0 Feet BEDROCK DEPTH: Not	Encou	ntered	LOGGED BY:			CHECKED BY:
FIRST WATER DEPTH: 14.0 Feet NO. OF SAMPLES: 2 S				oil, 1 W		MLD		_D	THK
	DEPTH (FT.)		DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION	BLOW COUNT PER 6"	PID	]	REMARKS
			0.0 to 0.5 ft. Concrete. 0.5 to 1.0 ft. Reddish-brown clayey gravel (FILL); loose, moist. Strong Petroleum Hydrocarbon (PHC) odor. 1.0 to 2.0 ft. Dark brown sandy clay (FILL); medium stiff, moist, with bluish-green staining. Strong PHC odor. (0,15,85)	FILL	No Well Constructed B94-1.0		63 94 6 0	inch O.D. h First encour	nd augered using a 3.0- and auger. ntered water during 14.0 ft. at 1600.
	5		2.0 to 6.0 ft. Black clay (CL); medium stiff, moist. No PHC or solvent odor. (0,0,100) 6.0 to 7.0 ft. Olive-brown sandy clay (CL); medium stiff, moist, with few angular gravel to 1.0-inch diameter, orange mottling, and carbonate concretions. (5,10,85)	CL			0	6/28/12. Ter diameter slo in borehole. and at 1645	minated at 15.0 ft. on mporary 1.0-inch tted PVC casing placed Casing was dry at 1600, . The PVC casing was t latex glove and
	10		7.0 to 8.0 ft. Grayish-brown silty clay (CL); medium stiff, moist, with orange mottling. No PHC or solvent odor. (0,0,100) 7.0 to 7.5 ft. Increase in sand content. (0,15,85) 8.0 to 15.0 ft. Brown silty clay (CL); medium stiff, moist to saturated, with bluish-gray mottling. Slight PHC odor. (0,0,100)		B94-8.0		4.6 2.2	recharge. On 6/29/12, 12.8 ft. at 03 0955. Wate	ug overnight to allow for water level measured at 810 and at 12.7 ft. at r sample B94-W
			12.0 to 12.5 ft. Increase in sand and gravel content. (5,10,85) Wet at 13.5 ft. Saturated at 14.0 ft. 14.0 to 14.5 ft. Increase in coarse gravel content. (30,5,60)		¥ Ţ		1.6 0 0 0	disposable p attached to sheen or od	1000 using new unused polyethylene tubing a peristaltic pump. No or on sample. Water leve y measured at 13.3 ft. at
	15							neat cement Mr. Steve N County Pub site to obser	outed on 7/2/12 using grout and a tremie pipe. filler with Alameda lic Works Agency on ve and document the borehole.
	20								mates of percent gravel, nes are shown in
	25								leterminations are ind are not based on evaluation.
_	30	_							

BC	RING		B95 PROJECT NO.: 0304 PROJECT N	AME: (	California Linen	, 989	41st St	., Oakland		
во	ORING	LOC	CATION: 940 40th Street approximately 25 ft. northwest of	gate en	trance in back y	ard	ELEVA	TION AND DA	тим: None	
DR	ILLIN	G AC	GENCY: Vironex, Inc.	DRILLER	e: Joel, Alex	DAT	е <b>&amp; тім</b> і 7/20/	E STARTED:	DATE & TIME FINISHED: 7/20/12	
DF	RILLIN	G EO	QUIPMENT: 3.0-inch O.D. Hand Auger				134		1700	
сс	OMPLE	TIO	N DEPTH: 12.0 Feet BEDROCK DEPTH: No	t Encou	ntered	LOGGED BY:			CHECKED BY:	
FIRST WATER DEPTH: 10.5 Feet NO. OF SAMPLES: 1 S					Vater			ALD THE		
	DEPTH (FT.)		DESCRIPTION	<b>GRAPHIC</b> COLUMN	WELL CONSTRUCTION	BLOW COUNT PER 6"	OIId		REMARKS	
			0.0 to 0.5 ft. Concrete. 0.5 to 2.5 ft. Dark brown sandy clay (FILL): stiff, moist, with brick fragments, abundant coarse angular gravel to 3.0-inch diameter, wood fragments and bluish-green staining. Strong Petroleum Hydrocarbon (PHC) or solvent odor from 1.0 to 1.5 ft.	FILL	No Well Constructed B95B-1.0		$     \begin{array}{c}       0 \\       475 \\       16 \\       2 \\       0     \end{array} $	inch O.D. h terminated First encou	nd augered using a 3.0- and auger. Borehole at 12.0 ft. on 7/20/12. ntered water during 10.5 ft. at 1445.	
	5		2.5 to 6.0 ft. Brown clay (CL): medium stiff, moist, with some coarse sand. No PHC or solvent odor. (0,15,85)				0 0	augering at 10.5 ft. at 1445. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Water level measured a 11.6 ft. at 1534 and at 10.8 ft. at 1625. Water sample B95B-W collected at 1645 using unused		
			6.0 to 7.0 ft. Grayish-green sandy clay (CL): medium stiff, moist, with gravel to 0.5-inch diameter, orange mottling, and carbonate concretions. (5.15.80)         7.0 to 12.0 ft. Orange-brown silty clay (CL): medium stiff, moist to saturated, with some coarse sand. No PHC or solvent odor. (0,15,85)	CL			0 0 0.6	disposable attached to Slight PHC sheen on sa	polyethylene tubing a peristaltic pump. or solvent odor and no imple. Water level ly measured at 10.9 ft.	
	10		Wet at 10.0 ft. Saturated at 10.5 ft. 10.0 to 12.0 ft. Increase in gravel content, bluish-green discoloration, and slight PHC or solvent odor		Ĕ		0.0 2.3 7 12			
	15			· · ·				neat cemen pipe. Mr. S Alameda C Agency on	routed on 7/20/12 using t grout and a tremie teve Miller with ounty Public Works site to observe and grouting of the borehole	
				· · ·						
	20			- - - -					mates of percent gravel, nes are shown in	
	25			- - -					leterminations are ind are not based on evaluation.	
_	25									
	30									

BORING NO	BIG PROJECT NO.: 0304 PROJECT N	AME: (	California Linen	, 989	41st St	., Oakland	
BORING LO							тим: None
DRILLING A	GENCY: Vironex, Inc.	DRILLER	a: Joel, Alex	DAT		E STARTED:	DATE & TIME FINISHED:
DRILLING E	QUIPMENT: 3.0-inch O.D. Hand Auger				7/20/ 083		7/20/12 1300
COMPLETIC	DN DEPTH: 8.0 Feet BEDROCK DEPTH: NO	t Encou	ntered		LOGGI		CHECKED BY:
FIRST WATE	R DEPTH: 6.5 Feet NO. OF SAMPLES: 1 V	Vater			MI	J-HK	
DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	]	REMARKS
	0.0 to 4.0 ft. Dark brown clayey silt (ML); medium stiff, moist, with coarse sand and rootlets. No Petroleum Hydrocarbon (PHC) or solvent odor. (0,5,95)	ML	No Well Constructed		0	inch O.D. ha First encour augering at Borehole te 7/20/12. Te diameter slo	ntered water during 6.5 ft. at 0926. rminated at 8.0 ft. on mporary 1.0-inch otted PVC casing placed
5	sand, orange mottling, and carbonate concretions. No PHC or solvent odor. (0,20,80) 5.0 to 8.0 ft. Brown clayey sand (SC); medium dense, moist to saturated, with some coarse angular gravel to 0.75-inch diameter, and orange mottling. No PHC or solvent odor. (10,70,20) Wet at 6.0 ft. Saturated at 6.5 ft.	CL SC	<b>₹</b> <u>₹</u>		0	at 6.1 ft. at 0954. Wate collected at disposable attached to	. Water level measured 0944 and at 5.8 ft. at r sample B96-W 1000 using unused polyethylene tubing a peristaltic pump. sheen on sample.
10	7.0 to 8.0 ft. color change to dark brown.					Water level at 6.4 ft. at Borehole gi neat cemen pipe. Mr. Si Alameda C Agency on	subsequently measured
						Drilling No 1) Field esti	<u>tes:</u> mates of percent gravel,
25						sand, and fir parentheses 2) Density c	nes are shown in determinations are and are not based on
		- - - -					

# **APPENDIX E**

Weather Information

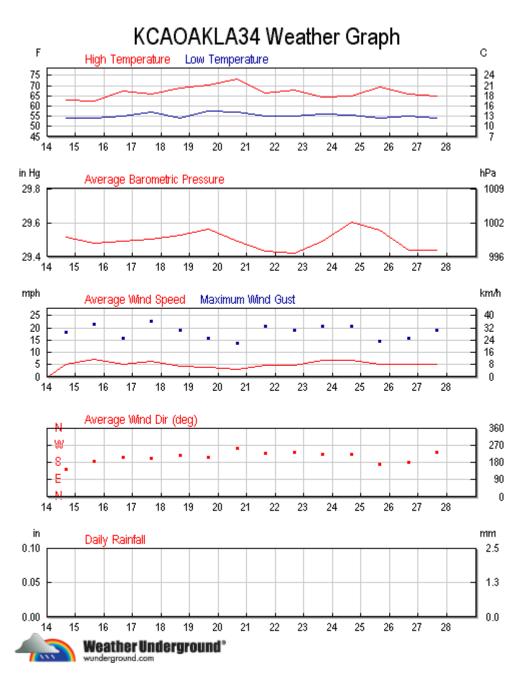
http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=cust om&month=7&day=14&year=2011&monthend=7&dayend=28&yearend=2011

# History for KCAOAKLA34 Triple Point, Oakland, CA

About This Station

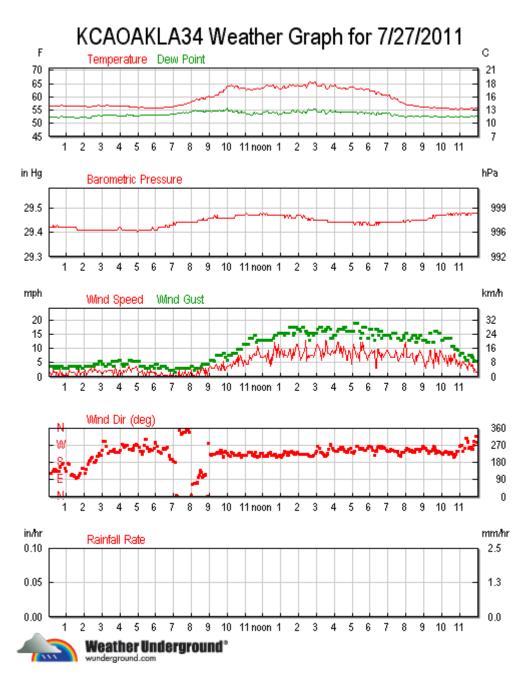
Lat: N 37 ° 50 ' 51 " ( 37.848 ° ) Lon: W 122 ° 17 ' 10 " ( -122.286 ° ) Elevation (ft): 36

July 🚽 14	4 2011 - TO - July	<b>•</b> 28 <b>•</b> 2011	Go
Daily Weekly Monthly Yearly Custom			
	High:	Low:	Average:
Temperature:	74.3 °F	54.7 °F	60.6 °F
Dew Point:	58.3 °F	46.3 °F	53.1 °F
Humidity:	91.0%	53.0%	77.3%
Wind Speed:	15.9mph from the SW	-	5.1mph
Wind Gust:	22.8mph from the SSW	-	-
Wind:	-	-	SSW
Pressure:	29.66in	29.39in	-
Precipitation:	0.00in		



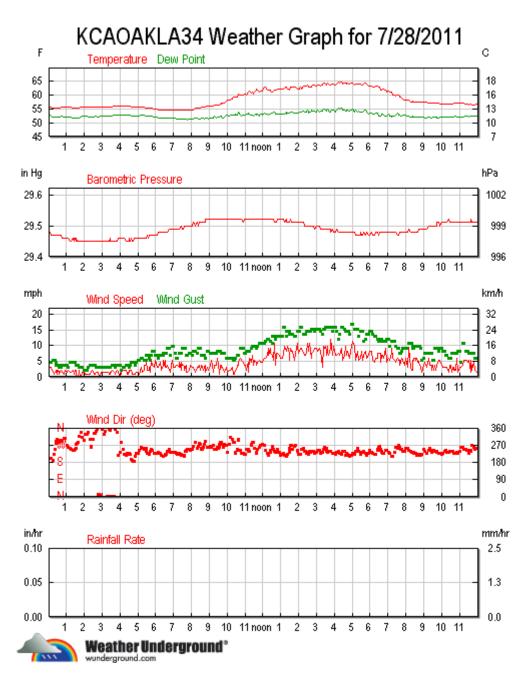
#### http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day &month=7&day=27&year=2011

« Previous Day	July 🗾 27	▼ 2011 ▼ View		Next Day »
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	65.5 °F	65.7 °F	55.2 °F	59.4 °F
Dew Point:	57.4 °F	55.6 °F	52.0 °F	53.5 °F
Humidity:	75%	90%	69%	81%
Wind Speed:	5.4mph	13.0mph	-	5.0mph
Wind Gust:	9.2mph	19.0mph	-	
Wind:	SW	-	-	WSW
Pressure:	29.58in	29.48in	29.40in	
Precipitation:	0.00in			
Statistics for the rest of the r	nonth			
		High:	Low:	Average:
Temperature:		78.3 °F	53.1 °F	60.2 °F
Dew Point:		58.3 °F	46.3 °F	52.8 °F
Humidity:		93.0%	46.0%	77.5%
Wind Speed:		15.9mph from the SW	-	4.9mph
Wind Gust:		22.8mph from the SSW	-	
Wind:		-	-	SW
Pressure:		29.66in	29.31in	-
Precipitation:		0.00in		



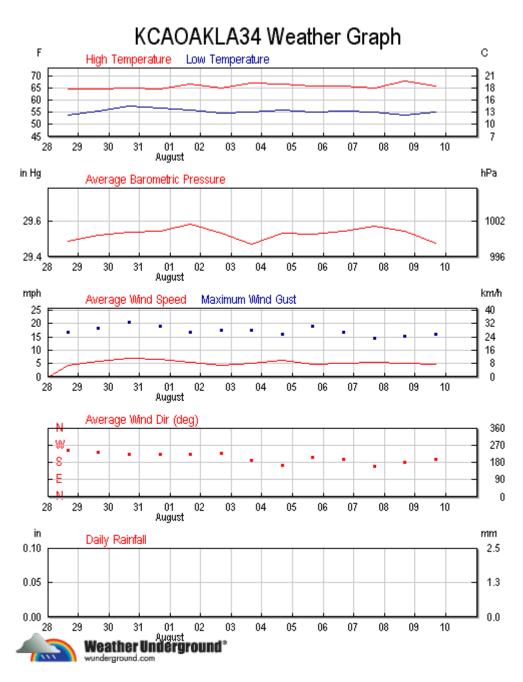
#### http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day &month=7&day=28&year=2011

« Previous Day	July 🗾 28			Next Day »
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	65.5 °F	64.9 °F	54.7 °F	58.8 °F
Dew Point:	57.4 °F	55.5 °F	51.2 °F	52.9 °F
Humidity:	75%	90%	70%	81%
Wind Speed:	5.4mph	12.1mph	-	4.3mph
Wind Gust:	9.2mph	16.8mph	-	
Wind:	SW	-	-	WSW
Pressure:	29.58in	29.52in	29.45in	
Precipitation:	0.00in			
Statistics for the rest of the r	nonth			
		High:	Low:	Average:
Temperature:		78.3 °F	53.1 °F	60.2 °F
Dew Point:		58.3 °F	46.3 °F	52.8 °F
Humidity:		93.0%	46.0%	77.5%
Wind Speed:		15.9mph from the SW	-	4.9mph
Wind Gust:		22.8mph from the SSW	-	
Wind:		-	-	SW
Pressure:		29.66in	29.31in	-
Precipitation:		0.00in		



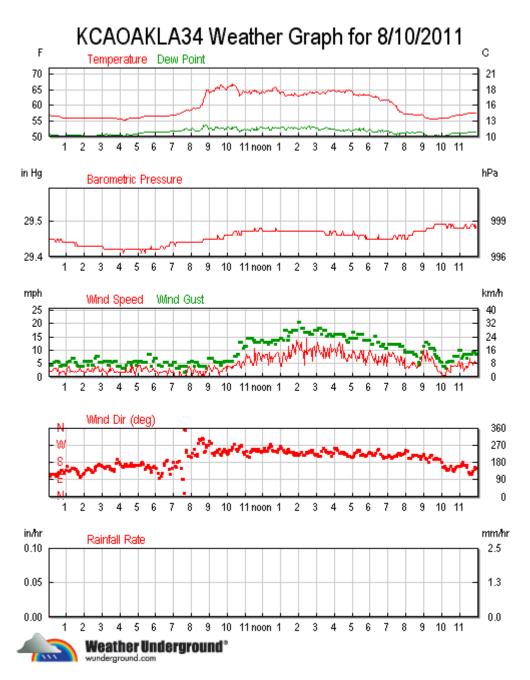
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July 🚽 24	3 🔽 2011 🔽 - TO - August 🗨	10 🚽 2011	Go
Daily Weekly Monthly Yearly Custom			
	High:	Low:	Average:
Temperature:	68.7 °F	54.7 °F	59.8 °F
Dew Point:	55.7 °F	49.9 °F	52.6 °F
Humidity:	90.0%	58.0%	77.6%
Wind Speed:	15.2mph from the WSW	-	5.3mph
Wind Gust:	20.6mph from the WSW	-	-
Wind:	-	-	SSW
Pressure:	29.63in	29.41in	-
Precipitation:	0.00in		



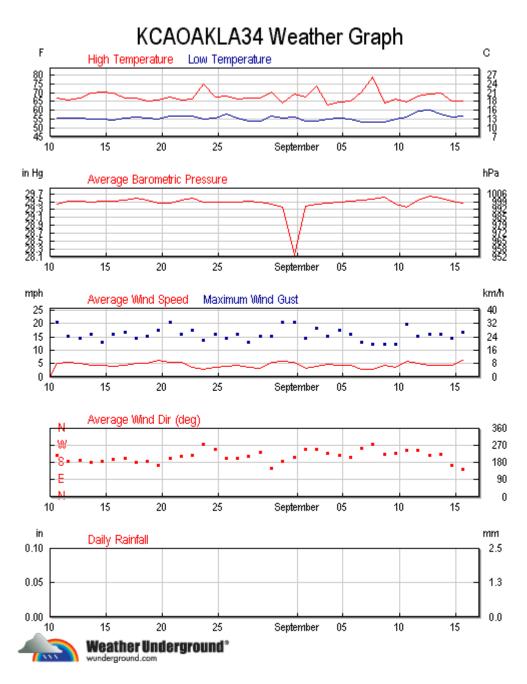
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« Previous Day	August 🚽 10			Next Day »
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	65.5 °F	66.9 °F	55.4 °F	60.1 °F
Dew Point:	57.4 °F	53.8 °F	50.1 °F	51.7 °F
Humidity:	75%	84%	62%	75%
Wind Speed:	5.4mph	14.5mph	-	4.9mph
Wind Gust:	9.2mph	20.6mph	-	-
Wind:	SW	-		SW
Pressure:	29.58in	29.49in	29.41in	-
Precipitation:	0.00in			
Statistics for the rest of the	month			
		High:	Low:	Average:
Temperature:		74.7 °F	54.1 °F	60.2 °F
Dew Point:		59.2 °F	48.9 °F	52.3 °F
Humidity:		90.0%	48.0%	76.2%
Wind Speed:		15.2mph from the SW	-	4.7mph
Wind Gust:		20.6mph from the SW	-	-
Wind:		-	-	SSW
Pressure:		29.65in	26.87in	-
Precipitation:		0.00in		



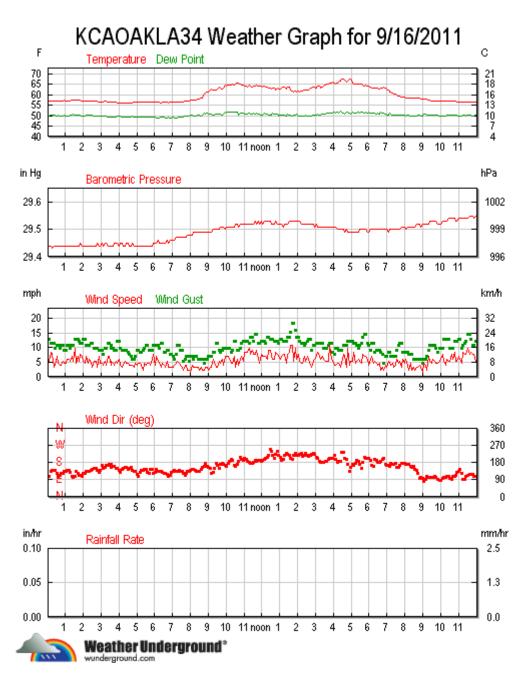
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August 🚽 10	▼ 2011 ▼ - TO - September	▼ 16 ▼ 2011	▼ Go
Daily Weekly Monthly Yearly Custom			
	High:	Low:	Average:
Temperature:	78.8 °F	53.1 °F	60.3 °F
Dew Point:	59.2 °F	48.4 °F	52.4 °F
Humidity:	90.0%	43.0%	76.1%
Wind Speed:	15.2mph from the SW	-	4.5mph
Wind Gust:	20.6mph from the SW	-	-
Wind:	-	-	SSW
Pressure:	29.67in	26.87in	-
Precipitation:	0.00in		



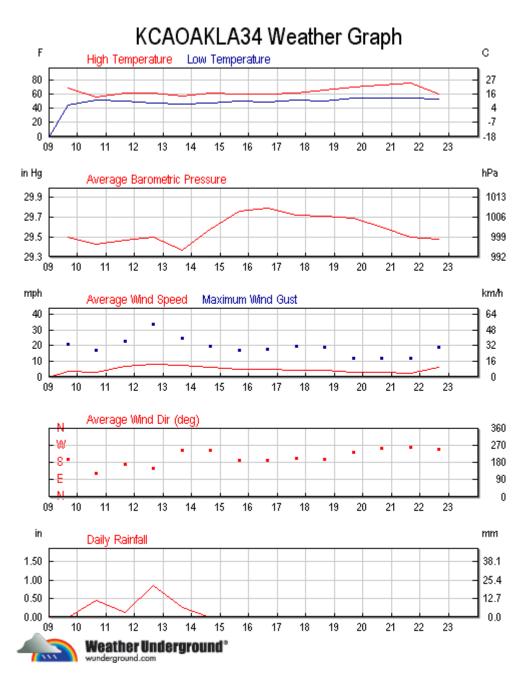
# http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day &month=9&day=16&year=2011

« Previous Day	September 🗾 16	2011 View		<u>Next Day »</u>
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	66.0 °F	68.4 °F	56.8 °F	60.9 °F
Dew Point:	58.3 °F	52.9 °F	49.9 °F	51.2 °F
Humidity:	76%	79%	57%	71%
Wind Speed:	4.9mph	10.7mph	-	5.2mph
Wind Gust:	9.8mph	18.3mph	-	-
Wind:	SSW	-	-	SSE
Pressure:	29.58in	29.55in	29.43in	-
Precipitation:	0.00in			
Statistics for the rest of the	month			
		High:	Low:	Average:
Temperature:		85.5 °F	53.1 °F	62.3 °F
Dew Point:		61.9 °F	45.7 °F	53.7 °F
Humidity:		98.0%	35.0%	74.9%
Wind Speed:		14.5mph from the WSW	-	3.9mph
Wind Gust:		20.6mph from the SW	-	-
Wind:		-	-	SW
Pressure:		29.67in	29.27in	-
Precipitation:		0.04in		



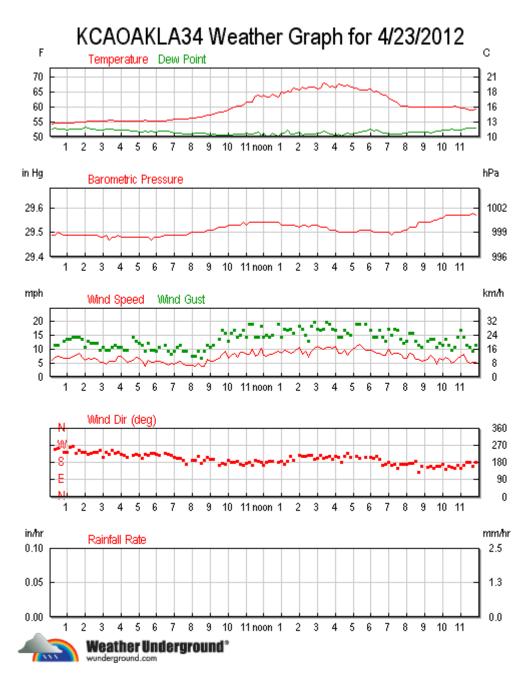
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April y 9	▼ 2012 ▼ - TO - April	<ul><li>✓ 23</li><li>✓ 2012</li></ul>	Go
Daily Weekly Monthly Yearly Custom			
	High:	Low:	Average:
Temperature:	76.6 °F	45.1 °F	56.8 °F
Dew Point:	60.1 °F	21.3 °F	48.8 °F
Humidity:	99.0%	16.0%	76.0%
Wind Speed:	16.4mph from the SSE	-	5.0mph
Wind Gust:	33.6mph from the SSE	-	-
Wind:	-	-	SSW
Pressure:	29.82in	29.29in	-
Precipitation:	1.65in		



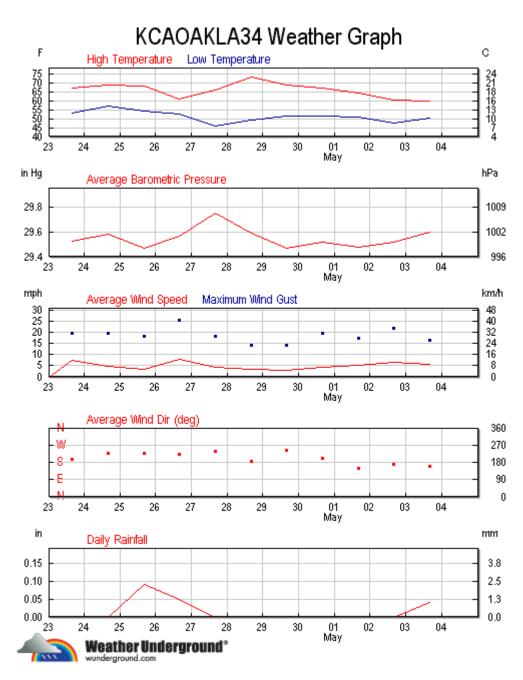
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« Previous Day	April 🗾 23	▼ 2012 ▼ View		<u>Next Day »</u>
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	66.0 °F	68.0 °F	54.1 °F	60.0 °F
Dew Point:	58.3 °F	53.1 °F	50.1 °F	51.6 °F
Humidity:	76%	94%	54%	75%
Wind Speed:	4.9mph	11.9mph	-	7.3mph
Wind Gust:	9.8mph	19.7mph	-	-
Wind:	SSW	-	-	SSW
Pressure:	29.58in	29.58in	29.47in	-
Precipitation:	0.00in			
Statistics for the rest of the	month			
		High:	Low:	Average:
Temperature:		76.6 °F	39.4 °F	56.3 °F
Dew Point:		60.1 °F	21.3 °F	46.5 °F
Humidity:		99.0%	16.0%	71.5%
Wind Speed:		16.4mph from the SSE	-	4.8mph
Wind Gust:		33.6mph from the SSE	-	-
Wind:		-	-	SW
Pressure:		29.86in	29.29in	-
Precipitation:		1.81in		



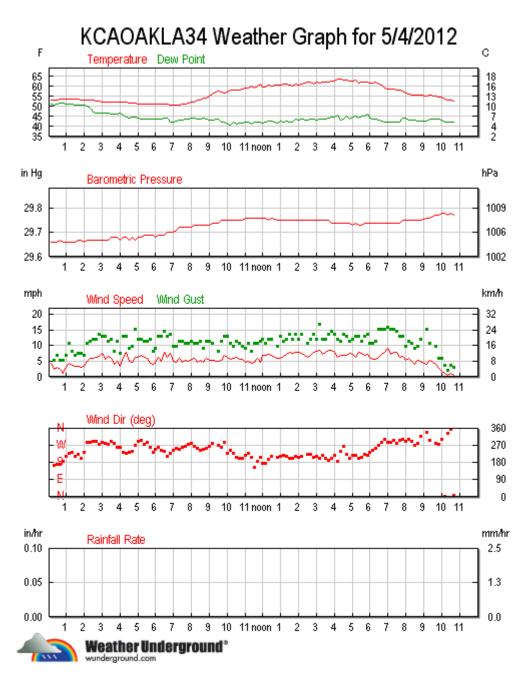
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April 🗾 23	▼ 2012 ▼ - TO - May ▼	4 🔽 2012	
Daily Weekly Monthly Yearly Custom			
	High:	Low:	Average:
Temperature:	73.8 °F	46.8 °F	58.4 °F
Dew Point:	56.2 °F	38.3 °F	49.1 °F
Humidity:	96.0%	41.0%	72.2%
Wind Speed:	14.4mph from the SW	-	5.1mph
Wind Gust:	25.9mph from the SW	-	-
Wind:	-	-	SSW
Pressure:	29.81in	29.35in	-
Precipitation:	0.18in		



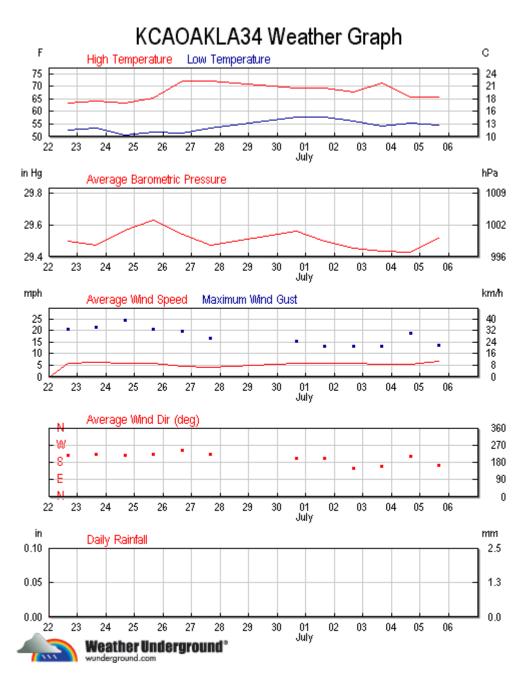
#### http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day &month=5&day=4&year=2012

« Previous Day	May 🚽 4	▼ 2012 ▼ View		Next Day »
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	66.0 °F	64.9 °F	51.6 °F	57.5 °F
Dew Point:	58.3 °F	52.5 °F	41.9 °F	45.4 °F
Humidity:	76%	93%	47%	65%
Wind Speed:	4.9mph	9.0mph	-	5.7mph
Wind Gust:	9.8mph	16.8mph	-	-
Wind:	SSW	-	-	WSW
Pressure:	29.58in	29.78in	29.66in	-
Precipitation:	0.00in			
Statistics for the rest of the r	nonth			
		High:	Low:	Average:
Temperature:		80.4 °F	48.2 °F	57.9 °F
Dew Point:		58.9 °F	23.2 °F	48.7 °F
Humidity:		99.0%	12.0%	73.2%
Wind Speed:		17.4mph from the SW	-	5.1mph
Wind Gust:		22.8mph from the NW	-	-
Wind:		-	-	SW
Pressure:		29.78in	29.29in	-
Precipitation:		0.05in		



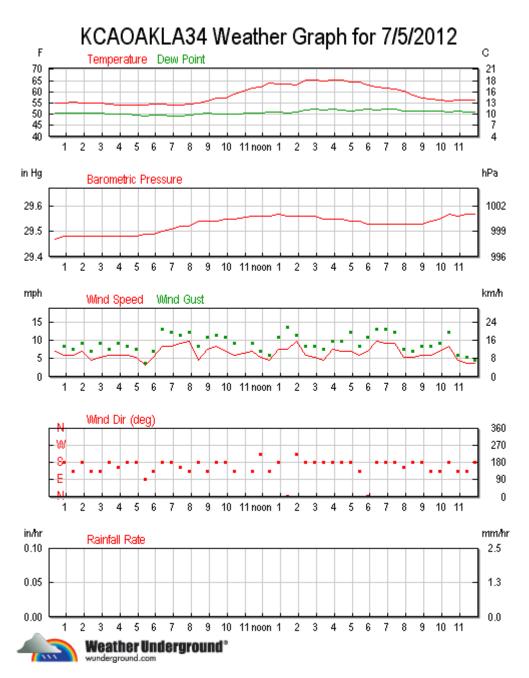
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June 🚽 22	2012 🔽 - TO - July 🗨 6	2012	Go
Daily Weekly Monthly Yearly Custom			
	High:	Low:	Average:
Temperature:	72.0 °F	50.7 °F	60.5 °F
Dew Point:	60.5 °F	45.8 °F	52.4 °F
Humidity:	96.0%	50.0%	75.5%
Wind Speed:	15.4mph from the SSW	-	5.5mph
Wind Gust:	24.4mph from the SW	-	-
Wind:	-	-	SSW
Pressure:	29.66in	29.39in	-
Precipitation:	0.00in		



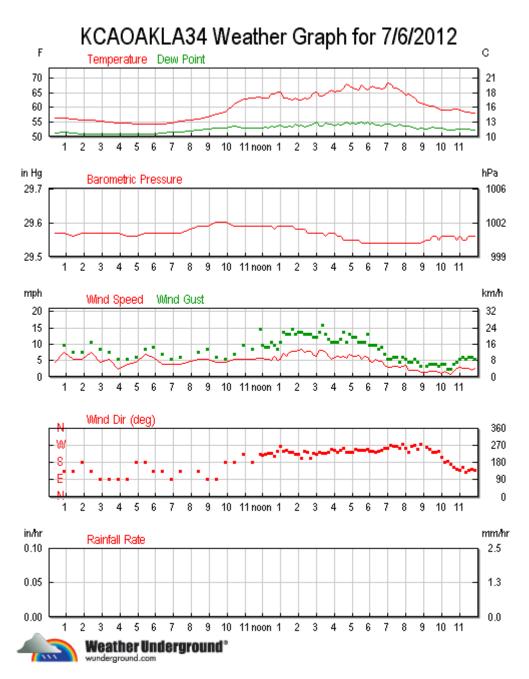
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« Previous Day	July 🗾 5	▼ 2012 ▼ View		<u>Next Day »</u>
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	60.6 °F	65.8 °F	54.5 °F	59.0 °F
Dew Point:	51.6 °F	52.7 °F	49.4 °F	51.2 °F
Humidity:	72%	86%	62%	76%
Wind Speed:	3.5mph	9.8mph	-	6.5mph
Wind Gust:	6.0mph	13.6mph	-	-
Wind:	SSW	-	-	SSE
Pressure:	29.60in	29.57in	29.47in	-
Precipitation:	0.00in			
Statistics for the rest of the	nonth			
		High:	Low:	Average:
Temperature:		76.5 °F	52.7 °F	60.2 °F
Dew Point:		60.0 °F	49.2 °F	53.2 °F
Humidity:		96.0%	49.0%	78.5%
Wind Speed:		13.9mph from the SW	-	5.2mph
Wind Gust:		26.6mph from the SSW	-	-
Wind:		-	-	SSW
Pressure:		29.66in	29.37in	-
Precipitation:		0.02in		



#### http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day &month=7&day=6&year=2012

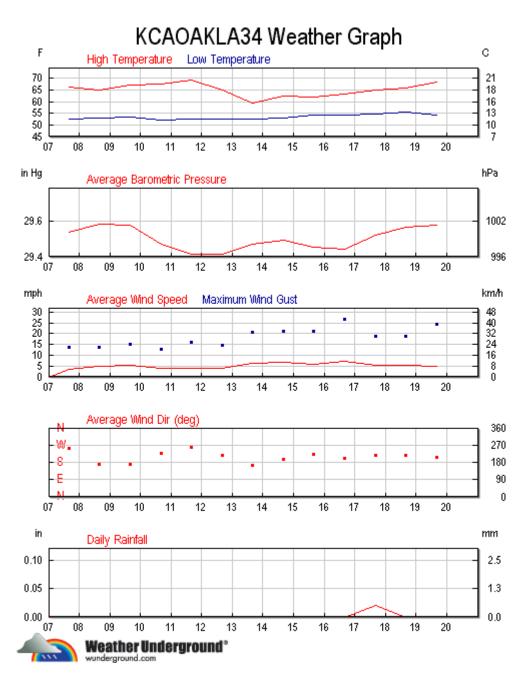
« Previous Day	July 6	▼ 2012 ▼ View		Next Day »
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	60.6 °F	68.2 °F	54.1 °F	61.9 °F
Dew Point:	51.6 °F	55.0 °F	50.8 °F	53.1 °F
Humidity:	72%	90%	61%	73%
Wind Speed:	3.5mph	8.3mph	-	4.7mph
Wind Gust:	6.0mph	15.9mph	-	-
Wind:	SSW	-	-	SW
Pressure:	29.60in	29.60in	29.54in	
Precipitation:	0.00in			
Statistics for the rest of the r	nonth			
		High:	Low:	Average:
Temperature:		76.5 °F	52.7 °F	60.2 °F
Dew Point:		60.0 °F	49.2 °F	53.2 °F
Humidity:		96.0%	49.0%	78.5%
Wind Speed:		13.9mph from the SW	-	5.2mph
Wind Gust:		26.6mph from the SSW	-	
Wind:		-	-	SSW
Pressure:		29.66in	29.37in	
Precipitation:		0.02in		



### Report 0304.R19 Appendix E

#### http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=cust om&month=7&day=7&year=2012&monthend=7&dayend=20&yearend=2012

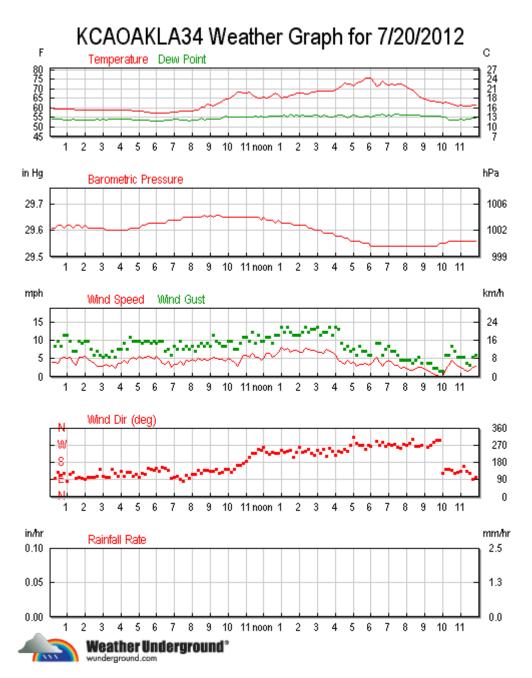
July 7	▼ 2012 ▼ - TO - July	<b>2</b> 0 <b>2</b> 012	- Go
Daily Weekly Monthly Yearly Custom			
	High:	Low:	Average:
Temperature:	76.5 °F	52.7 °F	59.4 °F
Dew Point:	57.8 °F	49.2 °F	52.8 °F
Humidity:	94.0%	49.0%	79.5%
Wind Speed:	13.9mph from the SW	-	5.1mph
Wind Gust:	26.6mph from the SSW	-	-
Wind:	-	-	SSW
Pressure:	29.66in	29.37in	-
Precipitation:	0.02in		



## Report 0304.R19 Appendix E

# http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day &month=7&day=20&year=2012

« Previous Day	July 🗾 20	▼ 2012 ▼ View		Next Day »
Daily Weekly Monthly Yea	rly Custom			
	Current:	High:	Low:	Average:
Temperature:	60.6 °F	76.5 °F	57.9 °F	64.9 °F
Dew Point:	51.6 °F	57.8 °F	53.8 °F	55.6 °F
Humidity:	72%	87%	49%	73%
Wind Speed:	3.5mph	8.1mph	-	4.3mph
Wind Gust:	6.0mph	13.6mph	-	-
Wind:	SSW	-	-	South
Pressure:	29.60in	29.66in	29.54in	
Precipitation:	0.00in			
Statistics for the rest of the	month			
		High:	Low:	Average:
Temperature:		76.5 °F	52.7 °F	60.2 °F
Dew Point:		60.0 °F	49.2 °F	53.2 °F
Humidity:		96.0%	49.0%	78.5%
Wind Speed:		13.9mph from the SW	-	5.2mph
Wind Gust:		26.6mph from the SSW	-	
Wind:		-	-	SSW
Pressure:		29.66in	29.37in	
Precipitation:		0.02in		



## **APPENDIX F**

## Laboratory Analytical Reports and Chain of Custody Documentation

#### Air

- Field Date 7/27/2011 and 7/28/2011 SG61 through SG67, SG67 DUP Air Toxics Lab Report #1108117A
- Field Date 7/27/2011 and 7/28/2011 SG61 through SG67, SG67 DUP Air Toxics Lab Report #1108117B
- Field Date 7/28/2011 SG 62 and SG 63 (Shroud) Air Toxics Lab Report #1107500
- Field Date 9/16/11 SG 62A, SG 62A-DUP, SG 68, SG 69, SG 70, SG 71, SG 72 Air Toxics Lab Report # 1109407AR1
- Field Date 9/16/2011 SG 62A, SG 62A-DUP, SG 68, SG 69, SG 70, SG 71, SG 72 Air Toxics Lab Report # 1109407B
- Field Date 9/16/2011 SG 62A, SG 69 (Shroud) McCampbell Lab Report #1109433
- Field Date 8/10/2011 VW1-SS, VW1-5, VW2-SS, VW2-5, VW2-5 DUP Air Toxics Lab Report #1108301A
- Field Date 8/10/2011 VW1-SS, VW1-5, VW2-SS, VW2-5, VW2-5 DUP Air Toxics Lab Report #1108301B
- Field Date 8/10/2011 VW1-SS, VW1-5, VW2-SS, VW2-5, VW2-5 DUP Air Toxics Lab Report #1108301C
- Field Date 4/23/2012 and 5/4/2012 VW1-SS, VW1-5, VW2-SS, VW2-5, VW2-5 DUP, VW3-SS, VW3-5 Air Toxics Lab Report #1205152A
- Field Date 4/23/2012 and 5/4/2012 VW1-SS, VW1-5, VW2-SS, VW2-5, VW2-5 DUP, VW3-SS, VW3-5 Air Toxics Lab Report #1205152B
- Field Date 4/23/2012 and 5/4/2012 VW1-SS, VW1-5, VW2-SS, VW2-5, VW2-5 DUP, VW3-SS, VW3-5 Air Toxics Lab Report #1205152C
- Field Date 5/4/2012 VW1-5, VW2-5, VW3-5 (Shroud) McCampbell Lab Report #1205173
- Field Date 7/5 and 7/6/2012 VW5, VW6, and VW7 Air Toxics Lab Report #1207155A
- Field Date 7/5 and 7/6/2012 VW5, VW6, and VW7 Air Toxics Lab Report #1207155B
- Field Date 7/5 and 7/6/2012 VW5, VW6, and VW7 Air Toxics Lab Report #1207155C
- Field Date 7/5 and 7/6/2012 VW5, VW6, and VW7 (Shroud) Air Toxics Lab Report #1207124
- Field Date 7/20/2012 VW4 and VW4-DUP Air Toxics Lab Report #1207527A
- Field Date 7/20/2012 VW4 and VW4-DUP Air Toxics Lab Report #1207527B
- Field Date 7/20/2012 VW4 and VW4-DUP Air Toxics Lab Report #1207527C
- Field Date 7/20/2012 VW4 (Shroud) Air Toxics Lab Report #1207538

#### Soil

- Field Date 6/28/2012 B94-1.0 and B94-8.0 McCampbell Lab Report # 1206894
- Field Date 7/18/2012 B90-7 McCampbell Lab Report # 1207481
- Field Date 7/20/2012 B95B-1 McCampbell Lab Report # 1207599

#### Groundwater

- Field Date 9/16/2011 B89-W McCampbell Lab Report # 1109474
- Field Date 6/28 and 6/29/2012 B93-W and B94-W McCampbell Lab Report # 1206897
- Field Date 7/2 and 7/3/2012 B91-W and B92-W McCampbell Lab Report # 1207071
- Field Date 7/18/2012 B90-W McCampbell Lab Report # 1207486
- Field Date 7/20/2012 B95B-W and B96-W McCampbell Lab Report # 1207600



8/17/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: CALIFORNIA LINEN RENTAL CO. OAKLAND Project #: 0304 Workorder #: 1108117A

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 8/4/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

Page 1 of 17



#### WORK ORDER #: 1108117A

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	<b>PROJECT</b> #	0304 CALIFORNIA LINEN RENTAL
DATE RECEIVED:	08/04/2011	CONTACT:	CO. QAKLAND Kyle Vagadori
DATE COMPLETED:	08/17/2011	continen	Kyle Vagadoli

			RECEIPT	FINAL
FRACTION #	NAME	<u>TEST</u>	VAC./PRES.	PRESSURE
01A	SG61	Modified TO-3	3.6 "Hg	15 psi
02A	SG62	Modified TO-3	6.0 "Hg	15 psi
03A	SG63	Modified TO-3	7.6 "Hg	15 psi
04A	SG64	Modified TO-3	3.2 "Hg	15 psi
05A	SG65	Modified TO-3	5.0 "Hg	15 psi
06A	SG66	Modified TO-3	21.4 "Hg	15 psi
07A	SG67	Modified TO-3	5.6 "Hg	15 psi
08A	SG67 DUP	Modified TO-3	5.4 "Hg	15 psi
09A	Lab Blank	Modified TO-3	NA	NA
10A	LCS	Modified TO-3	NA	NA
10AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

Sinda d. Fruman

DATE: <u>08/17/11</u>

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11 Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE Modified TO-3 P & D Environmental Workorder# 1108117A

Eight 1 Liter Summa Canister samples were received on August 04, 2011. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system. The TPH (Gasoline Range) results are calculated using the response factor of Gasoline. A molecular weight of 100 is used to convert the TPH (Gasoline Range) ppmv result to ug/L.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ТО-3	ATL Modifications
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch = 20 samples</td
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A+3.3S$ , where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

#### **Receiving Notes**

Sample SG66 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

#### **Analytical Notes**

The hydrocarbon profile present in sample SG62 did not resemble that of commercial gasoline. Results were calculated using the response factor derived from the current gasoline linear calibration.



#### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank greater than reporting limit.
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue



## Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

#### **Client Sample ID: SG61** Lab ID#: 1108117A-01A **Rpt.** Limit Amount Amount **Rpt.** Limit Compound (ppmv) (ug/L) (ppmv) (ug/L) **TPH** (Gasoline Range) 0.058 0.24 4.5 18 **Client Sample ID: SG62** Lab ID#: 1108117A-02A **Rpt.** Limit Rpt. Limit Amount Amount Compound (ppmv) (ug/L) (ppmv) (ug/L) **TPH** (Gasoline Range) 0.70 1600 2.9 390 **Client Sample ID: SG63** Lab ID#: 1108117A-03A **Rpt.** Limit Rpt. Limit Amount Amount Compound (ppmv) (ug/L) (ppmv) (ug/L) **TPH** (Gasoline Range) 0.28 23 0.068 5.6 **Client Sample ID: SG64** Lab ID#: 1108117A-04A Rpt. Limit **Rpt.** Limit Amount Amount Compound (ppmv) (ug/L) (ppmv) (ug/L) **TPH** (Gasoline Range) 75 0.11 0.46 310 **Client Sample ID: SG65** Lab ID#: 1108117A-05A **Rpt.** Limit **Rpt.** Limit Amount Amount Compound (ug/L) (ug/L) (ppmv) (ppmv) TPH (Gasoline Range) 0.060 0.25 1.2 5.0

#### **Client Sample ID: SG66**

Lab ID#: 1108117A-06A				
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
Compound	(ppmv)	(ug/L)	(ppmv)	(ug/L)



## Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

#### **Client Sample ID: SG66**

Lab ID#: 1108117A-06A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.18	0.72	3.3	13
Client Sample ID: SG67				
Lab ID#: 1108117A-07A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.062	0.25	0.62	2.5
Client Sample ID: SG67 DUP				
Lab ID#: 1108117A-08A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.062	0.25	0.65	2.7



### Client Sample ID: SG61 Lab ID#: 1108117A-01A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080807 2.30			
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.058	0.24	4.5	18
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		95		75-150



### Client Sample ID: SG62 Lab ID#: 1108117A-02A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080813 28.0	2.000	e of Collection: 7/2 e of Analysis: 8/8/1	
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.70	2.9	390	1600
Container Type: 1 Liter Summ	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		106		75-150



### Client Sample ID: SG63 Lab ID#: 1108117A-03A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080809 2.70	Date of Collection: 7/28/11 3:16:00 PM Date of Analysis: 8/8/11 12:39 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.068	0.28	5.6	23
Container Type: 1 Liter Summ	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		93		75-150



### Client Sample ID: SG64 Lab ID#: 1108117A-04A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080812 4.52	2 410	of Collection: 7/2 of Analysis: 8/8/1	
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.11	0.46	75	310
Container Type: 1 Liter Sumn	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		99		75-150



### Client Sample ID: SG65 Lab ID#: 1108117A-05A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	1.2	5.0
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		98		75-150



### Client Sample ID: SG66 Lab ID#: 1108117A-06A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor: Compound	d080814 7.05		Date of Collection: 7/27/11 4:55:00 PM Date of Analysis: 8/8/11 04:07 PM			
	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)		
TPH (Gasoline Range)	0.18	0.72	3.3	13		
Container Type: 1 Liter Summ	na Canister			Method		
Surrogates		%Recovery		Limits		
Fluorobenzene (FID)		104		75-150		



### Client Sample ID: SG67 Lab ID#: 1108117A-07A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080815 2.48	2 410	Date of Collection: 7/27/11 2:45:00 PM Date of Analysis: 8/8/11 04:39 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)	
TPH (Gasoline Range)	0.062	0.25	0.62	2.5	
Container Type: 1 Liter Sumn	na Canister			Method	
Surrogates		%Recovery Limit			
Fluorobenzene (FID)		100 75-150			



### Client Sample ID: SG67 DUP Lab ID#: 1108117A-08A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080816 2.46	2.000	Date of Collection: 7/27/11 2:45:00 PM Date of Analysis: 8/8/11 05:40 PM			
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)		
TPH (Gasoline Range)	0.062	0.25	0.65	2.7		
Container Type: 1 Liter Summ	na Canister			Method		
Surrogates		%Recovery		Limits		
Fluorobenzene (FID)		103		75-150		



### Client Sample ID: Lab Blank Lab ID#: 1108117A-09A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080804 1.00			1 08:54 AM
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected
Container Type: NA - Not App	licable			
Surrogates		Metho %Recovery Limit		
Fluorobenzene (FID)		104 75-150		



### Client Sample ID: LCS Lab ID#: 1108117A-10A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080802 1.00	Date of Collec Date of Analys	tion: NA sis: 8/8/11 07:33 AM
Compound			%Recovery
TPH (Gasoline Range)			101
Container Type: NA - Not App	blicable		Method
Surrogates		%Recovery	Limits
Fluorobenzene (FID)		105	75-150



### Client Sample ID: LCSD Lab ID#: 1108117A-10AA MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d080819 1.00		ate of Collection: NA ate of Analysis: 8/8/11 07:23 PM	
Compound			%Recovery	
TPH (Gasoline Range)			91	
Container Type: NA - Not App	olicable		Method	
Surrogates		%Recovery	Limits	
Fluorobenzene (FID)		107	75-150	



8/17/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: CALIFORNIA LINEN RENTAL CO. OAKLAND Project #: 0304 Workorder #: 1108117B

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 8/4/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kge Vych

Kyle Vagadori Project Manager



#### WORK ORDER #: 1108117B

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	PROJECT #	0304 CALIFORNIA LINEN RENTAL
DATE RECEIVED:	08/04/2011	CONTACT:	CO. QAKLAND Kyle Vagadori
DATE COMPLETED:	08/17/2011	continen	Kyle Vagadoli

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	PRESSURE
01A	SG61	Modified TO-15	3.6 "Hg	15 psi
02A	SG62	Modified TO-15	6.0 "Hg	15 psi
03A	SG63	Modified TO-15	7.6 "Hg	15 psi
04A	SG64	Modified TO-15	3.2 "Hg	15 psi
05A	SG65	Modified TO-15	5.0 "Hg	15 psi
06A	SG66	Modified TO-15	21.4 "Hg	15 psi
07A	SG67	Modified TO-15	5.6 "Hg	15 psi
08A	SG67 DUP	Modified TO-15	5.4 "Hg	15 psi
09A	Lab Blank	Modified TO-15	NA	NA
09B	Lab Blank	Modified TO-15	NA	NA
10A	CCV	Modified TO-15	NA	NA
10B	CCV	Modified TO-15	NA	NA
11A	LCS	Modified TO-15	NA	NA
11AA	LCSD	Modified TO-15	NA	NA
11B	LCS	Modified TO-15	NA	NA
11BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

Sinda d. Fruman

DATE: <u>08/17/11</u>

Laboratory Director

Certification numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11 Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE EPA Method TO-15 P & D Environmental Workorder# 1108117B

Eight 1 Liter Summa Canister samples were received on August 04, 2011. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

#### **Receiving Notes**

There were no receiving discrepancies.

#### Analytical Notes

Dilution was performed on samples SG62 and SG64 due to the presence of high level target species.

#### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit.
- UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue



## Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

#### **Client Sample ID: SG61**

Lab ID#: 1108117B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.6	4000 E	11	9900 E
Benzene	1.2	16	3.7	51
Toluene	1.2	98	4.3	370
Ethyl Benzene	1.2	4.9	5.0	21
m,p-Xylene	1.2	16	5.0	70
o-Xylene	1.2	4.5	5.0	19

#### **Client Sample ID: SG62**

#### Lab ID#: 1108117B-02A

Compound	Rpt. Limit	Amount	Rpt. Limit	Amount
	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
2-Propanol	1000	400000 E	2500	1000000 E

#### **Client Sample ID: SG63**

#### Lab ID#: 1108117B-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.4	15	4.3	48
Toluene	1.4	320	5.1	1200
Ethyl Benzene	1.4	21	5.9	92
m,p-Xylene	1.4	75	5.9	330
o-Xylene	1.4	25	5.9	110

#### **Client Sample ID: SG64**

#### Lab ID#: 1108117B-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	11	3300	42	13000
Ethyl Benzene	11	250	49	1100
m,p-Xylene	11	880	49	3800
o-Xylene	11	330	49	1400



## Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

#### **Client Sample ID: SG65**

Lab ID#: 1108117B-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.8	99	12	240
Benzene	1.2	2.2	3.9	6.9
Toluene	1.2	60	4.6	220
Ethyl Benzene	1.2	3.6	5.2	16
m,p-Xylene	1.2	13	5.2	55
o-Xylene	1.2	4.3	5.2	19

#### **Client Sample ID: SG66**

#### Lab ID#: 1108117B-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	14	23	35	56
Benzene	3.5	7.1	11	23
Toluene	3.5	170	13	660
Ethyl Benzene	3.5	9.7	15	42
m,p-Xylene	3.5	31	15	130
o-Xylene	3.5	11	15	49

#### **Client Sample ID: SG67**

#### Lab ID#: 1108117B-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	5.0	23	12	57
Benzene	1.2	3.0	4.0	9.7
Toluene	1.2	20	4.7	78
Ethyl Benzene	1.2	1.8	5.4	7.6
m,p-Xylene	1.2	7.0	5.4	30
o-Xylene	1.2	2.4	5.4	10

#### **Client Sample ID: SG67 DUP**

#### Lab ID#: 1108117B-08A



## Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

### Client Sample ID: SG67 DUP

Lab ID#: 1108117B-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.9	21	12	52
Benzene	1.2	2.9	3.9	9.2
Toluene	1.2	20	4.6	77
Ethyl Benzene	1.2	1.8	5.3	8.0
m,p-Xylene	1.2	6.9	5.3	30
o-Xylene	1.2	2.5	5.3	11



#### Client Sample ID: SG61 Lab ID#: 1108117B-01A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080908 2.30		of Collection: 7/2 of Analysis: 8/9/1	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.6	4000 E	11	9900 E
Methyl tert-butyl ether	1.2	Not Detected	4.1	Not Detected
Benzene	1.2	16	3.7	51
Toluene	1.2	98	4.3	370
Ethyl Benzene	1.2	4.9	5.0	21
m,p-Xylene	1.2	16	5.0	70
o-Xylene	1.2	4.5	5.0	19

E = Exceeds instrument calibration range.

		Method
Surrogates	%Recovery	Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	103	70-130



#### Client Sample ID: SG62 Lab ID#: 1108117B-02A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080824 504		of Collection: 7/2 of Analysis: 8/8/1	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	1000	400000 E	2500	1000000 E
Methyl tert-butyl ether	250	Not Detected	910	Not Detected
Benzene	250	Not Detected	800	Not Detected
Toluene	250	Not Detected	950	Not Detected
Ethyl Benzene	250	Not Detected	1100	Not Detected
m,p-Xylene	250	Not Detected	1100	Not Detected
o-Xylene	250	Not Detected	1100	Not Detected

E = Exceeds instrument calibration range.

Surrogatos	%Recovery	Method Limits
Surrogates	%Recovery	LIIIIIIS
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	102	70-130



#### Client Sample ID: SG63 Lab ID#: 1108117B-03A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	6080816 2.70		of Collection: 7/2 of Analysis: 8/8/1	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	5.4	Not Detected	13	Not Detected
Methyl tert-butyl ether	1.4	Not Detected	4.9	Not Detected
Benzene	1.4	15	4.3	48
Toluene	1.4	320	5.1	1200
Ethyl Benzene	1.4	21	5.9	92
m,p-Xylene	1.4	75	5.9	330
o-Xylene	1.4	25	5.9	110

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	103	70-130



#### Client Sample ID: SG64 Lab ID#: 1108117B-04A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080825 22.6		of Collection: 7/2 of Analysis: 8/8/1	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	45	Not Detected	110	Not Detected
Methyl tert-butyl ether	11	Not Detected	41	Not Detected
Benzene	11	Not Detected	36	Not Detected
Toluene	11	3300	42	13000
Ethyl Benzene	11	250	49	1100
m,p-Xylene	11	880	49	3800
o-Xylene	11	330	49	1400

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	101	70-130



#### Client Sample ID: SG65 Lab ID#: 1108117B-05A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080820 2.42	Date of Collection: 7/27/11 3:21:00 PM Date of Analysis: 8/8/11 08:03 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.8	99	12	240
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
Benzene	1.2	2.2	3.9	6.9
Toluene	1.2	60	4.6	220
Ethyl Benzene	1.2	3.6	5.2	16
m,p-Xylene	1.2	13	5.2	55
o-Xylene	1.2	4.3	5.2	19

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	96	70-130	
1,2-Dichloroethane-d4	108	70-130	
4-Bromofluorobenzene	101	70-130	



#### Client Sample ID: SG66 Lab ID#: 1108117B-06A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080821 7.05	Date of Collection: 7/27/11 4:55:00 PM Date of Analysis: 8/8/11 08:54 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	14	23	35	56
Methyl tert-butyl ether	3.5	Not Detected	13	Not Detected
Benzene	3.5	7.1	11	23
Toluene	3.5	170	13	660
Ethyl Benzene	3.5	9.7	15	42
m,p-Xylene	3.5	31	15	130
o-Xylene	3.5	11	15	49

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	106	70-130	
4-Bromofluorobenzene	97	70-130	



#### Client Sample ID: SG67 Lab ID#: 1108117B-07A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080822 2.48	Date of Collection: 7/27/11 2:45:00 PM Date of Analysis: 8/8/11 09:30 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	5.0	23	12	57
Methyl tert-butyl ether	1.2	Not Detected	4.5	Not Detected
Benzene	1.2	3.0	4.0	9.7
Toluene	1.2	20	4.7	78
Ethyl Benzene	1.2	1.8	5.4	7.6
m,p-Xylene	1.2	7.0	5.4	30
o-Xylene	1.2	2.4	5.4	10

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	106	70-130	
4-Bromofluorobenzene	100	70-130	



# Client Sample ID: SG67 DUP Lab ID#: 1108117B-08A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	6080823 2.46		of Collection: 7/2 of Analysis: 8/8/1	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.9	21	12	52
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
Benzene	1.2	2.9	3.9	9.2
Toluene	1.2	20	4.6	77
Ethyl Benzene	1.2	1.8	5.3	8.0
m,p-Xylene	1.2	6.9	5.3	30
o-Xylene	1.2	2.5	5.3	11

#### Container Type: 1 Liter Summa Canister

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	101	70-130



# Client Sample ID: Lab Blank Lab ID#: 1108117B-09A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:			Date of Collection: NA Date of Analysis:  8/8/11 11:33 AM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	2.0	Not Detected	4.9	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	101	70-130



# Client Sample ID: Lab Blank Lab ID#: 1108117B-09B EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:			Date of Collection: NA Date of Analysis: 8/9/11 10:20 AM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	2.0	Not Detected	4.9	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	105	70-130



# Client Sample ID: CCV Lab ID#: 1108117B-10A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080803 1.00	Date of Collection: NA Date of Analysis: 8/8/11 08:04 AM	
Compound		%Recovery	
2-Propanol		96	
Methyl tert-butyl ether		103	
Benzene		98	
Toluene		99	
Ethyl Benzene		99	
m,p-Xylene		98	
o-Xylene		97	

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	96	70-130	
4-Bromofluorobenzene	100	70-130	



#### Client Sample ID: CCV Lab ID#: 1108117B-10B EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name:         6080902           Dil. Factor:         1.00		Date of Collection: NA Date of Analysis: 8/9/11 07:14 AM	
	1.00		
Compound		%Recovery	
2-Propanol		91	
Methyl tert-butyl ether		99	
Benzene		99	
Toluene		100	
Ethyl Benzene		100	
m,p-Xylene		98	
o-Xylene		98	

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	94	70-130	
4-Bromofluorobenzene	100	70-130	



#### Client Sample ID: LCS Lab ID#: 1108117B-11A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	6080804 1.00	Date of Collection: NA Date of Analysis: 8/8/11 08:54 AM	
Compound		%Recove	
2-Propanol		92	
Methyl tert-butyl ether		99	
Benzene		97	
Toluene		93	
Ethyl Benzene		95	
m,p-Xylene		96	
o-Xylene		95	

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	98	70-130	
1,2-Dichloroethane-d4	93	70-130	
4-Bromofluorobenzene	105	70-130	



#### Client Sample ID: LCSD Lab ID#: 1108117B-11AA EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080805 1.00	Date of Collection: NA Date of Analysis: 8/8/11 09:15 AM
Compound		%Recovery
2-Propanol		91
Methyl tert-butyl ether		98
Benzene		96
Toluene		92
Ethyl Benzene		96
m,p-Xylene		94
o-Xylene		95

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	98	70-130



#### Client Sample ID: LCS Lab ID#: 1108117B-11B EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	6080903 1.00	Date of Collection: NA Date of Analysis: 8/9/11 07:59 AM
Compound		%Recovery
2-Propanol		93
Methyl tert-butyl ether		102
Benzene		93
Toluene		90
Ethyl Benzene		92
m,p-Xylene		92
o-Xylene		93

		Method
Surrogates	%Recovery	Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	101	70-130



#### Client Sample ID: LCSD Lab ID#: 1108117B-11BB EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	6080904 1.00	Date of Collection: NA Date of Analysis: 8/9/11 08:20 AM
Compound		%Recovery
2-Propanol		92
Methyl tert-butyl ether		101
Benzene		96
Toluene		93
Ethyl Benzene		97
m,p-Xylene		96
o-Xylene		96

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	104	70-130



8/10/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Company, Oakland Project #: 0304 Workorder #: 1107500

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 7/29/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

Page 1 of 10



#### WORK ORDER #: 1107500

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	<b>PROJECT</b> #	0304 California Linen Company,
DATE RECEIVED:	07/29/2011	CONTACT:	Oakland Kyle Vagadori
DATE COMPLETED:	08/10/2011	contract.	ityle vugatoli

			RECEIPT	FINAL
FRACTION #	NAME	<u>TEST</u>	VAC./PRES.	PRESSURE
01A	SG 62	Modified TO-15 (5&20 ppbv	Tedlar Bag	Tedlar Bag
02A	SG 63	Modified TO-15 (5&20 ppbv	Tedlar Bag	Tedlar Bag
03A	Lab Blank	Modified TO-15 (5&20 ppbv	NA	NA
04A	CCV	Modified TO-15 (5&20 ppbv	NA	NA
05A	LCS	Modified TO-15 (5&20 ppbv	NA	NA
05AA	LCSD	Modified TO-15 (5&20 ppbv	NA	NA

CERTIFIED BY:

Sinda d. Fruman

08/10/11 DATE:

Laboratory Director

Certification numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11 Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE EPA Method TO-15 Soil Gas P & D Environmental Workorder# 1107500

Two 1 Liter Tedlar Bag samples were received on July 29, 2011. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

#### **Receiving Notes**

There were no receiving discrepancies.

#### **Analytical Notes**

Dilution was performed on samples SG 62 and SG 63 due to the presence of high level target species.

#### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit.
- UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds EPA METHOD TO-15 GC/MS

#### Client Sample ID: SG 62

Lab ID#: 1107500-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	2000	500000	4900	1200000
Client Sample ID: SG 63				
Lab ID#: 1107500-02A				
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	2000	490000	4900	1200000



# Client Sample ID: SG 62 Lab ID#: 1107500-01A EPA METHOD TO-15 GC/MS

File Name: Dil. Factor:	14073011 100	Date of Collection: 7/28/11 12:45:00 PM Date of Analysis: 7/30/11 01:52 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	2000	500000	4900	1200000
Container Type: 1 Liter Tedla	r Bag			
Surrogates		%Recovery		Method Limits
1,2-Dichloroethane-d4		96		70-130
Toluene-d8		98		70-130
4-Bromofluorobenzene		97		70-130



# Client Sample ID: SG 63 Lab ID#: 1107500-02A EPA METHOD TO-15 GC/MS

File Name: Dil. Factor:	14073015 100	Date of Collection: 7/28/11 1:05:00 PM Date of Analysis: 7/30/11 03:56 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	2000	490000	4900	1200000
Container Type: 1 Liter Tedla	ar Bag			
Surrogates		%Recovery		Method Limits
1,2-Dichloroethane-d4		97		70-130
Toluene-d8		99		70-130
4-Bromofluorobenzene		92		70-130



# Client Sample ID: Lab Blank Lab ID#: 1107500-03A EPA METHOD TO-15 GC/MS

File Name: Dil. Factor:	14073006 1.00	Date of Collection: NA Date of Analysis: 7/30/11 10:34 AM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	20	Not Detected	49	Not Detected
Container Type: NA - Not Ap	plicable			
Surrogates		%Recovery		Method Limits
1,2-Dichloroethane-d4		98		70-130
Toluene-d8		100		70-130
4-Bromofluorobenzene		91		70-130



# Client Sample ID: CCV Lab ID#: 1107500-04A EPA METHOD TO-15 GC/MS

File Name: Dil. Factor:	14073002 1.00	Date of Collection: NA Date of Analysis: 7/30/11 08:35 AM		
Compound			%Recovery	
2-Propanol			88	
Container Type: NA - Not Ap	plicable		Mathad	
Surrogates		%Recovery	Method Limits	
1,2-Dichloroethane-d4		96	70-130	
Toluene-d8		100	70-130	



# Client Sample ID: LCS Lab ID#: 1107500-05A EPA METHOD TO-15 GC/MS

File Name: Dil. Factor:	14073003 1.00	Date of Collec Date of Analy	tion: NA sis:  7/30/11 09:00 AM
Compound			%Recovery
2-Propanol			76
Container Type: NA - Not Ap	plicable		Mathad
Surrogates		%Recovery	Method Limits
1,2-Dichloroethane-d4		98	70-130
Toluene-d8		100	70-130
4-Bromofluorobenzene		96	70-130



### Client Sample ID: LCSD Lab ID#: 1107500-05AA EPA METHOD TO-15 GC/MS

File Name: Dil. Factor:	14073004 1.00	Date of Collection: NA Date of Analysis: 7/30/11 09:18 AM	
Compound			%Recovery
2-Propanol			75
Container Type: NA - Not Ap	plicable		
Surrogates		%Recovery	Method Limits
1,2-Dichloroethane-d4		98	70-130
Toluene-d8		100	70-130



10/5/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. Oakland Project #: 0304 Workorder #: 1109407AR1

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 9/21/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

Page 1 of 16



#### WORK ORDER #: 1109407AR1

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX: DATE RECEIVED: DATE COMPLETE DATE REISSUED:	510-834-0772 09/21/2011 D: 10/04/2011 10/05/2011	PROJECT # CONTACT:	0304 California Linen Rental Co. Oakland Kyle Vagadori
			RECEIPT FINAL
FRACTION #	NAME	TEST	VAC./PRES. PRESSURE
01A	SG 62A	Modified TO-3	3 5.5 "Hg 15 psi
02A	SG 62A-DUP	Modified TO-3	3 6.0 "Hg 15 psi
03A	SG 68	Modified TO-3	3 4.5 "Hg 15 psi
04A	SG 69	Modified TO-3	3 5.0 "Hg 15 psi
05A	SG 70	Modified TO-3	3 5.0 "Hg 15 psi
06A	SG 71	Modified TO-3	3 5.0 "Hg 15 psi
07A	SG 72	Modified TO-3	3 5.0 "Hg 15 psi
08A	Lab Blank	Modified TO-3	3 NA NA
09A	LCS	Modified TO-3	3 NA NA
09AA	LCSD	Modified TO-3	3 NA NA

CERTIFIED BY:

Sinda d. Fruman

10/05/11 DATE:

Laboratory Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE Modified TO-3 P & D Environmental Workorder# 1109407AR1

Seven 1 Liter Summa Canister samples were received on September 21, 2011. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system. The TPH (Gasoline Range) results are calculated using the response factor of Gasoline. A molecular weight of 100 is used to convert the TPH (Gasoline Range) ppmv result to ug/L.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ТО-3	ATL Modifications
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch = 20 samples</td
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A+3.3S$ , where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

#### **Receiving Notes**

There were no receiving discrepancies.

#### **Analytical Notes**

There were no analytical discrepancies.

THE WORKORDER WAS REISSUED ON 10/05/11 TO REPORT RESULTS IN PPMV AND UG/L.



### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank greater than reporting limit.
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

# Client Sample ID: SG 62A

#### Lab ID#: 1109407AR1-01A

	Rpt. Limit	Rpt. Limit	Amount	Amount
Compound	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.62	2.5	71	290
Client Sample ID: SG 62A-DUP				
Lab ID#: 1109407AR1-02A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.17	0.69	94	390
Client Sample ID: SG 68				
Lab ID#: 1109407AR1-03A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.24	1.3	5.2
Client Sample ID: SG 69				
Lab ID#: 1109407AR1-04A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.12	0.49	17	70
Client Sample ID: SG 70				
Lab ID#: 1109407AR1-05A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	1.4	5.8
Client Sample ID: SG 71				
Lab ID#: 1109407AR1-06A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)



# Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

#### Client Sample ID: SG 71

#### Lab ID#: 1109407AR1-06A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	0.79	3.2
Client Sample ID: SG 72				
Lab ID#: 1109407AR1-07A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.17	0.71	3.2	13



# Client Sample ID: SG 62A Lab ID#: 1109407AR1-01A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d092717 24.7	Date of Collection: 9/16/11 11:00:00 AN Date of Analysis: 9/27/11 06:14 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.62	2.5	71	290
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		107		75-150



# Client Sample ID: SG 62A-DUP Lab ID#: 1109407AR1-02A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d092718 6.72	Date of Collection: 9/16/11 11:00:00 AM Date of Analysis: 9/27/11 07:48 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.17	0.69	94	390
Container Type: 1 Liter Summ	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		102		75-150



# Client Sample ID: SG 68 Lab ID#: 1109407AR1-03A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d092714 2.38	Date of Collection: 9/16/11 12:00:00 PM Date of Analysis: 9/27/11 04:33 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.24	1.3	5.2
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		106		75-150



# Client Sample ID: SG 69 Lab ID#: 1109407AR1-04A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d092719 4.84		of Collection: 9/16/11 12:17:00 P of Analysis: 9/27/11 08:20 PM	
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.12	0.49	17	70
Container Type: 1 Liter Summ	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		107		75-150



# Client Sample ID: SG 70 Lab ID#: 1109407AR1-05A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d092715 2.42	Date of Collection: 9/16/11 2:34:00 PM Date of Analysis: 9/27/11 05:07 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	1.4	5.8
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		105		75-150



# Client Sample ID: SG 71 Lab ID#: 1109407AR1-06A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor: Compound	d092720 2.42	Date of Collection: 9/16/11 2:27:00 PM Date of Analysis: 9/27/11 08:57 PM		
	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	0.79	3.2
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		106		75-150



# Client Sample ID: SG 72 Lab ID#: 1109407AR1-07A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor: Compound	d092716 6.99 Rpt. Limit (ppmv)	Date of Collection: 9/16/11 3:04:00 PM Date of Analysis: 9/27/11 05:42 PM		
		Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.17	0.71	3.2	13
Container Type: 1 Liter Summ	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		105		75-150



# Client Sample ID: Lab Blank Lab ID#: 1109407AR1-08A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor: Compound	d092707 1.00	Date of Collection: NA Date of Analysis: 9/27/11 11:03 AM		
	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected
Container Type: NA - Not App	licable			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		110		75-150



# Client Sample ID: LCS Lab ID#: 1109407AR1-09A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d092702 1.00		
Compound			%Recovery
TPH (Gasoline Range)			92
Container Type: NA - Not A	pplicable		Method
Surrogates		%Recovery	Limits
Fluorobenzene (FID)		112	75-150



# Client Sample ID: LCSD Lab ID#: 1109407AR1-09AA MODIFIED EPA METHOD TO-3 GC/FID

ile Name:d092703Dil. Factor:1.00		Date of Collection: NA Date of Analysis: 9/27/11 07:54 AM	
Compound			%Recovery
TPH (Gasoline Range)			102
Container Type: NA - Not A	pplicable		
Surrogates		%Recovery	Method Limits
Fluorobenzene (FID)		112	75-150



9/25/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. Oakland Project #: 0304 Workorder #: 1109407B

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 9/21/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager



#### WORK ORDER #: 1109407B

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	<b>PROJECT</b> #	0304 California Linen Rental Co.
DATE RECEIVED:	09/21/2011	CONTACT:	Oakland Kyle Vagadori
DATE COMPLETED:	09/25/2011	continent	ityle vugudoli

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	<b>PRESSURE</b>
01A	SG 62A	Modified TO-15	5.5 "Hg	15 psi
02A	SG 62A-DUP	Modified TO-15	6.0 "Hg	15 psi
03A	SG 68	Modified TO-15	4.5 "Hg	15 psi
04A	SG 69	Modified TO-15	5.0 "Hg	15 psi
05A	SG 70	Modified TO-15	5.0 "Hg	15 psi
06A	SG 71	Modified TO-15	5.0 "Hg	15 psi
07A	SG 72	Modified TO-15	5.0 "Hg	15 psi
08A	Lab Blank	Modified TO-15	NA	NA
08B	Lab Blank	Modified TO-15	NA	NA
09A	CCV	Modified TO-15	NA	NA
09B	CCV	Modified TO-15	NA	NA
10A	LCS	Modified TO-15	NA	NA
10AA	LCSD	Modified TO-15	NA	NA
10B	LCS	Modified TO-15	NA	NA
10BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

Sinda d. Fruman

DATE: <u>09/25/11</u>

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11 Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE EPA Method TO-15 P & D Environmental Workorder# 1109407B

Seven 1 Liter Summa Canister samples were received on September 21, 2011. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

#### **Receiving Notes**

There were no receiving discrepancies.

#### Analytical Notes

Dilution was performed on samples SG 62A, SG 62A-DUP and SG 69 due to the presence of high level target species.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

#### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit.
- UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

#### Client Sample ID: SG 62A

#### Lab ID#: 1109407B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	12	4700	46	18000
Ethyl Benzene	12	300	54	1300
m,p-Xylene	12	1200	54	5000
o-Xylene	12	350	54	1500

#### Client Sample ID: SG 62A-DUP

#### Lab ID#: 1109407B-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	17	4500	63	17000
Ethyl Benzene	17	280	73	1200
m,p-Xylene	17	1100	73	4800
o-Xylene	17	340	73	1500

### Client Sample ID: SG 68

#### Lab ID#: 1109407B-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	1.5	3.8	4.9
Toluene	1.2	39	4.5	150
Ethyl Benzene	1.2	4.0	5.2	17
m,p-Xylene	1.2	19	5.2	82
o-Xylene	1.2	6.1	5.2	26

#### **Client Sample ID: SG 69**

#### Lab ID#: 1109407B-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	4.0	1000	15	3800
Ethyl Benzene	4.0	67	18	290
m,p-Xylene	4.0	250	18	1100



# Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

#### Client Sample ID: SG 69

Lah	ID#∙	1109407B-04A
Lau	$\mathbf{D}\pi$ .	110740/D-04A

Lau $1D\pi$ , $1107407D-04A$				
o-Xylene	4.0	79	18	340

#### **Client Sample ID: SG 70**

#### Lab ID#: 1109407B-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	2.2	3.9	7.0
Toluene	1.2	34	4.6	130
Ethyl Benzene	1.2	3.4	5.2	15
m,p-Xylene	1.2	15	5.2	65
o-Xylene	1.2	4.2	5.2	18

#### **Client Sample ID: SG 71**

#### Lab ID#: 1109407B-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	1.7	3.9	5.6
Toluene	1.2	28	4.6	110
Ethyl Benzene	1.2	2.3	5.2	10
m,p-Xylene	1.2	10	5.2	44
o-Xylene	1.2	3.1	5.2	13

#### **Client Sample ID: SG 72**

#### Lab ID#: 1109407B-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	3.5	65	13	250
Ethyl Benzene	3.5	5.9	15	26
m,p-Xylene	3.5	22	15	94
o-Xylene	3.5	6.3	15	27



### Client Sample ID: SG 62A Lab ID#: 1109407B-01A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	p092311 24.7		Date of Collection: 9/16/11 11:00:00 AM Date of Analysis: 9/24/11 11:13 AM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)	
Methyl tert-butyl ether	12	Not Detected	44	Not Detected	
Benzene	12	Not Detected	39	Not Detected	
Toluene	12	4700	46	18000	
Ethyl Benzene	12	300	54	1300	
m,p-Xylene	12	1200	54	5000	
o-Xylene	12	350	54	1500	
1,1-Difluoroethane	49	Not Detected	130	Not Detected	

		Method
Surrogates	%Recovery	Limits
Toluene-d8	108	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	111	70-130



### Client Sample ID: SG 62A-DUP Lab ID#: 1109407B-02A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	P		Date of Collection: 9/16/11 11:00:00 AM Date of Analysis: 9/24/11 12:17 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	17	Not Detected	60	Not Detected
Benzene	17	Not Detected	54	Not Detected
Toluene	17	4500	63	17000
Ethyl Benzene	17	280	73	1200
m,p-Xylene	17	1100	73	4800
o-Xylene	17	340	73	1500
1,1-Difluoroethane	67	Not Detected	180	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	107	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	111	70-130



### Client Sample ID: SG 68 Lab ID#: 1109407B-03A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	P		te of Collection:  9/16/11 12:00:00 PM te of Analysis:  9/23/11 03:37 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.2	Not Detected	4.3	Not Detected
Benzene	1.2	1.5	3.8	4.9
Toluene	1.2	39	4.5	150
Ethyl Benzene	1.2	4.0	5.2	17
m,p-Xylene	1.2	19	5.2	82
o-Xylene	1.2	6.1	5.2	26
1,1-Difluoroethane	4.8	Not Detected	13	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	89	70-130
4-Bromofluorobenzene	112	70-130



### Client Sample ID: SG 69 Lab ID#: 1109407B-04A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	p092310 8.07		Date of Collection: 9/16/11 12:17:00 PM Date of Analysis: 9/24/11 10:40 AM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)	
Methyl tert-butyl ether	4.0	Not Detected	14	Not Detected	
Benzene	4.0	Not Detected	13	Not Detected	
Toluene	4.0	1000	15	3800	
Ethyl Benzene	4.0	67	18	290	
m,p-Xylene	4.0	250	18	1100	
o-Xylene	4.0	79	18	340	
1,1-Difluoroethane	16	Not Detected	44	Not Detected	

		Method
Surrogates	%Recovery	Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	91	70-130
4-Bromofluorobenzene	112	70-130



### Client Sample ID: SG 70 Lab ID#: 1109407B-05A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:			Date of Collection: 9/16/11 2:34:00 PM Date of Analysis: 9/23/11 03:59 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
Benzene	1.2	2.2	3.9	7.0
Toluene	1.2	34	4.6	130
Ethyl Benzene	1.2	3.4	5.2	15
m,p-Xylene	1.2	15	5.2	65
o-Xylene	1.2	4.2	5.2	18
1,1-Difluoroethane	4.8	Not Detected	13	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	112	70-130



### Client Sample ID: SG 71 Lab ID#: 1109407B-06A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	<b>P</b> • • • • • • • •		Date of Collection: 9/16/11 2:27:00 PM Date of Analysis: 9/23/11 04:25 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
Benzene	1.2	1.7	3.9	5.6
Toluene	1.2	28	4.6	110
Ethyl Benzene	1.2	2.3	5.2	10
m,p-Xylene	1.2	10	5.2	44
o-Xylene	1.2	3.1	5.2	13
1,1-Difluoroethane	4.8	Not Detected	13	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	112	70-130



### Client Sample ID: SG 72 Lab ID#: 1109407B-07A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	p092309 6.99		Date of Collection: 9/16/11 3:04:00 PM Date of Analysis: 9/24/11 10:11 AM	
Compound	Rpt. Limit (ppbv)	-		Amount (ug/m3)
Methyl tert-butyl ether	3.5	Not Detected	13	Not Detected
Benzene	3.5	Not Detected	11	Not Detected
Toluene	3.5	65	13	250
Ethyl Benzene	3.5	5.9	15	26
m,p-Xylene	3.5	22	15	94
o-Xylene	3.5	6.3	15	27
1,1-Difluoroethane	14	Not Detected	38	Not Detected

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	104	70-130	
1,2-Dichloroethane-d4	91	70-130	
4-Bromofluorobenzene	109	70-130	



### Client Sample ID: Lab Blank Lab ID#: 1109407B-08A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	p092238 1.00	2.00	of Collection: NA of Analysis: 9/23/	/11 08:21 AM
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
1,1-Difluoroethane	2.0	Not Detected	5.4	Not Detected

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	98	70-130	
1,2-Dichloroethane-d4	103	70-130	
4-Bromofluorobenzene	112	70-130	



### Client Sample ID: Lab Blank Lab ID#: 1109407B-08B EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	p092308 1.00	2.00	of Collection: NA of Analysis: 9/24	/11 09:34 AM
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
1,1-Difluoroethane	2.0	Not Detected	5.4	Not Detected

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	95	70-130	
1,2-Dichloroethane-d4	90	70-130	
4-Bromofluorobenzene	113	70-130	



### **Client Sample ID: CCV** Lab ID#: 1109407B-09A EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p092229	Date of Collection: NA
Dil. Factor: 1.00	Date of Analysis: 9/22/11 09:19 PM	
Compound		%Recovery
Methyl tert-butyl ether		98
Benzene		99
Toluene		102
Ethyl Benzene		101
m,p-Xylene		104
o-Xylene		101
1,1-Difluoroethane		94

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	104	70-130	
1,2-Dichloroethane-d4	107	70-130	
4-Bromofluorobenzene	120	70-130	



### Client Sample ID: CCV Lab ID#: 1109407B-09B EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	p092302 1.00	Date of Collection: NA Date of Analysis: 9/23/11 10:06 PM
Compound		%Recovery
Methyl tert-butyl ether		90
Benzene		93
Toluene		96
Ethyl Benzene		96
m,p-Xylene		98
o-Xylene		95
1,1-Difluoroethane		90

		Method
Surrogates	%Recovery	Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	117	70-130



### Client Sample ID: LCS Lab ID#: 1109407B-10A EPA METHOD TO-15 GC/MS FULL SCAN

-

File Name: Dil. Factor:	p092230 1.00	Date of Collection: NA Date of Analysis: 9/22/11 09:57 PM	
Compound		%Recovery	
Methyl tert-butyl ether		97	
Benzene		93	
Toluene		93	
Ethyl Benzene		94	
m,p-Xylene		100	
o-Xylene		97	
1,1-Difluoroethane		Not Spiked	

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	114	70-130



### Client Sample ID: LCSD Lab ID#: 1109407B-10AA EPA METHOD TO-15 GC/MS FULL SCAN

-

File Name: Dil. Factor:	p092231 1.00	Date of Collection: NA Date of Analysis: 9/22/11 10:14 PM	
Compound		%Recovery	
Methyl tert-butyl ether		93	
Benzene		92	
Toluene		92	
Ethyl Benzene		93	
m,p-Xylene		99	
o-Xylene		97	
1,1-Difluoroethane		Not Spiked	

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	119	70-130



### Client Sample ID: LCS Lab ID#: 1109407B-10B EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	p092304 1.00	Date of Collection: NA Date of Analysis: 9/24/11 07:46 AM					
Compound		%Recovery					
Methyl tert-butyl ether		98					
Benzene		94					
Toluene		92					
Ethyl Benzene		98					
m,p-Xylene		104					
o-Xylene		99					
1,1-Difluoroethane		Not Spiked					

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	114	70-130



### Client Sample ID: LCSD Lab ID#: 1109407B-10BB EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	p092305	Date of Collection: NA					
	1.00	Date of Analysis: 9/24/11 08:03 AM					
Compound		%Recovery					
Methyl tert-butyl ether		86					
Benzene		85					
Toluene		85					
Ethyl Benzene		88					
m,p-Xylene		91					
o-Xylene		90					
1,1-Difluoroethane		Not Spiked					

		Method
Surrogates	%Recovery	Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	112	70-130



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co. Oakland	Date Sampled:	09/16/11
55 Santa Clara, Ste.240	Caxiald	Date Received:	09/16/11
	Client Contact: Paul King	Date Reported:	09/21/11
Oakland, CA 94610	Client P.O.:	Date Completed:	09/19/11

#### WorkOrder: 1109433

September 21, 2011

Dear Paul:

Enclosed within are:

- 1) The results of the 2 analyzed samples from your project: #0304; California Linen Rental Co. Oakland,
- 2) A QC report for the above samples,
- 3) A copy of the chain of custody, and
- 4) An invoice for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing

McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

	(	СНА	IN (	DF C	CUST	ODY	RE	C	OR	D				110	94.	33	PAG	е <u> </u>	F
P&D	55 Santa Oa	RON a Clara akland, (510) 6	ME1 Ave., S CA 946 58-6916	NTA Juite 24	L, INC	Ζ.					//	7	7		//	//	/.		
PROJECT NUMBER: 0304		C		NAME: NIA LINEN RENTAL CO.			NUMBER OF CONTAINERS		Luco Contraction	CETTANE			/			6	/		
SAMPLED BY: (PRI MichAEL DESCH	ENES	ay	idia		esche	m	MBER OF C	AN	Die			//	//		Ever	THATTA			
SAMPLE NUMBER	DATE 9/16/11	1050	TYPE		MPLE LO	OCATION	NN I	/ X	1	//	$\left( - \right)$	/	_	_	(	(		URU AR	CUND
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The A	dients	-	DATE 2/16/0 DATE	TIME 175 TIME 623	24	ED BY: (SIG)			1	(This Total (This LAB	Shipme No. of C Shipme	nt) Containe nt) ORY (	CONT	ACT:	<u>M</u> C LABOR	ATORY	<u>Bell</u> phone	- <u>ANAL 7</u> NUMBER: 9262	
RELINQUISHED BY: (SIGNAT	URE)		DATE	TIME	(SIGNAT					SAM ATT	ACHE	ANAL D:	YSIS (	REQU ) YE	JEST SH S (	ieet X) no			
Results and billing to: P&D Environmental, Inc. lab@pdenviro.com					REMAR	KS: DIF	WO1	RDE	TH	ANE	W	15	001	2	TRAC	ER	GAS	8	

#### McCampbell Analytical, Inc. 1534 Willow Pass Rd Pitteburg CA 94565 1701

**CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

Pittsburg, CA 94565-1701 (925) 252-9262				WorkO	der: 1109433	3 Clier	ntCode: PDEO		
	WaterTra	x UvriteOn	EDF	Excel	Fax	🖌 Email	HardCopy	ThirdParty	☐ J-flag
Report to:				Bi	I to:		Req	uested TAT:	5 days
Paul King	Email:	lab@pdenviro.com			Accounts Pa	yable			
P & D Environmental	cc:				P & D Enviro	nmental			
55 Santa Clara, Ste.240	PO:				55 Santa Cla	ara, Ste.240	Dat	e Received:	09/16/2011
Oakland, CA 94610	ProjectNo:	#0304; California Li	nen Rental Co.		Oakland, CA	94610	Dat	e Printed:	09/16/2011
(510) 658-6916 FAX: 510-834-0152		Oakland							
						_			

					Requested Tests (See legend below)											
Lab ID	Client ID	Matrix	Collection Date	lold	1	2	3	4	5	6	7	8	9	10	11	12
1109433-001	SG 62-A	Air	9/16/2011 10:50		А											
1109433-002	SG 69	Air	9/16/2011 12:07		А											

#### Test Legend:

1	8260VOC_A(UG/M3)
6	
11	

2 7 12

3	
8	

4	
9	

5	
10	

Prepared by: Melissa Valles

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



### Sample Receipt Checklist

Client Name: P & D Environmental					Date and Time Received: 9/16/2011 5:21:54 PM				
Project Name: #0304; California Linen Rental Co. Oakland			nd		Check	Melissa Valles			
WorkOrder N°:	1109433	Matrix: <u>Air</u>			Carrie	er: <u>Benjamin Ysla</u>	s (MAI Courier	) )	
		<u>Chai</u>	n of Cւ	ustody (COC	) Informa	tion			
Chain of custody	present?		Yes	✓	No 🗌				
Chain of custody	signed when relinquis	hed and received?	Yes	✓	No 🗌				
Chain of custody	agrees with sample la	abels?	Yes	✓	No				
Sample IDs note	d by Client on COC?		Yes	✓	No 🗌				
Date and Time o	f collection noted by C	lient on COC?	Yes	✓	No 🗌				
Sampler's name	noted on COC?		Yes	✓	No				
	Sample Receipt Information								
Custody seals in	tact on shipping conta	iner/cooler?	Yes		No 🗌		NA 🗹		
Shipping contain	er/cooler in good cond	lition?	Yes	✓	No 🗌				
Samples in prope	er containers/bottles?		Yes	✓	No 🗌				
Sample containe	ers intact?		Yes	✓	No 🗌				
Sufficient sample	e volume for indicated	test?	Yes		No 🗌				
		Sample Prese	ervatio	n and Hold 1	<u> [ime (HT)</u>	Information			
All samples rece	ived within holding tim	e?	Yes		No				
Container/Temp	Blank temperature		Coole	er Temp:			NA 🗹		
Water - VOA vial	ls have zero headspac	e / no bubbles?	Yes		No 🗌	No VOA vials subm	itted 🗹		
Sample labels ch	necked for correct pres	servation?	Yes	✓	No				
Metal - pH accep	otable upon receipt (p⊦	l<2)?	Yes		No 🗌		NA 🗹		
Samples Receive	ed on Ice?		Yes		No 🗹				
* NOTE: If the "N	lo" box is checked, se	e comments below.							

Client contacted:

Date contacted:

Contacted by:

Comments:

\_ \_\_ \_\_ \_\_

	Campbell Anal "When Quality Cou	lytical, Inc. unts''		Pass Road, Pittsburg ne: (877) 252-9262 pbell.com / E-mail:	/ Fax: (925	5) 252-9269	
P & D Environmental		Client Project ID: Linen Rental Co.	#0304; California Oakland	Date Sample			
55 Santa Clara, S	te.240			Date Receiv			
		Client Contact: P	aul King	Date Extract	ed 09	/16/11	
Oakland, CA 946	10	Client P.O.:		Date Analyz	ed 09	/16/11	
Extraction method: SW50			&T and GC/MS (µg/m <sup>3</sup> nethods: SW8260B	)*	W	ork Order:	1109433
Lab ID	Client ID	Matrix 1	,1-Difluoroethane as Dichloroo	lifluoromethane	DF	% SS	Comments
001A	SG 62-A	А	51,000,000		2000	98	
002A	SG 69	А	26,000,000		5000	95	

Reporting Limit for DF =1; ND means not detected at or	А	250	$\mu g/m^3$
above the reporting limit	S	NA	NA

\* vapor samples are reported in µg/m³, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager



#### QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Air	QC Matrix: Water				BatchID: 61130 WorkOrde			Order: 11094	33			
EPA Method: SW8260B	Extrac	tion: SW	5030B					S	Spiked San	ple ID:	1109481-0	102C
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acc	eptance	e Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
tert-Amyl methyl ether (TAME)	ND	10	86.3	85.5	0.924	91.8	92.3	0.588	70 - 130	30	70 - 130	30
Benzene	ND	10	106	104	2.26	118	117	0.984	70 - 130	30	70 - 130	30
t-Butyl alcohol (TBA)	ND	50	95.1	92.7	2.56	114	112	2.41	70 - 130	30	70 - 130	30
Chlorobenzene	ND	10	113	111	1.89	118	114	2.80	70 - 130	30	70 - 130	30
1,2-Dibromoethane (EDB)	ND	10	108	106	1.90	111	109	1.82	70 - 130	30	70 - 130	30
1,2-Dichloroethane (1,2-DCA)	ND	10	99.6	100	0.500	111	109	1.48	70 - 130	30	70 - 130	30
1,1-Dichloroethene	ND	10	115	112	3.33	113	111	2.12	70 - 130	30	70 - 130	30
Diisopropyl ether (DIPE)	ND	10	108	106	2.22	108	106	1.52	70 - 130	30	70 - 130	30
Ethyl tert-butyl ether (ETBE)	ND	10	105	104	1.48	104	104	0	70 - 130	30	70 - 130	30
Methyl-t-butyl ether (MTBE)	ND	10	111	109	2.35	109	108	0.949	70 - 130	30	70 - 130	30
Toluene	ND	10	108	107	1.09	121	119	2.10	70 - 130	30	70 - 130	30
Trichloroethene	ND	10	116	113	2.87	109	109	0	70 - 130	30	70 - 130	30
%SS1:	101	25	92	91	0.760	102	105	2.99	70 - 130	30	70 - 130	30
%SS2:	105	25	97	98	0.733	108	108	0	70 - 130	30	70 - 130	30
%SS3:	110	2.5	92	93	1.03	103	103	0	70 - 130	30	70 - 130	30
All target compounds in the Method Blar NONE	All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE											

#### BATCH 61130 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1109433-001A	09/16/11 10:50 AM	I 09/16/11	09/16/11 9:15 PM	1109433-002A	09/16/11 12:07 PM	I 09/16/11	09/16/11 9:56 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

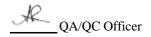
MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS ELAP Certification 1644





8/26/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental 989 41st St, Oak Project #: 0304 Workorder #: 1108301A

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 8/15/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

Page 1 of 16



#### WORK ORDER #: 1108301A

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	<b>PROJECT</b> #	0304 California Linen Rental 989 41st
DATE RECEIVED:	08/15/2011	CONTACT:	St. Oak Kyle Vagadori
DATE COMPLETED:	08/26/2011	contrict.	isjie (ugudon

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	PRESSURE
01A	VW1-SS	Modified TO-3	5.0 "Hg	15 psi
02A	VW1-5	Modified TO-3	23.0 "Hg	15 psi
03A	VW2-SS	Modified TO-3	2.0 "Hg	15 psi
04A	VW2-5	Modified TO-3	10.8 "Hg	15 psi
05A	VW2-5 DUP	Modified TO-3	9.0 "Hg	15 psi
06A	Lab Blank	Modified TO-3	NA	NA
06B	Lab Blank	Modified TO-3	NA	NA
07A	LCS	Modified TO-3	NA	NA
07AA	LCSD	Modified TO-3	NA	NA
07B	LCS	Modified TO-3	NA	NA
07BB	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

Sinda d. Fruman

DATE: 08/26/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11 Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE Modified TO-3 P & D Environmental Workorder# 1108301A

Five 1 Liter Summa Canister samples were received on August 15, 2011. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system. The TPH (Gasoline Range) results are calculated using the response factor of Gasoline. A molecular weight of 100 is used to convert the TPH (Gasoline Range) ppmv result to ug/L.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ТО-3	ATL Modifications
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch = 20 samples</td
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A+3.3S$ , where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

### **Receiving Notes**

Sample VW1-5 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

### Analytical Notes

There were no analytical discrepancies.



### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank greater than reporting limit.
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

### Client Sample ID: VW1-SS

Lab ID#: 1108301A-01A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	0.095	0.39
Client Sample ID: VW1-5				
Lab ID#: 1108301A-02A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.22	0.88	1.5	6.2
Client Sample ID: VW2-SS				
Lab ID#: 1108301A-03A No Detections Were Found.				
Client Sample ID: VW2-5				

#### Lab ID#: 1108301A-04A

Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.079	0.32	16	65

#### Client Sample ID: VW2-5 DUP

#### Lab ID#: 1108301A-05A

Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.19	0.79	120	480



### Client Sample ID: VW1-SS Lab ID#: 1108301A-01A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d081713 2.42	Date of Collection: 8/10/11 3:14:00 PM Date of Analysis: 8/17/11 05:38 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	0.095	0.39
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		90		75-150



### Client Sample ID: VW1-5 Lab ID#: 1108301A-02A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d081714 8.66	Date of Collection: 8/10/11 4:10:00 PM Date of Analysis: 8/17/11 06:11 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.22	0.88	1.5	6.2
Container Type: 1 Liter Summ	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		107		75-150



### Client Sample ID: VW2-SS Lab ID#: 1108301A-03A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d081715 2.16	Date of Collection: 8/10/11 11:50:00 AM Date of Analysis: 8/17/11 06:44 PM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.054	0.22	Not Detected	Not Detected
Container Type: 1 Liter Summ	a Canister			
Surrogates		%Recovery		Method Limits
Fluorobenzene (FID)		105		75-150



### Client Sample ID: VW2-5 Lab ID#: 1108301A-04A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor: Compound	d081716 3.16	Date of Collection: 8/10/11 4:30:00 PM Date of Analysis: 8/17/11 07:17 PM		
	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.079	0.32	16	65
Container Type: 1 Liter Summ	na Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		103		75-150



### Client Sample ID: VW2-5 DUP Lab ID#: 1108301A-05A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor: Compound	d081805 7.71	Date of Collection: 8/10/11 4:30:00 PM Date of Analysis: 8/18/11 10:31 AM		
	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.19	0.79	120	480
Container Type: 1 Liter Summ	a Canister			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		106		75-150



### Client Sample ID: Lab Blank Lab ID#: 1108301A-06A MODIFIED EPA METHOD TO-3 GC/FID

-

File Name: Dil. Factor:	d081706 1.00	Date of Collection: NA Date of Analysis: 8/17/11 09:58 AM		
Compound	Rpt. Limit (ppmv)	-	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected
Container Type: NA - Not App	licable			Method
Surrogates		%Recovery		Limits
Fluorobenzene (FID)		107		75-150



# Client Sample ID: Lab Blank Lab ID#: 1108301A-06B MODIFIED EPA METHOD TO-3 GC/FID

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File Name: Dil. Factor:	d081804 1.00		Pate of Collection: NA Pate of Analysis: 8/18/11 09:43 AM		
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)	
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected	
Container Type: NA - Not App	licable			Method	
Surrogates		%Recovery		Limits	
Fluorobenzene (FID)		102		75-150	



# Client Sample ID: LCS Lab ID#: 1108301A-07A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d081702 1.00		Date of Collection: NA Date of Analysis: 8/17/11 06:53 AM	
Compound			%Recovery	
TPH (Gasoline Range)			104	
Container Type: NA - Not Ap	plicable		Method	
Surrogates		%Recovery	Limits	
Fluorobenzene (FID)		104	75-150	



# Client Sample ID: LCSD Lab ID#: 1108301A-07AA MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d081718 1.00	Date of Collec Date of Analy	tion: NA sis:  8/17/11 08:44 PM	
Compound			%Recovery	
TPH (Gasoline Range)			105	
Container Type: NA - Not A	pplicable			
Surrogates		%Recovery	Method Limits	
Fluorobenzene (FID)		126	75-150	



# Client Sample ID: LCS Lab ID#: 1108301A-07B MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d081802 1.00	Date of Collec Date of Analys	tion: NA sis: 8/18/11 07:47 AM
Compound			%Recovery
TPH (Gasoline Range)			99
Container Type: NA - Not A	pplicable		Method
Surrogates		%Recovery	Limits
Fluorobenzene (FID)		102	75-150



# Client Sample ID: LCSD Lab ID#: 1108301A-07BB MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d081819 1.00		of Collection: NA of Analysis: 8/18/11 09:03 PM	
Compound			%Recovery	
TPH (Gasoline Range)			91	
Container Type: NA - Not Ap	plicable			
			Method	
Surrogates		%Recovery	Limits	
Fluorobenzene (FID)		108	75-150	



8/26/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental 989 41st St, Oak Project #: 0304 Workorder #: 1108301B

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 8/15/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager



#### WORK ORDER #: 1108301B

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	<b>PROJECT</b> #	0304 California Linen Rental 989 41st
DATE RECEIVED:	08/15/2011	CONTACT:	St. Oak Kyle Vagadori
DATE COMPLETED:	08/26/2011	contact.	ityle vugudoli

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	PRESSURE
01A	VW1-SS	Modified TO-15	5.0 "Hg	15 psi
02A	VW1-5	Modified TO-15	23.0 "Hg	15 psi
03A	VW2-SS	Modified TO-15	2.0 "Hg	15 psi
04A	VW2-5	Modified TO-15	10.8 "Hg	15 psi
05A	VW2-5 DUP	Modified TO-15	9.0 "Hg	15 psi
06A	Lab Blank	Modified TO-15	NA	NA
06B	Lab Blank	Modified TO-15	NA	NA
07A	CCV	Modified TO-15	NA	NA
07B	CCV	Modified TO-15	NA	NA
08A	LCS	Modified TO-15	NA	NA
08AA	LCSD	Modified TO-15	NA	NA
08B	LCS	Modified TO-15	NA	NA

CERTIFIED BY:

Sinda d. Fruman

DATE: 08/26/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11 Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE EPA Method TO-15 P & D Environmental Workorder# 1108301B

Five 1 Liter Summa Canister samples were received on August 15, 2011. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

#### **Receiving Notes**

Sample VW1-5 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

#### **Analytical Notes**

Dilution was performed on samples VW2-5 and VW2-5 DUP due to high concentration levels of the leak check compound 2-Propanol.

#### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit.
- UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

#### **Client Sample ID: VW1-SS**

Lab ID#: 1108301B-01A

Compound	Rpt. Limit	Amount	Rpt. Limit	Amount
	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
2-Propanol	4.8	43	12	100

#### **Client Sample ID: VW1-5**

#### Lab ID#: 1108301B-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	17	310	42	760
Toluene	4.3	17	16	63
Ethyl Benzene	4.3	7.0	19	30
m,p-Xylene	4.3	20	19	86
o-Xylene	4.3	5.7	19	25

#### Client Sample ID: VW2-SS

# Lab ID#: 1108301B-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)	
2-Propanol	4.3	17	11	41	

#### Client Sample ID: VW2-5

#### Lab ID#: 1108301B-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	51	11000 E	120	28000 E
Benzene	13	28	40	90
Toluene	13	440	48	1700
Ethyl Benzene	13	180	55	810
m,p-Xylene	13	600	55	2600
o-Xylene	13	200	55	850

#### Client Sample ID: VW2-5 DUP

#### Lab ID#: 1108301B-05A



# Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

### Client Sample ID: VW2-5 DUP

#### Lab ID#: 1108301B-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	690	160000 E	1700	400000 E
Toluene	170	290	650	1100
m,p-Xylene	170	420	750	1800



# Client Sample ID: VW1-SS Lab ID#: 1108301B-01A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081826 2.42	Date of Collection: 8/10/11 3:14:00 PM Date of Analysis: 8/18/11 10:11 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.8	43	12	100
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
Benzene	1.2	Not Detected	3.9	Not Detected
Toluene	1.2	Not Detected	4.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	101	70-130



# Client Sample ID: VW1-5 Lab ID#: 1108301B-02A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081827 8.66	Date of Collection: 8/10/11 4:10:00 PM Date of Analysis: 8/18/11 10:47 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	17	310	42	760
Methyl tert-butyl ether	4.3	Not Detected	16	Not Detected
Benzene	4.3	Not Detected	14	Not Detected
Toluene	4.3	17	16	63
Ethyl Benzene	4.3	7.0	19	30
m,p-Xylene	4.3	20	19	86
o-Xylene	4.3	5.7	19	25

		Method
Surrogates	%Recovery	Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	101	70-130



# Client Sample ID: VW2-SS Lab ID#: 1108301B-03A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	2081828 2.16	Date of Collection: 8/10/11 11:50:00 AM Date of Analysis: 8/18/11 11:20 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.3	17	11	41
Methyl tert-butyl ether	1.1	Not Detected	3.9	Not Detected
Benzene	1.1	Not Detected	3.4	Not Detected
Toluene	1.1	Not Detected	4.1	Not Detected
Ethyl Benzene	1.1	Not Detected	4.7	Not Detected
m,p-Xylene	1.1	Not Detected	4.7	Not Detected
o-Xylene	1.1	Not Detected	4.7	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	101	70-130



### Client Sample ID: VW2-5 Lab ID#: 1108301B-04A EPA METHOD TO-15 GC/MS FULL SCAN

1

File Name: Dil. Factor:	2081922 25.3		Date of Collection: 8/10/11 4:30:00 PM Date of Analysis: 8/19/11 07:29 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	51	11000 E	120	28000 E
Methyl tert-butyl ether	13	Not Detected	46	Not Detected
Benzene	13	28	40	90
Toluene	13	440	48	1700
Ethyl Benzene	13	180	55	810
m,p-Xylene	13	600	55	2600
o-Xylene	13	200	55	850

E = Exceeds instrument calibration range.

		Method
Surrogates	%Recovery	Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	89	70-130
4-Bromofluorobenzene	103	70-130



### Client Sample ID: VW2-5 DUP Lab ID#: 1108301B-05A EPA METHOD TO-15 GC/MS FULL SCAN

1

File Name: Dil. Factor:	2081925 344	Date of Collection: 8/10/11 4:30:00 PM Date of Analysis: 8/19/11 09:58 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	690	160000 E	1700	400000 E
Methyl tert-butyl ether	170	Not Detected	620	Not Detected
Benzene	170	Not Detected	550	Not Detected
Toluene	170	290	650	1100
Ethyl Benzene	170	Not Detected	750	Not Detected
m,p-Xylene	170	420	750	1800
o-Xylene	170	Not Detected	750	Not Detected

E = Exceeds instrument calibration range.

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	93	70-130
4-Bromofluorobenzene	115	70-130



# Client Sample ID: Lab Blank Lab ID#: 1108301B-06A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081805 1.00	2 4.10	Date of Collection: NA Date of Analysis: 8/18/11 08:40 AM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)	
2-Propanol	2.0	Not Detected	4.9	Not Detected	
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected	
Benzene	0.50	Not Detected	1.6	Not Detected	
Toluene	0.50	Not Detected	1.9	Not Detected	
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected	
m,p-Xylene	0.50	Not Detected	2.2	Not Detected	
o-Xylene	0.50	Not Detected	2.2	Not Detected	

		Method
Surrogates	%Recovery	Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	101	70-130



# Client Sample ID: Lab Blank Lab ID#: 1108301B-06B EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081909 1.00		Date of Collection: NA Date of Analysis: 8/19/11 10:25 AM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)		
2-Propanol	2.0	Not Detected	4.9	Not Detected	
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected	
Benzene	0.50	Not Detected	1.6	Not Detected	
Toluene	0.50	Not Detected	1.9	Not Detected	
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected	
m,p-Xylene	0.50	Not Detected	2.2	Not Detected	
o-Xylene	0.50	Not Detected	2.2	Not Detected	

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	100	70-130	
4-Bromofluorobenzene	100	70-130	



# Client Sample ID: CCV Lab ID#: 1108301B-07A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081802 1.00	Date of Collection: NA Date of Analysis: 8/18/11 06:54 AM
Compound		%Recovery
2-Propanol		78
Methyl tert-butyl ether		74
Benzene		81
Toluene		81
Ethyl Benzene		87
m,p-Xylene		93
o-Xylene		97

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	112	70-130



# Client Sample ID: CCV Lab ID#: 1108301B-07B EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081906 1.00	Date of Collection: NA Date of Analysis: 8/19/11 08:45 AM
Compound		%Recovery
2-Propanol		80
Methyl tert-butyl ether		71
Benzene		81
Toluene		83
Ethyl Benzene		86
m,p-Xylene		93
o-Xylene		96

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	101	70-130	
1,2-Dichloroethane-d4	99	70-130	
4-Bromofluorobenzene	111	70-130	



### Client Sample ID: LCS Lab ID#: 1108301B-08A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081803 1.00	Date of Collection: NA Date of Analysis: 8/18/11 07:29 AM
Compound		%Recovery
2-Propanol		93
Methyl tert-butyl ether		86
Benzene		89
Toluene		87
Ethyl Benzene		95
m,p-Xylene		104
o-Xylene		106

		Method
Surrogates	%Recovery	Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	109	70-130



# Client Sample ID: LCSD Lab ID#: 1108301B-08AA EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081804 1.00	Date of Collection: NA Date of Analysis: 8/18/11 08:01 AM
Compound		%Recovery
2-Propanol		92
Methyl tert-butyl ether		86
Benzene		91
Toluene		89
Ethyl Benzene		95
m,p-Xylene		103
o-Xylene		104

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	88	70-130	
4-Bromofluorobenzene	111	70-130	



# Client Sample ID: LCS Lab ID#: 1108301B-08B EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	2081907 1.00	Date of Collection: NA Date of Analysis: 8/19/11 09:13 AM	
Compound		%Recov	
2-Propanol		92	
Methyl tert-butyl ether		80	
Benzene		90	
Toluene		89	
Ethyl Benzene		97	
m,p-Xylene		106	
o-Xylene		108	

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	114	70-130



8/26/2011 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental 989 41st St, Oak Project #: 0304 Workorder #: 1108301C

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 8/15/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager



#### WORK ORDER #: 1108301C

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	<b>PROJECT</b> #	0304 California Linen Rental 989 41st
DATE RECEIVED:	08/15/2011	CONTACT:	St. Oak Kyle Vagadori
DATE COMPLETED:	08/26/2011	contact.	Kyle vagadoli

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	W1-SS	Modified ASTM D-1946	5.0 "Hg	15 psi
02A	VW1-5	Modified ASTM D-1946	23.0 "Hg	15 psi
03A	VW2-SS	Modified ASTM D-1946	2.0 "Hg	15 psi
04A	VW2-5	Modified ASTM D-1946	10.8 "Hg	15 psi
05A	VW2-5 DUP	Modified ASTM D-1946	9.0 "Hg	15 psi
06A	Lab Blank	Modified ASTM D-1946	NA	NA
07A	LCS	Modified ASTM D-1946	NA	NA
07AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:

Sinda d. Fruman

DATE: 08/26/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11 Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



#### LABORATORY NARRATIVE Modified ASTM D-1946 P & D Environmental Workorder# 1108301C

Five 1 Liter Summa Canister samples were received on August 15, 2011. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ASTM D-1946	ATL Modifications
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.



# **Receiving Notes**

Sample VW1-5 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

### **Analytical Notes**

There were no analytical discrepancies.

### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank greater than reporting limit.
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

### Client Sample ID: VW1-SS

#### Lab ID#: 1108301C-01A

	Rpt. Limit	Amount	
Compound	(%)	(%)	
Oxygen	0.47	14	
Nitrogen	0.47	81	
Carbon Dioxide	0.047	4.8	

#### **Client Sample ID: VW1-5**

#### Lab ID#: 1108301C-02A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.87	14
Nitrogen	0.87	83
Methane	0.00087	0.031
Carbon Dioxide	0.087	2.9

#### Client Sample ID: VW2-SS

#### Lab ID#: 1108301C-03A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.22	8.5
Nitrogen	0.22	80
Methane	0.00022	0.00038
Carbon Dioxide	0.022	11

#### **Client Sample ID: VW2-5**

#### Lab ID#: 1108301C-04A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.32	5.7
Nitrogen	0.32	91
Methane	0.00032	0.00092
Carbon Dioxide	0.032	2.8



# Summary of Detected Compounds NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

# Client Sample ID: VW2-5 DUP

Lab ID#: 1108301C-05A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.77	9.6
Nitrogen	0.77	88
Methane	0.00077	0.00084
Carbon Dioxide	0.077	2.3



# Client Sample ID: VW1-SS Lab ID#: 1108301C-01A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor: Compound	9082406 4.69		ction: 8/10/11 3:14:00 PM /sis: 8/24/11 04:06 PM
	Rpt. Limit (%)	Amount (%)	
Oxygen		0.47	14
Nitrogen		0.47	81
Methane		0.00047	Not Detected
Carbon Dioxide		0.047	4.8



# Client Sample ID: VW1-5 Lab ID#: 1108301C-02A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor: Compound	9082407 8.66		tion:  8/10/11 4:10:00 PM sis:  8/24/11 04:29 PM
	Rpt. Limit (%)	Amount (%)	
Oxygen		0.87	14
Nitrogen		0.87	83
Methane		0.00087	0.031
Carbon Dioxide		0.087	2.9



### Client Sample ID: VW2-SS Lab ID#: 1108301C-03A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor:	9082408 2.16		tion: 8/10/11 11:50:00 Al sis: 8/24/11 04:54 PM
Compound	Rpt. Limit (%)	Amount (%)	
Oxygen		0.22	8.5
Nitrogen		0.22	80
Methane		0.00022	0.00038
Carbon Dioxide		0.022	11



### Client Sample ID: VW2-5 Lab ID#: 1108301C-04A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor:	9082409 3.16		tion:  8/10/11 4:30:00 PN sis:  8/24/11 05:26 PM
Compound	Rpt. Limit (%)	Amount (%)	
Oxygen		0.32	5.7
Nitrogen		0.32	91
Methane		0.00032	0.00092
Carbon Dioxide		0.032	2.8



### Client Sample ID: VW2-5 DUP Lab ID#: 1108301C-05A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor: Compound	9082410 7.74	Date of Collection: 8/10/11 4:30:00 PM Date of Analysis: 8/24/11 05:49 PM	
		Rpt. Limit (%)	Amount (%)
Oxygen		0.77	9.6
Nitrogen		0.77	88
Methane		0.00077	0.00084
Carbon Dioxide		0.077	2.3



### Client Sample ID: Lab Blank Lab ID#: 1108301C-06A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor: Compound	9082405 1.00 R	Date of Collection: NA Date of Analysis: 8/24/11 03:40 PM	
		Rpt. Limit (%)	Amount (%)
Oxygen		0.10	Not Detected
Nitrogen		0.10	Not Detected
Methane		0.00010	Not Detected
Carbon Dioxide		0.010	Not Detected



### Client Sample ID: LCS Lab ID#: 1108301C-07A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9082402 1.00	Date of Collection: NA Date of Analysis: 8/24/11 02:15 PM	
Dil. Factor:			
Compound		%Recovery	
Oxygen		100	
Nitrogen		101	
Methane		99	
Carbon Dioxide		100	



### Client Sample ID: LCSD Lab ID#: 1108301C-07AA NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor:	9082426 1.00	Date of Collection: NA Date of Analysis: 8/25/11 10:25 AM
	1.00	Date of Analysis: 6/25/11 10:25 Alvi
Compound		%Recovery
Oxygen		94
Nitrogen		94
Methane		96
Carbon Dioxide		94



5/17/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: CALIFORNIA LINEN RENTAL,6.989 41st STREE Project #: 0304 Workorder #: 1205152A

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 5/8/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



### WORK ORDER #: 1205152A

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	<b>PROJECT</b> #	0304 CALIFORNIA LINEN
DATE RECEIVED:	05/08/2012	CONTACT:	RENTAL, 6.989 41st STREE Kyle Vagadori
DATE COMPLETED:	05/17/2012	contact.	Kyle v agadoli

			RECEIPT	FINAL
FRACTION #	NAME	<u>TEST</u>	VAC./PRES.	PRESSURE
01A	VW1-SS	Modified TO-3	4.0 "Hg	5 psi
02A	VW1-5	Modified TO-3	18.0 "Hg	5 psi
03A	VW2-SS	Modified TO-3	5.5 "Hg	5 psi
04A	VW2-5	Modified TO-3	27.0 "Hg	5 psi
05A	VW2-5 DUP	Modified TO-3	1.0 "Hg	5 psi
06A	VW3-SS	Modified TO-3	4.0 "Hg	5 psi
07A(cancelled)	VW3-5	Modified TO-3	27.5 "Hg	5 psi
08A	Lab Blank	Modified TO-3	NA	NA
09A	LCS	Modified TO-3	NA	NA
09AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

Sinda d. Fruman

05/17/12 DATE:

DECEIDT

TTNIA T

Laboratory Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

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#### LABORATORY NARRATIVE Modified TO-3 P & D Environmental Workorder# 1205152A

Seven 1 Liter Summa Canister samples were received on May 08, 2012. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/L. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ТО-3	ATL Modifications
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch = 20 samples.</td
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A+3.3S$ , where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

### **Receiving Notes**

Samples VW1-5 and VW2-5 were received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Sample VW3-5 was received with significant vacuum remaining in the canister. The client was notified and requested the sample be cancelled.

### **Analytical Notes**

The hydrocarbon profile present in samples VW2-SS, VW2-5 and VW3-SS was heavier than that of



commercial gasoline. Results were calculated using the response factor derived from the current gasoline linear calibration.

### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank greater than reporting limit.
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

### **Client Sample ID: VW1-SS**

# Lab ID#: 1205152A-01A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.050	0.20	0.12	0.48
Client Sample ID: VW1-5				
Lab ID#: 1205152A-02A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.11	0.44	0.39	1.6
Client Sample ID: VW2-SS				
Lab ID#: 1205152A-03A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.051	0.21	6.4	26
Client Sample ID: VW2-5				
Lab ID#: 1205152A-04A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.42	1.7	0.54	2.2
Client Sample ID: VW2-5 DUP				
Lab ID#: 1205152A-05A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.046	0.19	0.15	0.61
Client Sample ID: VW3-SS				
Lab ID#: 1205152A-06A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.054	0.22	3.9	16



# Client Sample ID: VW1-SS Lab ID#: 1205152A-01A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d051605	Date of Collection: 4/23/12 5:15		
Dil. Factor:	2.00	Date of Analysis: 5/16/12 11:31		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.050	0.20	0.12	0.48

		Method
Surrogates	%Recovery	Limits
Fluorobenzene (FID)	84	75-150



#### Client Sample ID: VW1-5 Lab ID#: 1205152A-02A **MODIFIED EPA METHOD TO-3 GC/FID** d051606 File Name: Date of Collection: 5/4/12 5:16:00 PM Dil. Factor: 4.36 Date of Analysis: 5/16/12 12:04 PM **Rpt.** Limit Rpt. Limit Amount Amount Compound (ppmv) (ug/L) (ppmv) (ug/L) 0.44 TPH (Gasoline Range) 0.11 0.39 1.6 Container Type: 1 Liter Summa Canister Method Surrogates %Recovery Limits

Fluorobenzene (FID)

84

75-150

Page 7 of 14



## Client Sample ID: VW2-SS Lab ID#: 1205152A-03A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d051607 2.03			
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.051	0.21	6.4	26

		Method
Surrogates	%Recovery	Limits
Fluorobenzene (FID)	85	75-150



#### Client Sample ID: VW2-5 Lab ID#: 1205152A-04A **MODIFIED EPA METHOD TO-3 GC/FID** File Name: d051608 Date of Collection: 5/4/12 2:23:00 PM Dil. Factor: 16.8 Date of Analysis: 5/16/12 01:21 PM Rpt. Limit **Rpt.** Limit Amount Amount Compound (ppmv) (ug/L) (ppmv) (ug/L) 1.7 TPH (Gasoline Range) 0.42 0.54 2.2 Container Type: 1 Liter Summa Canister Method Surrogates %Recovery Limits

Fluorobenzene (FID)

90

75-150



## Client Sample ID: VW2-5 DUP Lab ID#: 1205152A-05A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d051609 1.83			
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.046	0.19	0.15	0.61

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	85	75-150



## Client Sample ID: VW3-SS Lab ID#: 1205152A-06A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d051610	Date of Collection: 5/4/12 4:5		
Dil. Factor:	2.15	Date of Analysis: 5/16/12 02:		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.054	0.22	3.9	16

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	84	75-150



## Client Sample ID: Lab Blank Lab ID#: 1205152A-08A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d051604	Date of Collection: NA		
Dil. Factor:	1.00	Date of Analysis: 5/16/12 10:47 AM		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected

		Method
Surrogates	%Recovery	Limits

Fluorobenzene (FID)

88

Limits 75-150



## Client Sample ID: LCS Lab ID#: 1205152A-09A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d051602 1.00		Date of Collection: NA Date of Analysis: 5/16/12 09:32 AM	
Compound			%Recovery	
TPH (Gasoline Range)			112	
Container Type: NA - Not A	pplicable		Method	
Surrogates		%Recovery	Limits	
Fluorobenzene (FID)		78	75-150	



## Client Sample ID: LCSD Lab ID#: 1205152A-09AA MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d051614 1.00		Date of Collection: NA Date of Analysis: 5/16/12 06:16 PM	
Compound			%Recovery	
TPH (Gasoline Range)			107	
Container Type: NA - Not A	pplicable			
Surrogates		%Recovery	Method Limits	
Fluorobenzene (FID)		94	75-150	



5/17/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: CALIFORNIA LINEN RENTAL,6.989 41st STREE Project #: 0304 Workorder #: 1205152B

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 5/8/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



### WORK ORDER #: 1205152B

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	PROJECT #	0304 CALIFORNIA LINEN
DATE RECEIVED:	05/08/2012	CONTACT:	RENTAL, 6.989 41st STREE Kyle Vagadori
DATE COMPLETED:	05/17/2012	contact.	Kyle vagadoli

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	PRESSURE
01A	VW1-SS	Modified TO-15	4.0 "Hg	5 psi
02A	VW1-5	Modified TO-15	18.0 "Hg	5 psi
03A	VW2-SS	Modified TO-15	5.5 "Hg	5 psi
04A	VW2-5	Modified TO-15	27.0 "Hg	5 psi
05A	VW2-5 DUP	Modified TO-15	1.0 "Hg	5 psi
06A	VW3-SS	Modified TO-15	4.0 "Hg	5 psi
07A(cancelled)	VW3-5	Modified TO-15	27.5 "Hg	5 psi
08A	Lab Blank	Modified TO-15	NA	NA
09A	CCV	Modified TO-15	NA	NA
10A	LCS	Modified TO-15	NA	NA
10AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

Sinda d. Fruman

05/17/12 DATE:

DECEIDT

**FINAT** 

Laboratory Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020



### LABORATORY NARRATIVE EPA Method TO-15 P & D Environmental Workorder# 1205152B

Seven 1 Liter Summa Canister samples were received on May 08, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

### **Receiving Notes**

Samples VW1-5 and VW2- were received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Sample VW3-5 was received with significant vacuum remaining in the canister. The client was notified and requested the sample be cancelled.

### **Analytical Notes**

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds. Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit.
- UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

#### **Client Sample ID: VW1-SS**

#### Lab ID#: 1205152B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.78	1.4	2.5	4.5
Toluene	0.78	1.1	2.9	4.2
m,p-Xylene	0.78	0.90	3.4	3.9
1,1-Difluoroethane	3.1	100	8.4	280

### Client Sample ID: VW1-5

#### Lab ID#: 1205152B-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	1.7	3.1	6.3	12
1,1-Difluoroethane	6.7	1500 E	18	4100 E

#### **Client Sample ID: VW2-SS**

#### Lab ID#: 1205152B-03A

Compound	Rpt. Limit	Amount	Rpt. Limit	Amount
	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
1,1-Difluoroethane	3.3	7100 E	8.9	19000 E

Amount (ug/m3)

96

#### **Client Sample ID: VW2-5**

Lab ID#: 1205152B-04A			
	Rpt. Limit	Amount	Rpt. Limit
Compound	(ppbv)	(ppbv)	(ug/m3)

#### **Client Sample ID: VW2-5 DUP**

#### Lab ID#: 1205152B-05A

	Rpt. Limit	Amount	Rpt. Limit	Amount
Compound	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
Benzene	0.70	1.0	2.2	3.2
Toluene	0.70	1.8	2.6	6.9

27

35

72



# **Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN**

### Client Sample ID: VW3-SS

### Lab ID#: 1205152B-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.78	0.85	2.5	2.7
Toluene	0.78	0.79	2.9	3.0
m,p-Xylene	0.78	1.1	3.4	4.7
1,1-Difluoroethane	3.1	38	8.4	100



## Client Sample ID: VW1-SS Lab ID#: 1205152B-01A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	3051409 1.55		Date of Collection: 4/23/12 5:15:00 PM Date of Analysis: 5/14/12 02:05 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.78	Not Detected	2.8	Not Detected
Benzene	0.78	1.4	2.5	4.5
Toluene	0.78	1.1	2.9	4.2
Ethyl Benzene	0.78	Not Detected	3.4	Not Detected
m,p-Xylene	0.78	0.90	3.4	3.9
o-Xylene	0.78	Not Detected	3.4	Not Detected
1,1-Difluoroethane	3.1	100	8.4	280

		Method
Surrogates	%Recovery	Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	103	70-130



## Client Sample ID: VW1-5 Lab ID#: 1205152B-02A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	3051410 3.35		of Collection: 5/4 of Analysis: 5/14/	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.7	Not Detected	6.0	Not Detected
Benzene	1.7	Not Detected	5.4	Not Detected
Toluene	1.7	3.1	6.3	12
Ethyl Benzene	1.7	Not Detected	7.3	Not Detected
m,p-Xylene	1.7	Not Detected	7.3	Not Detected
o-Xylene	1.7	Not Detected	7.3	Not Detected
1,1-Difluoroethane	6.7	1500 E	18	4100 E

E = Exceeds instrument calibration range.

		Method
Surrogates	%Recovery	Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	93	70-130
4-Bromofluorobenzene	106	70-130



## Client Sample ID: VW2-SS Lab ID#: 1205152B-03A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	3051411 1.64		of Collection: 5/4 of Analysis: 5/14	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.82	Not Detected	3.0	Not Detected
Benzene	0.82	Not Detected	2.6	Not Detected
Toluene	0.82	Not Detected	3.1	Not Detected
Ethyl Benzene	0.82	Not Detected	3.6	Not Detected
m,p-Xylene	0.82	Not Detected	3.6	Not Detected
o-Xylene	0.82	Not Detected	3.6	Not Detected
1,1-Difluoroethane	3.3	7100 E	8.9	19000 E

E = Exceeds instrument calibration range.

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	107	70-130



## Client Sample ID: VW2-5 Lab ID#: 1205152B-04A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	3051412 13.4		of Collection: 5/4 of Analysis: 5/14/	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	6.7	Not Detected	24	Not Detected
Benzene	6.7	Not Detected	21	Not Detected
Toluene	6.7	Not Detected	25	Not Detected
Ethyl Benzene	6.7	Not Detected	29	Not Detected
m,p-Xylene	6.7	Not Detected	29	Not Detected
o-Xylene	6.7	Not Detected	29	Not Detected
1,1-Difluoroethane	27	35	72	96

		Method
Surrogates	%Recovery	Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	107	70-130



# Client Sample ID: VW2-5 DUP Lab ID#: 1205152B-05A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	3051413 1.39		of Collection: 5/4 of Analysis: 5/14/	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.70	Not Detected	2.5	Not Detected
Benzene	0.70	1.0	2.2	3.2
Toluene	0.70	1.8	2.6	6.9
Ethyl Benzene	0.70	Not Detected	3.0	Not Detected
m,p-Xylene	0.70	Not Detected	3.0	Not Detected
o-Xylene	0.70	Not Detected	3.0	Not Detected
1,1-Difluoroethane	2.8	Not Detected	7.5	Not Detected

		Method
Surrogates	%Recovery	Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	107	70-130



## Client Sample ID: VW3-SS Lab ID#: 1205152B-06A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	3051414 1.55		of Collection: 5/4 of Analysis: 5/14/	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.78	Not Detected	2.8	Not Detected
Benzene	0.78	0.85	2.5	2.7
Toluene	0.78	0.79	2.9	3.0
Ethyl Benzene	0.78	Not Detected	3.4	Not Detected
m,p-Xylene	0.78	1.1	3.4	4.7
o-Xylene	0.78	Not Detected	3.4	Not Detected
1,1-Difluoroethane	3.1	38	8.4	100

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	106	70-130



## Client Sample ID: Lab Blank Lab ID#: 1205152B-08A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	3051408a 1.00	2 4 10	of Collection: NA of Analysis: 5/14/	/12 12:52 PM
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
1,1-Difluoroethane	2.0	Not Detected	5.4	Not Detected

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	96	70-130	
1,2-Dichloroethane-d4	96	70-130	
4-Bromofluorobenzene	100	70-130	



## Client Sample ID: CCV Lab ID#: 1205152B-09A EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	3051403 1.00	Date of Collection: NA Date of Analysis: 5/14/12 09:52 AM
Compound		%Recovery
Methyl tert-butyl ether		103
Benzene		99
Toluene		98
Ethyl Benzene		110
m,p-Xylene		111
o-Xylene		115
1,1-Difluoroethane		100

		Method
Surrogates	%Recovery	Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	104	70-130



## Client Sample ID: LCS Lab ID#: 1205152B-10A EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	3051404 1.00	Date of Collection: NA Date of Analysis: 5/14/12 10:26 AM
Compound		%Recovery
Methyl tert-butyl ether		108
Benzene		113
Toluene		110
Ethyl Benzene		118
m,p-Xylene		121
o-Xylene		121
1,1-Difluoroethane		Not Spiked

		Method
Surrogates	%Recovery	Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	103	70-130



## Client Sample ID: LCSD Lab ID#: 1205152B-10AA EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	3051405 1.00	Date of Collection: NA Date of Analysis: 5/14/12 10:43 AM
Compound		%Recovery
Methyl tert-butyl ether		106
Benzene		110
Toluene		105
Ethyl Benzene		119
m,p-Xylene		122
o-Xylene		121
1,1-Difluoroethane		Not Spiked

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	97	70-130	
1,2-Dichloroethane-d4	99	70-130	
4-Bromofluorobenzene	104	70-130	



5/17/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: CALIFORNIA LINEN RENTAL,6.989 41st STREE Project #: 0304 Workorder #: 1205152C

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 5/8/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



### WORK ORDER #: 1205152C

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	PROJECT #	0304 CALIFORNIA LINEN
DATE RECEIVED:	05/08/2012	CONTACT:	RENTAL, 6.989 41st STREE Kyle Vagadori
DATE COMPLETED:	05/17/2012	connen	Kyle vagadoli

			RECEIPT	FINAL
FRACTION #	NAME	<u>TEST</u>	VAC./PRES.	PRESSURE
01A	VW1-SS	Modified ASTM D-1946	4.0 "Hg	5 psi
02A	VW1-5	Modified ASTM D-1946	18.0 "Hg	5 psi
03A	VW2-SS	Modified ASTM D-1946	5.5 "Hg	5 psi
04A	VW2-5	Modified ASTM D-1946	27.0 "Hg	5 psi
05A	VW2-5 DUP	Modified ASTM D-1946	1.0 "Hg	5 psi
06A	VW3-SS	Modified ASTM D-1946	4.0 "Hg	5 psi
07A(cancelled)	VW3-5	Modified ASTM D-1946	27.5 "Hg	5 psi
08A	Lab Blank	Modified ASTM D-1946	NA	NA
09A	LCS	Modified ASTM D-1946	NA	NA
09AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:

Sinda d. Fruman

05/17/12 DATE:

DECEIDT

**FINAT** 

Laboratory Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020

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#### LABORATORY NARRATIVE Modified ASTM D-1946 P & D Environmental Workorder# 1205152C

Seven 1 Liter Summa Canister samples were received on May 08, 2012. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ASTM D-1946	ATL Modifications
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.



### **Receiving Notes**

Samples VW1-5 and VW2- were received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Sample VW3-5 was received with significant vacuum remaining in the canister. The client was notified and requested the sample be cancelled.

### **Analytical Notes**

There were no analytical discrepancies.

### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank greater than reporting limit.
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

#### **Client Sample ID: VW1-SS**

#### Lab ID#: 1205152C-01A

Compound	Rpt. Limit	Amount (%)
	(%)	
Oxygen	0.20	5.9
Nitrogen	0.20	90
Carbon Dioxide	0.020	3.7

#### **Client Sample ID: VW1-5**

#### Lab ID#: 1205152C-02A

Compound	Rpt. Limit	Amount (%)
	(%)	
Oxygen	0.44	20
Nitrogen	0.44	80
Carbon Dioxide	0.044	0.37

#### **Client Sample ID: VW2-SS**

#### Lab ID#: 1205152C-03A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.20	11
Nitrogen	0.20	80
Carbon Dioxide	0.020	8.6

### **Client Sample ID: VW2-5**

#### Lab ID#: 1205152C-04A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	1.7	7.6
Nitrogen	1.7	85
Carbon Dioxide	0.17	7.3

#### **Client Sample ID: VW2-5 DUP**

#### Lab ID#: 1205152C-05A

	Rpt. Limit	Amount
Compound	(%)	(%)



# Summary of Detected Compounds NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

### Client Sample ID: VW2-5 DUP

Lab ID#: 1205152C-05A

	Rpt. Limit (%)	Amount (%)
Compound		
Oxygen	0.18	5.7
Nitrogen	0.18	81
Methane	0.00018	0.00033
Carbon Dioxide	0.018	13

### Client Sample ID: VW3-SS

#### Lab ID#: 1205152C-06A

Compound	Rpt. Limit	Amount (%)
	(%)	
Oxygen	0.22	15
Nitrogen	0.22	80
Carbon Dioxide	0.022	5.0



## Client Sample ID: VW1-SS Lab ID#: 1205152C-01A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name: Dil. Factor: Compound			Collection: 4/23/12 5:15:00 PM Analysis: 5/15/12 10:24 PM	
		Rpt. Limit (%)	Amount (%)	
Oxygen		0.20	5.9	
Nitrogen		0.20	90	
Methane		0.00020	Not Detected	
Carbon Dioxide		0.020	3.7	

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### Client Sample ID: VW1-5 Lab ID#: 1205152C-02A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name: Dil. Factor:	9051570 4.36		tion: 5/4/12 5:16:00 PM sis: 5/15/12 10:49 PM		
Compound Dxvaen		Rpt. Limit (%)	Amount (%)		
Oxygen		0.44	20		
Nitrogen		0.44	80		
Methane		0.00044	Not Detected		
Carbon Dioxide		0.044	0.37		

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### Client Sample ID: VW2-SS Lab ID#: 1205152C-03A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name: Dil. Factor:	9051571 2.03		ction: 5/4/12 4:08:00 PM vsis: 5/16/12 07:05 AM			
Compound		Rpt. Limit (%)	Amount (%)			
Oxygen		0.20	11			
xygen itrogen		0.20				
Methane		0.00020	Not Detected			
Carbon Dioxide		0.020	8.6			

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### Client Sample ID: VW2-5 Lab ID#: 1205152C-04A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name: Dil. Factor:	9051572 16.8	Date of Collection: 5/4/12 2:23:0 Date of Analysis: 5/16/12 07:27					
Compound		Rpt. Limit (%)	Amount (%)				
Oxygen		1.7	7.6				
Nitrogen		1.7	85				
Methane		0.0017	Not Detected				
Carbon Dioxide		0.17	7.3				

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### Client Sample ID: VW2-5 DUP Lab ID#: 1205152C-05A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name: Dil. Factor:	9051573 1.83	Date of Collection: 5/4/12 2:23: Date of Analysis: 5/16/12 07:49					
Compound		Rpt. Limit (%)	Amount (%)				
Oxygen		0.18	5.7				
Nitrogen		0.18	81				
Methane		0.00018	0.00033				
Carbon Dioxide		0.018	13				

٦



### Client Sample ID: VW3-SS Lab ID#: 1205152C-06A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name: Dil. Factor:	9051574 2.15		ction: 5/4/12 4:56:00 PM sis: 5/16/12 08:12 AM		
Dxygen		Rpt. Limit (%)	Amount (%)		
Compound Oxygen Nitrogen		0.22	15		
Nitrogen		0.22	80		
Methane		0.00022	Not Detected		
Carbon Dioxide		0.022	5.0		

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### Client Sample ID: Lab Blank Lab ID#: 1205152C-08A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor:	9051554 1.00	Date of Colle Date of Analy	ction: NA /sis: 5/15/12 03:40 PM		
<b>Compound</b> Oxygen		Rpt. Limit (%)	Amount (%)		
Oxygen		0.10	Not Detected		
Nitrogen		0.10	Not Detected		
Methane		0.00010	Not Detected		
Carbon Dioxide		0.010 N			



### Client Sample ID: LCS Lab ID#: 1205152C-09A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9051552	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 5/15/12 02:57 PM
Compound		%Recovery
Oxygen		100
Nitrogen		100
Methane		98
in our larie		



### **Client Sample ID: LCSD** Lab ID#: 1205152C-09AA NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9051575	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 5/16/12 08:40 AM
Compound		%Recovery
Oxygen		101
Nitrogen		100
Methane		100



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	05/04/12
55 Santa Clara, Ste.240		Date Received:	05/04/12
55 Sunta Chata, 510.2 10	Client Contact: Paul King	Date Reported:	05/09/12
Oakland, CA 94610	Client P.O.:	Date Completed:	05/08/12

#### WorkOrder: 1205173

May 09, 2012

Dear Paul:

Enclosed within are:

- 1) The results of the **3** analyzed samples from your project: **#0304; California Linen Rental Co.,**
- 2) QC data for the above samples, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

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P&D ENVIRO 55 Santa Cl Oaklar (510	DNMENTAI ara Ave., Suite 240 nd, CA 94610 )) 658-6916	L, INC.				1.1C-12	/	//	/	/ /	//	//	/	
PROJECT NUMBER: 0304	PROJECT NAME CALIFORNIA 1 OAKLAND	LINEN REVTALCO	CONTAINERS	ANALYSICA	THALE GAS			/	/	/	//	#		
SAMPLED BY: (PRINTED & SIGNA Michael Deschares U SAMPLE NUMBER DATE TI	Tickens Desc	MPLE LOCATION	NUMBER OF	Dia. AN	THINK THE			/	/	/	PRESERV	THATTINE	REMA	RKS
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Results and billing to: P&D Environmental, Inc. lab@pdenviro.com		REMARKS:	DIFI									Bag		

### McCampbell Analytical, Inc. 1534 Willow Pass Rd Pittsburg, CA 94565-1701



Page 1 of 1

(925) 252-9262				WorkOr	der: 1205173	Clier	ntCode: PDEO		
	WaterTrax	WriteOn		Excel	Fax	Email	HardCopy	ThirdParty	J-flag
Report to:				Bil	l to:		Req	uested TAT:	5 days
Paul King	Email:	lab@pdenviro.com			Accounts Pay	able			
P & D Environmental	CC:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clar	a, Ste.240	Dat	e Received:	05/04/2012
Oakland, CA 94610 (510) 658-6916 FAX: 510-834-0152	ProjectNo:	#0304; California Li	nen Rental Co.		Oakland, CA S	94610	Dat	e Printed:	05/04/2012

					Requested Tests (See legend below)											
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1205173-001	VW 1-5	Air	5/4/2012 11:25		А	Α										
1205173-002	VW 2-5	Air	5/4/2012 13:15		А	Α										
1205173-003	VW 3-5	Air	5/4/2012 12:30		A	A										

#### Test Legend:

1	8260VOC_A
6	
11	

2	8260VOC_PPMV
7	
12	

3	
8	

4	
9	

5	
10	

**Prepared by: Zoraida Cortez** 

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



### Sample Receipt Checklist

Client Name:	P & D Environmenta	al			Date ar	nd Time Received:	5/4/2012 7::	31:51 PM
Project Name:	#0304; California Li	nen Rental Co.			LogIn R	Reviewed by:		Zoraida Cortez
WorkOrder N°:	1205173	Matrix: <u>Air</u>			Carrier:	<u>Rob Pringle (M</u>	Al Courier)	
		<u>Cha</u>	in of Cu	ustody (COC	:) Informati	on		
Chain of custody	present?		Yes	✓	No			
Chain of custody	signed when relinquis	shed and received?	Yes	✓	No			
Chain of custody	agrees with sample la	abels?	Yes	✓	No 🗌			
Sample IDs note	d by Client on COC?		Yes	✓	No 🗌			
Date and Time o	f collection noted by C	lient on COC?	Yes	✓	No 🗌			
Sampler's name	noted on COC?		Yes	✓	No 🗌			
			Sample	Receipt Inf	ormation			
Custody seals in	tact on shipping conta	iner/cooler?	Yes		No 🗌		NA 🗹	
Shipping contain	er/cooler in good cond	lition?	Yes		No 🗌			
Samples in prop	er containers/bottles?		Yes	✓	No 🗌			
Sample containe	ers intact?		Yes	✓	No 🗌			
Sufficient sample	e volume for indicated	test?	Yes	✓	No 🗌			
		Sample Pres	servatio	n and Hold	<u>Time (HT) l</u>	nformation		
All samples rece	ived within holding tim	e?	Yes	✓	No 🗌			
Container/Temp	Blank temperature		Coole	er Temp:			NA 🗹	
Water - VOA via	ls have zero headspac	e / no bubbles?	Yes		No 🗌 🛛	No VOA vials submi	itted 🗹	
Sample labels ch	necked for correct pres	servation?	Yes		No 🗌			
Metal - pH accep	otable upon receipt (p⊦	l<2)?	Yes		No 🗌		NA 🗹	
Samples Receive	ed on Ice?		Yes		No 🗹			

\* NOTE: If the "No" box is checked, see comments below.

Comments:

\_\_\_\_\_

\_\_\_\_\_

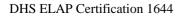
McCampbell Analytical, Inc "When Quality Counts"			1534 Willow Pass Toll Free Telephone: ( http://www.mccampbel	5) 252-9269				
P & D Environmental 55 Santa Clara, Ste.240		Client Project ID: Linen Rental Co.		Date Sampled: 05/04/12 Date Received: 05/04/12				
		Client Contact: Pa	aul King D	Date Extracted 05/07/12				
Oakland, CA 946	10	Client P.O.:	E	Date Analyze	ed 05	/07/12		
Extraction method: SW50	)30B	-	y P&T and GC/MS* nethods: SW8260B		Wo	ork Order:	1205173	
Lab ID	Client ID	Matrix 1,	1-Difluoroethane as Dichlorodifle	uoromethane	DF	% SS	Comments	
001A	VW 1-5	A	26,000		4000	113		
002A	VW 2-5	А	11,000		1000	111		
003A	VW 3-5	А	9,000		2000	110		

Reporting Limit for $DF = 1$ ; ND means not detected at or	А	0.25	µg/L
above the reporting limit	S	NA	NA

\* vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.





Angela Rydelius, Lab Manager

McCampbell Analytical, Inc. "When Quality Counts"				Pass Road, Pittsburg ne: (877) 252-9262 pbell.com / E-mail:	/ Fax: (92	5) 252-926			
P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610		Client Project ID: Linen Rental Co.	Client Project ID: #0304; California Linen Rental Co.		Date Sampled: 05/04/12 Date Received: 05/04/12				
		Client Contact: F	Client Contact: Paul King			Date Extracted 05/07/12			
		Client P.O.:	0	Date Analyz	ed 05	/07/12			
Extraction method: SW50		•	T and GC/MS in PPM nethods: SW8260B	V*	Wo	ork Order:	1205173		
Lab ID	Client ID	Matrix 1	,1-Difluoroethane as Dichloroo	lifluoromethane	DF	% SS	Comments		
001A	VW 1-5	А	5300		4000	113			
002A	VW 2-5	А	2100		1000	111			
003A	VW 3-5	А	1800		2000	110			

Reporting Limit for DF =1; ND means not detected at or	А	0.062	μL/L
above the reporting limit	S	NA	NA

\* air samples reported in ppmv ( $\mu$ L/L).

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.





### **QC SUMMARY REPORT FOR SW8260B**

W.O. Sample Matrix: Air	D. Sample Matrix: Air QC Matrix: Water			BatchID: 67342 WorkO			order: 1205173		
EPA Method: SW8260B Extraction	n: SW5030B						Spiked Sam	ple ID:	1205084-006A
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acc	eptance	Criteria (%)
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	105	102	2.62	108	70 - 130	20	70 - 130
Benzene	ND	10	96.6	98	1.43	113	70 - 130	20	70 - 130
t-Butyl alcohol (TBA)	ND	40	104	102	2.30	97.8	70 - 130	20	70 - 130
Chlorobenzene	ND	10	85.6	86.6	1.16	101	70 - 130	20	70 - 130
1,2-Dibromoethane (EDB)	ND	10	96.8	95.9	0.941	104	70 - 130	20	70 - 130
1,2-Dichloroethane (1,2-DCA)	ND	10	106	103	2.90	112	70 - 130	20	70 - 130
1,1-Dichloroethene	ND	10	87.4	91.5	4.49	104	70 - 130	20	70 - 130
Diisopropyl ether (DIPE)	ND	10	108	106	1.74	117	70 - 130	20	70 - 130
Ethyl tert-butyl ether (ETBE)	ND	10	109	104	4.04	115	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	105	102	3.02	105	70 - 130	20	70 - 130
Toluene	ND	10	84.6	86.7	2.37	101	70 - 130	20	70 - 130
Trichloroethene	ND	10	85.9	86	0.146	99.1	70 - 130	20	70 - 130
%SS1:	106	25	110	108	1.77	108	70 - 130	20	70 - 130
%SS2:	94	25	90	93	2.51	93	70 - 130	20	70 - 130
%SS3:	92	2.5	100	102	1.94	103	70 - 130	20	70 - 130
All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE									

#### BATCH 67342 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1205173-001A	05/04/12 11:25 AM	05/07/12	05/07/12 11:08 AM	1205173-001A	05/04/12 11:25 AM	05/07/12	05/07/12 11:08 AM
1205173-002A	05/04/12 1:15 PM	05/07/12	05/07/12 1:23 PM	1205173-002A	05/04/12 1:15 PM	05/07/12	05/07/12 1:23 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

A QA/QC Officer

DHS ELAP Certification 1644



### QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Air	QC Matrix:	Water			BatchID	: 67343		WorkO	rder: 1205173
EPA Method: SW8260B Extraction: S	W5030B					;	Spiked Sam	ple ID:	1205085-001A
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acc	eptance	Criteria (%)
, unaryce	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	102	103	0.934	102	70 - 130	20	70 - 130
Benzene	ND	10	102	103	1.44	106	70 - 130	20	70 - 130
t-Butyl alcohol (TBA)	ND	40	92.8	101	8.72	90.3	70 - 130	20	70 - 130
Chlorobenzene	ND	10	97.6	101	3.47	103	70 - 130	20	70 - 130
1,2-Dibromoethane (EDB)	ND	10	100	103	2.73	102	70 - 130	20	70 - 130
1,2-Dichloroethane (1,2-DCA)	ND	10	97.3	100	2.94	100	70 - 130	20	70 - 130
1,1-Dichloroethene	ND	10	103	109	5.87	114	70 - 130	20	70 - 130
Diisopropyl ether (DIPE)	ND	10	103	104	0.673	106	70 - 130	20	70 - 130
Ethyl tert-butyl ether (ETBE)	ND	10	102	103	0.910	104	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	99	102	3.09	99.4	70 - 130	20	70 - 130
Toluene	ND	10	97.9	101	2.67	106	70 - 130	20	70 - 130
Trichloroethene	ND	10	102	105	3.14	108	70 - 130	20	70 - 130
%SS1:	110	25	110	112	2.12	113	70 - 130	20	70 - 130
%SS2:	112	25	110	109	0.704	115	70 - 130	20	70 - 130
%SS3:	108	2.5	112	109	2.01	116	70 - 130	20	70 - 130
All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE									

#### BATCH 67343 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1205173-003A	05/04/12 12:30 PM	I 05/07/12	05/07/12 2:22 PM	1205173-003A	05/04/12 12:30 PM	1 05/07/12	05/07/12 2:22 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS ELAP Certification 1644

AC\_\_\_QA/QC Officer



7/17/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. 989 41st St. Project #: 0304 Workorder #: 1207155A

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 7/10/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



### WORK ORDER #: 1207155A

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE: FAX: DATE RECEIVED:	510-658-6916 510-834-0772 07/10/2012	P.O. # PROJECT # CONTACT:	0304 California Linen Rental Co. 989 41st St. Kyle Vagadori
DATE COMPLETED:	07/17/2012		, a degrada

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	PRESSURE
01A	VW5	Modified TO-3	6.0 "Hg	5 psi
02A	VW6	Modified TO-3	4.0 "Hg	5 psi
03A	VW7	Modified TO-3	2.0 "Hg	5 psi
04A	Lab Blank	Modified TO-3	NA	NA
05A	LCS	Modified TO-3	NA	NA
05AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY:

layes

07/17/12 DATE:

DECEIDT

**FINAT** 

Technical Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

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> > Page 2 of 11

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### LABORATORY NARRATIVE Modified TO-3 P & D Environmental Workorder# 1207155A

Three 1 Liter Summa Canister samples were received on July 10, 2012. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/L. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ТО-3	ATL Modifications
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch = 20 samples.</td
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A+3.3S$ , where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

### **Receiving Notes**

There were no receiving discrepancies.

### Analytical Notes

There were no analytical discrepancies.

### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows: B - Compound present in laboratory blank greater than reporting limit.



- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



### Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

### **Client Sample ID: VW5**

### Lab ID#: 1207155A-01A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.042	0.17	2.5	10
Client Sample ID: VW6				
Lab ID#: 1207155A-02A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.039	0.16	1.8	7.4
Client Sample ID: VW7				
Lab ID#: 1207155A-03A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.036	0.15	0.73	3.0



### Client Sample ID: VW5 Lab ID#: 1207155A-01A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d071005	Date of Collection: 7/5/12 2:44:00 PM		
Dil. Factor:	1.68	Date of Analysis: 7/11/12 09:25 AM		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.042	0.17	2.5	10

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	98	75-150



### Client Sample ID: VW6 Lab ID#: 1207155A-02A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d071006	Date of Collection: 7/6/12 10:05:00		
Dil. Factor:	1.55	Date of Analysis: 7/11/12 10:00 AM		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.039	0.16	1.8	7.4

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Surrogates	%Recovery	Limits
Fluorobenzene (FID)	90	75-150

Method



### Client Sample ID: VW7 Lab ID#: 1207155A-03A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	Date of Collection: 7/5/12 3:03:00 PM			
Dil. Factor:	Date of Analysis: 7/11/12 10:42 AM			
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.036	0.15	0.73	3.0

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	88	75-150



### Client Sample ID: Lab Blank Lab ID#: 1207155A-04A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d071004	Date of Collection: NA		
Dil. Factor:	1.00	Date of Analysis: 7/10/12 08:21 PM		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	89	75-150



### Client Sample ID: LCS Lab ID#: 1207155A-05A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d071002 1.00	Date of Collec Date of Analys	etion: NA sis:  7/10/12 06:12 PM
Compound			%Recovery
TPH (Gasoline Range)			110
Container Type: NA - Not A	pplicable		Method
Surrogates		%Recovery	Limits
Fluorobenzene (FID)		97	75-150



### Client Sample ID: LCSD Lab ID#: 1207155A-05AA MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d071010 1.00	Date of Collec Date of Analy	ction: NA sis:  7/11/12 02:30 PM
Compound			%Recovery
TPH (Gasoline Range)			104
Container Type: NA - Not Ap	olicable		Method
Surrogates		%Recovery	Limits
Fluorobenzene (FID)		87	75-150



7/17/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. 989 41st St. Project #: 0304 Workorder #: 1207155B

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 7/10/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



### WORK ORDER #: 1207155B

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE: FAX: DATE RECEIVED:	510-658-6916 510-834-0772 07/10/2012	P.O. # PROJECT # CONTACT:	0304 California Linen Rental Co. 989 41st St. Kyle Vagadori
DATE COMPLETED:	07/17/2012		, a degrada

			RECEIPT	FINAL
FRACTION #	<u>NAME</u>	<u>TEST</u>	VAC./PRES.	PRESSURE
01A	VW5	Modified TO-15	6.0 "Hg	5 psi
02A	VW6	Modified TO-15	4.0 "Hg	5 psi
03A	VW7	Modified TO-15	2.0 "Hg	5 psi
04A	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA
06AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

layes

DATE: 07/17/12

DECEIDT

TTNIA T

Technical Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

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> > Page 2 of 11



### LABORATORY NARRATIVE EPA Method TO-15 P & D Environmental Workorder# 1207155B

Three 1 Liter Summa Canister samples were received on July 10, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

### **Receiving Notes**

There were no receiving discrepancies.

### **Analytical Notes**

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A dilution was performed on sample VW5 due to the presence of high level target species.

### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit.
- UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



### Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

### **Client Sample ID: VW5**

### Lab ID#: 1207155B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	2.2	65	8.5	240
Ethyl Benzene	2.2	5.6	9.8	24
m,p-Xylene	2.2	30	9.8	130
o-Xylene	2.2	16	9.8	70
1,1-Difluoroethane	9.0	520	24	1400

#### **Client Sample ID: VW6**

#### Lab ID#: 1207155B-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	1.0	32	3.9	120
Ethyl Benzene	1.0	2.4	4.5	10
m,p-Xylene	1.0	7.2	4.5	31
o-Xylene	1.0	7.5	4.5	32

#### **Client Sample ID: VW7**

#### Lab ID#: 1207155B-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.96	1.3	3.1	4.1
Toluene	0.96	3.9	3.6	15
Ethyl Benzene	0.96	1.4	4.2	5.9
m,p-Xylene	0.96	4.3	4.2	18
o-Xylene	0.96	1.4	4.2	6.0



### Client Sample ID: VW5 Lab ID#: 1207155B-01A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	j071211 4.50	Date of Collection: 7/5/12 2:44:00 PM Date of Analysis: 7/12/12 08:29 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	2.2	Not Detected	8.1	Not Detected
Benzene	2.2	Not Detected	7.2	Not Detected
Toluene	2.2	65	8.5	240
Ethyl Benzene	2.2	5.6	9.8	24
m,p-Xylene	2.2	30	9.8	130
o-Xylene	2.2	16	9.8	70
1,1-Difluoroethane	9.0	520	24	1400

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	100	70-130	
4-Bromofluorobenzene	100	70-130	



### Client Sample ID: VW6 Lab ID#: 1207155B-02A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	j071214 2.08				
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)	
Methyl tert-butyl ether	1.0	Not Detected	3.7	Not Detected	
Benzene	1.0	Not Detected	3.3	Not Detected	
Toluene	1.0	32	3.9	120	
Ethyl Benzene	1.0	2.4	4.5	10	
m,p-Xylene	1.0	7.2	4.5	31	
o-Xylene	1.0	7.5	4.5	32	
1,1-Difluoroethane	4.2	Not Detected	11	Not Detected	

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	96	70-130	
1,2-Dichloroethane-d4	97	70-130	
4-Bromofluorobenzene	100	70-130	



### Client Sample ID: VW7 Lab ID#: 1207155B-03A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	j071213 1.93		of Collection: 7/5 of Analysis: 7/12	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.96	Not Detected	3.5	Not Detected
Benzene	0.96	1.3	3.1	4.1
Toluene	0.96	3.9	3.6	15
Ethyl Benzene	0.96	1.4	4.2	5.9
m,p-Xylene	0.96	4.3	4.2	18
o-Xylene	0.96	1.4	4.2	6.0
1,1-Difluoroethane	3.9	Not Detected	10	Not Detected

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	95	70-130	
1,2-Dichloroethane-d4	101	70-130	
4-Bromofluorobenzene	103	70-130	



### Client Sample ID: Lab Blank Lab ID#: 1207155B-04A EPA METHOD TO-15 GC/MS FULL SCAN

٦

File Name: Dil. Factor:	j071209 1.00	Date of Collection: NA Date of Analysis: 7/12/12 06:55 P		/12 06:55 PM
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
1,1-Difluoroethane	2.0	Not Detected	5.4	Not Detected

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	95	70-130	
1,2-Dichloroethane-d4	95	70-130	
4-Bromofluorobenzene	99	70-130	



### Client Sample ID: CCV Lab ID#: 1207155B-05A EPA METHOD TO-15 GC/MS FULL SCAN

File Name:j071202Dil. Factor:1.00		Date of Collection: NA Date of Analysis: 7/12/12 02:00 PM	
Compound		%Recovery	
Methyl tert-butyl ether		118	
Benzene		109	
Toluene		108	
Ethyl Benzene		112	
m,p-Xylene		115	
o-Xylene		114	
1,1-Difluoroethane		118	

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	99	70-130	
1,2-Dichloroethane-d4	101	70-130	
4-Bromofluorobenzene	105	70-130	



#### Client Sample ID: LCS Lab ID#: 1207155B-06A EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	j071203 1.00	Date of Collection: NA Date of Analysis: 7/12/12 02:40 PM
Compound		%Recovery
Methyl tert-butyl ether		111
Benzene		106
Toluene		107
Ethyl Benzene		107
m,p-Xylene		112
o-Xylene		110
1,1-Difluoroethane		Not Spiked

		Method
Surrogates	%Recovery	Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	99	70-130



#### Client Sample ID: LCSD Lab ID#: 1207155B-06AA EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	j071204 1.00	Date of Collection: NA Date of Analysis: 7/12/12 02:59 PM
Compound		%Recovery
Methyl tert-butyl ether		114
Benzene		107
Toluene		107
Ethyl Benzene		109
m,p-Xylene		115
o-Xylene		114
1.1-Difluoroethane		Not Spiked

		Method Limits	
Surrogates	%Recovery		
Toluene-d8	101	70-130	
1,2-Dichloroethane-d4	101	70-130	
4-Bromofluorobenzene	106	70-130	



7/17/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. 989 41st St. Project #: 0304 Workorder #: 1207155C

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 7/10/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



#### WORK ORDER #: 1207155C

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	PROJECT #	0304 California Linen Rental Co. 989
DATE RECEIVED:	07/10/2012	CONTACT:	41st St. Kyle Vagadori
DATE COMPLETED:	07/17/2012	connen	

			<b>KEUEIF</b> I	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	<b>PRESSURE</b>
01A	VW5	Modified ASTM D-1946	6.0 "Hg	5 psi
02A	VW6	Modified ASTM D-1946	4.0 "Hg	5 psi
03A	VW7	Modified ASTM D-1946	2.0 "Hg	5 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:

layes

07/17/12 DATE:

DECEIDT

**FINAT** 

Technical Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

> 180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000. (800) 985-5955. FAX (916) 985-1020

> > Page 2 of 11

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#### LABORATORY NARRATIVE Modified ASTM D-1946 P & D Environmental Workorder# 1207155C

Three 1 Liter Summa Canister samples were received on July 10, 2012. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ASTM D-1946	ATL Modifications
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.



#### **Receiving Notes**

There were no receiving discrepancies.

#### **Analytical Notes**

There were no analytical discrepancies.

#### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates

as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



### Summary of Detected Compounds NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

#### **Client Sample ID: VW5**

#### Lab ID#: 1207155C-01A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.34	22
Nitrogen	0.34	77
Carbon Dioxide	0.034	0.68

#### **Client Sample ID: VW6**

#### Lab ID#: 1207155C-02A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.32	20
Nitrogen	0.32	78
Carbon Dioxide	0.032	2.2

#### **Client Sample ID: VW7**

#### Lab ID#: 1207155C-03A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.26	18
Nitrogen	0.26	77
Carbon Dioxide	0.026	4.6



#### Client Sample ID: VW5 Lab ID#: 1207155C-01A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor:	9071620 3.35		ction: 7/5/12 2:44:00 PM /sis: 7/16/12 05:37 PM
Compound		Rpt. Limit (%)	Amount (%)
Oxygen		0.34	22
Nitrogen		0.34	77
Methane		0.00034	Not Detected
Carbon Dioxide		0.034	0.68



#### Client Sample ID: VW6 Lab ID#: 1207155C-02A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

٦

File Name: Dil. Factor:	9071621 3.22		ction: 7/6/12 10:05:00 AM /sis: 7/16/12 06:07 PM
Compound		Rpt. Limit (%)	Amount (%)
Oxygen		0.32	20
Nitrogen		0.32	78
Methane		0.00032	Not Detected
Carbon Dioxide		0.032	2.2



#### Client Sample ID: VW7 Lab ID#: 1207155C-03A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

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File Name: Dil. Factor:	9071622 2.58		ection: 7/5/12 3:03:00 PM ysis: 7/16/12 06:33 PM		
Compound		Rpt. Limit (%)	Amount (%)		
Oxygen		0.26	18		
Nitrogen		0.26	77		
Methane		0.00026	Not Detected		
Carbon Dioxide		0.026	4.6		



#### Client Sample ID: Lab Blank Lab ID#: 1207155C-04A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

٦

File Name: S Dil. Factor:	9071605 1.00	Date of Colle Date of Analy	ction: NA /sis:   7/16/12 09:54 AM		
Compound		Rpt. Limit (%)	Amount (%)		
Oxygen		0.10	Not Detected		
Nitrogen		0.10	Not Detected		
Methane		0.00010	Not Detected		
Carbon Dioxide		0.010	Not Detected		



#### Client Sample ID: LCS Lab ID#: 1207155C-05A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9071602	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/16/12 08:43 AM
Compound		%Recovery
Oxygen		100
Nitrogen		101
Methane		98
		102



#### **Client Sample ID: LCSD** Lab ID#: 1207155C-05AA NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9071628	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/16/12 09:35 PM
Compound		%Recovery
Oxygen		99
Nitrogen		100
Methane		99
Carbon Dioxide		102



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/05/12-07/06/12
55 Santa Clara, Ste.240		Date Received:	07/06/12
55 Sunta Chata, 50.210	Client Contact: Paul King	Date Reported:	07/11/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/11/12

#### WorkOrder: 1207124

July 12, 2012

Dear Paul:

Enclosed within are:

- 1) The results of the **3** analyzed samples from your project: **#0304; California Linen Rental Co.,**
- 2) QC data for the above samples, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

	С	HAI	IN O	FC	USTO	DDY F	RE	CO	RD	)		12	07	124	PAC	E L	OF 1
P&D	ENVIF 55 Santa Oal	Clara A cland, C 510) 65	MEN Ave., Su 2A 9461 8-6916	TAL ite 240 0	, INC				/								
project number: 0304		PR CA 92 O	PROJECT NAME: CALIFORNIA LINEN 989 41 St St. CAKLAND			Rautal	CONTAINERS	ANALYSIGG	Case of ETHALL	t 75-37					#		
SAMPLED BY: (PRIN Michael Descho SAMPLE NUMBER		NATUR	RE)	ne l	Asch IPLE LOG	CATION	NUMBER OF CONTAINERS	Dird AN	Case I	#		//	//	PRESERVA	RI	EMARKS	
VW5 (SHROUD) VWG (SHROUD) VW7 (SHROUD)	7/6/12	0958	AIR	SAR	/		1	X X X						NOUE 11	NORMAL	- TURN	
									_								
RELINQUISHED BY: (SIGNAT		10	DATE	TIME	RECEIVI	BY: (SIG	NATU	RE)		(This	No. of Si Shipmer No. of C	imples t) ontainers	37		RATORY:	11 11	H LYTICA
RELINQUISHED BY: (SIGNAT	_	7/6	DATE 2 DATE	TIME	RECEIVI	ED BY: (SIG			BY:	(This LAB AU SAM	ORATO	DRY CO	ELIUS SIS REQ	LABOI	TATORY PHO	ONE NUM	ABER:
Results and billing to: P&D Environmental, Inc. lab@pdenviro.com					REMARK	ell	Wo	ROE	THA		W		()Y		ER GA	S	

#### McCampbell Analytical, Inc. 1534 Willow Pass Rd Pittsburg, CA 94565-1701

**CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

(925) 252-9262				WorkOr	der: 1207124	Clier	ntCode: PDEO		
	WaterTrax	WriteOn	EDF	Excel	EQuIS	🖌 Email	HardCopy	ThirdParty	J-flag
Report to:				Bill	to:		Requ	lested TAT:	5 days
Paul King	Email:	lab@pdenviro.com	n		Accounts Paya	able			
P & D Environmental	CC:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Date	e Received:	07/06/2012
Oakland, CA 94610 (510) 658-6916     FAX:   510-834-0152	ProjectNo:	#0304; California L	inen Rental Co.		Oakland, CA 9	4610	Date	Printed:	07/06/2012

				Ī				Re	questec	l Tests (	See leg	end belo	ow)			
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1207124-001	VW 5	Air	7/5/2012 14:40		Α	Α										
1207124-002	VW 6	Air	7/6/2012 9:58		А	Α										
1207124-003	VW 7	Air	7/5/2012 13:53		A	Α										

#### Test Legend:

1	8260VOC_A
6	
11	

2	8260VOC_PPMV
7	
12	

3	
8	

4	
9	

5	
10	

**Prepared by: Zoraida Cortez** 

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



### Sample Receipt Checklist

Client Name:	P & D Environmenta	al			Date and	d Time Received:	7/6/2012 2::	34:58 PM
Project Name:	#0304; California Li	nen Rental Co.			LogIn Re	eviewed by:		Zoraida Cortez
WorkOrder N°:	1207124	Matrix: <u>Air</u>			Carrier:	<u>Rob Pringle (N</u>	IAI Courier)	
		<u>Cha</u>	in of Cu	ustody (COC	:) Informatio	<u>n</u>		
Chain of custody	present?		Yes	✓	No 🗌			
Chain of custody	signed when relinquis	hed and received?	Yes	✓	No 🗌			
Chain of custody	agrees with sample la	abels?	Yes	✓	No 🗌			
Sample IDs note	d by Client on COC?		Yes	✓	No 🗌			
Date and Time o	f collection noted by C	lient on COC?	Yes	✓	No 🗌			
Sampler's name	noted on COC?		Yes	✓	No 🗌			
			Sample	e Receipt Inf	ormation			
Custody seals in	tact on shipping conta	iner/cooler?	Yes		No 🗌		NA 🗹	
Shipping contain	er/cooler in good conc	lition?	Yes		No 🗌			
Samples in prope	er containers/bottles?		Yes	✓	No 🗌			
Sample containe	ers intact?		Yes	✓	No 🗌			
Sufficient sample	e volume for indicated	test?	Yes	✓	No 🗌			
		Sample Pres	servatio	n and Hold	<u>Time (HT) In</u>	formation		
All samples rece	ived within holding tim	e?	Yes	✓	No 🗌			
Container/Temp	Blank temperature		Coole	er Temp:			NA 🖌	
Water - VOA vial	ls have zero headspac	e / no bubbles?	Yes		No 🗌 N	lo VOA vials subm	itted 🗹	
Sample labels ch	necked for correct pres	servation?	Yes		No 🗌			
Metal - pH accep	otable upon receipt (pł	l<2)?	Yes		No 🗌		NA 🗹	
Samples Receive	ed on Ice?		Yes		No 🗹			

\* NOTE: If the "No" box is checked, see comments below.

Comments:

\_\_\_\_\_

\_\_\_\_\_

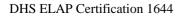
	Campbell Anal "When Quality Cou	<u>ytical, Inc.</u> unts''		Pass Road, Pittsburg ne: (877) 252-9262 obell.com / E-mail: 1	/ Fax: (92	5) 252-9269	
P & D Environmental 55 Santa Clara, Ste.240		Linen Rental Co.		Date Sampled:         07/05/12-07/06/12           Date Received:         07/06/12			
		Client Contact: Pa	aul King	Date Extract			
Oakland, CA 946	510	Client P.O.:		Date Analyz	ed 07	/06/12	
Extraction method: SW50			y P&T and GC/MS* methods: SW8260B		Wo	ork Order:	1207124
Lab ID	Client ID	Matrix 1,	1-Difluoroethane as Dichloroe	lifluoromethane	DF	% SS	Comments
001A	VW 5	А	12,000		1000	94	
002A	VW 6	А	8900		1000	93	
003A	<b>VW</b> 7	А	11,000		1000	89	

Reporting Limit for DF =1; ND means not detected at or	А	0.25	μg/L
above the reporting limit	S	NA	NA

\* vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.





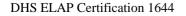
	Campbell Anal "When Quality Cou	<u>ytical, Inc.</u> unts''		Pass Road, Pittsburg ne: (877) 252-9262 pbell.com / E-mail:	/ Fax: (92	5) 252-9269	
P & D Environmental 55 Santa Clara, Ste.240		Linen Rental Co.		Date Sampled:         07/05/12-07/06/12           Date Received:         07/06/12			07/06/12
55 Bunta Chara, B		Client Contact: F	Paul King	Date Extract	ted 07	/06/12	
Oakland, CA 946	510	Client P.O.:		Date Analyz	ed 07	/06/12	
Extraction method: SW50			&T and GC/MS in PPM methods: SW8260B	V*	Wo	ork Order:	1207124
Lab ID	Client ID	Matrix 1	,1-Difluoroethane as Dichloroo	difluoromethane	DF	% SS	Comments
001A	VW 5	A	2400		1000	94	
002A	VW 6	А	1800		1000	93	
003A	VW 7	А	2100		1000	89	

Reporting Limit for DF =1; ND means not detected at or	А	0.061	μL/L
above the reporting limit	S	NA	NA

\* air samples reported in ppmv (µL/L).

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.



Angela Rydelius, Lab Manager



#### QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Air	QC Matrix: Water Batchl			BatchID	: 68918	3 WorkOrder: 1207124			
EPA Method: SW8260B Extraction: S	W5030B					;	Spiked Sam	ple ID:	1207061-035A
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acc	eptance	Criteria (%)
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	96.1	87.5	9.33	90.4	70 - 130	20	70 - 130
Benzene	ND	10	95	86.5	9.41	87	70 - 130	20	70 - 130
t-Butyl alcohol (TBA)	ND	40	94.2	86.5	8.46	90.9	70 - 130	20	70 - 130
Chlorobenzene	ND	10	95.6	86.6	9.87	87.3	70 - 130	20	70 - 130
1,2-Dibromoethane (EDB)	ND	10	101	93.1	8.22	94.4	70 - 130	20	70 - 130
1,2-Dichloroethane (1,2-DCA)	ND	10	91.5	83.2	9.50	85.4	70 - 130	20	70 - 130
1,1-Dichloroethene	ND	10	91.4	82.8	9.78	86.9	70 - 130	20	70 - 130
Diisopropyl ether (DIPE)	ND	10	99.4	90.9	8.96	91.1	70 - 130	20	70 - 130
Ethyl tert-butyl ether (ETBE)	ND	10	101	92.2	9.14	93.2	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	98.2	89.8	8.90	91.4	70 - 130	20	70 - 130
Toluene	ND	10	94.8	85.9	9.76	89.2	70 - 130	20	70 - 130
Trichloroethene	ND	10	96.6	87.2	10.2	86.8	70 - 130	20	70 - 130
%SS1:	95	25	94	94	0	98	70 - 130	20	70 - 130
%SS2:	87	25	87	86	0.130	89	70 - 130	20	70 - 130
%SS3:	90	2.5	90	92	2.15	98	70 - 130	20	70 - 130
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with th	he following	g exceptior	ns:		

#### BATCH 68918 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1207124-001A	07/05/12 2:40 PM	07/06/12	07/06/12 4:03 PM	1207124-002A	07/06/12 9:58 AM	07/06/12	07/06/12 4:46 PM
1207124-003A	07/05/12 1:53 PM	07/06/12	07/06/12 5:31 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS ELAP Certification 1644

₩\_\_\_\_QA/QC Officer



8/1/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. 989 41st St. Project #: 0304 Workorder #: 1207527A

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 7/25/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



#### WORK ORDER #: 1207527A

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	PROJECT #	0304 California Linen Rental Co. 989
DATE RECEIVED: DATE COMPLETED:	07/25/2012 08/01/2012	CONTACT:	41st St Kyle Vagadori

			RECEIPT	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	<b>PRESSURE</b>
01A	VW4	Modified TO-3	3.0 "Hg	5 psi
02A	VW4-DUP	Modified TO-3	3.0 "Hg	5 psi
03A	Lab Blank	Modified TO-3	NA	NA
04A	LCS	Modified TO-3	NA	NA

CERTIFIED BY:

layes 110

08/01/12 DATE:

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291, TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935 Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program) Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012. Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

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#### LABORATORY NARRATIVE Modified TO-3 P & D Environmental Workorder# 1207527A

Two 1 Liter Summa Canister samples were received on July 25, 2012. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/L. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ТО-3	ATL Modifications
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch = 20 samples.</td
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A+3.3S$ , where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

#### **Receiving Notes**

There were no receiving discrepancies.

#### Analytical Notes

There were no analytical discrepancies.

#### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows: B - Compound present in laboratory blank greater than reporting limit.



- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- M Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



### Summary of Detected Compounds MODIFIED EPA METHOD TO-3 GC/FID

#### Client Sample ID: VW4

#### Lab ID#: 1207527A-01A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.056	0.23	0.82	3.4
Client Sample ID: VW4-DUP				
Lab ID#: 1207527A-02A				
Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.046	0.19	0.85	3.5



#### Client Sample ID: VW4 Lab ID#: 1207527A-01A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d073107		Date of Collection: 7/20/12 9:39:00		
Dil. Factor:	2.22		Date of Analysis: 7/31/12 07:06 PN		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount	
	(ppmv)	(ug/L)	(ppmv)	(ug/L)	
TPH (Gasoline Range)	0.056	0.23	0.82	3.4	

		Method
Surrogates	%Recovery	Limits
Fluorobenzene (FID)	89	75-150



#### Client Sample ID: VW4-DUP Lab ID#: 1207527A-02A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d073108	Date of Collection: 7/20/12		
Dil. Factor:	1.82	Date of Analysis: 7/31/12 07:38 PM		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount
	(ppmv)	(ug/L)	(ppmv)	(ug/L)
TPH (Gasoline Range)	0.046	0.19	0.85	3.5

		Method
Surrogates	%Recovery	Limits
Fluorobenzene (FID)	92	75-150



#### Client Sample ID: Lab Blank Lab ID#: 1207527A-03A MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d073105		Date of Collection: NA		
Dil. Factor:	1.00		Date of Analysis: 7/31/12 05:15 PM		
Compound	Rpt. Limit	Rpt. Limit	Amount	Amount	
	(ppmv)	(ug/L)	(ppmv)	(ug/L)	
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected	

		Method
Surrogates	%Recovery	Limits
Fluorobenzene (FID)	92	75-150



#### Client Sample ID: LCS Lab ID#: 1207527A-04A MODIFIED EPA METHOD TO-3 GC/FID

File Name: Dil. Factor:	d073110 1.00	Date of Collec Date of Analys	tion: NA sis:  7/31/12 09:12 PM
Compound			%Recovery
TPH (Gasoline Range)			102
Container Type: NA - Not A	pplicable		Method
Surrogates		%Recovery	Limits
Fluorobenzene (FID)		91	75-150



8/1/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. 989 41st St. Project #: 0304 Workorder #: 1207527B

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 7/25/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



#### WORK ORDER #: 1207527B

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE: FAX: DATE RECEIVED: DATE COMPLETED:	510-658-6916 510-834-0772 07/25/2012 08/01/2012	P.O. # PROJECT # CONTACT:	0304 California Linen Rental Co. 989 41st St. Kyle Vagadori

			RECEIPT	FINAL
FRACTION #	NAME	<u>TEST</u>	VAC./PRES.	PRESSURE
01A	VW4	Modified TO-15	3.0 "Hg	5 psi
02A	VW4-DUP	Modified TO-15	3.0 "Hg	5 psi
03A	Lab Blank	Modified TO-15	NA	NA
04A	CCV	Modified TO-15	NA	NA
05A	LCS	Modified TO-15	NA	NA
05AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

layes

08/01/12 DATE:

Technical Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

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> > Page 2 of 10



#### LABORATORY NARRATIVE EPA Method TO-15 P & D Environmental Workorder# 1207527B

Two 1 Liter Summa Canister samples were received on July 25, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

#### **Receiving Notes**

There were no receiving discrepancies.

#### Analytical Notes

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

Dilution was performed on samples VW4 and VW4-DUP due to the presence of high level target species.

#### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit.
- UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



### Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

#### Client Sample ID: VW4

#### Lab ID#: 1207527B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	4.4	49	17	180
Ethyl Benzene	4.4	7.6	19	33
m,p-Xylene	4.4	25	19	110
o-Xylene	4.4	9.0	19	39
1,1-Difluoroethane	18	1600	48	4400

#### **Client Sample ID: VW4-DUP**

#### Lab ID#: 1207527B-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	7.4	45	28	170
Ethyl Benzene	7.4	7.4	32	32
m,p-Xylene	7.4	19	32	81
o-Xylene	7.4	7.6	32	33
1,1-Difluoroethane	30	1500	80	4100



#### Client Sample ID: VW4 Lab ID#: 1207527B-01A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	j072621 8.88		Date of Collection: 7/20/12 9:39:00 AN Date of Analysis: 7/26/12 09:14 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)	
Methyl tert-butyl ether	4.4	Not Detected	16	Not Detected	
Benzene	4.4	Not Detected	14	Not Detected	
Toluene	4.4	49	17	180	
Ethyl Benzene	4.4	7.6	19	33	
m,p-Xylene	4.4	25	19	110	
o-Xylene	4.4	9.0	19	39	
1,1-Difluoroethane	18	1600	48	4400	

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	97	70-130	
1,2-Dichloroethane-d4	100	70-130	
4-Bromofluorobenzene	98	70-130	



#### Client Sample ID: VW4-DUP Lab ID#: 1207527B-02A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	<b>J</b> ======		of Collection: 7/20/12 of Analysis: 7/26/12 09:32 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	7.4	Not Detected	27	Not Detected
Benzene	7.4	Not Detected	24	Not Detected
Toluene	7.4	45	28	170
Ethyl Benzene	7.4	7.4	32	32
m,p-Xylene	7.4	19	32	81
o-Xylene	7.4	7.6	32	33
1,1-Difluoroethane	30	1500	80	4100

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	98	70-130	
4-Bromofluorobenzene	100	70-130	



#### Client Sample ID: Lab Blank Lab ID#: 1207527B-03A EPA METHOD TO-15 GC/MS FULL SCAN

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File Name: Dil. Factor:	j072608 1.00			Collection: NA Analysis: 7/26/12 01:29 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)	
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected	
Benzene	0.50	Not Detected	1.6	Not Detected	
Toluene	0.50	Not Detected	1.9	Not Detected	
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected	
m,p-Xylene	0.50	Not Detected	2.2	Not Detected	
o-Xylene	0.50	Not Detected	2.2	Not Detected	
1,1-Difluoroethane	2.0	Not Detected	5.4	Not Detected	

		Method Limits	
Surrogates	%Recovery		
Toluene-d8	100	70-130	
1,2-Dichloroethane-d4	102	70-130	
4-Bromofluorobenzene	101	70-130	



# Client Sample ID: CCV Lab ID#: 1207527B-04A EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	j072602 1.00	Date of Collection: NA Date of Analysis: 7/26/12 08:25 AM
Compound		%Recovery
Methyl tert-butyl ether		101
Benzene		103
Toluene		102
Ethyl Benzene		106
m,p-Xylene		107
o-Xylene		108
1,1-Difluoroethane		111

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	99	70-130	
1,2-Dichloroethane-d4	102	70-130	
4-Bromofluorobenzene	99	70-130	



# Client Sample ID: LCS Lab ID#: 1207527B-05A EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	j072603 1.00	Date of Collection: NA Date of Analysis: 7/26/12 09:07 AM
Compound		%Recovery
Methyl tert-butyl ether		107
Benzene		102
Toluene		98
Ethyl Benzene		100
m,p-Xylene		102
o-Xylene		102
1.1-Difluoroethane		Not Spiked

		Method	
Surrogates	%Recovery	Limits	
Toluene-d8	103	70-130	
1,2-Dichloroethane-d4	105	70-130	
4-Bromofluorobenzene	101	70-130	



# Client Sample ID: LCSD Lab ID#: 1207527B-05AA EPA METHOD TO-15 GC/MS FULL SCAN

File Name: Dil. Factor:	j072604 1.00	Date of Collection: NA Date of Analysis: 7/26/12 09:26 AM
Compound		%Recovery
Methyl tert-butyl ether		102
Benzene		102
Toluene		99
Ethyl Benzene		102
m,p-Xylene		104
o-Xylene		104
1,1-Difluoroethane		Not Spiked

		Method
Surrogates	%Recovery	Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	100	70-130



7/17/2012 Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland CA 94610

Project Name: California Linen Rental Co. 989 41st St. Project #: 0304 Workorder #: 1207155C

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 7/10/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kga Vych

Kyle Vagadori Project Manager

180 Blue Ravine Road, Suite B Folsom, CA 95630



### WORK ORDER #: 1207155C

#### Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	BILL TO:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	<b>P.O.</b> #	
FAX:	510-834-0772	PROJECT #	0304 California Linen Rental Co. 989
DATE RECEIVED:	07/10/2012	CONTACT:	41st St. Kyle Vagadori
DATE COMPLETED:	07/17/2012	connen	

			<b>KEUEIF</b> I	FINAL
FRACTION #	NAME	TEST	VAC./PRES.	<b>PRESSURE</b>
01A	VW5	Modified ASTM D-1946	6.0 "Hg	5 psi
02A	VW6	Modified ASTM D-1946	4.0 "Hg	5 psi
03A	VW7	Modified ASTM D-1946	2.0 "Hg	5 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:

layes

07/17/12 DATE:

DECEIDT

**FINAT** 

Technical Director

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935 Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11, Expiration date: 06/30/12. Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

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> > Page 2 of 11

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#### LABORATORY NARRATIVE Modified ASTM D-1946 P & D Environmental Workorder# 1207155C

Three 1 Liter Summa Canister samples were received on July 10, 2012. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ASTM D-1946	ATL Modifications
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.



### **Receiving Notes**

There were no receiving discrepancies.

### **Analytical Notes**

There were no analytical discrepancies.

### **Definition of Data Qualifying Flags**

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates

as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



# Summary of Detected Compounds NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

### **Client Sample ID: VW5**

### Lab ID#: 1207155C-01A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.34	22
Nitrogen	0.34	77
Carbon Dioxide	0.034	0.68

#### **Client Sample ID: VW6**

#### Lab ID#: 1207155C-02A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.32	20
Nitrogen	0.32	78
Carbon Dioxide	0.032	2.2

### **Client Sample ID: VW7**

### Lab ID#: 1207155C-03A

	Rpt. Limit	Amount
Compound	(%)	(%)
Oxygen	0.26	18
Nitrogen	0.26	77
Carbon Dioxide	0.026	4.6



# Client Sample ID: VW5 Lab ID#: 1207155C-01A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

٦

File Name: Dil. Factor:	9071620 3.35	Date of Collection: 7/5/12 2:44:00 PM Date of Analysis: 7/16/12 05:37 PM					
Compound		Rpt. Limit (%)	Amount (%)				
Oxygen		0.34	22				
Nitrogen		0.34	77				
Methane		0.00034	Not Detected				
Carbon Dioxide		0.034	0.68				

Container Type: 1 Liter Summa Canister



# Client Sample ID: VW6 Lab ID#: 1207155C-02A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

٦

File Name: Dil. Factor:	9071621 3.22		Date of Collection: 7/6/12 10:05:00 AM Date of Analysis: 7/16/12 06:07 PM				
Compound		Rpt. Limit (%)	Amount (%)				
Oxygen		0.32	20				
Nitrogen		0.32	78				
Methane		0.00032	Not Detected				
Carbon Dioxide		0.032	2.2				

Container Type: 1 Liter Summa Canister



# Client Sample ID: VW7 Lab ID#: 1207155C-03A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

٦

File Name: Dil. Factor:	9071622 2.58	Date of Collection: 7/5/12 3:03:00 PM Date of Analysis: 7/16/12 06:33 PM					
Compound		Rpt. Limit (%)	Amount (%)				
Oxygen		0.26	18				
Nitrogen		0.26	77				
Methane		0.00026	Not Detected				
Carbon Dioxide		0.026	4.6				

Container Type: 1 Liter Summa Canister



# Client Sample ID: Lab Blank Lab ID#: 1207155C-04A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

٦

File Name: Dil. Factor:	9071605 1.00		Date of Collection: NA Date of Analysis: 7/16/12 09:54 AM				
Compound		Rpt. Limit (%)	Amount (%)				
Oxygen		0.10	Not Detected				
Nitrogen		0.10	Not Detected				
Methane		0.00010	Not Detected				
Carbon Dioxide		0.010	Not Detected				



## Client Sample ID: LCS Lab ID#: 1207155C-05A NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9071602	Date of Collection: NA					
Dil. Factor:	1.00	Date of Analysis: 7/16/12 08:43 AM					
Compound		%Recovery					
Oxygen		100					
Nitrogen		101					
Methane		98					
		102					



## **Client Sample ID: LCSD** Lab ID#: 1207155C-05AA NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9071628	Date of Collection: NA					
Dil. Factor:	1.00	Date of Analysis: 7/16/12 09:35 PM					
Compound		%Recovery					
Oxygen		99					
Nitrogen		100					
Methane		99					
Carbon Dioxide		102					



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/20/12
55 Santa Clara, Ste.240		Date Received:	07/20/12
55 Sunta Chata, 510.2 10	Client Contact: Paul King	Date Reported:	07/23/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/23/12

#### WorkOrder: 1207538

July 26, 2012

Dear Paul:

Enclosed within are:

- 1) The results of the 1 analyzed sample from your project: #0304; California Linen Rental Co.,
- 2) QC data for the above sample, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions or concerns, please feel free to give me a call. Thank you for choosing

McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

DAD			and the owner of the owner owner		and a second	ODY				1	1	7	1	1	/	1	1 1	/	<sub>GE</sub> ⊥⊥ ∕	
P&D	ENVI 55 Santa Oa	RON a Clara kland, 0 (510) 65	MEN Ave., S CA 946 58-6916	NTAI uite 240	L, INC					/	/	/	/	/ ,	/		//	/		
PROJECT NUMBER: $0304$		(A) 9	KOJECT LI FOR 89 4 DALLA	NAME: NIA U 1STS	NEN RE	STAL CO.	CONTAINERS	Alve	AD COLORED.	TANE	/					//	B	/		
SAMPLED BY: (PRI Linchael Desch SAMPLE NUMBER		left	RE) <i>Alloop</i> TYPE	SAN	APLE LOG	CATION	NUMBER OF (	D. AN	Temps			/	/	/		PRESER	TIMATIVE	RE	EMARKS	
VW4	7/20/12	0925	AIR	SHRO	UD		1	×								NONE	NOR	BUAL -	DRIA	ROUDI
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													-							
														1370						
											CE /	1º 1	k		/				/	
											HEAD DECR	SPA	CE AE	DINI		PR		RS V	B	
0										P	RES	ERVA	TION	VOA:	5 10 8	G I META	SI OTH	FR		
ELINQUISHED BY: (SIGNAT	URE)		DATE	TIME	RECEIVE	DBP: (SIG	NATUI	RE)	7	-	otal N his S otal N	o. of S hipmer o. of C	amples it) ontaine	rs	1	LABOI	RATOR	Υ: ≈1/ -	WALY	richt
ELINQUISHED BY: (SIGNAT	URE)	h	PATE 1912	TIME	RECEIVE	ED BY: (SIG	MATU	RES_	-	L	ABO	RAT	ORY (	CONT	ACT:	LABOR	RATOR	Y PHON	VE NUMI	BER:
ELINQUISHED BY: (SIGNAT	TURE)	/	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE) SAMPLE A ATTACHEI					ANAL	NALYSIS REQUEST SHEET									
esults and billing to: &D Environmental, Inc. b@pdenviro.com				÷*	REMARK	S: DFL	VORO	EN	AN	E	W.A.	50	UR	TR	ACE	e G	45.			

#### McCampbell Analytical, Inc. **CHAIN-OF-CUSTODY RECORD** Page 1 of 1 1534 Willow Pass Rd Pittsburg, CA 94565-1701 WorkOrder: 1207538 **ClientCode: PDEO** (925) 252-9262 EDF EQuIS 🖌 Email ☐ ThirdParty WaterTrax WriteOn Excel HardCopy □ J-flag Report to: Bill to: **Requested TAT:** 5 days lab@pdenviro.com Paul King Email: Accounts Payable P & D Environmental P & D Environmental CC: Date Received: 07/20/2012

ProjectNo: #0304; California Linen Rental Co.

Oakland, CA 94610 (510) 658-6916 FAX: 510-834-0152

55 Santa Clara, Ste.240

				Ī	Requested Tests (See legend below)											
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1207538-001	VW4	Air	7/20/2012 9:25		А											

#### Test Legend:

1	8260VOC_A
6	
11	

2	
7	
12	

PO:

3	
8	

4	
9	

55 Santa Clara, Ste.240

Oakland, CA 94610

5	
10	

Prei	nared	hv۰	Melissa	Valles
110	parcu	Dy.	IVICH55a	v ancs

Date Printed:

07/20/2012

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Environment	al			Date and Time Received: 7/20/2012 4:12:24 PM								
Project Name:	#0304; California Li	nen Rental Co.			LogIn F	Reviewed by:	Melissa Valles						
WorkOrder N°:	1207538	Matrix: <u>Air</u>			Carrier	: <u>Rob Pringle (M</u>	AI Courier)						
		<u>Cha</u>	ain of Cu	istody (COC	) Informati	ion							
Chain of custody	present?		Yes	✓	No								
Chain of custody	signed when relinqui	shed and received?	Yes	✓	No 🗌								
Chain of custody	agrees with sample I	abels?	Yes	✓	No 🗌								
Sample IDs note	d by Client on COC?		Yes	✓	No								
Date and Time o	f collection noted by (	Client on COC?	Yes	✓	No								
Sampler's name	noted on COC?		Yes	$\checkmark$	No 🗌								
Sample Receipt Information													
Custody seals int	tact on shipping conta	iner/cooler?	Yes		No 🗌		NA 🗹						
Shipping contain	er/cooler in good con	dition?	Yes	✓	No 🗌								
Samples in prope	er containers/bottles?		Yes	✓	No 🗌								
Sample containe	rs intact?		Yes	✓	No 🗌								
Sufficient sample	e volume for indicated	test?	Yes	✓	No 🗌								
		Sample Pres	servatio	n and Hold T	<u> Fime (HT) I</u>	Information							
All samples rece	ived within holding tim	ie?	Yes	$\checkmark$	No 🗌								
Container/Temp	Blank temperature		Coole	er Temp:			NA 🖌						
Water - VOA vial	s have zero headspa	ce / no bubbles?	Yes		No 🗌	No VOA vials submi	tted 🗹						
Sample labels ch	necked for correct pre	servation?	Yes	$\checkmark$	No								
Metal - pH accep	table upon receipt (pl	H<2)?	Yes		No 🗌		NA 🗹						
Samples Receive	ed on Ice?		Yes		No 🗹								

\* NOTE: If the "No" box is checked, see comments below.

Comments:

\_\_\_\_\_

\_\_\_\_\_

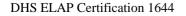
	AcCampbell Anal "When Quality Cou	<u>ytical, Inc.</u> unts''	1534 Willow Pass Road, Pittsburg, CA 94565-1701 Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269 http://www.mccampbell.com / E-mail: main@mccampbell.com									
P & D Envir	onmental	Client Project ID: Linen Rental Co.	: #0304; California	_	ed: 07/20/12							
55 Santa Cla	ra, Ste.240			Date Receiv	ed: 07	/20/12						
		Client Contact: P	Paul King	Date Extract	ed 07	/20/12						
Oakland, CA	94610	Client P.O.:		Date Analyz	ed 07	/20/12						
Extraction method:			&T and GC/Msin PPM nethods: SW8260B	V*	W	ork Order:	1207538					
Lab ID         Client ID         Matrix         1,1-Difluoroethane as Dichlorodifluoromethane         DF						% SS	Comments					
001A	VW4	А	990		1000	95						

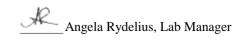
Reporting Limit for DF =1; ND means not detected at or	А	0.061	μL/L
above the reporting limit	S	NA	NA

\* air samples reported in ppmv (µL/L).

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.





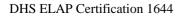
	McCampbell Ana "When Quality Con	lytical, Inc. unts"	1534 Willow Pass Road, Pittsburg, CA 94565-1701 Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269 http://www.mccampbell.com / E-mail: main@mccampbell.com								
P & D Env	ironmental	Client Project ID: Linen Rental Co.	#0304; California	ed: 07	/20/12						
55 Santa C	lara, Ste.240	Linen Kentai Co.		Date Receiv	ed: 07	/20/12					
	,	Client Contact: P	Paul King	Date Extract	ed 07	/20/12					
Oakland, C	A 94610	Client P.O.:		Date Analyz	ed 07	/20/12					
Extraction metho			by P&T and GC/MS* methods: SW8260B		W	ork Order:	1207538				
Lab ID	Client ID	Matrix 1	,1-Difluoroethane as Dichloroo	lifluoromethane	DF	% SS	Comments				
001A	VW4	A	5000		1000	95					

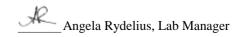
Reporting Limit for DF =1; ND means not detected at or	А	0.25	µg/L
above the reporting limit	S	NA	NA

\* vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

# surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.







## **QC SUMMARY REPORT FOR SW8260B**

W.O. Sample Matrix: Air	QC Matrix:	Water			BatchID	: 69342		WorkOrder: 1207538				
EPA Method: SW8260B	Extraction: SW5030B				Spiked Sample ID: N/A							
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acc	eptance	Criteria (%)			
, individ	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS			
tert-Amyl methyl ether (TAME)	N/A	10	N/A	N/A	N/A	94.1	N/A	N/A	70 - 130			
Benzene	N/A	10	N/A	N/A	N/A	90.8	N/A	N/A	76 - 106			
t-Butyl alcohol (TBA)	N/A	40	N/A	N/A	N/A	77.8	N/A	N/A	70 - 130			
Chlorobenzene	N/A	10	N/A	N/A	N/A	89.5	N/A	N/A	79 - 105			
1,2-Dibromoethane (EDB)	N/A	10	N/A	N/A	N/A	92.3	N/A	N/A	76 - 116			
1,2-Dichloroethane (1,2-DCA)	N/A	10	N/A	N/A	N/A	91.8	N/A	N/A	69 - 111			
1,1-Dichloroethene	N/A	10	N/A	N/A	N/A	85.9	N/A	N/A	70 - 104			
Diisopropyl ether (DIPE)	N/A	10	N/A	N/A	N/A	96.9	N/A	N/A	79 - 111			
Ethyl tert-butyl ether (ETBE)	N/A	10	N/A	N/A	N/A	95.6	N/A	N/A	70 - 130			
Methyl-t-butyl ether (MTBE)	N/A	10	N/A	N/A	N/A	91.1	N/A	N/A	70 - 130			
Toluene	N/A	10	N/A	N/A	N/A	87.9	N/A	N/A	70 - 130			
Trichloroethene	N/A	10	N/A	N/A	N/A	90.1	N/A	N/A	70 - 130			
%SS1:	N/A	25	N/A	N/A	N/A	97	N/A	N/A	70 - 130			
%SS2:	N/A	25	N/A	N/A	N/A	90	N/A	N/A	70 - 130			
%SS3:	N/A	2.5	N/A	N/A	N/A	92	N/A	N/A	70 - 130			

#### BATCH 69342 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1207538-001A	07/20/12 9:25 AN	A 07/20/12	07/20/12 5:51 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS ELAP Certification 1644



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	06/28/12
55 Santa Clara, Ste.240		Date Received:	06/29/12
55 Sunta Chata, 510.2 10	Client Contact: Paul King	Date Reported:	07/05/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/02/12

#### WorkOrder: 1206894

July 05, 2012

Dear Paul:

Enclosed within are:

- 1) The results of the 2 analyzed samples from your project: **#0304; California Linen Rental Co.,**
- 2) QC data for the above samples, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

10 <sup>1</sup>	С	HA	IN (	OF C	UST	ODY	RE	C	OR	D			1	2	00	080	74	PAG	ЗЕ —	OF 1
P&D	ENVIF 55 Santa Oal	Clara A Clara A kland, ( 510) 65	MEN Ave., S CA 946 8-6916	VTAI uite 240	L, IN(	C.			Ċ.		MICH EN COLUMED	dimes	$\int_{\infty}$	/	/	//	//	/	/	
PROJECT NUMBER: 0304	PROJECT NAMI CALIFORNIA 989 41 St OAKLANI				INEN ST.	RENTAL Q	ONTAINERS	OF CONTAINERS		1 Ale	-	Prea	SULAND			/		/		
SAMPLED BY: (PRI Juchael Desci SAMPLE NUMBER		GNATUR	RE)	m h	Oes 0	liener DCATION	NUMBER OF CONTAINERS	NV	Eth a DY ETA	IL MIN	A Par	LEX BLOG.	/			PRESE	MATTIVE	RE	MARKS	5
B94-1.0 B94-8.0	6/28/12 6/28/12	1435	Soi L	9.40 11	0 40 <sup>th</sup>	S.	1	XX			XX					ICE ICE	NBRIN 1	4_7	URN "	AROUND "
												3.4								
						4				I G H O H O H O H O H O H O H O H O H O H		SPAC		I ENT_ IN LA VOAS		CON PRES	OPRIATE AINERS ERVED I ALS OT	NLAB		
RELINQUISHED BY: (SIGNAT	chever	-01	DATE	TIME	/	ED BY: (SIG		1	2		fotal N This S	o. of C hipmen	ontaine it)	rs o	2	MCG	RATORY:	LAN		
RELINQUISHED BY: (SIGNAT	URE)	6	DATE	ISTS TIME	RECEIVI (SIGMAT	ED FOR LAB			BY:	4	<b>LUG</b> SAM	ELA	RY	DEL YSIS	ius	( 925 JEST SH	5125	52-		
Results and billing to: P&D Environmental, Inc. lab@pdenviro.com	-				REMAR	KS:														

>

#### McCampbell Analytical, Inc. 1534 Willow Pass Rd Pittsburg, CA 94565-1701



Page 1 of 1

(925) 252-9262				WorkOr	der: 1206894	Clie	ntCode: PDEO		
	WaterTrax	WriteOn	EDF	Excel	EQuIS	✓ Email	HardCopy	ThirdParty	J-flag
Report to:				Bill	l to:		Req	uested TAT:	5 days
Paul King	Email:	lab@pdenviro.com			Accounts Paya	able			
P & D Environmental	CC:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Date	e Received:	06/29/2012
Oakland, CA 94610 (510) 658-6916      FAX:   510-834-0152	ProjectNo:	#0304; California Li	inen Rental Co.		Oakland, CA S	94610	Date	e Printed:	06/29/2012

				Ī	Requested Tests (See legend below)											
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1206894-001	B94-1.0	Soil	6/28/2012 14:35		А											
1206894-002	B94-8.0	Soil	6/28/2012 15:00		А											

#### Test Legend:

1	G-MBTEX_S
6	
11	

2	
7	
12	

3	
8	

4	
9	

5	
10	

**Prepared by: Zoraida Cortez** 

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Environr	nental	Date and Time Received: 6/29/2012 4:06:47 PM						
Project Name:	#0304; Californ	ia Linen Rental Co.			LogIn	Reviewed by:		Zoraida Cortez	
WorkOrder N°:	1206894	Matrix: Soil			Carrie	er: <u>Rob Pringle (M</u>	AI Courier)		
		Cha	in of Cu	<u>istody (C</u>	COC) Informa	<u>ition</u>			
Chain of custody	present?		Yes	✓	No				
Chain of custody	v signed when reli	nquished and received?	Yes	✓	No 🗌				
Chain of custody	agrees with sam	ple labels?	Yes	✓	No 🗌				
Sample IDs note	d by Client on CO	DC?	Yes	✓	No 🗌				
Date and Time o	f collection noted	by Client on COC?	Yes	✓	No 🗌				
Sampler's name	noted on COC?		Yes	✓	No 🗌				
			Sample	Receipt	Information				
Custody seals in	tact on shipping of	container/cooler?	Yes		No 🗌		NA 🖌		
Shipping contain	er/cooler in good	condition?	Yes	✓	No 🗌				
Samples in prop	er containers/bott	les?	Yes	✓	No 🗌				
Sample containe	ers intact?		Yes	✓	No 🗌				
Sufficient sample	e volume for indic	ated test?	Yes	✓	No 🗌				
		Sample Pres	servatio	n and Ho	old Time (HT)	Information			
All samples rece	ived within holdin	g time?	Yes	✓	No 🗌				
Container/Temp	Blank temperatu	re	Coole	r Temp:	3.4°C		NA		
Water - VOA via	ls have zero head	lspace / no bubbles?	Yes		No 🗌	No VOA vials subm	itted 🗹		
Sample labels ch	necked for correc	t preservation?	Yes	✓	No 🗌				
Metal - pH accep	otable upon recei	ot (pH<2)?	Yes		No 🗌		NA 🗹		
Samples Receive	ed on Ice?		Yes	✓	No 🗌				
		(Ісе Тур	be: WE	TICE	)				
* NOTE: If the "N	Vo" box is checke	d, see comments below.							

Comments:

\_\_\_\_\_

\_\_\_\_\_

McCampbell Analytical, Inc. "When Quality Counts"							oll Free Telepho	Pass Road, Pittsburg ne: (877) 252-9262 pbell.com / E-mail:	/ Fax: (925) 252	-9269		
P & C	D Environmental					#0304; Cali	fornia	Date Sample	ed: 06/2	8/12		
55 Sa	nta Clara, Ste.240			Linen F	Rental Co.			Date Receiv	ed: 06/2	9/12		
Client Contact: 1						ul King		Date Extract	ted: 06/2	9/12		
Oakla	nd, CA 94610			Client l	P.O.:			Date Analyz	xed: 06/30	0/12		
Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*         Extraction method:       SW5030B       Analytical methods:       SW8021B/8015Bm       Work Order:       12068												1206894
Lab ID	Client ID	Matrix	TP	PH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	B94-1.0	S		37	ND	ND	0.040	0.016	0.067	1	94	d7,d9
002A	B94-8.0	S		14	ND	ND	0.015	ND	0.018	1	99	d7

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	ug/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: d7) strongly aged gasoline or diesel range compounds are significant in the TPH(g) chromatogram d9) no recognizable pattern



### QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Soil	QC Matrix: Soil				BatchID	: 68716	WorkOrder: 1206894			
EPA Method: SW8021B/8015Bm Extraction: S	W5030B						Spiked Sam	ple ID:	1206848-013A	
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS	
TPH(btex) <sup>£</sup>	ND	0.60	109	110	1.16	115	70 - 130	20	70 - 130	
MTBE	ND	0.10	96.2	90.4	5.87	102	70 - 130	20	70 - 130	
Benzene	ND	0.10	107	102	4.80	110	70 - 130	20	70 - 130	
Toluene	ND	0.10	104	99.9	3.76	108	70 - 130	20	70 - 130	
Ethylbenzene	ND	0.10	104	100	4.00	109	70 - 130	20	70 - 130	
Xylenes	ND	0.30	96.9	94.8	2.21	103	70 - 130	20	70 - 130	
%SS:	96	0.10	121	101	18.1	120	70 - 130	20	70 - 130	
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with th	ne following	g exceptio	ns:			

BATCH 68716 SUMMARY											
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed				
1206894-001A	06/28/12 2:35 PM	06/29/12	06/30/12 2:14 AM	1206894-002A	06/28/12 3:00 PM	06/29/12	06/30/12 9:04 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

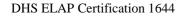
MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

£ TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.



QA/QC Officer



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/18/12
55 Santa Clara, Ste.240		Date Received:	07/18/12
55 Sunta Chata, 510.2 10	Client Contact: Paul King	Date Reported:	07/23/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/20/12

#### WorkOrder: 1207481

July 23, 2012

Dear Paul:

Enclosed within are:

- 1) The results of the 1 analyzed sample from your project: #0304; California Linen Rental Co.,
- 2) QC data for the above sample, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing

McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

	C	HA	IN (	OF C	CUST	ODY	RE	C	OR	D			07	4	31			PA	GE _	_ OF _
P&D	ENVII 55 Santa Oa	RON Clara kland, ( 510) 65	MEN Ave., Si CA 946 58-6916	VTA uite 240	L, IN	C.				/	Contraction of	- Canue		/		//	//	/ /	/	
PROJECT NUMBER:		Cal 9	ROJECT	41st	NENS F	ENTAL CO	CONTAINERS		By By Call	2015 W ~: 2020	- HIGH GE		ELECTER P		/	/ /	/			
SAMPLED BY: (PRI Michael Desch				1 De	oche	uer	NUMBER OF C	ANA	9	~		XEX	/	//	//		POERVATIVE	/		
SAMPLE NUMBER	DATE	TIME	TYPE	SA	MPLE L	OCATION	IN	1/2		7	WELL	7	/	/	/	PRI	1	RI	EMARK	S
B90-7	7/18/12	0940	Soil	996	Hoths	t., Cakino	1	X			X					ICE	NO	RUA	- 11	315AROQ
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							+				-	2	2		-					
										10	CE/t <sup>e</sup>	5.	DIFFIC	N		AP	ROPE	LATE		
		_									EAD	SPAC	EAB	SENT.	AB	- CO	SER	ERS	AB	
											DES	ERV/	TION	VOA	5 0	&G M	TALS	OTHER	-	
							-			- [	REDU	Lacto		-	-					
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Michael Der	UNE	2/	SIN	14/	RECEI	ED BY: (SIGN	NATU	(E)	-	> 1	This S otal N	hipmer o. of C	ampies (t) ontaine	rs	1	LABO				
ELINQUISHED BY: (SIGNATI	URE)	1	DATE	TIME	RECEI	VED BY: (SIG	NATU	RE)					ontaine (t) ORY (		ACT:	LABOR	AL	RY PHON	JE NUM	ALYTICA
	/ /	5	1812	1400				,										252		
RELINQUISHED BY: (SIGNAT	URE)	1	PATE	TIME		TURE)	ORAT	ORY	BY:	S	AM		NAL	YSIS		JEST SI				
Results and billing to: P&D Environmental, Inc. lab@pdenviro.com					REMA	KS:														

#### McCampbell Analytical, Inc. **CHAIN-OF-CUSTODY RECORD** Page 1 of 1 1534 Willow Pass Rd Pittsburg, CA 94565-1701 WorkOrder: 1207481 **ClientCode: PDEO** (925) 252-9262 EDF EQuIS WaterTrax WriteOn Excel Email HardCopy ☐ ThirdParty Report to: Bill to: **Requested TAT:** lab@pdenviro.com Paul King Email: Accounts Payable

P & D Environmental cc: PO: 55 Santa Clara, Ste.240 Oakland, CA 94610 ProjectNo: #0304; California Linen Rental Co. (510) 658-6916 FAX: 510-834-0152

				Γ				Re	quested	l Tests (	(See leg	end belo	ow)			
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1207481-001	B90-7	Soil	7/18/2012 9:40		А											

#### Test Legend:

1	G-MBTEX_S
6	
11	

2	
7	
12	

3	
8	

4	
9	

P & D Environmental

Oakland, CA 94610

55 Santa Clara, Ste.240

5	
10	

□J-flag

07/18/2012

07/18/2012

Date Received:

Date Printed:

5 days

**Prepared by: Zoraida Cortez** 

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Environn	nental			D	ate and	d Time Received:	7/18/2012 8	3:10:05 PM
Project Name:	#0304; Californ	ia Linen Rental Co.			L	ogIn Re	eviewed by:		Zoraida Cortez
WorkOrder N°:	1207481	Matrix: Soil			С	arrier:	<u>Rob Pringle (M</u>	AI Courier)	
		Cha	in of Cu	ustody (C	OC) Info	rmatio	<u>n</u>		
Chain of custody	present?		Yes	✓	No				
Chain of custody	signed when reli	nquished and received?	Yes	✓	No				
Chain of custody	agrees with sam	ple labels?	Yes	✓	No				
Sample IDs note	d by Client on CC	DC?	Yes	✓	No				
Date and Time o	f collection noted	by Client on COC?	Yes	✓	No				
Sampler's name	noted on COC?		Yes	✓	No				
			Sample	Receipt	Informa	<u>tion</u>			
Custody seals in	tact on shipping o	container/cooler?	Yes		No			NA 🖌	
Shipping contain	er/cooler in good	condition?	Yes	✓	No				
Samples in prope	er containers/bott	les?	Yes	✓	No				
Sample containe	ers intact?		Yes	✓	No				
Sufficient sample	e volume for indic	ated test?	Yes	✓	No				
		Sample Pres	servatio	n and Ho	old Time	<u>(HT) Ini</u>	formation		
All samples rece	ived within holdin	g time?	Yes	✓	No				
Container/Temp	Blank temperatu	e	Coole	er Temp:	3.2°C			NA	
Water - VOA via	ls have zero head	lspace / no bubbles?	Yes		No	N N	o VOA vials submi	tted 🗹	
Sample labels ch	necked for correct	t preservation?	Yes	✓	No				
Metal - pH accep	otable upon receip	ot (pH<2)?	Yes		No			NA 🗹	
Samples Receive	ed on Ice?		Yes	✓	No				
		(Ісе Тур	be: WE	TICE )	)				
* NOTE: If the "N	No" box is checke	d, see comments below.							

Comments:

\_\_\_\_\_

\_\_\_\_\_

P & D Environmental       Client Project ID: #0304; California       Date Sampled: 07/18/12         55 Santa Clara, Ste.240       Date Received: 07/18/12         Client Contact: Paul King       Date Extracted: 07/18/12         Oakland, CA 94610       Client P.O.:         Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*         Extraction method:       SW5030B         Analytical methods:       SW8021B/8015Bm         Work Order:       12         Lab ID       Client ID         Matrix       TPH(g)         MTBE       Benzene         Toluene       Ethylbenzene         Xylenes       DF         % SS	07481 Comments
55 Santa Clara, Ste.240       Date Received: 07/18/12         Client Contact: Paul King       Date Extracted: 07/18/12         Oakland, CA 94610       Client P.O.:         Date Analyzed: 07/20/12         Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*         Extraction method: SW5030B       Analytical methods: SW8021B/8015Bm	
Client Contact: Paul King       Date Extracted: 07/18/12         Oakland, CA 94610       Client P.O.:       Date Analyzed: 07/20/12         Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*         Extraction method: SW5030B       Analytical methods: SW8021B/8015Bm       Work Order: 12	
Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*         Extraction method:       SW5030B       Analytical methods:       SW8021B/8015Bm       Work Order:       12	
Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 12	
Lao D Chent D Mainx IFR(g) MIBE Benzene Toluene Eurybenzene Xylenes DF % 55	Comments
001A B90-7 S 770 ND<5.0 ND<0.50 4.4 13 100#	d2,d9

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	ug/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: d2) heavier gasoline range compounds are significant (aged gasoline?) d9) no recognizable pattern

DHS ELAP Certification 1644



### QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Soil	QC Matrix:			BatchID	: 69203	WorkOrder: 1207481			
EPA Method: SW8021B/8015Bm Extraction: S	W5030B					:	Spiked Sam	ple ID:	1207493-013A
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acc	eptance	Criteria (%)
, and ye	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
TPH(btex) <sup>£</sup>	ND	0.60	113	109	3.00	115	70 - 130	20	70 - 130
MTBE	ND	0.10	93.1	86.3	7.57	94.1	70 - 130	20	70 - 130
Benzene	ND	0.10	101	98.7	2.29	105	70 - 130	20	70 - 130
Toluene	ND	0.10	99.1	96.6	2.56	104	70 - 130	20	70 - 130
Ethylbenzene	ND	0.10	101	97.9	3.49	104	70 - 130	20	70 - 130
Xylenes	ND	0.30	104	99.3	4.18	103	70 - 130	20	70 - 130
%SS:	118	0.10	93	97	4.68	111	70 - 130	20	70 - 130
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with th	he following	g exception	18:		

			BATCH 69203 S	<u>UMMARY</u>			
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1207481-001A	07/18/12 9:40 AM	07/18/12	07/20/12 4:15 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

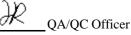
MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

 $\pounds$  TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.





McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/20/12
55 Santa Clara, Ste.240		Date Received:	07/24/12
55 Sunta Chata, 510.2 10	Client Contact: Michael Deschenes	Date Reported:	07/27/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/25/12

#### WorkOrder: 1207599

July 27, 2012

#### Dear Michael:

Enclosed within are:

- 1) The results of the 1 analyzed sample from your project: #0304; California Linen Rental Co.,
- 2) QC data for the above sample, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

	C	HA	IN C	<b>F</b> C	UST	ODY	RE	CC	DR	D		ľ	20	)7	50	29		PAG	GE/	OF								
P&D	ENVII 55 Santa Oa			and a second second second		and the second data and the se				/	THE	JAN	B	/	/	//	//		/									
PROJECT NUMBER:		PR CAV 9	OJECT	NAME:		N REDTAL CO			U.YSIS(ES). S3A		41YSISTES).		ALYSIS(ES)		NUMBER OF CONTAINERS		TRH-GEN CANALYSISSES). EAR ENIS AS SOLUTION HADDERED.		Suice Car		TROWN							
SAMPLED BY: (PRI	ES C	ylie	lou	Resi	cheni		MBER OF	V	C. B. C.B.	ALLS N		E	/	/	/	Even	TATIVE											
SAMPLE NUMBER	DATE	TIME	TYPE	SAN	MPLE.LO	CATION	NU	1ª	15	7	AN AN	1		/	/	PR	/	RE	MARKS									
B95B-1	7/20/12	1415	SOIL	940	0 40	st.	1	X			×					ice	NORM	AL	TURNA	ROUND								
									_	_	_	_																
							-							_														
								_			1	-																
										IC	J/a	-0	_					1										
										H	AD S	PACE	ABSE		-	CONT PRES	MINERS_	UT AR										
		-										RVAT	1	OAS	0&0		LS OTF											
										PR	CESE	AVAI			-			_										
RELINQUISHED BY: (SIGNA)	TURE)		DATE	TIME	RECEIV	ED BY ISIC	ATU	TET			Total N	o, of S	amples nt)	-	7	LABO	RATORY	1										
Widow Dec	Mour		7/24/2	1325	-1			/	/		Total N This S	o, of C hipmer	ontaine nt)	гs	1	Ne	AUPB	ELL	ANAL	YTICA								
RELINQUISHED BY: (SIGNAT	URE)	1 -	DATE	TIME	RECEIV	ED BY: (SIC	GNATH	RE)											E NUMB									
RELINQUISHED BY: (SIGNA'	TURE)	1	DATE	1430 TIME	RECEIV	ED FOR LAI	BOPAT	OPV	BV.							UEST S		od.	926:	1								
REALING CONTROL DI L'OIGINA	(ORD)	/	DATE	TIME	(STONA)	ED FOR LA	F	UKI	51.			CHE			) YE		(>) NO	)										
Results and billing to: P&D Environmental, Inc. lab@pdenviro.com					REMAR	KS:	1																					

McCampbell Analytical, 1534 Willow Pass Rd Pittsburg, CA 94565-1701	, Inc.			CHAIN	I-OF-CUS	STODY	RECORD	Page	e 1 of 1
(925) 252-9262				WorkO	order: 1207599	Clie	ntCode: PDEO		
	WaterTrax	WriteOn	EDF	Excel	EQuIS	✓ Email	HardCopy	ThirdParty	_J-flag
Report to:				В	ill to:		Requ	uested TAT:	5 days
Michael Deschenes	Email: la	ab@pdenviro.co	m; Michael.De	schenes@p	Accounts Paya	able			
P & D Environmental	cc:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Date	e Received:	07/24/2012
Oakland, CA 94610	ProjectNo: #	0304; California	Linen Rental	Co.	Oakland, CA 9	4610	Date	e Printed:	07/24/2012
(510) 658-6916 FAX: 510-834-0152									

					Requested Tests (See legend below)											
Lab ID	Client ID	Matrix	Collection Date H	lold	1	2	3	4	5	6	7	8	9	10	11	12
1207599-001	B95B-1	Soil	7/20/2012 14:15		٨											
1207599-001	D90D-1	3011			A											

#### Test Legend:

1	G-MBTEX_S
6	
11	

2	
7	
12	

3	
8	

4	
9	
9	

5	
10	

**Prepared by: Zoraida Cortez** 

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Environm	ental			Date a	and Time Received:	7/24/2012	2:45:27 PM
Project Name:	#0304; Californi	a Linen Rental Co.			LogIn	Reviewed by:		Zoraida Cortez
WorkOrder N°:	1207599	Matrix: Soil			Carrie	er: <u>Rob Pringle (N</u>	IAI Courier)	
		Cha	in of Cu	ustody (C	OC) Informa	tion		
Chain of custody	present?		Yes	✓	No 🗌			
Chain of custody	signed when relir	nquished and received?	Yes	✓	No 🗌			
Chain of custody	agrees with samp	ble labels?	Yes	✓	No 🗌			
Sample IDs note	d by Client on CO	C?	Yes	✓	No 🗌			
Date and Time o	f collection noted	by Client on COC?	Yes	✓	No 🗌			
Sampler's name	noted on COC?		Yes	✓	No 🗌			
			<u>Sample</u>	e Receipt	Information			
Custody seals in	tact on shipping co	ontainer/cooler?	Yes		No 🗌		NA 🖌	
Shipping contain	er/cooler in good o	condition?	Yes	✓	No 🗌			
Samples in prop	er containers/bottle	es?	Yes	✓	No 🗌			
Sample containe	ers intact?		Yes	✓	No 🗌			
Sufficient sample	e volume for indica	ated test?	Yes	✓	No 🗌			
		Sample Pres	servatio	n and Ho	old Time (HT)	Information		
All samples rece	ived within holding	g time?	Yes	✓	No 🗌			
Container/Temp	Blank temperature	e	Coole	er Temp:	3°C		NA	
Water - VOA via	ls have zero heads	space / no bubbles?	Yes		No 🗌	No VOA vials subm	itted 🔽	
Sample labels ch	necked for correct	preservation?	Yes	✓	No 🗌			
Metal - pH accep	table upon receip	t (pH<2)?	Yes		No 🗌		NA 🗹	
Samples Receive	ed on Ice?		Yes	✓	No 🗌			
		(Ісе Тур	be: WE	TICE )	)			
* NOTE: If the "N	lo" box is checked	d, see comments below.						

Comments:

\_\_\_\_\_

\_\_\_\_\_

	McCamp	D <mark>bell A</mark> When Qual			l <u>, Inc.</u>		oll Free Telepho	Pass Road, Pittsburg ne: (877) 252-9262 obell.com / E-mail: 1	/ Fax: (925) 252	-9269		
P & D	Environmental					#0304; Cali	ifornia	Date Sample	ed: 07/20	0/12		
55 Sat	nta Clara, Ste.240			Linen F	Rental Co.			4/12				
00.04				Client (	Contact: Mi	ichael Desch	ienes	Date Extract	ted: 07/2	4/12		
Oaklar	nd, CA 94610			Client I	P.O.:			Date Analyz	xed: 07/24	4/12		
Extractio	Gas n method: SW5030B	soline Ra	nge (C	6-C12)	-		<b>s as Gasoli</b> SW8021B/80151	ne with BTEX	X and MTI		k Order:	1207599
Lab ID	Client ID	Matrix	TP	H(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	B95B-1	S	6	510	ND<1.7	ND<0.17	ND<0.17	ND<0.17	1.8	33	94	d7

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	ug/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: d7) strongly aged gasoline or diesel range compounds are significant in the TPH(g) chromatogram



## QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Soil	QC Matrix:	Soil			BatchID	: 69383	8 WorkOrder: 1207599				
EPA Method: SW8021B/8015Bm Extraction: S	W5030B						Spiked Sarr	ple ID:	1207627-001A		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acc	ceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS		
TPH(btex) <sup>£</sup>	ND	0.60	99.8	101	1.62	89.7	70 - 130	20	70 - 130		
MTBE	ND	0.10	93.6	89	5.02	77.6	70 - 130	20	70 - 130		
Benzene	ND	0.10	104	96.1	8.05	88.3	70 - 130	20	70 - 130		
Toluene	ND	0.10	104	97.5	6.63	88.8	70 - 130	20	70 - 130		
Ethylbenzene	ND	0.10	106	100	5.57	91	70 - 130	20	70 - 130		
Xylenes	ND	0.30	108	102	5.49	93.2	70 - 130	20	70 - 130		
%SS:	113	0.10	107	109	1.75	101	70 - 130	20	70 - 130		
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with tl	ne following	g exception	ns:				

			BATCH 69383 S	UMMARY			
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1207599-001A	07/20/12 2:15 PM	07/24/12	07/24/12 11:01 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

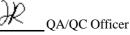
MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

 $\pounds$  TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.





McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co. Oakland	Date Sampled:	09/16/11
55 Santa Clara, Ste.240	Caxiald	Date Received:	09/19/11
	Client Contact: Paul King	Date Reported:	09/28/11
Oakland, CA 94610	Client P.O.:	Date Completed:	09/27/11

#### WorkOrder: 1109474

September 28, 2011

Dear Paul:

Enclosed within are:

- 1) The results of the 1 analyzed sample from your project: #0304; California Linen Rental Co. Oakland,
- 2) A QC report for the above sample,
- 3) A copy of the chain of custody, and
- 4) An invoice for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing

McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

		С	HA	IN C	<b>F</b> C	USTO	DY F	RE	СС	R	D		][	00	74	74		PAGE	L OF	1
	P&D	ENVIE 55 Santa Oal	Clara Clara kland, 0 510) 65	MEN Ave., Su CA 946 8-6916	ITAL nite 240 10	, INC.					H		7	/	/	//	//	/		
PI	0304		PR CAI	OJECT	NAME:	EN RENTA	L (O.	ONTAINERS	ANALVON	LAND R.	CLEAN	BU 2	Teos			//				_
	SAMPLED BY: (PRI Michael DES SAMPLE NUMBER	1	sC	RE) Elfie TYPE	la k SAN	Apden IPLE LOCAT	ия ГІОN	NUMBER OF CONTAINERS	TPu Z ANA	9.	The Cert	HBTEA B				PRESED.	MILKAN	REM.	ARKS	
	B89-W	9/16/11	1515	Hao				6	X		×					ICE	Noru	ALTU	RN AROLI	ND
E																				
										_	+									
												6	0							
											ICE GOO HEA	D SPA	_	SENT						
	<i>v</i>						2		-	-	PRE	SERV	TION	VOAS	108	S   META	SOTHER	<u>1</u>		
PL	NQUISHED BY: (SIGNA	dest	-9/	DATE	TIME	RECEIVED	V		1		Total (This	No. of Shipme Shipme ORAT	nt) Containe nt)	ers 4	6 ACT:	Mc		PBEU	LANALY NUMBER:	
REL	INQUISHED BY: (SIGNA	TUKE)	9	9/1 VATE	IS/S TIME	RECEIVED F (SIGNATUR)	FØR LAB			BY:	AN	ÆU	Ry. ANAI	DEL .YSIS	jus	( 92) JEST SI	5) 2:	52-0	9262	
P&I	ults and billing to: D Environmental, Inc. Ipdenviro.com					REMARKS: 5 VOA	ALL ER AM			ES	PRE	504	VEI	> w	TH	HC	L .			

X

# McCampbell Analytical, Inc. 1534 Willow Pass Rd

**CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

(925) 252-9262				WorkO	rder: 1109474	Clie	ntCode: PDEO		
	WaterTrax	writeOn	EDF	Excel	Fax	🖌 Email	HardCopy	ThirdParty	☐ J-flag
Report to:				Bi	ll to:		Req	uested TAT:	5 days
Paul King	Email:	lab@pdenviro.com			Accounts Paya	able			
P & D Environmental	cc:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Dat	te Received:	09/19/2011
Oakland, CA 94610	ProjectNo:	#0304; California Li	nen Rental Co.		Oakland, CA 9	94610	Dat	te Printed:	09/19/2011
(510) 658-6916 FAX: 510-834-0152		Oakland							

			Requested Tests (See legend below)													
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1109474-001	B89-W	Water	9/16/2011 15:15		В	Α										

#### Test Legend:

1	G-MBTEX_W
6	
11	

2	TPH(DMO)WSG_W
7	
12	

3	
8	

4	
9	

5	
10	

Prepared by: Ana Venegas

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Environmenta	I			Date a	and T	ime Received:	9/19/2011 4	:34:51 PM
Project Name:	#0304; California Lin	en Rental Co. Oaklan	d		Check	klist c	ompleted and re	eviewed by:	Ana Venegas
WorkOrder N°:	1109474	Matrix: <u>Water</u>			Carrie	ər:	<u>Rob Pringle (M</u>	IAI Courier)	
		<u>Chain</u>	of Cu	ustody (COC	Informa	ation			
Chain of custody	present?		Yes	✓	No				
Chain of custody	signed when relinquis	ned and received?	Yes	✓	No				
Chain of custody	agrees with sample la	Yes	✓	No					
Sample IDs noted	d by Client on COC?		Yes	✓	No 🗌				
Date and Time of	collection noted by Cl	ient on COC?	Yes	✓	No 🗌				
Sampler's name	noted on COC?		Yes	✓	No				
		<u>S</u>	ample	e Receipt Info	ormation	l			
Custody seals int	act on shipping contai	ner/cooler?	Yes		No			NA 🖌	
Shipping containe	er/cooler in good condi	tion?	Yes	✓	No				
Samples in prope	er containers/bottles?		Yes	✓	No				
Sample container	rs intact?		Yes	✓	No 🗌				
Sufficient sample	volume for indicated t	est?	Yes		No				
		Sample Prese	rvatio	n and Hold T	<u>ime (HT)</u>	) Infoi	rmation		
All samples recei	ved within holding time	?	Yes	✓	No				
Container/Temp	Blank temperature		Coole	er Temp: 5°	С			NA	
Water - VOA vial	s have zero headspace	e / no bubbles?	Yes	✓	No	No	VOA vials submi	itted	
Sample labels ch	ecked for correct pres	ervation?	Yes	✓	No				
Metal - pH accep	table upon receipt (pH	<2)?	Yes		No 🗌			NA 🗹	
Samples Receive	ed on Ice?		Yes	✓	No				
		(Ісе Туре	: WE	TICE )					
* NOTE: If the "N	lo" box is checked, see	e comments below.							
									========

Client contacted:

Date contacted:

Contacted by:

Comments:

		bell . When Qua			l <u>, Inc.</u>		oll Free Telepho	Pass Road, Pittsburg ne: (877) 252-9262 pbell.com / E-mail:	/ Fax: (925) 252	-9269		
P & D	Environmental					#0304; Cali	ifornia	Date Sample	ed: 09/10	6/11		
55 Sa	nta Clara, Ste.240			Linen F	Rental Co. C	Jakland		Date Receiv	ed: 09/19	9/11		
				Client (	Contact: Pa	ul King		Date Extract	ted: 09/2	1/11		
Oakla	nd, CA 94610			Client I	P.O.:			Date Analyz	xed: 09/2	1/11		
Extractio	Gas	ange (C	C6-C12)	-		<b>as Gasoli</b> 888021B/8015	ne with BTE	X and MTI		rk Order:	1100474	
Lab ID	Client ID	Matrix	TF	PH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001B	B89-W	w		ND	ND	ND	0.76	ND	ND	1	98	b1

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	μg/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference. %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: b1) aqueous sample that contains greater than ~1 vol. % sediment

DHS ELAP Certification 1644

	McCampbell "When Qu	Anal ality Cou	<u>ytical, Inc.</u> <sup>nts''</sup>	Toll Free Telepho	Pass Road, Pittsburg, CA 9456 ne: (877) 252-9262 / Fax: (925 pbell.com / E-mail: main@mcc	) 252-9269		
P & D I	Environmental		Client Project ID: Linen Rental Co. (	#0304; California	Date Sampled:	09/16/11		
55 Sant	a Clara, Ste.240		Linen Kentai Co. C	Jakianu	Date Received:	09/19/11		
			Client Contact: Pa	ul King	Date Extracted:	09/19/11		
Oakland	d, CA 94610		Client P.O.:		Date Analyzed:	09/27/11		
Extraction	method: SW3510C/3630C	Total Ex	tractable Petroleum Analytical 1	Hydrocarbons with Silie nethods: SW8015B	ca Gel Clean-Up*	Work Or	der: 11094	474
Lab ID	Client ID	Matrix	TPH-Diesel (C10-C23)	TPH-Motor Oil (C18-C36)	TPH-Bunker Oil (C10-C36)	DF	% SS	Comments
001A	B89-W	W	ND	ND	ND	1	100	b1

Reporting Limit for DF =1; ND means not detected at or	W	50	250	100	μg/L
above the reporting limit	S	NA	NA	NA	mg/Kg

\* water samples are reported in µg/L, wipe samples in µg/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, and all DISTLC / STLC / SPLP / TCLP extracts are reported in µg/L.

#) cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract; &) low or no surrogate due to matrix interference.

SS = Percent Recovery of Surrogate Standard. DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: b1) aqueous sample that contains greater than ~1 vol. % sediment

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager



## **QC SUMMARY REPORT FOR SW8021B/8015Bm**

W.O. Sample Matrix: Water			QC Matrix	k: Water			Batch	ID: 61173		WorkOrder: 1109474				
EPA Method: SW8021B/8015Bm	Extrac	tion: SW	5030B					S	Spiked Sam	ple ID:	1109466-0	02A		
Analyte	Sample	Sample Spiked MS MS			MS-MSD	LCS	LCSD	LCS-LCSD	Acc	eptance	e Criteria (%)			
, indigite	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD		
TPH(btex) <sup>£</sup>	ND	60	92.2	93.8	1.71	101	93.1	8.19	70 - 130	20	70 - 130	20		
MTBE	ND	10	124	122	1.76	121	123	0.932	70 - 130	20	70 - 130	20		
Benzene	ND	10	107	106	0.774	105	111	5.21	70 - 130	20	70 - 130	20		
Toluene	ND	10	95.1	94.9	0.246	94.8	99.1	4.48	70 - 130	20	70 - 130	20		
Ethylbenzene	ND	10	96.3	96	0.217	95.7	99.1	3.57	70 - 130	20	70 - 130	20		
Xylenes	ND	30	109	109	0	109	113	3.22	70 - 130	20	70 - 130	20		
%SS:	103	10	98	97	1.08	97	98	1.20	70 - 130	20	70 - 130	20		
All target compounds in the Method Blan NONE	k of this extr	action bate	h were NE	less than	the method	RL with	the follow	ing exception	s:					

#### BATCH 61173 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1109474-001B	09/16/11 3:15 PM	09/21/11	09/21/11 4:56 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

 $\pounds$  TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.

DHS ELAP Certification 1644

AL\_\_QA/QC Officer



McCampbell Analytical, Inc. "When Quality Counts" 1534 Willow Pass Road, Pittsburg, CA 94565-1701 Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269 http://www.mccampbell.com / E-mail: main@mccampbell.com

### QC SUMMARY REPORT FOR SW8015B

QC Matrix: Water BatchID: 61143 WorkOrder: 1109474 W.O. Sample Matrix: Water EPA Method: SW8015B Extraction: SW3510C/3630C Spiked Sample ID: N/A Sample Spiked MS MSD MS-MSD LCS LCSD LCS-LCSD Acceptance Criteria (%) Analyte MS / MSD RPD LCS/LCSD RPD µg/L µg/L % Rec. % Rec. % RPD % Rec. % Rec. % RPD TPH-Diesel (C10-C23) N/A 1000 N/A N/A N/A 107 108 1.34 N/A N/A 70 - 130 30 %SS: N/A 625 N/A N/A N/A 96 97 1.32 N/A N/A 70 - 130 30 All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE

#### BATCH 61143 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1109474-001A	09/16/11 3:15 PN	<b>I</b> 09/19/11	09/27/11 4:28 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

QA/QC Officer

DHS ELAP Certification 1644



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	06/28/12-06/29/12
55 Santa Clara, Ste.240		Date Received:	06/29/12
55 Sunta Chata, Sto.2 10	Client Contact: Paul King	Date Reported:	07/06/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/06/12

#### WorkOrder: 1206897

July 06, 2012

Dear Paul:

Enclosed within are:

- 1) The results of the 2 analyzed samples from your project: **#0304; California Linen Rental Co.,**
- 2) QC data for the above samples, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

-		С	HA	IN (	)F C	UST	ODY	RE	C	ORD	,		17	0	68	97	7	PAGE	_ /	OF _/
	P&D I			a stress of the second second		L, INC.					1.5	AUNT	18	/	/	//	//			
	PROJECT NUMBER: 0304 SAMPLED BY: (PRIN		PF Q	ALIFON 989 OAK	NAME:	NNEN F St.St.	BENTAL G	NUMBER OF CONTAINERS	WALL.	EN SISTER	UL Slighter	BYEn	M 80 3 13		/		TVE	/		
	SAMPLED BI. (FRIN Michael DESC SAMPLE NUMBER	1		Vie	las SAN	As A MPLE LO	CATION	NUMBER O	10	Mals.	12	BIEK			/	PRFOR	PUCKNATIVE	REM	ARKS	
rt	1393-W 1394-W	6/28/12 6/29/12	1330	H20 H20	9.40 1	" Hoh	\$.	5	××		XX					ICE ICE		I ALAZ	K K	AROONE
														-						
											- H	DOD C AD S LCHLC	PACE	ABSE TED I		-		VERS	AB	
									P			ESEI		ON	DAS	0&G		OTHER		
	RELINQUISHED BY: (SIGNATU RELINQUISHED BY: (SIGNATU	chere	200	land	TIME	1	ED BY: (SIG	A	-		Total 1 (This 3 LAB(		ontainer it) ORY C	SONT	O ACT:	LABOI	RATORY	THONE	NUMB	ER:
	RELINQUISHED BY: (SIGNATU	RE)	1	DATE	TIME	(SIGNAT	VT				SAM ATT	IPLE A ACHE	ANAL D:	YSIS (	REQU ) YE	JEST SI S		12	100	a
1	Results and billing to: P&D Environmental, Inc. lab@pdenviro.com	Environmental, Inc.				REMARKS: ALL VOA'S PRESERVED WITH HCL														

### McCampbell Analytical, Inc. 1534 Willow Pass Rd Pittsburg, CA 94565-1701

**CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

(925) 252-9262				WorkOr	der: 1206897	Clier	ntCode: PDEO		
	WaterTrax	WriteOn		Excel	EQuIS	✓ Email	HardCopy	ThirdParty	J-flag
Report to:				Bill	to:		Requ	lested TAT:	5 days
Paul King	Email: I	ab@pdenviro.com			Accounts Paya	able			
P & D Environmental	CC:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Date	e Received:	06/29/2012
Oakland, CA 94610	ProjectNo: #	#0304; California Lir	nen Rental Co.		Oakland, CA 9	4610	Date	e Printed:	06/29/2012
(510) 658-6916 FAX: 510-834-0152									

				Ī	Requested Tests (See legend below)											
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
							1			1	1	1		1	1	
1206897-001	B93-W	Water	6/28/2012 13:30		A											
1206897-002	B94-W	Water	6/29/2012 10:00		Α											

#### Test Legend:

1	G-MBTEX_W
6	
11	

2	
7	
12	

3	
8	

4	
9	

5	
10	

Prepared by: Zoraida Cortez

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D	Environmenta	al			Date	and 1	Time Received:	6/29/2012 5	/29/2012 5:43:06 PM		
Project Name:	#0304	; California Li	nen Rental Co.			Logl	n Rev	iewed by:		Zoraida Cortez		
WorkOrder N°:	12068	97	Matrix: Water			Carr	ier:	<u>Rob Pringle (M</u>	Al Courier)			
			<u>Cha</u>	in of Cu	stody (C	COC) Inform	ation					
Chain of custody	, presen	?		Yes	✓	No 🗌						
Chain of custody signed when relinquished and received?					✓	No 🗌						
Chain of custody	agrees	with sample la	abels?	Yes	✓	No 🗌						
Sample IDs note	d by Cli	ent on COC?		Yes	✓	No 🗌						
Date and Time of	f collect	on noted by C	Client on COC?	Yes	✓	No 🗌						
Sampler's name	noted o	n COC?		Yes	✓	No 🗌						
				<u>Sample</u>	Receipt	Informatio	<u>n</u>					
Custody seals in	tact on s	shipping conta	iner/cooler?	Yes		No 🗌			NA 🔽			
Shipping contain	er/coole	r in good cond	dition?	Yes	✓	No 🗌						
Samples in prope	er conta	iners/bottles?		Yes	✓	No 🗌						
Sample containe	ers intact	?		Yes	✓	No 🗌						
Sufficient sample	e volume	e for indicated	test?	Yes	✓	No 🗌						
			Sample Pres	servation	n and Ho	old Time (H	<u>F) Info</u>	ormation				
All samples rece	ived with	nin holding tim	ie?	Yes	✓	No 🗌						
Container/Temp	Blank te	mperature		Coole	r Temp:	3.4°C			NA			
Water - VOA vial	ls have :	zero headspac	ce / no bubbles?	Yes	✓	No 🗌	No	VOA vials submi	tted			
Sample labels ch	necked f	or correct pres	servation?	Yes	✓	No 🗌						
Metal - pH accep	otable up	on receipt (pl	H<2)?	Yes		No 🗌			NA 🗹			
Samples Receive	ed on Ic	e?		Yes	✓	No 🗌						
			(Ісе Тур	be: WE	TICE	)						
* NOTE: If the "N	lo" box	s checked, se	e comments below.									

Comments:

\_\_\_\_\_

\_\_\_\_\_

McCampbell Analytical, Inc. "When Quality Counts"						1534 Willow Pass Road, Pittsburg, CA 94565-1701 Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269 http://www.mccampbell.com / E-mail: main@mccampbell.com									
P & C	Environmental					#0304; Cal	ifornia	Date Sampled: 06/28/12-06/29/12							
55 Sa	nta Clara, Ste.240			Linen F	Rental Co.			Date Received: 06/29/12							
55 54	nia Clara, 5to.2 10			Client (	Contact: Pa	Paul King Date Extracted: 07/02/12									
Oakla	nd, CA 94610			Client I	P.O.:			Date Analyz	xed: 07/02	2/12					
Extractio	Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*           Extraction method:         SVS030B         Mork         Work         Vol         Vol														
Lab ID	Client ID	Matrix	TP	H(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments			
001A	B93-W	W	ľ	ND	ND	ND	ND	ND	ND	1	92				
002A	B94-W	W	-	53	ND	ND	ND	ND	ND	1	95				

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	μg/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference. %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation:

Angela Rydelius, Lab Manager



## QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water	QC Matrix: Water				BatchID	: 68796	WorkOrder: 1206897			
EPA Method: SW8021B/8015Bm Extraction: S	W5030B						Spiked Sam	ple ID:	1206897-001A	
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS	
TPH(btex) <sup>£</sup>	ND	60	89.8	86.5	3.67	90.7	70 - 130	20	70 - 130	
MTBE	ND	10	98.1	98	0.0742	94.1	70 - 130	20	70 - 130	
Benzene	ND	10	85.6	85.7	0.125	88.2	70 - 130	20	70 - 130	
Toluene	ND	10	84.2	85.4	1.43	87.4	70 - 130	20	70 - 130	
Ethylbenzene	ND	10	87	86.5	0.585	88.3	70 - 130	20	70 - 130	
Xylenes	ND	30	88.8	88.3	0.498	90.1	70 - 130	20	70 - 130	
% SS:	92	10	91	92	1.43	91	70 - 130	20	70 - 130	
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with t	he following	g exceptio	ns:			

BATCH 68796 SUMMARY										
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed			
1206897-001A	06/28/12 1:30 PM	07/02/12	07/02/12 7:40 PM	1206897-002A	06/29/12 10:00 AM	07/04/12	07/04/12 8:10 AM			

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

£ TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/02/12-07/03/12
55 Santa Clara, Ste.240		Date Received:	07/03/12
55 Sunta Chata, 510.2 10	Client Contact: Paul King	Date Reported:	07/09/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/09/12

#### WorkOrder: 1207071

July 09, 2012

Dear Paul:

Enclosed within are:

- 1) The results of the 2 analyzed samples from your project: **#0304; California Linen Rental Co.,**
- 2) QC data for the above samples, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

	3	С	HAI	IN C	FC	USTO	DYR	E	CC	RD			121	070	61	1	P/	GE _	OF L
	P&D	ENVIF 55 Santa Oal	Clara A kland, C 510) 65	MEN Ave., Su CA 9461 8-6916	NTAL nite 240 10	, INC.		8		/	DIFIED	CURNULP.	B	/ /	/ /				
	project number: 0304		Cau	OJECT UFRZNI 789 DAKL	NAME: in Lu 41st MUD	UEN RENT	AL G.	CONTAINERS	ANALYON	ET ROLEN STATIS	IL Suice Con	BY En.	ELLES HA	/	/	//	H		
	SAMPLED BY: (PRIN Michael Descher SAMPLE NUMBER	/	sid		Jesch SAN	IPLE LOCA	TION	NUMBER OF CONTAINERS	TOUL AN	ER BUCH	Ma	PIEK BI				PRESFID.	HILKAV-	EMARKS	
++	B91-W B92-W	7/2/12 7/3/12	1350	Hao	990 984	40th st.		55	X		× ×					ICE ICE	NORMAI	L TUR	J AFOUND M
											ICE/I GOC HEA	D CON		N IENT		APPI CON PRE	OPRIATE	AB	
								,				SERV	ATION				ALS OTHER	_	
0	RELINQUISHED BY: (SIGNAT	imer	7/2/2	DATE 3/12 DATE	TIME	RECEIVED			/	/	Total (This LAB	No. of ( Shipme ORAT	ORY	CONT	ACT:	LABOR	RATORY PHO	ONE NUM	
	RELINQUISHED INY: (SHONAT	TURE)	17	DATE	TIME	RECEIVED (SIGNATUR	ELU	Y	F		SAN ATT	MPLE ACHI	ANAI ED:	YSIS (	REQU ) YE	UEST SI S	5) <i>253</i> HEET ( <b>J</b> 6) NO	(-926	~~
	Results and billing to: P&D Environmental, Inc. lab@pdenviro.com					REMARKS	All	_ V.	OAS	PRE	SEE	VE		1 14	r h	(L			

### McCampbell Analytical, Inc. 1534 Willow Pass Rd Pittsburg, CA 94565-1701

**CHAIN-OF-CUSTODY RECORD** 

Page 1 of 1

(925) 252-9262				WorkOı	der: 1207071	Clie	ntCode: PDEO		
	WaterTrax	WriteOn	EDF	Excel	EQuIS	✓ Email	HardCopy	ThirdParty	□J-flag
Report to:				Bil	l to:		Req	uested TAT:	5 days
Paul King	Email:	lab@pdenviro.con	n		Accounts Paya	able			
P & D Environmental	CC:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Dat	e Received:	07/03/2012
Oakland, CA 94610 (510) 658-6916     FAX:   510-834-0152	ProjectNo:	#0304; California	Linen Rental Co.		Oakland, CA S	94610	Date	e Printed:	07/03/2012

					Requested Tests (See legend below)											
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1207071-001	B91-W	Water	7/2/2012 13:50		А											
1207071-002	B92-W	Water	7/3/2012 13:00		А											

#### Test Legend:

1	G-MBTEX_W
6	
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Prepared by: Zoraida Cortez

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Enviror	nmental			Date a	and Time Received:	7/3/2012 9:	48:26 PM
Project Name:	#0304; Califor	rnia Linen Rental Co.			LogIn	Reviewed by:		Zoraida Cortez
WorkOrder N°:	1207071	Matrix: Water			Carrie	r: <u>Rob Pringle (M</u>	Al Courier)	
		Cha	<u>in of Cι</u>	<u>istody (C</u>	OC) Informa	tion		
Chain of custody	present?		Yes	✓	No 🗌			
Chain of custody	signed when re	elinquished and received?	Yes	✓	No 🗌			
Chain of custody	agrees with sa	mple labels?	Yes	✓	No 🗌			
Sample IDs note	d by Client on C	COC?	Yes	✓	No 🗌			
Date and Time o	f collection note	d by Client on COC?	Yes	✓	No			
Sampler's name	noted on COC?	,	Yes	✓	No			
			<u>Sample</u>	Receipt	Information			
Custody seals in	tact on shipping	container/cooler?	Yes		No 🗌		NA 🖌	
Shipping contain	er/cooler in goo	d condition?	Yes	✓	No 🗌			
Samples in prope	er containers/bo	ottles?	Yes	✓	No 🗌			
Sample containe	ers intact?		Yes	✓	No 🗌			
Sufficient sample	e volume for ind	icated test?	Yes	✓	No 🗌			
		Sample Pres	ervatio	n and Ho	old Time (HT)	Information		
All samples rece	ived within holdi	ing time?	Yes	✓	No			
Container/Temp	Blank temperate	ure	Coole	r Temp:	2.4°C		NA	
Water - VOA vial	ls have zero hea	adspace / no bubbles?	Yes	✓	No 🗌	No VOA vials submi	tted	
Sample labels ch	necked for corre	ct preservation?	Yes	✓	No			
Metal - pH accep	table upon rece	eipt (pH<2)?	Yes		No 🗌		NA 🗹	
Samples Receive	ed on Ice?		Yes	✓	No 🗌			
		(Ісе Тур	e: WE	TICE	)			
* NOTE: If the "N	lo" box is check	ed, see comments below.						

Comments:

\_\_\_\_\_

\_\_\_\_\_

	McCamp	bell / Vhen Qua			II, Inc.		oll Free Telepho	Pass Road, Pittsburg ne: (877) 252-9262 pbell.com / E-mail:	/ Fax: (925) 252	-9269			
P & D	Environmental					#0304; Cali	ifornia	Date Sample	ed: 07/0	2/12-07	/03/12		
55 Sa	nta Clara, Ste.240			Linen Rental Co.				Date Received: 07/03/12					
22.54				Client	Contact: Paul King Date Extracted: 07/07/12								
Oakla	nd, CA 94610			Client	P.O.:			Date Analyz	xed: 07/0	7/12			
Extractio	Gas on method: SW5030B	oline Ra	nge (C	c6-C12)	-		<b>5 as Gasoli</b> 5W8021B/8015	ne with BTE	X and MT		rk Order:	1207071	
Lab ID	Client ID	Matrix	TF	PH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments	
001A	B91-W	W		58	ND	ND	2.3	0.55	4.5	1	94	d2	
002A	B92-W	W	1	ND	ND	ND	5.7	0.56	3.3	1	94		

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference. %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: d2) heavier gasoline range compounds are significant (aged gasoline?)



## QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water	QC Matrix:	QC Matrix: Water					WorkOrder: 1207071			
EPA Method: SW8021B/8015Bm Extraction: S	W5030B						Spiked Sam	ple ID:	1207036-004A	
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS	
TPH(btex) <sup>£</sup>	ND	60	83.9	85.7	2.15	94.4	70 - 130	20	70 - 130	
MTBE	ND	10	90	88.7	1.44	98.2	70 - 130	20	70 - 130	
Benzene	ND	10	84.4	81	4.04	88.1	70 - 130	20	70 - 130	
Toluene	ND	10	86.5	82.2	5.03	88.6	70 - 130	20	70 - 130	
Ethylbenzene	ND	10	86.1	82.3	4.52	89.9	70 - 130	20	70 - 130	
Xylenes	ND	30	88.6	85	4.07	93	70 - 130	20	70 - 130	
%SS:	96	10	95	91	4.24	91	70 - 130	20	70 - 130	
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with th	ne following	g exceptio	ns:			

BATCH 68886 SUMMARY										
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed			
1207071-001A	07/02/12 1:50 PM	07/07/12	07/07/12 5:21 AM	1207071-002A	07/03/12 1:00 PM	07/07/12	07/07/12 5:50 AM			

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

 $\pounds$  TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.

K\_\_\_QA/QC Officer



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/18/12
55 Santa Clara, Ste.240		Date Received:	07/18/12
55 Sunta Chata, 510.2 10	Client Contact: Michael Deschenes	Date Reported:	07/24/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/24/12

#### WorkOrder: 1207486

July 24, 2012

#### Dear Michael:

Enclosed within are:

- 1) The results of the 1 analyzed sample from your project: #0304; California Linen Rental Co.,
- 2) QC data for the above sample, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

		C	HA	IN C	<b>DF C</b>	USTO	DYF	RE	CC	DR	D		1	20	574	18	6		PA	GE 🔟	OF _
	P&D	ENVII 55 Santa Oa	RON Clara kland, ( 510) 65	MEN Ave., Si CA 946 58-6916	NTAI uite 240	., INC.					this .	E FEED	-	A/B			//	//		/	
	project number:		4	LIFOR	419	ing) re St.	NTAL G.	VTAINERS	ANALVO	olS(ES):	ULI AMO LAN	A Get o	danna 2	4 2021				/			
	SAMPLED BY: (PRIN Michael Desche		GNATU	RE)	/ De	schau		NUMBER OF CONTAINERS		A.	and a sum		JEX BY	1	//	//		PARATIVE	/		
	SAMPLE NUMBER	DATE	TIME	TYPE	SAN	APLE LOCA	TION	NUN	Thur	E	7	10		/	/	/	PRF	1	RI	MARKS	
4	B90-W	7/18/12	1010	Hao	996	HOTST.C	ARLAND	5	×		-	$\times$					ICE	NO	RHAL	TURN	ARODNE
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ľ	ELINQUISHED BY: (SIGNAT	UKC)	/	DATE	TIME	RECEIVED (SIGNATUR	al	N	4		A	ATT/	CHE	ED:	(	) YE		$(\chi)$ N	10		
	Results and billing to: P&D Environmental, Inc. ab@pdenviro.com					REMARKS	All	VOI	a}	RE	SE	206	Ð	19:11	ret t	1cl	•				

					I-OF-CUS	Page 1 of 1			
Pittsburg, CA 94565-1701 (925) 252-9262				WorkO	order: 1207486	Clie	ntCode: PDEO		
	WaterTrax	WriteOn	EDF	Excel	EQuIS	🖌 Email	HardCopy	ThirdParty	_ J-flag
Report to:				В	ill to:		Req	uested TAT:	5 days
Michael Deschenes	Email: la	ab@pdenviro.co	m; Michael.De	schenes@p	Accounts Paya	able			
P & D Environmental	CC:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Date	e Received:	07/18/2012
Oakland, CA 94610 (510) 658-6916 FAX: 510-834-0152	ProjectNo: #	#0304; California	Linen Rental (	Co.	Oakland, CA 9	94610	Date	e Printed:	07/18/2012

				Γ	Requested Tests (See legend below)										
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11 12
1207486-001	B90-W	Water	7/18/2012 10:10		А										

#### Test Legend:

1	G-MBTEX_W
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**Prepared by: Zoraida Cortez** 

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Envir	onmental			Date	and Time Received:	7/18/2012 8	3:47:11 PM				
Project Name:	#0304; Calif	iornia Linen Rental Co.			LogIr	n Reviewed by:		Zoraida Cortez				
WorkOrder N°:	1207486	Matrix: Water			Carri	er: <u>Rob Pringle (N</u>	<u>//AI Courier)</u>					
		Cha	in of Cu	stody (C	OC) Inform	ation						
Chain of custody	present?		Yes	✓	No							
Chain of custody	relinquished and received?	Yes	✓	No								
Chain of custody	ample labels?	Yes	✓	No 🗌								
Sample IDs note	d by Client on	COC?	Yes	✓	No 🗌							
Date and Time o	f collection no	ted by Client on COC?	Yes	✓	No 🗌							
Sampler's name	noted on CO	C?	Yes	✓	No 🗌							
Sample Receipt Information												
Custody seals in	tact on shippir	ng container/cooler?	Yes		No 🗌		NA 🗹					
Shipping contain	er/cooler in go	ood condition?	Yes	✓	No 🗌							
Samples in prope	er containers/l	bottles?	Yes	✓	No 🗌							
Sample containe	rs intact?		Yes	✓	No 🗌							
Sufficient sample	e volume for ir	ndicated test?	Yes	✓	No 🗌							
		Sample Pres	ervatior	n and Ho	old Time (HT	<u>) Information</u>						
All samples rece	ived within ho	Iding time?	Yes	✓	No 🗌							
Container/Temp	Blank tempera	ature	Coole	r Temp:	3.2°C		NA					
Water - VOA vial	s have zero h	eadspace / no bubbles?	Yes	✓	No 🗌	No VOA vials subm	nitted					
Sample labels ch	necked for cor	rect preservation?	Yes	✓	No							
Metal - pH accep	table upon re	ceipt (pH<2)?	Yes		No		NA 🗹					
Samples Receive	ed on Ice?		Yes	✓	No							
		(Ісе Тур	e: WE	TICE )	)							
* NOTE: If the "N	lo" box is che	cked, see comments below.										

Comments:

\_\_\_\_\_

\_\_\_\_\_

	McCamp	bell / When Qua			l <u>, Inc.</u>		oll Free Telepho	Pass Road, Pittsburg ne: (877) 252-9262 pbell.com / E-mail:	/ Fax: (925) 252	-9269						
P & D	Environmental					#0304; Cal	ifornia	Date Sampled: 07/18/12								
55 Sai	nta Clara, Ste.240			Linen F	Rental Co.			Date Receiv	ed: 07/1	8/12						
55 54	na Ciara, 500.240			Client (	Contact: Mi	ichael Desch	ienes	Date Extract	ted: 07/2	1/12						
Oakla	nd, CA 94610			Client I	P.O.:			Date Analyz	xed: 07/2	1/12						
Extractio	Gas n method: SW5030B	soline Ra	nge (C	<b>C6-C12</b> )	-		<b>as Gasoli</b> 8W8021B/8015	ne with BTEX	X and MTI		rk Order:	1207486				
Lab ID	Client ID	Matrix	TF	PH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments				
001A	B90-W	W	30	,000	ND<500	ND<50	ND<50	420	2200	100	92	d2,b1				
		_														

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference. % SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation:

b1) aqueous sample that contains greater than ~1 vol. % sediment d2) heavier gasoline range compounds are significant (aged gasoline?)

Angela Rydelius, Lab Manager



## QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water	QC Matrix:	Water			BatchID	: 69353	WorkOrder: 1207486				
EPA Method: SW8021B/8015Bm Extraction: S	W5030B	V5030B Spiked Sample ID: 12074							1207487-006A		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)				
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS		
TPH(btex) <sup>£</sup>	ND	60	93.3	95.6	2.39	96.2	70 - 130	20	70 - 130		
MTBE	ND	10	97.1	110	12.0	105	70 - 130	70 - 130			
Benzene	ND	10	87.5	93	6.15	88.9	70 - 130	20	70 - 130		
Toluene	ND	10	86.8	93	6.75	89.2	70 - 130	20	70 - 130		
Ethylbenzene	ND	10	89	94.7	6.22	91.5	70 - 130	20	70 - 130		
Xylenes	ND	30	90.4	96.4	6.45	92.6	70 - 130	20	70 - 130		
%SS:	97	10	92	92	0	91	70 - 130	20	70 - 130		
All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE											

			BATCH 69353 SI	UMMARY			
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1207486-001A	07/18/12 10:10 AM	07/21/12	07/21/12 4:18 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

 $\pounds$  TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.

QA/QC Officer



McCampbell Analytical, Inc. "When Quality Counts"

# **Analytical Report**

P & D Environmental	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/20/12
55 Santa Clara, Ste.240		Date Received:	07/24/12
55 Sunta Chata, 510.2 10	Client Contact: Michael Deschenes	Date Reported:	07/30/12
Oakland, CA 94610	Client P.O.:	Date Completed:	07/26/12

#### WorkOrder: 1207600

July 30, 2012

#### Dear Michael:

Enclosed within are:

- 1) The results of the 2 analyzed samples from your project: **#0304; California Linen Rental Co.,**
- 2) QC data for the above samples, and
- 3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius Laboratory Manager McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

		С	HA	IN C	<b>FC</b>	USTODY I	RE	CC	DRI	D		20	71	9α	2		PAGE	L OF _
	P&D	ENVII 55 Santa Oal	Clara / Clara / kland, C 510) 65	MEN Ave., Su CA 946 8-6916	ITAL nite 240	, INC.			/	LEIED	41	[]	/	/	//	//		
	PROJECT NUMBER:		CAL	FORNI	1st st	RENTAL LO.	CONTAINERS	AI Vo.	Contraction of the second	and a silling the training	INIT	ALEM SOALE			//	#	/	
	SAMPLED BY: (PRIN Lù <i>chae</i> L Desche SAMPLE NUMBER		Wh	RE) Cellae TYPE	I Des SAM	ple LOCATION	NUMBER OF CONTAINERS	TRU ~ AN	Par Build	15mm	ABER O				PREGE	TIMATIVE	REMA	RKS
T.	B95B-W B96-W	7/20/12	1645	Ha O HaO	940 996	40th St 40th St	5	XX		>					ICE ICE	NORM	IL TUI	AN AROUNT
						-												
										+	+	+						
											ICE/r GOO HUA	B.COND D.COND		NT.		APPROPR CONTAIN	LATE	
											PLE	SERVAT	TED Y	DAS	0&G	METALS	ED IN LA	<u> </u>
	RELINQUISHED BY: (SIGNAT	auss	1	7/24/12	1325 -	RECEIVED BY: (SIG	2	~	$\sim$	Tot (Th	is Ship al No. is Ship BOR		CON	Q TACT:	LABO	RATORY	PHONE	JALYTICAL NUMBER:
ł	RELINQUISHED BY: (SIGNAT	TURE	14	DATE	TIME	RECEIVED FOR LAI	a	A		SA A1	MPI	LE ANA HED:	LYSIS (	) YE	UEST S			9262
	Results and billing to: P&D Environmental, Inc. lab@pdenviro.com					REMARKS: ALL	Va	AKS	PRE	ESER	LVE	DO	HCL	_				

### McCampbell Analytical, Inc. 1534 Willow Pass Rd Pittsburg, CA 94565-1701



Page 1 of 1

(925) 252-9262				WorkO	rder: 1207600	Clier	ntCode: PDEO		
	WaterTrax	WriteOn		Excel	EQuIS	Email	HardCopy	ThirdParty	_J-flag
Report to:				В	ill to:		Req	uested TAT:	5 days
Michael Deschenes	Email: la	ab@pdenviro.co	m; Michael.Des	schenes@p	Accounts Paya	able			
P & D Environmental	cc:				P & D Environ	mental			
55 Santa Clara, Ste.240	PO:				55 Santa Clara	a, Ste.240	Date	e Received:	07/24/2012
Oakland, CA 94610 (510) 658-6916 FAX: 510-834-0152	ProjectNo: #	#0304; California	Linen Rental C	Co.	Oakland, CA S	94610	Date	e Printed:	07/24/2012

				[				Re	quested	l Tests (	See leg	end bel	ow)			
Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
[						1		1	1	1	T	1	1	1		
1207600-001	B95B-W	Water	7/20/2012 16:45		Α											
1207600-002	B96-W	Water	7/20/2012 10:00		А											

#### Test Legend:

1	G-MBTEX_W
6	
11	

2	
7	
12	

3	
8	

4	
9	

5	
10	

Prepared	bv:	Zoraida	Cortez

#### **Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



# Sample Receipt Checklist

Client Name:	P & D Enviror	nmental			Da	te and	Time Received:	7/24/2012	3:00:06 PM
Project Name:	#0304; Califor	rnia Linen Rental Co.			Lo	gIn Re	eviewed by:		Zoraida Cortez
WorkOrder N°:	1207600	Matrix: Water			Ca	rrier:	<u>Rob Pringle (M</u>	AI Courier)	
		Cha	in of Cu	<u>istody (C</u>	COC) Infor	matior	<u>n</u>		
Chain of custody	present?		Yes	✓	No				
Chain of custody	signed when re	linquished and received?	Yes	✓	No				
Chain of custody	agrees with sa	mple labels?	Yes	✓	No				
Sample IDs note	d by Client on C	COC?	Yes	✓	No				
Date and Time o	f collection note	d by Client on COC?	Yes	✓	No				
Sampler's name	noted on COC?		Yes	✓	No				
			Sample	Receipt	Informati	<u>on</u>			
Custody seals in	tact on shipping	container/cooler?	Yes		No			NA 🖌	
Shipping contain	er/cooler in goo	d condition?	Yes	✓	No				
Samples in prope	er containers/bo	ttles?	Yes	✓	No				
Sample containe	ers intact?		Yes	✓	No				
Sufficient sample	e volume for ind	icated test?	Yes	✓	No				
		Sample Pres	servatio	n and Ho	old Time (I	HT) Inf	formation		
All samples rece	ived within hold	ing time?	Yes	✓	No				
Container/Temp	Blank temperat	ure	Coole	r Temp:	3°C			NA	
Water - VOA vial	ls have zero hea	adspace / no bubbles?	Yes		No	No	o VOA vials submi	tted 🗹	
Sample labels ch	necked for corre	ct preservation?	Yes	✓	No				
Metal - pH accep	table upon rece	eipt (pH<2)?	Yes	✓	No			NA	
Samples Receive	ed on Ice?		Yes	✓	No				
		(Ісе Тур	be: WE	T ICE	)				
* NOTE: If the "N	lo" box is check	ed, see comments below.							

Comments:

\_\_\_\_\_

\_\_\_\_\_

McCampbell Anal "When Quality Cou				<u>l, Inc.</u>	1534 Willow Pass Road, Pittsburg, CA 94565-1701 Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269 http://www.mccampbell.com / E-mail: main@mccampbell.com							
P & D	Environmental					#0304; Cali	ifornia	Date Sample	ed: 07/2	0/12		
55 Sai	nta Clara, Ste.240			Linen F	Rental Co.			Date Receiv	ed: 07/24	4/12		
	···· - ··· , ··· - ·			Client (	Contact: M	ichael Desch	ienes	Date Extract	ted: 07/2	5/12-07	//26/12	
Oakla	nd, CA 94610			Client I	P.O.:			Date Analyz	ed: 07/2	5/12-07	/26/12	
Extractio	Gas on method: SW5030B	soline Ra	nge (C	C6-C12)	-		<b>5 as Gasoli</b> 5W8021B/8015	ne with BTE	X and MTI		rk Order:	1207600
Lab ID	Client ID	Matrix	TF	PH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	B95B-W	W		65	ND	ND	ND	ND	ND	1	88	d7
002A	B96-W	W	]	ND	ND	ND	ND	ND	ND	1	90	b1

Reporting Limit for DF =1; ND means not detected at or	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
above the reporting limit	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference. %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation:

b1) aqueous sample that contains greater than ~1 vol. % sediment

d7) strongly aged gasoline or diesel range compounds are significant in the TPH(g) chromatogram



## QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water	QC Matrix:	QC Matrix: Water				: 69403		WorkOrder: 1207600		
EPA Method: SW8021B/8015Bm Extraction: S	W5030B						Spiked Sam	ple ID:	1207577-005A	
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS	
TPH(btex) <sup>£</sup>	ND	60	116	109	6.39	112	70 - 130	20	70 - 130	
MTBE	ND	10	105	103	2.54	99.9	70 - 130	20	70 - 130	
Benzene	ND	10	102	104	2.24	102	70 - 130	20	70 - 130	
Toluene	ND	10	101	104	2.05	102	70 - 130	20	70 - 130	
Ethylbenzene	ND	10	102	103	1.21	104	70 - 130	20	70 - 130	
Xylenes	ND	30	104	102	1.60	106	70 - 130	20	70 - 130	
%SS:	105	10	97	104	6.82	95	70 - 130	20	70 - 130	
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with th	ne following	g exceptio	ns:			

BATCH 69403 SUMMARY									
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed		
1207600-001A	07/20/12 4:45 PM	07/26/12	07/26/12 9:20 PM						

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

 $\pounds$  TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.



QA/QC Officer



## QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water QC Matrix: Water				BatchID: 69444			WorkOrder: 1207600			
EPA Method: SW8021B/8015Bm Extraction: S	W5030B						Spiked Sam	ple ID:	1207593-001A	
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acc	eptance	Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS	
TPH(btex) <sup>£</sup>	ND	60	97	99.4	2.41	96.4	70 - 130	20	70 - 130	
MTBE	ND	10	95.4	93.4	2.12	80.1	70 - 130	20	70 - 130	
Benzene	ND	10	96.8	98.3	1.53	90.3	70 - 130	20	70 - 130	
Toluene	ND	10	98.7	100	1.54	92.1	70 - 130	20	70 - 130	
Ethylbenzene	ND	10	101	103	2.07	94.6	70 - 130	20	70 - 130	
Xylenes	ND	30	104	106	2.29	98.2	70 - 130	20	70 - 130	
%SS:	88	10	92	93	0.614	91	70 - 130	20	70 - 130	
All target compounds in the Method Blank of this extraction ba NONE	tch were ND	less than th	e method	RL with th	ne following	g exceptio	ns:			

			BATCH 69444 SI	UMMARY			
Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1207600-002A	07/20/12 10:00 AM	07/25/12	07/25/12 10:59 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

 $\pounds$  TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.

QA/QC Officer

# **APPENDIX G**

# **Onsite Fill Statistical Analysis**

- Table G1 Arsenic Data Used for Fill Material Statistical Analysis
- Table G2 Lead Data Used for Fill Material Statistical Analysis
- Table G3 UCL Calculation for Arsenic Concentrations in Fill Material
- Table G4 UCL Calculation for Arsenic Concentrations in Fill Material Without Outlier, Pit Sample 2f
- Table G5 UCL Calculation for Arsenic Concentrations in Fill Material Without Outliers, Pit Samples 2f and 1g
- Table G6 UCL Calculation for Lead Concentrations in Fill Material
- Table G7 UCL Calculation for Lead Concentrations in Fill Material Without Outlier, Test Pit Sample TP2-2.0
- UCL Calculation for Lead Concentrations in Fill Material Without Outliers, Test Pit Samples TP2-2.0 and TP4-2.0
- Figure G1 Soil Excavation and Confirmation Sample Locations
- Figure G2 Site Plan Detail Showing Post-Excavation Pit Confirmation Sample Locations in Pits 1 and 2
- Figure G3 Site Plan Detail Showing Test Pits

Sample ID	Arsenic
	Concentration
	(mg/kg)
Pit 1g	30
Pit 2 f	48
TP1-1.0	15
TP1-2.0	5.8
TP2-1.0	12
TP2-2.0	13
TP3-1.0	19
TP3-2.0	7.8
TP4-1.0	5.7
TP4-2.0	8.7
B14a-1.0	5.2
B14a-3.0	8.9
B15a-1.0	5.2
B30a-1.5	8.7
B40-0.5	6.8
B41-0.5	4.9
B42-0.5	4.3
B44-0.5	7.2
B51a-2.0	7.1
B51a-3.0	8.9
B59-1.0	4.9
B59-3.0	5.4
B60-1.0	4.9
MW7-1.0	6.7
Pit3a-0.5	6.2
Pit3b-0.5	7.5
Pit3c-0.5	7.5
Pit3d-0.5	7.2
Pit6d-1.0	3.5
Pit6p-2.0	11
Pit7a-0.5	11
Pit7b-0.5	8.5
Pit7c-0.5	5.1
Pit7d-0.5	6.3

Table G1
Arsenic Data Used for Fill Material Statistical Analysis

Table G2
Lead Data Used for Fill Material Statistical Analysis

Sample ID	Lead Concentration
I I I	(mg/kg)
Pit 1g	85
Pit 2 f	140
Pit3a-0.5	82
Pit3b-0.5	48
Pit3c-0.5	35
Pit3d-0.5	46
Pit6d-1.0	160
Pit6f-2.0	18
Pit6g-2.0	8.8
Pit6h-1.5	120
Pit6k-2.0	180
Pit6n-2.0	150
Pit6o-2.0	61
Pit6p-2.0	210
Pit7a-0.5	9.4
Pit7b-0.5	9.1
Pit7c-0.5	7.9
Pit7d-0.5	7.9
TP1-1.0	64
TP1-2.0	34
TP2-1.0	90
TP2-2.0	460
TP3-1.0	88
TP3-2.0	47
TP4-1.0	4.6
TP4-2.0	290
B14a-1.0	68
B14a-3.0	48
B15a-1.0	120
B30a-1.5	36
B40-0.5	190
B41-0.5	120
B42-0.5	7.3
B44-0.5	92
B51a-2.0	110
B51a-3.0	13
B59-1.0	7.1
B59-3.0	6.8
B60-1.0	150
B63-1.0	15
MW7-1.0	260

 Table G3

 UCL Calculation for Arsenic Concentrations in Fill Material

General Statistics			
Number of Valid Observations	34	Number of Distinct Observations	26
Raw Statistics		Log-transformed Statistics	
Minimum	3.5	5 Minimum of Log Data	1.253
Maximum		Maximum of Log Data	3.871
Maxindin		Maximum of Log Data	2.079
Geometric Mean	3.044	SD of log Data	0.542
Median	7.334		0.542
SD	8.42		
Std. Error of Mean	1.444		
Coefficient of Variation	0.873		
Skewness	3.48		
Skewiless	3.40	3	
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.592	Shapiro Wilk Test Statistic	0.882
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	0.882
Data not Normal at 5% Significance Level	0.933	Data not Lognormal at 5% Significance Level	0.933
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	12.09		11.16
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13.15
95% Adjusted-CLT UCL (Chen-1995)	12.94	97.5% Chebyshev (MVUE) UCL	14.85
95% Modified-t UCL (Johnson-1978)	12.23		18.2
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.591	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.722	2	
MLE of Mean	9.644	1	
MLE of Standard Deviation	5.991	1	
nu star	176.2	2	
Approximate Chi Square Value (.05)	146.5	5 Nonparametric Statistics	
Adjusted Level of Significance	0.0422	2 95% CLT UCL	12.02
Adjusted Chi Square Value	145.2	2 95% Jackknife UCL	12.09
		95% Standard Bootstrap UCL	12.01
Anderson-Darling Test Statistic	2.237		15.35
Anderson-Darling 5% Critical Value	0.755		22.51
Kolmogorov-Smirnov Test Statistic	0.238	3 95% Percentile Bootstrap UCL	12.11
Kolmogorov-Smirnov 5% Critical Value	0.152		13.37
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	15.94
		97.5% Chebyshev(Mean, Sd) UCL	18.66
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	24.01
95% Approximate Gamma UCL (Use when $n \ge 40$ )	11.6		
95% Adjusted Gamma UCL (Use when n < 40)	11.71		
			15.04
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	15.94
Note: Suggestions regarding the selection of a 95% UCL	are provid	ded to help the user to select the most appropriate 95% UC	L.
These recommendations are based upon the results of t			
and Singh and Singh (2003). For additional insight, the			

Table G4
UCL Calculation for Arsenic Concentrations in Fill Material Without Outlier, Pit Sample 2f

	-						-			
General Statistics										
Number of Valid Obse	rvations			33	Number of	Distinct Ob	servations			25
Number of Missing Va				1						
Raw Statistics					Log-transfo	ormed Statis	stics			
Minimum				3.5	Minimum o	f Log Data				1.253
Maximum					Maximum o					3.401
Mean					Mean of log					2.024
Geometric Mean					SD of log D	Data				0.447
Median				7.2						
SD				5.074						
Std. Error of Mean				0.883						
Coefficient of Variation				0.598						
Skewness				2.805						
Delevent LICI. Statistic										
Relevant UCL Statistic Normal Distribution Te						Diatribution	Teet			
Shapiro Wilk Test Stat				0.710	Shapiro Wi	Distribution				0.936
Shapiro Wilk Critical V					Shapiro Wi					0.930
Data not Normal at 5%				0.931				nificance Le	wol	0.931
Data not Normal at 5 /	Significant				Dala appea		ai ai 0 /0 Oig		evei	
Assuming Normal Dist	ribution				Assumina	Lognormal [	Distribution			
95% Student's-t UCL				9.978		CI				9.719
95% UCLs (Adjusted		ess)		0.070		byshev (MV	(UE) UCI			11.27
95% Adjusted-CLT L				10.4	97.5% Che					12.54
95% Modified-t UCL				10.05		byshev (MV				15.03
	(0000	,					02,002			.0.00
Gamma Distribution To	est				Data Distril	oution				
k star (bias corrected)				4.169			al at 5% Sic	nificance Le	evel	
Theta Star				2.034					-	
MLE of Mean				8.482						
MLE of Standard Devia	ation			4.154						
nu star				275.2						
Approximate Chi Squa	re Value (.0	)5)		237.8	Nonparame	etric Statisti	cs			
Adjusted										
Level of										
Significan										
се				0.0419	95% CLT					9.935
Adjusted Chi Square V	alue			236		kknife UCL				9.978
						ndard Boots				9.87
Anderson-Darling Test					95% Boo					10.88
Anderson-Darling 5%					95% Hall					16.26
Kolmogorov-Smirnov -	Fest Statisti	С		0.185		centile Boot	strap UCL			10.12
Kolmogorov-Smirnov 5				0.154		A Bootstrap				10.37
Data not Gamma Distr	ibuted at 5%	% Significan	ce Level			yshev(Mean				12.33
						byshev(Mea		L		14
Assuming Gamma Dis				/ -	99% Cheby	yshev(Mean	, Sd) UCL			17.27
95% Approximate G				9.817						
95% Adjusted Gamn	na UCL (Us	e when n <	40)	9.891						
						 				0.070
Determine LIOL 1. L					Use 95% S	Student's-t U	ICL III	_		9.978
Potential UCL to Use					or 0E0/ M4-	dified + LICI				10.05
Potential UCL to Use						dified-t UCL	-			
Potential UCL to Use					or 95% Mo or 95% H-l		-			9.719
		etatiatia bas		r biotoriac!	or 95% H-l	JCL				
ProUCL computes and					or 95% H-L reasons onl	JCL y.		achnical Cu	ide	
ProUCL computes and H-statistic often results	s in unstable	e (both high	and low) va	lues of UC	or 95% H-L reasons onl L95 as shov	JCL y.		echnical Gu	ide.	
ProUCL computes and H-statistic often results It is therefore recommo	in unstable ended to av	e (both high oid the use	and low) va of H-statisti	lues of UC c based 95	or 95% H-L reasons onl L95 as shov % UCLs.	JCL y. vn in examp	les in the T			
ProUCL computes and H-statistic often results	in unstable ended to av	e (both high oid the use	and low) va of H-statisti	lues of UC c based 95	or 95% H-L reasons onl L95 as shov % UCLs.	JCL y. vn in examp	les in the T			
ProUCL computes and H-statistic often results It is therefore recommo Use of nonparametric	in unstable ended to av methods are	e (both high oid the use e preferred	and low) va of H-statisti to compute	lues of UC c based 95 UCL95 for	or 95% H-L reasons onl L95 as shov % UCLs. skewed dat	JCL y. vn in examp a sets which	les in the T n do not foll	ow a gamm	a distribution.	
ProUCL computes and H-statistic often results It is therefore recomm	s in unstable ended to av methods are arding the s	e (both high roid the use e preferred selection of a	and low) va of H-statisti to compute a 95% UCL	lues of UC c based 95 UCL95 for are provide	or 95% H-L reasons onl L95 as shov % UCLs. skewed dat ed to help th	JCL y. vn in examp a sets which e user to se	les in the T n do not foll lect the mo	ow a gamm ost appropria	a distribution. te 95% UCL.	

Table G5 UCL Calculation for Arsenic Concentrations in Fill Material Without Outliers, Pit Samples 2f and 1g

			1		
General Statistics					
Number of Valid Observations	32	Number of Distinct Ob	servations		24
Number of Missing Values	2				
Raw Statistics		Log-transformed Statis	atice		
Minimum	3.5	Minimum of Log Data	51103		1.253
Maximum		Maximum of Log Data			2.944
Mean		Mean of log Data			1.981
Geometric Mean		SD of log Data			0.378
Median	7.15	OB OF IOG Bala			0.070
SD	3.342				
Std. Error of Mean	0.591				
Coefficient of Variation	0.428				
Skewness	1.623				
	1.020				
Relevant UCL Statistics					
Normal Distribution Test		Lognormal Distribution	Test		
Shapiro Wilk Test Statistic	0.862	Shapiro Wilk Test Stat			0.971
Shapiro Wilk Critical Value		Shapiro Wilk Critical V			0.93
Data not Normal at 5% Significance Level	0.00	Data appear Lognorm		inificance Level	0.00
		Data appear Lognorm			
Assuming Normal Distribution		Assuming Lognormal	Distribution		
95% Student's-t UCL	8.811		Distribution		8.832
95% UCLs (Adjusted for Skewness)	0.011	95% Chebyshev (M			10.1
95% Adjusted-CLT UCL (Chen-1995)	8 962	97.5% Chebyshev (M			11.11
95% Modified-t UCL (Johnson-1978)	8.839				13.08
	0.000				10.00
Gamma Distribution Test		Data Distribution			
k star (bias corrected)	6.295		Distributed a	at 5% Significance Level	
Theta Star	1.241				
MLE of Mean	7.809				
MLE of Standard Deviation	3.113				
nu star	402.8				
Approximate Chi Square Value (.05)		Nonparametric Statisti	CS		
Adjusted Level of Significance		95% CLT UCL			8.781
Adjusted					
Chi					
Square					
Value	355	95% Jackknife UCL			8.811
		95% Standard Boots	strap UCL		8.785
Anderson-Darling Test Statistic	0.595				9.076
Anderson-Darling 5% Critical Value	0.747				9.13
Kolmogorov-Smirnov Test Statistic	0.129				8.806
Kolmogorov-Smirnov 5% Critical Value	0.156				8.969
Data appear Gamma Distributed at 5% Significance Lev		95% Chebyshev(Mear			10.38
	-	97.5% Chebyshev(Me		L İ	11.5
Assuming Gamma Distribution		99% Chebyshev(Mear			13.69
95% Approximate Gamma UCL (Use when $n \ge 40$ )	8.804		, ,		
95% Adjusted Gamma UCL (Use when n < 40)	8.861				
Potential UCL to Use		Use 95% Approximate	Gamma U	CL	8.804
					5.001
Note: Suggestions regarding the selection of a 95% UC	L are provide	ed to help the user to se	elect the mo	st appropriate 95% UCL	
These recommendations are based upon the results of					
and Singh and Singh (2003). For additional insight, the					

 Table G6

 UCL Calculation for Lead Concentrations in Fill Material

General Statistics								
Number of Valid Observations		41	Number of	Distinct Ob	servations			36
Daw Statistics			L og tropof	armod Stati	tion			
Raw Statistics		1.0		ormed Statis	SUCS			1 500
Minimum				of Log Data				1.526
Maximum				of Log Data				6.131
Mean		90.22	Mean of lo	g Data				3.89
Geometric Mean			SD of log I	Jata				1.256
Median		64						
SD SD		93.84						
Std. Error of Mean		14.66						
Coefficient of Variation		1.04						
Skewness		1.928						
Relevant UCL Statistics								
Normal Distribution Test			Lognorma	Distribution	Test			
Shapiro Wilk Test Statistic		0.816	Shapiro W	ilk Test Stat	istic			0.927
Shapiro Wilk Critical Value		0.941	Shapiro W	ilk Critical V	alue			0.941
Data not Normal at 5% Significance Level				ognormal at		ance Level		
Assuming Normal Distribution			Assuming	Lognormal	Distribution		<u> </u>	
95% Student's-t UCL		114.9						182.2
95% UCLs (Adjusted for Skewness)			95% Chebyshev (MVUE) UCL					214.5
95% Adjusted-CLT UCL (Chen-1995)			97.5% Chebyshev (MVUE) UCL				<u> </u>	262.2
95% Modified-t UCL (Johnson-1978)		115.6	99% Che	ebyshev (M)	/UE) UCL			355.9
Gamma Distribution Test			Data Distri	bution				
k star (bias corrected)		0.895			Distributed a	at 5% Signifi	icance Level	
Theta Star		100.7	Data appo					
MLE of Mean		90.22						
MLE of Standard Deviation		95.34						
nu star		73.43						
Approximate Chi Square Value (.05)				etric Statisti	CS.			
Adjusted Level of Significance		0.0441	95% CL					114.3
Adjusted Chi Square Value		54.1		kknife UCL				114.9
		0		ndard Boots	tran UCI			113.7
Anderson-Darling Test Statistic		0.527		otstrap-t UC				121.7
Anderson-Darling 5% Critical Value		0.781						125.8
Kolmogorov-Smirnov Test Statistic		0.111		centile Boot				115.3
Kolmogorov-Smirnov 5% Critical Value		0.142		A Bootstrap				119
Data appear Gamma Distributed at 5% Sig	nificance Leve			yshev(Mear				154.1
			97.5% Che	byshev(Me	an, Sd) UC	_		181.7
Assuming Gamma Distribution				yshev(Mear				236
95% Approximate Gamma UCL (Use whe	en n >= 40)	121.1						
95% Adjusted Gamma UCL (Use when n		122.4						
					Comment			101 1
Potential UCL to Use			USE 95% /	Approximate	Gamma U			121.1
Note: Suggestions regarding the selection	of a 95% UCL	are provid	ed to help t	he user to s	elect the mo	ost appropria	ate 95% UCL.	
These recommendations are based upon the								
and Singh and Singh (2003). For addition						-		

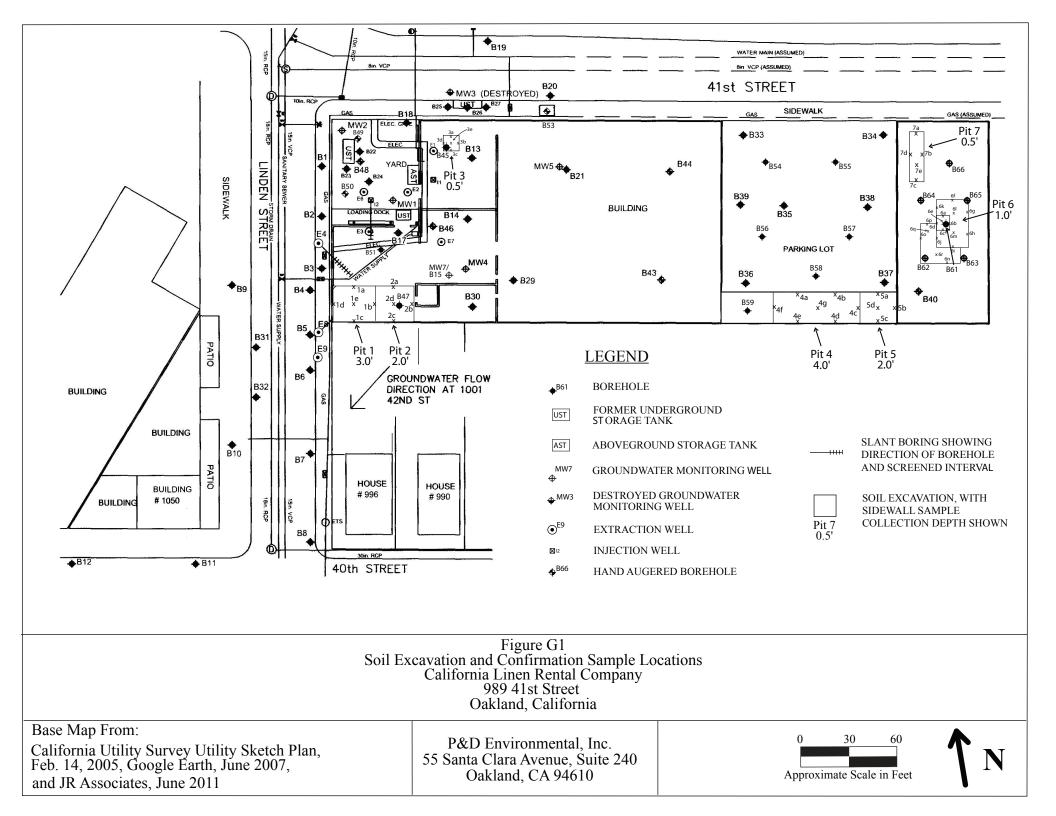
# Table G7 UCL Calculation for Lead Concentrations in Fill Material Without Outlier, Test Pit Sample TP2-2.0

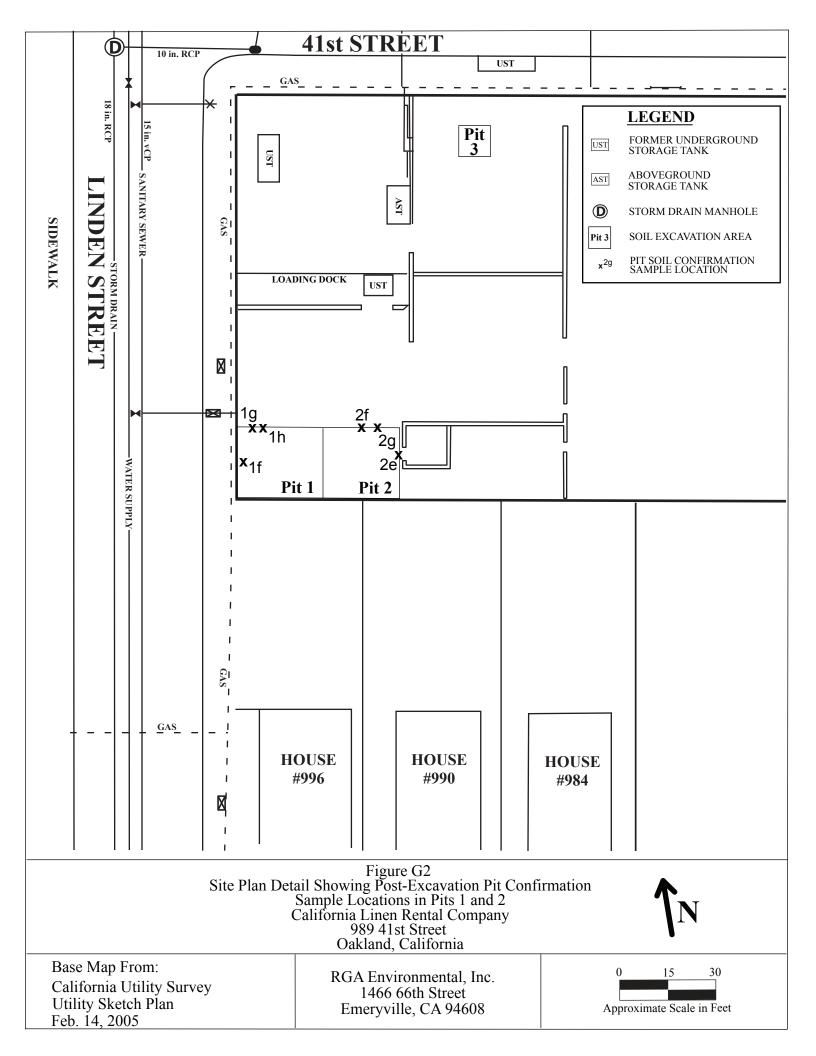
General Statistics			
Number of Valid Observations	40	Number of Distinct Observations	35
Number of Missing Values	1		
Raw Statistics		Log-transformed Statistics	
Minimum	4.6	Minimum of Log Data	1.526
Maximum		Maximum of Log Data	5.67
Mean		Mean of log Data	3.834
Geometric Mean		SD of log Data	1.219
Median	62.5		
SD	73.75		
Std. Error of Mean	11.66		
Coefficient of Variation	0.911		
Skewness	1.076		
	1.070		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0 879	Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	0.000
Data not Normal at 5% Significance Level	0.34	Data not Lognormal at 5% Significance Level	0.34
Data not Normal at 5 % Significance Level		Data not Edgiorniar at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	100.6		163.9
95% UCLs (Adjusted for Skewness)	100.0	95% Chebyshev (MVUE) UCL	191.4
	100.0	97.5% Chebyshev (MVUE) UCL	233.4
95% Adjusted-CLT UCL (Chen-1995)	102.3		233.4
95% Modified-t UCL (Johnson-1978)	100.9	99% Chebyshev (MVUE) UCL	315.9
Gamma Distribution Test		Data Distribution	
	0.007		
k star (bias corrected)		Data appear Gamma Distributed at 5% Significance Level	
Theta Star	83.76		
MLE of Mean	80.97		
MLE of Standard Deviation	82.35		
nu star	77.34		
Approximate Chi Square Value (.05)	58.08	Nonparametric Statistics	
Adjusted			
Level of			
Significan			
ce la la la la la la la la la la la la la		95% CLT UCL	100.2
Adjusted Chi Square Value	57.45		100.6
		95% Standard Bootstrap UCL	99.78
Anderson-Darling Test Statistic	0.668		101.9
Anderson-Darling 5% Critical Value	0.778	1	102.5
Kolmogorov-Smirnov Test Statistic	0.12		99.73
Kolmogorov-Smirnov 5% Critical Value	0.144	95% BCA Bootstrap UCL	102.3
Data appear Gamma Distributed at 5% Significance Leve		95% Chebyshev(Mean, Sd) UCL	131.8
		97.5% Chebyshev(Mean, Sd) UCL	153.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	197
95% Approximate Gamma UCL (Use when n >= 40)	107.8		
95% Adjusted Gamma UCL (Use when n < 40)	109		
Potential UCL to Use		Use 95% Approximate Gamma UCL	107.8
Note: Suggestions regarding the selection of a 95% UCL	are provide	ed to help the user to select the most appropriate 95% UCL	
These recommendations are based upon the results of th			
and Singh and Singh (2003). For additional insight, the			
	asor may w		

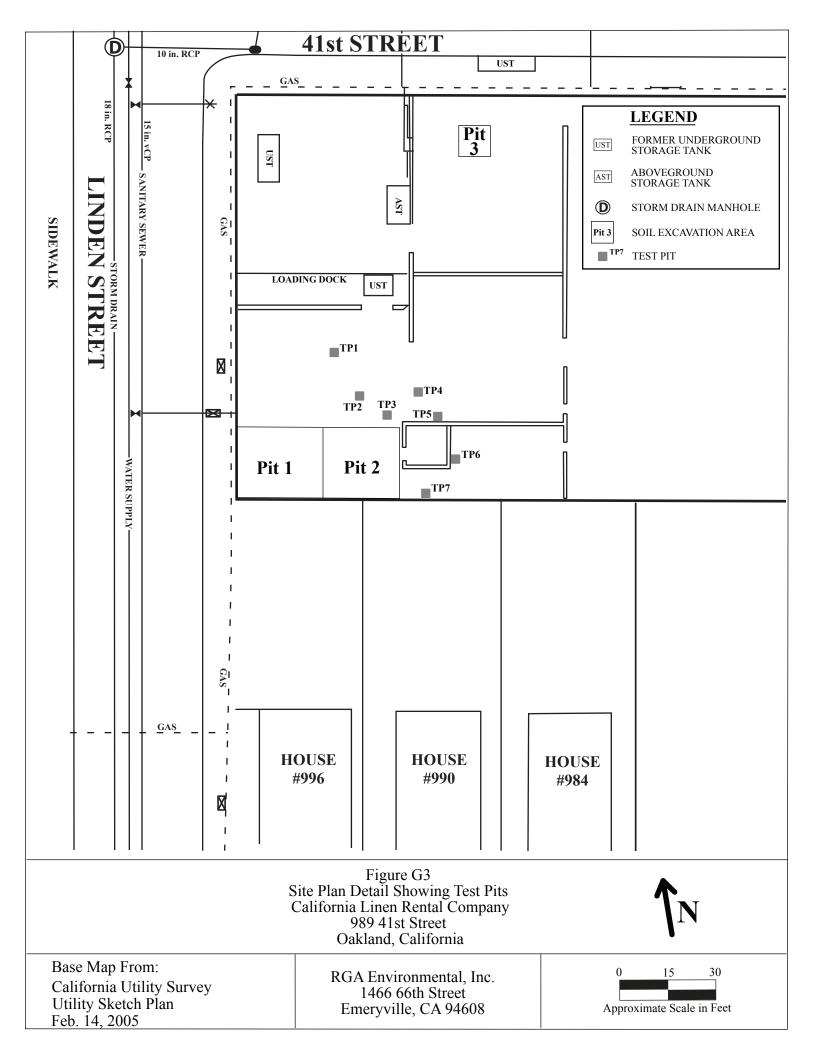
Table G8

### UCL Calculation for Lead Concentrations in Fill Material Without Outliers, Test Pit samples TP2-2.0 and TP4-2.0

General Statistics			
Number of Valid Observations		Number of Distinct Observations	34
Number of Missing Values	2		
Raw Statistics		Log-transformed Statistics	
Minimum	4.6	Minimum of Log Data	1.526
Maximum		Maximum of Log Data	5.561
Mean	75.61	Mean of log Data	3.787
Geometric Mean	44.11	SD of log Data	1.198
Median	61		
SD	66.35	5	
Std. Error of Mean	10.62	2	
Coefficient of Variation	0.878	3	
Skewness	0.907	7	
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0 803	B Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical Value		Shapiro Wilk Critical Value	0.939
Data not Normal at 5% Significance Level	0.939	Data not Lognormal at 5% Significance Level	0.955
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	93.53		150.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	177
95% Adjusted-CLT UCL (Chen-1995)	94.74	97.5% Chebyshev (MVUE) UCL	215.6
95% Modified-t UCL (Johnson-1978)	93.78		291.5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.000	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	75.7		
MLE of Mean	75.61		
MLE of Standard Deviation	75.65		
nu star	73.03		
Approximate Chi Square Value (.05)	-	Nonparametric Statistics	
Adjusted Level of Significance	0.0437		93.09
Adjusted Adjusted	0.0437	93% CET OCE	93.08
Chi			
Square			
Value	57.92	95% Jackknife UCL	93.53
Value	57.92	95% Standard Bootstrap UCL	<u>93.53</u> 93
Anderson-Darling Test Statistic	0.756		97.09
Anderson-Darling 5% Critical Value	0.730		95.04
Kolmogorov-Smirnov Test Statistic	0.125		94.25
Kolmogorov-Smirnov 5% Critical Value	0.125		94.28
Data appear Gamma Distributed at 5% Significance Leve		95% Chebyshev(Mean, Sd) UCL	121.9
Data appear Gamma Distributed at 5% Significance Leve		97.5% Chebyshev(Mean, Sd) UCL	142
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	181.3
95% Approximate Gamma UCL (Use when $n \ge 40$ )	100.6		
95% Adjusted Gamma UCL (Use when n < 40)	101.7		
Potential UCL to Use		Use 95% Approximate Gamma UCL	100.6
		ed to help the user to select the most appropriate 95% UCL.	
These recommendations are based upon the results of the			
and Singh and Singh (2003). For additional insight, the	user may w	want to consult a statistician.	



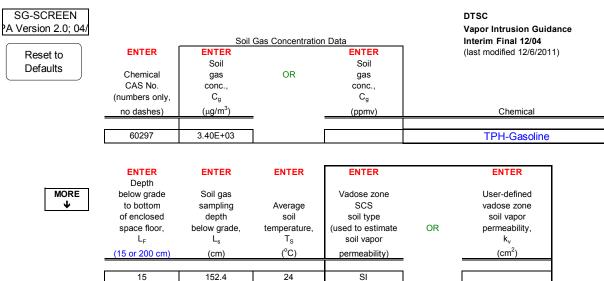


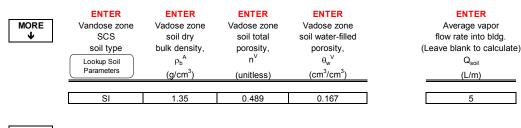


# **APPENDIX H**

HERD December 2011 Vapor Intrusion Risk and Hazard Calculation Work Sheets

### VW4 3,400 ug/m<sup>3</sup> TPH-G





ENTER

Exposure frequency,

EF

(days/yr)

350

MORE  $\mathbf{\Psi}$ ENTER ENTER ENTER Averaging Averaging time for time for Exposure carcinogens, noncarcinogens, duration,  $AT_{C}$ AT<sub>NC</sub> ED (yrs) (yrs) (yrs) 70 30 30

END

DATA ENTRY SHEET

## VW4 3,400 ug/m<sup>3</sup> TPH-G

#### CHEMICAL PROPERTIES SHEET

Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Molecular weight, MW (g/mol)
7.00E-02	7.80E-06	3.00E-02	25	7,000	369.00	508.00	0.0E+00	4.9E+01	108.00

### VW4 3,400 ug/m<sup>3</sup> TPH-G

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	3.40E+03	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	8,304	2.86E-02	1.17E+00	1.80E-04	6.72E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.40E+03	1.25	8.33E+01	6.72E-03	5.00E+03	5.81E+10	9.10E-04	3.09E+00

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	4.9E+01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	6.1E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

VLOOKUP TABLES

		S	oil Properties L	ookup Table				Bulk Density	
SCS Soil Type	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> ) SCS Soil Name
С	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215 Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168 Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148 Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076 Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054 Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197 Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146 Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167 Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216 Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198 Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180 Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103 Sandy Loam

PT38 Observer         1257-00         1456-02         1256-03         1456-02         1256-03         1456-02         1256-03         1550-03         1456-03         1550-03         1456-03         1550-03			
undress         component         temporal         berray         temporal         <			
conflicts         instr.         instr.         instr.         instr.         instruction         instruction <td></td> <td></td> <td></td>			
Lensisu         Lensisu         Life         D         S         H         H         H         T         T         T         H         H         H         H         H         T         T         T         H			
LOBIN         Character         CPUI         Current         CPUI			RfC
State         Characterization         124-00         7.06-00         126-00         <		extrapolated extrapo	
PT28 Observed         116:20	) <sup>-1</sup> (mg/m <sup>3</sup> )	(X) (X	(X)
PT28 Observed         116:20	-05 0.0E+00		
Bits Bits and an analysis         107-03         1.46-00         7.346-00         7.736-0			
Boy?         Definition         2.14-04         1.25-04         1.25-06         1.25-05         2.5         0.13.2         0.42.35         1.15-05         3.87.55         3.8	-04 1.1E-03	x x	Х
D/0141 Accione         578-01         1244-05         1144-05         1064-05         218-25         208.10         0.58-05			Х
PM3 Checkborn         388-01         1046-01         1046-01         388-03         25         333-32         60.84         6.86         5.8-01         3.16-01         3.88-03         25         333-32         60.840         6.98         5.16-01         3.86-03         2.76         4.60.00           7713         Schwardsondhane         5.900-02         5.800-02         2.76         1.06-01         5.900-02         2.800-02         3.800-02			X
1721: HoadRongthing         1782-10         2565-00         6500-00         176-00         2572-10         2772-00         5500-00         6500-00         1560-00         3560-00		X	х
P1432 Biname         6.88E-01         6.88E-01         6.88E-01         7.88E-01         7.78E-03         2.85E-01         7.78E-03         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         7.78E-03         3.82-11         3.82-12         7.78E-03         7.78E-03         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-11         3.82-11         3.82-11 <td></td> <td>×</td> <td>х</td>		×	х
172450         Methodychia         184-02         144-02         544-06         1000-00         646-04         1260-05         25         611.02         844-00         116-00         0.00-00         804-00         126-00         0.00-00 </td <td></td> <td></td> <td></td>			
74580         DEL         4.7E+00         1.2EE+00         1.2E			
Partial         Methy formine         1.21E-00         1.22E-01         2.22E-01			х
Prior Multip dustation (choromatham)         212E+00         1.86-00         5.3E+03         3.81E+01         8.80E-03         2.8         240.00         446.25         5.115         1.8.66         0.6-20         5.2E+01         0.6E+00           Prior Margin Control         1.850+0         1.250+0         5.850+0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         3.850-0         3.850-0         3.850-0         3.850-0         2.850-0         3.850-0         5.850-0         7.100-0         0.65-0         3.850-0         0.850-0         3.850-0		х	
Protect         3.88E+00         1.83E+01         2.10E+06         1.02E+06         2.52         2.90.00         4.66.70         0.0E+00         3.10E+01         2.70E+01         0.0E+00         3.10E+01         3.10			
9000 Cholombane (ethy chonde)         4.46E-00         2.71E-01         1.15E-05         5.88E+03         3.61E-01         2.86E-03         2.52         2.88.30         440.40         5.879         8.8E-07         1.00E-10         6.4EE+01         2.8EE+03           70568         Actionatie         4.20E+00         1.28E+03         1.08E+03         1.7EE+03         3.4EE+03         2.52         235.0         7.846         0.8E+03         0.0E+00         0.8E+01         0.0E+00         0.0E+			
7614         Ving: choose choose         1.0E-01         1.2E-03         3.0E-03         3.0E-05         3.580         7.664         1.0E-01         0.2E-01         0.8E-06           76003         Accutation function         1.0E-00         1.2E-01         1.4E-03         3.2E-03         3.6E-05         2.5         3.58         0.65         4.4E-01         0.6E-00         4.4E-01 <td< td=""><td></td><td></td><td>х</td></td<>			х
75608 Actionship         4.20E-00         1.28E-01         1.08E-06         1.00E+06         1.22E-03         3.46E-05         2.5         235.10         465.00         7.110         0.0E+02         4.41E+01         0.0E+02           75607 Activatiby/second         1.17E+01         1.41E+05         1.30E+04         8.38E+02         2.18E+03         2.5         311.00         8.010         8.070         7.0E-04         8.48E+01         4.4E+01         4.0E+01         8.44E+01         8.44E+00		х	
75070         Acela deltyline         1.04E-01         1.14E-01         1.04E-01         1.14E-05         1.00E-06         3.23E-03         7.87E-05         2.5         23.10         61.00         6.157         2.7.E-68         9.8.E-31         4.41E-01         2.2.E-28         2.2.E-23         31.00         0.572.00         0.8.E-10         0.6.E-01			
75092         Methylene chorade         1.77E-r01         1.01E-01         1.77E-05         1.90E-00         3.02E-02         2.5         313.00         510.00         6.706         1.00E-06         4.08E-01         4.07E-07           75102         Carbon disulfice         4.77E-10         1.04E-01         1.48E-05         3.04E-02         2.58E-04         2.5         2.85.00         6.310         0.0E-03         7.0E-02         2.5EE-01         7.0E-07           75218         Environe cold         5.56E-01         2.3EE-02         1.0E-04         2.5         2.85.00         6.30.00         0.476         7.0E-02         2.5EE-01         7.0E-02			
75150 Cabon daulidie       4.57E+01       1.08E+01       1.08E+03       1.24E+00       3.22E+02       2.58E+04       2.52       319.00       65.00       6.319       0.0E+00       7.0E+01       7.0E+02       2.58E+02       2.58E+02       2.888       448.00       6.0E+00       7.0E+01       7.0E			
75252         Brondelhormeme         5.716-01         1.486-02         1.506-03         2.54         42.35         666.00         9.479         1.16-06         7.056-22         2.537-02         X         1.16-06           75236         2.0160-001         6.586-02         1.066-03         2.53         333.15         553.56         7.065-02         1.062-00         7.062-02         2.537-02         X         1.18-00           75354         1.1.00-kinocethylene         5.086-01         2.306-01         5.086-01         2.062-01         1.072-00         2.040-02         2.53         0.025-00         7.062-0         7.0	00 7.0E-01		
75274       Borndockbornethane       5.06±01       2.98±02       1.06±05       6.74±03       6.54±02       1.06±05       5.83±01       1.45±02       5.98±07       4.85±02       1.6±010000000       7.84±02       1.8±000       1.74±02       7.84±02       1.8±000 <td< td=""><td></td><td></td><td></td></td<>			
75296 2-Chargorpane         9.14E-00         8.88E-02         10.16-05         3.73E-03         5.32E-01         14.5E-02         25         308.70         445.00         6.268         0.0E-00         7.8E-01         7.8E-01         7.8           75345 11-01chroomethane         5.89E-01         9.00E-02         1.0E+05         5.22E+03         1.07E+100         2.0E-02         25         308.75         575.05         6.247         0.0E+00         7.0E-02         9.89E+01         0.0E+00           75545 11-01chroomethane         4.97E+01         1.01E+03         3.97E+00         9.80E+01         2.52         238.40         38.93         0.483         0.0E+00         7.0E-01         1.37E+02         0.0E+00           75131 11.2-Trchotro-1.2.2-trifuorenthane         4.97E+02         8.20E-06         1.70E+02         1.97E+01         4.80E-01         2.532.70         487.30         6.433         0.0E+00         3.0E+01         1.37E+02         0.0E+00           776131 11.2-Trchotro-1.2.2-trifuorenthane         1.11E+04         7.80E-02         8.20E-06         1.80E+01         1.48E+00         2.50         381.04         477.81         0.86E-02         3.82E+02         X         1.8E-03           77747 Hexachorcychopenal         2.00E+00         5.0E+06         8.0BE-04 <td></td> <td></td> <td>X</td>			X
75343       11-0bic/socethane       316E-06       7.62E-01       9.00E+01       X       0.00E+00         75545       11-0bic/socethane       4.76E+01       1.0E+06       2.2E+03       1.07E+00       2.06E+02       25       330.55       552.300       6.689       1.6E+06       7.0E+02       9.06E+01       X       0.0E+00         75456       Chordmituromethane       4.76E+01       1.0E+06       2.00E+00       2.00E+00       2.0E+02       2.5       2.32.40       369.30       4.438       0.0E+00       5.0E+01       0.0E+00       0.0E+00       7.0E+01       3.7E+02       0.0E+00         776141       1.12E+102       6.65E+02       9.92E+06       2.80E+02       1.40E+01       3.42E+01       2.5       2.43.20       3.84.95       9.421       0.0E+00       2.0E+01       1.21E+02       0.0E+00       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       0.0E+00       1.80E+01		x x	х
75334         11-10-linotentylene         5.88±r01         9.00E-02         1.04E-05         2.20E+00         1.10E+r00         2.70E-02         25         304.75         576.05         6.247         0.0E+00         7.0E+02         9.66E+01         0.0E+00           75696         Trichloroduromethane         4.37E+02         8.70E+02         8.70E+02         1.00E+00         3.82E+01         2.25         286.70         471.00         5.999         0.0E+00         7.0E+01         1.32E+02         0.0E+00           76131         1.1.2E+102         0.82E+02         1.40E+01         3.42E+01         2.5         320.70         487.30         6.463         0.0E+00         2.0E+04         2.1.8E+02         0.0E+00           76131         1.1.2E+04         7.80E+02         8.20E+06         1.80E+00         1.60E+01         4.80E+02         2.5         512.15         746.00         10.931         0.0E+00         2.0E+04         2.37E+02         X         0.0E+00           78837         1.2.0E+05         1.60E+00         1.60E+04         4.88E+01         1.18E+05         2.55         512.15         746.00         10.931         0.0E+00         7.41E+01         X         0.0E+00           78837         1.2.0E+06         1.60E+02 <td< td=""><td></td><td></td><td></td></td<>			
76694       Trichtonorumentane       4.97E+02       8.70E+02       9.70E+06       1.01E+03       3.97E+00       9.88E+02       25       298.70       471.00       5.999       0.0E+00       7.0E+01       1.21E+02       0.0E+00         77613       11.112+17       7.050E+02       2.00E+02       1.97E+01       4.80E+01       25       282.070       487.30       6.463       0.0E+00       3.07E+03       3.87E+02       0.0E+00       3.07E+01       1.21E+02       0.0E+00       3.07E+01       1.21E+02       0.0E+00       3.07E+01       3.37E+02       X       1.35E+03       3.73E+02       X       1.35E+03       2.55       3.810       5.47E+01       1.6E+02       7.23E+02       X       1.35E+02       7.758       1.0E+03       3.73E+02       X       1.3E+02       X       1.3E+02       X       1.3E+02       X       1.6E+02       7.3E+02       X       1.6E+02       7.3E+02       X       1.6E+02       7.0E+01       7.0E+01       7.0E+01       7.0E+01       X       0.0E+00       5.6E+00       7.0E+01			
75718         Dickhordihuoromethane         4,57E+02         682E+02         2,20E+00         2,80E+06         1,70E+02         1,77E+01         4,80E+01         25         243,20         384,85         9,421         0.0E+00         2,0E+01         1,2E+02         0.0E+00         2,0E+01         1,2E+02         0.0E+00         2,0E+01         1,2E+03         3,7E+02         X         1,3E+02         0.0E+00         1,7E+02         X         1,3E+02         X         1,3E+02         X         1,3E+03         2,2E+03         3,7E+02         X         1,3E+03         2,2E+03         3,7E+02         X         1,3E+02         X         1,3E+02         X         1,3E+02         X         1,3E+02         X         1,3E+01         2,7E+03         2,5E+03         3,8E,56         2,53         381,45         547,78         10,938         0,0E+00         7,4E+01         X         0,0E+00         7,4E+01         X         0,0E+00         7,2E+01         0,0E+00         7,2E+01         X         0,0E+00         7,2E+01         X         1,0E+01         X         0,0E+00         7,2E+01         X         1,0E+01         X         0,0E+00         2,2E+01         0,0E+01         7,3E+01         0,0E+01         7,3E+01         0,2E+01         7,3E+02         <			
76131         1.1.2.Trichloro-1.2.2.Hildurodehan         1.11E+04         7.80E-02         6.20E-06         1.70E+02         1.97E+01         4.80E+01         2.5         320.70         447.30         6.463         0.0E+00         3.0E+01         1.87E+02         X         1.87E+02         X         1.87E+02         X         1.87E+02         X         1.87E+03         X         1.87E+03         X         1.87E+02         X <td></td> <td></td> <td></td>			
76448       Heightein       1.11E+06       1.12E-02       5.68E-05       1.80E+00       2.60E+01       1.46E+00       2.5       603.69       84.61       1.3000       0.2E-63       3.37E+02       X       1.3E-03         77444       Hexploxopolentadine       2.00E+05       1.61E-00       2.69E+04       4.83E+04       1.18E-05       2.5       381.04       547.78       10.936       0.0E+00       1.1E+00       7.21E+01       X       0.0E+00         78875       1.2.Dichtoropropane       4.37E+01       7.32E+02       8.30E+04       4.83E+04       1.18E-05       2.5       381.92       5.26E+00       5.0E+00       7.21E+01       X       0.0E+00         78905       1.2.Dichtoropropane       4.37E+01       7.32E+02       8.30E+04       4.38E+01       2.38E+05       2.55       356.78       7.481       0.0E+00       5.0E+00       7.21E+01       X       0.0E+00       7.21E+01       X       0.0E+00       7.21E+01       X       1.8E-03       7.37E+02       X       1.8E-03       7.37E+01       7.0E       0.0E+00       7.2E+01       X			
77474 Hexablorocyclopentaleine         2.00E+05         161E-02         7.21E-06         1.80E+00         1.10E+00         2.68E+02         25         512.15         74.60         10.931         0.0E+00         2.0E+04         2.73E+02         0.0E+00           78831 isolutanol         2.58E+00         8.50E+04         4.83E+04         1.18E+01         2.79E+03         25         381.64         547.78         10.935         0.0E+00         1.1E+02         ?         0.0E+00           78873         1.12E-101         7.82E+02         8.73E+06         2.28E+05         2.29E+03         5.56E+05         25         352.50         536.78         7.481         0.0E+00         7.85E+02         1.33E+02         X         1.6E+05         1.4E+02         1.33E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.		×	х
78831 isobutanol         2.59E+00         8.60E-02         9.30E+06         8.80E+04         4.83E+04         1.18E+05         25         381.44         547.78         10.938         0.0E+00         7.1E+01         X         0.0E+00           78837 12.01ch/orograme         4.37E+01         7.82E+03         5.58E+05         25         356.52         558.78         7.481         0.0E+00         5.0E+00         7.21E+01         0.0E+00           78035 1.12.1ch/orograme         5.01E+01         7.80E+02         8.80E+06         4.22E+03         3.73E+02         9.11E+04         25         366.15         602.00         8.322         1.8E+05         2.28         1.8E+04         1.8E+06         2.0E+00         7.835+02         1.8E+04         2.5         360.15         602.00         8.322         1.8E+02         X         1.8E+02         X         1.8E+04         1.8E+04         2.5         329.80         506.70         7.260         0.0E+00         3.31E+00         7.41E+01         X         0.0E+00         7.895         1.4E+02         1.33E+02         X         1.8E+04         2.5         329.80         506.70         7.260         0.0E+00         3.4E+01         X         0.0E+00         3.4E+01         X         0.0E+00         3.4E+01         <		~	~
78933         Methyderbylektone (2-butanone)         2.30E+00         8.08E-02         9.80E-06         2.22E-03         5.8E-05         25         352.50         538.78         7.481         0.0E+00         7.0E-01         7.80E-01		x	х
79005         11.2-Inclincentane         501E+01         7.80E-02         8.80E-06         4.42E+03         3.73E-02         9.11E-04         25         386.15         602.00         8.322         1.6E-05         1.4E-02         1.33E+02         X         1.1E-04           79016         Incidiorethylee         3.26E+00         1.00E+01         1.00E+05         2.00E+03         4.21E-01         1.03E-02         25         360.36         544.20         7.526         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           73916         1.00E+01         1.00E+05         2.00E+03         4.21E-01         1.03E-02         2.5         360.36         544.20         7.526         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           73945         1.1.2_2_Tetrachioreethane         9.33E+01         7.10E-02         1.01E+05         2.00E+03         1.41E+02         3.44E-04         25         373.50         567.00         8.975         0.0E+00         3.5E+00         7.0E+04         3.5E+00         7.6E+04         1.5E+04         2.5         373.50         567.00         8.975         0.0E+00         3.5E+02         0.0E+00         3.5E+02         0.0E+00         3.5E+02         0.0E+00         3.5E+02 <t< td=""><td></td><td>х</td><td></td></t<>		х	
79016 Tickhorethylene         166E+02         7.90E-02         9.10E-06         1.47E+03         4.21E-01         1.03E+02         25         360.36         544.20         7.505         0.0E+00         3.51E+02         1.11E+02         1.11E+04           79209 Methylacetate         3.32E+01         7.010-02         7.90E+06         2.00E+03         1.41E+02         3.44E+04         25         393.20         564.00         3.5E+00         7.41E+01         X         5.5E+06           79469 2-Mitropropen         1.17E+01         9.23E+02         7.90E+06         2.00E+03         1.41E+02         3.44E+04         25         393.20         594.00         8.38         2.7E+03         2.81E+02         X         5.8E+02         2.7E<03			
79209         Methyl acetate         3 28E+00         1.04E-01         1.00E-05         2.00E+03         4.84E-03         1.18E-04         25         329.80         506.70         7.260         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           793045         1.1.2.2-Tetrachoroethane         9.33E+01         7.10E-02         7.90E-06         2.96E+03         1.41E-02         3.44E-04         25         419.60         661.15         8.996 <b>5.8E+05</b> 7.41E+01         X         5.8E+00         7.41E+01         X         5.8E+00         7.41E+01         X         5.8E+00         7.41E+01         Y         5.8E+00         7.4E+01         Y         0.0E+00         Y         1.00E+02         Y         0.0E+00         Y         Y         0.0E+00         Y         Y         0.0E+00         Y         Y         0.0E+00		x	х
73945         1.12_21etrachtoroethane         9.33E+01         7.10E-02         7.99E-06         2.96E+03         1.41E-02         3.44E-04         25         419.60         661.15         8.996         5.8E-05         1.4E-02         1.8E+02         X         5.8E-05         7.4E+02         1.8E+02         2.7E+03         2.2E+03         2.0E+00         8.81E+02         X         5.8E+05         2.7E+03         2.0E+00         8.81E+02         X         5.8E+05         2.7E+03         2.0E+00         8.81E+02         X         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.8E+02         X			х
80626 Methymethacrylate         6.98E+00         7.70E-02         8.80E+04         1.38E+02         3.36E+04         2.5         373.50         567.00         8.975         0.0E+00         7.0E+01         1.00E+02         X         0.0E+00           83329 Acenaphthene         7.0BE+04         3.42E+04         3.36E+04         2.5         550.54         803.15         12.156         0.0E+00         2.1E+01         1.56E+02         X         0.0E+00           86737 Fluorene         1.38E+04         3.63E+02         7.88E+06         1.98E+00         2.60E+03         6.34E+03         2.5         570.44         807.00         12.666         0.0E+00         1.4E+01         1.66E+02         X         0.0E+00           87633 Hexachtoro-1,3-butadiene         5.37E+04         6.50E+02         5.11E+04         2.2E+05         3.5E+03         2.61E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         9.2E+02         X         0.0E+00			x
83329 Accempthtene         7.08E+03         4.21E-02         7.69E+06         3.57E+00         6.34E-03         1.58E+04         2.5         550.54         803.15         12.155         0.0E+00         1.4E+02         X         0.0E+00           86737 Fluorene         1.38E+04         2.5         550.54         803.15         12.155         0.0E+00         1.4E+02         X         0.0E+00           87637 Fluorene         5.37E+04         5.61E-02         C.18E+00         3.33E+01         6.34E-03         2.5         486.15         7.800         10.208         2.2E+03         3.8E+02         X         2.2E+04           87620 e-Nitroblene         3.24E+04         5.87E+02         8.67E+00         5.11E-04         1.25E+05         2.5         495.00         720.00         12.208         3.0E+03         1.37E+02         X         0.0E+00           91203 Napithalene         2.00E+03         5.90E+04         3.10E+01         1.38E+02         0.0E+00         1.38E+02         0.0E+00         1.8E+02         0.0E+00         0.0E+00         1.8E+02         0.0E+0			
86737 Fluorene         1.38E+04         3.63E-02         7.88E-06         1.98E+00         2.60E-03         6.34E-05         25         570.44         870.00         12.666         0.0E+00         1.4E-01         1.6E-02         X         0.0E+00           87683         Hexachbore-1.3-butatione         5.37E+04         5.61E-02         6.16E-06         3.33E-01         8.13E-03         25         486.15         738.00         10.268         0.0E+00         3.2E-03         2.61E-02         X         0.0E+00           87623         -Mitrotoluene         3.24E+02         5.87E-02         8.67E-06         6.06E+01         1.98E-02         4.82E-04         25         495.10         7.22.90         0.2E+03         1.37E+02         X         0.0E+00           91203         Naphthalene         2.016+03         5.22E-06         3.0E+01         1.98E-02         4.82E-04         25         491.14         74.840         10.373         3.4E-05         1.8E+02         X         0.0E+00           91576         2.40E+013         5.22E-00         7.75E-06         3.0E+01         1.98E+02         2.98E-04         25         529.10         781.00         1.260         0.0E+00         1.4E+02         X         0.0E+00         9.26E+02         1.42E+02 </td <td></td> <td></td> <td></td>			
B7683 Hexachloro-13-butadene         5.37E+04         6.61E-02         6.16E-06         3.20E+00         3.33E+01         8.13E-03         2.5         486.15         738.00         10.208         2.2E+05         3.5E+03         2.61E+02         X         2.2EE-05           88720 - Nitroblene         3.24E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.85E+03         1.226         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.1676         3.0E+02         7.8E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.1676         3.0E+02         7.8E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.0E+00         1.8E+02         1.0E+02         X         0.0E+00           91576 2-MitryInaphtalene         2.3E+03         4.0E+02         8.15E+06         7.45E+02         2.12E+02         5.17E+04         2.5         512+01         1.680         0.0E+00         1.8E+02         1.4E+02         X         0.0E+00           95571 12-Dictionoberzene         6.17E+02         8.0E+02         7.77E+02			X
88722 o-Nitrobluene         3.24E+02         5.87E-02         8.67E-06         6.50E+02         5.11E-04         1.25E-05         2.5         4.95.00         720.00         12.238         0.0E+00         3.2E-03         1.37E+02         X         0.0E+00           91203 Naphthelene         2.00E+03         5.90E-02         7.75E-06         3.10E+01         1.98E+02         4.82E-04         2.5         491.14         748.40         10.373         3.4E-03         1.32E+02         X         0.0E+00           91576 2-Methylinpathtalene         2.81E+03         5.22E-02         7.75E-06         2.46E+01         1.28E-02         5.77E-04         2.5         521.42         671.00         12.260         0.0E+00         1.4E+02         1.42E+02         X         0.0E+00           92524 Biphenyl         4.38E+03         4.04E-02         8.15E-06         7.45E+00         1.28E-02         2.99E-04         2.5         529.10         789.00         10.80         0.0E+00         1.8E+02         X         0.0E+00           95476 0-X/µene         3.38E+02         8.05E+00         1.28E+02         1.29E+02         X         0.0E+00         1.0E+01         1.06E+02         0.0E+00         1.0E+01         1.06E+02         0.0E+00         0.0E+00         1.0E+01			X
91203         Naphthalene         2.00E+03         5.90E-02         7.50E-06         3.10E+01         1.98E-02         4.82E-04         2.5         491.14         748.40         10.373 <b>3.4E-05</b> 1.28E+02         0.0E+00         91/576           91/576         2.4ME/1043         5.22E-02         7.75E-06         3.12E+02         1.78E+02         2.5         491.14         748.40         10.373 <b>3.4E-05</b> 1.28E+02         0.0E+00         91/576           92524         Biphenyi         4.38E+03         4.04E-02         8.15E-06         7.45E+00         1.23E-02         2.99E-04         25         529.10         789.00         10.890         0.0E+00         1.8E-01         1.54E+02         X         0.0E+00           95476         5.Vighene         3.63E+02         8.70E-02         1.28E+02         2.12E-01         5.18E-03         25         417.60         630.30         8.68         10.0E+00         1.68E+02         X         0.0E+00           95578         2.Chorophenol         3.68E+02         7.77E+02         1.90E-03         25         447.55         675.00         9.570         0.0E+00         1.48E+02         2.0E+04         0.0E+00           95578         2.Chorophenol         3.88E+02			x
92524 Biphenyl         4.38E+03         4.04E-02         8.18E+06         7.45E+00         1.23E+02         2.98E+04         2.5         529.10         789.00         10.890         0.0E+00         1.8E+01         1.54E+02         X         0.0E+00           95476 o-Xylene         3.63E+02         8.70E+02         1.08E+00         1.23E+02         2.98E+04         2.5         529.10         789.00         10.890         0.0E+00         1.8E+02         X         0.0E+00         9.676         0.0E+00         1.0E+02         0.0E+00         0.0E+00         1.0E+01         1.06E+02         0.0E+00         0.0E+00         1.0E+02         0.0E+00         0.0E+00         0.0E+00         1.0E+02         0.0E+00         0.0E+	-00 3.0E-03		
95476 o-Xylene         3.63E+02         8.70E-02         1.00E-05         1.78E+02         2.12E-01         5.18E-03         25         417.60         630.30         8.661         0.0E+00         1.0E-01         1.06E+02         0.0E+00           95517 1.2-Dichlorobenzene         6.17E+02         9.09E-00         1.58E+02         7.77E-02         1.90E-03         25         453.57         705.00         9.70         0.0E+00         1.8E+02         0.0E+00         0.0E+00           95578 2-Chlorophenol         3.88E+02         5.10E-02         3.90E-04         25         447.53         675.00         9.70         0.0E+00         1.8E+02         1.20E+02         0.0E+00         0.0E+00           95658 1.2.4-Timethylbenzene         1.35E+03         6.06E-02         7.92E+06         5.70E+01         2.52E+01         6.14E+03         25         447.53         675.00         9.70         0.0E+00         7.0E+02         X         0.0E+00           95636 1.2.4-Timethylbenzene         1.35E+03         6.06E-02         7.92E+06         5.70E+01         2.52E+01         6.14E+03         25         447.53         675.00         9.50E+00         7.0E+03         1.20E+02         X         0.0E+00			х
95501 1.2-Dichlorobenzene         6.17E+02         6.90E-02         7.90E-06         1.56E+02         7.77E-02         1.90E-03         2.5         453.57         705.00         9.700         0.0E+00         1.27E+02         0.0E+00           95578 2-Chlorophenol         3.88E+02         5.01E-02         9.46E-06         2.20E+04         1.60E-02         3.90E-04         2.5         447.53         675.00         9.70         0.0E+00         1.8E-02         1.29E+02         X         0.0E+00           95658 1.2.4-Timmethylberzene         1.35E+03         6.0EE-02         7.92E-06         5.70E+01         6.14E-03         25         442.30         649.17         9.369         0.0E+00         7.0E-03         1.20E+02         0.0E+00		x	х
95578         2-Chlorophenol         3.88E+02         5.01E-02         9.46E-06         2.20E+04         1.60E-02         3.90E-04         25         447.53         675.00         9.572         0.0E+00         1.8E-02         1.29E+02         X         0.0E+00           95636         1,2,4-Trimethybenzene         1.35E+03         6.06E-02         7.92E-06         5.70E+01         2.52E-01         6.14E-03         25         442.30         649.17         9.369         0.0E+00         7.0E-03         1.20E+02         X         0.0E+00			
95636 1,2,4-Trimethyberzene 1.35E+03 6.06E-02 7.92E-06 5.70E+01 2.52E-01 6.14E-03 25 442.30 649.17 9.369 0.0E+00 7.0E-03 1.20E+02 0.0E+00		x	х
			~
96184 1,2,3-Trichloropropane 2.20E+01 7.10E-02 7.90E-06 1.75E+03 1.67E-02 4.08E-04 25 430.00 652.00 9,171 8.6E-03 3.0E-04 1.47E+02 X 5.7E-04		х	
96333 Methylacylate 4,53E+00 9.76E-02 1.02E-05 6.00E+04 7.68E-03 1.87E-04 25 353.70 536.00 7.749 0.0E+00 1.1E-01 8.61E+01 X 0.0E+00 1.0E+00 1.			X
97632 Ethylmethacrylate 2.95E+01 6.53E-02 8.37E-06 3.37E+03 3.44E-02 8.40E-04 25 390.00 571.00 10.957 0.0E+00 3.2E-01 1.14E+02 X 0.0E=00 98066 tert-Burlybenzene 7.71E+02 5.65E-02 8.02E+03 3.44E-02 11.19E+02 25 44210 1220.00 8.980 0.0E+00 1.4E-01 1.34E+02 X 0.0E=00 98066 tert-Burlybenzene 7.71E+02 5.65E-02 8.02E+03 3.44E-02 5.55E-01 1.19E+02 5.55E-01 1.34E+02 5.55E-01 1.			X
98000 tert-butytoenzene /./TE+V2 5:05E-V2 5/2E+V0 2.55E+V1 4.67E-V1 1.19E-V2 25 442.10 1220.00 8,980 0.0E+V0 1.4E-V1 1.34E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 6.55E-05 7.10E-V0 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.4E-V1 1.20E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 6.55E-05 7.10E-V0 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 5.56 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 5.56 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 5.56 5.56 5.56 5.56 5.56 5.56 5.56 5.5		~	~
98862 Acetophenone 5.77E+01 6.00E-02 8.73E-06 6.13E+03 4.38E-04 1.07E-05 25 475.00 709.50 11,732 0.0E+00 3.5E-01 1.20E+02 X 0.0E+00	00 3.5E-01	х	х
98953 Nitrobenzene 6.46E+01 7.60E-02 8.60E-06 2.09E+03 9.82E-04 2.39E-05 25 483.95 719.00 10,566 0.0E+00 2.0E-03 1.23E+02 0.0E+00	00 2.0E-03		
100414 Ethybenzene 3.63E+02 7.50E-02 7.80E-06 1.69E+02 3.22E-01 7.86E-03 25 409.34 617.20 8.501 2.5E-06 1.0E+00 1.06E+02 0.0E+00			
100425 Styrene 7.76E+02 7.10E-02 8.00E-06 3.10E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.0E+00 9.0E-01 1.04E+02 0.0E=00 10047 9.0E-01 1.04E+02 4.14E-04 25 448.21 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 7.80E-06		~	
100447 Benzyleholde 6.14E+01 7.50E-02 7.80E-06 5.25E+02 1.70E-02 4.14E-04 25 452.00 685.00 8,773 4.9E-05 1.0E-03 1.27E+02 ? 4.9E-05 100527 Benzyleholde 4.59E+01 7.21E-02 9.07E-06 3.30E+03 9.73E-04 2.37E-05 25 452.00 685.00 11.658 0.0E+00 3.5E-01 1.06E+02 X 0.0E+00		×	x
100627 derizaberlyde 1,35E-701 7,21E-02 5/01E-00 5/01E-00 5/01E-00 2/0 4/02.00 05/00 1/000 1/00010 0.0E-00 1,4E-01 1/00E-02 X 0.0E+00 1/4E-01 1/00E+02 X 0.0E+00			x
104518 n-Butylbenzene 1.11E+03 5.70E-02 8.12E-06 2.00E+00 5.38E-01 1.31E-02 25 456.46 660.50 9,290 0.0E+00 1.4E-01 1.34E+02 X 0.0E+00		x	X
106423 p-Xylene 3.89E+02 7.69E-02 8.44E-06 1.85E+02 3.13E-01 7.64E-03 25 411.52 616.20 8.525 0.0E+00 1.0E-01 1.06E+02 ? 0.0E+00			
106467 1,4-Dichlorobenzene 6.17E+02 6.90E-02 7.90E-06 7.90E+01 9.82E-02 2.39E-03 25 447.21 684.75 9,271 1.1E-05 8.0E-01 1.47E+02 0.0E+00 0.0E+00	00 8.0E-01		

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### VW4 180 $ug/m^3$ Toluene

#### DATA ENTRY SHEET

ENTER Chemical CAS No. umbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc.,		(last modified 12/6/2011)
CAS No. umbers only,	gas conc., C <sub>g</sub>	OR	gas		
CAS No. umbers only,	conc., C <sub>g</sub>	OR	•		
umbers only,	Cg		conc		
	•		conc.,		
no dashes)	$(uq/m^3)$		Cg		
	(µg/III )	-	(ppmv)		Chemical
108883	1.80E+02	ו	<del>_</del>		Toluene
	ENTER	ENTER	ENTER		ENTER
	ENTER	ENTER	ENTER		ENTER
	Soil ass		Vadose zone		User-defined
		Average			vadose zone
		•			soil vapor
				OR	permeability,
. ,		• •	•	on	k <sub>v</sub>
5 or 200 cm)	(cm)	( <sup>o</sup> C)	permeability)		(cm <sup>2</sup> )
15	152.4	24	SI		
,	ENTER Depth elow grade to bottom f enclosed pace floor, L <sub>F</sub>	ENTER ENTER Depth elow grade Soil gas to bottom sampling f enclosed depth pace floor, below grade, L <sub>F</sub> L <sub>s</sub>	$\begin{array}{cccc} \textbf{ENTER} & \textbf{ENTER} & \textbf{ENTER} \\ Depth \\ elow grade & Soil gas \\ to bottom & sampling & Average \\ f enclosed & depth & soil \\ pace floor, & below grade, & temperature, \\ L_F & L_s & T_S \end{array}$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	ENTER     ENTER     ENTER       Depth     elow grade     Soil gas     Vadose zone       to bottom     sampling     Average     SCS       f enclosed     depth     soil     soil type       pace floor,     below grade,     temperature,     (used to estimate     OR       L <sub>F</sub> L <sub>s</sub> T <sub>S</sub> soil vapor

MORE ↓	ENTER Vandose zone SCS soil type Lookup Soil Parameters	$\begin{array}{c} \textbf{ENTER} \\ \text{Vadose zone} \\ \text{soil dry} \\ \text{bulk density,} \\ \rho_{\text{b}}^{\text{A}} \\ (g/\text{cm}^3) \end{array}$	ENTER Vadose zone soil total porosity, n <sup>V</sup> (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ (cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

ENTER					
Average vapor					
flow rate into bldg.					
(Leave blank to calculate)					
Q <sub>soil</sub>					
(L/m)					
5					

MORE ↓

E	ENTER	ENTER	ENTER	ENTER
	Averaging time for carcinogens, AT <sub>C</sub>	Averaging time for noncarcinogens, AT <sub>NC</sub>	Exposure duration, ED	Exposure frequency, EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

### VW4 180 $ug/m^3$ Toluene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	1.80E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	8.36E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.80E+02	1.25	8.33E+01	8.36E-03	5.00E+03	4.58E+08	1.04E-03	1.87E-01

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	3.0E-01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	6.0E-04

MESSAGE SUMMARY BELOW:

### VW4 33 ug/m<sup>3</sup> Ethylbenzene

#### DATA ENTRY SHEET

ersion 2.0; 04/		Soil	Gas Concentratio	n Data		Vapor Intrusion Guidance Interim Final 12/04	
Reset to	ENTER	ENTER	our concontratio	ENTER	(last modified 12/6/2011)		
Defaults		Soil		Soil			
Delaulto	Chemical	gas	OR	gas			
	CAS No.	conc.,		conc.,			
	(numbers only,	Cg		Cg			
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical	
	100414	3.30E+01	]			Ethylbenzene	
	ENTER Depth	ENTER	ENTER	ENTER		ENTER	
MORE	below grade	Soil gas		Vadose zone		User-defined	
$\mathbf{+}$	to bottom	sampling	Average	SCS		vadose zone	
	of enclosed	depth	soil	soil type		soil vapor	
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,	
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>	
	(15 or 200 cm)	(cm)	(°C)	permeability)	:	(cm <sup>2</sup> )	
	15	152.4	24	SI	ſ		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
¥	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167
		1.55	0.409	0.107

ENTER						
Average vapor						
flow rate into bldg.						
(Leave blank to calculate)						
Q <sub>soil</sub>						
(L/m)						
5						

MORE ↓

ENTER Averaging	ENTER Averaging	ENTER	ENTER
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

### VW4 33 ug/m<sup>3</sup> Ethylbenzene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	3.30E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,994	7.43E-03	3.05E-01	1.80E-04	7.20E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.30E+01	1.25	8.33E+01	7.20E-03	5.00E+03	1.11E+10	9.50E-04	3.13E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.5E-06	1.0E+00
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
3.2E-08	3.0E-05

MESSAGE SUMMARY BELOW:

### VW4 110 ug/m<sup>3</sup> m,p-Xylene

#### DATA ENTRY SHEET

ersion 2.0; 04/		Soil	Gas Concentratio	n Data		Vapor Intrusion Guidance Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(μg/m <sup>3</sup> )	-	(ppmv)		Chemical
	106423	1.10E+02	]			p-Xylene
	ENTER	ENTER	ENTER	ENTER		ENTER
	Depth					
MORE	below grade	Soil gas	A	Vadose zone		User-defined
$\bullet$	to bottom of enclosed	sampling	Average soil	SCS		vadose zone
	space floor,	depth below grade,	temperature,	soil type (used to estimate	OR	soil vapor permeability,
	L <sub>F</sub>	L <sub>s</sub>	T <sub>S</sub>	soil vapor	OR	k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SI		
		102.1		01		·J

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
4	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	$\rho_b^A$	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

E					
	ENTER	ENTER	ENTER	ENTER	
	Averaging	Averaging			
	time for	time for	Exposure	Exposure	
	carcinogens,	noncarcinogens,	duration,	frequency,	
	AT <sub>c</sub>	AT <sub>NC</sub>	ED	EF	
	(yrs)	(yrs)	(yrs)	(days/yr)	_
					-
	70	30	30	350	1
					-

### VW4 110 ug/m<sup>3</sup> m,p-Xylene

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	1.10E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,083	7.22E-03	2.96E-01	1.80E-04	7.39E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.10E+02	1.25	8.33E+01	7.39E-03	5.00E+03	6.28E+09	9.64E-04	1.06E-01

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	1.0E-03

MESSAGE SUMMARY BELOW:

### VW4 39 $ug/m^3$ o-Xylene

#### DATA ENTRY SHEET

	-		Gas Concentratio			Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(μg/m <sup>3</sup> )	-	(ppmv)		Chemical
	95476	3.90E+01	]			o-Xylene
MORE	ENTER Depth below grade	ENTER Soil gas	ENTER	ENTER Vadose zone		ENTER User-defined
WORE V	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SI		
			•	•		<u>.</u>

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

ENTER	ENTER	ENTER	ENTER
 Averaging	Averaging		
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

### VW4 39 ug/m<sup>3</sup> o-Xylene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>bullding</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	3.90E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µтs (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,245	4.88E-03	2.00E-01	1.80E-04	8.36E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.90E+01	1.25	8.33E+01	8.36E-03	5.00E+03	4.58E+08	1.04E-03	4.05E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m³)⁻¹	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	3.9E-04

MESSAGE SUMMARY BELOW:

### VW4-DUP 3,500 ug/m<sup>3</sup> TPH-G

#### DATA ENTRY SHEET

	_	Soil	Gas Concentratio	n Data		Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m³)	-	(ppmv)		Chemical
	60297	3.50E+03	]			TPH-Gasoline
MORE	ENTER Depth below grade	ENTER Soil gas	ENTER	ENTER Vadose zone		ENTER User-defined
$\mathbf{+}$	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
				SI		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{V}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	$\rho_b^A$	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

ENTER Averaging	ENTER Averaging	ENTER	ENTER
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

## VW4-DUP 3,500 ug/m<sup>3</sup> TPH-G

#### CHEMICAL PROPERTIES SHEET

Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Molecular weight, MW (g/mol)	-
7.00E-02	7.80E-06	3.00E-02	25	7,000	369.00	508.00	0.0E+00	4.9E+01	108.00	]

### VW4-DUP 3,500 $ug/m^3$ TPH-G

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	BIdg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	3.50E+03	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	8,304	2.86E-02	1.17E+00	1.80E-04	6.72E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.50E+03	1.25	8.33E+01	6.72E-03	5.00E+03	5.81E+10	9.10E-04	3.18E+00

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	4.9E+01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	6.2E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

## VW4-DUP 3,500 ug/m<sup>3</sup> TPH-G

VLOOKUP TABLES

		S	oil Properties L	ookup Table				Bulk Density	
SCS Soil Type	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> ) SCS Soil Name
С	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215 Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168 Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148 Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076 Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054 Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197 Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146 Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167 Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216 Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198 Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180 Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103 Sandy Loam

																	T	Original E	PA Values	
		Organic		C	hemical Proper Pure	ties Lookup Table	Henry's	Henry's			Enthalpy of (		oxicity Criter 12/02/2011 D							
		carbon			component		law constant	law constant	Normal		vaporization at	Unit	12/02/2011/2				Unit			
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	risk	Reference	Molecular			risk	Reference		
		coefficient,	in air,	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor, URF	conc.,	weight,	URF	RfC	factor, URF	conc.,	URF	RfC
	<b>a</b>	K <sub>oc</sub>	D <sub>a</sub> (cm <sup>2</sup> /s)	D <sub>w</sub>	S	H'	H	T <sub>R</sub>	TB	Tc	ΔH <sub>v,b</sub>		RfC	MW	extrapolated			RfC		d extrapolate
CAS No.	Chemical	(cm <sup>3</sup> /g)	(cm <sup>-</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m <sup>3</sup> /mol)	(°C)	(°K)	(°K)	(cal/mol)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(g/mol)	(X)	(X)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(X)	(X)
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	4.2E-05	4.0E-02	1.54E+02			1.5E-05	0.0E+00		
	9 Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05		624.24	885.73	14,000	3.4E-04	7.0E-04	4.10E+02			1.0E-04			
	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.1E-04	1.1E-03	2.91E+02	?	х	3.7E-04		Х	х
	7 TPH-Gasoline	5.00E+03	7.00E-02	7.80E-06	1.50E+02	7.20E-04	3.00E-02		369.00		7,000	0.0E+00	4.9E+01	1.08E+02		х	0.0E+00			х
	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32		17,000	4.6E-03	1.8E-04	3.81E+02		x	4.6E-03			х
	Acetone Chloroform	5.75E-01 3.98E+01	1.24E-01 1.04E-01	1.14E-05 1.00E-05	1.00E+06 7.92E+03	1.59E-03 1.50E-01	3.87E-05 3.66E-03		329.20 334.32	508.10 536.40	6,955 6,988	0.0E+00 5.3E-06	3.1E+01 3.0E-01	5.81E+01 1.19E+02		х	0.0E+00 2.3E-05			х
	Hexachloroethane	1.78E+01	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03		458.00		9.510	1.1E-05	3.5E-03	2.37E+02		×	4.0E-06			х
	2 Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24		7,342	2.9E-05	3.0E-02	7.81E+01		X	7.8E-06			~
71556	5 1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02		347.24	545.00	7,136	0.0E+00	5.0E+00	1.33E+02			0.0E+00			
	5 Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05		651.02		16,000	0.0E+00	1.8E-02	3.46E+02		х	0.0E+00			Х
72559		4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05		636.44		15,000	9.7E-05	0.0E+00	3.18E+02	?		9.7E-05			
	Methyl bromide	1.05E+01	7.28E-02 1.26E-01	1.21E-05	1.52E+04	2.55E-01	6.22E-03 8.80E-03	25 25	276.71 249.00	467.00	5,714 5,115	0.0E+00 1.8E-06	5.0E-03 9.0E-02	9.49E+01 5.05E+01			0.0E+00 1.0E-06			
	3 Methyl chloride (chloromethane) 3 Hydrogen cyanide	2.12E+00 3.80E+00	1.26E-01 1.93E-01	6.50E-06 2.10E-05	5.33E+03 1.00E+06	3.61E-01 5.44E-03	8.80E-03 1.33E-04	25	249.00	416.25 456.70	6,115	1.8E-06 0.0E+00	9.0E-02 3.0E-03	2.70E+01			1.0E-06 0.0E+00			
	3 Methylene bromide	1.26E+00	4.30E-02	2.10E-05 8.44E-06	1.19E+06	3.52E-02	8.59E-04	25	370.00		7,868	0.0E+00	3.0E-03 3.5E-02	2.70E+01 1.74E+02		х	0.0E+00			х
	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	6.45E+01	?	X	8.3E-07		x	~
	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25		5,250	7.8E-05	1.0E-01	6.25E+01			8.8E-06			
	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60		7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00			
	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10		6,157	2.7E-06	9.0E-03	4.41E+01			2.2E-06			
	2 Methylene chloride	1.17E+01 4.57E+01	1.01E-01 1.04E-01	1.17E-05 1.00E-05	1.30E+04 1.19E+03	8.96E-02 1.24E+00	2.18E-03 3.02E-02		313.00 319.00	510.00 552.00	6,706	1.0E-06 0.0E+00	4.0E-01 7.0E-01	8.49E+01 7.61E+01			4.7E-07 0.0E+00			
	Carbon disulfide Ethylene oxide	4.57E+01 1.33E+00	1.04E-01 1.04E-01	1.00E-05 1.45E-05	1.19E+03 3.04E+05	1.24E+00 2.27E-02	3.02E-02 5.54E-04	25	283.60		6,391 6,104	8.8E-05	3.0E-01	4.41E+01		2	1.0E-04			
	2 Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35		9,479	1.1E-06	7.0E-02	2.53E+02		x	1.1E-04			х
	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03		363.15		7,800	3.7E-05	7.0E-02	1.64E+02		x	1.8E-05			X
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01	7.85E+01		?	0.0E+00	1.0E-01		
	3 1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	1.6E-06	7.0E-01	9.90E+01		х	0.0E+00			
	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75		6,247	0.0E+00	7.0E-02	9.69E+01			0.0E+00			
	Chlorodifluoromethane	4.79E+01 4.97E+02	1.01E-01 8.70E-02	1.28E-05 9.70E-06	2.00E+00 1.10E+03	1.10E+00 3.97E+00	2.70E-02 9.68E-02	25 25	232.40 296.70		4,836 5,999	0.0E+00 0.0E+00	5.0E+01 7.0E-01	8.65E+01 1.37E+02			0.0E+00 0.0E+00			
	3 Dichlorodifluoromethane	4.97E+02 4.57E+02	6.65E-02	9.70E-06 9.92E-06	2.80E+02	1.40E+01	9.00E-02 3.42E-01	25	296.70		9,421	0.0E+00	2.0E-01	1.37E+02 1.21E+02			0.0E+00			
	1,1,2-Trichloro-1,2,2-trifluoroethar	1.11E+04	7.80E-02	8.20E-00	1.70E+02	1.97E+01	4.80E-01	25	320.70		6.463	0.0E+00	3.0E+01	1.87E+02			0.0E+00			
	B Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69		13,000	1.2E-03	1.8E-03	3.73E+02		х	1.3E-03			х
	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15		10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00			
	1 Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05		381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		х	0.0E+00			х
	5 1,2-Dichloropropane	4.37E+01 2.30E+00	7.82E-02 8.08E-02	8.73E-06 9.80E-06	2.80E+03 2.23E+05	1.15E-01 2.29E-03	2.79E-03 5.58E-05	25 25	369.52 352.50	572.00 536.78	7,590 7,481	1.0E-05 0.0E+00	4.0E-03 5.0E+00	1.13E+02 7.21E+01			1.9E-05 0.0E+00			
	Methylethylketone (2-butanone)	2.30E+00 5.01E+01	8.08E-02 7.80E-02	9.80E-06 8.80E-06	2.23E+05 4.42E+03	2.29E-03 3.73E-02	5.58E-05 9.11E-04	25	352.50	536.78 602.00	7,481 8,322	1.6E-05	5.0E+00 1.4F-02	1.33E+01		x	1.6E-05			х
	S Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	4.1E-06	2.0E-02	1.31E+02		^	1.1E-04			^
	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00	7.41E+01		х	0.0E+00			х
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	1.4E-02	1.68E+02		х	5.8E-05	2.1E-01		х
	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04		393.20		8,383	2.7E-03	2.0E-02	8.91E+01			2.7E-03			
	6 Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50		8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00			
	Acenaphthene 7 Fluorene	7.08E+03 1.38E+04	4.21E-02 3.63E-02	7.69E-06 7.88E-06	3.57E+00 1.98E+00	6.34E-03 2.60E-03	1.55E-04 6.34E-05	25 25	550.54 570.44	803.15 870.00	12,155 12,666	0.0E+00 0.0E+00	2.1E-01 1.4E-01	1.54E+02 1.66E+02		x	0.0E+00 0.0E+00			x
	B Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	3.5E-03	2.61E+02		â	2.2E-05			x
	2 o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.2E-03	1.37E+02		x	0.0E+00	3.5E-02		x
	3 Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	3.4E-05	3.0E-03	1.28E+02			0.0E+00			
	3 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26		12,600	0.0E+00	1.4E-02	1.42E+02		х	0.0E+00			х
	Biphenyl	4.38E+03	4.04E-02	8.15E-06 1.00E-05	7.45E+00	1.23E-02	2.99E-04	25	529.10 417.60		10,890 8,661	0.0E+00 0.0E+00	1.8E-01 1.0E-01	1.54E+02 1.06E+02		х	0.0E+00			х
	6 o-Xylene I 1,2-Dichlorobenzene	3.63E+02 6.17E+02	8.70E-02 6.90E-02	7.90E-06	1.78E+02 1.56E+02	2.12E-01 7.77E-02	5.18E-03 1.90E-03	25 25	417.60 453.57		9,700	0.0E+00 0.0E+00	1.0E-01 2.0E-01	1.06E+02 1.47E+02			0.0E+00 0.0E+00			
	3 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2 20E+02	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	1.47E+02		x	0.0E+00			х
	5 1.2.4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03		442.30		9.369	0.0E+00	7.0E-02	1.20E+02		~	0.0E+00			~
	1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00		9,171	8.6E-03	3.0E-04	1.47E+02			5.7E-04			
	3 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70		7,749	0.0E+00	1.1E-01	8.61E+01		х	0.0E+00			х
	2 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	1.14E+02		x	0.0E+00			X
	6 tert-Butylbenzene 8 Cumene	7.71E+02 4.89E+02	5.65E-02 6.50E-02	8.02E-06 7.10E-06	2.95E+01 6.13E+01	4.87E-01 4.74E+01	1.19E-02 1.16E+00	25 25	442.10 425.56		8,980 10.335	0.0E+00 0.0E+00	1.4E-01 4.0E-01	1.34E+02 1.20E+02		х	0.0E+00 0.0E+00			х
	2 Acetophenone	4.89E+02 5.77E+01	6.50E-02 6.00E-02	7.10E-06 8.73E-06	6.13E+01 6.13E+03	4.74E+01 4.38E-04	1.16E+00 1.07E-05		425.56		10,335	0.0E+00 0.0E+00	4.0E-01 3.5E-01	1.20E+02 1.20E+02		×	0.0E+00 0.0E+00			х
	3 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95		10,566	0.0E+00	2.0E-03	1.23E+02		~	0.0E+00			~
	Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34		8,501	2.5E-06	1.0E+00	1.06E+02			0.0E+00			
	5 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31		8,737	0.0E+00	9.0E-01	1.04E+02			0.0E+00			
	Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04		452.00		8,773	4.9E-05	1.0E-03	1.27E+02	?		4.9E-05		х	
	7 Benzaldehyde I n-Propylbenzene	4.59E+01 5.62E+02	7.21E-02 6.01E-02	9.07E-06 7.83E-06	3.30E+03 6.00E+01	9.73E-04 4.37E-01	2.37E-05 1.07E-02		452.00 432.20		11,658 9,123	0.0E+00 0.0E+00	3.5E-01 1.4E-01	1.06E+02 1.20E+02		x	0.0E+00 0.0E+00			X X
	I n-Propylbenzene 3 n-Butvlbenzene	5.62E+02 1.11E+03	6.01E-02 5.70E-02	7.83E-06 8.12E-06	6.00E+01 2.00E+00	4.37E-01 5.38E-01	1.0/E-02 1.31E-02		432.20 456.46		9,123 9.290	0.0E+00 0.0E+00	1.4E-01 1.4E-01	1.20E+02 1.34E+02		x	0.0E+00 0.0E+00			x
													1.4E-01	1.06E+02		2				~
	p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00					0.0E+00	1.0E-01		

### VW4-DUP 170 ug/m<sup>3</sup> Toluene

#### DATA ENTRY SHEET

-	Soil		Interim Final 12/04			
ENTER	ENTER		ENTER		(last modified 12/6/2011)	
	Soil		Soil			
Chemical	gas	OR	gas			
CAS No.	conc.,		conc.,			
(numbers only,	C <sub>q</sub>		Cq			
no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical	
108883	1.70E+02	1	r		Toluene	
Depth	ENTER	ENTER	ENTER		ENTER	
Depth						
					User-defined	
					vadose zone	
					soil vapor	
space floor,	below grade,		,	OR	permeability,	
L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>	
(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )	
15	152.4	24	SI			
	Chemical CAS No. (numbers only, no dashes) 108883 ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (15 or 200 cm)	Chemical     gas       CAS No.     conc.,       (numbers only,     Cg       no dashes)     (µg/m³)       108883     1.70E+02         ENTER     ENTER       Depth     Soil gas       below grade     Soil gas       to bottom     sampling       of enclosed     depth       below grade,     L <sub>s</sub> (15 or 200 cm)     (cm)	Soil       Chemical     gas     OR       CAS No.     conc.,     OR       (numbers only,     Cg     OR       no dashes)     (µg/m³)     OR       108883     1.70E+02     Interval       108883     1.70E+02     Interval       ENTER     ENTER     ENTER       Depth     Soil gas     Soil       below grade     Soil gas     Soil       space floor,     below grade,     temperature,       LF     Ls     Ts       (15 or 200 cm)     (cm)     (°C)	$\begin{tabular}{ c c c c c } & Soil & Soil & Soil & Soil & \\ Chemical & gas & OR & gas & \\ CAS No. & conc., & conc., & \\ (numbers only, & C_g & C_g & \\ (\mu g/m^3) & (ppmv) & \\ \hline & & & & \\ \hline & & & & & \\ \hline & & & &$	$\begin{tabular}{ c c c c c c } & Soil & Soil & GR & gas & GR & gas & GR & gas & GR & gas & GR & gas & GR & Gas &$	

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{A}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρϧΑ	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

E	ENTER Averaging	ENTER Averaging	ENTER	ENTER
	time for	time for	Exposure	Exposure
	carcinogens,	noncarcinogens,	duration,	frequency,
	AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

# VW4-DUP 170 ug/m<sup>3</sup> Toluene

### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	1.70E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µтs (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	8.36E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.70E+02	1.25	8.33E+01	8.36E-03	5.00E+03	4.58E+08	1.04E-03	1.76E-01

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	3.0E-01
END	

DTSC / HERD Last Update: 11/1/03

### INCREMENTAL RISK CALCULATIONS:

Hazard
quotient
from vapor
intrusion to
indoor air,
noncarcinogen
(unitless)
5.6E-04

MESSAGE SUMMARY BELOW:

### VW4-DUP 32 ug/m<sup>3</sup> Ethylbenzene

DATA ENTRY SHEET

ersion 2.0; 04/		Soil	Gas Concentratio	n Data	Vapor Intrusion Guidance Interim Final 12/04	
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
Deludito	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	100414	3.20E+01	ו			Ethylbenzene
MORE ↓	ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
	15	152.4	24	SI		
	15	152.4	24			
MORE	ENTER Vandose zone	ENTER Vadose zone	ENTER Vadose zone	ENTER Vadose zone		ENTER Average vapor
₩OILE ₩	SCS	soil dry	soil total	soil water-filled		flow rate into bldg.
	soil type	bulk density,	porosity,	porosity,		(Leave blank to calculate)

Vandose zone	Vadose zone	Vadose zone	Vadose zone
SCS	soil dry	soil total	soil water-filled
soil type	bulk density,	porosity,	porosity,
Lookup Soil	ρ <sub>b</sub> <sup>A</sup>	n∨	$\theta_w^{\vee}$
Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
SI	1.35	0.489	0.167

ENTER

Exposure

duration,

ED

(yrs)

30

ENTER

Exposure

frequency, EF

(days/yr)

350

ENTER

Averaging

time for

noncarcinogens,

 $\mathsf{AT}_{\mathsf{NC}}$ 

(yrs)

30

Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

¥

MORE

ENTER

Averaging time for

carcinogens,

AT<sub>c</sub>

(yrs)

70

### VW4-DUP 32 ug/m<sup>3</sup> Ethylbenzene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	3.20E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,994	7.43E-03	3.05E-01	1.80E-04	7.20E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.20E+01	1.25	8.33E+01	7.20E-03	5.00E+03	1.11E+10	9.50E-04	3.04E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.5E-06	1.0E+00
END	

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
3.1E-08	2.9E-05

MESSAGE SUMMARY BELOW:

END

Γ

### VW4-DUP 81 ug/m<sup>3</sup> m,p-Xylene

### DATA ENTRY SHEET

			Gas Concentratio			Vapor Intrusion Guidance Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults	Chemical CAS No. (numbers only,	Soil gas conc., C <sub>g</sub>	OR	Soil gas conc., C <sub>g</sub>		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	106423	8.10E+01	]			p-Xylene
	ENTER Depth	ENTER	ENTER	ENTER		ENTER
MORE ↓	below grade to bottom of enclosed	Soil gas sampling depth	Average soil	Vadose zone SCS soil type		User-defined vadose zone soil vapor
	space floor, L <sub>F</sub>	below grade,	temperature, T <sub>s</sub>	(used to estimate	OR	permeability, k <sub>v</sub>
	L <sub>F</sub> (15 or 200 cm)	L <sub>s</sub> (cm)	(°C)	soil vapor permeability)		(cm <sup>2</sup> )
	15	152.4	24	SI		

MORE ↓	ENTER Vandose zone SCS soil type Lookup Soil	ENTER Vadose zone soil dry bulk density, pb <sup>A</sup>	ENTER Vadose zone soil total porosity, n <sup>V</sup>	ENTER Vadose zone soil water-filled porosity, ⊕ <sub>w</sub> <sup>∨</sup>
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ¥

ENTER ENTER ENTER ENTER Averaging Averaging time for time for Exposure Exposure carcinogens, noncarcinogens, duration, frequency, EF AT<sub>c</sub>  $\mathsf{AT}_{\mathsf{NC}}$ ED (yrs) (yrs) (yrs) (days/yr) 30 30 70

END

350

# VW4-DUP 81 ug/m<sup>3</sup> m,p-Xylene

### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	8.10E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,083	7.22E-03	2.96E-01	1.80E-04	7.39E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	8.10E+01	1.25	8.33E+01	7.39E-03	5.00E+03	6.28E+09	9.64E-04	7.81E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

DTSC / HERD Last Update: 11/1/03

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	7.5E-04

MESSAGE SUMMARY BELOW:

# VW4-DUP 33 $ug/m^3$ o-Xylene

### DATA ENTRY SHEET

	_	Soil	Gas Concentratio	n Data		Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
More ↓	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	95476	3.30E+01	ן	<del> </del>		o-Xylene
	Depth below grade to bottom of enclosed space floor,	Soil gas sampling depth below grade,	Average soil temperature,	Vadose zone SCS soil type (used to estimate	OR	User-defined vadose zone soil vapor permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SI		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
¥	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167
			•	

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

E				
	ENTER	ENTER	ENTER	ENTER
	Averaging	Averaging		
	time for	time for	Exposure	Exposure
	carcinogens,	noncarcinogens,	duration,	frequency,
	AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

END
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# VW4-DUP 33 ug/m<sup>3</sup> o-Xylene

### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	3.30E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µтs (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,245	4.88E-03	2.00E-01	1.80E-04	8.36E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.30E+01	1.25	8.33E+01	8.36E-03	5.00E+03	4.58E+08	1.04E-03	3.42E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

DTSC / HERD Last Update: 11/1/03

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	3.3E-04

MESSAGE SUMMARY BELOW:

### DATA ENTRY SHEET

Reset to	Soil Gas Concentration Data					Interim Final 12/04 (last modified 12/6/2011)		
		Soil		Soil		()		
Defaults	Chemical	gas	OR	gas				
	CAS No.	conc.,		conc.,				
	(numbers only,	Cg		Cg				
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical		
	60297	1.00E+04	]			TPH-Gasoline		
	ENTER	ENTER	ENTER	ENTER		ENTER		
	Depth							
MORE	below grade	Soil gas		Vadose zone		User-defined		
↓	to bottom	sampling	Average	SCS		vadose zone		
	of enclosed	depth	soil	soil type		soil vapor		
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,		
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>		
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )		
	15	152.4	24	SC				

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{\Psi}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	$\rho_b^A$	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

Г

E	ENTER Averaging	ENTER Averaging	ENTER	ENTER
	time for	time for	Exposure	Exposure
	carcinogens,	noncarcinogens,	duration,	frequency,
	AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

### CHEMICAL PROPERTIES SHEET

	Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Molecular weight, MW (g/mol)
7.00E-02 7.80E-06 3.00E-02 25 7,000 369.00 508.00 0.0E+00 4.9E+01 108.00	7.00E-02	7.80E-06	3.00E-02	25	7,000	369.00	508.00	0.0E+00	4.9E+01	108.00

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.00E+04	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	8,304	2.86E-02	1.17E+00	1.80E-04	1.81E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.00E+04	1.25	8.33E+01	1.81E-03	5.00E+03	1.09E+40	3.35E-04	3.35E+00

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	4.9E+01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	6.6E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

VLOOKUP TABLES

		S	oil Properties L	ookup Table				Bulk Density	
SCS Soil Type	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> ) SCS Soil Name
С	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215 Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168 Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148 Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076 Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054 Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197 Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146 Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167 Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216 Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198 Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180 Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103 Sandy Loam

PT38 Observer         1257-00         1456-02         1256-03         1456-02         1256-03         1456-02         1256-03         1550-03         1456-03         1550-03         1456-03         1550-03			
undress         component         temporal         berray         temporal         <			
conflicts         instr.         instr.         instr.         instr.         instruction         instruction <td></td> <td></td> <td></td>			
Lensisu         Lensisu         Life         D         S         H         H         H         T         T         T         H         H         H         H         H         T         T         T         H			
LOBIN         Character         CPUI         Current         CPUI			RfC
State         Characterization         124-00         7.06-00         126-00         <		extrapolated extrapo	
PT28 Observed         116:20	) <sup>-1</sup> (mg/m <sup>3</sup> )	(X) (X	(X)
PT28 Observed         116:20	-05 0.0E+00		
Bits Bits and an analysis         107-03         1.46-00         7.346-00         7.736-0			
Boy?         Definition         2.14-04         1.25-04         1.25-06         1.25-05         2.5         0.13.2         0.42.35         1.15-05         3.87.55         3.8	-04 1.1E-03	x x	Х
D/0141 Accione         578-01         1244-05         1144-05         1064-05         218-25         208.10         0.58-05			Х
PM3 Checkborn         388-01         1046-01         1046-01         388-03         25         333-32         60.84         6.86         5.8-01         3.16-01         3.88-03         25         333-32         60.840         6.98         5.16-01         3.86-03         2.76         4.60.00           7713         Schwardsondhane         5.900-02         5.800-02         2.76         1.06-01         5.900-02         2.800-02         3.800-02			X
1721: HoadRongthing         1782-10         2565-00         6500-00         176-00         2572-10         2772-00         5500-00         6500-00         1560-00         3560-00		X	х
P1432 Biname         6.88E-01         6.88E-01         6.88E-01         7.88E-01         7.78E-03         2.85E-01         7.78E-03         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         7.78E-03         3.82-11         3.82-12         7.78E-03         7.78E-03         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-11         3.82-11         3.82-11 <td></td> <td>×</td> <td>х</td>		×	х
172450         Methodychia         184-02         144-02         544-06         1000-00         646-04         1260-05         25         611.02         844-00         116-00         0.00-00         804-00         126-00         0.00-00 </td <td></td> <td></td> <td></td>			
74580         DEL         4.7E+00         1.2EE+00         1.2E			
Partial         Methy formine         1.21E-00         1.22E-01         2.22E-01			х
Prior Multip dustation (choromatham)         212E+00         1.86-00         5.3E+03         3.81E+01         8.80E-03         2.8         240.00         446.25         5.115         1.8.66         0.6-20         5.2E+01         0.6E+00           Prior Margin Control         1.850+0         1.250+0         5.850+0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.852         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         2.850-0         3.850-0         3.850-0         3.850-0         3.850-0         3.850-0         2.850-0         3.850-0         5.850-0         7.100-0         0.65-0         3.850-0         0.850-0         3.850-0		х	
Protect         3.88E+00         1.83E+01         2.10E+06         1.02E+06         2.52         2.90.00         4.66.70         0.0E+00         3.10E+01         2.70E+01         0.0E+00         3.10E+01         3.10			
9000 Cholombane (ethy chonde)         4.46E-00         2.71E-01         1.15E-05         5.88E+03         3.61E-01         2.86E-03         2.52         2.88.30         440.40         5.879         8.8E-07         1.00E-10         6.4EE+01         2.8EE+03           70568         Actionatie         4.20E+00         1.28E+03         1.08E+03         1.7EE+03         3.4EE+03         2.52         235.0         7.846         0.8E+03         0.0E+00         0.8E+01         0.0E+00         0.0E+			
7614         Ving: choose choose         1.0E-01         1.2E-03         3.0E-03         3.0E-05         3.580         7.664         1.0E-01         0.2E-01         0.8E-06           76003         Accutation function         1.0E-00         1.2E-01         1.4E-03         3.2E-03         3.6E-05         2.5         3.58         0.65         4.4E-01         0.6E-00         4.4E-01 <td< td=""><td></td><td></td><td>х</td></td<>			х
75608 Actionship         4.20E-00         1.28E-01         1.08E-06         1.00E+06         1.22E-03         3.46E-05         2.5         235.10         465.00         7.110         0.0E+02         4.41E+01         0.0E+02           75607 Activatiby/second         1.17E+01         1.41E+05         1.30E+04         8.38E+02         2.18E+03         2.5         311.00         8.010         8.070         7.0E-04         8.48E+01         4.4E+01         4.0E+01         8.44E+01         8.44E+00		х	
75070         Acela deltyline         1.04E-01         1.14E-01         1.04E-01         1.14E-05         1.00E-06         3.23E-03         7.87E-05         2.5         23.10         61.00         6.157         2.7.E-68         9.8.E-31         4.41E-01         2.2.E-28         2.2.E-23         31.00         0.572.00         0.8.E-10         0.6.E-01			
75092         Methylene chorade         1.77E-r01         1.01E-01         1.77E-05         1.90E-00         3.02E-02         2.5         313.00         510.00         6.706         1.00E-06         4.08E-01         4.07E-07           75102         Carbon disulfice         4.77E-10         1.04E-01         1.48E-05         3.04E-02         2.58E-04         2.5         2.85.00         6.310         0.0E-03         7.0E-02         2.5EE-01         7.0E-07           75218         Environe cold         5.56E-01         2.3EE-02         1.0E-04         2.5         2.85.00         6.30.00         0.476         7.0E-02         2.5EE-01         7.0E-02			
75150 Cabon daulidie       4.57E+01       1.08E+01       1.08E+03       1.24E+00       3.22E+02       2.58E+04       2.52       319.00       65.00       6.319       0.0E+00       7.0E+01       7.0E+02       2.58E+02       2.58E+02       2.888       448.00       6.0E+00       7.0E+01       7.0E			
75252         Brondelhormeme         5.716-01         1.486-02         1.506-03         2.54         42.35         666.00         9.479         1.16-06         7.056-22         2.537-02         X         1.16-06           75236         2.0160-001         6.586-02         1.066-03         2.53         333.15         553.56         7.065-02         1.062-00         7.062-02         2.537-02         X         1.18-00           75354         1.1.00-kinocethylene         5.086-01         2.306-01         5.086-01         2.062-01         1.072-00         2.040-02         2.53         0.025-00         7.062-0         7.0	00 7.0E-01		
75274       Borndockbornethane       5.06±01       2.98±02       1.06±05       6.74±03       6.54±02       1.06±05       5.83±01       1.45±02       5.98±07       4.85±02       1.6±010000000       7.84±02       1.8±000       1.74±02       7.84±02       1.8±000 <td< td=""><td></td><td></td><td></td></td<>			
75296 2-Chargorpane         9.14E-00         8.88E-02         10.16-05         3.73E-03         5.32E-01         14.5E-02         25         308.70         445.00         6.268         0.0E-00         7.8E-01         7.8E-01         7.8           75345 11-01chroomethane         5.89E-01         9.00E-02         1.0E+05         5.22E+03         1.07E+100         2.0E-02         25         308.75         575.05         6.247         0.0E+00         7.0E-02         9.89E+01         0.0E+00           75545 11-01chroomethane         4.97E+01         1.01E+03         3.97E+00         9.80E+01         2.52         238.40         38.93         0.483         0.0E+00         7.0E-01         1.37E+02         0.0E+00           75131 11.2-Trchotro-1.2.2-trifuorenthane         4.97E+02         8.20E-06         1.70E+02         1.97E+01         4.80E-01         2.532.70         487.30         6.433         0.0E+00         3.0E+01         1.37E+02         0.0E+00           776131 11.2-Trchotro-1.2.2-trifuorenthane         1.11E+04         7.80E-02         8.20E-06         1.80E+01         1.48E+00         2.50         381.04         477.81         0.86E-02         3.82E+02         X         1.8E-03           77747 Hexachorcychopenal         2.00E+00         5.0E+06         8.0BE-04 <td></td> <td></td> <td>X</td>			X
75343       11-0bic/socethane       316E-06       7.62E-01       9.00E+01       X       0.00E+00         75545       11-0bic/socethane       4.76E+01       1.0E+06       2.2E+03       1.07E+00       2.06E+02       25       330.55       552.300       6.689       1.6E+06       7.0E+02       9.06E+01       X       0.0E+00         75456       Chordmituromethane       4.76E+01       1.0E+06       2.00E+00       2.00E+00       2.0E+02       2.5       2.32.40       369.30       4.438       0.0E+00       5.0E+01       0.0E+00       0.0E+00       7.0E+01       3.7E+02       0.0E+00         776141       1.12E+102       6.65E+02       9.92E+06       2.80E+02       1.40E+01       3.42E+01       2.5       2.43.20       3.84.95       9.421       0.0E+00       2.0E+01       1.21E+02       0.0E+00       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       0.0E+00       1.80E+01		x x	х
75334         11-10-linotentylene         5.88±r01         9.00E-02         1.04E-05         2.20E+00         1.10E+r00         2.70E-02         25         304.75         576.05         6.247         0.0E+00         7.0E+02         9.66E+01         0.0E+00           75696         Trichloroduromethane         4.37E+02         8.70E+02         8.70E+02         1.00E+00         3.82E+01         2.25         286.70         471.00         5.999         0.0E+00         7.0E+01         1.32E+02         0.0E+00           76131         1.1.2E+102         0.82E+02         1.40E+01         3.42E+01         2.5         320.70         487.30         6.463         0.0E+00         2.0E+04         2.1.8E+02         0.0E+00           76131         1.1.2E+04         7.80E+02         8.20E+06         1.80E+00         1.60E+01         4.80E+02         2.5         512.15         746.00         10.931         0.0E+00         2.0E+04         2.37E+02         X         0.0E+00           78837         1.2.0E+05         1.60E+00         1.60E+04         4.88E+01         1.18E+05         2.55         512.15         746.00         10.931         0.0E+00         7.41E+01         X         0.0E+00           78837         1.2.0E+06         1.60E+02 <td< td=""><td></td><td></td><td></td></td<>			
76694       Trichtonorumentane       4.97E+02       8.70E+02       9.70E+06       1.01E+03       3.97E+00       9.88E+02       25       298.70       471.00       5.999       0.0E+00       7.0E+01       1.21E+02       0.0E+00         77613       11.112+17       7.050E+02       2.00E+02       1.97E+01       4.80E+01       25       282.070       487.30       6.463       0.0E+00       3.07E+03       3.87E+02       0.0E+00       3.07E+01       1.21E+02       0.0E+00       3.07E+01       1.21E+02       0.0E+00       3.07E+01       3.37E+02       X       1.35E+03       3.73E+02       X       1.35E+03       2.55       3.810       5.47E+01       1.6E+02       7.23E+02       X       1.35E+02       7.758       1.0E+03       3.73E+02       X       1.3E+02       X       1.3E+02       X       1.3E+02       X       1.6E+02       7.3E+02       X       1.6E+02       7.3E+02       X       1.6E+02       7.0E+01       7.0E+01       7.0E+01       7.0E+01       X       0.0E+00       5.6E+00       7.0E+01			
75718         Dickhordihuoromethane         4,57E+02         682E+02         2,20E+00         2,80E+06         1,70E+02         1,77E+01         4,80E+01         25         243,20         384,85         9,421         0.0E+00         2,0E+01         1,2E+02         0.0E+00         2,0E+01         1,2E+02         0.0E+00         2,0E+01         1,2E+03         3,7E+02         X         1,3E+02         0.0E+00         1,7E+02         X         1,3E+02         X         1,3E+02         X         1,3E+03         2,2E+03         3,7E+02         X         1,3E+03         2,2E+03         3,7E+02         X         1,3E+02         X         1,3E+02         X         1,3E+02         X         1,3E+02         X         1,3E+01         2,7E+03         2,5E+03         3,8E,56         2,53         381,45         547,78         10,938         0,0E+00         7,4E+01         X         0,0E+00         7,4E+01         X         0,0E+00         7,2E+01         0,0E+00         7,2E+01         X         0,0E+00         7,2E+01         X         1,0E+01         X         0,0E+00         7,2E+01         X         1,0E+01         X         0,0E+00         2,2E+01         0,0E+01         7,3E+01         0,0E+01         7,3E+01         0,2E+01         7,3E+02         <			
76131         1.1.2.Trichloro-1.2.2.Hildurodehan         1.11E+04         7.80E-02         6.20E-06         1.70E+02         1.97E+01         4.80E+01         2.5         320.70         447.30         6.463         0.0E+00         3.0E+01         1.87E+02         X         1.87E+02         X         1.87E+02         X         1.87E+02         X         1.87E+03         X         1.87E+03         X         1.87E+02         X <td></td> <td></td> <td></td>			
76448       Heightein       1.11E+06       1.12E-02       5.68E-05       1.80E+00       2.60E+01       1.46E+00       2.5       603.69       84.61       1.3000       0.2E-63       3.37E+02       X       1.3E-03         77444       Hexploxopolentadine       2.00E+05       1.61E-00       2.69E+04       4.83E+04       1.18E-05       2.5       381.04       547.78       10.936       0.0E+00       1.1E+00       7.21E+01       X       0.0E+00         78875       1.2.Dichtoropropane       4.37E+01       7.32E+02       8.30E+04       4.83E+04       1.18E-05       2.5       381.92       5.26E+00       5.0E+00       7.21E+01       X       0.0E+00         78905       1.2.Dichtoropropane       4.37E+01       7.32E+02       8.30E+04       4.38E+01       2.38E+05       2.55       356.78       7.481       0.0E+00       5.0E+00       7.21E+01       X       0.0E+00       7.21E+01       X       0.0E+00       7.21E+01       X       1.8E-03       7.37E+02       X       1.8E-03       7.37E+01       7.0E       0.0E+00       7.2E+01       X			
77474 Hexablorocyclopentaleine         2.00E+05         161E-02         7.21E-06         1.80E+00         1.10E+00         2.68E+02         25         512.15         74.60         10.931         0.0E+00         2.0E+04         2.73E+02         0.0E+00           78831 isolutanol         2.58E+00         8.50E+04         4.83E+04         1.18E+01         2.79E+03         25         381.64         547.78         10.935         0.0E+00         1.1E+02         ?         0.0E+00           78873         1.12E-101         7.82E+02         8.73E+06         2.28E+05         2.29E+03         5.56E+05         25         352.50         536.78         7.481         0.0E+00         7.85E+02         1.33E+02         X         1.6E+05         1.4E+02         1.33E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.		×	х
78831 isobutanol         2.59E+00         8.60E-02         9.30E+06         8.80E+04         4.83E+04         1.18E+05         25         381.44         547.78         10.938         0.0E+00         7.1E+01         X         0.0E+00           78837 12.01ch/orograme         4.37E+01         7.82E+03         5.58E+05         25         356.52         558.78         7.481         0.0E+00         5.0E+00         7.21E+01         0.0E+00           78035 1.12.1ch/orograme         5.01E+01         7.80E+02         8.80E+06         4.22E+03         3.73E+02         9.11E+04         25         366.15         602.00         8.322         1.8E+05         2.28         1.8E+04         1.8E+06         2.0E+00         7.835+02         1.8E+04         2.5         360.15         602.00         8.322         1.8E+02         X         1.8E+02         X         1.8E+04         1.8E+04         2.5         329.80         506.70         7.260         0.0E+00         3.31E+00         7.41E+01         X         0.0E+00         7.895         1.4E+02         1.33E+02         X         1.8E+04         2.5         329.80         506.70         7.260         0.0E+00         3.4E+01         X         0.0E+00         3.4E+01         X         0.0E+00         3.4E+01         <		~	~
78933         Methyderbylektone (2-butanone)         2.30E+00         8.08E-02         9.80E-06         2.22E-03         5.8E-05         25         352.50         538.78         7.481         0.0E+00         7.0E-01         7.80E-01		х	х
79005         11.2-Inclincentane         501E+01         7.80E-02         8.80E-06         4.42E+03         3.73E-02         9.11E-04         25         386.15         602.00         8.322         1.6E-05         1.4E-02         1.33E+02         X         1.1E-04           79016         Incidiorethylee         3.26E+00         1.00E+01         1.00E+05         2.00E+03         4.21E-01         1.03E-02         25         360.36         544.20         7.526         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           73916         1.00E+01         1.00E+05         2.00E+03         4.21E-01         1.03E-02         2.5         360.36         544.20         7.526         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           73945         1.1.2_2_Tetrachioreethane         9.33E+01         7.10E-02         1.01E+05         2.00E+03         1.41E+02         3.44E-04         25         373.50         567.00         8.975         0.0E+00         3.5E+00         7.0E+04         3.5E+00         7.6E+04         1.5E+04         2.5         373.50         567.00         8.975         0.0E+00         3.5E+02         0.0E+00         3.5E+02         0.0E+00         3.5E+02         0.0E+00         3.5E+02 <t< td=""><td></td><td>х</td><td></td></t<>		х	
79016 Tickhorethylene         166E+02         7.90E-02         9.10E-06         1.47E+03         4.21E-01         1.03E+02         25         360.36         544.20         7.505         0.0E+00         3.51E+02         1.11E+02         1.11E+04           79209 Methylacetate         3.32E+01         7.010-02         7.90E+06         2.00E+03         1.41E+02         3.44E+04         25         393.20         564.00         3.5E+00         7.41E+01         X         5.5E+06           79469 2-Mitropropen         1.17E+01         9.23E+02         7.90E+06         2.00E+03         1.41E+02         3.44E+04         25         393.20         594.00         8.38         2.7E+03         2.81E+02         X         5.8E+02         2.7E<03			
79209         Methyl acetate         3 28E+00         1.04E-01         1.00E-05         2.00E+03         4.84E-03         1.18E-04         25         329.80         506.70         7.260         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           793045         1.1.2.2-Tetrachoroethane         9.33E+01         7.10E-02         7.90E-06         2.96E+03         1.41E-02         3.44E-04         25         419.60         661.15         8.996 <b>5.8E+05</b> 7.41E+01         X         5.8E+00         7.41E+01         X         5.8E+00         7.41E+01         X         5.8E+00         7.41E+01         Y         5.8E+00         7.4E+01         Y         0.0E+00         Y         1.00E+02         Y         0.0E+00         Y         Y         0.0E+00         Y         Y         0.0E+00         Y         Y         0.0E+00		x	х
73945         1.12_21etrachtoroethane         9.33E+01         7.10E-02         7.99E-06         2.96E+03         1.41E-02         3.44E-04         25         419.60         661.15         8.996         5.8E-05         1.4E-02         1.8E+02         X         5.8E-05         7.4E+02         1.8E+02         2.7E+03         2.2E+03         2.0E+00         8.81E+02         X         5.8E+05         2.7E+03         2.0E+00         8.81E+02         X         5.8E+05         2.7E+03         2.0E+00         8.81E+02         X         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.8E+02         X			х
80626 Methymethacrylate         6.98E+00         7.70E-02         8.80E+04         1.38E+02         3.36E+04         2.5         373.50         567.00         8.975         0.0E+00         7.0E+01         1.00E+02         X         0.0E+00           83329 Acenaphthene         7.0BE+04         3.42E+04         3.36E+04         2.5         550.54         803.15         12.156         0.0E+00         2.1E+01         1.56E+02         X         0.0E+00           86737 Fluorene         1.38E+04         3.63E+02         7.88E+06         1.98E+00         2.60E+03         6.34E+03         2.5         570.44         807.00         12.666         0.0E+00         1.4E+01         1.66E+02         X         0.0E+00           87633 Hexachtoro-1,3-butadiene         5.37E+04         6.50E+02         5.11E+04         2.2E+05         3.5E+03         2.61E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         9.2E+02         X         0.0E+00			x
83329 Accempthtene         7.08E+03         4.21E-02         7.69E+06         3.57E+00         6.34E-03         1.58E+04         2.5         550.54         803.15         12.155         0.0E+00         1.4E+02         X         0.0E+00           86737 Fluorene         1.38E+04         2.5         550.54         803.15         12.155         0.0E+00         1.4E+02         X         0.0E+00           87637 Fluorene         5.37E+04         5.61E-02         C.18E+00         3.33E+01         6.34E-03         2.5         486.15         7.800         10.208         2.2E+03         3.8E+02         X         2.2E+04           87620 e-Nitroblene         3.24E+04         5.87E+02         8.67E+00         5.11E-04         1.25E+05         2.5         495.00         720.00         12.208         3.0E+03         1.37E+02         X         0.0E+00           91203 Napithalene         2.00E+03         5.90E+04         3.10E+01         1.38E+02         0.0E+00         1.38E+02         0.0E+00         1.8E+02         0.0E+00         0.0E+00         1.8E+02         0.0E+0			
86737 Fluorene         1.38E+04         3.63E-02         7.88E-06         1.98E+00         2.60E-03         6.34E-05         25         570.44         870.00         12.666         0.0E+00         1.4E-01         1.6E-02         X         0.0E+00           87683         Hexachbore-1.3-butatione         5.37E+04         5.61E-02         6.16E-06         3.33E-01         8.13E-03         25         486.15         738.00         10.268         0.0E+00         3.2E-03         2.61E-02         X         0.0E+00           87623         -Mitrotoluene         3.24E+02         5.87E-02         8.67E-06         6.06E+01         1.98E-02         4.82E-04         25         495.10         7.22.90         0.2E+03         1.37E+02         X         0.0E+00           91203         Naphthalene         2.016+03         5.22E-06         3.0E+01         1.98E-02         4.82E-04         25         491.14         74.840         10.373         3.4E-05         1.8E+02         X         0.0E+00           91576         2.40E+013         5.22E-00         7.75E-06         3.0E+01         1.98E+02         2.98E-04         25         529.10         781.00         1.260         0.0E+00         1.4E+02         X         0.0E+00         9.26E+02         1.42E+02 </td <td></td> <td></td> <td></td>			
B7683 Hexachloro-13-butadene         5.37E+04         6.61E-02         6.16E-06         3.20E+00         3.33E+01         8.13E-03         2.5         486.15         738.00         10.208         2.2E+05         3.5E+03         2.61E+02         X         2.2EE-05           88720 - Nitroblene         3.24E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.85E+03         1.226         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.1676         3.0E+02         7.8E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.1676         3.0E+02         7.8E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.0E+00         1.8E+02         1.0E+02         X         0.0E+00           91576 2-MitryInaphtalene         2.3E+03         4.0E+02         8.15E+06         7.45E+02         2.12E+02         5.17E+04         2.5         512+01         1.680         0.0E+00         1.8E+02         1.4E+02         X         0.0E+00           95571 12-Dictionoberzene         6.17E+02         8.0E+02         7.77E+02			X
88722 o-Nitrobluene         3.24E+02         5.87E-02         8.67E-06         6.50E+02         5.11E-04         1.25E-05         2.5         4.95.00         720.00         12.238         0.0E+00         3.2E-03         1.37E+02         X         0.0E+00           91203 Naphthelene         2.00E+03         5.90E-02         7.75E-06         3.10E+01         1.98E+02         4.82E-04         2.5         491.14         748.40         10.373         3.4E-03         1.32E+02         X         0.0E+00           91576 2-Methylinpathtalene         2.81E+03         5.22E-02         7.75E-06         2.46E+01         1.28E-02         5.77E-04         2.5         521.42         671.00         12.260         0.0E+00         1.4E+02         1.42E+02         X         0.0E+00           92524 Biphenyl         4.38E+03         4.04E-02         8.15E-06         7.45E+00         1.28E-02         2.99E-04         2.5         529.10         789.00         10.80         0.0E+00         1.8E+02         X         0.0E+00           95476 0-X/µene         3.38E+02         8.05E+00         1.28E+02         1.29E+02         X         0.0E+00         1.0E+01         1.06E+02         0.0E+00         1.0E+01         1.06E+02         0.0E+00         0.0E+00         1.0E+01			X
91203         Naphthalene         2.00E+03         5.90E-02         7.50E-06         3.10E+01         1.98E-02         4.82E-04         2.5         491.14         748.40         10.373 <b>3.4E-05</b> 1.28E+02         0.0E+00         91/576           91/576         2.4ME/1043         5.22E-02         7.75E-06         3.12E+02         1.78E+02         2.5         491.14         748.40         10.373 <b>3.4E-05</b> 1.28E+02         0.0E+00         91/576           92524         Biphenyi         4.38E+03         4.04E-02         8.15E-06         7.45E+00         1.23E-02         2.99E-04         25         529.10         789.00         10.890         0.0E+00         1.8E-01         1.54E+02         X         0.0E+00           95476         5.Vighene         3.63E+02         8.70E-02         1.28E+02         2.12E-01         5.18E-03         25         417.60         630.30         8.68         10.0E+00         1.68E+02         X         0.0E+00           95578         2.Chorophenol         3.68E+02         7.77E+02         1.90E-03         25         447.55         675.00         9.570         0.0E+00         1.48E+02         2.0E+04         0.0E+00           95578         2.Chorophenol         3.88E+02			x
92524 Biphenyl         4.38E+03         4.04E-02         8.18E+06         7.45E+00         1.23E+02         2.98E+04         2.5         529.10         789.00         10.890         0.0E+00         1.8E+01         1.54E+02         X         0.0E+00           95476 o-Xylene         3.63E+02         8.70E+02         1.08E+00         1.23E+02         2.98E+04         2.5         529.10         789.00         10.890         0.0E+00         1.8E+02         X         0.0E+00         9.676         0.0E+00         1.0E+02         0.0E+00         0.0E+00         1.0E+01         1.06E+02         0.0E+00         0.0E+00         1.0E+02         0.0E+00         0.0E+00         0.0E+00         1.0E+02         0.0E+00         0.0E+	-00 3.0E-03		
95476 o-Xylene         3.63E+02         8.70E-02         1.00E-05         1.78E+02         2.12E-01         5.18E-03         25         417.60         630.30         8.661         0.0E+00         1.0E-01         1.06E+02         0.0E+00           95517 1.2-Dichlorobenzene         6.17E+02         9.09E-00         1.58E+02         7.77E-02         1.90E-03         25         453.57         705.00         9.70         0.0E+00         1.8E+02         0.0E+00         0.0E+00           95578 2-Chlorophenol         3.88E+02         5.10E-02         3.90E-04         25         447.53         675.00         9.70         0.0E+00         1.8E+02         1.20E+02         0.0E+00         0.0E+00           95658 1.2.4-Timethylbenzene         1.35E+03         6.06E-02         7.92E+06         5.70E+01         2.52E+01         6.14E+03         25         447.53         675.00         9.70         0.0E+00         7.0E+02         X         0.0E+00           95636 1.2.4-Timethylbenzene         1.35E+03         6.06E-02         7.92E+06         5.70E+01         2.52E+01         6.14E+03         25         447.53         675.00         9.50E+00         7.0E+03         1.20E+02         X         0.0E+00			х
95501 1.2-Dichlorobenzene         6.17E+02         6.90E-02         7.90E-06         1.56E+02         7.77E-02         1.90E-03         2.5         453.57         705.00         9.700         0.0E+00         1.27E+02         0.0E+00           95578 2-Chlorophenol         3.88E+02         5.01E-02         9.46E-06         2.20E+04         1.60E-02         3.90E-04         2.5         447.53         675.00         9.70         0.0E+00         1.8E-02         1.29E+02         X         0.0E+00           95658 1.2.4-Timmethylberzene         1.35E+03         6.0EE-02         7.92E-06         5.70E+01         6.14E-03         25         442.30         649.17         9.369         0.0E+00         7.0E-03         1.20E+02         0.0E+00		x	х
95578         2-Chlorophenol         3.88E+02         5.01E-02         9.46E-06         2.20E+04         1.60E-02         3.90E-04         25         447.53         675.00         9.572         0.0E+00         1.8E-02         1.29E+02         X         0.0E+00           95636         1,2,4-Trimethybenzene         1.35E+03         6.06E-02         7.92E-06         5.70E+01         2.52E-01         6.14E-03         25         442.30         649.17         9.369         0.0E+00         7.0E-03         1.20E+02         X         0.0E+00			
95636 1,2,4-Trimethyberzene 1.35E+03 6.06E-02 7.92E-06 5.70E+01 2.52E-01 6.14E-03 25 442.30 649.17 9.369 0.0E+00 7.0E-03 1.20E+02 0.0E+00		x	х
			~
96184 1,2,3-Trichloropropane 2.20E+01 7.10E-02 7.90E-06 1.75E+03 1.67E-02 4.08E-04 25 430.00 652.00 9,171 8.6E-03 3.0E-04 1.47E+02 X 5.7E-04		х	
96333 Methylacylate 4,53E+00 9.76E-02 1.02E-05 6.00E+04 7.68E-03 1.87E-04 25 353.70 536.00 7.749 0.0E+00 1.1E-01 8.61E+01 X 0.0E+00 1.0E+00 1.			X
97632 Ethylmethacrylate 2.95E+01 6.53E-02 8.37E-06 3.37E+03 3.44E-02 8.40E-04 25 390.00 571.00 10.957 0.0E+00 3.2E-01 1.14E+02 X 0.0E=00 98066 tert-Burlybenzene 7.71E+02 5.65E-02 8.02E+03 3.44E-02 11.19E+02 25 44210 1220.00 8.980 0.0E+00 1.4E-01 1.34E+02 X 0.0E=00 98066 tert-Burlybenzene 7.71E+02 5.65E-02 8.02E+03 3.44E-02 5.55E-01 1.19E+02 5.55E-01 1.34E+02 5.55E-01 1.			X
98000 tert-butytoenzene /./TE+V2 5:05E-V2 5/2E+V0 2.55E+V1 4.67E-V1 1.19E-V2 25 442.10 1220.00 8,980 0.0E+V0 1.4E-V1 1.34E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 6.55E-05 7.10E-V0 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.4E-V1 1.20E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 6.55E-05 7.10E-V0 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 5.56 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 5.56 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 5.56 5.56 5.56 5.56 5.56 5.56 5.56 5.5		~	~
98862 Acetophenone 5.77E+01 6.00E-02 8.73E-06 6.13E+03 4.38E-04 1.07E-05 25 475.00 709.50 11,732 0.0E+00 3.5E-01 1.20E+02 X 0.0E+00	00 3.5E-01	х	х
98953 Nitrobenzene 6.46E+01 7.60E-02 8.60E-06 2.09E+03 9.82E-04 2.39E-05 25 483.95 719.00 10,566 0.0E+00 2.0E-03 1.23E+02 0.0E+00	00 2.0E-03		
100414 Ethybenzene 3.63E+02 7.50E-02 7.80E-06 1.69E+02 3.22E-01 7.86E-03 25 409.34 617.20 8.501 2.5E-06 1.0E+00 1.06E+02 0.0E+00			
100425 Styrene 7.76E+02 7.10E-02 8.00E-06 3.10E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.0E+00 9.0E-01 1.04E+02 0.0E=00 10047 9.0E-01 1.04E+02 4.14E-04 25 448.21 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 7.80E-06		~	
100447 Benzyleholde 6.14E+01 7.50E-02 7.80E-06 5.25E+02 1.70E-02 4.14E-04 25 452.00 685.00 8,773 4.9E-05 1.0E-03 1.27E+02 ? 4.9E-05 100527 Benzyleholde 4.59E+01 7.21E-02 9.07E-06 3.30E+03 9.73E-04 2.37E-05 25 452.00 685.00 11.658 0.0E+00 3.5E-01 1.06E+02 X 0.0E+00		×	x
100627 derizaberlyde 1,35E-701 7,21E-02 5/01E-00 5/01E-00 5/01E-00 2/0 4/02.00 05/00 1/000 1/00010 0.0E-00 1,4E-01 1/00E-02 X 0.0E+00 1/4E-01 1/00E+02 X 0.0E+00			x
104518 n-Butylbenzene 1.11E+03 5.70E-02 8.12E-06 2.00E+00 5.38E-01 1.31E-02 25 456.46 660.50 9,290 0.0E+00 1.4E-01 1.34E+02 X 0.0E+00		x	X
106423 p-Xylene 3.89E+02 7.69E-02 8.44E-06 1.85E+02 3.13E-01 7.64E-03 25 411.52 616.20 8.525 0.0E+00 1.0E-01 1.06E+02 ? 0.0E+00			
106467 1,4-Dichlorobenzene 6.17E+02 6.90E-02 7.90E-06 7.90E+01 9.82E-02 2.39E-03 25 447.21 684.75 9,271 1.1E-05 8.0E-01 1.47E+02 0.0E+00 0.0E+00	00 8.0E-01		

# VW5 240 $ug/m^3$ Toluene

### DATA ENTRY SHEET

			Gas Concentratio			Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	108883	2.40E+02	Ъ	<del> </del>		Toluene
	ENTER	ENTER	ENTER	ENTER		ENTER
	Depth	ENTER	LITER	ENTER		ENTER
MORE	below grade	Soil gas		Vadose zone		User-defined
$\mathbf{+}$	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SC		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

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MORE ↓

 ENTER veraging	ENTER Averaging	ENTER	ENTER
time for	time for noncarcinogens, AT <sub>NC</sub>	Exposure duration, ED	Exposure frequency, EF
 (yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

### VW5 240 ug/m<sup>3</sup> Toluene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	2.40E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	2.25E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (µg/m <sup>3</sup> )
15	2.40E+02	1.25	8.33E+01	2.25E-03	5.00E+03	1.60E+32	4.04E-04	9.68E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	3.0E-01
END	

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	3.1E-04

MESSAGE SUMMARY BELOW:

# VW5 24 ug/m<sup>3</sup> Ethylbenzene

### DATA ENTRY SHEET

ersion 2.0; 04/			Gas Concentratio			Vapor Intrusion Guidance Interim Final 12/04	
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)	
Defaults		Soil		Soil			
)	Chemical CAS No.	gas	OR	gas			
	(numbers only,	conc.,		conc.,			
		C <sub>g</sub>		Cg			
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical	
	100414	2.40E+01	]			Ethylbenzene	
	ENTER	ENTER	ENTER	ENTER		ENTER	
	Depth						
MORE	below grade	Soil gas		Vadose zone		User-defined	
<b>1</b>	to bottom	sampling	Average	SCS		vadose zone	
	of enclosed	depth	soil	soil type		soil vapor	
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,	
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>	
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )	
	15	152.4	24	SC			

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{A}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

Ξ					
	ENTER	ENTER	ENTER	ENTER	
	Averaging	Averaging			
	time for	time for	Exposure	Exposure	
	carcinogens,	noncarcinogens,	duration,	frequency,	
	AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF	
	(yrs)	(yrs)	(yrs)	(days/yr)	-
					-
	70	30	30	350	

# VW5 24 ug/m<sup>3</sup> Ethylbenzene

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	2.40E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,994	7.43E-03	3.05E-01	1.80E-04	1.94E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	2.40E+01	1.25	8.33E+01	1.94E-03	5.00E+03	2.28E+37	3.56E-04	8.54E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.5E-06	1.0E+00
END	

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
8.8E-09	8.2E-06

MESSAGE SUMMARY BELOW:

END

Γ

### DATA ENTRY SHEET

	-		Gas Concentratio	n Data		Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
ciudito	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	_	(ppmv)		Chemical
	106423	1.30E+02	ו	r – – – –		p-Xylene
MORE ↓	Depth below grade to bottom of enclosed	Soil gas sampling	Average soil	Vadose zone SCS		User-defined vadose zone
	space floor,	depth below grade,	temperature,	soil type (used to estimate	OR	soil vapor permeability,
	L <sub>F</sub>	L <sub>s</sub>	T <sub>s</sub>	soil vapor	OIX	k <sub>v</sub>
	(15 or 200 cm)	(cm)	( <sup>0</sup> C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SC		

MORE ↓	ENTER Vandose zone SCS soil type Lookup Soil Parameters	$\begin{array}{c} \textbf{ENTER} \\ \text{Vadose zone} \\ \text{soil dry} \\ \text{bulk density,} \\ \rho_{\text{b}}^{\text{A}} \\ (g/\text{cm}^3) \end{array}$	ENTER Vadose zone soil total porosity, n <sup>V</sup> (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	
	SC	1.63	0.385	0.197	

ENTER				
Average vapor				
flow rate into bldg.				
(Leave blank to calculate)				
Q <sub>soil</sub>				
(L/m)				
5				

MORE ↓

ENTER	ENTER	ENTER	ENTER	
Averaging	Averaging			
time for	time for	Exposure	Exposure	
carcinogens,	noncarcinogens,	duration,	frequency,	
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF	
(yrs)	(yrs)	(yrs)	(days/yr)	
				-
70	30	30	350	

# VW5 130 ug/m<sup>3</sup> m,p-Xylene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>bullding</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.30E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,083	7.22E-03	2.96E-01	1.80E-04	1.99E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.30E+02	1.25	8.33E+01	1.99E-03	5.00E+03	2.71E+36	3.64E-04	4.73E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	4.5E-04

MESSAGE SUMMARY BELOW:

### VW5 70 ug/m<sup>3</sup> o-Xylene

### DATA ENTRY SHEET

Version 2.0; 04/		Soil Gas Concentration Data				Vapor Intrusion Guidance Interim Final 12/04		
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)		
Defaults	Chemical CAS No. (numbers only,	Soil gas conc., C <sub>q</sub>	OR	Soil gas conc., C <sub>g</sub>				
	no dashes)	(μ <b>g</b> /m <sup>3</sup> )	-	(ppmv)		Chemical		
	95476	7.00E+01	7.00E+01		o-Xylene			
	ENTER Depth	ENTER	ENTER	ENTER		ENTER		
MORE ↓	below grade to bottom	Soil gas sampling	Average	Vadose zone SCS		User-defined vadose zone		
	of enclosed space floor,	depth below grade,	soil temperature,	soil type (used to estimate	OR	soil vapor permeability,		
	L <sub>F</sub>	L <sub>s</sub>	T <sub>S</sub>	soil vapor	U.I.	k <sub>v</sub>		
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )		
	15	152.4	24	SC				

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
↓	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

Average vapor					
flow rate into bldg.					
(Leave blank to calculate)					
Q <sub>soil</sub>					
(L/m)					
5					

MORE ↓

ENTER Averaging	ENTER Averaging	ENTER	ENTER
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
 (yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

### VW5 70 ug/m<sup>3</sup> o-Xylene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	7.00E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,245	4.88E-03	2.00E-01	1.80E-04	2.25E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	7.00E+01	1.25	8.33E+01	2.25E-03	5.00E+03	1.57E+32	4.04E-04	2.83E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	2.7E-04

MESSAGE SUMMARY BELOW:

# VW6 7,400 $ug/m^3$ TPH-G

#### DATA ENTRY SHEET

		Soil	Gas Concentratio	n Data		Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cq		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	60297	7.40E+03	ן	r +		TPH-Gasoline
	ENTER Depth	ENTER	ENTER	ENTER		ENTER
	Depth					
MORE	below grade	Soil gas		Vadose zone		User-defined
$\mathbf{+}$	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	CL		
	15	152.4	24	CL		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	$\rho_b^A$	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	CL	1.48	0.442	0.168

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

ENTER	ENTER	ENTER	ENTER	
Averaging	Averaging			
time for	time for	Exposure	Exposure	
carcinogens,	noncarcinogens,	duration,	frequency,	
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF	
(yrs)	(yrs)	(yrs)	(days/yr)	
				_
70	30	30	350	

### CHEMICAL PROPERTIES SHEET

		Henry's law constant	Henry's law constant	Enthalpy of vaporization at	Normal		Unit		
Diffusivity	Diffusivity	at reference	reference	the normal	boiling	Critical	risk	Reference	Molecular
in air,	in water,	temperature,	temperature,	boiling point,	point,	temperature,	factor,	conc.,	weight,
Da	Dw	Н	T <sub>R</sub>	$\Delta H_{v,b}$	T <sub>B</sub>	Tc	URF	RfC	MW
(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(atm-m <sup>3</sup> /mol)	(°C)	(cal/mol)	(°K)	(°K)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(g/mol)
7.00E-02	7.80E-06	3.00E-02	25	7,000	369.00	508.00	0.0E+00	4.9E+01	108.00

# VW6 7,400 $ug/m^3$ TPH-G

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.274	0.245	1.29E-09	0.865	1.12E-09	4,000	7.40E+03	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	8,304	2.86E-02	1.17E+00	1.80E-04	4.81E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (µg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	7.40E+03	1.25	8.33E+01	4.81E-03	5.00E+03	1.13E+15	7.27E-04	5.38E+00

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	4.9E+01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	1.1E-04

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

VLOOKUP TABLES

		5	oil Properties I	ookup Table				Bulk Density	
SCS Soil Type	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> ) SCS Soil Name
С	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215 Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168 Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148 Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076 Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054 Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197 Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146 Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167 Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216 Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198 Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180 Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103 Sandy Loam

PT38 Observer         1257-00         1456-02         1256-03         1456-02         1256-03         1456-02         1256-03         1550-03         1456-03         1550-03         1456-03         1550-03			
undress         component         temporal         berray         temporal         <			
conflicts         instr.         instr.         instr.         instr.         instruction         instruction <td></td> <td></td> <td></td>			
Lensisu         Lensisu         Life         D         S         H         H         H         T         T         T         H         H         H         H         H         T         T         T         H			
LOBIN         Character         CPUI         Current         CPUI			RfC
State         Characterization         124-00         7.06-00         126-00         <		extrapolated extrapo	
PT28 Observed         116:20	) <sup>-1</sup> (mg/m <sup>3</sup> )	(X) (X	(X)
PT28 Observed         116:20	-05 0.0E+00		
Bits Bits and an analysis         107-03         1.46-00         7.346-00         7.736-0			
Boy?         Definition         2.14-04         1.25-04         1.25-06         1.25-05         2.5         0.13.2         0.42.35         1.15-05         3.87.55         3.8	-04 1.1E-03	x x	Х
D/0141 Accione         578-01         1244-05         1144-05         1064-05         218-25         208.10         0.58-05         218-25         208.10         0.58-05			Х
PM3 Checkborn         388-01         1046-01         1046-01         388-03         25         333-32         633-40         6,989         51.60         3.60-03         1160-02         7			X
1721: HoadRongthing         1782-10         2565-00         6500-00         176-00         2572-10         2772-00         5500-00         6500-00         1560-00         3560-00		X	х
P1432 Biname         6.88E-01         6.88E-01         6.88E-01         7.88E-01         7.78E-03         2.85E-01         7.78E-03         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         2.82-10         3.82-12         7.78E-03         7.78E-03         3.82-11         3.82-12         7.78E-03         7.78E-03         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-12         3.82-11         3.82-11 <td></td> <td>×</td> <td>х</td>		×	х
172450         Methodychia         184-02         144-02         544-06         1000-00         648-04         1000-00         288-89         10000         000-00         348-02         X         0.00-00           72450         Methy formation and have         1000-00         148-02         348-02         X         0.00-00 </td <td></td> <td></td> <td></td>			
74580         DEL         4.7E+00         1.2EE+00         1.2E			
Partial         Methy formine         1.21E-00         1.22E-01         2.22E-01			х
Prior Multip dustation (choromatham)         212E+00         1.86-00         5.3E+03         3.81E+01         8.80E-03         2.8         240.00         446.25         5.115         1.8.66         0.6-20         5.2E+01         0.6E+00           Prior Margin Control         1.850+0         1.38E+00         5.85E+00         3.85E+00         2.85E+00         4.85E+00         2.85E+00         4.85E+00         2.85E+00         3.85E+00         2.85E+00         3.85E+00         2.85E+00         3.85E+00         2.85E+00         3.85E+00         2.85E+00         3.85E+00         2.85E+00         3.85E+00         3.85E+00 </td <td></td> <td>х</td> <td></td>		х	
Protect         3.88E+00         1.83E+01         2.10E+06         1.02E+06         2.52         2.90.00         4.66.70         0.0E+00         3.10E+01         2.70E+01         0.0E+00         3.10E+01         3.10			
9000 Cholombane (ethy chonde)         4.46E-00         2.71E-01         1.15E-05         5.88E+03         3.61E-01         2.86E-03         2.52         2.88.30         440.40         5.879         8.8E-07         1.00E-10         6.4EE+01         2.8EE+03           70568         Actionatie         4.20E+00         1.28E+03         1.08E+03         1.7EE+03         3.4EE+03         2.52         235.0         7.846         4.20E+00         0.2E+01         0.2E+00         2.2E+01         0.2E+00         2.2E+01         0.2E+00         2.2E+01         0.2E+00         2.2E+01         0.2E+00         2.2E+01         0.2E+00         2.2E+01         0.2E+00         0.2E+00         2.2E+01         0.2E+00         2.2E+01         0.2E+00         0.2E			
7614         Ving: choose choose         1.0E-01         1.2E-03         3.0E-03         3.0E-05         3.580         7.664         1.0E-01         0.2E-01         0.8E-06           76003         Accutation function         1.0E-00         1.2E-01         1.4E-03         3.2E-03         3.6E-05         2.5         3.58         0.65         4.4E-01         0.6E-00         4.4E-01 <td< td=""><td></td><td></td><td>х</td></td<>			х
75608 Actionship         4.20E-00         1.28E-01         1.08E-06         1.00E+06         1.22E-03         3.46E-05         2.5         235.10         465.00         7.110         0.0E+02         4.41E+01         0.0E+02           75607 Activatiby/second         1.17E+01         1.41E+05         1.30E+04         8.38E+02         2.18E+03         2.5         311.00         8.010         8.070         7.0E-04         8.48E+01         4.4E+01         4.0E+01         8.44E+01         8.44E+00		х	
75070         Acela deltyline         1.04E-01         1.14E-01         1.04E-01         1.14E-05         1.00E-06         3.23E-03         7.87E-05         2.5         23.10         61.00         6.157         2.7.E-68         9.8.E-31         4.41E-01         2.2.E-28         2.2.E-23         31.00         0.572.00         0.8.E-10         0.6.E-01			
75092         Methylene chorade         1.77E-r01         1.01E-01         1.77E-05         1.90E-00         3.02E-02         2.5         313.00         510.00         6.706         1.00E-06         4.08E-01         4.07E-07           75102         Carbon disulfice         4.77E-10         1.04E-01         1.48E-05         3.04E-02         2.58E-04         2.5         2.85.00         6.310         0.0E-03         7.0E-02         2.5EE-01         7.0E-07           75218         Environe cold         5.56E-01         2.3EE-02         1.0E-04         2.5         2.85.00         6.30.00         0.476         7.0E-02         2.5EE-01         7.0E-02			
75150 Cabon daulidie       4.57E+01       1.08E+01       1.08E+03       1.24E+00       3.22E+02       2.58E+04       2.52       319.00       65.00       6.319       0.0E+00       7.0E+01       7.0E+02       2.58E+02       2.58E+02       2.888       448.00       6.0E+00       7.0E+01       7.0E			
75252         Brondelhormeme         5.716-01         1.486-02         1.506-03         2.54         42.35         666.00         9.479         1.16-06         7.056-22         2.537-02         X         1.16-06           75236         2.0160-001         6.586-02         1.066-03         2.53         333.15         553.56         7.065-02         1.062-00         7.062-02         2.537-02         X         1.18-00           75354         1.1.00-kinocethylene         5.086-01         2.306-01         5.086-01         2.062-01         1.072-00         2.040-02         2.53         0.025-00         7.062-0         7.0	00 7.0E-01		
75274       Borndockbornethane       5.06±01       2.98±02       1.06±05       6.74±03       6.54±02       1.06±05       5.83±01       1.45±02       5.98±07       4.85±02       1.6±010000000       7.84±02       1.8±000       1.74±02       7.84±02       1.8±000 <td< td=""><td></td><td></td><td></td></td<>			
75296 2-Chargorpane         9.14E-00         8.88E-02         10.16-05         3.73E-03         5.32E-01         14.5E-02         25         308.70         445.00         6.268         0.0E-00         7.8E-01         7.8E-01         7.8           75345 11-01chroomethane         5.89E-01         9.00E-02         1.0E+05         5.22E+03         1.07E+100         2.0E-02         25         308.75         575.05         6.247         0.0E+00         7.0E-02         9.89E+01         0.0E+00           75545 11-01chroomethane         4.97E+01         1.01E+03         3.97E+00         9.80E+01         2.52         238.40         38.93         0.483         0.0E+00         7.0E-01         1.37E+02         0.0E+00           75131 11.2-Trchotro-1.2.2-trifuorenthane         4.97E+02         8.20E-06         1.70E+02         1.97E+01         4.80E-01         2.532.70         487.30         6.433         0.0E+00         3.0E+01         1.37E+02         0.0E+00           776131 11.2-Trchotro-1.2.2-trifuorenthane         1.11E+04         7.80E-02         8.20E-06         1.80E+01         1.48E+00         2.50         381.04         477.81         0.86E-02         3.82E+02         X         1.8E-03           77747 Hexachorcychopenal         2.00E+00         5.0E+06         8.0BE-04 <td></td> <td></td> <td>X</td>			X
75343       11-0bic/socethane       316E-06       7.62E-01       9.00E+01       X       0.00E+00         75545       11-0bic/socethane       4.76E+01       1.0E+06       2.2E+03       1.07E+00       2.06E+02       25       330.55       552.300       6.689       1.6E+06       7.0E+02       9.06E+01       X       0.0E+00         75456       Chordmituromethane       4.76E+01       1.0E+06       2.00E+00       2.00E+00       2.0E+02       2.5       2.32.40       369.30       4.438       0.0E+00       5.0E+01       0.0E+00       0.0E+00       7.0E+01       3.7E+02       0.0E+00         776141       1.12E+102       6.65E+02       9.92E+06       2.80E+02       1.40E+01       3.42E+01       2.5       2.43.20       3.84.95       9.421       0.0E+00       2.0E+01       1.21E+02       0.0E+00       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       1.80E+01       0.0E+00       1.80E+01		x x	х
75334         11-10-linotentylene         5.88±r01         9.00E-02         1.04E-05         2.20E+00         1.10E+r00         2.70E-02         25         304.75         576.05         6.247         0.0E+00         7.0E+02         9.66E+01         0.0E+00           75696         Trichloroduromethane         4.37E+02         8.70E+02         8.70E+02         1.00E+00         3.82E+01         2.25         286.70         471.00         5.999         0.0E+00         7.0E+01         1.32E+02         0.0E+00           76131         1.1.2E+102         0.82E+02         1.40E+01         3.42E+01         2.5         320.70         487.30         6.463         0.0E+00         2.0E+04         2.1.8E+02         0.0E+00           76131         1.1.2E+04         7.80E+02         8.20E+06         1.80E+00         1.60E+01         4.80E+01         2.5         320.70         487.30         0.643         0.0E+00         2.0E+04         2.37E+02         X         0.0E+00           77474         Hexachoroxycopenatione         2.06E+05         1.80E+00         1.90E+04         4.38E+01         1.48E+00         2.55         398.92         572.00         7.590         1.0E+01         X         0.0E+00           78837         1.2.0E100rapropane         4.37E			
76694       Trichtonorumentane       4.97E+02       8.70E+02       9.70E+06       1.01E+03       3.97E+00       9.88E+02       25       298.70       471.00       5.999       0.0E+00       7.0E+01       1.21E+02       0.0E+00         77613       11.112+17       7.050E+02       2.00E+02       1.97E+01       4.80E+01       25       282.070       487.30       6.463       0.0E+00       3.07E+03       3.87E+02       0.0E+00       3.07E+01       1.21E+02       0.0E+00       3.07E+01       1.21E+02       0.0E+00       3.07E+01       3.37E+02       X       1.35E+03       3.73E+02       X       1.35E+03       2.55       3.810       5.47E+01       1.6E+02       7.23E+02       X       1.35E+02       7.758       1.0E+03       3.73E+02       X       1.3E+02       X       1.3E+02       X       1.3E+02       X       1.6E+02       7.3E+02       X       1.6E+02       7.3E+02       X       1.6E+02       7.0E+01       7.0E+01       7.0E+01       7.0E+01       X       0.0E+00       5.6E+00       7.0E+01			
75718         Dickhordihuoromethane         4,57E+02         682E+02         2,20E+00         2,80E+06         1,70E+02         1,77E+01         4,80E+01         25         243,20         384,85         9,421         0.0E+00         2,0E+01         1,2E+02         0.0E+00         2,0E+01         1,2E+02         0.0E+00         2,0E+01         1,2E+03         3,7E+02         X         1,3E+02         0.0E+00         1,7E+02         X         1,3E+02         X         1,3E+02         X         1,3E+03         2,2E+03         3,7E+02         X         1,3E+03         2,2E+03         3,7E+02         X         1,3E+02         X         1,3E+02         X         1,3E+02         X         1,3E+02         X         1,3E+01         2,7E+03         2,5E+03         3,8E,56         2,53         381,45         547,78         10,938         0,0E+00         7,4E+01         X         0,0E+00         7,4E+01         X         0,0E+00         7,2E+01         0,0E+00         7,2E+01         X         0,0E+00         7,2E+01         X         1,0E+01         X         0,0E+00         7,2E+01         X         1,0E+01         X         0,0E+00         2,2E+01         0,0E+01         7,3E+01         0,0E+01         7,3E+01         0,2E+01         7,3E+02         <			
76131         1.1.2.Trichloro-1.2.2.Hildurodehan         1.11E+04         7.80E-02         6.20E-06         1.70E+02         1.97E+01         4.80E+01         2.5         320.70         447.30         6.463         0.0E+00         3.0E+01         1.87E+02         X         1.87E+02         X         1.87E+02         X         1.87E+02         X         1.87E+03         X         1.87E+03         X         1.87E+02         X <td></td> <td></td> <td></td>			
76448       Heightein       1.11E+06       1.12E-02       5.68E-05       1.80E+00       2.60E+01       1.46E+00       2.5       603.69       84.61       1.3000       0.2E-63       3.37E+02       X       1.3E-03         77444       Hexploxopolentadine       2.00E+05       1.61E-00       2.69E+04       4.83E+04       1.18E-05       2.5       381.04       547.78       10.936       0.0E+00       1.1E+00       7.21E+01       X       0.0E+00         78875       1.2.Dichtoropropane       4.37E+01       7.32E+02       8.30E+04       4.83E+04       1.18E-05       2.5       381.92       5.26E+00       5.0E+00       7.21E+01       X       0.0E+00         78905       1.2.Dichtoropropane       4.37E+01       7.32E+02       8.30E+04       4.38E+01       2.38E+05       2.55       356.78       7.481       0.0E+00       5.0E+00       7.21E+01       X       0.0E+00       7.21E+01       X       0.0E+00       7.21E+01       X       1.8E-03       7.37E+02       X       1.8E-03       7.37E+01       7.0E       0.0E+00       7.2E+01       X			
77474 Hexablorocyclopentaleine         2.00E+05         161E-02         7.21E-06         1.80E+00         1.10E+00         2.68E+02         25         512.15         74.60         10.931         0.0E+00         2.0E+04         2.73E+02         0.0E+00           78831 isolutanol         2.58E+00         8.50E+04         4.83E+04         1.18E+01         2.79E+03         25         381.64         547.78         10.935         0.0E+00         1.1E+02         ?         0.0E+00           78873         1.12E-101         7.82E+02         8.73E+06         2.28E+05         2.29E+03         5.56E+05         25         352.50         536.78         7.481         0.0E+00         7.85E+02         1.33E+02         X         1.6E+05         1.4E+02         1.33E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.4E+02         X         0.6E+00         1.		×	х
78831 isobutanol         2.59E+00         8.60E-02         9.30E+06         8.80E+04         4.83E+04         1.18E+05         25         381.44         547.78         10.938         0.0E+00         7.1E+01         X         0.0E+00           78837 12.01ch/orograme         4.37E+01         7.82E+03         5.58E+05         25         356.52         558.78         7.481         0.0E+00         5.0E+00         7.21E+01         0.0E+00           78035 1.12.1ch/orograme         5.01E+01         7.80E+02         8.80E+06         4.22E+03         3.73E+02         9.11E+04         25         366.15         602.00         8.322         1.8E+05         2.28         1.8E+04         1.8E+06         2.0E+00         7.835+02         1.8E+04         2.5         360.15         602.00         8.322         1.8E+02         X         1.8E+02         X         1.8E+04         1.8E+04         2.5         329.80         506.70         7.260         0.0E+00         3.31E+00         7.41E+01         X         0.0E+00         7.895         1.4E+02         1.33E+02         X         1.8E+04         2.5         329.80         506.70         7.260         0.0E+00         3.4E+01         X         0.0E+00         3.4E+01         X         0.0E+00         3.4E+01         <		~	~
78933         Methyderbylektone (2-butanone)         2.30E+00         8.08E-02         9.80E-06         2.22E-03         5.8E-05         25         352.50         538.78         7.481         0.0E+00         7.0E-01         7.80E-01		x	х
79005         11.2-Inclincentane         501E+01         7.80E-02         8.80E-06         4.42E+03         3.73E-02         9.11E-04         25         386.15         602.00         8.322         1.6E-05         1.4E-02         1.33E+02         X         1.1E-04           79016         Incidiorethylee         3.26E+00         1.00E+01         1.00E+05         2.00E+03         4.21E-01         1.03E-02         25         360.36         544.20         7.526         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           73916         1.00E+01         1.00E+05         2.00E+03         4.21E-01         1.03E-02         2.5         360.36         544.20         7.526         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           73945         1.1.2_2_Tetrachioreethane         9.33E+01         7.10E-02         1.01E+05         2.00E+03         1.41E+02         3.44E-04         25         373.50         567.00         8.975         0.0E+00         3.5E+00         7.0E+04         3.5E+00         7.6E+04         1.5E+04         2.5         373.50         567.00         8.975         0.0E+00         3.5E+02         0.0E+00         3.5E+02         0.0E+00         3.5E+02         0.0E+00         3.5E+02 <t< td=""><td></td><td>х</td><td></td></t<>		х	
79016 Tickhorethylene         166E+02         7.90E-02         9.10E-06         1.47E+03         4.21E-01         1.03E+02         25         360.36         544.20         7.505         0.0E+00         3.51E+02         1.11E+02         1.11E+04           79209 Methylacetate         3.32E+01         7.010-02         7.90E+06         2.00E+03         1.41E+02         3.44E+04         25         393.20         564.00         3.5E+00         7.41E+01         X         5.5E+06           79469 2-Mitropropen         1.17E+01         9.23E+02         7.90E+06         2.00E+03         1.41E+02         3.44E+04         25         393.20         594.00         8.38         2.7E+03         2.81E+02         X         5.8E+02         2.7E<03			
79209         Methyl acetate         3 28E+00         1.04E-01         1.00E-05         2.00E+03         4.84E-03         1.18E-04         25         329.80         506.70         7.260         0.0E+00         3.5E+00         7.41E+01         X         0.0E+00           793045         1.1.2.2-Tetrachoroethane         9.33E+01         7.10E-02         7.90E-06         2.96E+03         1.41E-02         3.44E-04         25         419.60         661.15         8.996 <b>5.8E+05</b> 7.41E+01         X         5.8E+00         7.41E+01         X         5.8E+00         7.41E+01         X         5.8E+00         7.41E+01         Y         5.8E+00         7.4E+01         Y         0.0E+00         Y         1.00E+02         Y         0.0E+00         Y         Y         0.0E+00         Y         Y         0.0E+00         Y         Y         0.0E+00		x	х
73945         1.12_21etrachtoroethane         9.33E+01         7.10E-02         7.99E-06         2.96E+03         1.41E-02         3.44E-04         25         419.60         661.15         8.996         5.8E-05         1.4E-02         1.8E+02         X         5.8E-05         7.4E+02         1.8E+02         2.7E+03         2.2E+03         2.0E+00         8.81E+02         X         5.8E+05         2.7E+03         2.0E+00         8.81E+02         X         5.8E+05         2.7E+03         2.0E+00         8.81E+02         X         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.7E+01         1.00E+02         0.0E+00         2.8E+02         X			х
80626 Methymethacrylate         6.98E+00         7.70E-02         8.80E+04         1.38E+02         3.36E+04         2.5         373.50         567.00         8.975         0.0E+00         7.0E+01         1.00E+02         X         0.0E+00           83329 Acenaphthene         7.0BE+04         3.42E+04         3.36E+04         2.5         550.54         803.15         12.156         0.0E+00         2.1E+01         1.56E+02         X         0.0E+00           86737 Fluorene         1.38E+04         3.63E+02         7.88E+06         1.98E+00         2.60E+03         6.34E+03         2.5         570.44         807.00         12.666         0.0E+00         1.4E+01         1.66E+02         X         0.0E+00           87633 Hexachtoro-1,3-butadiene         5.37E+04         6.50E+02         5.11E+04         2.2E+05         3.5E+03         2.61E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         2.2E+05         3.5E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         3.2E+02         X         0.0E+00         9.2E+02         X         0.0E+00			x
83329 Accempthtene         7.08E+03         4.21E-02         7.69E+06         3.57E+00         6.34E-03         1.58E+04         2.5         550.54         803.15         12.155         0.0E+00         1.4E+02         X         0.0E+00           86737 Fluorene         1.38E+04         2.5         550.54         803.15         12.155         0.0E+00         1.4E+02         X         0.0E+00           87637 Fluorene         5.37E+04         5.61E-02         C.18E+00         3.33E+01         6.34E-03         2.5         486.15         7.800         10.208         2.2E+03         3.8E+02         X         2.2E+04           87620 e-Nitroblene         3.24E+04         5.87E+02         8.67E+00         5.11E-04         1.25E+05         2.5         495.00         720.00         12.208         3.0E+03         1.37E+02         X         0.0E+00           91203 Napithalene         2.00E+03         5.90E+04         3.10E+01         1.38E+02         0.0E+00         1.38E+02         0.0E+00         1.8E+02         0.0E+00         0.0E+00         1.8E+02         0.0E+0			
86737 Fluorene         1.38E+04         3.63E-02         7.88E-06         1.98E+00         2.60E-03         6.34E-05         25         570.44         870.00         12.666         0.0E+00         1.4E-01         1.6E-02         X         0.0E+00           87683         Hexachbore-1.3-butatione         5.37E+04         5.61E-02         6.16E-06         3.33E-01         8.13E-03         25         486.15         738.00         10.268         0.0E+00         3.2E-03         2.61E-02         X         0.0E+00           87623         -Mitrotoluene         3.24E+02         5.87E-02         8.67E-06         6.06E+01         1.98E-02         4.82E-04         25         495.10         7.22.90         0.2E+03         1.37E+02         X         0.0E+00           91203         Naphthalene         2.016+03         5.22E-06         3.0E+01         1.98E-02         4.82E-04         25         491.14         74.840         10.373         3.4E-05         1.8E+02         X         0.0E+00           91576         2.40E+013         5.22E-00         7.75E-06         3.0E+01         1.98E+02         2.98E-04         25         529.10         781.00         1.2600         0.0E+00         1.4E+02         X         0.0E+00           92524			
B7683 Hexachloro-13-butadene         5.37E+04         6.61E-02         6.16E-06         3.20E+00         3.33E+01         8.13E-03         2.5         486.15         738.00         10.208         2.2E+05         3.5E+03         2.61E+02         X         2.2EE-05           88720 - Nitroblene         3.24E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.87E+04         5.85E+03         1.226         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.1676         3.0E+02         7.8E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.1676         3.0E+02         7.8E+02         0.0E+00         3.2E+02         0.0E+00         3.2E+02         0.0E+00         9.0E+00         1.8E+02         1.0E+02         X         0.0E+00           91576 2-MitryInaphtalene         2.3E+03         4.0E+02         8.15E+06         7.45E+02         2.12E+02         5.17E+04         2.5         512+01         1.680         0.0E+00         1.8E+02         1.4E+02         X         0.0E+00           95571 12-Dictionoberzene         6.17E+02         8.0E+02         7.77E+02			X
88722 o-Nitrobluene         3.24E+02         5.87E-02         8.67E-06         6.50E+02         5.11E-04         1.25E-05         2.5         4.95.00         720.00         12.238         0.0E+00         3.2E-03         1.37E+02         X         0.0E+00           91203 Naphthelene         2.00E+03         5.90E-02         7.75E-06         3.10E+01         1.98E+02         4.82E-04         2.5         491.14         748.40         10.373         3.4E-03         1.32E+02         X         0.0E+00           91576 2-Methylinpathtalene         2.81E+03         5.22E-02         7.75E-06         2.46E+01         1.28E-02         5.77E-04         2.5         521.42         671.00         12.260         0.0E+00         1.4E+02         1.42E+02         X         0.0E+00           92524 Biphenyl         4.38E+03         4.04E-02         8.15E-06         7.45E+00         1.28E-02         2.99E-04         2.5         529.10         789.00         10.80         0.0E+00         1.8E+02         X         0.0E+00           95476 0-X/µene         3.38E+02         8.05E+00         1.28E+02         1.29E+02         X         0.0E+00         1.0E+01         1.06E+02         0.0E+00         1.0E+01         1.06E+02         0.0E+00         0.0E+00         1.0E+01			X
91203         Naphthalene         2.00E+03         5.90E-02         7.50E-06         3.10E+01         1.98E-02         4.82E-04         2.5         491.14         748.40         10.373 <b>3.4E-05</b> 1.28E+02         0.0E+00         91/576           91/576         2.4ME/1043         5.22E-02         7.75E-06         3.12E+02         1.78E+02         2.5         491.14         748.40         10.373 <b>3.4E-05</b> 1.28E+02         0.0E+00         91/576           92524         Biphenyi         4.38E+03         4.04E-02         8.15E-06         7.45E+00         1.23E-02         2.99E-04         25         529.10         789.00         10.890         0.0E+00         1.8E-01         1.54E+02         X         0.0E+00           95476         5.Vighene         3.63E+02         8.70E-02         1.28E+02         2.12E-01         5.18E-03         25         417.60         630.30         8.68         10.0E+00         1.68E+02         X         0.0E+00           95578         2.Chorophenol         3.68E+02         7.77E+02         1.90E-03         25         447.55         675.00         9.570         0.0E+00         1.48E+02         2.0E+04         0.0E+00           95578         2.Chorophenol         3.88E+02			x
92524 Biphenyl         4.38E+03         4.04E-02         8.18E+06         7.45E+00         1.23E+02         2.98E+04         2.5         529.10         789.00         10.890         0.0E+00         1.8E+01         1.54E+02         X         0.0E+00           95476 o-Xylene         3.63E+02         8.70E+02         1.08E+00         1.23E+02         2.98E+04         2.5         529.10         789.00         10.890         0.0E+00         1.8E+02         X         0.0E+00         9.676         0.0E+00         1.0E+02         0.0E+00         0.0E+00         1.0E+01         1.06E+02         0.0E+00         0.0E+00         1.0E+02         0.0E+00         0.0E+00         0.0E+00         1.0E+02         0.0E+00         0.0E+	-00 3.0E-03		
95476 o-Xylene         3.63E+02         8.70E-02         1.00E-05         1.78E+02         2.12E-01         5.18E-03         25         417.60         630.30         8.661         0.0E+00         1.0E-01         1.06E+02         0.0E+00           95517 1.2-Dichlorobenzene         6.17E+02         9.09E-00         1.58E+02         7.77E-02         1.90E-03         25         453.57         705.00         9.70         0.0E+00         1.8E+02         0.0E+00         0.0E+00           95578 2-Chlorophenol         3.88E+02         5.10E-02         3.90E-04         25         447.53         675.00         9.70         0.0E+00         1.8E+02         1.20E+02         0.0E+00         0.0E+00           95658 1.2.4-Timethylbenzene         1.35E+03         6.06E-02         7.92E+06         5.70E+01         2.52E+01         6.14E+03         25         447.53         675.00         9.70         0.0E+00         7.0E+02         X         0.0E+00           95636 1.2.4-Timethylbenzene         1.35E+03         6.06E-02         7.92E+06         5.70E+01         2.52E+01         6.14E+03         25         447.53         675.00         9.50E+00         7.0E+03         1.20E+02         X         0.0E+00			х
95501 1.2-Dichlorobenzene         6.17E+02         6.90E-02         7.90E-06         1.56E+02         7.77E-02         1.90E-03         2.5         453.57         705.00         9.700         0.0E+00         1.27E+02         0.0E+00           95578 2-Chlorophenol         3.88E+02         5.01E-02         9.46E-06         2.20E+04         1.60E-02         3.90E-04         2.5         447.53         675.00         9.70         0.0E+00         1.8E-02         1.29E+02         X         0.0E+00           95658 1.2.4-Timmethylberzene         1.35E+03         6.0EE-02         7.92E-06         5.70E+01         6.14E-03         25         442.30         649.17         9.369         0.0E+00         7.0E-03         1.20E+02         0.0E+00		x	х
95578         2-Chlorophenol         3.88E+02         5.01E-02         9.46E-06         2.20E+04         1.60E-02         3.90E-04         25         447.53         675.00         9.572         0.0E+00         1.8E-02         1.29E+02         X         0.0E+00           95636         1,2,4-Trimethybenzene         1.35E+03         6.06E-02         7.92E-06         5.70E+01         2.52E-01         6.14E-03         25         442.30         649.17         9.369         0.0E+00         7.0E-03         1.20E+02         X         0.0E+00			
95636 1,2,4-Trimethyberzene 1.35E+03 6.06E-02 7.92E-06 5.70E+01 2.52E-01 6.14E-03 25 442.30 649.17 9.369 0.0E+00 7.0E-03 1.20E+02 0.0E+00		x	х
			~
96184 1,2,3-Trichloropropane 2.20E+01 7.10E-02 7.90E-06 1.75E+03 1.67E-02 4.08E-04 25 430.00 652.00 9,171 8.6E-03 3.0E-04 1.47E+02 X 5.7E-04		х	
96333 Methylacylate 4,53E+00 9.76E-02 1.02E-05 6.00E+04 7.68E-03 1.87E-04 25 353.70 536.00 7.749 0.0E+00 1.1E-01 8.61E+01 X 0.0E+00 1.0E+00 1.			X
97632 Ethylmethacrylate 2.95E+01 6.53E-02 8.37E-06 3.37E+03 3.44E-02 8.40E-04 25 390.00 571.00 10.957 0.0E+00 3.2E-01 1.14E+02 X 0.0E=00 98066 tert-Burlybenzene 7.71E+02 5.65E-02 8.02E+03 3.44E-02 11.19E+02 25 44210 1220.00 8.980 0.0E+00 1.4E-01 1.34E+02 X 0.0E=00 98066 tert-Burlybenzene 7.71E+02 5.65E-02 8.02E+03 3.44E-02 5.55E-01 1.19E+02 5.55E-01 1.34E+02 5.55E-01 1.			X
98000 tert-butytoenzene /./TE+V2 5:05E-V2 5/2E+V0 2.55E+V1 4.67E-V1 1.19E-V2 25 442.10 1220.00 8,980 0.0E+V0 1.4E-V1 1.34E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 6.55E-05 7.10E-V0 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.4E-V1 1.20E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 6.55E-05 7.10E-V0 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 5.56 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 4.89E+V2 5.56 6.13E+V1 4.74E+V1 1.19E+V2 25 442.10 1220.00 8,980 0.0E+V0 1.120E+V2 X 0.0E+V0 98828 Cumene 5.56 5.56 5.56 5.56 5.56 5.56 5.56 5.5		~	~
98862 Acetophenone 5.77E+01 6.00E-02 8.73E-06 6.13E+03 4.38E-04 1.07E-05 25 475.00 709.50 11,732 0.0E+00 3.5E-01 1.20E+02 X 0.0E+00	00 3.5E-01	х	х
98953 Nitrobenzene 6.46E+01 7.60E-02 8.60E-06 2.09E+03 9.82E-04 2.39E-05 25 483.95 719.00 10,566 0.0E+00 2.0E-03 1.23E+02 0.0E+00	00 2.0E-03		
100414 Ethybenzene 3.63E+02 7.50E-02 7.80E-06 1.69E+02 3.22E-01 7.86E-03 25 409.34 617.20 8.501 2.5E-06 1.0E+00 1.06E+02 0.0E+00			
100425 Styrene 7.76E+02 7.10E-02 8.00E-06 3.10E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.0E+00 9.0E-01 1.04E+02 0.0E=00 10047 9.0E-01 1.04E+02 4.14E-04 25 448.21 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E-03 1.27E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 1.12E-01 2.74E-03 25 418.31 636.00 8.737 0.9E+05 1.0E+02 7.80E-06 5.25E+02 7.80E-06		~	
100447 Benzyleholde 6.14E+01 7.50E-02 7.80E-06 5.25E+02 1.70E-02 4.14E-04 25 452.00 685.00 8,773 4.9E-05 1.0E-03 1.27E+02 ? 4.9E-05 100527 Benzyleholde 4.59E+01 7.21E-02 9.07E-06 3.30E+03 9.73E-04 2.37E-05 25 452.00 685.00 11.658 0.0E+00 3.5E-01 1.06E+02 X 0.0E+00		×	x
100627 derizaberlyde 1,35E-701 7,21E-02 5/01E-00 5/01E-00 5/01E-00 2/0 4/02.00 05/00 1/000 1/00010 0.0E-00 1,4E-01 1/00E-02 X 0.0E+00 1/4E-01 1/00E+02 X 0.0E+00			x
104518 n-Butylbenzene 1.11E+03 5.70E-02 8.12E-06 2.00E+00 5.38E-01 1.31E-02 25 456.46 660.50 9,290 0.0E+00 1.4E-01 1.34E+02 X 0.0E+00		x	X
106423 p-Xylene 3.89E+02 7.69E-02 8.44E-06 1.85E+02 3.13E-01 7.64E-03 25 411.52 616.20 8.525 0.0E+00 1.0E-01 1.06E+02 ? 0.0E+00			
106467 1,4-Dichlorobenzene 6.17E+02 6.90E-02 7.90E-06 7.90E+01 9.82E-02 2.39E-03 25 447.21 684.75 9,271 1.1E-05 8.0E-01 1.47E+02 0.0E+00 0.0E+00	00 8.0E-01		

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# VW6 120 $ug/m^3$ Toluene

### DATA ENTRY SHEET

		Soil	Gas Concentratio	n Data		Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	C <sub>q</sub>		Cg		
	no dashes)	(µg/m <sup>3</sup> )		(ppmv)		Chemical
	ne adonecy	(µg,)	-	(pp)		ononioai
	108883	1.20E+02	ן			Toluene
MORE	ENTER Depth below grade	ENTER Soil gas	ENTER	ENTER Vadose zone		ENTER User-defined
↓	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
		152.4	24	CL		
	15		24	C		

MORE ↓	ENTER Vandose zone SCS soil type Lookup Soil Parameters	ENTER Vadose zone soil dry bulk density, $ ho_b^A$ (g/cm <sup>3</sup> )	ENTER Vadose zone soil total porosity, n <sup>V</sup> (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ (cm <sup>3</sup> /cm <sup>3</sup> )
		1.48	0.442	0.168

ENTER					
Average vapor					
flow rate into bldg.					
(Leave blank to calculate)					
Q <sub>soil</sub>					
(L/m)					
5					

MORE ↓

ENTER	ENTER	ENTER	ENTER
 Averaging	Averaging		
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

# VW6 120 $ug/m^3$ Toluene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.274	0.245	1.29E-09	0.865	1.12E-09	4,000	1.20E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	5.98E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (µg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.20E+02	1.25	8.33E+01	5.98E-03	5.00E+03	1.29E+12	8.43E-04	1.01E-01

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m³)⁻¹	(mg/m <sup>3</sup> )
NA	3.0E-01
END	

### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	3.2E-04

MESSAGE SUMMARY BELOW:

## VW6 10 ug/m<sup>3</sup> Ethylbenzene

#### DATA ENTRY SHEET

	Soil Gas Concentration Data					Interim Final 12/04
Reset to Defaults	ENTER Chemical	ENTER Soil gas	OR	ENTER Soil gas		(last modified 12/6/2011)
	CAS No. (numbers only,	conc., C <sub>q</sub>		conc., C <sub>g</sub>		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	100414	1.00E+01	]			Ethylbenzene
	ENTER Depth	ENTER	ENTER	ENTER		ENTER
MORE ↓	below grade to bottom of enclosed	Soil gas sampling depth	Average soil	Vadose zone SCS soil type		User-defined vadose zone soil vapor
	space floor, L <sub>F</sub>	below grade, L <sub>s</sub>	temperature, T <sub>S</sub>	(used to estimate soil vapor	OR	permeability, k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
				CL		

ENTER	ENTER	ENTER	ENTER
Vandose zone	Vadose zone	Vadose zone	Vadose zone
SCS	soil dry	soil total	soil water-filled
soil type	bulk density,	porosity,	porosity,
Lookup Soil	ρ <sub>b</sub> Α	n∨	$\theta_w^{\vee}$
Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
CL	1.48	0.442	0.168
	Vandose zone SCS soil type Lookup Soil	Vandose zone SCS soil dry soil type bulk density, Lookup Soil Parameters (g/cm <sup>3</sup> )	Vandose zone Vadose zone SCS soil dry soil total soil type bulk density, porosity, Lookup Soil Parameters (g/cm <sup>3</sup> ) (unitless)

Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

ENTER

MORE ↓

ENTER	ENTER	ENTER	ENTER
Averaging	Averaging		
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

## VW6 10 ug/m<sup>3</sup> Ethylbenzene

### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.274	0.245	1.29E-09	0.865	1.12E-09	4,000	1.00E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µтs (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,994	7.43E-03	3.05E-01	1.80E-04	5.15E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.00E+01	1.25	8.33E+01	5.15E-03	5.00E+03	1.12E+14	7.63E-04	7.63E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.5E-06	1.0E+00
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
7.8E-09	7.3E-06

MESSAGE SUMMARY BELOW:

# VW6 31 ug/m<sup>3</sup> m,p-Xylene

#### DATA ENTRY SHEET

		Soil Gas Concentration Data				Interim Final 12/04	
Reset to Defaults	ENTER Chemical CAS No. (numbers only,	ENTER Soil gas conc., C <sub>g</sub>	OR	ENTER Soil gas conc., C <sub>g</sub>		(last modified 12/6/2011)	
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical	
	106423	3.10E+01	1			p-Xylene	
	ENTER	ENTER	ENTER	ENTER		ENTER	
MORE ↓	Depth below grade to bottom of enclosed space floor, L <sub>F</sub>	Soil gas sampling depth below grade, L <sub>s</sub>	Average soil temperature, T <sub>S</sub>	Vadose zone SCS soil type (used to estimate soil vapor	OR	User-defined vadose zone soil vapor permeability, k <sub>v</sub>	
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )	
	15	152.4	24	CL			

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρμΑ	n∨	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	CL	1.48	0.442	0.168

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

Г

E	ENTER	ENTER	ENTER	ENTER
	Averaging time for carcinogens, AT <sub>C</sub>	Averaging time for noncarcinogens, AT <sub>NC</sub>	Exposure duration, ED	Exposure frequency, EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

## VW6 31 ug/m<sup>3</sup> m,p-Xylene

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>bullding</sub> (cm <sup>3</sup> /s)
137.4	0.274	0.245	1.29E-09	0.865	1.12E-09	4,000	3.10E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µтs (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,083	7.22E-03	2.96E-01	1.80E-04	5.28E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.10E+01	1.25	8.33E+01	5.28E-03	5.00E+03	5.04E+13	7.76E-04	2.41E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

DTSC / HERD Last Update: 11/1/03

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	2.3E-04

MESSAGE SUMMARY BELOW:

## VW6 32 $ug/m^3$ o-Xylene

#### DATA ENTRY SHEET

			Gas Concentratio			Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	95476	3.20E+01	7	r		o-Xylene
	ENTER	ENTER	ENTER	ENTER		ENTER
	Depth					
MORE	below grade	Soil gas		Vadose zone		User-defined
$\mathbf{+}$	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	CL		
				•		•

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
¥	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	CL	1.48	0.442	0.168

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

ENTER	ENTER	ENTER	ENTER
 Averaging	Averaging		
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

## VW6 32 ug/m<sup>3</sup> o-Xylene

### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.274	0.245	1.29E-09	0.865	1.12E-09	4,000	3.20E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,245	4.88E-03	2.00E-01	1.80E-04	5.98E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soll</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.20E+01	1.25	8.33E+01	5.98E-03	5.00E+03	1.29E+12	8.43E-04	2.70E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	2.6E-04

MESSAGE SUMMARY BELOW:

#### DATA ENTRY SHEET

			Gas Concentratio	n Data		Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	60297	3.00E+03	]	· · · · · · ·		TPH-Gasoline
MORE	Depth below grade	Soil gas	<b>A</b>	Vadose zone		User-defined
<b>↓</b>	to bottom	sampling	Average	SCS		vadose zone
	of enclosed space floor,	depth below grade,	soil temperature,	soil type (used to estimate	OR	soil vapor
	L <sub>F</sub>	L <sub>s</sub>	T <sub>s</sub>	soil vapor	UK	permeability, k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SC		
	15	152.4	27	00		

MORE ↓	ENTER Vandose zone SCS	ENTER Vadose zone soil dry	ENTER Vadose zone soil total	ENTER Vadose zone soil water-filled
	Soil type Lookup Soil Parameters	bulk density, $\rho_b^A$ (g/cm <sup>3</sup> )	porosity, n <sup>v</sup> (unitless)	porosity, θ <sub>w</sub> <sup>∨</sup> (cm³/cm³)
	SC	1.63	0.385	0.197

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

Г

ENTER Averaging	ENTER Averaging	ENTER	ENTER
time for carcinogens, AT <sub>C</sub>	time for noncarcinogens, AT <sub>NC</sub>	Exposure duration, ED	Exposure frequency, EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

### CHEMICAL PROPERTIES SHEET

	Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Unit risk factor, URF (µg/m <sup>3)-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Molecular weight, MW (g/mol)
7.00E-02 7.80E-06 3.00E-02 25 7,000 369.00 508.00 0.0E+00 4.9E+01 108.0	7.00E-02	7.80E-06	3.00E-02	25	7,000	369.00	508.00	0.0E+00	4.9E+01	108.00

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	3.00E+03	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	8,304	2.86E-02	1.17E+00	1.80E-04	1.81E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.00E+03	1.25	8.33E+01	1.81E-03	5.00E+03	1.09E+40	3.35E-04	1.01E+00

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	4.9E+01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	2.0E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

VLOOKUP TABLES

		S	oil Properties L	ookup Table				Bulk Density	
SCS Soil Type	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> ) SCS Soil Name
С	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215 Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168 Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148 Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076 Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054 Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197 Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146 Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167 Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216 Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198 Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180 Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103 Sandy Loam

		Organic		C	hemical Propert	ties Lookup Table														
		Organic			Pure		Henry's	Henry's			Enthalpy of (I		0xicity Criter 12/02/2011 D							
		carbon			component		law constant	law constant	Normal		vaporization at	Unit	12/02/2011 D	(150/HERO)			Unit			
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	risk	Reference	Molecular			risk	Reference		
		coefficient,	in air,	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc.,	weight,	URF	RfC	factor,	conc.,	URF	RfC
		Koc	Da	Dw	s	H'	н	TR	TB	Tc	$\Delta H_{v,b}$	URF	RfC	MW	extrapolated		URF		extrapolated	
CAS No.	Chemical	(cm <sup>3</sup> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m <sup>3</sup> /mol)	(°C)	(°K)	(°K)	(cal/mol)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(g/mol)	(X)	(X)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(X)	(X)
50005	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	4.2E-05	4.0E-02	1.54E+02			1.5E-05	0.0E+00		
	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-02		624.24	885.73	14 000	4.2E-05 3.4E-04	4.0E-02 7.0E-04	4.10E+02			1.0E-05			
	amma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05		596.55	839.36	15,000	3.1E-04	1.1E-03	2.91E+02	?	х	3.7E-04		х	х
60297	TPH-Gasoline	5.00E+03	7.00E-02	7.80E-06	1.50E+02	7.20E-04	3.00E-02	25	369.00	508.00	7,000	0.0E+00	4.9E+01	1.08E+02		х	0.0E+00			х
60571		2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04	3.81E+02		х	4.6E-03			х
67641		5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05		329.20	508.10	6,955	0.0E+00	3.1E+01	5.81E+01		х	0.0E+00			х
	Chloroform Hexachloroethane	3.98E+01 1.78E+03	1.04E-01 2.50E-03	1.00E-05 6.80E-06	7.92E+03 5.00E+01	1.50E-01 1.59E-01	3.66E-03 3.88E-03		334.32 458.00	536.40 695.00	6,988 9.510	5.3E-06 1.1E-05	3.0E-01 3.5E-03	1.19E+02 2.37E+02		x	2.3E-05 4.0E-06			x
71432		1.78E+03 5.89E+01	2.50E-03 8.80E-02	9.80E-06	5.00E+01 1.79E+03	2.27E-01	3.88E-03 5.54E-03	25	458.00	562.16	9,510	1.1E-05 2.9E-05	3.5E-03 3.0E-02	2.37E+02 7.81E+01		X	4.0E-06 7.8E-06			x
	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02		347.24	545.00	7,136	0.0F+00	5.0E+02	1.33E+02			0.0E+00			
	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05		651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		х	0.0E+00	1.8E-02		х
72559		4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	3.18E+02	?		9.7E-05	0.0E+00	х	
	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03	9.49E+01			0.0E+00			
	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.8E-06	9.0E-02	5.05E+01			1.0E-06			
	Hydrogen cyanide	3.80E+00 1.26E+01	1.93E-01	2.10E-05	1.00E+06 1.19E+04	5.44E-03	1.33E-04		299.00	456.70 583.00	6,676	0.0E+00 0.0E+00	3.0E-03	2.70E+01 1.74E+02		х	0.0E+00 0.0E+00			х
	Methylene bromide Chloroethane (ethyl chloride)	1.26E+01 4.40E+00	4.30E-02 2.71E-01	8.44E-06 1.15E-05	1.19E+04 5.68E+03	3.52E-02 3.61E-01	8.59E-04 8.80E-03	25 25	370.00 285.30	583.00 460.40	7,868 5.879	0.0E+00 8.3E-07	3.5E-02 1.0E+01	1.74E+02 6.45E+01	2	x	0.0E+00 8.3E-07		х	X
	Vinyl chloride (chloroethene)	4.40E+00 1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02		259.25	432.00	5,250	7.8E-05	1.0E+01	6.25E+01			8.8E-06		~	
	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05		354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00			
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.7E-06	9.0E-03	4.41E+01			2.2E-06	9.0E-03		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03		313.00	510.00	6,706	1.0E-06	4.0E-01	8.49E+01			4.7E-07	3.0E+00		
	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02		319.00	552.00	6,391	0.0E+00	7.0E-01	7.61E+01			0.0E+00			
	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	8.8E-05	3.0E-02	4.41E+01		?	1.0E-04			v
	Bromoform Bromodichloromethane	8.71E+01 5.50E+01	1.49E-02 2.98E-02	1.03E-05 1.06E-05	3.10E+03 6.74E+03	2.41E-02 6.54E-02	5.88E-04 1.60E-03	25 25	422.35 363.15	696.00 585.85	9,479 7.800	1.1E-06 3 7E-05	7.0E-02 7.0E-02	2.53E+02 1.64E+02	2	x x	1.1E-06 1.8E-05		х	×
	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02		303.13	485.00	6.286	0.0E+00	1.0E-02	7.85E+01	1	2	0.0E+00		~	^
	1 1-Dichloroethane	3.16E+01	7 42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03		330.55	523.00	6,895	1.6E-06	7.0E-01	9.90E+01		x	0.0E+00			
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	7.0E-02	9.69E+01			0.0E+00	2.0E-01		
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02		232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00			
	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02		296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00			
	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01 1.97E+01	3.42E-01	25 25	243.20 320.70	384.95 487.30	9,421 6,463	0.0E+00 0.0E+00	2.0E-01 3.0E+01	1.21E+02 1.87E+02			0.0E+00 0.0E+00			
	1,1,2-Trichloro-1,2,2-trifluoroethar Heptachlor	1.11E+04 1.41E+06	7.80E-02 1.12E-02	8.20E-06 5.69E-06	1.70E+02 1.80E-01	6.05E+01	4.80E-01 1.48E+00	25	603.69	467.30	13.000	1.2E-03	1.8E-03	3.73E+02		х	1.3E-03			х
	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02		512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02		^	0.0E+00			^
	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05		381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		х	0.0E+00			х
	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03		369.52	572.00	7,590	1.0E-05	4.0E-03	1.13E+02	?		1.9E-05		х	
	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05		352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00			
	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02	1.33E+02		х	1.6E-05		×	х
	Trichloroethylene Methyl acetate	1.66E+02 3.26E+00	7.90E-02 1.04E-01	9.10E-06 1.00E-05	1.47E+03 2.00E+03	4.21E-01 4.84E-03	1.03E-02 1.18E-04	25 25	360.36 329.80	544.20 506.70	7,505 7,260	4.1E-06 0.0E+00	2.0E-03 3.5E+00	1.31E+02 7.41E+01		x	1.1E-04 0.0E+00	4.0E-02 3.5E+00	х	х
	1.1.2.2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	1.4E-02	1.68E+02		x	5.8E-05			x
	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04		393.20	594.00	8,383	2.7E-03	2.0E-02	8.91E+01		~	2.7E-03			~
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04		373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00			
	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01	1.54E+02		х	0.0E+00			х
	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01	1.66E+02		x	0.0E+00	1.4E-01		X
	Hexachloro-1,3-butadiene p-Nitrotoluene	5.37E+04 3.24E+02	5.61E-02 5.87E-02	6.16E-06 8.67E-06	3.20E+00 6.50E+02	3.33E-01 5.11E-04	8.13E-03 1.25E-05	25 25	486.15 495.00	738.00 720.00	10,206 12,239	2.2E-05 0.0E+00	3.5E-03 3.2E-03	2.61E+02 1.37E+02		x x	2.2E-05 0.0E+00			x
	Naphthalene	3.24E+02 2.00E+03	5.90E-02	7.50E-06	3.10E+02	1.98E-02	4.82E-04	25	495.00	720.00	12,239	3.4E-05	3.2E-03 3.0E-03	1.28E+02		^	0.0E+00			^
	2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	1.4E-02	1.42E+02		х	0.0E+00			х
92524	Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04		529.10	789.00	10,890	0.0E+00	1.8E-01	1.54E+02		х	0.0E+00			х
	o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03		417.60	630.30	8,661	0.0E+00	1.0E-01	1.06E+02			0.0E+00			
	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03		453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00			
	2-Chlorophenol	3.88E+02 1.35E+03	5.01E-02 6.06E-02	9.46E-06 7.92E-06	2.20E+04 5.70E+01	1.60E-02 2.52E-01	3.90E-04 6.14E-03	25	447.53 442.30	675.00 649.17	9,572 9,369	0.0E+00 0.0E+00	1.8E-02 7.0E-03	1.29E+02 1.20E+02		х	0.0E+00 0.0E+00			х
	1,2,4-Trimethylbenzene 1,2,3-Trichloropropane	1.35E+03 2.20E+01	6.06E-02 7.10E-02	7.92E-06 7.90E-06	5.70E+01 1.75E+03	2.52E-01 1.67E-02	6.14E-03 4.08E-04	25	442.30	649.17	9,369	8.6E-03	7.0E-03 3.0E-04	1.20E+02 1.47E+02			0.0E+00 5.7E-04		х	
	Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	4.08E-04 1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	8.61E+01	~	х	0.0E+00		~	х
	Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04		390.00	571.00	10,957	0.0E+00	3.2E-01	1.14E+02		x	0.0E+00			x
98066 t	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02		442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		х	0.0E+00			х
98828 (		4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00		425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00			
	Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05		475.00	709.50	11,732	0.0E+00	3.5E-01	1.20E+02		х	0.0E+00			х
	Nitrobenzene	6.46E+01 3.63E+02	7.60E-02 7.50E-02	8.60E-06 7.80E-06	2.09E+03 1.69E+02	9.82E-04 3.22E-01	2.39E-05 7.86E-03	25 25	483.95 409.34	719.00 617.20	10,566 8,501	0.0E+00 2.5E-06	2.0E-03 1.0E+00	1.23E+02 1.06E+02			0.0E+00 0.0E+00			
100414		3.63E+02 7.76E+02	7.50E-02 7.10E-02	7.80E-06 8.00E-06	1.69E+02 3.10E+02	3.22E-01 1.12E-01	7.86E-03 2.74E-03		409.34	636.00	8,501	0.0E+00	9.0E+00	1.06E+02 1.04E+02			0.0E+00 0.0E+00			
	Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04		452.00	685.00	8,773	4.9E-05	1.0E-03	1.27E+02			4.9E-05		х	
100527	Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	1.06E+02		х	0.0E+00	3.5E-01		х
	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02		432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		х	0.0E+00			х
	n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02		456.46	660.50	9,290	0.0E+00	1.4E-01	1.34E+02		x	0.0E+00			х
106423	p-Xylene 1.4-Dichlorobenzene	3.89E+02 6.17E+02	7.69E-02 6.90E-02	8.44E-06 7.90E-06	1.85E+02 7.90E+01	3.13E-01 9.82E-02	7.64E-03 2.39E-03		411.52 447.21	616.20 684.75	8,525 9,271	0.0E+00 1.1E-05	1.0E-01 8.0E-01	1.06E+02 1.47E+02		?	0.0E+00 0.0E+00			
100467	r,4-Dichi0l0Delizerie	0.1/E+02	0.90E-02	1.900-06	7.90E+01	9.02E-UZ	2.39E-03	25	447.21	004./5	9,271	1.1E-05	0.UE-01	1.47 E+02			0.00000	0.UE-01		

## VW7 4.1 ug/m<sup>3</sup> Benzene

#### DATA ENTRY SHEET

Reset to	ENTER	Soil ENTER	Gas Concentratio	n Data ENTER		Interim Final 12/04 (last modified 12/6/2011)
		Soil		Soil		()
Defaults	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	71432	4.10E+00	]			Benzene
	ENTER	ENTER	ENTER	ENTER		ENTER
	Depth					
MORE	below grade	Soil gas		Vadose zone		User-defined
$\mathbf{+}$	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SC		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
¥	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER									
Average vapor									
flow rate into bldg.									
(Leave blank to calculate)									
Q <sub>soil</sub>									
(L/m)									
5									

MORE ↓

Г

ENTER Averaging	ENTER Averaging	ENTER	ENTER
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

## VW7 4.1 ug/m<sup>3</sup> Benzene

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	2.27E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	2.27E-03	5.00E+03	6.79E+31	4.07E-04	1.67E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
2.0E-08	5.3E-05

MESSAGE SUMMARY BELOW:

## VW7 15 ug/m<sup>3</sup> Toluene

#### DATA ENTRY SHEET

		Soil	Gas Concentratio	n Data		Interim Final 12/04
Reset to Defaults	ENTER Chemical CAS No.	ENTER Soil gas conc.,	OR	ENTER Soil gas conc.,		(last modified 12/6/2011)
	(numbers only, no dashes)	C <sub>g</sub> (μg/m <sup>3</sup> )		C <sub>g</sub> (ppmv)		Chemical
	108883	1.50E+01	•			Toluene
	ENTER	ENTER	ENTER	ENTER		ENTER
	Depth		2			
MORE ↓	below grade to bottom	Soil gas sampling	Average	Vadose zone SCS		User-defined vadose zone
	of enclosed space floor,	depth below grade,	soil temperature,	soil type (used to estimate	OR	soil vapor permeability,
		Ls	T <sub>S</sub>	soil vapor permeability)		k <sub>v</sub> (cm <sup>2</sup> )
	L <sub>F</sub> (15 or 200 cm)	(cm)	(-C)			( )
	L <sub>F</sub> (15 or 200 cm)	(cm)	(°C)	pointodointy		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

E	ENTER Averaging	ENTER Averaging	ENTER	ENTER
	time for carcinogens, AT <sub>C</sub>	time for noncarcinogens, AT <sub>NC</sub>	Exposure duration, ED	Exposure frequency, EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

END

## VW7 15 ug/m<sup>3</sup> Toluene

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>bullding</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.50E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	2.25E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.50E+01	1.25	8.33E+01	2.25E-03	5.00E+03	1.60E+32	4.04E-04	6.05E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m³)⁻¹	(mg/m <sup>3</sup> )
NA	3.0E-01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	1.9E-05

MESSAGE SUMMARY BELOW:

## VW7 5.9 ug/m<sup>3</sup> Ethylbenzene

#### DATA ENTRY SHEET

		Soil	Gas Concentratio	n Data		Interim Final 12/04
Reset to Defaults	ENTER Chemical	ENTER Soil gas	OR	ENTER Soil		(last modified 12/6/2011)
)	CAS No.	conc.,	UK	gas conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	_	(ppmv)		Chemical
	100414	5.90E+00	ו			Ethylbenzene
	ENTER Depth	ENTER	ENTER	ENTER		ENTER
MORE	below grade to bottom	Soil gas sampling	Average	Vadose zone SCS		User-defined vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
			24	SC		

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
4	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> A	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

E					
	ENTER	ENTER	ENTER	ENTER	
	Averaging	Averaging			
	time for	time for	Exposure	Exposure	
	carcinogens,	noncarcinogens,	duration,	frequency,	
	AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF	
	(yrs)	(yrs)	(yrs)	(days/yr)	_
					•
	70	30	30	350	

## VW7 5.9 ug/m<sup>3</sup> Ethylbenzene

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	5.90E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,994	7.43E-03	3.05E-01	1.80E-04	1.94E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	5.90E+00	1.25	8.33E+01	1.94E-03	5.00E+03	2.28E+37	3.56E-04	2.10E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.5E-06	1.0E+00
END	

DTSC / HERD Last Update: 11/1/03

#### INCREMENTAL RISK CALCULATIONS:

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MESSAGE SUMMARY BELOW:

END

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### VW7 16 ug/m<sup>3</sup> m,p-Xylene

#### DATA ENTRY SHEET

		Soil		Interim Final 12/04		
Reset to Defaults	ENTER Chemical CAS No. (numbers only,	ENTER Soil gas conc., C <sub>q</sub>	OR	ENTER Soil gas conc., C <sub>g</sub>		(last modified 12/6/2011)
	no dashes)	(μg/m <sup>3</sup> )	-	(ppmv)		Chemical
	106423	1.60E+01	1			p-Xylene
	ENTER	ENTER	ENTER	ENTER		ENTER
MORE ↓	Depth below grade to bottom of enclosed	Soil gas sampling depth	Average soil	Vadose zone SCS soil type		User-defined vadose zone soil vapor
	space floor, L <sub>F</sub>	below grade, L <sub>s</sub>	temperature, T <sub>S</sub>	(used to estimate soil vapor	OR	permeability, k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
			24	SC		

ENTER Exposure frequency, EF (days/yr) 350

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
¥	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> <sup>A</sup>	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

Ξ				
	ENTER	ENTER	ENTER	
	Averaging	Averaging		
	time for	time for	Exposure	
	carcinogens,	noncarcinogens,	duration,	
	AT <sub>c</sub>	AT <sub>NC</sub>	ED	
	(yrs)	(yrs)	(yrs)	
	70	30	30	

END

HERD\_Soil\_Gas\_Screening\_Model.xls 7/27/2012 4:42 PM

## VW7 16 ug/m<sup>3</sup> m,p-Xylene

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.60E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,083	7.22E-03	2.96E-01	1.80E-04	1.99E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.60E+01	1.25	8.33E+01	1.99E-03	5.00E+03	2.71E+36	3.64E-04	5.82E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

DTSC / HERD Last Update: 11/1/03

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	5.6E-05

MESSAGE SUMMARY BELOW:

## VW7 $6.0 \text{ ug/m}^3 \text{ o-Xylene}$

#### DATA ENTRY SHEET

Reset to	ENTER	Soil ENTER		Interim Final 12/04 (last modified 12/6/2011)		
Defaults		Soil		Soil		. ,
Delaulto	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	95476	6.00E+00	]			o-Xylene
	ENTER	ENTER	ENTER	ENTER		ENTER
MORE	Depth below grade	Soil gas		Vadose zone		User-defined
₩OKE Ψ	to bottom	sampling	Average	SCS		vadose zone
<b>v</b>	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	L <sub>s</sub>	T <sub>s</sub>	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	( <sup>o</sup> C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SC		

MORE ↓	ENTER Vandose zone SCS soil type Lookup Soil Parameters	$\begin{array}{c} \textbf{ENTER} \\ \text{Vadose zone} \\ \text{soil dry} \\ \text{bulk density,} \\ \rho_{\text{b}}^{\text{A}} \\ (g/\text{cm}^3) \end{array}$	ENTER Vadose zone soil total porosity, n <sup>V</sup> (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	
	SC	1.63	0.385	0.197	

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

time for time for	Exposure	Exposure
carcinogens, noncarcinoge AT <sub>C</sub> AT <sub>NC</sub>	ns, duration, ED	frequency, EF
(yrs) (yrs)	(yrs)	(days/yr)
70 30	30	350

## VW7 $6.0 \text{ ug/m}^3 \text{ o-Xylene}$

### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	6.00E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,245	4.88E-03	2.00E-01	1.80E-04	2.25E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	6.00E+00	1.25	8.33E+01	2.25E-03	5.00E+03	1.57E+32	4.04E-04	2.42E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

DTSC / HERD Last Update: 11/1/03

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	2.3E-05

MESSAGE SUMMARY BELOW:

DATA ENTRY SHEET

SG-SCREEN PA Version 2.0; 04/		Soil	Gas Concentratior	Data	DTSC Vapor Intrusion Guidance Interim Final 12/04
Reset to Defaults	ENTER Chemical CAS No. (numbers only,	ENTER Soil gas conc., C <sub>a</sub>	OR	ENTER Soil gas conc., C <sub>g</sub>	(last modified 12/6/2011)
	no dashes)	(µg/m <sup>3</sup> )	ı	(ppmv)	Chemical
	60297	1.00E+04			TPH-Gasoline
MORE ↓	ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>s</sub> (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	ENTER User-defined vadose zone soil vapor OR permeability, k <sub>v</sub> (cm <sup>2</sup> )
	15	152.4	24	SC	
MORE	ENTER Vandose zone	ENTER Vadose zone	ENTER Vadose zone	ENTER Vadose zone	ENTER Average vapor
$\checkmark$	SCS	soil dry	soil total	soil water-filled	flow rate into bldg.

ENTER Exposure frequency, EF (days/yr) 350

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER	
Average vapor	
flow rate into bldg.	
(Leave blank to calculate)	
Q <sub>soil</sub>	
(L/m)	
5	

MORE ↓

Ξ				
	ENTER	ENTER	ENTER	
	Averaging	Averaging		
	time for	time for	Exposure	
	carcinogens,	noncarcinogens,	duration,	
	AT <sub>c</sub>	AT <sub>NC</sub>	ED	
	(yrs)	(yrs)	(yrs)	
	70	30	30	

#### CHEMICAL PROPERTIES SHEET

Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	Molecular weight, MW (g/mol)
7.00E-02	7.80E-06	3.00E-02	25	7,000	369.00	508.00	0.0E+00	4.9E+01	108.00

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.00E+04	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	8,304	2.86E-02	1.17E+00	1.80E-04	1.81E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soli</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.00E+04	1.25	8.33E+01	1.81E-03	5.00E+03	1.09E+40	3.35E-04	3.35E+00

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	4.9E+01
END	

#### INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	6.6E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

Highest Concentration Scenario VW5 10,000 ug/m<sup>3</sup> TPH-G

VLOOKUP TABLES

Soil Properties Lookup Table							Bulk Density				
SCS Soil Type	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> ) SCS Soil Name		
С	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215 Clay		
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168 Clay Loam		
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148 Loam		
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076 Loamy Sand		
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054 Sand		
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197 Sandy Clay		
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146 Sandy Clay Loam		
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167 Silt		
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216 Silty Clay		
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198 Silty Clay Loam		
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180 Silt Loam		
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103 Sandy Loam		

																	-	Original El	PA Values	
		Organic		C	hemical Proper Pure	ties Lookup Table	Henry's	Henry's			Enthalpy of (I		oxicity Criter	ria in bold DTSC/HERO)						
		carbon			component		law constant	law constant	Normal		vaporization at	Unit	12/02/2011 L	(130/HERO)			Unit			
		partition	Diffusivity	Diffusivity	water	Henry's	at reference	reference	boiling	Critical	the normal	risk	Reference	Molecular			risk	Reference		
		coefficient,	in air,	in water,	solubility,	law constant	temperature,	temperature,	point,	temperature,	boiling point,	factor,	conc.,	weight,	URF	RfC	factor,	conc.,	URF	RfC
		Koc	Da	Dw	S	H'	H	TR	TB	Tc	$\Delta H_{v,b}$	URF	RfC	MW	extrapolated		URF	RfC		d extrapolate
CAS No.	Chemical	(cm <sup>3</sup> /g)	(cm <sup>2</sup> /s)	(cm <sup>2</sup> /s)	(mg/L)	(unitless)	(atm-m <sup>3</sup> /mol)	(°C)	(°K)	(°K)	(cal/mol)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(g/mol)	(X)	(X)	(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )	(X)	(X)
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	4.2E-05	4.0E-02	1.54E+02			1.5E-05	5 0.0E+00	1	
	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05		624.24		14,000	3.4E-04	7.0E-04	4.10E+02			1.0E-04			
	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.1E-04	1.1E-03	2.91E+02	?	х	3.7E-04	4 1.1E-03		х
	7 TPH-Gasoline	5.00E+03	7.00E-02	7.80E-06	1.50E+02	7.20E-04	3.00E-02		369.00		7,000	0.0E+00	4.9E+01	1.08E+02		х	0.0E+00			Х
	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32		17,000	4.6E-03	1.8E-04 3.1E+01	3.81E+02		x	4.6E-03			X
	Acetone Chloroform	5.75E-01 3.98E+01	1.24E-01 1.04E-01	1.14E-05 1.00E-05	1.00E+06 7.92E+03	1.59E-03 1.50E-01	3.87E-05 3.66E-03	25 25	329.20 334.32	508.10 536.40	6,955 6,988	0.0E+00 5.3E-06	3.1E+01 3.0E-01	5.81E+01 1.19E+02		х	0.0E+00 2.3E-05			х
	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00		9,510	1.1E-05	3.5E-03	2.37E+02		x	4.0E-06			х
	2 Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24		7,342	2.9E-05	3.0E-02	7.81E+01			7.8E-06			
	5 1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02		347.24	545.00	7,136	0.0E+00	5.0E+00	1.33E+02			0.0E+00			
	5 Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05		651.02		16,000	0.0E+00	1.8E-02			х	0.0E+00			х
72559	DDE     Methyl bromide	4.47E+06 1.05E+01	1.44E-02 7.28E-02	5.87E-06 1.21E-05	1.20E-01 1.52E+04	8.59E-04 2.55E-01	2.09E-05 6.22E-03		636.44 276.71	860.38 467.00	15,000 5,714	9.7E-05 0.0E+00	0.0E+00 5.0E-03	3.18E+02 9.49E+01	?		9.7E-05 0.0E+00			
	3 Methyl chloride (chloromethane)	2.12E+01	1.26E-02	6.50E-06	5.33E+03	2.55E-01 3.61E-01	6.22E-03 8.80E-03	25	249.00	467.00	5,714	1.8E-06	9.0E-03	5.05E+01			1.0E+00			
	3 Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00		6,676	0.0E+00	3.0E-03				0.0E+00			
	3 Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02	1.74E+02		х	0.0E+00	3.5E-02	2	х
	3 Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	6.45E+01	?		8.3E-07			
	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02		259.25		5,250	7.8E-05	1.0E-01	6.25E+01			8.8E-06			
	3 Acetonitrile 3 Acetaldehyde	4.20E+00 1.06E+00	1.28E-01 1.24E-01	1.66E-05 1.41E-05	1.00E+06 1.00E+06	1.42E-03 3.23E-03	3.45E-05 7.87E-05	25 25	354.60 293.10		7,110 6,157	0.0E+00 2.7E-06	6.0E-02 9.0E-03	4.11E+01 4.41E+01			0.0E+00 2.2E-06			
	2 Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	1.0E-06	4.0E-01	8.49E+01			4.7E-07			
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	7.61E+01			0.0E+00	0 7.0E-01	1	
	3 Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60		6,104	8.8E-05	3.0E-02	4.41E+01		?	1.0E-04			
	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35		9,479	1.1E-06	7.0E-02	2.53E+02		x	1.1E-06			х
	Bromodichloromethane 2-Chloropropane	5.50E+01 9.14E+00	2.98E-02 8.88E-02	1.06E-05 1.01E-05	6.74E+03 3.73E+03	6.54E-02 5.93E-01	1.60E-03 1.45E-02	25 25	363.15 308.70	585.85 485.00	7,800 6,286	3.7E-05 0.0E+00	7.0E-02 1.0E-01	1.64E+02 7.85E+01	?	X	1.8E-05 0.0E+00			х
	3 1,1-Dichloroethane	3.14E+00 3.16E+01	0.00E-02 7.42E-02	1.01E-05 1.05E-05	5.06E+03	2.30E-01	5.61E-03		308.70		6,895	1.6E-06	7.0E-01	9.90E+01		x	0.0E+00			
	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	7.0E-02	9.69E+01		A	0.0E+00			
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01	1	
	1 Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02		296.70		5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00			
	B Dichlorodifluoromethane	4.57E+02 1.11E+04	6.65E-02 7.80E-02	9.92E-06 8.20E-06	2.80E+02 1.70E+02	1.40E+01 1.97E+01	3.42E-01 4.80E-01	25 25	243.20 320.70	384.95 487.30	9,421 6,463	0.0E+00 0.0E+00	2.0E-01 3.0E+01	1.21E+02 1.87E+02			0.0E+00 0.0E+00			
	Heptachlor	1.11E+04 1.41E+06	7.80E-02 1.12E-02	5.20E-06	1.70E+02 1.80E-01	1.97E+01 6.05E+01	4.80E-01 1.48E+00	25	320.70	487.30	6,463	1.2E-03	3.0E+01 1.8E-03	1.87E+02 3.73E+02		x	0.0E+00 1.3E-03			х
	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02		512.15		10,931	0.0E+00	2.0E-04	2.73E+02		^	0.0E+00			^
	I Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05		381.04		10,936	0.0E+00	1.1E+00	7.41E+01		х	0.0E+00			х
	5 1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52		7,590	1.0E-05	4.0E-03	1.13E+02	?		1.9E-05			
	3 Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50		7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00			
	5 1,1,2-Trichloroethane 5 Trichloroethylene	5.01E+01 1.66E+02	7.80E-02 7.90E-02	8.80E-06 9.10E-06	4.42E+03 1.47E+03	3.73E-02 4.21E-01	9.11E-04 1.03E-02	25 25	386.15 360.36	602.00 544.20	8,322 7.505	1.6E-05 4.1E-06	1.4E-02 2.0E-03	1.33E+02 1.31E+02		х	1.6E-05			х
	Methyl acetate	3.26E+02	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80		7,260	0.0E+00	3.5E+00	7.41E+02		x	0.0E+00			х
	5 1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60		8,996	5.8E-05	1.4E-02	1.68E+02		x	5.8E-05			x
	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02	8.91E+01			2.7E-03			
	6 Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50		8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00			
	Acenaphthene	7.08E+03 1.38E+04	4.21E-02	7.69E-06 7.88E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54		12,155	0.0E+00	2.1E-01	1.54E+02		x	0.0E+00			X
	7 Fluorene 3 Hexachloro-1,3-butadiene	1.38E+04 5.37E+04	3.63E-02 5.61E-02	7.88E-06 6.16E-06	1.98E+00 3.20E+00	2.60E-03 3.33E-01	6.34E-05 8.13E-03		570.44 486.15		12,666 10,206	0.0E+00 2.2E-05	1.4E-01 3.5E-03	1.66E+02 2.61E+02		x	0.0E+00 2.2E-05			×
	2 o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00		12,239	0.0E+00	3.2E-03	1.37E+02		x	0.0E+00			x
91203	Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	3.4E-05	3.0E-03	1.28E+02			0.0E+00	3.0E-03	3	
	6 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	1.4E-02	1.42E+02		х	0.0E+00			х
	Biphenyl	4.38E+03 3.63E+02	4.04E-02 8.70E-02	8.15E-06 1.00E-05	7.45E+00 1.78E+02	1.23E-02	2.99E-04 5.18E-03	25	529.10 417.60	789.00 630.30	10,890 8,661	0.0E+00 0.0E+00	1.8E-01 1.0E-01	1.54E+02 1.06E+02		х	0.0E+00 0.0E+00			х
	o-Xylene	3.63E+02 6.17E+02	8.70E-02 6.90E-02	1.00E-05 7.90E-06	1.78E+02 1.56E+02	2.12E-01 7.77E-02	5.18E-03 1.90E-03	25 25	417.60 453.57		8,661 9,700	0.0E+00 0.0E+00	1.0E-01 2.0E-01	1.06E+02 1.47E+02			0.0E+00 0.0E+00			
	3 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+02	1.60E-02	3.90E-04	25	453.57 447.53		9,700	0.0E+00	1.8E-02	1.47E+02 1.29E+02		х	0.0E+00			х
	5 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	7.0E-03	1.20E+02			0.0E+00	6.0E-03	3	
	1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00		9,171	8.6E-03	3.0E-04	1.47E+02	х		5.7E-04			
	3 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	8.61E+01		X	0.0E+00			x
	2 Ethylmethacrylate 3 tert-Butylbenzene	2.95E+01 7.71E+02	6.53E-02 5.65E-02	8.37E-06 8.02E-06	3.67E+03 2.95E+01	3.44E-02 4.87E-01	8.40E-04 1.19E-02	25 25	390.00 442.10		10,957 8,980	0.0E+00 0.0E+00	3.2E-01 1.4E-01	1.14E+02 1.34E+02		x	0.0E+00 0.0E+00			x
	3 Cumene	4.89E+02	6.50E-02	7.10E-06	2.95E+01 6.13E+01	4.74E+01	1.19E+02		442.10		10,335	0.0E+00	4.0E-01	1.34E+02 1.20E+02		^	0.0E+00			^
	2 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05		475.00		11,732	0.0E+00	3.5E-01	1.20E+02		х	0.0E+00			х
	Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95		10,566	0.0E+00	2.0E-03	1.23E+02			0.0E+00			
	Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03		409.34		8,501	2.5E-06	1.0E+00	1.06E+02			0.0E+00			
	5 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03		418.31		8,737	0.0E+00	9.0E-01	1.04E+02			0.0E+00			
	7 Benzylchloride 7 Benzaldehyde	6.14E+01 4.59E+01	7.50E-02 7.21E-02	7.80E-06 9.07E-06	5.25E+02 3.30E+03	1.70E-02 9.73E-04	4.14E-04 2.37E-05	25	452.00 452.00	685.00 695.00	8,773 11,658	4.9E-05 0.0E+00	1.0E-03 3.5E-01	1.27E+02 1.06E+02	(	x	4.9E-05 0.0E+00			x
	I n-Propylbenzene	4.59E+01 5.62E+02	7.21E-02 6.01E-02	9.07E-06 7.83E-06	3.30E+03 6.00E+01	9.73E-04 4.37E-01	2.37E-05 1.07E-02	25	452.00		9,123	0.0E+00 0.0E+00	3.5E-01 1.4E-01	1.06E+02 1.20E+02		x	0.0E+00			x
		1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02		456.46		9,290	0.0E+00	1.4E-01	1.34E+02		x	0.0E+00			x
	3 n-Butylbenzene	1.112.00																		
104518 106423	3 n-Butylbenzene 3 p-Xylene 7 1,4-Dichlorobenzene	3.89E+02 6.17E+02	7.69E-02 6.90E-02	8.44E-06 7.90E-06	1.85E+02 7.90E+01	3.13E-01 9.82E-02	7.64E-03 2.39E-03	25 25	411.52 447.21	616.20 684.75	8,525 9,271	0.0E+00 1.1E-05	1.0E-01 8.0E-01	1.06E+02 1.47E+02		?	0.0E+00 0.0E+00			

DATA ENTRY SHEET

SG-SCREEN PA Version 2.0; 04/					DTSC Vapor Intrusion Guidance
Reset to Defaults	ENTER Chemical CAS No.	ENTER Soil gas conc.,	Gas Concentration	ENTER Soil gas conc.,	Interim Final 12/04 (last modified 12/6/2011)
	(numbers only, no dashes)	C <sub>g</sub> (μg/m³)		C <sub>g</sub> (ppmv)	Chemical
	71432	4.10E+00	]		Benzene
	ENTER Depth	ENTER	ENTER	ENTER	ENTER
MORE ↓	below grade to bottom of enclosed space floor, L <sub>F</sub>	Soil gas sampling depth below grade, L <sub>s</sub>	Average soil temperature, T <sub>s</sub>	Vadose zone SCS soil type (used to estimate soil vapor	User-defined vadose zone soil vapor OR permeability, k <sub>v</sub>
	(15 or 200 cm)	(cm) 152.4	(°C)	permeability) SC	(cm <sup>2</sup> )
MORE ↓	ENTER Vandose zone SCS soil type Lookup Soil Parameters	ENTER Vadose zone soil dry bulk density, $\rho_b^A$ (g/cm <sup>3</sup> )	ENTER Vadose zone soil total porosity, n <sup>V</sup> (unitless)	ENTER Vadose zone soil water-filled porosity, θ <sub>w</sub> <sup>V</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q <sub>soil</sub> (L/m)

0.385

0.197

Γ	MORE
	$\mathbf{+}$

ENTER Averaging	ENTER Averaging	ENTER	ENTER
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>c</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

1.63

SC

END

5

#### INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>bullding</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	2.27E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (µg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	2.27E-03	5.00E+03	6.79E+31	4.07E-04	1.67E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
2.0E-08	5.3E-05

MESSAGE SUMMARY BELOW:

SG-SCREEN PA Version 2.0; 04/					DTSC Vapor Intrusion Guidance
Reset to Defaults	ENTER Chemical CAS No. (numbers only,	ENTER Soil gas conc., C <sub>g</sub>	Gas Concentration	ENTER Soil gas conc., C <sub>g</sub>	Interim Final 12/04 (last modified 12/6/2011) Chemical
	no dashes) 108883	(μg/m <sup>3</sup> ) 2.40E+02	- ]	(ppmv)	Toluene
More ↓	ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, Ts (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	ENTER User-defined vadose zone soil vapor OR permeability, k <sub>v</sub> (cm <sup>2</sup> )
	15	152.4	24	SC	
MORE ↓	ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density,	ENTER Vadose zone soil total porosity,	ENTER Vadose zone soil water-filled porosity,	ENTER Average vapor flow rate into bldg. (Leave blank to calculate)

ENTER

Exposure

frequency, EF

(days/yr)

350

Vandose zone SCS	Vadose zone	Vadose zone soil total	Vadose zone soil water-filled		
soil type	soil dry bulk density,	porosity,	porosity,		
Lookup Soil	ρμΑ	n <sup>v</sup>	$\theta_w^{\vee}$		
Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )		
SC	1.63	0.385	0.197		

ENTER
Average vapor
flow rate into bldg.
Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

ENTER ENTER ENTER Averaging Averaging time for time for Exposure carcinogens, noncarcinogens, duration, AT<sub>c</sub>  $\mathsf{AT}_{\mathsf{NC}}$ ED (yrs) (yrs) (yrs) 30 70 30

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	2.40E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	2.25E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	2.40E+02	1.25	8.33E+01	2.25E-03	5.00E+03	1.60E+32	4.04E-04	9.68E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	3.0E-01
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
Incremental	Hazalu
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	3.1E-04

MESSAGE SUMMARY BELOW:

END

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SG-SCREEN A Version 2.0; 04/		Soil	Gas Concentration	n Data		DTSC Vapor Intrusion Guidance Interim Final 12/04	
Reset to Defaults	ENTER Chemical CAS No. (numbers only,	ENTER Soil gas conc., C <sub>g</sub>	OR	ENTER Soil gas conc., C <sub>g</sub>		(last modified 12/6/2011)	
	no dashes)	(µg/m <sup>3</sup> )	•	(ppmv)		Chemical	
	100414	3.30E+01	]			Ethylbenzene	
	ENTER Depth	ENTER	ENTER	ENTER		ENTER	
MORE ↓	below grade to bottom of enclosed space floor,	Soil gas sampling depth below grade,	Average soil temperature,	Vadose zone SCS soil type (used to estimate	OR	User-defined vadose zone soil vapor permeability,	
	L <sub>F</sub>	L <sub>s</sub>	T <sub>s</sub>	soil vapor	OIX	k <sub>v</sub>	
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )	
		150.4					
	15	152.4	24	SI			
MODE	ENTER	ENTER	ENTER	ENTER		ENTER	

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
¥	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

ENTER	ENTER	ENTER	ENTER
Averaging	Averaging		
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	3.30E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	9,994	7.43E-03	3.05E-01	1.80E-04	7.20E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	3.30E+01	1.25	8.33E+01	7.20E-03	5.00E+03	1.11E+10	9.50E-04	3.13E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.5E-06	1.0E+00
	_
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
3.2E-08	3.0E-05

MESSAGE SUMMARY BELOW:

SG-SCREEN A Version 2.0; 04/ Reset to Defaults	ENTER Chemical CAS No.	ENTER Soil gas conc.,	Gas Concentration	ENTER Soil gas conc.,		DTSC Vapor Intrusion Guidance Interim Final 12/04 (last modified 12/6/2011)		
	(numbers only, no dashes)	C <sub>g</sub> (µg/m <sup>3</sup> )		C <sub>g</sub> (ppmv)		Chemical		
	106423	1.30E+02	]			p-Xylene		
MORE ↓	ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>s</sub> (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )		
	15	152.4	24	SC				
MORE ↓	ENTER Vandose zone SCS	ENTER Vadose zone soil dry	ENTER Vadose zone soil total	ENTER Vadose zone soil water-filled		ENTER Average vapor flow rate into bldg.		

	ENTER	ENTER	ENTER	ENTER	
MORE ↓	Vandose zone SCS	Vadose zone soil dry	Vadose zone soil total	Vadose zone soil water-filled	
	soil type Lookup Soil Parameters	bulk density, $\rho_b^A$ (g/cm <sup>3</sup> )	porosity, n <sup>V</sup> (unitless)	porosity, θ <sub>w</sub> <sup>∨</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	
	SC	1.63	0.385	0.197	

ENTER

Exposure

duration,

ED

(yrs)

30

ENTER

Exposure

frequency, EF

(days/yr)

350

Average vapor					
flow rate into bldg.					
(Leave blank to calculate)					
Q <sub>soil</sub>					
(L/m)					
5					

MORE ↓

 ENTER
 ENTER

 Averaging
 Averaging

 time for
 time for

 carcinogens,
 noncarcinogens,

 AT<sub>c</sub>
 AT<sub>NC</sub>

 (yrs)
 (yrs)

 70
 30

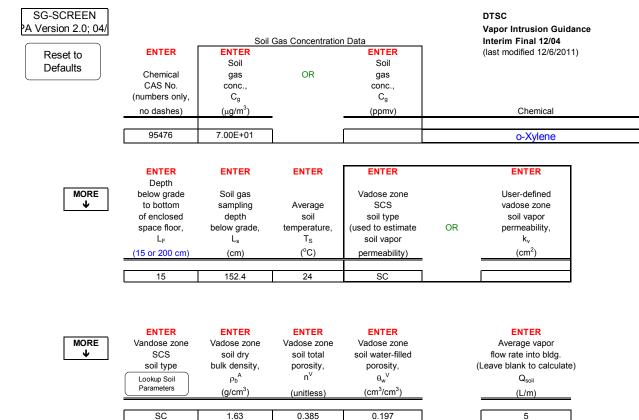
Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^{V}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.30E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,083	7.22E-03	2.96E-01	1.80E-04	1.99E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.30E+02	1.25	8.33E+01	1.99E-03	5.00E+03	2.71E+36	3.64E-04	4.73E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	4.5E-04

MESSAGE SUMMARY BELOW:



٦				
<u> </u>	ENTER Averaging	ENTER Averaging	ENTER	ENTER
	time for carcinogens, AT <sub>C</sub>	time for noncarcinogens, AT <sub>NC</sub>	Exposure duration, ED	Exposure frequency, EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350
7				

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	7.00E+01	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	10,245	4.88E-03	2.00E-01	1.80E-04	2.25E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	7.00E+01	1.25	8.33E+01	2.25E-03	5.00E+03	1.57E+32	4.04E-04	2.83E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
NA	1.0E-01
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
NA	2.7E-04

MESSAGE SUMMARY BELOW:

END

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# **APPENDIX I**

DTSC JE Soil Gas Model Sensitivity Analysis Risk and Hazard Calculation Work Sheets

			Gas Concentratio			Interim Final 12/04
Reset to	ENTER	ENTER		ENTER		(last modified 12/6/2011)
Defaults		Soil		Soil		
	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(μg/m <sup>3</sup> )	-	(ppmv)		Chemical
	71432	4.10E+00	]			Benzene
	ENTER Depth	ENTER	ENTER	ENTER		ENTER
MORE	below grade	Soil gas		Vadose zone		User-defined
↓	to bottom	sampling	Average	SCS		vadose zone
	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SC		
	•		•			

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
↓	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

ENTER							
Average vapor							
flow rate into bldg.							
(Leave blank to calculate)							
Q <sub>soil</sub>							
(L/m)							
5							

MORE ↓

E	ENTER Averaging	ENTER Averaging	ENTER	ENTER
	time for carcinogens, AT <sub>C</sub>	time for noncarcinogens, AT <sub>NC</sub>	Exposure duration, ED	Exposure frequency, EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

# Scenario 1 VW7 4.1 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	2.27E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	2.27E-03	5.00E+03	6.79E+31	4.07E-04	1.67E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

MESSAGE SUMMARY BELOW:

END

Г

Version 2.0; 04/						DTSC Vapor Intrusion Guidance
Reset to Defaults	ENTER Chemical CAS No. (numbers only,	Soil ENTER Soil gas conc., C <sub>q</sub>	Gas Concentratio	ENTER Soil gas conc.,		Interim Final 12/04 (last modified 12/6/2011)
	no dashes)	(μg/m <sup>3</sup> )	-	C <sub>g</sub> (ppmv)		Chemical
	71432	4.10E+00	]			Benzene
	ENTER	ENTER	ENTER	ENTER		ENTER
MORE	Depth below grade to bottom	Soil gas sampling depth	Average soil	Vadose zone SCS soil type	0.5	User-defined vadose zone soil vapor
<b>↓</b>	of enclosed space floor, L <sub>F</sub> (15 or 200 cm)	below grade, L <sub>s</sub> (cm)	temperature, T <sub>S</sub> (°C)	(used to estimate soil vapor permeability)	OR	permeability, k <sub>v</sub> (cm <sup>2</sup> )

ENTER	ENTER	ENTER	ENTER
Vandose zone	Vadose zone	Vadose zone	Vadose zone
SCS	soil dry	soil total	soil water-filled
soil type	bulk density,	porosity,	porosity,
Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197
	Vandose zone SCS soil type Lookup Soil Parameters	Vandose zone SCS soil dry soil type bulk density, Lookup Soil Parameters (g/cm <sup>3</sup> )	Vandose zone Vadose zone SCS soil dry soil total soil type bulk density, porosity, Lookup Soil Parameters (g/cm <sup>3</sup> ) (unitless)

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5



E					
	ENTER	ENTER	ENTER	ENTER	
	Averaging	Averaging			
	time for	time for	Exposure	Exposure	
	carcinogens,	noncarcinogens,	duration,	frequency,	
	AT <sub>c</sub>	AT <sub>NC</sub>	ED	EF	
_	(yrs)	(yrs)	(yrs)	(days/yr)	
-					_
	70	30	30	350	

# Scenario 2 VW7 4.1 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.76E-09	0.837	1.47E-09	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	8,071	3.45E-03	1.46E-01	1.77E-04	2.27E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	2.27E-03	5.00E+03	6.65E+31	4.08E-04	1.67E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

MESSAGE SUMMARY BELOW:

END

Γ

SG-SCREEN PA Version 2.0; 04/						DTSC Vapor Intrusion Guidance	
		Soil Gas Concentration Data			Interim Final 12/04	Interim Final 12/04	
Reset to Defaults	ENTER	ENTER Soil		ENTER Soil		(last modified 12/6/2011)	
Delaults	Chemical	gas	OR	gas			
	CAS No.	conc.,		conc.,			
	(numbers only,	C <sub>q</sub>		Cg			
	no dashes)	(µg/m <sup>3</sup> )	•	(ppmv)		Chemical	
	71432	4.10E+00	ן			Benzene	
MORE ↓	ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub>	ENTER Soil gas sampling depth below grade, L <sub>s</sub>	ENTER Average soil temperature, Ts	ENTER Vadose zone SCS soil type (used to estimate soil vapor	OR	ENTER User-defined vadose zone soil vapor permeability, k <sub>v</sub>	
	Depth below grade to bottom of enclosed space floor,	Soil gas sampling depth below grade,	Average soil temperature,	Vadose zone SCS soil type (used to estimate	OR	User-defined vadose zone soil vapor permeability,	

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρμΑ	n∨	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	S	1.66	0.375	0.054

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5



-					
	ENTER	ENTER	ENTER	ENTER	
	Averaging	Averaging			
	time for	time for	Exposure	Exposure	
	carcinogens,	noncarcinogens,	duration,	frequency,	
	AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF	
	(yrs)	(yrs)	(yrs)	(days/yr)	
					_
	70	30	30	350	

# Scenario 3 VW7 4.1 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.321	0.003	1.02E-07	0.998	1.01E-07	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	1.42E-02	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	1.42E-02	5.00E+03	1.22E+05	1.36E-03	5.59E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
6.7E-08	1.8E-04
6.7E-08	1.8E-04

MESSAGE SUMMARY BELOW:

END

Г

G-SCREEN /ersion 2.0; 04/					DTSC Vapor I	ntrusion Guidance
		Soil	Gas Concentration	n Data	Interim	Final 12/04
Reset to	ENTER	ENTER		ENTER	(last mo	dified 12/6/2011)
Defaults		Soil		Soil		
Delaulto	Chemical	gas	OR	gas		
	CAS No.	conc.,		conc.,		
	(numbers only,	Cg		Cg		
	no dashes)	(µg/m <sup>3</sup> )		(ppmv)		Chemical
	71432	4.10E+00	]			Benzene
	ENTER	ENTER	ENTER	ENTER		INTER
	Depth					
MORE	below grade	Soil gas		Vadose zone	Use	er-defined
↓	to bottom	sampling	Average	SCS	vac	lose zone
	of enclosed	depth	soil	soil type	S	oil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR per	meability,
	L <sub>F</sub>	Ls	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)		(cm <sup>2</sup> )
	15	152.4	24	SI	[	
	ENTER	ENTER	ENTER	ENTER		INTER

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SI	1.35	0.489	0.167

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5



E				
	ENTER	ENTER	ENTER	ENTER
	Averaging	Averaging		
	time for	time for	Exposure	Exposure
	carcinogens,	noncarcinogens,	duration,	frequency,
	AT <sub>C</sub>	AT <sub>NC</sub>	ED	EF
	(yrs)	(yrs)	(yrs)	(days/yr)
	70	30	30	350

# Scenario 4 VW7 4.1 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.322	0.267	6.91E-09	0.830	5.73E-09	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	8.45E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	8.45E-03	5.00E+03	3.65E+08	1.04E-03	4.28E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
5.1E-08	1.4E-04

MESSAGE SUMMARY BELOW:

END

Г

SG-SCREEN PA Version 2.0; 04/						DTSC Vapor Intrusion Guidance	
		Soil	Gas Concentratio	n Data		Interim Final 12/04	
Reset to Defaults	ENTER Chemical CAS No.	ENTER Soil gas conc.,	OR	ENTER Soil gas conc.,		(last modified 12/6/2011)	
	(numbers only,	Cg		Cg			
	no dashes)	(µg/m³)	-	(ppmv)		Chemical	
	71432	4.10E+00	1			Danasa	
	7 1432	4.10E+00				Benzene	
MORE ↓	ENTER Depth below grade to bottom of enclosed	ENTER Soil gas sampling	ENTER Average soil	ENTER Vadose zone SCS		ENTER User-defined vadose zone	
	space floor, L <sub>F</sub> (15 or 200 cm)	depth below grade, L <sub>s</sub> (cm)	temperature, T <sub>S</sub> (°C)	soil type (used to estimate soil vapor permeability)	OR	soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	
	15	76.2	24	SC			

ENTER

Exposure

frequency, EF

(days/yr)

350

Vandose zone			
Vanaooc Zone	Vadose zone	Vadose zone	Vadose zone
SCS	soil dry	soil total	soil water-filled
soil type	bulk density,	porosity,	porosity,
Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$
Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197
	soil type Lookup Soil Parameters	soil type         bulk density,           Lookup Soil         ρ <sub>b</sub> <sup>A</sup> Parameters         (g/cm³)	soil type bulk density, porosity, Lookup Soil pb <sup>A</sup> n <sup>V</sup> Parameters (g/cm <sup>3</sup> ) (unitless)

ENTER
Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

ENTER ENTER ENTER Averaging Averaging time for time for Exposure carcinogens, noncarcinogens, duration, AT<sub>c</sub>  $\mathsf{AT}_{\mathsf{NC}}$ ED (yrs) (yrs) (yrs) 30 70 30

# Scenario 5 VW7 4.1 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	Vadose zone soil air-filled porosity, $\theta_a^V$ (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
61.2	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	2.27E-03	61.2
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	2.27E-03	5.00E+03	6.79E+31	7.58E-04	3.11E-03

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
3.7E-08	9.9E-05
carcinogen (unitless)	noncarcinogen (unitless)

MESSAGE SUMMARY BELOW:

END

Г

G-SCREEN /ersion 2.0; 04/						DTSC Vapor Intrusion Guidance
	ENTER	Soil ENTER	Gas Concentratio	n Data ENTER	Interim Final 12/04 (last modified 12/6/2011)	
Reset to	ENTER	Soil		Soil		(last filouilleu 12/0/2011)
Defaults	Chemical	gas	OR	gas		
)	CAS No.	conc.,	011	conc.,		
	(numbers only,	Cq		Cq		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	71432	4.10E+00	- 1			Dennene
	7 1432	4.10E+00				Benzene
	ENTER Depth	ENTER	ENTER	ENTER		ENTER
MORE	below grade	Soil gas		Vadose zone		User-defined
₩	to bottom	sampling	Average	SCS		vadose zone
· ·	of enclosed	depth	soil	soil type		soil vapor
	space floor,	below grade,	temperature,	(used to estimate	OR	permeability,
	L <sub>F</sub>	L <sub>s</sub>	Ts	soil vapor		k <sub>v</sub>
	(15 or 200 cm)	(cm)	( <sup>o</sup> C)	permeability)		(cm <sup>2</sup> )
	15	304.8	24	SC		
	15	304.8	24	30		
	ENTER	ENTER	ENTER	ENTER		ENTER
MORE	Vandose zone SCS	Vadose zone soil dry	Vadose zone soil total	Vadose zone soil water-filled		Average vapor flow rate into bldg.
	200	oon ary	con total			now rate into blag.

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^V$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197
	-		-	

(yrs)

30

ENTER Averaging

time for

noncarcinogens,

 $\mathsf{AT}_{\mathsf{NC}}$ 

(yrs)

30

(unitless)	(cm³/cm²)	_
		-
0.385	0.197	
		-
ENTER	ENTER	
Exposure	Exposure	
duration,	frequency,	
ED	EF	

(days/yr)

350

END

MORE ¥

ENTER

Averaging time for

carcinogens,

AT<sub>c</sub>

(yrs)

70

(Leave blank to calculate)  $Q_{\text{soil}}$ (L/m) 5

# Scenario 6 VW7 4.1 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
289.8	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	4.10E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, ΔH <sub>v,TS</sub> (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	2.27E-03	289.8
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	4.10E+00	1.25	8.33E+01	2.27E-03	5.00E+03	6.79E+31	2.12E-04	8.68E-04

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
1.0E-08	2.8E-05
1.0L-00	2.0L-03

MESSAGE SUMMARY BELOW:

END

Γ

SG-SCREEN A Version 2.0; 04/					DTSC Vapor Intrusion Guidance
Reset to Defaults	ENTER Chemical CAS No. (numbers only,	Soil ENTER Soil gas conc., C <sub>g</sub>	Gas Concentration	n Data ENTER Soil gas conc., C <sub>g</sub>	Interim Final 12/04 (last modified 12/6/2011)
	no dashes)	(µg/m <sup>3</sup> )		(ppmv)	Chemical
	71432	1.00E+00	]		Benzene
	ENTER Depth	ENTER	ENTER	ENTER	ENTER
MORE ↓	below grade to bottom of enclosed space floor, L <sub>F</sub>	Soil gas sampling depth below grade, L <sub>s</sub>	Average soil temperature, T <sub>S</sub>	Vadose zone SCS soil type (used to estimate soil vapor	User-defined vadose zone soil vapor OR permeability, k <sub>v</sub>
	(15 or 200 cm)	(cm)	(°C)	permeability)	(cm <sup>2</sup> )
	15	152.4	24	SC	
	ENTER	ENTER	ENTER	ENTER	ENTER
MORE ↓	Vandose zone SCS	Vadose zone soil dry	Vadose zone soil total	Vadose zone soil water-filled	Average vapor flow rate into bldg.

ENTER Exposure frequency, EF (days/yr) 350

	ENTER	ENTER	ENTER	ENTER
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled
	soil type	bulk density,	porosity,	porosity,
	Lookup Soil	ρ <sub>b</sub> <sup>A</sup>	n∨	$\theta_w^{\vee}$
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )
	SC	1.63	0.385	0.197

Average vapor
flow rate into bldg.
(Leave blank to calculate)
Q <sub>soil</sub>
(L/m)
5

MORE ↓

E			
	ENTER	ENTER	ENTER
	Averaging	Averaging	
	time for	time for	Exposure
	carcinogens,	noncarcinogens,	duration,
	AT <sub>C</sub>	AT <sub>NC</sub>	ED
_	(yrs)	(yrs)	(yrs)
	70	30	30

# Scenario 7 1.0 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone effective total fluid saturation, S <sub>te</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m <sup>3</sup> )	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.00E+00	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, μ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	2.27E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (µg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soli</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>f</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (μg/m <sup>3</sup> )
15	1.00E+00	1.25	8.33E+01	2.27E-03	5.00E+03	6.79E+31	4.07E-04	4.07E-04

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(μg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# Scenario 7 1.0 ug/m<sup>3</sup> Benzene

#### RESULTS SHEET

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard
risk from	quotient
vapor	from vapor
intrusion to	intrusion to
indoor air,	indoor air,
carcinogen	noncarcinogen
(unitless)	(unitless)
4.9E-09	1.3E-05

MESSAGE SUMMARY BELOW:

END

Г

rsion 2.0; 04/		Soil	Gas Concentratio	n Data		Vapor Intrusion Guidance Interim Final 12/04
Reset to Defaults	ENTER Chemical CAS No.	ENTER Soil gas conc.,	OR	ENTER Soil gas conc.,		(last modified 12/6/2011)
	(numbers only,	C <sub>q</sub>		C <sub>q</sub>		
	no dashes)	(µg/m <sup>3</sup> )	-	(ppmv)		Chemical
	71432	1.00E+02	ו			Benzene
	ENTER Depth	ENTER	ENTER	ENTER		ENTER
MORE	Depth below grade	Soil gas		Vadose zone		User-defined
MORE ↓	Depth below grade to bottom	Soil gas sampling	Average	Vadose zone SCS		User-defined vadose zone
-	Depth below grade	Soil gas		Vadose zone	OR	User-defined
	Depth below grade to bottom of enclosed	Soil gas sampling depth	Average soil	Vadose zone SCS soil type	OR	User-defined vadose zone soil vapor
	Depth below grade to bottom of enclosed space floor,	Soil gas sampling depth below grade,	Average soil temperature,	Vadose zone SCS soil type (used to estimate	OR	User-defined vadose zone soil vapor permeability,

	ENTER	ENTER	ENTER	ENTER	
MORE	Vandose zone	Vadose zone	Vadose zone	Vadose zone	
$\mathbf{+}$	SCS	soil dry	soil total	soil water-filled	
	soil type	bulk density,	porosity,	porosity,	
	Lookup Soil	ρ <sub>b</sub> Α	n <sup>v</sup>	$\theta_w^{\vee}$	
	Parameters	(g/cm <sup>3</sup> )	(unitless)	(cm <sup>3</sup> /cm <sup>3</sup> )	
	SC	1.63	0.385	0.197	

ENTER					
Average vapor					
flow rate into bldg.					
(Leave blank to calculate)					
Q <sub>soil</sub>					
(L/m)					
5					



ENTER Averaging	ENTER Averaging	ENTER	ENTER
time for	time for	Exposure	Exposure
carcinogens,	noncarcinogens,	duration,	frequency,
AT <sub>c</sub>	AT <sub>NC</sub>	ED	EF
(yrs)	(yrs)	(yrs)	(days/yr)
70	30	30	350

# Scenario 8 100 ug/m<sup>3</sup> Benzene

Source- building separation, L <sub>T</sub> (cm)	$\begin{array}{c} \text{Vadose zone} \\ \text{soil} \\ \text{air-filled} \\ \text{porosity,} \\ \theta_a^{\ V} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	$\begin{array}{c} \text{Vadose zone} \\ \text{effective} \\ \text{total fluid} \\ \text{saturation,} \\ \\ S_{\text{te}} \\ (\text{cm}^3/\text{cm}^3) \end{array}$	Vadose zone soil intrinsic permeability, k <sub>i</sub> (cm <sup>2</sup> )	Vadose zone soil relative air permeability, k <sub>rg</sub> (cm <sup>2</sup> )	Vadose zone soil effective vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )	Floor- wall seam perimeter, X <sub>crack</sub> (cm)	Soil gas conc. (µg/m³)	Bldg. ventilation rate, Q <sub>building</sub> (cm <sup>3</sup> /s)
137.4	0.188	0.299	1.78E-09	0.837	1.49E-09	4,000	1.00E+02	3.39E+04
Area of enclosed space below grade, A <sub>B</sub> (cm <sup>2</sup> )	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z <sub>crack</sub> (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H <sub>TS</sub> (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, H' <sub>TS</sub> (unitless)	Vapor viscosity at ave. soil temperature, µ <sub>TS</sub> (g/cm-s)	Vadose zone effective diffusion coefficient, D <sup>eff</sup> v (cm <sup>2</sup> /s)	Diffusion path length, L <sub>d</sub> (cm)
1.00E+06	5.00E-03	15	7,977	5.29E-03	2.17E-01	1.80E-04	2.27E-03	137.4
Convection path length, L <sub>p</sub> (cm)	Source vapor conc., C <sub>source</sub> (μg/m <sup>3</sup> )	Crack radius, r <sub>crack</sub> (cm)	Average vapor flow rate into bldg., Q <sub>soil</sub> (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, D <sup>crack</sup> (cm <sup>2</sup> /s)	Area of crack, A <sub>crack</sub> (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, exp(Pe <sup>r</sup> ) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C <sub>building</sub> (µg/m <sup>3</sup> )
15	1.00E+02	1.25	8.33E+01	2.27E-03	5.00E+03	6.79E+31	4.07E-04	4.07E-02

Unit	
risk	Reference
factor,	conc.,
URF	RfC
(µg/m <sup>3</sup> ) <sup>-1</sup>	(mg/m <sup>3</sup> )
2.9E-05	3.0E-02
END	

# INCREMENTAL RISK CALCULATIONS:

Incremental	Hazard		
risk from	quotient		
vapor	from vapor		
intrusion to	intrusion to		
indoor air,	indoor air,		
carcinogen	noncarcinogen		
(unitless)	(unitless)		
4.9E-07	1.3E-03		

MESSAGE SUMMARY BELOW:

END

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