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Alameda County
Environmental Health

October 23, 2012

Mr. Mark Detterman
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

SUBJECT: SUBSURFACE INVESTIGATION REPORT CERTIFICATION
County File # RO 337
California Linen Rental Company
989 41st Street
Oakland, CA

Dear Mr. Detterman:

You will find enclosed one copy of the following document prepared by P&D Environmental, Inc.:

Subsurface Investigation Report dated October 23, 2012 (document 0304.R19).

I declare, under penalty of perjury, that the information and/or recommendations contained in the above-mentioned report for the subject site is true and correct to the best of my knowledge.

Should you have any questions, please do not hesitate to call me at (925) 938-2491.

Cordially,

CALIFORNIA LINEN SUPPLY CO., INC.

Donald J Miller

~~Donald J.~~ Miller,
President

cc: LeRoy Griffin, Oakland Fire Department, Office of Emergency Services, 250 Frank Ogawa Plaza, Suite 3341, Oakland, CA 94612

0304.L111

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 41st 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 41st Street; collection of soil gas samples at a depth of 5 feet below the ground surface (bgs) primarily along the north side of 41st Street; and the collection of one groundwater grab sample on the north side of 41st 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 41st 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 #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, 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 bluish-gray 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 40th 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 42nd 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.

<u>SOIL GAS RISK AND HAZARD EVALUATION</u>

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^3 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 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 in the onsite permanent soil gas wells P&D recommends that no further investigation of soil gas be 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 41st 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 indicates that aerobic respiration of organic compounds is occurring below 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 40th Street. Review of historical water quality in the vicinity of the intersection of Linden and 40th 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 in groundwater in adjacent borehole B96, the petroleum hydrocarbons detected in borehole B90 appear to be limited in extent primarily to the northwestern corner of the house at 996 40th 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.

<u>DISTRIBUTION</u>

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,

P&D Environmental, Inc.

Paul H. King
Professional Geologist #5901
Expires: 12/31/13

Attachments:

<u>TABLES</u>

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
Table 2B - Summary of Shroud Air Sample Analytical Results
Table 3 - Summary of Borehole Soil 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

<u>FIGURES</u>

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

<u>APPENDICES</u>

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 ID	Sample Date	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	2-Propanol	1,1-Difluoroethane
SG61	7/28/2011	**18,000**	ND<4.1	51	370	21	70	19	9,900,a	NA
SG62	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
SG 62A	9/16/2011	**<u>290,000</u>**	ND<44	ND<39	18,000	**1,300**	5,000	1,500	NA	ND<130
SG62A-DUP	9/16/2011	**<u>390,000</u>**	ND<60	ND<54	17,000	**1,200**	4,800	1,500	NA	ND<180
SG63	7/28/2011	**23,000**	ND<4.9	48	1,200	92	330	110	ND<13	NA
SG64	7/27/2011	**<u>310,000</u>**	ND<41	ND<36	13,000	**1,100**	3,800	1,400	ND<110	NA
SG65	7/27/2011	5,000	ND<4.4	6.9	220	16	55	19	240	NA
SG66	7/27/2011	**13,000**	ND<13	23	660	42	130	49	56	NA
SG67	7/27/2011	2,500	ND<4.5	9.7	78	7.6	30	10	57	NA
SG67-DUP	7/27/2011	2,700	ND<4.4	9.2	77	8.0	30	11	52	NA
SG68	9/16/2011	5,200	ND<4.3	4.9	150	17	82	26	NA	ND<13
SG69	9/16/2011	**<u>70,000</u>**	ND<14	ND<13	3,800	290	1,100	340	NA	ND<44
SG70	9/16/2011	5,800	ND<4.4	7.0	130	15	65	18	NA	ND<13
SG71	9/16/2011	3,200	ND<4.4	5.6	110	10	44	13	NA	ND<13
SG72	9/16/2011	**13,000**	ND<13	ND<11	250	26	94	27	NA	ND<38
ESL [1]		*10,000*	*9,400*	*84*	*63,000*	*980*	*21,000 combined*		*None*	*None*
ESL [2]		*29,000*	*31,000*	*280*	*180,000*	*3,300*	*58,000 combined*		*None*	*None*

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
MTBE = Methyl-tert-Butyl Ether.
2-Propanol = used as leak detector during sample collection for soil gas samples collected on 7/28/11.
2-Difluoroethane = used as leak detector during soil gas sample collection on 9/16/11.
ND = Not Detected.
NA = Not Analyzed.
a = Laboratory Note: Exceeds Instrument Calibration Range.
b = Tedlar bag samples collected from shroud to quantify amount of 2-Propanol inside sampling chamber.
ESL[1]= 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[2]= 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[1] values.
<u>Underlined Values exceed their respective ESL[2] values.</u>
Results and ESLs in micrograms per cubic meter (µg/m3), unless otherwise indicated.

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 [1]		*10,000*	*9,400*	*84*	*63,000*	*980*	*21,000 combined*		*None*	*None*
ESL [2]		*29,000*	*31,000*	*280*	*180,000*	*3,300*	*58,000 combined*		*None*	*None*

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
MTBE = Methyl-tert-Butyl Ether.
2-Propanol = used as leak detector during sample collection for soil gas samples collected on 7/28/11.
1,1-Difluoroethane = (1,1-DFA) used as leak detector during soil gas sample collection on 9/16/11.
ND = Not Detected.
NA = Not Analyzed.
a = Laboratory Note: Exceeds Instrument Calibration Range.
b = Tedlar bag samples collected from shroud to quantify amount of 2-Propanol inside sampling chamber.
c = Tedlar bag samples collected from shroud to quantify amount of 1,1-DFA inside sampling chamber.
ESL[1]= 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[2]= 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[1] values.
Underlined Values exceed their respective ESL[2] values.
Results and ESLs in micrograms per cubic meter (μg/m3), unless otherwise indicated.

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 Dioxide (%)
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 combined*		*None*	*None*	*None*	*None*	*None*	*None*
ESL [2]		*29,000*	*31,000*	*280*	*180,000*	*3,300*	*58,000 combined*		*None*	*None*	*None*	*None*	*None*	*None*

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
MTBE = Methyl-tert-Butyl Ether.
1,1-DFA = 1,1-Difluoroethane
2-Propanol = used as leak detector during sample collection.
ND = Not Detected.
NA = Not Analyzed.
* = Tracer Gas
a = Laboratory Note: Exceeds Instrument Calibration Range.
ESL[1]= 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[2]= 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[1] values.
<u>Underlined Values exceed their respective ESL[2] values.</u>
Results and ESLs in micrograms per cubic meter (μg/m3), unless otherwise indicated.

Table 2B
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-DFA*	Oxygen (%)	Nitrogen (%)	Methane (%)	Carbon Dioxide (%)
VW1-5 Shroud	5/4/2012	NA	NA	NA	NA	NA	NA	NA	NA	26,000,000	NA	NA	NA	NA
VW2-5 Shroud	5/4/2012	NA	NA	NA	NA	NA	NA	NA	NA	11,000,000	NA	NA	NA	NA
VW3-5 Shroud	5/4/2012	NA	NA	NA	NA	NA	NA	NA	NA	9,000,000	NA	NA	NA	NA
VW4 Shroud	7/20/2012	NA	NA	NA	NA	NA	NA	NA	NA	5,000,000	NA	NA	NA	NA
VW5 Shroud	7/5/2012	NA	NA	NA	NA	NA	NA	NA	NA	12,000,000	NA	NA	NA	NA
VW6 Shroud	7/6/2012	NA	NA	NA	NA	NA	NA	NA	NA	8,900,000	NA	NA	NA	NA
VW7 Shroud	7/5/2012	NA	NA	NA	NA	NA	NA	NA	NA	11,000,000	NA	NA	NA	NA
ESL [1]		*10,000*	*9,400*	*84*	*63,000*	*980*	*21,000 combined*		*None*	*None*	*None*	*None*	*None*	*None*
ESL [2]		*29,000*	*31,000*	*280*	*180,000*	*3,300*	*58,000 combined*		*None*	*None*	*None*	*None*	*None*	*None*

NOTES:
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[1]= 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[2]= 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[1] values.
Underlined Values exceed their respective ESL[2] values.
Results and ESLs in micrograms per cubic meter (µg/m3), unless otherwise indicated.

Table 3
Summary 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 Petroleum Hydrocarbons as Gasoline.
MTBE = Methyl-tert-Butyl Ether.
ND = Not Detected.
a = Laboratory Note: strongly aged gasoline or diesel range compounds are significant in the TPHG chromatogram.
b = Laboratory Note: no recognizable pattern.
ESL = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB)
updated May 2008, from Table A–Shallow Soil Screening Levels, Groundwater is a current or potential source of drinking water.
Residential Land Use
Values in bold exceed their respective ESL values.
Results and ESLs in milligrams per kilogram (mg/k), unless otherwise 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*

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
TPH-BO = Total Petroleum Hydrocarbons as Bunker Oil.
MTBE = Methyl-tert-Butyl Ether.
ND = Not Detected.
ESL = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB) updated May 2008, from Table A–Groundwater Screening Levels, Groundwater is a current or potential source of drinking water.
Values in bold exceed their respective ESL values.
Results and ESLs in micrograms per Liter (µg/L), unless otherwise indicated.

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

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} * (cm^3/g)	Diffusivity in air, D_a * (cm^2/s)	Diffusivity in water, D_w * (cm^2/s)	Pure component water solubility, S * (mg/L)	Henry's law constant H' * (unitless)	Henry's law constant at reference temperature, H * (atm-m^3/mol)	Henry's law constant reference temperature, T_R ** (°C)	Normal boiling point, T_B ** (°K)	Critical temperature, T_C ** (°K)	Enthalpy of vaporization at the normal boiling point, $DH_{v,b}$ ** (cal/mol)	Unit risk factor, URF ** (mg/m^3)$^{-1}$	Reference conc., RfC * (mg/m^3)	Molecular weight, MW * (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Original EPA Values: Unit risk factor, URF (mg/m^3)$^{-1}$	Original EPA Values: Reference conc., RfC (mg/m^3)	Original EPA Values: URF extrapolated (X)	Original EPA Values: RfC 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 C5-C8 aliphatic compounds.

Table 6

Summary of Soil Vapor Well Soil Gas Sample Risk and Hazard Analysis

Cal/EPA Screening-Level Model
for Soil Gas Contamination (last modified 12/6/2011)
Former California Linen Site
989 41st Street
Oakland, CA

Chemical		Sample Location	Concentration ($\mu g/m^3$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	NOTES	CAS#
VW4	**996 40th Street**	VW4					
TPH-G		silt	3,400	NA	6.1E-05		None
Toluene			180	NA	6.0E-04		108883
Ethylbenzene			33	3.2E-08	3.0E-05		100414
m,p-xylene			110	NA	1.0E-03	used p-xylene CAS #	106423
o-xylene			39	NA	3.9E-04		95476
			TOTALS	**3.2E-08**	**2.1E-03**		
VW4-DUP	**996 40th Street**	VW4					
TPH-G		silt	3,500	NA	6.2E-05		None
Toluene			170	NA	5.6E-04		108883
Ethylbenzene			32	3.1E-08	2.9E-05		100414
m,p-xylene			81	NA	7.5E-04	used p-xylene CAS #	106423
o-xylene			33	NA	3.3E-04		95476
			TOTALS	**3.1E-08**	**1.7E-03**		
VW5		VW5					
TPH-G	**990 40th Street**	sandy clay	10,000	NA	6.6E-05		None
Toluene			240	NA	3.1E-04		108883
Ethylbenzene			24	8.8E-09	8.2E-06		100414
m,p-xylene			130	NA	4.5E-04	used p-xylene CAS #	106423
o-xylene			70	NA	2.7E-04		95476
			TOTALS	**8.8E-09**	**1.1E-03**		
VW6	**984 40th Street**	VW6					
TPH-G		clay	7,400	NA	1.1E-04		None
Toluene			120	NA	3.2E-04		108883
Ethylbenzene			10	7.8E-09	7.3E-06		100414
m,p-xylene			31	NA	2.3E-04	used p-xylene CAS #	106423
o-xylene			32	NA	2.6E-04		95476
			TOTALS	**7.8E-09**	**9.3E-04**		
VW7	**940 40th Street**	VW7					
TPH-G		sandy clay	3,000	NA	2.0E-05		None
Benzene			4.1	2.0E-08	5.3E-05		71432
Toluene			15	NA	1.9E-05		108883
Ethylbenzene			5.9	2.2E-09	2.0E-06		100414
m,p-xylene			16	NA	5.6E-05	used p-xylene CAS #	106423
o-xylene			6.0	NA	2.3E-05		95476
			TOTALS	**2.2E-08**	**1.7E-04**		

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 6

Summary of Soil Vapor Well Soil Gas Sample Risk and Hazard Analysis

Cal/EPA Screening-Level Model
for Soil Gas Contamination (last modified 12/6/2011)
Former Bytech Chemical Site
1905-1991 Dennison Street
Oakland, CA
Sampled 5/9/12

Chemical	Sample Location	Concentration ($\mu g/m^3$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (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 (DTSC 12/6/11 spreadsheet)
Former Bytech Chemical Site
1905-1991 Dennison Street
Oakland, CA

Chemical	Concentration (ug/m^3)	Sample Result Location	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
Scenario 1 = Table 5 Highest Concentration with Model Default Values Except for Soil = SC and Sample Depth = 152.4 cm (5.0 ft).				
Benzene	4.1	VW7	2.0E-08	5.3E-05
Scenario 2 = Scenario 1 values except average soil temperature is 15 degrees C.				
Benzene	4.1	VW7	2.0E-08	5.3E-05
Scenario 3 = Scenario 1 values except soil type is S.				
Benzene	4.1	VW7	6.7E-08	1.8E-04
Scenario 4 = Scenario 1 values except soil type is SI.				
Benzene	4.1	VW7	5.1E-08	1.4E-04
Scenario 5 = Scenario 1 values except soil gas sampling depth is 76.2 cm (2.5 ft).				
Benzene	4.1	VW7	3.7E-08	9.9E-05
Scenario 6 = Scenario 1 values except soil gas sampling depth is 304.8 cm (10 ft).				
Benzene	4.1	VW7	1.0E-08	2.8E-05
Scenario 7 = Scenario 1 values except benzene concentration = 1.0 ug/m3.				
Benzene	1.0	None	4.9E-09	1.3E-05
Scenario 8 = Scenario 1 values except benzene concentration = 100 ug/m3.				
Benzene	100	None	4.9E-07	1.3E-03

FIGURES

Figure 1
Site Vicinity Aerial Photograph Showing Geophysical Survey Profile Locations
California Linen Rental Company
989 41st Street
Oakland, California

Base Map From: JR Associates, April 6, 2011	P&D Environmental, Inc. 55 Santa Clara Avenue, Suite 240 Oakland, CA 94610	0 50 100 Approximate Scale in Feet	N

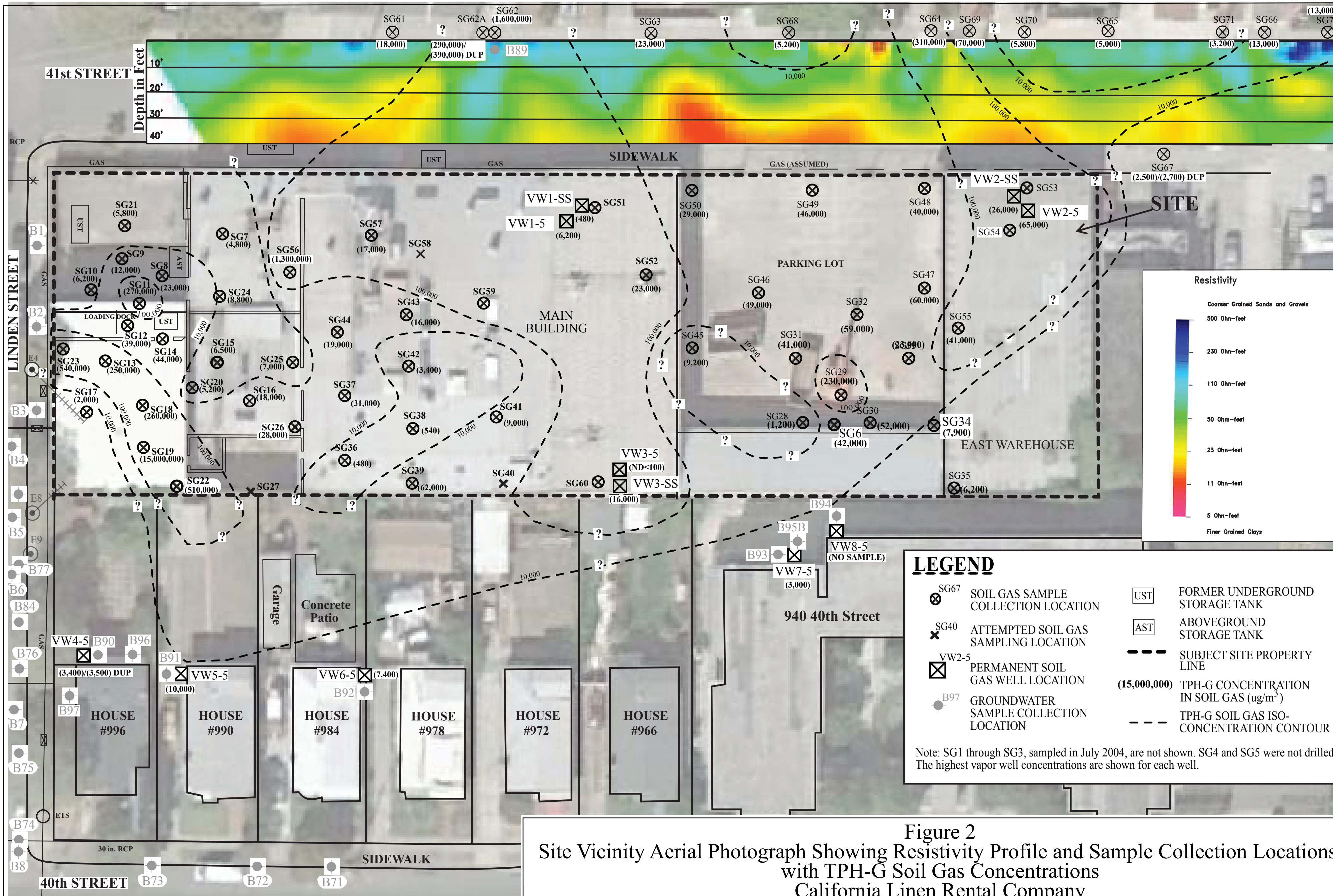


Figure 2
Site Vicinity Aerial Photograph Showing Resistivity Profile and Sample Collection Locations with TPH-G Soil Gas Concentrations
California Linen Rental Company
989 41st Street
Oakland, California

Base Map From:
California Utility Survey Utility Sketch Plan, Feb. 14, 2005, Google Earth, June 2007, and JR Associates, June 2011

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

0 25 50
Approximate Scale in Feet

N

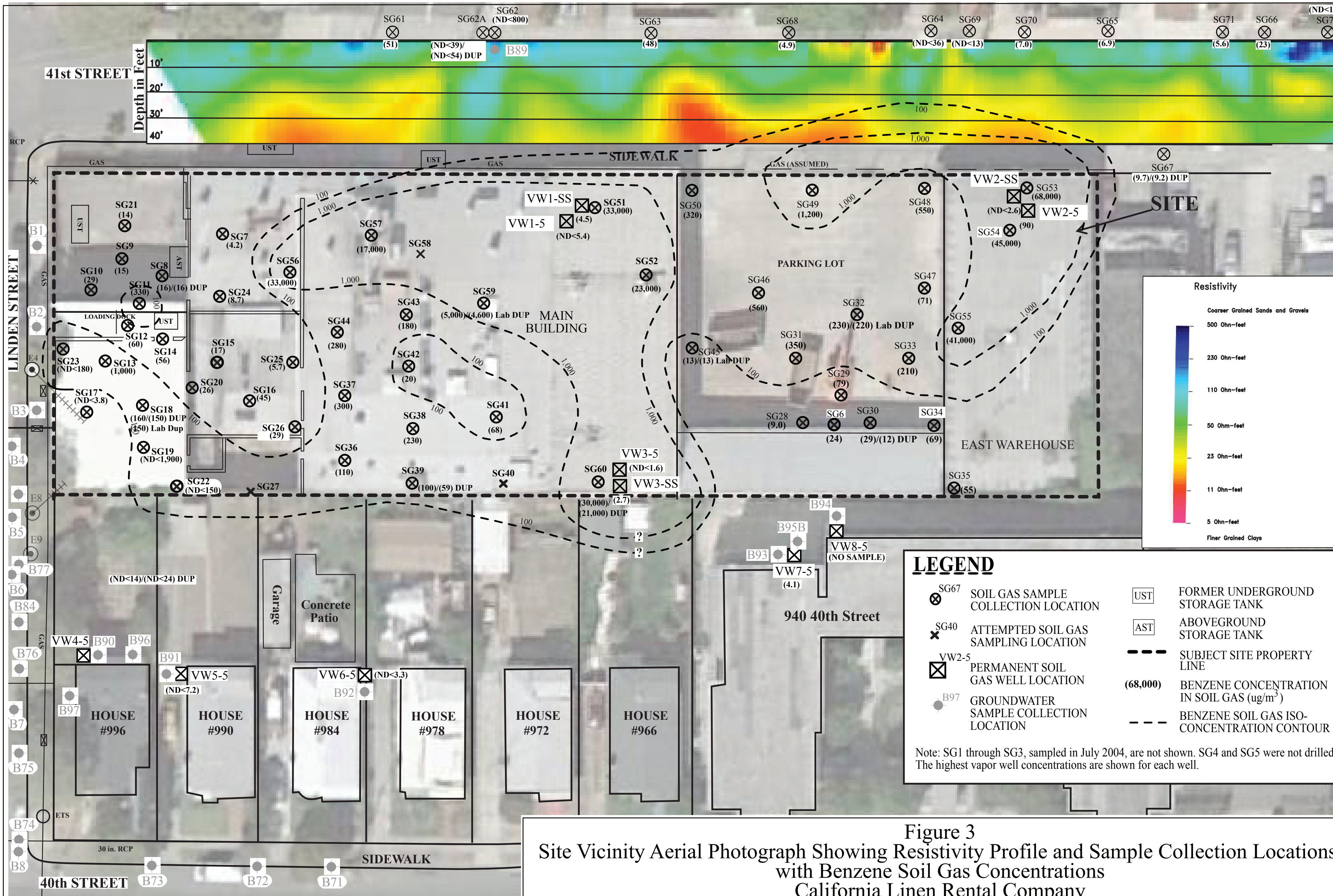


Figure 3

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

California Linen Rental Company

989 41st Street

Oakland, California

Base Map From:

California Utility Survey Utility Sketch Plan, Feb. 14, 2005, Google Earth, June 2007, and JR Associates, June 2011

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

0 25 50

Approximate Scale in Feet

N

Figure 4
Typical Soil Gas Sampling Manifold
California Linen Rental Company
989 41st Street
Oakland, California

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

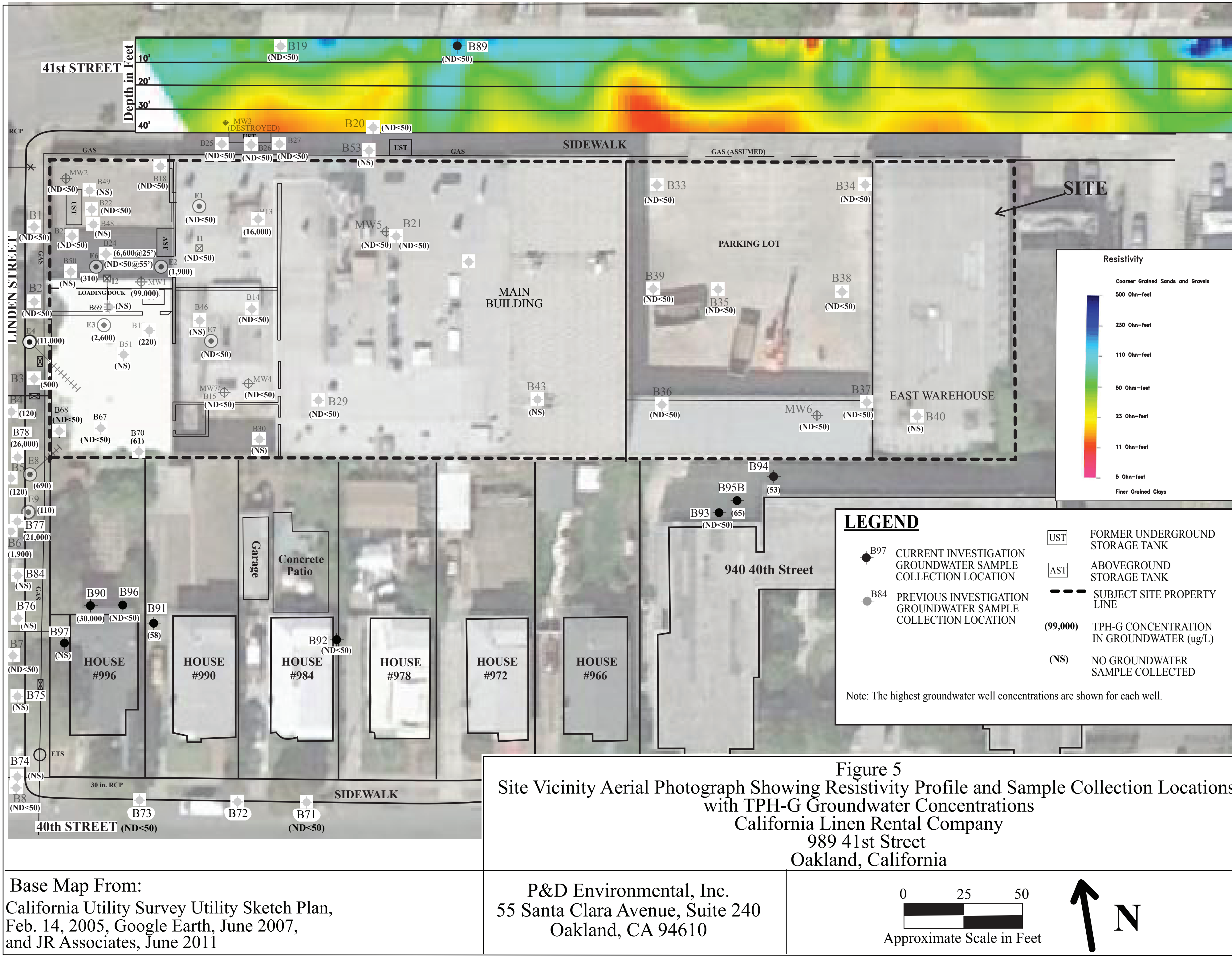


Figure 5
Site Vicinity Aerial Photograph Showing Resistivity Profile and Sample Collection Locations with TPH-G Groundwater Concentrations
California Linen Rental Company
989 41st Street
Oakland, California

Base Map From:
California Utility Survey Utility Sketch Plan, Feb. 14, 2005, Google Earth, June 2007, and JR Associates, June 2011

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

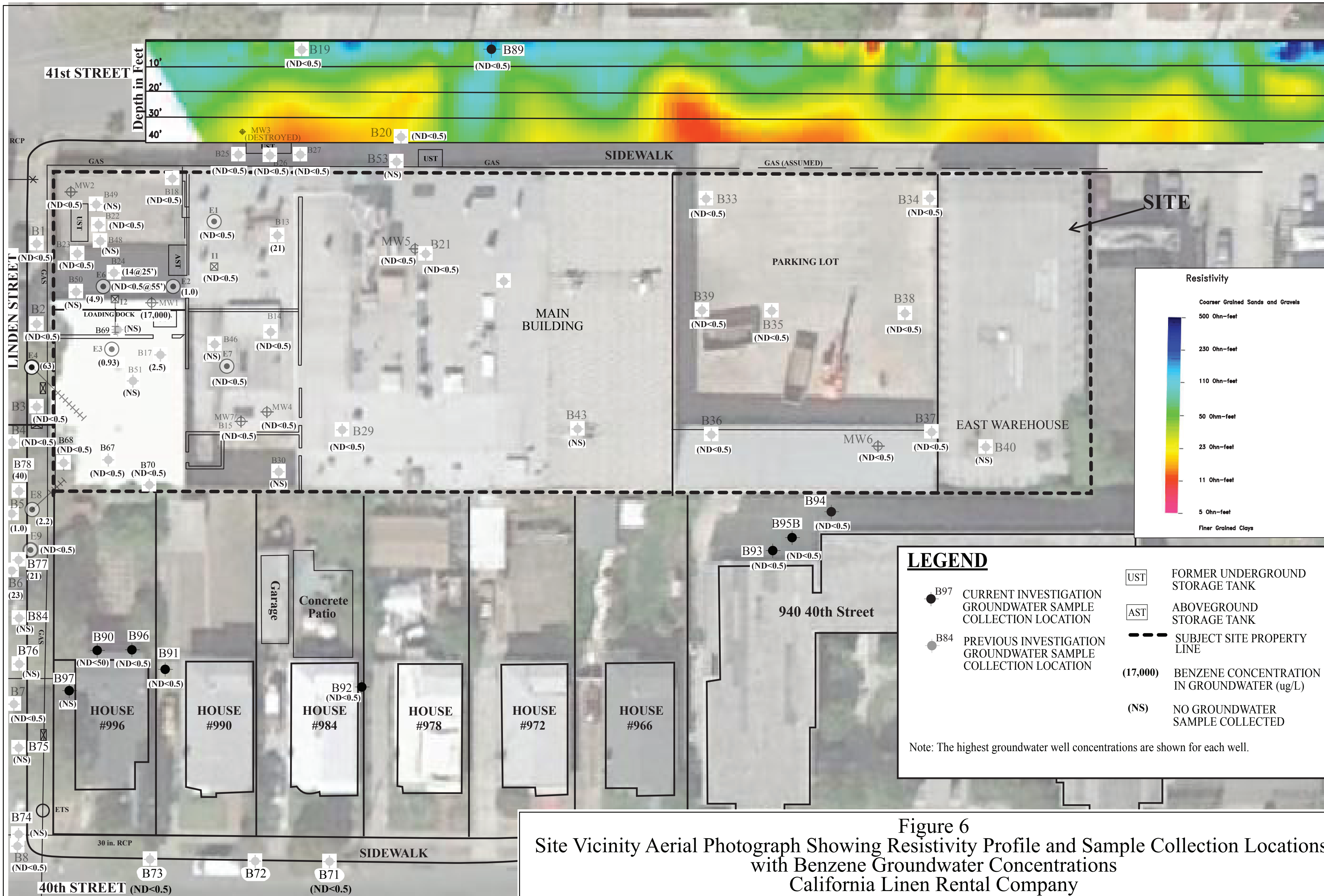


Figure 6
Site Vicinity Aerial Photograph Showing Resistivity Profile and Sample Collection Locations with Benzene Groundwater Concentrations
California Linen Rental Company
989 41st Street
Oakland, California

Base Map From:
California Utility Survey Utility Sketch Plan, Feb. 14, 2005, Google Earth, June 2007, and JR Associates, June 2011

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

0 25 50
Approximate Scale in Feet

N

APPENDIX A

Geophysical Survey

J R ASSOCIATES

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

James Rezowalli
California Registered Geophysicist, GP-921

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

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

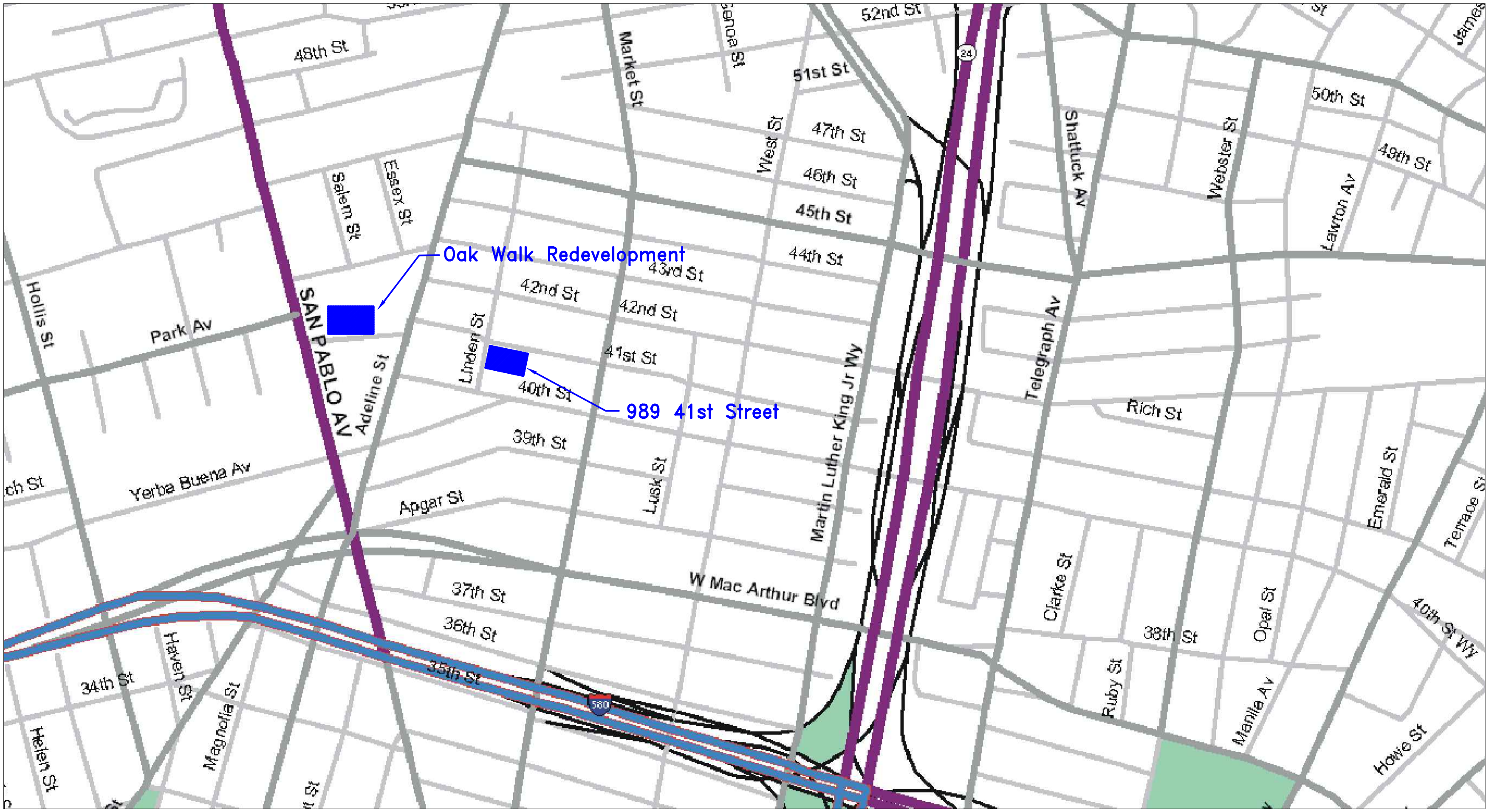
A. Resistivity Profiles

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.

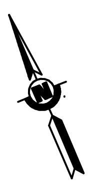
IV DRAWINGS



Vicinity Map Dipole Resistivity Investigation 989 41st Street Oakland, California			
SCALE: No Scale		DRAWN BY: J.J.R.	
DATE: 3-27-09	JOB NUMBER: 121-261-11	REVISED: 6-17-2011	
J R Associates Civil and Environmental Geophysics 1886 Emory Street, San Jose, CA (408) 293-7390			
		DRAWING NUMBER: 1	

EXPLANATION:

RESISTIVITY ARRAY

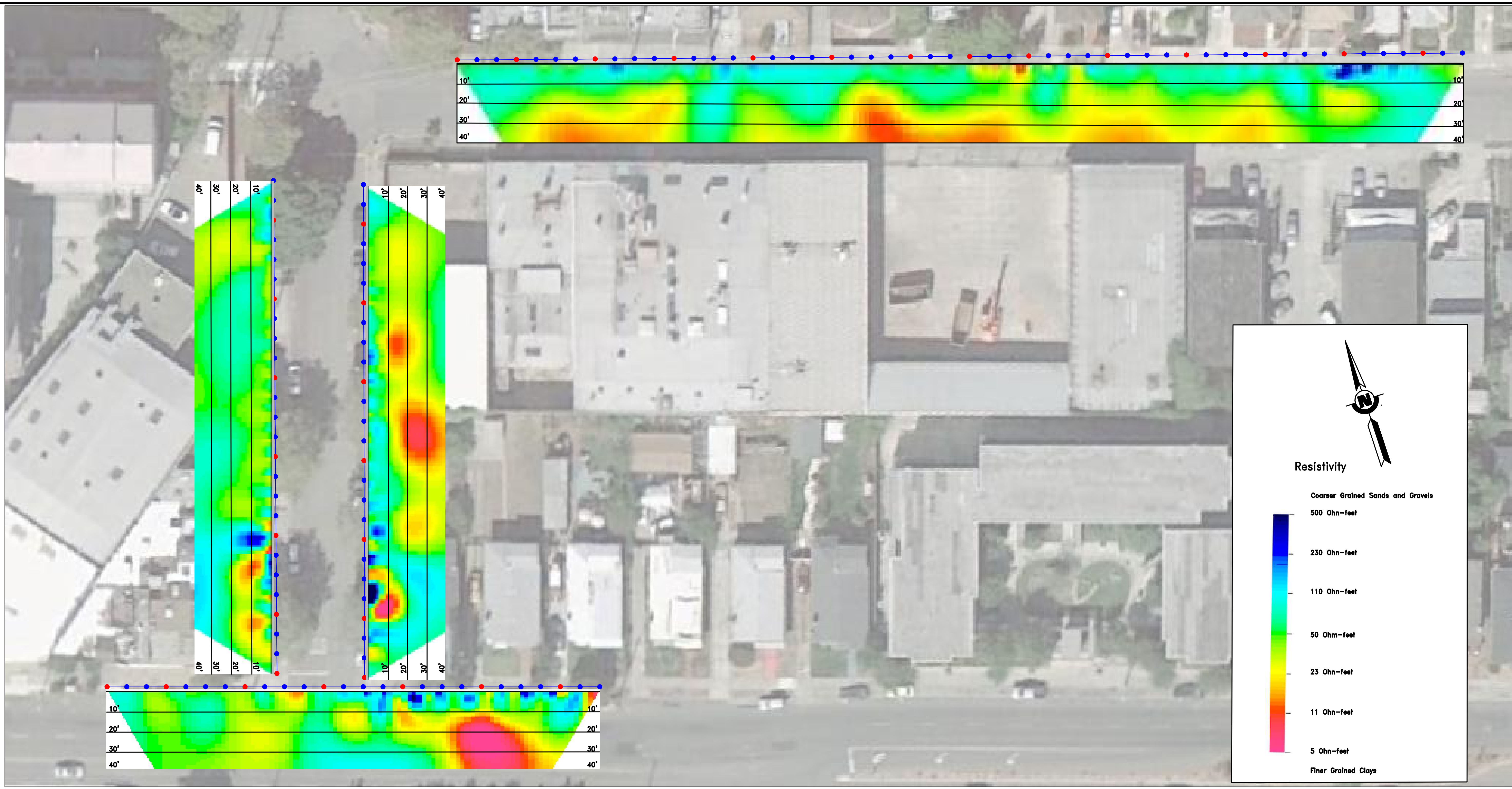


Site Map Dipole Resistivity Investigation
989 41st Street
Oakland, California

SCALE: 1" = 100'		DRAWN BY:	J.J.R.
DATE: 3-27-09	JOB NUMBER: 121-261-11	REVISED:	6-17-2011

J R Associates Civil and Environmental Geophysics
1886 Emory Street, San Jose, CA (408) 293-7390

DRAWING NUMBER: 2



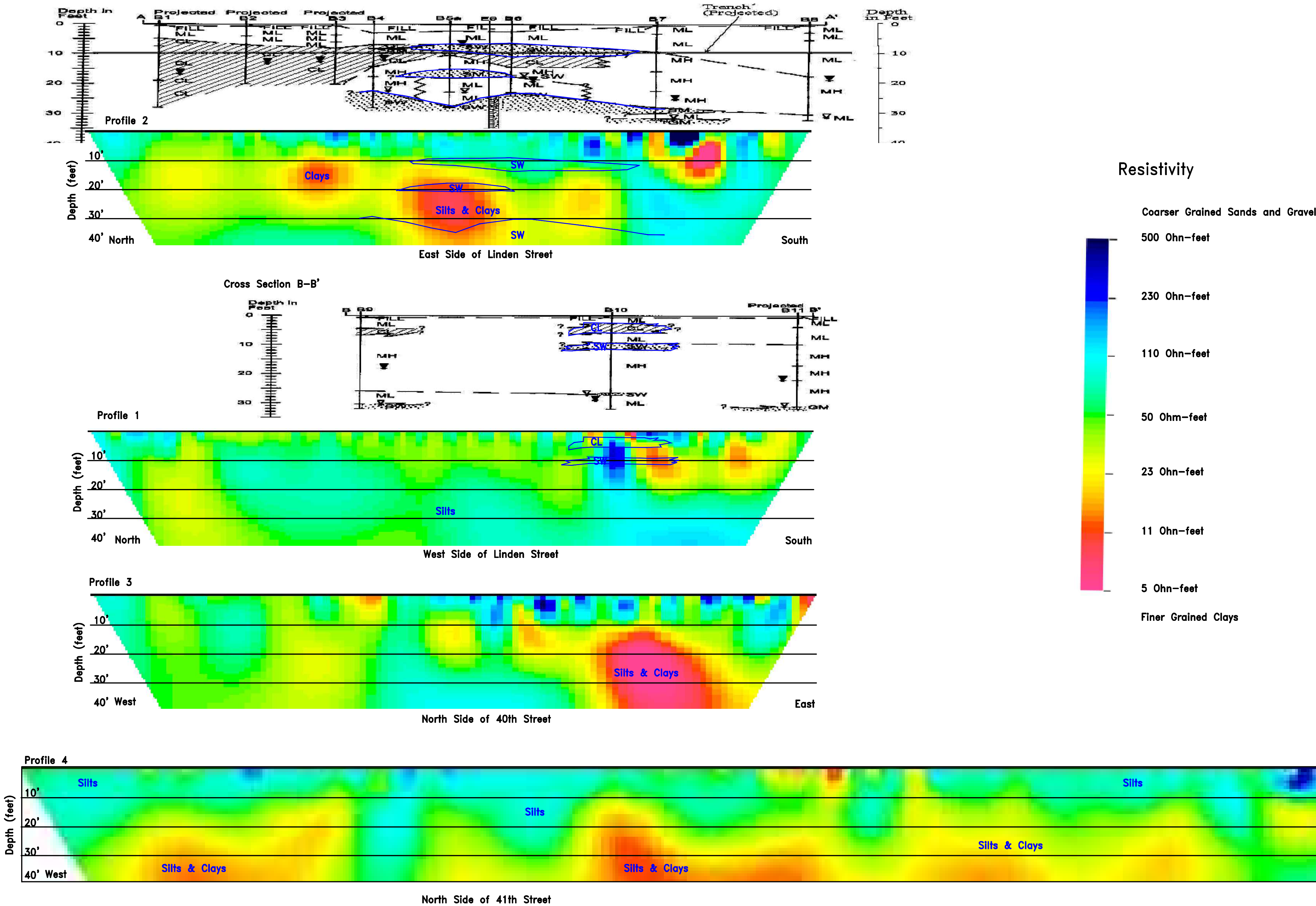
Scale 1" = 50'

Resistivity Profiles Dipole Resistivity Investigation
989 41st Street
Oakland, California

SCALE: 1"=50'		DRAWN BY:	J.J.R.
DATE: 3-27-09	JOB NUMBER: 121-261-11	REVISED:	6-17-2011

J R Associates Civil and Environmental Geophysics
1886 Emory Street, San Jose, CA (408) 293-7390

DRAWING NUMBER: 3



Note: Geologic cross sections were provided by P&D Environmental

Resistivity Profiles Vs Geologic Cross Sections 989 41st Street Oakland, California			
SCALE: 1" = 40'		DRAWN BY: J.J.R.	
DATE: 3-27-09	JOB NUMBER: 111-261-09	REVISED: 6-17-2011	
J R Associates Civil and Environmental Geophysics 1886 Emory Street, San Jose, CA (408) 293-7390			
		DRAWING NUMBER: 4	

APPENDIX B

Soil Gas Purge Volume Calculations and Soil Gas Sampling Data Sheets

2.6 feet tubing, 3 inch sand interval

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:

V 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 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 x (0.5 x 0.5) x 3 x 0.35 = 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 3 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, 1.65 minutes x 60seconds/ minute = 99 seconds.

Notes:

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

7 feet tubing, 12 inch sand interval

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:

V 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 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 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, 1.38 minutes x 60seconds/ minute = 83 seconds.

Notes:

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

SOIL GAS SAMPLING DATA SHEET
Address 989 41st St. Oakland
Job # 0304
Date 7/27/11, 7/28/11
P&D Sampler
Drilling Company

Probe Method (check one)
o PRT
X Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	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	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
SG 61	5	1450	33726	vac -30 time 1405	vac -28 time 1410	vac -28 time 1420	vac time	time 142600	time 142723	time 1428	conc. 102 time 1430	vac -30 time 143100	vac -5 time 151540	PID: 0 PPM 1517
SG 62	5	1435	36402	vac -30 time 1105	vac -25 time 1110	vac -25 time 1120	vac time	time 115500	time 115623	time 1200	conc. 87 time 1209	vac -28 time 124700	vac -5 time 125840	PID: 0 PPM 1300
SG 63	5	1410	8036	vac -30 time 1100	vac -26 time 1105	vac -26 time 1115	vac time	time 115300	time 115423	time 1158	conc. 68 time 1205	vac -30 time 130300	vac -5 time 151630	PID: 0 PPM 1518
SG 64	5	1340	8011	vac -29 time 1550	vac -25 time 1600	vac -25 time 1610	vac time	time 161700	time 161823	time 1619	conc. 74 time 1623	vac -29 time 162400	vac -5 time 163305	PID: 64 PPM 1649
SG 65	5	1255	8023	vac -30 time 1340	vac -30 time 1350	vac -30 time 1400	vac time	time 145600	time 145723	time 1500	conc. 72 time 1508	vac -30 time 150930	vac -5 time 152130	PID: 0.4 PPM 1533
SG 66	5	1315	8031	vac -30 time 1340	vac -30 time 1350	vac -30 time 1400	vac time	time 161200	time 161323	time 1616	conc. 68 time 1621	vac -26 time 162200	vac -23.5 time 165500	PID: 0 PPM 1659
SG 67	~~1330~~ 5	~~7999~~ 1230	7999	vac -30 time 1330	vac -26 time 1340	vac -26 time 1350	vac time	time 141500	time 141623	time 142000	conc. 64 time 142400	vac -30 time 142415	vac -5 time 144520	PID: 0 PPM 1456
SG 67 DUP	~~1330~~ 5	~~8018~~ 1230	8018	vac -30 time 1332	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	

SOIL GAS SAMPLING DATA SHEET CALIFORNIA LINEN RENTAL CO.
Address 789 41st St, OAKLAND
Job # 0304
Date 9/14/11
P&D Sampler [illegible]
Drilling Company Vironex

Probe Method (check one)
o PRT
[x] Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	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	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
SG62A	5	0800	2C70	vac -29 time 0900	vac -29 time 0907	vac -29 time 0917	vac time	time 095700	time 095823	time	conc. time	vac -29 time 104600	vac -5 time 110020	0.8 PPM 1103
SG62A DUP			2154	vac -28 time 0905	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG68	5	0830	37315	vac -29 time 0930	vac -30 time 0940	vac -30 time 0950	vac time	time 114800	time 114923	time	conc. time	vac -30 time 115100	vac -5 time 120010	0 PPM 1203
SG69	5	0850	36446	vac -28 time 1115	vac -28 time 1120	vac -28 time 1130	vac time	time 115300	time 115423	time	conc. time	vac -29 time 120800	vac -5 time 121730	6.8 PPM 1220
SG70	5	0915	37666	vac -28 time 1340	vac -28 time 1350	vac -28 time 1400	vac time	time 142300	time 142423	time	conc. time	vac -30 time 142500	vac -5 time 143418	0 PPM 1436
SG71	5	0940	94183	vac -28 time 1350	vac -26 time 1400	vac -26 time 1410	vac time	time 142500	time 142623	time	conc. time	vac -30 time 142800	vac -5 time 142740	0 PPM 1429
SG72	5	1005	94931	vac -28 time 1430	vac -27 time 1435	vac -27 time 1445	vac time	time 145600	time 145723	time	conc. time	vac -30 time 145900	vac -5 time 150425	0 PPM 1506
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	

SOIL GAS SAMPLING DATA SHEET

Address 989 41st St, OAKLAND
Job # 8304
Date 8/10/11
P&D Sampler MLD
Drilling Company VIRONEX

Probe Method (check one)
o PRT
X Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	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	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
SG VW1-55			37668	vac -30 time 1420	vac -26 time 1425	vac -26 time 1435	vac time	time 144300	time 144428	time 1455	conc 49 time 1512	vac -29 time 151300	vac -5 time 151428	PID: 0PPM 1515
SG VW1-5			36388	vac -30 time 1210	vac -27 time 1212	vac -27 time 1222	vac time	time 122100	time 123023	time 1231	conc. 58 time 1235	vac -30 time 123600	vac -29 time 161000	PID: 0PPM 1612 LOW FLOW
SG VW2-55			2190	vac -30 time 1030	vac -27 time 1035	vac -27 time 1045	vac time	time 110700	time 110828	time 1110	conc. 62 time 1115	vac -28 time 12360	vac -5 time 115010	PID. 0PPM 1152
SG VW2-5			33712	vac -30 time 1032	vac -23 time 1040	vac -25 time 1050	vac time	time 111000	time 111123	time 1112	conc. 54 time 1118	vac -30 time 112400	vac -11 time 163020	PID: 2PPM 1615
SG VW2-5 DUP			33398	vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	

SOIL GAS SAMPLING DATA SHEET

Address 989 41st St, OAKLAND
Job # 0304
Date 4/23/12 AND 5/4/12
P&D Sampler [illegible]
Drilling Company VIRONEX

Probe Method (check one)
o PRT
o Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	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	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
SG VW1-SS	0.75	4/23/12	30832	vac -30 time 1500	vac -30 time 161200	vac -30 time 162200	vac time	time 165000	time 165128	time	conc. time	vac -28 time 165400	vac -5 time 171545	PID: 0 ppm
SG VW1-5	5	5/4/12	37714	vac -30 time 1030	vac -30 time 104000	vac -30 time 105000	vac time	time 105500	time 105650	time	conc. time	vac -26 time 112000	vac -23 time 171612	PID: 0 ppm
SG VW2-SS	0.75	5/4/12	36472	vac -30 time 150000	vac -28 time 152500	vac -28 time 153500	vac time	time 153700	time 153828	time	conc. time	vac -30 time 154400	vac -5 time 160845	PID: 2.3 ppm
SG VW2-5	5	5/4/12	37707	vac -30 time 1000	vac -28 time 125000	vac -28 time 130000	vac time	time 130500	time 130650	time	conc. time	vac -28 time 131500	vac -5 time 142310	PID: 0ppm
SG VW2-5 DUP	5	5/4/12	36409	vac -30 time 1005	vac -28 time 125000	vac -28 time 130000	vac time	time 130500	time 130650	time	conc. time	vac -28 time 131500	vac -5 time 142310	PID: 0ppm
SG VW3-SS	0.75	5/4/12	30817	vac -30 time 1010	vac -28 time 161500	vac -28 time 162500	vac time	time 162900	time 163028	time	conc. time	vac -30 time 163400	vac -5 time 165630	PID: 3.6 ppm
SG VW3-5	5	5/4/12	36431	vac -30 time 1015	vac -29 time 115000	vac -29 time 120000	vac time	time 120500	time 120650	time	conc. time	vac -30 time 123000	vac -30 time 165300	PID: 0 ppm
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	

SOIL GAS SAMPLING DATA SHEET CALIFORNIA LINEN RENTAL CO.
Address 989 41st St. OAKLAND
Job # 0304
Date 7/5/12 & 7/6/12
P&D Sampler MLD
Drilling Company VIRONEX

Probe Method (check one)
o PRT
o Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	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	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
VW 5-5	5	7/2/12	37364	vac -29 time 1300	vac -29 time 1355	vac -29 time 1405	vac time	time 143200	time 143339	time	conc. time	vac -30 time 143800	vac -5 time 144458	0 PPM
VW 6-5	5	7/3/12	36446	vac -29 time 1310	vac -29 time 0930	vac -29 time 0940	vac time	time 095000	time 095139	time	conc. time	vac -30 time 095700	vac -5 time 100510	0 PPM SAMPLED ON 7/6/12
VW 7-5	5	6/28/12	37740	vac -29 time 1000	vac -29 time 1230	vac -29 time 1240	vac time	time 130500	time 130639	time	conc. time	vac -30 time 135100	vac -4 time 150356	0 PPM
VW 8-5	5	6/28/12	33707	vac -29 time 1005	vac -29 time 1235	vac -29 time 1245	vac time	time 130000	time 130139	time	conc. time	vac -29 time 132800	vac -29 time 161810	0 PPM NO FLOW
VW 8-5 DUP		6/28/12	36477	vac -29 time 1005	vac -29 time 1235	vac -29 time 1245	vac time	time 130000	time 130139	time	conc. time	vac -29 time 132800	vac -29 time 161810	NO FLOW
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	

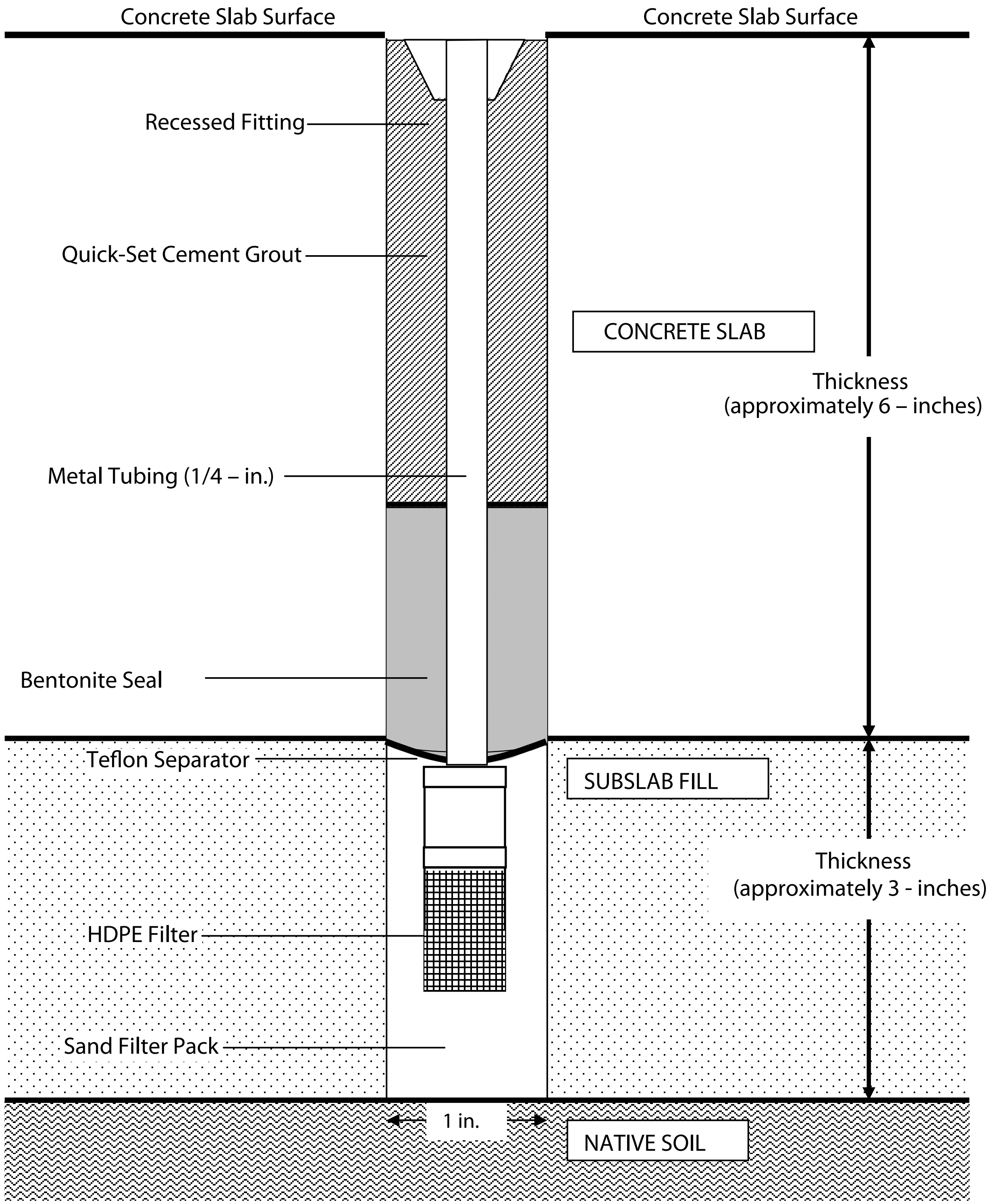
SOIL GAS SAMPLING DATA SHEET CALIFORNIA LINEN
Address 989 41st ST OAKLAND
Job # 0304
Date 7/20/12
P&D Sampler MLD
Drilling Company VIRONEX

Probe Method (check one)
o PRT
o Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	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	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
VW 4-5	5	7/18/12	35681	vac -29 time 0800	vac -29 time 0850	vac -29 time 0900	vac time	time 091000	time 091134	time	conc. time	vac -30 time 092200	vac -5 time 093918	PID: 0 PPM
VW 4-5 DUP	5	7/18/12	34115	vac -29 time 0800	vac -29 time 0850	vac -29 time 0900	vac time	time 091000	time 091134	time	conc. time	vac -30 time 092200	vac -5 time 093918	PID: 0 ppm
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
VW				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	

APPENDIX C

Vapor Well Construction Diagrams



Sub-Slab Soil Gas Well VW1-SS Construction Diagram
California Linen Supply Company
989 41st Street
Oakland, California

Schematic from DTSC/Cal-EPA Vapor Intrusion Guidance Document - Final Interim, December 15, 2004	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	No Permit Required. Date Constructed: 7/28/11

P&D ENVIRONMENTAL, INC.

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

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2011-0590

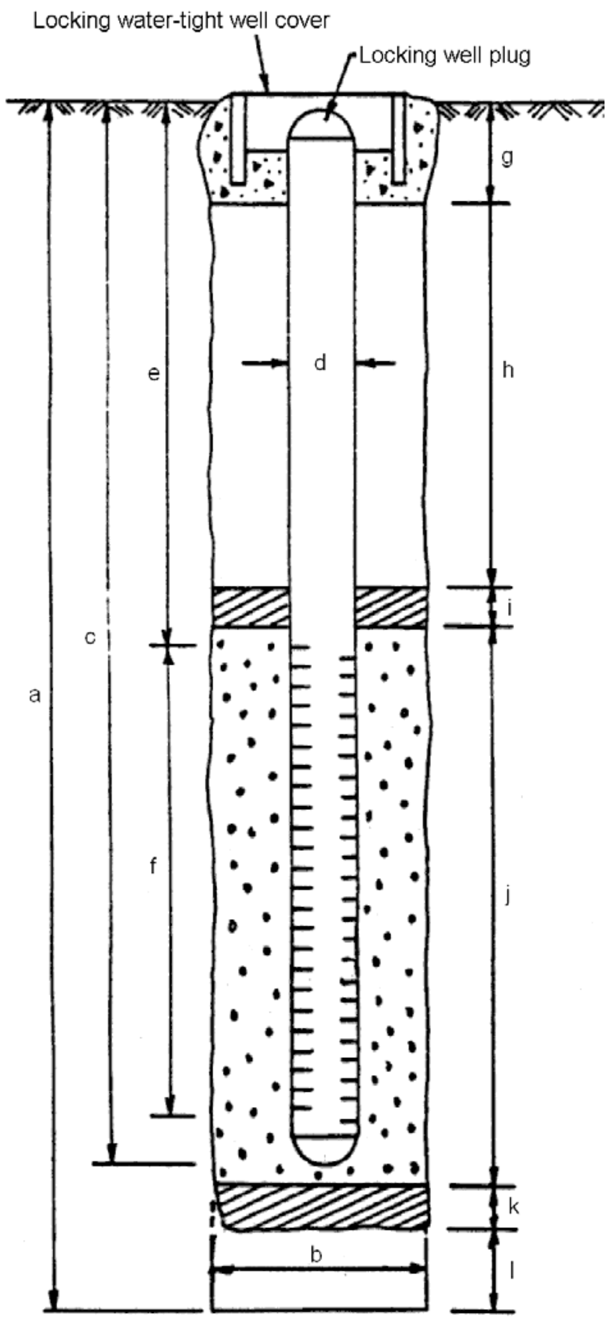
BORING/WELL NO. VW1-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 7/28/11



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

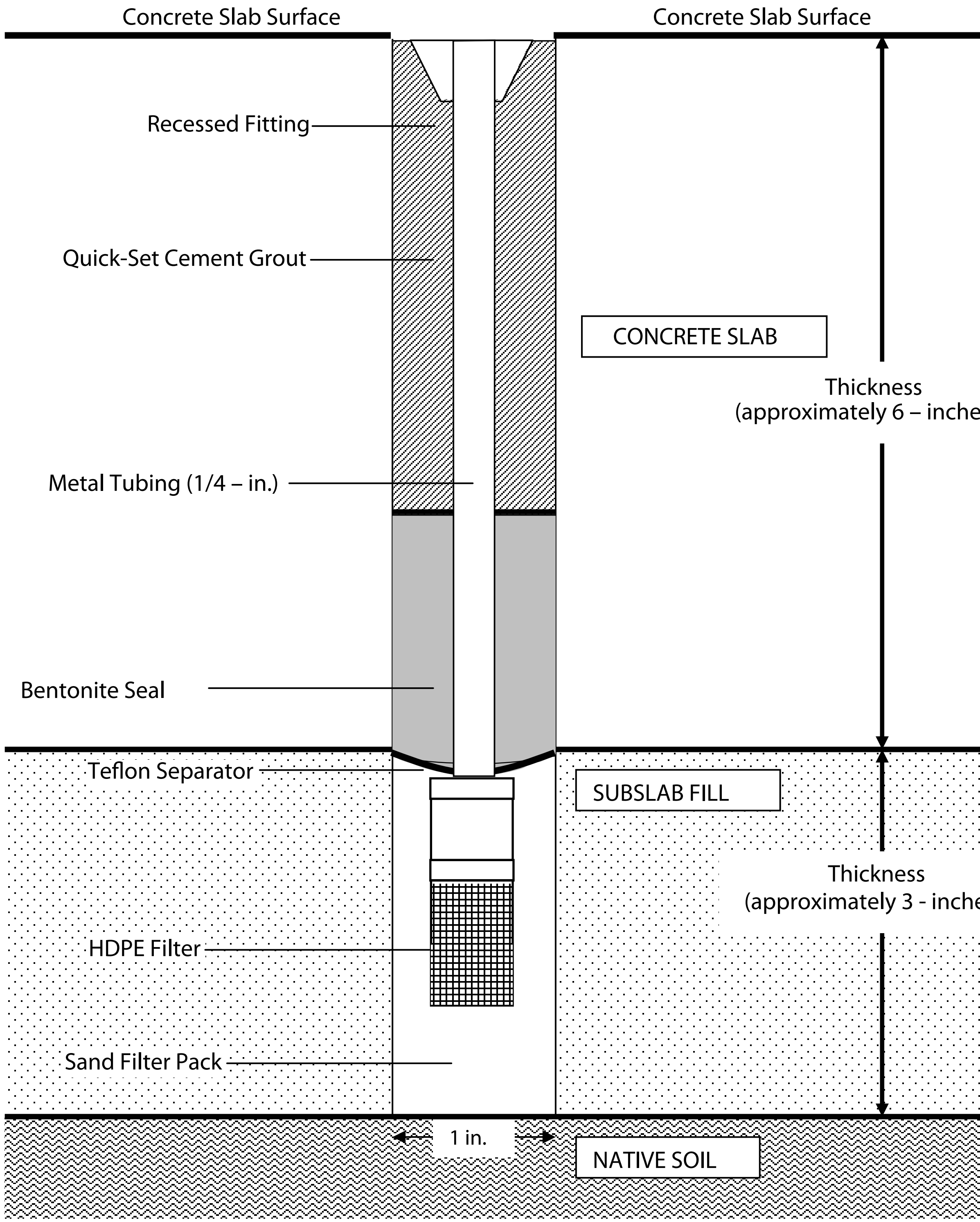
Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.



Sub-Slab Soil Gas Well VW2-SS Construction Diagram
California Linen Supply Company
989 41st Street
Oakland, California

Schematic from DTSC/Cal-EPA Vapor Intrusion Guidance Document - Final Interim, December 15, 2004	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	No Permit Required. Date Constructed: 7/28/11

P&D ENVIRONMENTAL, INC.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2011-0590

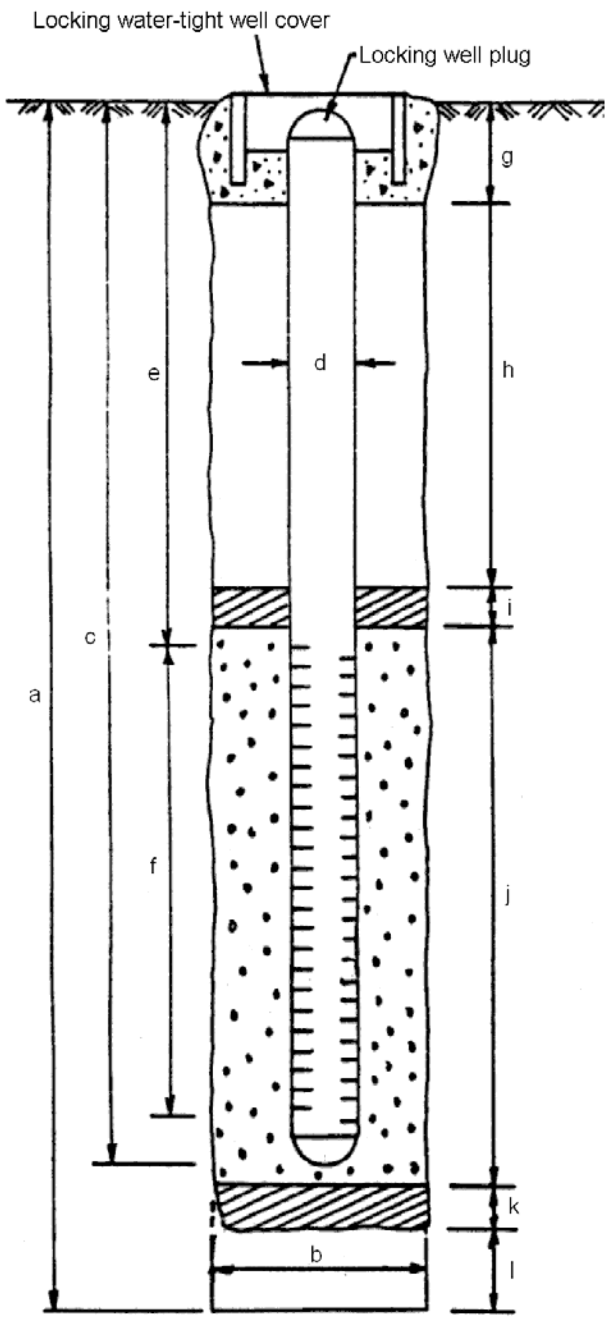
BORING/WELL NO. VW2-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 7/28/11



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

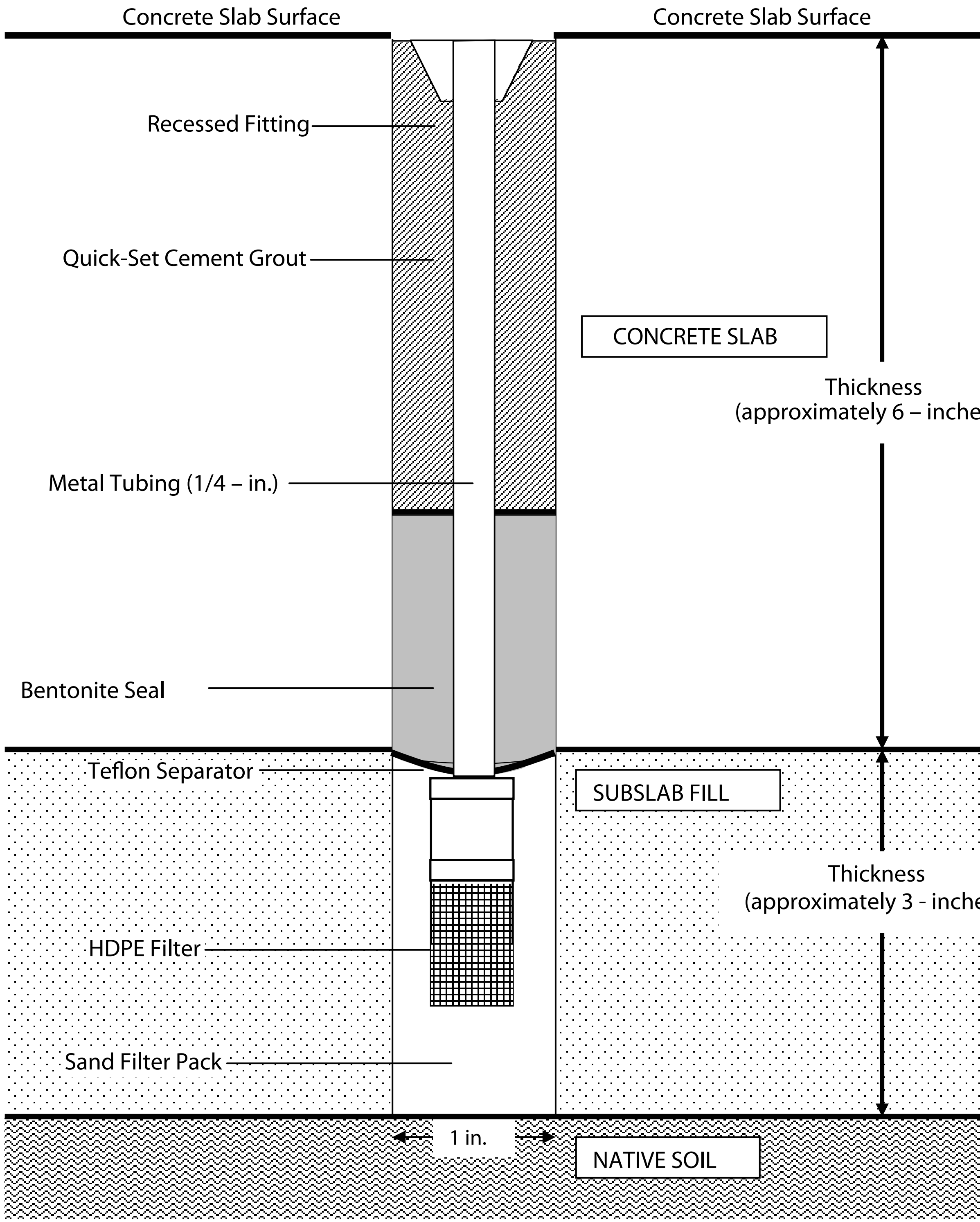
Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.



Sub-Slab Soil Gas Well VW3-SS Construction Diagram
California Linen Supply Company
989 41st Street
Oakland, California

Schematic from DTSC/Cal-EPA Vapor Intrusion Guidance Document - Final Interim, December 15, 2004	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	No Permit Required. Date Constructed: 3/12/12

P&D ENVIRONMENTAL, INC.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2012-0158

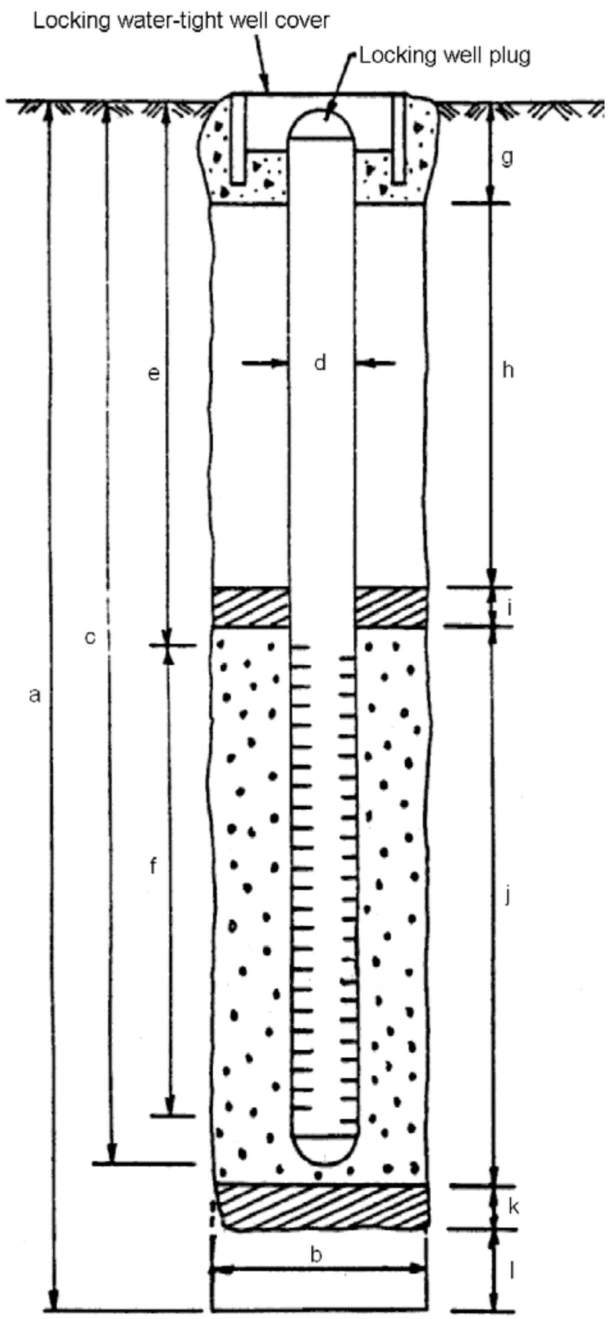
BORING/WELL NO. VW3-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 3/12/12



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.

P&D ENVIRONMENTAL, INC.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2012-0471

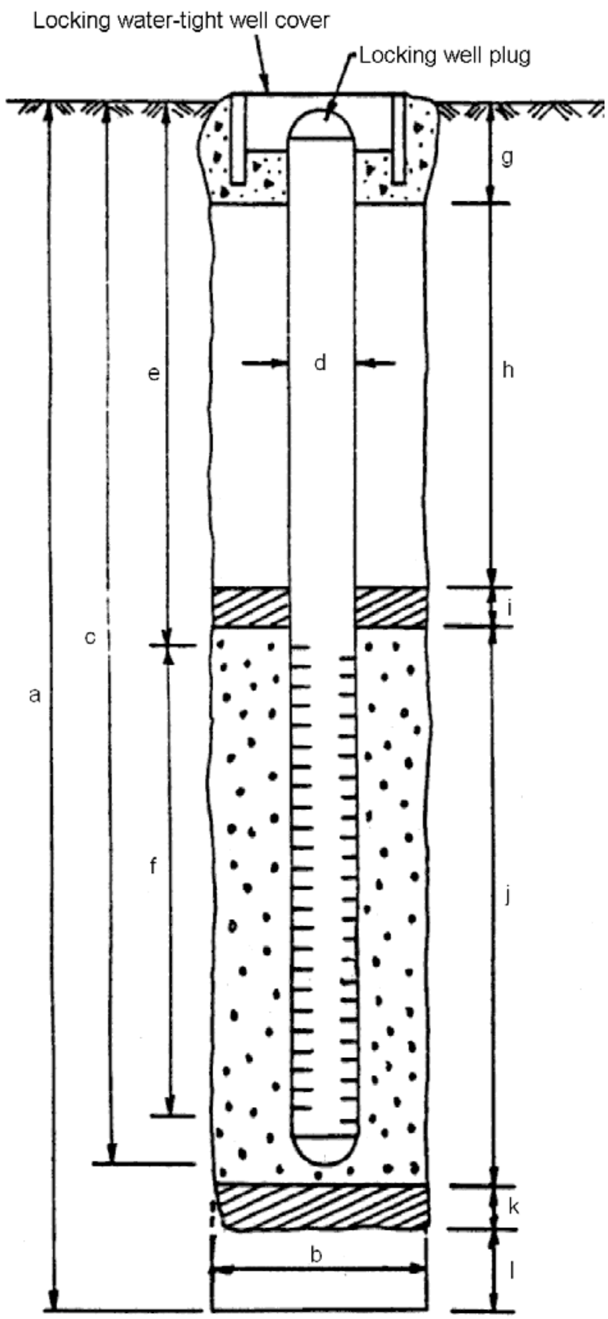
BORING/WELL NO. VW4-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 7/18/12



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.

P&D ENVIRONMENTAL, INC.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2012-0451

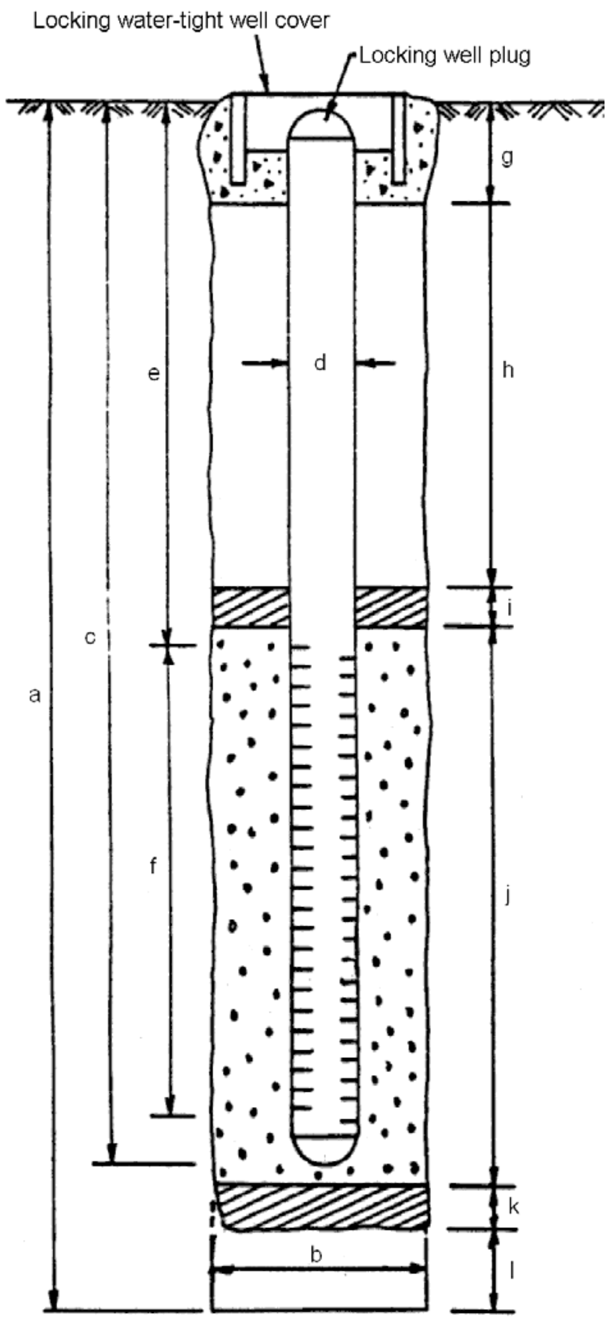
BORING/WELL NO. VW5-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 7/2/12



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.

P&D ENVIRONMENTAL, INC.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2012-0453

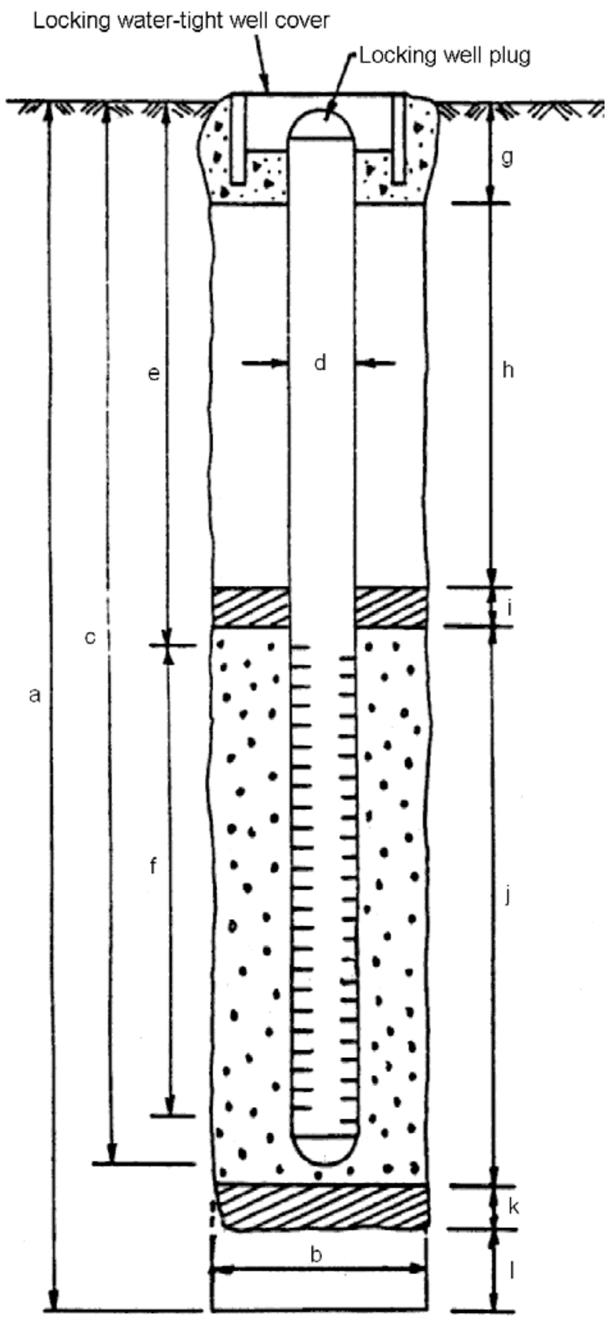
BORING/WELL NO. VW6-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 7/3/12



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.

P&D ENVIRONMENTAL, INC.

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

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2012-0446

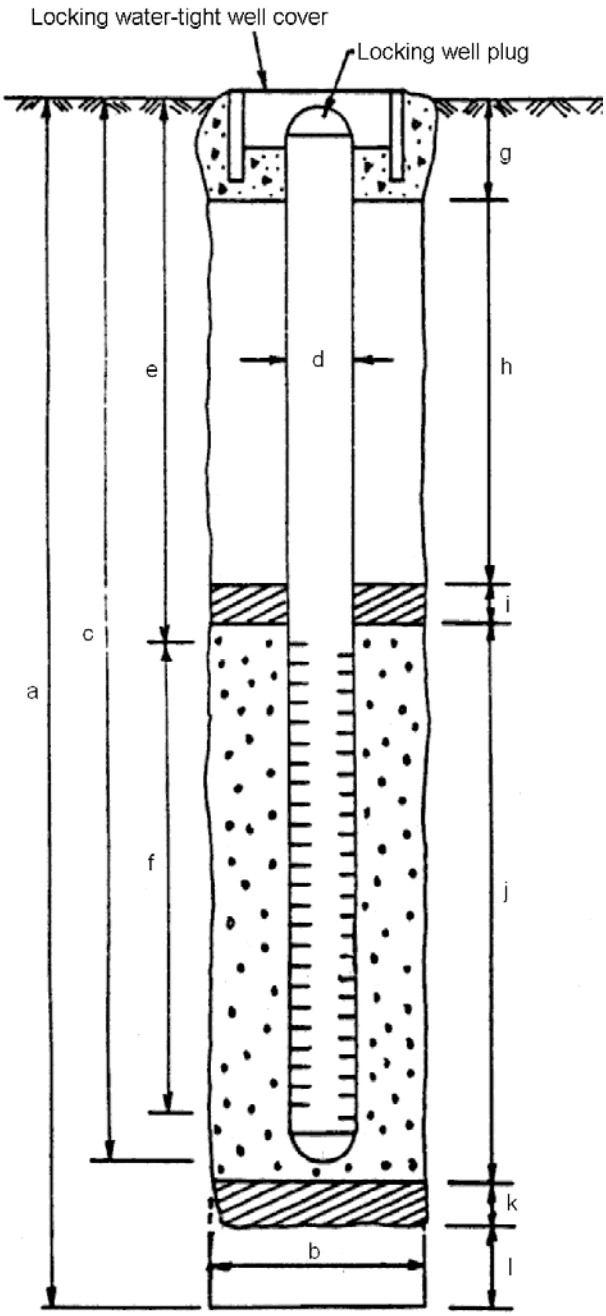
BORING/WELL NO. VW7-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 6/28/12



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.

P&D ENVIRONMENTAL, INC.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

WELL CONSTRUCTION DIAGRAM

PROJECT NUMBER 0304

PROJECT NAME California Linen, 989 41st Oakland.

COUNTY Alameda

WELL PERMIT NO. W2012-0446

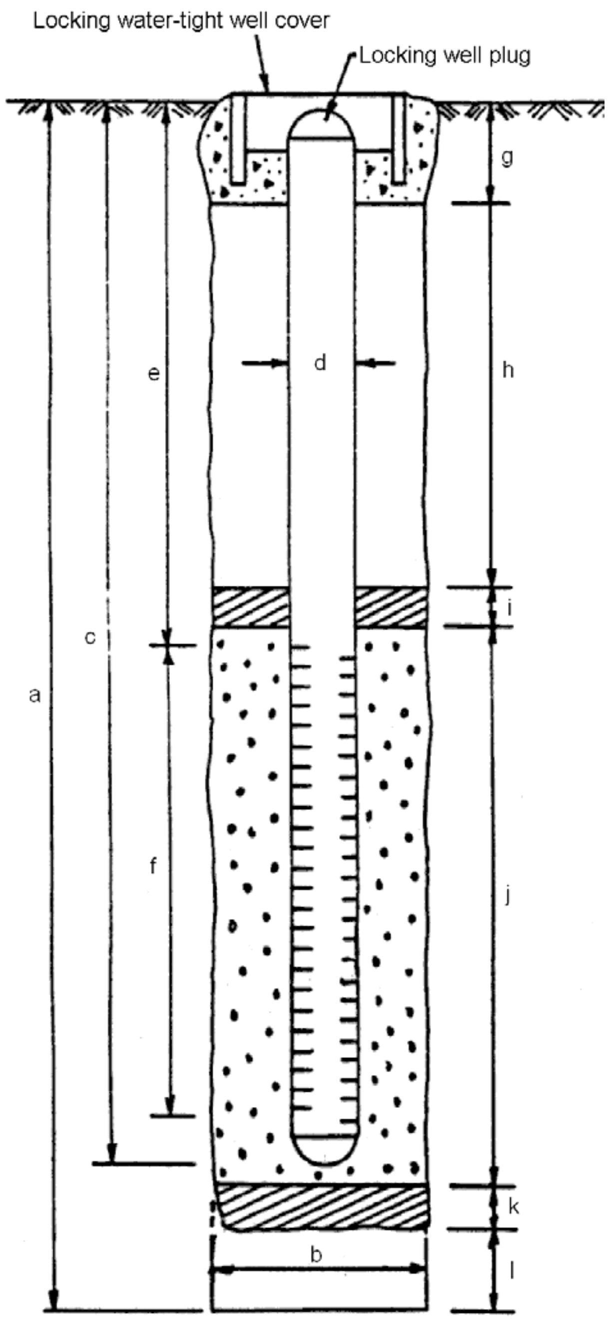
BORING/WELL NO. VW8-5

TOP OF CASING ELEV. Not Surveyed

GROUND SURFACE ELEVATION Not Surveyed

DATUM None

DATE(S) CONSTRUCTED 6/28/12



EXPLORATORY BORING

a. Total depth 5.0 ft.

b. Diameter 1.0 in.

Drilling method Slide Hammer

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 sanitary seal 2.0 ft.

Seal material Neat Cement

h. Sanitary seal 1.0 ft.

Seal material Bentonite Slurry

i. Filter pack seal 1.0 ft.

Seal material Bentonite

j. Filter pack length 1.0 ft.

Filter pack interval from 4.0 to 5.0 ft.

Pack material # 3 sand

k. Bottom seal 0 ft.

Seal material None

l. Slough in bottom of borehole 0 ft.

APPENDIX D

Boring Logs

RGA ENVIRONMENTAL, INC.

BORING NO.: B89	**PROJECT NO.:** 0304	**PROJECT NAME:** California Linen, 989 41st St., Oakland	
BORING LOCATION: On north side of 41st St., approx. 172 ft. east of intersection with Linden St..		**ELEVATION AND DATUM:** None	
DRILLING AGENCY: Vironex, Inc.	**DRILLER:** Joe	**DATE & TIME STARTED:** 9/16/11 1020	**DATE & TIME FINISHED:** 9/16/11 1600
DRILLING EQUIPMENT: Geoprobe 6600			
COMPLETION DEPTH: 25.0 Feet	**BEDROCK DEPTH:** Not Encountered	**LOGGED BY:** MLD	**CHECKED BY:** PMK
FIRST WATER DEPTH: 15.5 Feet	**NO. OF SAMPLES:** 1 Water		

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	REMARKS
0–0.6	0.0 to 0.6 ft. Asphalt and base rock.		No Well Constructed		0	Borehole continuously cored using 5-foot long 2.0-inch O.D. Geoprobe Macrocore barrel sampler. The sampler was lined with 4.8-foot long 1.5-inch O.D. transparent PVC tubes.
0.6–8.0 (5)	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. No Petroleum Hydrocarbon (PHC) or solvent odor.	FILL			0	0 to 5 ft. 4.3 ft. recovery 5 to 10 ft. 4.4 ft. recovery 10 to 15 ft. 4.6 ft. recovery 15 to 20 ft. 4.6 ft. recovery 20 to 25 ft. 4.8 ft. recovery
8.0–20.0 (10, 15, 20)	8.0 to 20.0 ft. Brown silt (ML); medium stiff to soft, moist to saturated. No PHC or solvent odor. Wet at 15.0 ft. Saturated at 15.5 ft.	ML	▽ (15.5)		0 0 0	Water encountered during drilling at 15.5 ft. at 1245. Borehole terminated at 20.0 ft. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Casing was dry at 1310. Temporary PVC casing removed and borehole extended to 25.0 ft. PVC casing placed back in borehole. Water level measured at 23.6 ft. at 1511. Sample B89-W collected at 1515; No odor or sheen on sample.
20.0–25.0 (25)	20.0 to 25.0 ft. Brown silty clay (CL); soft, saturated. No PHC or solvent odor.	CL	▼ (23.6)		0	
25–30						Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of borehole using a tremie pipe and neat cement grout on 9/16/11.

RGA ENVIRONMENTAL, INC.

BORING NO.: B90	**PROJECT NO.:** 0304	**PROJECT NAME:** California Linen, 989 41st St., Oakland	
BORING LOCATION: 996 40th Street approximately 8 ft. east of nw corner of house		**ELEVATION AND DATUM:** None	
DRILLING AGENCY: Vironex, Inc.	**DRILLER:** Joel, Alex	**DATE & TIME STARTED:** 7/18/12 0900	**DATE & TIME FINISHED:** 7/18/12 1130
DRILLING EQUIPMENT: 3.0-inch O.D. Hand Auger			
COMPLETION DEPTH: 9.0 Feet	**BEDROCK DEPTH:** Not Encountered	**LOGGED BY:** MLD	**CHECKED BY:** PHK
FIRST WATER DEPTH: 6.5 Feet	**NO. OF SAMPLES:** 1 Soil, 1 Water		

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 0	Borehole hand augered using a 3.0-inch O.D. hand auger. First encountered water during augering at 6.5 ft. at 0930.
	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	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. Satutrated at 6.5 ft.	SC X	B90-7		0 18 296 540 38	
	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						Borehole terminated at 7.5 ft. on 7/18/12. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Water level measured at 6.6 ft. at 0950 and at 6.4 ft. at 1000. Water sample B90-W collected at 1010 using new unused disposable polyethylene tubing attached to a peristaltic pump. Strong odor and sheen on sample. Water level was subsequently measured at 6.9 ft. at 1025. Borehole advanced to 9.0 ft. (refusal depth), to determine the vertical extent of contamination. Borehole grouted on 7/18/12 using neat cement grout and a tremie pipe. Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of the borehole.
15						
20						
25						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
30						

RGA ENVIRONMENTAL, INC.

BORING NO.: B91	PROJECT NO.: 0304	PROJECT NAME: California Linen, 989 41st St., Oakland	
BORING LOCATION: 990 40th Street approximately 7 ft. west of nw corner of house		ELEVATION AND DATUM: None	
DRILLING AGENCY: Vironex, Inc.	DRILLER: Brett, Alex	DATE & TIME STARTED: 7/2/12 0930	DATE & TIME FINISHED: 7/2/12 1415
DRILLING EQUIPMENT: 3.0-inch O.D. Hand Auger			
COMPLETION DEPTH: 12.0 Feet	BEDROCK DEPTH: Not Encountered	LOGGED BY: MLD	CHECKED BY: PHK
FIRST WATER DEPTH: 10.5 Feet	NO. OF SAMPLES: 1 Water		

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION LOG	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	Borehole hand augered using a 3.0-inch O.D. hand auger.
	2.0 to 4.0 ft. Dark brown sandy clay (CL);medium stiff, moist, with rootlets. No PHC or solvent odor. (0,5,95)	CL			0	First encountered water during augering at 10.5 ft. at 1100.
5	4.0 to 5.0 ft. Color change to grayish-brown with orange and gray mottling.				0	Borehole terminated at 12.0 ft. on 7/2/12. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Casing was dry at 1130. Water level measured at 11.6 ft. at 1205 and at 10.4 ft. at 1340. Water sample B91-W collected at 1350 using new unused disposable polyethylene tubing attached to a peristaltic pump. No sheen or odor on sample. Water level was subsequently measured at 10.5 ft. at 1400.
	5.0 to 7.0 ft. Color change to olive-brown with bluish-gray mottling, and carbonate concretions.					
	7.0 to 12.0 ft. Brown silty clay (CL); medium stiff to soft, moist to saturated, with few coarse sand and orange mottling. No PHC or solvent odor. (0,5,95)				0	
10	Wet at 10.0 ft. Saturated at 10.5 ft. 10.0 to 11.0 ft. Increase in coarse angular gravel to 1.0-inch diameter. (5,10,85)		▼ ▽		0 0	
15						Borehole grouted on 7/2/12 using neat cement grout and a tremie pipe. Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of the borehole. <u>Drilling Notes:</u> 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
20						
25						
30						

RGA ENVIRONMENTAL, INC.

BORING NO.: B92	**PROJECT NO.:** 0304	**PROJECT NAME:** California Linen, 989 41st St., Oakland			
BORING LOCATION: 984 40th Street approximately 4 ft. south of ne corner of house		**ELEVATION AND DATUM:** None			
DRILLING AGENCY: Vironex, Inc.	**DRILLER:** Brett, Alex	**DATE & TIME STARTED:** 7/3/12 1030	**DATE & TIME FINISHED:** 7/3/12 1400		
DRILLING EQUIPMENT: 3.0-inch O.D. Hand Auger					
COMPLETION DEPTH: 10.0 Feet	**BEDROCK DEPTH:** Not Encountered	**LOGGED BY:** MLD	**CHECKED BY:** PHK		
FIRST WATER DEPTH: 9.5 Feet	**NO. OF SAMPLES:** 1 Water				

DEPTH (FT.)	DESCRIPTION	GRAPHIC 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	Borehole hand augered using a 3.0-inch O.D. hand auger.
					0	First encountered water during augering at 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)	CL			0	Borehole terminated at 10.0 ft. on 7/3/12. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Water level measured at 8.6 ft. at 1200 and at 7.9 ft. at 1210.
	6.0 to 7.0 ft. Olive-brown clay (CL); medium stiff, moist, with some coarse sand, bluish-gray and orange mottling, and carbonate concretions. No PHC or solvent odor. (0,10,90)				0	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	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. 9.0 to 10.0 ft. Increase in coarse angular gravel to 0.5-inch diameter. (10,10,80)		▼ ▽		0	
15						Water level was subsequently measured at 7.8 ft. at 1320. Borehole grouted on 7/3/12 using neat cement grout and a tremie pipe. Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of the borehole.
20						<u>Drilling Notes:</u> 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
25						
30						

RGA ENVIRONMENTAL, INC.

BORING NO.: B93	PROJECT NO.: 0304	PROJECT NAME: California Linen, 989 41st St., Oakland
BORING LOCATION: 940 40th Street approximately 25 ft. west of gate entrance in back yard		ELEVATION AND DATUM: None
DRILLING AGENCY: Vironex, Inc.	DRILLER: Brett, Alex	DATE & TIME STARTED: 6/28/12 1000 / DATE & TIME FINISHED: 6/28/12 1700
DRILLING EQUIPMENT: 3.0-inch O.D. Hand Auger		
COMPLETION DEPTH: 12.0 Feet	BEDROCK DEPTH: Not Encountered	LOGGED BY: MLD / CHECKED BY: PHK
FIRST WATER DEPTH: 11.0 Feet	NO. OF SAMPLES: 1 Water	

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	REMARKS
0–1	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.	FILL	No Well Constructed		0	Borehole hand augered using a 3.0-inch O.D. hand auger.
1–3	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)	FILL			0	First encountered water during augering at 11.0 ft. at 1150.
3–5	3.0 to 5.0 ft. Black clay (CL); medium stiff, moist, with some coarse sand. No PHC or solvent odor. (0,10,90)	CL				Borehole terminated at 12.0 ft. on 6/28/12. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Water level measured at 11.9 ft. at 1205 and at 11.5 ft. at 1210. Water sample B93-W collected at 1330 using new unused disposable polyethylene tubing attached to a peristaltic pump. No sheen or odor on sample.
5	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	
7–8	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)	CL			0	
8–12	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. 11.0 to 12.0 ft. Increase in coarse angular gravel to 1.0-inch diameter. (15,5,80)	CL	▽ ▼		0 0	
12–30						Borehole grouted on 6/28/12 using neat cement grout and a tremie pipe. Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of the borehole. <u>Drilling Notes:</u> 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.

RGA ENVIRONMENTAL, INC.

BORING NO.: B94	PROJECT NO.: 0304
PROJECT NAME: California Linen, 989 41st St., Oakland	
BORING LOCATION: 940 40th Street approximately 2 ft. east of gate entrance in back yard	ELEVATION AND DATUM: None
DRILLING AGENCY: Vironex, Inc.	DRILLER: Brett
DRILLING EQUIPMENT: 3.0-inch O.D. Hand Auger	
DATE & TIME STARTED: 6/28/12 1400	DATE & TIME FINISHED: 7/2/12 1400
COMPLETION DEPTH: 15.0 Feet	BEDROCK DEPTH: Not Encountered
FIRST WATER DEPTH: 14.0 Feet	NO. OF SAMPLES: 2 Soil, 1 Water
LOGGED BY: MLD	CHECKED BY: PMK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	REMARKS
	0.0 to 0.5 ft. Concrete.		No Well Constructed		63	Borehole hand augered using a 3.0-inch O.D. hand auger.
	0.5 to 1.0 ft. Reddish-brown clayey gravel (FILL); loose, moist. Strong Petroleum Hydrocarbon (PHC) odor.	X FILL	B94-1.0		94	
	1.0 to 2.0 ft. Dark brown sandy clay (FILL); medium stiff, moist, with bluish-green staining. Strong PHC odor. (0,15,85)				6 0	First encountered water during augering at 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)				0	Borehole terminated at 15.0 ft. on 6/28/12. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Casing was dry at 1600, and at 1645. The PVC casing was capped with latex glove and bentonite plug overnight to allow for recharge.
	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	
	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)	X	B94-8.0			
10	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)				4.6 2.2 1.6	On 6/29/12, water level measured at 12.8 ft. at 0810 and at 12.7 ft. at 0955. Water sample B94-W collected at 1000 using new unused disposable polyethylene tubing attached to a peristaltic pump. No sheen or odor on sample. Water level subsequently measured at 13.3 ft. at 1013.
	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)		▼ ▽		0 0 0	
15						Borehole grouted on 7/2/12 using neat cement grout and a tremie pipe. Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of the borehole.
20						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
25						
30						

RGA ENVIRONMENTAL, INC.

BORING NO.: B95 **PROJECT NO.:** 0304 **PROJECT NAME:** California Linen, 989 41st St., Oakland

BORING LOCATION: 940 40th Street approximately 25 ft. northwest of gate entrance in back yard **ELEVATION AND DATUM:** None

DRILLING AGENCY: Vironex, Inc. **DRILLER:** Joel, Alex

DRILLING EQUIPMENT: 3.0-inch O.D. Hand Auger

DATE & TIME STARTED: 7/20/12 1345

DATE & TIME FINISHED: 7/20/12 1700

COMPLETION DEPTH: 12.0 Feet **BEDROCK DEPTH:** Not Encountered

FIRST WATER DEPTH: 10.5 Feet **NO. OF SAMPLES:** 1 Soil, 1 Water

LOGGED BY: MLD **CHECKED BY:** TMK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	REMARKS
	0.0 to 0.5 ft. Concrete.		No Well Constructed		0	Borehole hand augered using a 3.0-inch O.D. hand auger. Borehole terminated at 12.0 ft. on 7/20/12.
	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.	X FILL	B95B-1.0		475 16 2	First encountered water during augering at 10.5 ft. at 1445. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Water level measured at 11.6 ft. at 1534 and at 10.8 ft. at 1625. Water sample B95B-W collected at 1645 using unused disposable polyethylene tubing attached to a peristaltic pump. Slight PHC or solvent odor and no sheen on sample. Water level subsequently measured at 10.9 ft. at 1656.
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)	CL			0 0 0	
	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)				0	
10	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) 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		▼ ▽		0 0.6 2.3 7 12	
15						Borehole grouted on 7/20/12 using neat cement grout and a tremie pipe. Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of the borehole.
20						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
25						
30						

RGA ENVIRONMENTAL, INC.

BORING NO.: B96	**PROJECT NO.:** 0304	**PROJECT NAME:** California Linen, 989 41st St., Oakland			
BORING LOCATION: 940 40th Street approximately 20 ft. east of northwest corner of house			**ELEVATION AND DATUM:** None		
DRILLING AGENCY: Vironex, Inc.		**DRILLER:** Joel, Alex		**DATE & TIME STARTED:** 7/20/12 0830	**DATE & TIME FINISHED:** 7/20/12 1300
DRILLING EQUIPMENT: 3.0-inch O.D. Hand Auger					
COMPLETION DEPTH: 8.0 Feet	**BEDROCK DEPTH:** Not Encountered			**LOGGED BY:** MLD	**CHECKED BY:** PHK
FIRST WATER DEPTH: 6.5 Feet	**NO. OF SAMPLES:** 1 Water				

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	WELL CONSTRUCTION LOG	BLOW COUNT PER 6"	PID	REMARKS
0–4	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 0 0	Borehole hand augered using a 3.0-inch O.D. hand auger. First encountered water during augering at 6.5 ft. at 0926. Borehole terminated at 8.0 ft. on 7/20/12. Temporary 1.0-inch diameter slotted PVC casing placed in borehole. Water level measured at 6.1 ft. at 0944 and at 5.8 ft. at 0954. Water sample B96-W collected at 1000 using unused disposable polyethylene tubing attached to a peristaltic pump. No odor or sheen on sample.
4–5	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				
5–8	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. 7.0 to 8.0 ft. color change to dark brown.	SC			0 0	
10						Water level subsequently measured at 6.4 ft. at 1020. Borehole grouted on 7/20/12 using neat cement grout and a tremie pipe. Mr. Steve Miller with Alameda County Public Works Agency on site to observe and document grouting of the borehole.
15						
20						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
25						
30						

APPENDIX E

Weather Information

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

□istory for □C□□□□□□□□

Triple Point, Oakland, CA

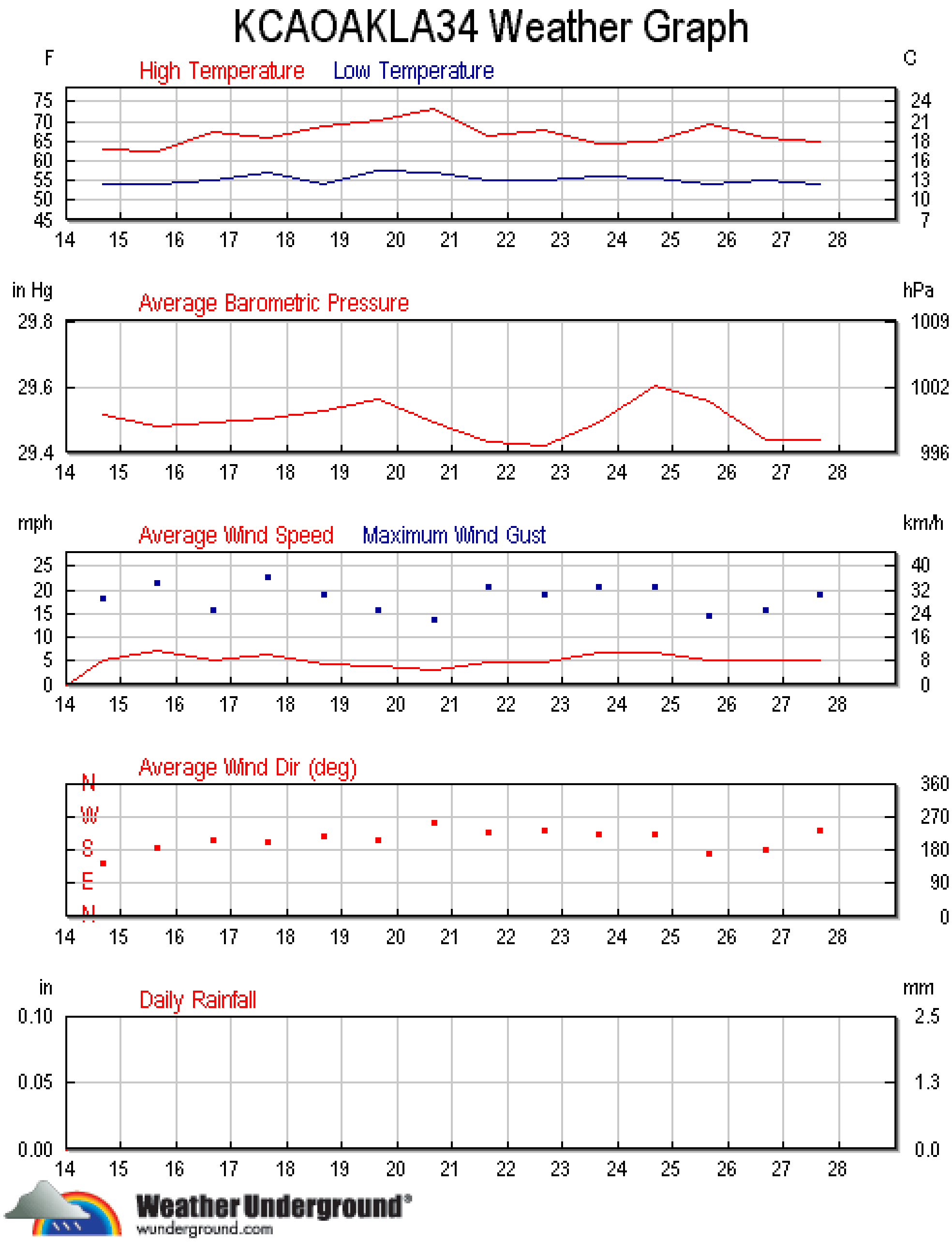
About This Station

□□t□N 37 ° 50 ' 51 " (37.848 °)
□on□W 122 ° 17 ' 10 " (-122.286 °)
□lev□tion □ft□□36

July | 14 | 2011 - TO - July | 28 | 2011 | Go

Daily Weekly Monthly Yearly C□sto□

	High:	Low:	Average:
Temperature:	□□□ °F	□□□ °F	□□□ °F
Dew Point:	□□□ °F	□□□ °F	□□□ °F
Humidity:	91.0%	53.0%	77.3%
Wind Speed:	□□□mph from the SW	-	□□mph
Wind Gust:	□□□mph from the SSW	-	-
Wind:	-	-	SSW
Pressure:	□□□□□in	□□□□□in	-
Precipitation:	□□□□in		


KCAOAKLA34 Weather Graph
F
High Temperature
Low Temperature
C
in Hg
Average Barometric Pressure
hPa
mph
Average Wind Speed
Maximum Wind Gust
km/h
Average Wind Dir (deg)
N
W
S
E
N
in
Daily Rainfall
mm
Weather Underground
wunderground.com

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

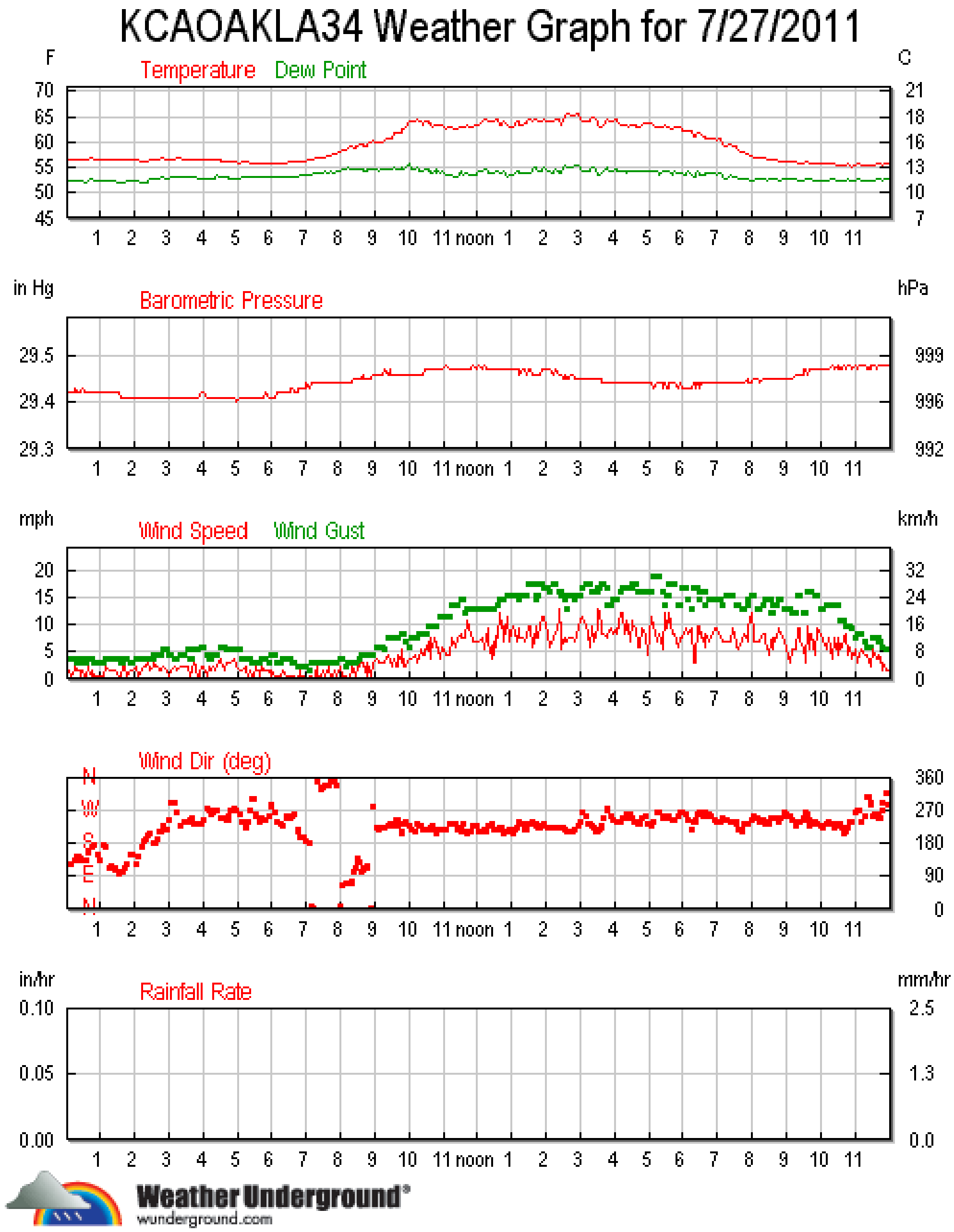
« Previous Day | July | 27 | 2011 | View | Next Day »

□□ily | Weekly | Monthly | Yearly | Custom

	Current:	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	75%	90%	69%	81%
Wind Speed:	[illegible] mph	[illegible] mph	-	[illegible] mph
Wind Gust:	[illegible] mph	[illegible] mph	-	-
Wind:	SW	-	-	WSW
Pressure:	[illegible] in	[illegible] in	[illegible] in	-
Precipitation:	[illegible] in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	93.0%	46.0%	77.5%
Wind Speed:	[illegible] mph from the SW	-	[illegible] mph
Wind Gust:	[illegible] mph from the SSW	-	-
Wind:	-	-	SW
Pressure:	[illegible] in	[illegible] in	-
Precipitation:	[illegible] in		


KCAOAKLA34 Weather Graph for 7/27/2011
F
C
Temperature
Dew Point
70
65
60
55
50
45
21
18
16
13
10
7
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in Hg
hPa
Barometric Pressure
29.5
29.4
29.3
999
996
992
mph
km/h
Wind Speed
Wind Gust
20
15
10
5
0
32
24
16
8
0
Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
in/hr
mm/hr
Rainfall Rate
0.10
0.05
0.00
2.5
1.3
0.0
Weather Underground
wunderground.com

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

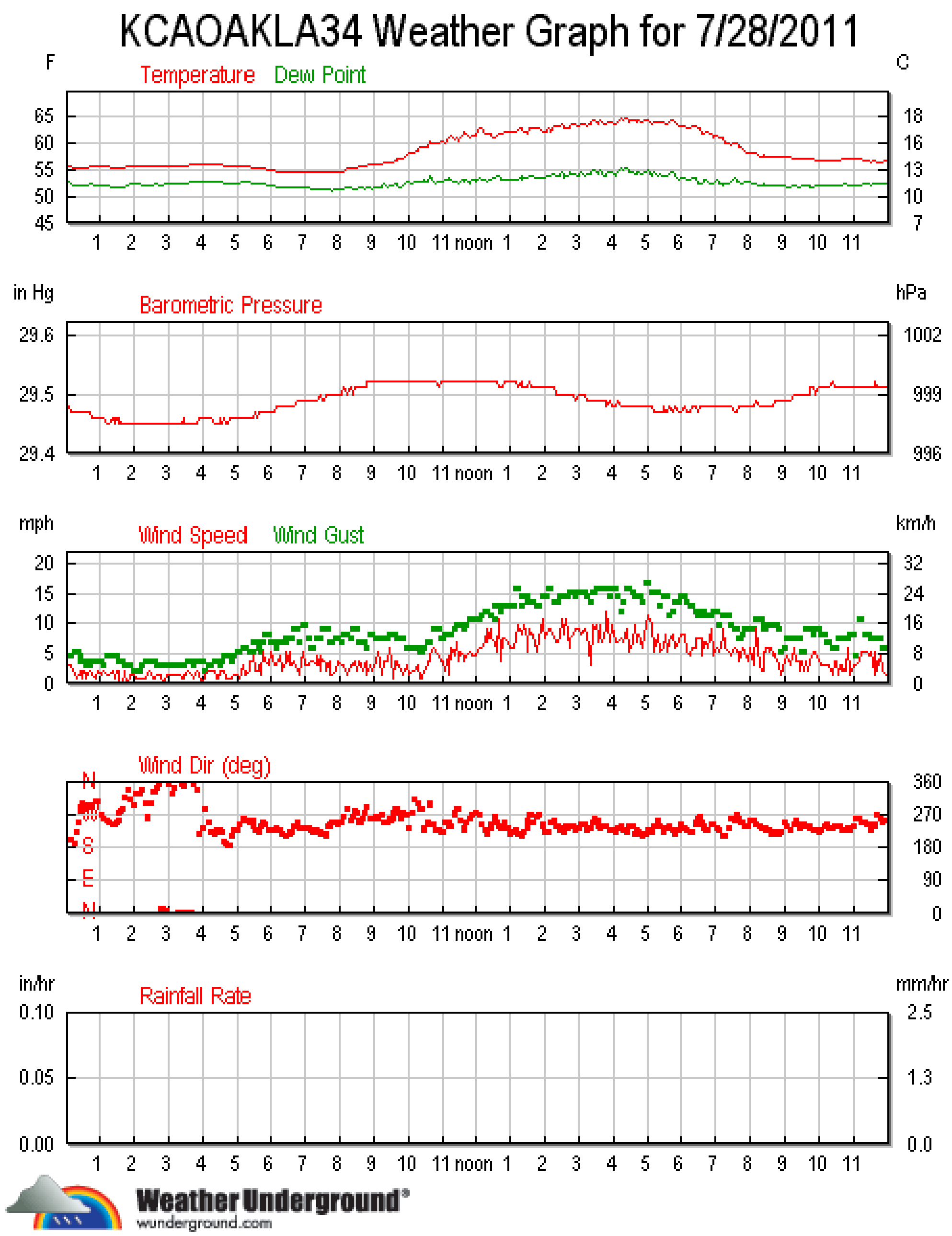
« Previous Day | July | 28 | 2011 | View | Next Day »

□□ily Weekly Monthly Yearly Custom

	Current:	High:	Low:	Average:
Temperature:	□□□ °F	□□□ °F	□□□ °F	□□□ °F
Dew Point:	□□□ °F	□□□ °F	□□□ °F	□□□ °F
Humidity:	75%	90%	70%	81%
Wind Speed:	□□mph	□□□mph	-	□□mph
Wind Gust:	□□mph	□□□mph	-	-
Wind:	SW	-	-	WSW
Pressure:	□□□□in	□□□□in	□□□□in	-
Precipitation:	□□□in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	□□□ °F	□□□ °F	□□□ °F
Dew Point:	□□□ °F	□□□ °F	□□□ °F
Humidity:	93.0%	46.0%	77.5%
Wind Speed:	□□□mph from the SW	-	□□mph
Wind Gust:	□□□mph from the SSW	-	-
Wind:	-	-	SW
Pressure:	□□□□in	□□□□in	-
Precipitation:	□□□in		

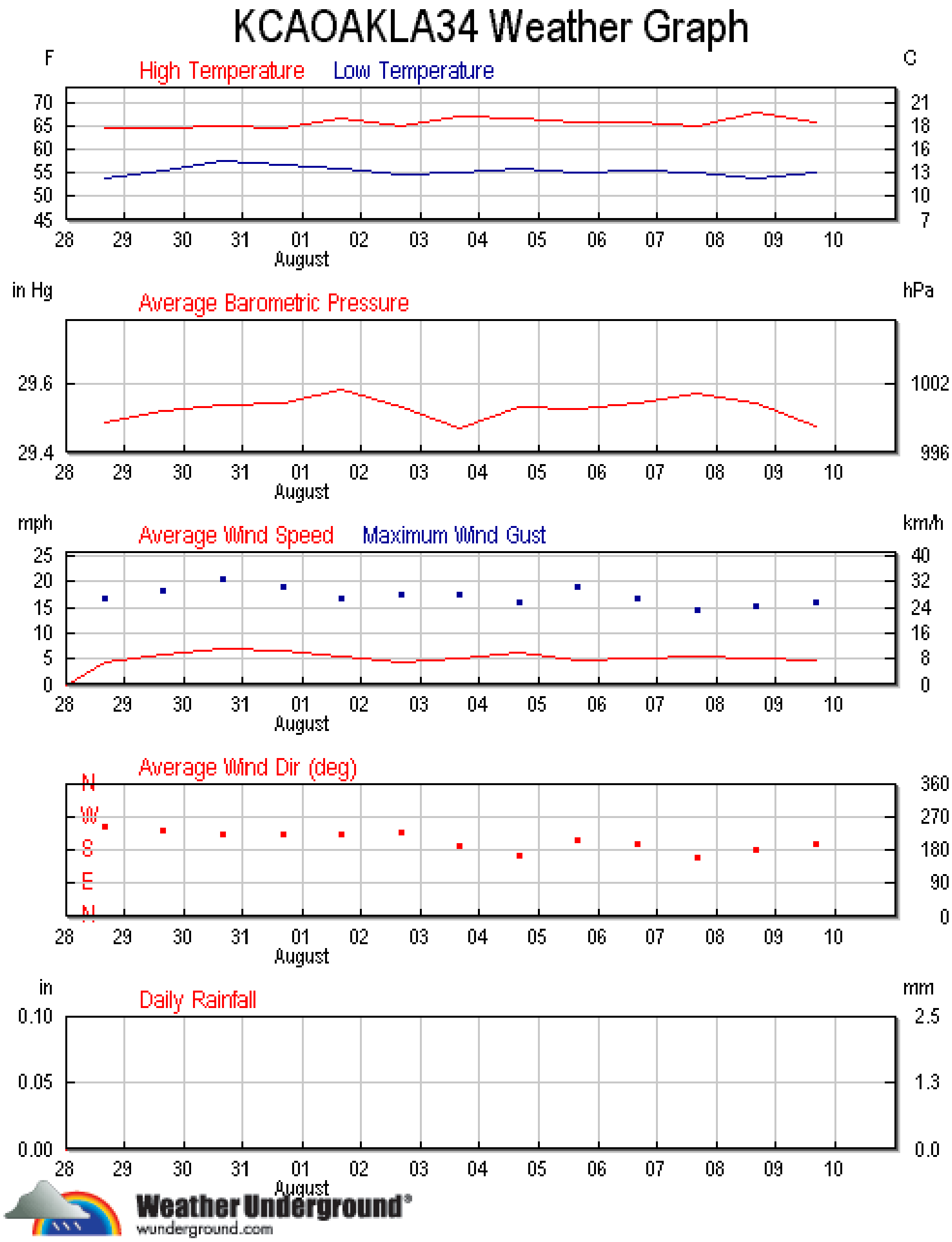

KCAOAKLA34 Weather Graph for 7/28/2011
F
C
Temperature
Dew Point
65 60 55 50 45
18 16 13 10 7
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in Hg
hPa
Barometric Pressure
29.6 29.5 29.4
1002 999 996
mph
km/h
Wind Speed
Wind Gust
20 15 10 5 0
32 24 16 8 0
Wind Dir (deg)
N
S
E
N
360 270 180 90 0
in/hr
mm/hr
Rainfall Rate
0.10 0.05 0.00
2.5 1.3 0.0
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=custom&month=7&day=28&year=2011&monthend=8&dayend=10&yearend=2011

July | 28 | 2011 - TO - August | 10 | 2011 Go

Daily Weekly Monthly Yearly C[illegible]sto[illegible]

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	90.0%	58.0%	77.6%
Wind Speed:	[illegible]mph from the WSW	-	[illegible]mph
Wind Gust:	[illegible]mph from the WSW	-	-
Wind:	-	-	SSW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		


KCAOAKLA34 Weather Graph
F
C
High Temperature
Low Temperature
70
65
60
55
50
45
21
18
16
13
10
7
28
29
30
31
01
August
02
03
04
05
06
07
08
09
10
in Hg
hPa
Average Barometric Pressure
29.6
29.4
1002
996
mph
km/h
Average Wind Speed
Maximum Wind Gust
25
20
15
10
5
0
40
32
24
16
8
0
Average Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
in
mm
Daily Rainfall
0.10
0.05
0.00
2.5
1.3
0.0
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day&month=8&day=10&year=2011

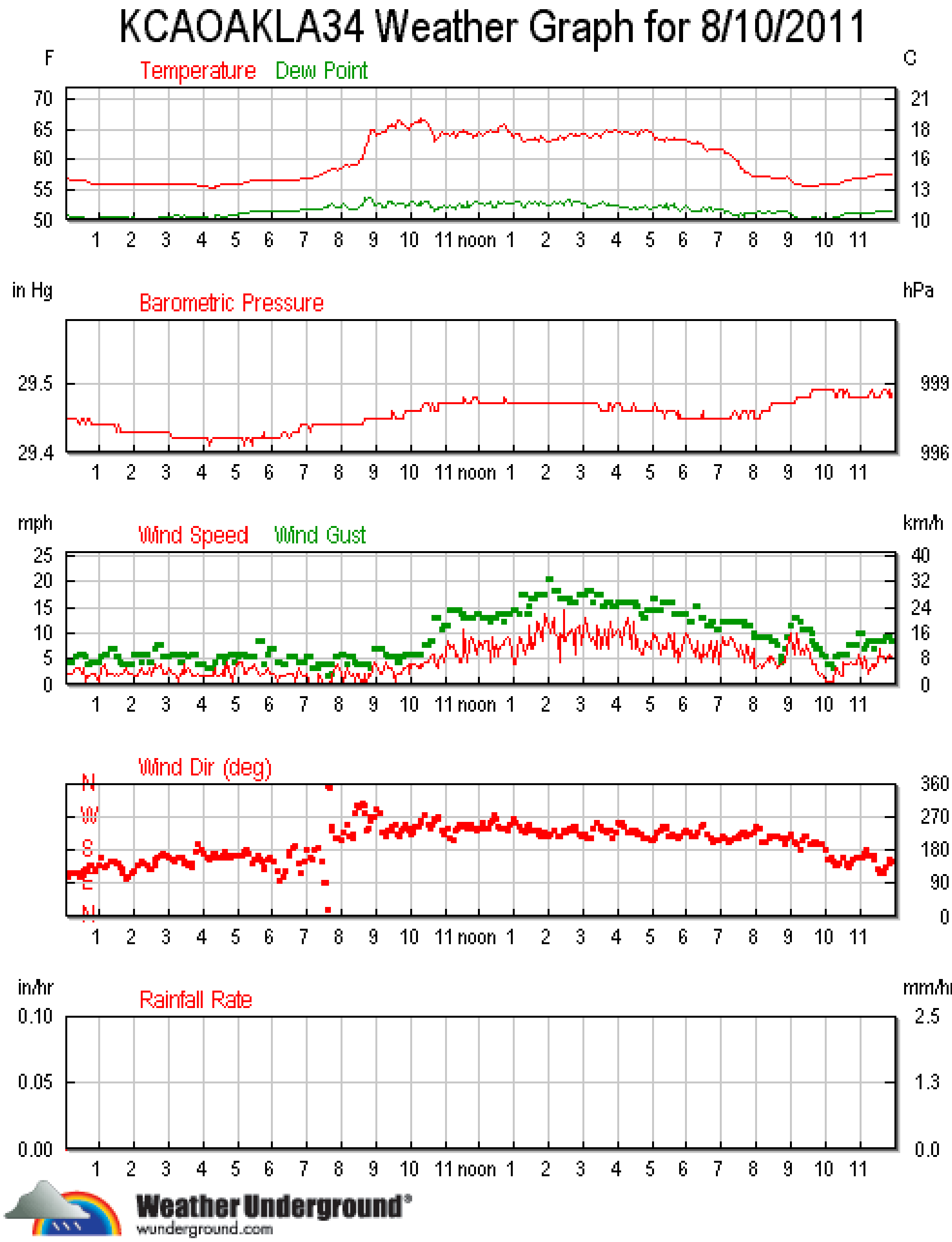
« Previous Day | August | 10 | 2011 | View | Next Day »

[illegible]ily Weekly Monthly Yearly Custom

	Current:	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	75%	84%	62%	75%
Wind Speed:	[illegible]mph	[illegible]mph	-	[illegible]mph
Wind Gust:	[illegible]mph	[illegible]mph	-	-
Wind:	SW	-	-	SW
Pressure:	[illegible]in	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	90.0%	48.0%	76.2%
Wind Speed:	[illegible]mph from the SW	-	[illegible]mph
Wind Gust:	[illegible]mph from the SW	-	-
Wind:	-	-	SSW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		

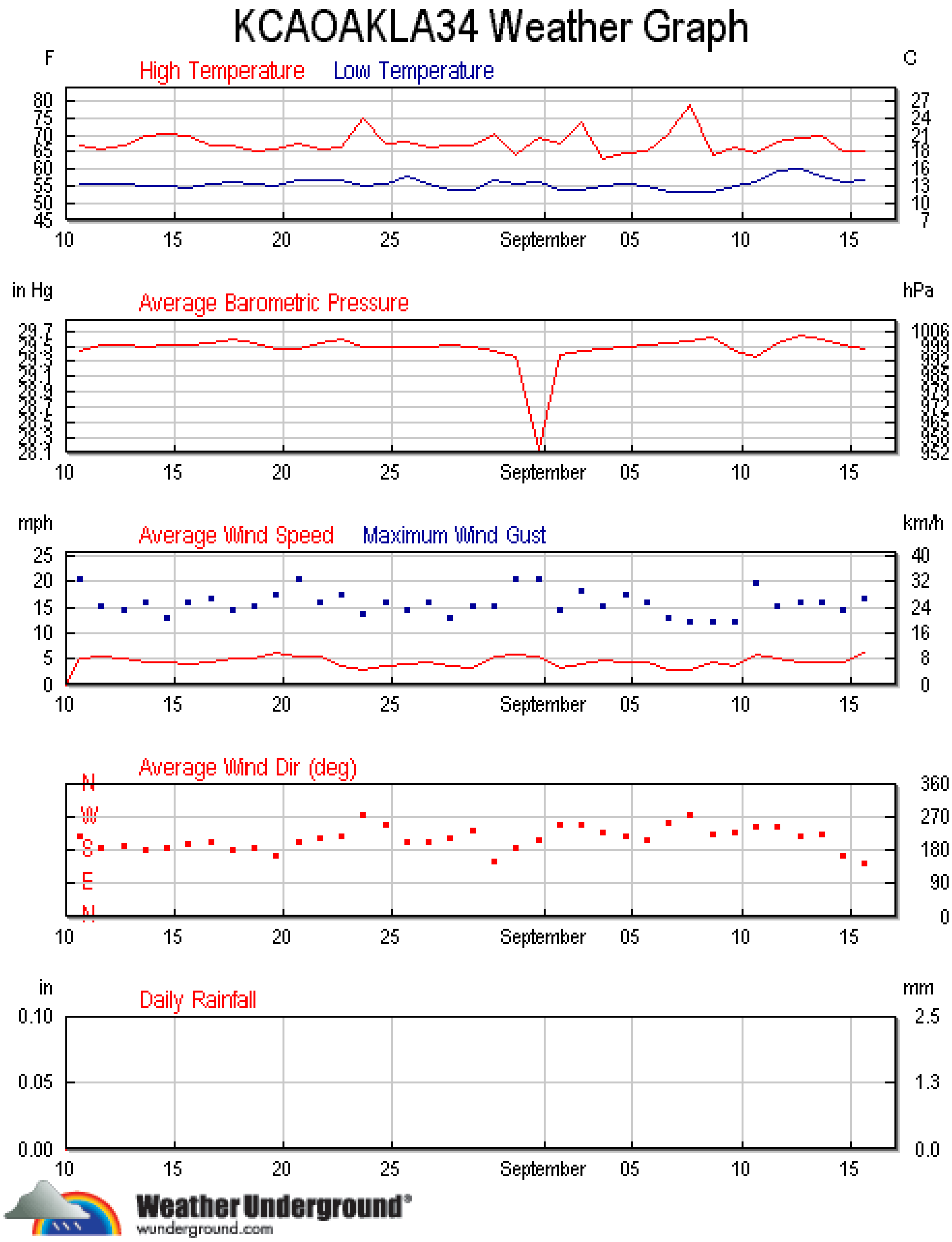

KCAOAKLA34 Weather Graph for 8/10/2011
F
Temperature
Dew Point
C
70 65 60 55 50
21 18 16 13 10
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in Hg
Barometric Pressure
hPa
29.5 29.4
999 996
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
mph
Wind Speed
Wind Gust
km/h
25 20 15 10 5 0
40 32 24 16 8 0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
Wind Dir (deg)
N W S E N
360 270 180 90 0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in/hr
Rainfall Rate
mm/hr
0.10 0.05 0.00
2.5 1.3 0.0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
Weather Underground®
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=custom&month=8&day=10&year=2011&monthend=9&dayend=16&yearend=2011

August 10 2011 - TO - September 16 2011 Go

Daily Weekly Monthly Yearly C[illegible]sto[illegible]

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	90.0%	43.0%	76.1%
Wind Speed:	[illegible] mph from the SW	-	[illegible] mph
Wind Gust:	[illegible] mph from the SW	-	-
Wind:	-	-	SSW
Pressure:	[illegible] in	[illegible] in	-
Precipitation:	[illegible] in		


KCAOAKLA34 Weather Graph
F
C
High Temperature
Low Temperature
in Hg
hPa
Average Barometric Pressure
mph
km/h
Average Wind Speed
Maximum Wind Gust
Average Wind Dir (deg)
in
mm
Daily Rainfall
10
15
20
25
September
05
10
15
Weather Underground
wunderground.com

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

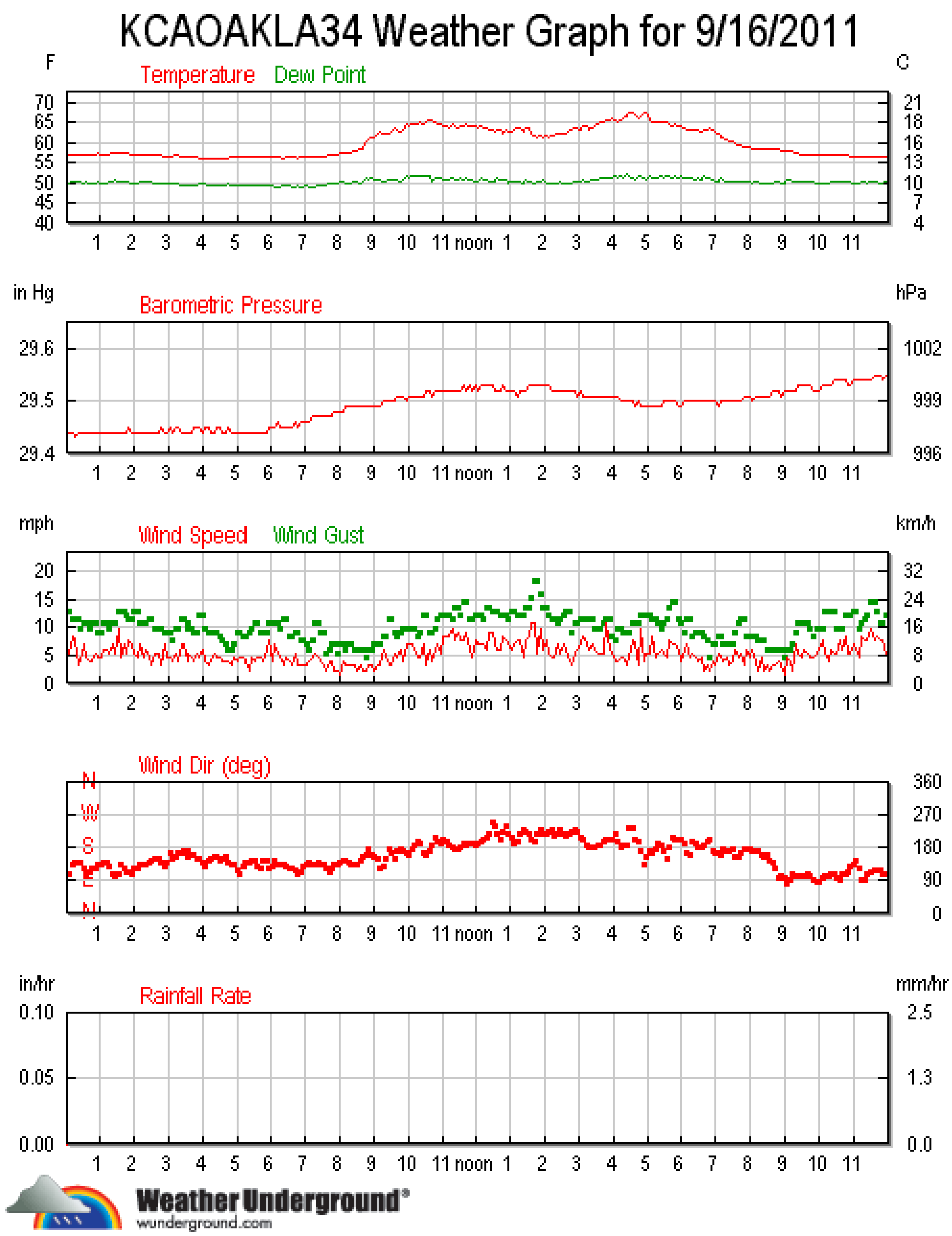
« Previous Day | September | 16 | 2011 | View | Next Day »

[illegible]ily Weekly Monthly Yearly Custom

	Current:	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	76%	79%	57%	71%
Wind Speed:	[illegible]mph	[illegible]mph	-	[illegible]mph
Wind Gust:	[illegible]mph	[illegible]mph	-	-
Wind:	SSW	-	-	SSE
Pressure:	[illegible]in	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	98.0%	35.0%	74.9%
Wind Speed:	[illegible]mph from the WSW	-	[illegible]mph
Wind Gust:	[illegible]mph from the SW	-	-
Wind:	-	-	SW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		

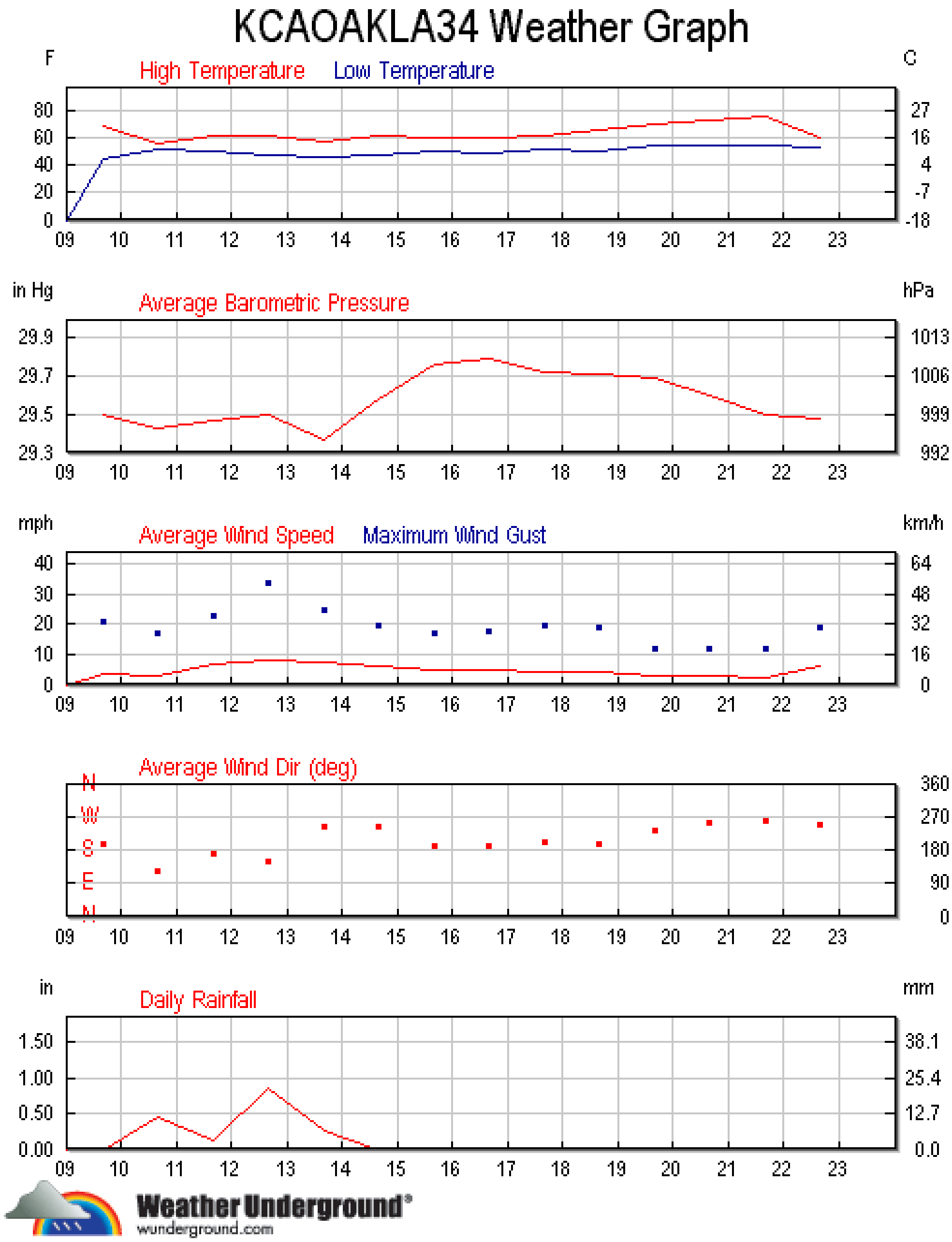

KCAOAKLA34 Weather Graph for 9/16/2011
F
C
Temperature
Dew Point
70
65
60
55
50
45
40
21
18
16
13
10
7
4
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in Hg
hPa
Barometric Pressure
29.6
29.5
29.4
1002
999
996
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
mph
km/h
Wind Speed
Wind Gust
20
15
10
5
0
32
24
16
8
0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in/hr
mm/hr
Rainfall Rate
0.10
0.05
0.00
2.5
1.3
0.0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=custom&month=4&day=9&year=2012&monthend=4&dayend=23&yearend=2012

April 9 2012 - TO - April 23 2012 Go

Daily Weekly Monthly Yearly C[illegible]sto[illegible]

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	99.0%	16.0%	76.0%
Wind Speed:	[illegible]mph from the SSE	-	[illegible]mph
Wind Gust:	[illegible]mph from the SSE	-	-
Wind:	-	-	SSW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		


KCAOAKLA34 Weather Graph
F
C
High Temperature
Low Temperature
80
60
40
20
0
27
16
4
-7
-18
in Hg
hPa
Average Barometric Pressure
29.9
29.7
29.5
29.3
1013
1006
999
992
mph
km/h
Average Wind Speed
Maximum Wind Gust
40
30
20
10
0
64
48
32
16
0
Average Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
in
mm
Daily Rainfall
1.50
1.00
0.50
0.00
38.1
25.4
12.7
0.0
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day&month=4&day=23&year=2012

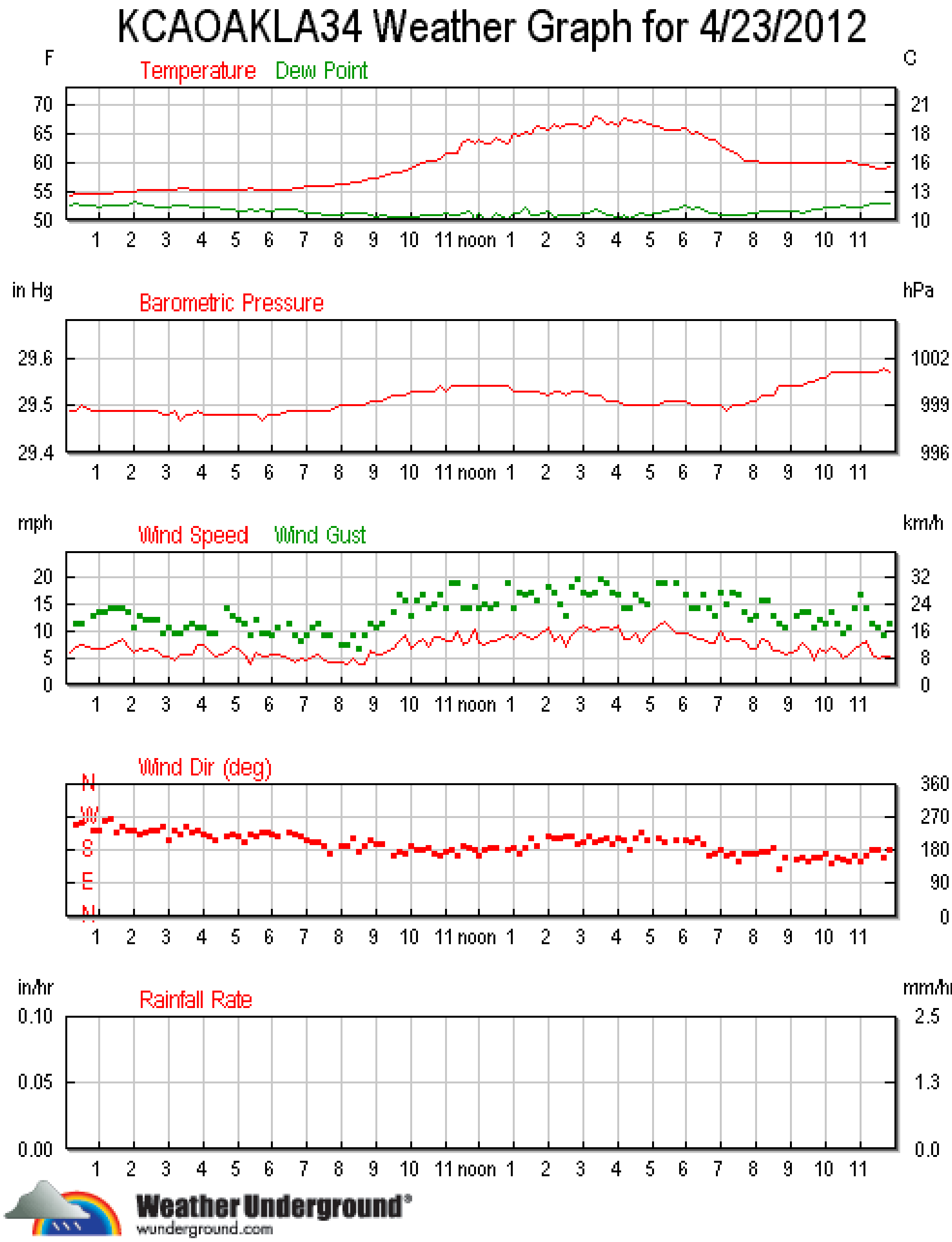
« Previous Day | April | 23 | 2012 | View | Next Day »

□□ily | Weekly | Monthly | Yearly | Custom

	Current:	High:	Low:	Average:
Temperature:	□□□ °F	□□□ °F	□□□ °F	□□□ °F
Dew Point:	□□□ °F	□□□ °F	□□□ °F	□□□ °F
Humidity:	76%	94%	54%	75%
Wind Speed:	□□mph	□□□mph	-	□□mph
Wind Gust:	□□mph	□□□mph	-	-
Wind:	SSW	-	-	SSW
Pressure:	□□□□□in	□□□□□in	□□□□□in	-
Precipitation:	□□□□in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	□□□ °F	□□□ °F	□□□ °F
Dew Point:	□□□ °F	□□□ °F	□□□ °F
Humidity:	99.0%	16.0%	71.5%
Wind Speed:	□□□mph from the SSE	-	□□mph
Wind Gust:	□□□mph from the SSE	-	-
Wind:	-	-	SW
Pressure:	□□□□□in	□□□□□in	-
Precipitation:	□□□□in		

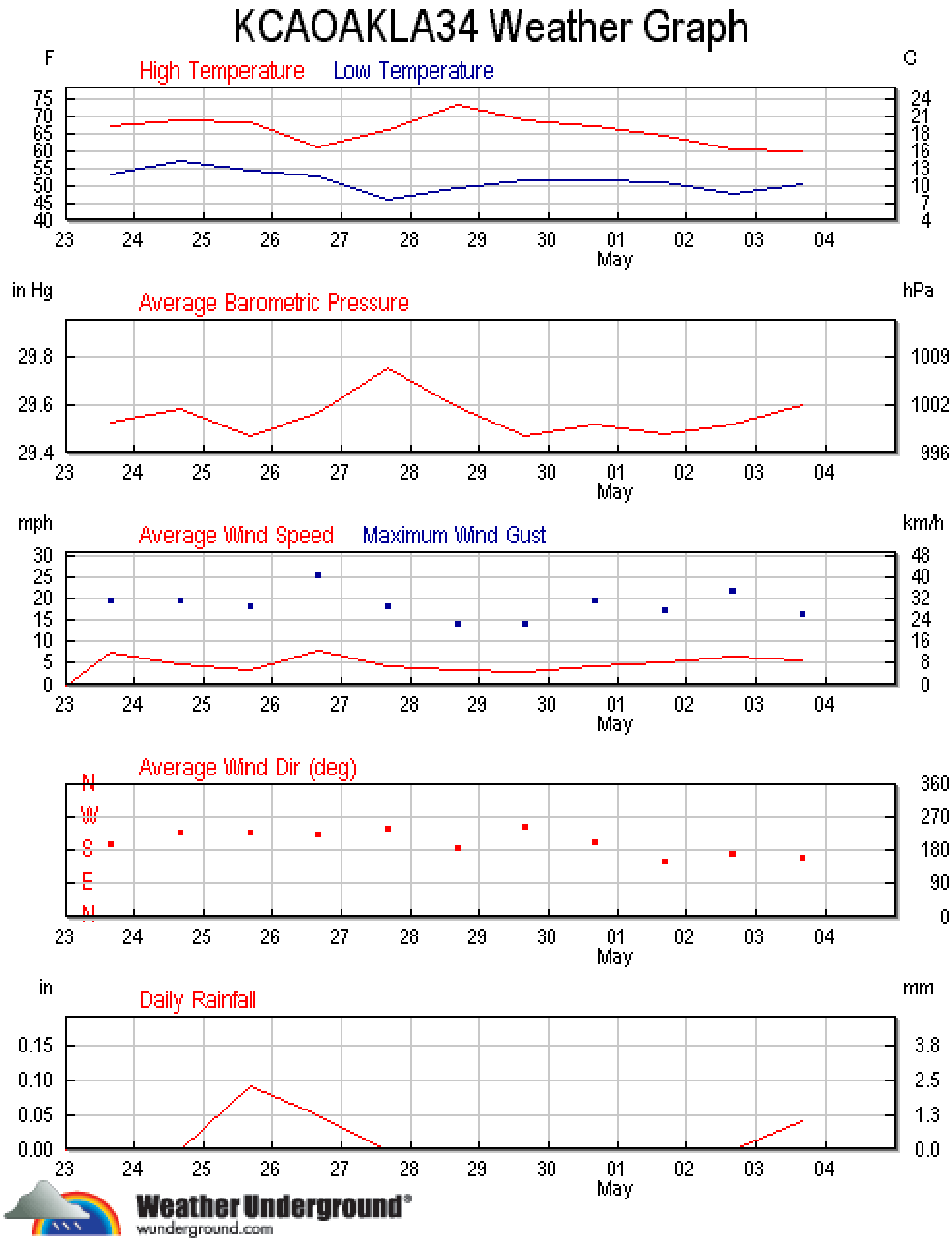

KCAOAKLA34 Weather Graph for 4/23/2012
F
Temperature Dew Point
C
70
65
60
55
50
21
18
16
13
10
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in Hg
Barometric Pressure
hPa
29.6
29.5
29.4
1002
999
996
mph
Wind Speed Wind Gust
km/h
20
15
10
5
0
32
24
16
8
0
Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
in/hr
Rainfall Rate
mm/hr
0.10
0.05
0.00
2.5
1.3
0.0
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=custom&month=4&day=23&year=2012&monthend=5&dayend=4&yearend=2012

April | 23 | 2012 - TO - May | 4 | 2012 | Go

Daily Weekly Monthly Yearly C[illegible]sto[illegible]

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	96.0%	41.0%	72.2%
Wind Speed:	[illegible]mph from the SW	-	[illegible]mph
Wind Gust:	[illegible]mph from the SW	-	-
Wind:	-	-	SSW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		


KCAOAKLA34 Weather Graph
F
C
High Temperature
Low Temperature
Average Barometric Pressure
in Hg
hPa
Average Wind Speed
Maximum Wind Gust
mph
km/h
Average Wind Dir (deg)
Daily Rainfall
in
mm
May
Weather Underground
wunderground.com

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

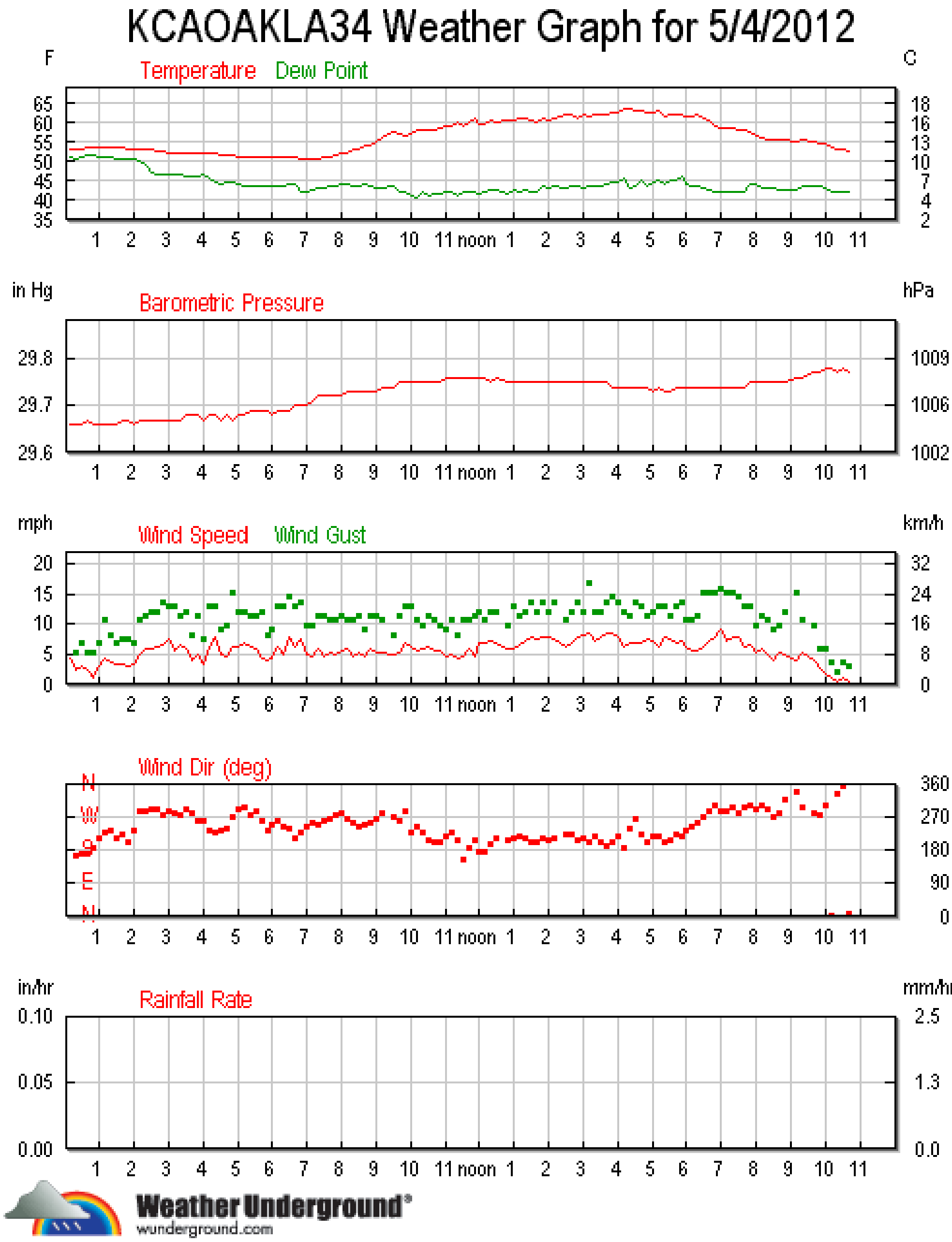
« Previous Day | May | 4 | 2012 | View | Next Day »

[illegible]ily Weekly Monthly Yearly Custom

	Current:	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	76%	93%	47%	65%
Wind Speed:	[illegible]mph	[illegible]mph	-	[illegible]mph
Wind Gust:	[illegible]mph	[illegible]mph	-	-
Wind:	SSW	-	-	WSW
Pressure:	[illegible]in	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	99.0%	12.0%	73.2%
Wind Speed:	[illegible]mph from the SW	-	[illegible]mph
Wind Gust:	[illegible]mph from the NW	-	-
Wind:	-	-	SW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		

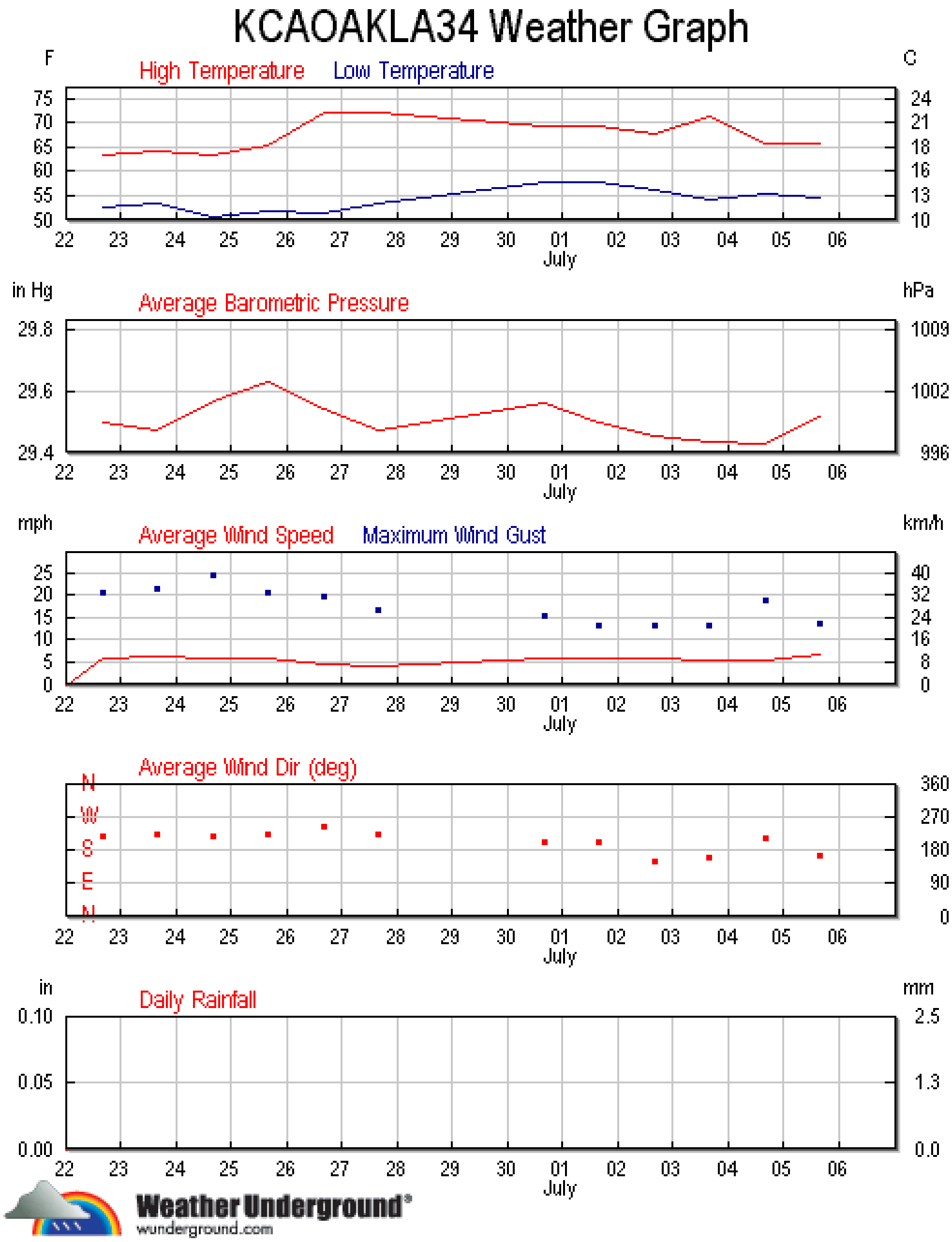

KCAOAKLA34 Weather Graph for 5/4/2012
F
C
Temperature
Dew Point
Barometric Pressure
in Hg
hPa
Wind Speed
Wind Gust
mph
km/h
Wind Dir (deg)
Rainfall Rate
in/hr
mm/hr
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=custom&month=6&day=22&year=2012&monthend=7&dayend=6&yearend=2012

June 22 2012 - TO - July 6 2012 Go

Daily Weekly Monthly Yearly **C□sto□**

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	96.0%	50.0%	75.5%
Wind Speed:	[illegible] mph from the SSW	-	[illegible] mph
Wind Gust:	[illegible] mph from the SW	-	-
Wind:	-	-	SSW
Pressure:	[illegible] in	[illegible] in	-
Precipitation:	[illegible] in		


KCAOAKLA34 Weather Graph
F
C
High Temperature
Low Temperature
75 70 65 60 55 50
24 21 18 16 13 10
22 23 24 25 26 27 28 29 30 01 02 03 04 05 06
July
in Hg
hPa
Average Barometric Pressure
29.8 29.6 29.4
1009 1002 996
mph
km/h
Average Wind Speed
Maximum Wind Gust
25 20 15 10 5 0
40 32 24 16 8 0
Average Wind Dir (deg)
N W S E N
360 270 180 90 0
in
mm
Daily Rainfall
0.10 0.05 0.00
2.5 1.3 0.0
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAOAKLA34&graphspan=day&month=7&day=5&year=2012

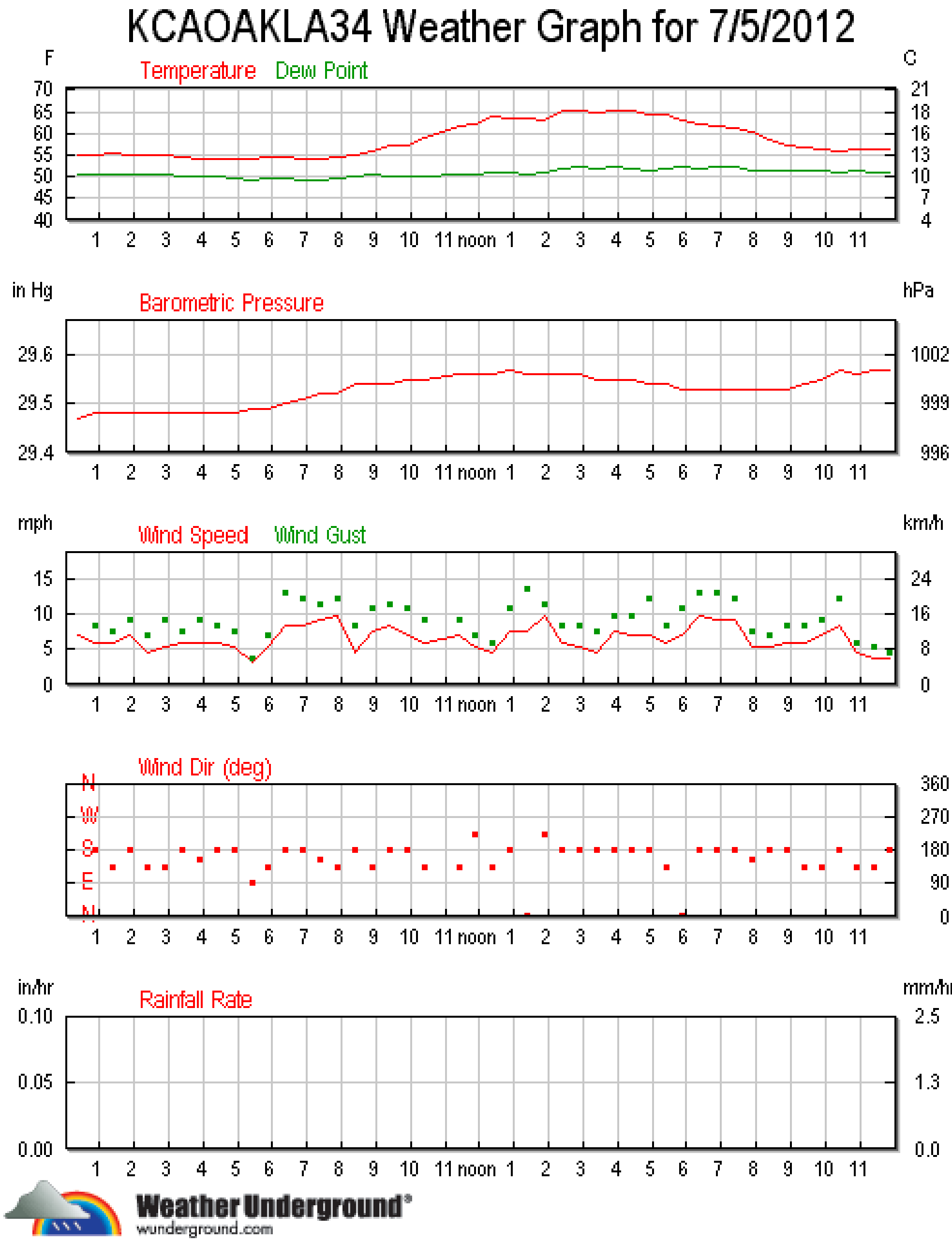
« Previous Day | July | 5 | 2012 | View | Next Day »

□□ily Weekly Monthly Yearly Custom

	Current:	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	72%	86%	62%	76%
Wind Speed:	[illegible]mph	[illegible]mph	-	[illegible]mph
Wind Gust:	[illegible]mph	[illegible]mph	-	-
Wind:	SSW	-	-	SSE
Pressure:	[illegible]in	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	96.0%	49.0%	78.5%
Wind Speed:	[illegible]mph from the SW	-	[illegible]mph
Wind Gust:	[illegible]mph from the SSW	-	-
Wind:	-	-	SSW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		


KCAOAKLA34 Weather Graph for 7/5/2012
F
C
Temperature
Dew Point
in Hg
hPa
Barometric Pressure
mph
km/h
Wind Speed
Wind Gust
Wind Dir (deg)
in/hr
mm/hr
Rainfall Rate
Weather Underground
wunderground.com

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

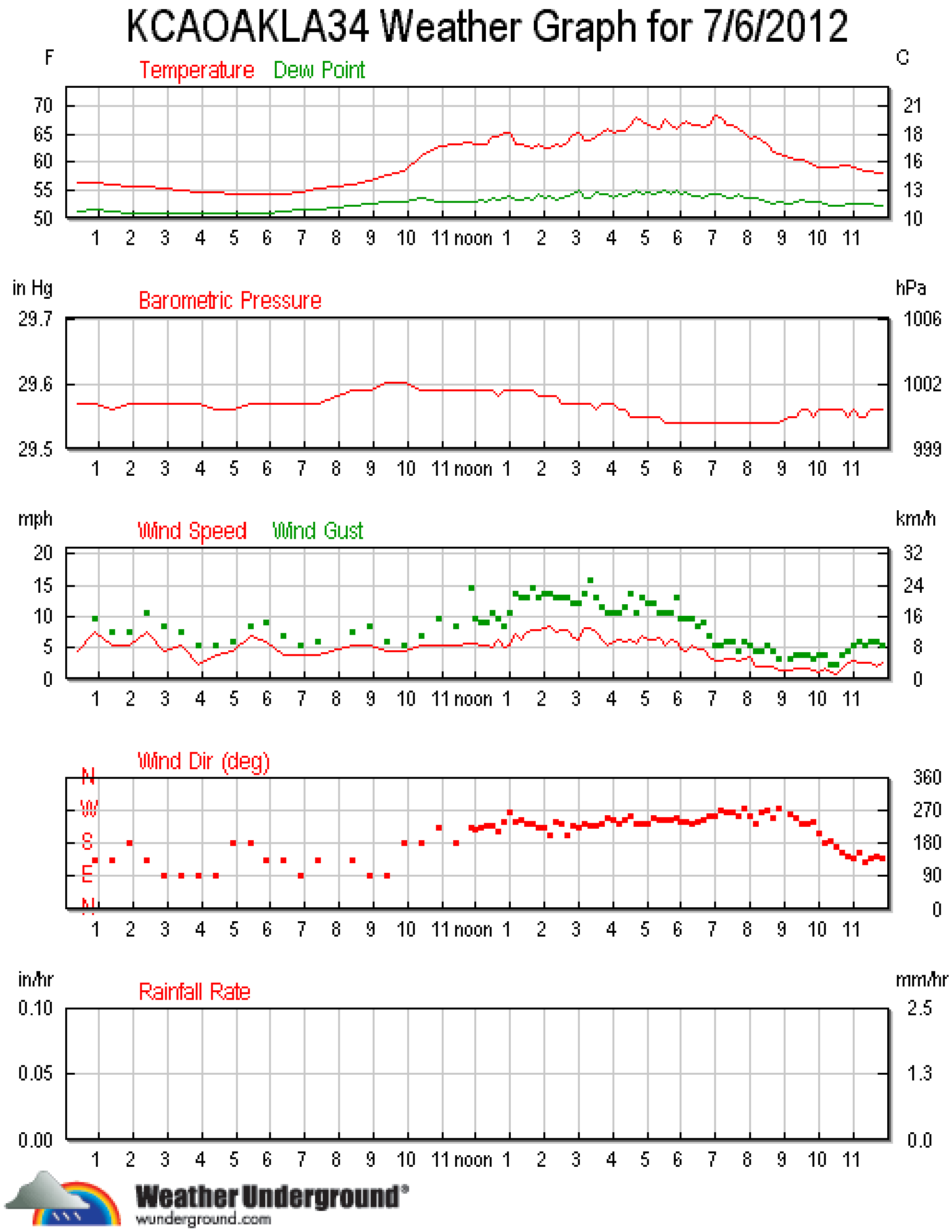
« Previous Day | July | 6 | 2012 | View | Next Day »

□□ily | Weekly | Monthly | Yearly | Custom

	Current:	High:	Low:	Average:
Temperature:	□□□ °F	□□□ °F	□□□ °F	□□□ °F
Dew Point:	□□□ °F	□□□ °F	□□□ °F	□□□ °F
Humidity:	72%	90%	61%	73%
Wind Speed:	□□mph	□□mph	-	□□mph
Wind Gust:	□□mph	□□□mph	-	-
Wind:	SSW	-	-	SW
Pressure:	□□□□□in	□□□□□in	□□□□□in	-
Precipitation:	□□□□in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	□□□ °F	□□□ °F	□□□ °F
Dew Point:	□□□ °F	□□□ °F	□□□ °F
Humidity:	96.0%	49.0%	78.5%
Wind Speed:	□□□mph from the SW	-	□□mph
Wind Gust:	□□□mph from the SSW	-	-
Wind:	-	-	SSW
Pressure:	□□□□□in	□□□□□in	-
Precipitation:	□□□□in		

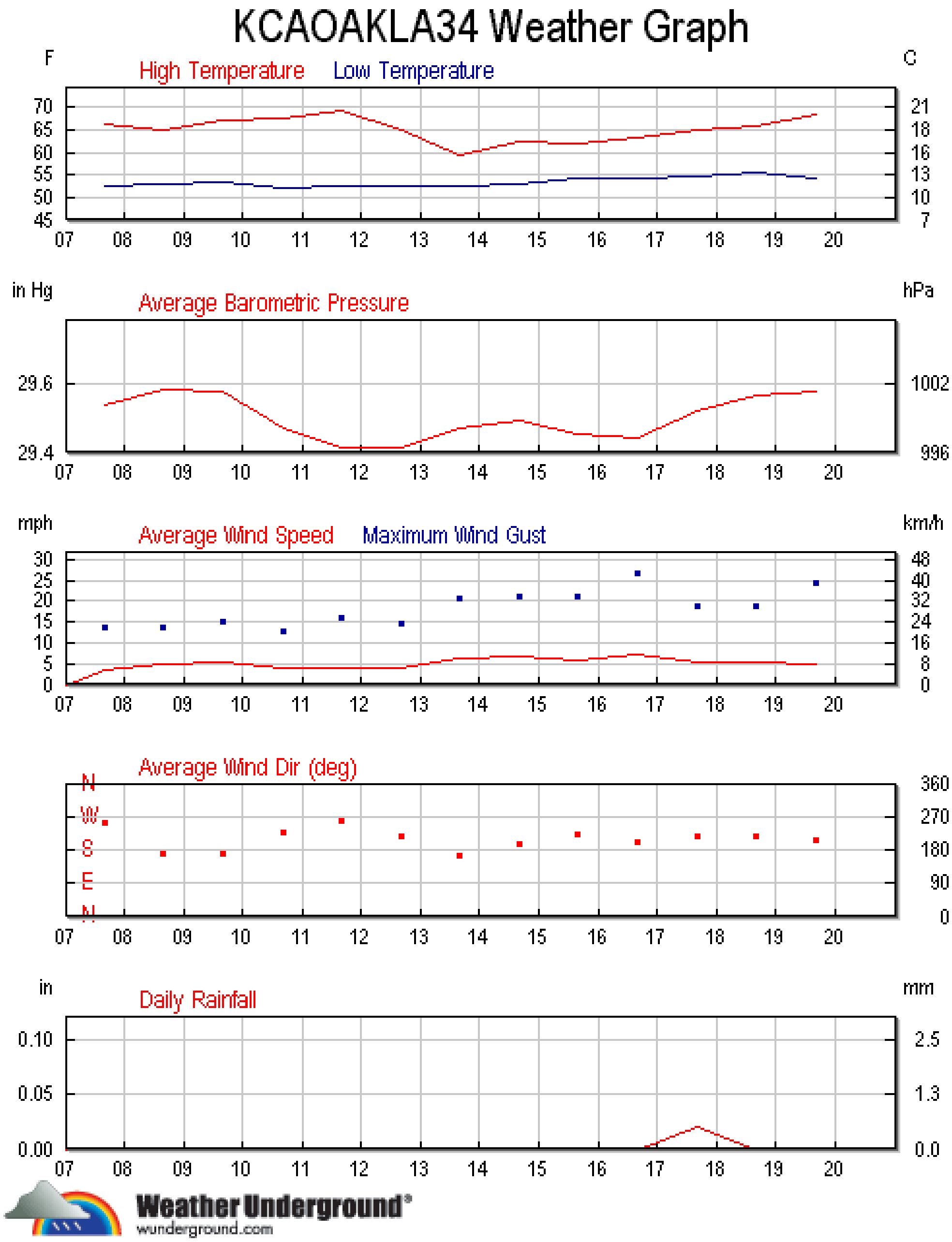

KCAOAKLA34 Weather Graph for 7/6/2012
F
C
Temperature
Dew Point
70
65
60
55
50
21
18
16
13
10
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in Hg
hPa
Barometric Pressure
29.7
29.6
29.5
1006
1002
999
mph
km/h
Wind Speed
Wind Gust
20
15
10
5
0
32
24
16
8
0
Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
in/hr
mm/hr
Rainfall Rate
0.10
0.05
0.00
2.5
1.3
0.0
Weather Underground
wunderground.com

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

July 7 2012 - TO - July 20 2012 Go

Daily Weekly Monthly Yearly C□sto□

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	94.0%	49.0%	79.5%
Wind Speed:	[illegible] mph from the SW	-	[illegible] mph
Wind Gust:	[illegible] mph from the SSW	-	-
Wind:	-	-	SSW
Pressure:	[illegible] in	[illegible] in	-
Precipitation:	[illegible] in		


KCAOAKLA34 Weather Graph
F
C
High Temperature
Low Temperature
70
65
60
55
50
45
21
18
16
13
10
7
07 08 09 10 11 12 13 14 15 16 17 18 19 20
in Hg
hPa
Average Barometric Pressure
29.6
29.4
1002
996
07 08 09 10 11 12 13 14 15 16 17 18 19 20
mph
km/h
Average Wind Speed
Maximum Wind Gust
30
25
20
15
10
5
0
48
40
32
24
16
8
0
07 08 09 10 11 12 13 14 15 16 17 18 19 20
Average Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
07 08 09 10 11 12 13 14 15 16 17 18 19 20
in
mm
Daily Rainfall
0.10
0.05
0.00
2.5
1.3
0.0
07 08 09 10 11 12 13 14 15 16 17 18 19 20
Weather Underground
wunderground.com

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

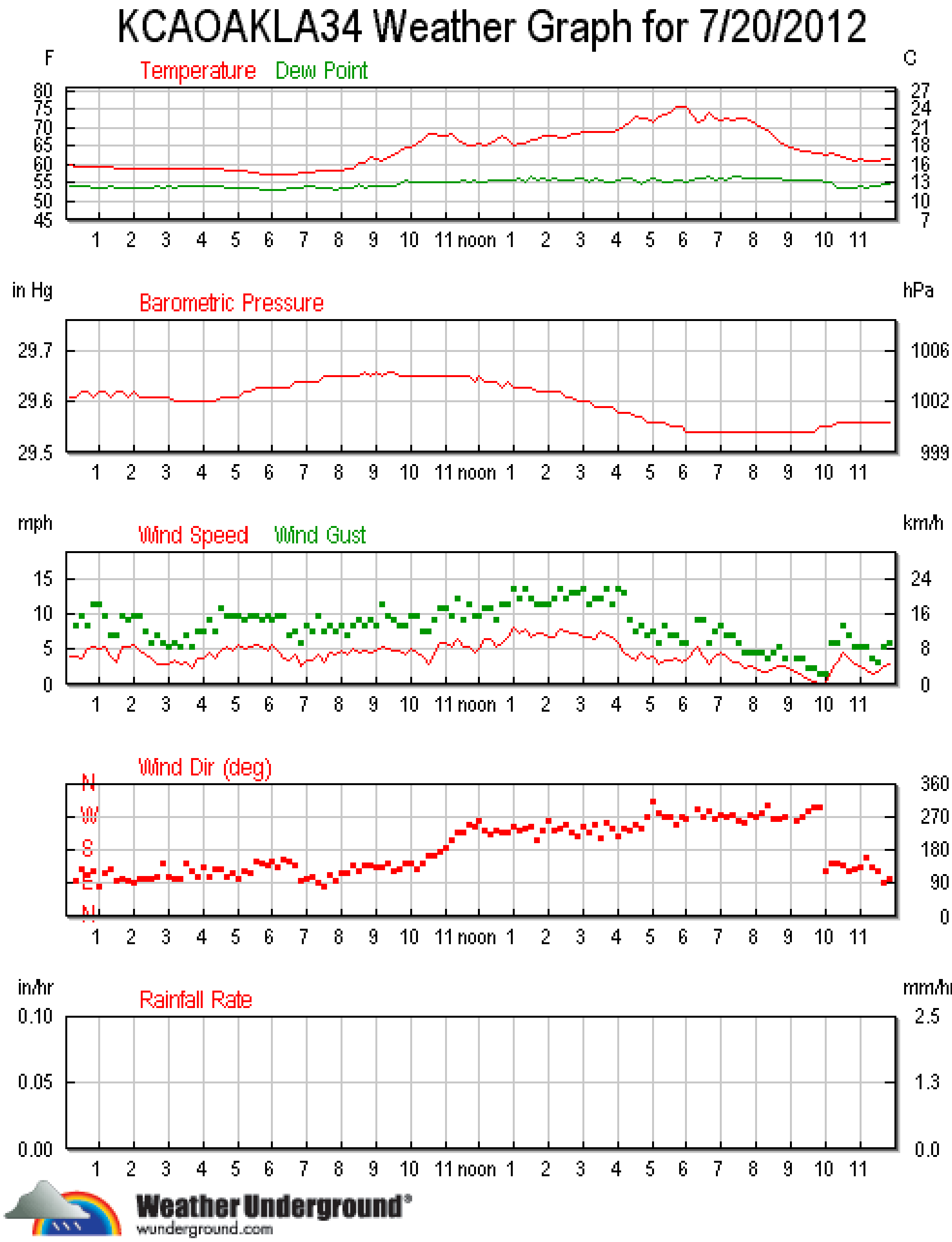
« Previous Day July 20 2012 View Next Day »

[illegible]ily Weekly Monthly Yearly Custom

	Current:	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	72%	87%	49%	73%
Wind Speed:	[illegible]mph	[illegible]mph	-	[illegible]mph
Wind Gust:	[illegible]mph	[illegible]mph	-	-
Wind:	SSW	-	-	South
Pressure:	[illegible]in	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	[illegible] °F	[illegible] °F	[illegible] °F
Dew Point:	[illegible] °F	[illegible] °F	[illegible] °F
Humidity:	96.0%	49.0%	78.5%
Wind Speed:	[illegible]mph from the SW	-	[illegible]mph
Wind Gust:	[illegible]mph from the SSW	-	-
Wind:	-	-	SSW
Pressure:	[illegible]in	[illegible]in	-
Precipitation:	[illegible]in		


KCAOAKLA34 Weather Graph for 7/20/2012
Temperature
Dew Point
Barometric Pressure
Wind Speed
Wind Gust
Wind Dir (deg)
Rainfall Rate
Weather Underground
wunderground.com

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,

Kyle Vagadori

Kyle Vagadori
Project Manager

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 CALIFORNIA LINEN RENTAL CO. OAKLAND
DATE RECEIVED:	08/04/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/17/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda d. Fruman DATE: 08/17/11

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

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

Laboratory Services Since 1989

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	*TO-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
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

Laboratory Services Since 1989

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

Client Sample ID: SG61

Lab ID#: 1108117A-01A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.058	0.24	4.5	18

Client Sample ID: SG62

Lab ID#: 1108117A-02A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.70	2.9	390	1600

Client Sample ID: SG63

Lab ID#: 1108117A-03A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.068	0.28	5.6	23

Client Sample ID: SG64

Lab ID#: 1108117A-04A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.11	0.46	75	310

Client Sample ID: SG65

Lab ID#: 1108117A-05A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	1.2	5.0

Client Sample ID: SG66

Lab ID#: 1108117A-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: 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:	**d080807**	**Date of Collection:**	**7/28/11 3:15:00 PM**
Dil. Factor:	**2.30**	**Date of Analysis:**	**8/8/11 11:22 AM**

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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	95	75-150

Air Toxics LTD.
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Client Sample ID: SG62

Lab ID#: 1108117A-02A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080813**	**Date of Collection:**	**7/28/11 12:58:00 PM**
Dil. Factor:	**28.0**	**Date of Analysis:**	**8/8/11 03:19 PM**

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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	106	75-150

Client Sample ID: SG63

Lab ID#: 1108117A-03A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080809**	**Date of Collection: 7/28/11 3:16:00 PM**
Dil. Factor:	**2.70**	**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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	93	75-150

Client Sample ID: SG64

Lab ID#: 1108117A-04A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080812**	**Date of Collection: 7/27/11 4:33:00 PM**
Dil. Factor:	**4.52**	**Date of Analysis: 8/8/11 02:33 PM**

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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	99	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG65

Lab ID#: 1108117A-05A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080811**	**Date of Collection:**	**7/27/11 3:21:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**8/8/11 01:48 PM**

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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	98	75-150

Client Sample ID: SG66

Lab ID#: 1108117A-06A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080814**	**Date of Collection: 7/27/11 4:55:00 PM**
Dil. Factor:	**7.05**	**Date of Analysis: 8/8/11 04:07 PM**

Compound	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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	104	75-150

Client Sample ID: SG67

Lab ID#: 1108117A-07A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080815**	**Date of Collection: 7/27/11 2:45:00 PM**
Dil. Factor:	**2.48**	**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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	100	75-150

Client Sample ID: SG67 DUP

Lab ID#: 1108117A-08A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080816**	**Date of Collection:**	**7/27/11 2:45:00 PM**
Dil. Factor:	**2.46**	**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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	103	75-150

Client Sample ID: Lab Blank

Lab ID#: 1108117A-09A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080804**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/8/11 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 Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	104	75-150

Client Sample ID: LCS

Lab ID#: 1108117A-10A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080802**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/8/11 07:33 AM**

Compound	**%Recovery**
TPH (Gasoline Range)	101

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Fluorobenzene (FID)	105	75-150

Client Sample ID: LCSD

Lab ID#: 1108117A-10AA

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d080819**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/8/11 07:23 PM**

Compound	%Recovery
TPH (Gasoline Range)	91

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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,

Kyle Vagadori
Project Manager

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 .FAX (916) 985-1020
Hours 6:30 A.M to 5:30 PST

Air Toxics LTD.
Laboratory Services Since 1989

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 CALIFORNIA LINEN RENTAL CO, OAKLAND
DATE RECEIVED:	08/04/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/17/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda L. Freeman   DATE: 08/17/11

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

Laboratory Services Since 1989

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

Laboratory Services Since 1989

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 (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (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

File Name:	**6080908**	**Date of Collection: 7/28/11 3:15:00 PM**
Dil. Factor:	**2.30**	**Date of Analysis: 8/9/11 11:13 AM**

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.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**6080824**	**Date of Collection: 7/28/11 12:58:00 PM**
Dil. Factor:	**504**	**Date of Analysis: 8/8/11 10:39 PM**

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.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
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

File Name:	**6080816**	**Date of Collection:**	**7/28/11 3:16:00 PM**
Dil. Factor:	**2.70**	**Date of Analysis:**	**8/8/11 05:47 PM**

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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**6080825**	**Date of Collection: 7/27/11 4:33:00 PM**
Dil. Factor:	**22.6**	**Date of Analysis: 8/8/11 11:12 PM**

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

Container Type: 1 Liter Summa Canister

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG65

Lab ID#: 1108117B-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6080820**	**Date of Collection: 7/27/11 3:21:00 PM**
Dil. Factor:	**2.42**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**6080821**	**Date of Collection:**	**7/27/11 4:55:00 PM**
Dil. Factor:	**7.05**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	6080822	Date of Collection:	7/27/11 2:45:00 PM
Dil. Factor:	2.48	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

Container Type: 1 Liter Summa Canister

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG67 DUP

Lab ID#: 1108117B-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6080823**	**Date of Collection:**	**7/27/11 2:45:00 PM**
Dil. Factor:	**2.46**	**Date of Analysis:**	**8/8/11 10:05 PM**

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

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1108117B-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6080808**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1108117B-09B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6080907**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**6080803**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**6080902**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/11 07:14 AM**

Compound	%Recovery
2-Propanol	91
Methyl tert-butyl ether	99
Benzene	99
Toluene	100
Ethyl Benzene	100
m,p-Xylene	98
o-Xylene	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**6080804**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/8/11 08:54 AM**

Compound	%Recovery
2-Propanol	92
Methyl tert-butyl ether	99
Benzene	97
Toluene	93
Ethyl Benzene	95
m,p-Xylene	96
o-Xylene	95

Container Type: NA - Not Applicable

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1108117B-11AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**6080805**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**6080903**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**6080904**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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,

Kyle Vagadori
Project Manager

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 .FAX (916) 985-1020
Hours 6:30 A.M to 5:30 PST

Air Toxics LTD.
Laboratory Services Since 1989

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Company, Oakland
DATE RECEIVED:	07/29/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/10/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda L. Freeman DATE: 08/10/11

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

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

Laboratory Services Since 1989

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG 62

Lab ID#: 1107500-01A

EPA METHOD TO-15 GC/MS

File Name:	**14073011**	**Date of Collection:**	**7/28/11 12:45:00 PM**
Dil. Factor:	**100**	**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 Tedlar 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:	**14073015**	**Date of Collection: 7/28/11 1:05:00 PM**
Dil. Factor:	**100**	**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 Tedlar Bag

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	92	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1107500-03A

EPA METHOD TO-15 GC/MS

File Name:	**14073006**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**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 Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	91	70-130

Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1107500-04A

EPA METHOD TO-15 GC/MS

File Name:	**14073002**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 7/30/11 08:35 AM**

Compound	%Recovery
2-Propanol	88

Container Type: NA - Not Applicable

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

Client Sample ID: LCS

Lab ID#: 1107500-05A

EPA METHOD TO-15 GC/MS

File Name:	**14073003**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 7/30/11 09:00 AM**

Compound	%Recovery
2-Propanol	76

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1107500-05AA

EPA METHOD TO-15 GC/MS

File Name:	**14073004**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 7/30/11 09:18 AM**

Compound	%Recovery
2-Propanol	75

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	98	70-130

Laboratory Services Since 1989

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,

Kyle Vagadori

Kyle Vagadori
Project Manager

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 .FAX (916) 985-1020
Hours 6:30 A.M to 5:30 PST

Air Toxics LTD.
Laboratory Services Since 1989

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. Oakland
DATE RECEIVED:	09/21/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	10/04/2011		
DATE REISSUED:	10/05/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SG 62A	Modified TO-3	5.5 "Hg	15 psi
02A	SG 62A-DUP	Modified TO-3	6.0 "Hg	15 psi
03A	SG 68	Modified TO-3	4.5 "Hg	15 psi
04A	SG 69	Modified TO-3	5.0 "Hg	15 psi
05A	SG 70	Modified TO-3	5.0 "Hg	15 psi
06A	SG 71	Modified TO-3	5.0 "Hg	15 psi
07A	SG 72	Modified TO-3	5.0 "Hg	15 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: Linda d. Freeman DATE: 10/05/11

Laboratory Director

Certfication 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

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	*TO-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
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

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (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:	**d092717**	**Date of Collection: 9/16/11 11:00:00 AM**
Dil. Factor:	**24.7**	**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 Summa Canister

Surrogates	**%Recovery**	**Method Limits**
Fluorobenzene (FID)	107	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG 62A-DUP

Lab ID#: 1109407AR1-02A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092718**	**Date of Collection:**	**9/16/11 11:00:00 AM**
Dil. Factor:	**6.72**	**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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	102	75-150

Client Sample ID: SG 68

Lab ID#: 1109407AR1-03A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	d092714	Date of Collection: 9/16/11 12:00:00 PM
Dil. Factor:	2.38	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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	106	75-150

Laboratory Services Since 1989

Client Sample ID: SG 69

Lab ID#: 1109407AR1-04A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092719**	**Date of Collection:**	**9/16/11 12:17:00 PM**
Dil. Factor:	**4.84**	**Date 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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	107	75-150

Client Sample ID: SG 70

Lab ID#: 1109407AR1-05A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092715**	**Date of Collection:**	**9/16/11 2:34:00 PM**
Dil. Factor:	**2.42**	**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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	105	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG 71

Lab ID#: 1109407AR1-06A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092720**	**Date of Collection: 9/16/11 2:27:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis: 9/27/11 08:57 PM**

Compound	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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	106	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG 72

Lab ID#: 1109407AR1-07A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092716**	**Date of Collection: 9/16/11 3:04:00 PM**
Dil. Factor:	**6.99**	**Date of Analysis: 9/27/11 05:42 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.17	0.71	3.2	13

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	105	75-150

Client Sample ID: Lab Blank

Lab ID#: 1109407AR1-08A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092707**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 9/27/11 11:03 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 Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	110	75-150

Client Sample ID: LCS

Lab ID#: 1109407AR1-09A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092702**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 9/27/11 07:21 AM**

Compound	%Recovery
TPH (Gasoline Range)	92

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	112	75-150

Client Sample ID: LCSD

Lab ID#: 1109407AR1-09AA

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d092703**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 9/27/11 07:54 AM**

Compound	%Recovery
TPH (Gasoline Range)	102

Container Type: NA - Not Applicable

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,

Kyle Vagadori
Project Manager

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 .FAX (916) 985-1020
Hours 6:30 A.M to 5:30 PST

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. Oakland
DATE RECEIVED:	09/21/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	09/25/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
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: Linda L. Freeman DATE: 09/25/11

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

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

Air Toxics LTD. Laboratory Services Since 1989

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

Laboratory Services Since 1989

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

Client Sample ID: SG 69

Lab ID#: 1109407B-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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG 62A

Lab ID#: 1109407B-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p092311**	**Date of Collection: 9/16/11 11:00:00 AM**
Dil. Factor:	**24.7**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**p092313**	**Date of Collection: 9/16/11 11:00:00 AM**
Dil. Factor:	**33.6**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**p092246**	**Date of Collection: 9/16/11 12:00:00 PM**
Dil. Factor:	**2.38**	**Date 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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**p092310**	**Date of Collection: 9/16/11 12:17:00 PM**
Dil. Factor:	**8.07**	**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

Container Type: 1 Liter Summa Canister

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

Laboratory Services Since 1989

Client Sample ID: SG 70

Lab ID#: 1109407B-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p092247**	**Date of Collection:**	**9/16/11 2:34:00 PM**
Dil. Factor:	**2.42**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**p092248**	**Date of Collection: 9/16/11 2:27:00 PM**
Dil. Factor:	**2.42**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**p092309**	**Date of Collection:**	**9/16/11 3:04:00 PM**
Dil. Factor:	**6.99**	**Date of Analysis:**	**9/24/11 10:11 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	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

Container Type: 1 Liter Summa Canister

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1109407B-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p092238**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date 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

Container Type: NA - Not Applicable

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

Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1109407B-08B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p092308**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date 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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**p092302**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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:	**p092230**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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:	**p092231**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**p092304**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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:	**p092305**	**Date of Collection: NA**
Dil. Factor:	**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

Container Type: NA - Not Applicable

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

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

Analytical Report

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

1109433

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES Michael Deschenes

NUMBER OF CONTAINERS | ANALYSIS(ES): DIFLUOROETHANE | PRESERVATIVE | REMARKS

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	DIFLUOROETHANE							PRESERVATIVE	REMARKS
SG62-A	9/16/11	1050	AIR	SHROUD	1	X							NONE	NORMAL TURN AROUND
SG69	"	1207	"	"	1	X							"	" " "

ICE/t° N/A
GOOD CONDITION ✓ APPROPRIATE
HEAD SPACE ABSENT ___ CONTAINERS ✓
DECHLORINATED IN LAB ___ PRESERVED IN LAB ___
PRESERVATION ___ VOAS | O&G | METALS | OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	
Michael Deschenes	9/16/11	1351	[signature]	Total No. of Samples (This Shipment): 2; Total No. of Containers (This Shipment): 2
[signature]	9/16	1623	[signature]	LABORATORY: McCAMPBELL ANALYTICAL; LABORATORY CONTACT: ANGELA RYDELIUS; LABORATORY PHONE NUMBER: (925) 252-9262
			RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: DIFLUOROETHANE WAS OUR TRACER GAS

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1109433 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co. Oakland

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **09/16/2011**
Date Printed: **09/16/2011**

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

Test Legend:

1	8260VOC_A(UG/M3)	2		3		4		5	
6		7		8		9		10	
11		12							

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.

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

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**

Checklist completed and reviewed by: Melissa Valles

WorkOrder N°: **1109433** Matrix: Air

Carrier: Benjamin Yslas (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp:		NA ☑
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☐	No ☑	

** NOTE: If the "No" box is checked, see comments below.*

Client contacted: Date contacted: Contacted by:

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

Volatile Organics by P&T and GC/MS (µg/m³)*

Extraction method: SW5030B Analytical methods: SW8260B Work Order: 1109433

Lab ID	Client ID	Matrix	1,1-Difluoroethane as Dichlorodifluoromethane	DF	% SS	Comments
001A	SG 62-A	A	51,000,000	2000	98	
002A	SG 69	A	26,000,000	5000	95	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit			
	A	250	µg/m³
	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

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 SW8260B

W.O. Sample Matrix: Air | QC Matrix: Water | BatchID: 61130 | WorkOrder: 1109433

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1109481-002C**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance 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 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	09/16/11	09/16/11 9:15 PM	1109433-002A	09/16/11 12:07 PM	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

QA/QC Officer

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,

Kyle Vagadori
Project Manager

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental 989 41st St, Oak
DATE RECEIVED:	08/15/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/26/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda d. Freeman 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

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

Air Toxics LTD.
Laboratory Services Since 1989

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	***TO-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
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

Laboratory Services Since 1989

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

Client Sample ID: VW2-5 DUP

Lab ID#: 1108301A-05A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (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:	**d081713**	**Date of Collection:**	**8/10/11 3:14:00 PM**
Dil. Factor:	**2.42**	**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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	90	75-150

Laboratory Services Since 1989

Client Sample ID: VW1-5

Lab ID#: 1108301A-02A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081714**	**Date of Collection:**	**8/10/11 4:10:00 PM**
Dil. Factor:	**8.66**	**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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	107	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VW2-SS

Lab ID#: 1108301A-03A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081715**	**Date of Collection: 8/10/11 11:50:00 AM**
Dil. Factor:	**2.16**	**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 Summa 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:	**d081716**	**Date of Collection:**	**8/10/11 4:30:00 PM**
Dil. Factor:	**3.16**	**Date of Analysis:**	**8/17/11 07:17 PM**

Compound	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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	103	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VW2-5 DUP

Lab ID#: 1108301A-05A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081805**	**Date of Collection:**	**8/10/11 4:30:00 PM**
Dil. Factor:	**7.71**	**Date of Analysis:**	**8/18/11 10:31 AM**

Compound	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 Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	106	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1108301A-06A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081706**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/11 09:58 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 Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	107	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1108301A-06B

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date 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 Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	102	75-150

Client Sample ID: LCS

Lab ID#: 1108301A-07A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081702**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/11 06:53 AM**

Compound	**%Recovery**
TPH (Gasoline Range)	104

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Fluorobenzene (FID)	104	75-150

Client Sample ID: LCSD

Lab ID#: 1108301A-07AA

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081718**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/11 08:44 PM**

Compound	%Recovery
TPH (Gasoline Range)	105

Container Type: NA - Not Applicable

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:	**d081802**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/18/11 07:47 AM**

Compound	%Recovery
TPH (Gasoline Range)	99

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	102	75-150

Client Sample ID: LCSD

Lab ID#: 1108301A-07BB

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d081819**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/18/11 09:03 PM**

Compound	**%Recovery**
TPH (Gasoline Range)	91

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Fluorobenzene (FID)	108	75-150

Laboratory Services Since 1989

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,

Kyle Vagadori
Project Manager

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 .FAX (916) 985-1020
Hours 6:30 A.M to 5:30 PST

Air Toxics LTD.
Laboratory Services Since 1989

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental 989 41st St, Oak
DATE RECEIVED:	08/15/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/26/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda L. Freeman 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

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 (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (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

Laboratory Services Since 1989

Client Sample ID: VW1-SS

Lab ID#: 1108301B-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2081826**	**Date of Collection:**	**8/10/11 3:14:00 PM**
Dil. Factor:	**2.42**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**2081827**	**Date of Collection: 8/10/11 4:10:00 PM**
Dil. Factor:	**8.66**	**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

Container Type: 1 Liter Summa Canister

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

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Laboratory Services Since 1989

Client Sample ID: VW2-SS

Lab ID#: 1108301B-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2081828**	**Date of Collection: 8/10/11 11:50:00 AM**
Dil. Factor:	**2.16**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**2081922**	**Date of Collection: 8/10/11 4:30:00 PM**
Dil. Factor:	**25.3**	**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.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method 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

File Name:	**2081925**	**Date of Collection: 8/10/11 4:30:00 PM**
Dil. Factor:	**344**	**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.

Container Type: 1 Liter Summa Canister

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

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Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1108301B-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2081805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1108301B-06B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**2081909**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/19/11 10:25 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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**2081802**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**2081906**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**2081803**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**2081804**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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

File Name:	**2081907**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/19/11 09:13 AM**

Compound	%Recovery
2-Propanol	92
Methyl tert-butyl ether	80
Benzene	90
Toluene	89
Ethyl Benzene	97
m,p-Xylene	106
o-Xylene	108

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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,

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental 989 41st St, Oak
DATE RECEIVED:	08/15/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/26/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VW1-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: Linda L. Freeman 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

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

Laboratory Services Since 1989

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

Air Toxics LTD.
Laboratory Services Since 1989

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

Client Sample ID: VW1-SS

Lab ID#: 1108301C-01A

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

Client Sample ID: VW1-5

Lab ID#: 1108301C-02A

Compound	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

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

Compound	Rpt. Limit (%)	Amount (%)
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

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

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: VW1-SS

Lab ID#: 1108301C-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082406**	**Date of Collection: 8/10/11 3:14:00 PM**
Dil. Factor:	**4.69**	**Date of Analysis: 8/24/11 04:06 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.47	14
Nitrogen	0.47	81
Methane	0.00047	Not Detected
Carbon Dioxide	0.047	4.8

Container Type: 1 Liter Summa Canister

Client Sample ID: VW1-5

Lab ID#: 1108301C-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082407**	**Date of Collection: 8/10/11 4:10:00 PM**
Dil. Factor:	**8.66**	**Date of Analysis: 8/24/11 04:29 PM**

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

Container Type: 1 Liter Summa Canister

Client Sample ID: VW2-SS

Lab ID#: 1108301C-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082408**	**Date of Collection: 8/10/11 11:50:00 AM**
Dil. Factor:	**2.16**	**Date of Analysis: 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

Container Type: 1 Liter Summa Canister

Client Sample ID: VW2-5

Lab ID#: 1108301C-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082409**	**Date of Collection:**	**8/10/11 4:30:00 PM**
Dil. Factor:	**3.16**	**Date of Analysis:**	**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

Container Type: 1 Liter Summa Canister

Client Sample ID: VW2-5 DUP

Lab ID#: 1108301C-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082410**	**Date of Collection: 8/10/11 4:30:00 PM**
Dil. Factor:	**7.74**	**Date of Analysis: 8/24/11 05:49 PM**

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

Container Type: 1 Liter Summa Canister

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1108301C-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082405**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/24/11 03:40 PM**

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

Container Type: NA - Not Applicable

Client Sample ID: LCS

Lab ID#: 1108301C-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082402**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/24/11 02:15 PM**

Compound	%Recovery
Oxygen	100
Nitrogen	101
Methane	99
Carbon Dioxide	100

Container Type: NA - Not Applicable

Client Sample ID: LCSD

Lab ID#: 1108301C-07AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9082426**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 8/25/11 10:25 AM**

Compound	**%Recovery**
Oxygen	94
Nitrogen	94
Methane	96
Carbon Dioxide	94

Container Type: NA - Not Applicable

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,

Kyle Vagadori
Project Manager

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 CALIFORNIA LINEN RENTAL 6989 41st STREE
DATE RECEIVED:	05/08/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	05/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda d. Fruman DATE: 05/17/12

Laboratory Director

Certfication 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

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 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	***TO-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.
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

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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 5:15:00 PM**
Dil. Factor:	**2.00**	**Date of Analysis:**	**5/16/12 11:31 AM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.050	0.20	0.12	0.48

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VW1-5

Lab ID#: 1205152A-02A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d051606**	**Date of Collection:**	**5/4/12 5:16:00 PM**
Dil. Factor:	**4.36**	**Date of Analysis:**	**5/16/12 12:04 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.11	0.44	0.39	1.6

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VW2-SS

Lab ID#: 1205152A-03A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d051607**	**Date of Collection:**	**5/4/12 4:08:00 PM**
Dil. Factor:	**2.03**	**Date of Analysis:**	**5/16/12 12:45 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.051	0.21	6.4	26

Container Type: 1 Liter Summa Canister

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

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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**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.42	1.7	0.54	2.2

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	90	75-150

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Client Sample ID: VW2-5 DUP

Lab ID#: 1205152A-05A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d051609**	**Date of Collection:**	**5/4/12 2:23:00 PM**
Dil. Factor:	**1.83**	**Date of Analysis:**	**5/16/12 01:56 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.046	0.19	0.15	0.61

Container Type: 1 Liter Summa Canister

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

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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 4:56:00 PM**
Dil. Factor:	**2.15**	**Date of Analysis: 5/16/12 02:29 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.054	0.22	3.9	16

Container Type: 1 Liter Summa Canister

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

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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 (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 Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	88	75-150

Client Sample ID: LCS

Lab ID#: 1205152A-09A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d051602**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/16/12 09:32 AM**

Compound	**%Recovery**
TPH (Gasoline Range)	112

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Fluorobenzene (FID)	78	75-150

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Client Sample ID: LCSD

Lab ID#: 1205152A-09AA

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d051614**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/16/12 06:16 PM**

Compound	%Recovery
TPH (Gasoline Range)	107

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	94	75-150

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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,

Kyle Vagadori

Kyle Vagadori
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.
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Folsom, CA 95630

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www.airtoxics.com

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 CALIFORNIA LINEN RENTAL,6989 41st STREE
DATE RECEIVED:	05/08/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	05/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda d. Fruman DATE: 05/17/12

Laboratory Director

Certfication 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

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
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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

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

Client Sample ID: VW2-5

Lab ID#: 1205152B-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1-Difluoroethane	27	35	72	96

Client Sample ID: VW2-5 DUP

Lab ID#: 1205152B-05A

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

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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

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

File Name:	**3051409**	**Date of Collection:**	**4/23/12 5:15:00 PM**
Dil. Factor:	**1.55**	**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

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VW1-5

Lab ID#: 1205152B-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051410**	**Date of Collection:**	**5/4/12 5:16:00 PM**
Dil. Factor:	**3.35**	**Date of Analysis:**	**5/14/12 02:29 PM**

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.

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VW2-SS

Lab ID#: 1205152B-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051411**	**Date of Collection:**	**5/4/12 4:08:00 PM**
Dil. Factor:	**1.64**	**Date of Analysis:**	**5/14/12 02:59 PM**

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.

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VW2-5

Lab ID#: 1205152B-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051412**	**Date of Collection:**	**5/4/12 2:23:00 PM**
Dil. Factor:	**13.4**	**Date of Analysis:**	**5/14/12 03:31 PM**

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

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VW2-5 DUP

Lab ID#: 1205152B-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051413**	**Date of Collection:**	**5/4/12 2:23:00 PM**
Dil. Factor:	**1.39**	**Date of Analysis:**	**5/14/12 04:12 PM**

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

Container Type: 1 Liter Summa Canister

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

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

File Name:	**3051414**	**Date of Collection:**	**5/4/12 4:56:00 PM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**5/14/12 05:01 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	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

Container Type: 1 Liter Summa Canister

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

Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1205152B-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051408a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date 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

Container Type: NA - Not Applicable

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

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Client Sample ID: CCV

Lab ID#: 1205152B-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051403**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

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

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Client Sample ID: LCS

Lab ID#: 1205152B-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051404**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

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

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Client Sample ID: LCSD

Lab ID#: 1205152B-10AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3051405**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	104	70-130

eurofins | Air Toxics

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,

Kyle Vagadori

Kyle Vagadori
Project Manager

eurofins | Air Toxics

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 CALIFORNIA LINEN RENTAL,6,989 41st STREE
DATE RECEIVED:	05/08/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	05/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Linda d. Fruman DATE: 05/17/12

Laboratory Director

Certfication 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

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# 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

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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

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.20	11
Nitrogen	0.20	80
Carbon Dioxide	0.020	8.6

Client Sample ID: VW2-5

Lab ID#: 1205152C-04A

Compound	Rpt. Limit (%)	Amount (%)
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

Compound	Rpt. Limit (%)	Amount (%)

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

Client Sample ID: VW2-5 DUP

Lab ID#: 1205152C-05A

Compound	Rpt. Limit (%)	Amount (%)
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

Air Toxics

Client Sample ID: VW1-SS

Lab ID#: 1205152C-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9051569**	**Date of Collection: 4/23/12 5:15:00 PM**
Dil. Factor:	**2.00**	**Date of Analysis: 5/15/12 10:24 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.20	5.9
Nitrogen	0.20	90
Methane	0.00020	Not Detected
Carbon Dioxide	0.020	3.7

Container Type: 1 Liter Summa Canister

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Client Sample ID: VW1-5

Lab ID#: 1205152C-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9051570**	**Date of Collection: 5/4/12 5:16:00 PM**
Dil. Factor:	**4.36**	**Date of Analysis: 5/15/12 10:49 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.44	20
Nitrogen	0.44	80
Methane	0.00044	Not Detected
Carbon Dioxide	0.044	0.37

Container Type: 1 Liter Summa Canister

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Client Sample ID: VW2-SS

Lab ID#: 1205152C-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9051571**	**Date of Collection:**	**5/4/12 4:08:00 PM**
Dil. Factor:	**2.03**	**Date of Analysis:**	**5/16/12 07:05 AM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.20	11
Nitrogen	0.20	80
Methane	0.00020	Not Detected
Carbon Dioxide	0.020	8.6

Container Type: 1 Liter Summa Canister

Client Sample ID: VW2-5

Lab ID#: 1205152C-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9051572**	**Date of Collection: 5/4/12 2:23:00 PM**
Dil. Factor:	**16.8**	**Date of Analysis: 5/16/12 07:27 AM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	1.7	7.6
Nitrogen	1.7	85
Methane	0.0017	Not Detected
Carbon Dioxide	0.17	7.3

Container Type: 1 Liter Summa Canister

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Client Sample ID: VW2-5 DUP

Lab ID#: 1205152C-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9051573**	**Date of Collection: 5/4/12 2:23:00 PM**
Dil. Factor:	**1.83**	**Date of Analysis: 5/16/12 07:49 AM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	5.7
Nitrogen	0.18	81
Methane	0.00018	0.00033
Carbon Dioxide	0.018	13

Container Type: 1 Liter Summa Canister

Air Toxics

Client Sample ID: VW3-SS

Lab ID#: 1205152C-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9051574**	**Date of Collection: 5/4/12 4:56:00 PM**
Dil. Factor:	**2.15**	**Date of Analysis: 5/16/12 08:12 AM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.22	15
Nitrogen	0.22	80
Methane	0.00022	Not Detected
Carbon Dioxide	0.022	5.0

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1205152C-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9051554**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/15/12 03:40 PM**

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

Container Type: NA - Not Applicable

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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
Carbon Dioxide	104

Container Type: NA - Not Applicable

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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
Carbon Dioxide	104

Container Type: NA - Not Applicable

McCampbell Analytical, Inc.
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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

Analytical Report

P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 05/04/12
		Date Received: 05/04/12
	Client Contact: Paul King	Date Reported: 05/09/12
	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.

CHAIN OF CUSTODY RECORD

1205173

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES Michael Deschenes

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	ANALYSIS(ES): DIFLUOROETHANE CAS#75-37-6	PRESERVATIVE	REMARKS
VW1-5 Shroud	5/4/12	1125	AIR	SHROUD	1	X	NONE	NORMAL TAT
VW2-5 Shroud	"	1315	"	"	1	X	"	" "
VW3-5 Shroud	"	1230	"	"	1	X	"	" "

ICE/t° 16
GOOD CONDITION ___ APPROPRIATE
HEAD SPACE ABSENT ___ CONTAINERS ___
DECHLORINATED IN LAB ___ PRESERVED IN LAB ___
VOAS | O&G | METALS | OTHER
PRESERVATION ___

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
Michael Deschenes	5/4/12	1605		Total No. of Samples (This Shipment): 3	LABORATORY: McCAMPBELL ANALYTICAL
RELINQUISHED BY: (SIGNATURE)	DATE 5/4/12	TIME 1717	RECEIVED BY: (SIGNATURE)	Total No. of Containers (This Shipment): 3	
				LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: DIFLUOROETHANE WAS OUR TRACER GAS.
Container = Tedlar Bag

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1205173 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **05/04/2012**
Date Printed: **05/04/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
					Requested Tests (See legend below)											
1205173-001	VW 1-5	Air	5/4/2012 11:25	☐	A	A										
1205173-002	VW 2-5	Air	5/4/2012 13:15	☐	A	A										
1205173-003	VW 3-5	Air	5/4/2012 12:30	☐	A	A										

Test Legend:

1	8260VOC_A	2	8260VOC_PPMV	3		4		5	
6		7		8		9		10	
11		12							

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.

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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

Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**5/4/2012 7:31:51 PM**
Project Name:	**#0304; California Linen Rental Co.**	LogIn Reviewed by:	Zoraida Cortez
WorkOrder N°:	**1205173** Matrix: Air	Carrier:	Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

	Yes	No	
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	

Sample Receipt Information

	Yes	No	NA
Custody seals intact on shipping container/cooler?	☐	☐	☑
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature	Cooler Temp:		NA ☑
Water - VOA vials have zero headspace / no bubbles?	☐	☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	☑	☐	
Metal - pH acceptable upon receipt (pH<2)?	☐	☐	NA ☑
Samples Received on Ice?	☐	☑	

** NOTE: If the "No" box is checked, see comments below.*

Comments:

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"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 05/04/12
		Date Received: 05/04/12
	Client Contact: Paul King	Date Extracted 05/07/12
	Client P.O.:	Date Analyzed 05/07/12

Volatile Organics by P&T and GC/MS*

Extraction method: SW5030B   Analytical methods: SW8260B   Work Order: 1205173

Lab ID	Client ID	Matrix	1,1-Difluoroethane as Dichlorodifluoromethane	DF	% SS	Comments
001A	VW 1-5	A	26,000	4000	113	
002A	VW 2-5	A	11,000	1000	111	
003A	VW 3-5	A	9,000	2000	110	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	A	0.25	µg/L
	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.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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 & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 05/04/12 Date Received: 05/04/12
	Client Contact: Paul King	Date Extracted 05/07/12
	Client P.O.:	Date Analyzed 05/07/12

Volatile Organics by P&T and GC/MS in PPMV*

Extraction method: SW5030B | Analytical methods: SW8260B | Work Order: 1205173

Lab ID	Client ID	Matrix	1,1-Difluoroethane as Dichlorodifluoromethane	DF	% SS	Comments
001A	VW 1-5	A	5300	4000	113	
002A	VW 2-5	A	2100	1000	111	
003A	VW 3-5	A	1800	2000	110	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	A	0.062	µL/L
	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.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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 SW8260B

W.O. Sample Matrix: Air | QC Matrix: Water | BatchID: 67342 | WorkOrder: 1205173

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1205084-006A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance 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.

DHS ELAP Certification 1644

QA/QC Officer

McCampbell Analytical, Inc.
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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Air | QC Matrix: Water | BatchID: 67343 | WorkOrder: 1205173

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1205085-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	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	05/07/12	05/07/12 2:22 PM	1205173-003A	05/04/12 12:30 PM	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

QA/QC Officer

Air Toxics

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,

Kyle Vagadori

Kyle Vagadori
Project Manager

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:	510-658-6916	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. 989 41st St.
DATE RECEIVED:	07/10/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	07/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Heidi Hayes DATE: 07/17/12

Technical Director

Certfication 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

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# 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	***TO-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.
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

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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

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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 (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.042	0.17	2.5	10

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	98	75-150

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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 AM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**7/11/12 10:00 AM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.039	0.16	1.8	7.4

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	90	75-150

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Client Sample ID: VW7

Lab ID#: 1207155A-03A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d071007**	**Date of Collection:**	**7/5/12 3:03:00 PM**
Dil. Factor:	**1.44**	**Date of Analysis:**	**7/11/12 10:42 AM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.036	0.15	0.73	3.0

Container Type: 1 Liter Summa Canister

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 (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 Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	89	75-150

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Client Sample ID: LCS

Lab ID#: 1207155A-05A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d071002**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 7/10/12 06:12 PM**

Compound	%Recovery
TPH (Gasoline Range)	110

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	97	75-150

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Client Sample ID: LCSD

Lab ID#: 1207155A-05AA

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d071010**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 7/11/12 02:30 PM**

Compound	%Recovery
TPH (Gasoline Range)	104

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	87	75-150

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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,

Kyle Vagadori
Project Manager

Eurofins Air Toxics, Inc.
180 Blue Ravine Road, Suite B
Folsom, CA 95630
T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

eurofins | Air Toxics

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:	510-658-6916	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. 989 41st St.
DATE RECEIVED:	07/10/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	07/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Heidi Hayes DATE: 07/17/12

Technical Director

Certfication 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

Air Toxics

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

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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

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Client Sample ID: VW5

Lab ID#: 1207155B-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j071211**	**Date of Collection:**	**7/5/12 2:44:00 PM**
Dil. Factor:	**4.50**	**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

Container Type: 1 Liter Summa Canister

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

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Client Sample ID: VW6

Lab ID#: 1207155B-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j071214**	**Date of Collection:**	**7/6/12 10:05:00 AM**
Dil. Factor:	**2.08**	**Date of Analysis:**	**7/12/12 10:37 PM**

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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VW7

Lab ID#: 1207155B-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j071213**	**Date of Collection: 7/5/12 3:03:00 PM**
Dil. Factor:	**1.93**	**Date of Analysis: 7/12/12 09:50 PM**

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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1207155B-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j071209**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 7/12/12 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

Container Type: NA - Not Applicable

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

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Client Sample ID: CCV

Lab ID#: 1207155B-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j071202**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method 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:	**j071203**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1207155B-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j071204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	106	70-130

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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,

Kyle Vagadori
Project Manager

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. 989 41st St.
DATE RECEIVED:	07/10/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	07/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
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: Heidi Hayes DATE: 07/17/12

Technical Director

Certfication 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

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

eurofins | Air Toxics

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

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.34	22
Nitrogen	0.34	77
Carbon Dioxide	0.034	0.68

Client Sample ID: VW6

Lab ID#: 1207155C-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.32	20
Nitrogen	0.32	78
Carbon Dioxide	0.032	2.2

Client Sample ID: VW7

Lab ID#: 1207155C-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	18
Nitrogen	0.26	77
Carbon Dioxide	0.026	4.6

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Client Sample ID: VW5

Lab ID#: 1207155C-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071620**	**Date of Collection: 7/5/12 2:44:00 PM**
Dil. Factor:	**3.35**	**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

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Client Sample ID: VW6

Lab ID#: 1207155C-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071621**	**Date of Collection: 7/6/12 10:05:00 AM**
Dil. Factor:	**3.22**	**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

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Client Sample ID: VW7

Lab ID#: 1207155C-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071622**	**Date of Collection: 7/5/12 3:03:00 PM**
Dil. Factor:	**2.58**	**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

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Client Sample ID: Lab Blank

Lab ID#: 1207155C-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071605**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

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
Carbon Dioxide	102

Container Type: NA - Not Applicable

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

Container Type: NA - Not Applicable

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

P & D Environmental 55 Santa Clara, Ste.240	Client Project ID: #0304; California Linen Rental Co.	Date Sampled:	07/05/12-07/06/12
		Date Received:	07/06/12
	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.

CHAIN OF CUSTODY RECORD

1207124

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL 989 41st St. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES [signature]

ANALYSIS(ES): DIFLUOROETHANE (CAS# 75-37-6)

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	DIFLUOROETHANE (CAS# 75-37-6)								PRESERVATIVE	REMARKS
VW5 (SHROUD)	7/5/12	1440	AIR	SHROUD	1	X								NONE	NORMAL TURNAROUND
VW6 (SHROUD)	7/6/12	0958	"	"	1	X								"	" "
VW7 (SHROUD)	7/5/12	1353	"	"	1	X								"	" "

RELINQUISHED BY: (SIGNATURE) [signature]	DATE 7/6/12	TIME 1345	RECEIVED BY: (SIGNATURE) [signature]	Total No. of Samples (This Shipment) 3 / Total No. of Containers (This Shipment) 3	LABORATORY: McCAMPBELL ANALYTICAL
RELINQUISHED BY: (SIGNATURE) [signature]	DATE 7/6/12	TIME 1430	RECEIVED BY: (SIGNATURE)	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE) [signature]	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: DIFLUOROETHANE WAS OUR TRACER GAS

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1207124 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **07/06/2012**
Date Printed: **07/06/2012**

					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**
1207124-001	VW 5	Air	7/5/2012 14:40	☐	A	A										
1207124-002	VW 6	Air	7/6/2012 9:58	☐	A	A										
1207124-003	VW 7	Air	7/5/2012 13:53	☐	A	A										

Test Legend:

1	**8260VOC_A**	**2**	**8260VOC_PPMV**	**3**		**4**		**5**	
6		**7**		**8**		**9**		**10**	
11		**12**							

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.

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Sample Receipt Checklist

Client Name: **P & D Environmental**

Date and Time Received: **7/6/2012 2:34:58 PM**

Project Name: **#0304; California Linen Rental Co.**

LogIn Reviewed by: Zoraida Cortez

WorkOrder N°: **1207124** Matrix: Air

Carrier: Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp:		NA ☑
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☐	No ☑	

** NOTE: If the "No" box is checked, see comments below.*

Comments:

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 07/05/12-07/06/12
		Date Received: 07/06/12
	Client Contact: Paul King	Date Extracted 07/06/12
Oakland, CA 94610	Client P.O.:	Date Analyzed 07/06/12

Volatile Organics by P&T and GC/MS*

Extraction method: SW5030B | Analytical methods: SW8260B | Work Order: 1207124

Lab ID	Client ID	Matrix	1,1-Difluoroethane as Dichlorodifluoromethane	DF	% SS	Comments
001A	VW 5	A	12,000	1000	94	
002A	VW 6	A	8900	1000	93	
003A	VW 7	A	11,000	1000	89	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	A	0.25	µg/L
	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.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 07/05/12-07/06/12
		Date Received: 07/06/12
	Client Contact: Paul King	Date Extracted 07/06/12
	Client P.O.:	Date Analyzed 07/06/12

Volatile Organics by P&T and GC/MS in PPMV*

Extraction method: SW5030B Analytical methods: SW8260B Work Order: 1207124

Lab ID	Client ID	Matrix	1,1-Difluoroethane as Dichlorodifluoromethane	DF	% SS	Comments
001A	VW 5	A	2400	1000	94	
002A	VW 6	A	1800	1000	93	
003A	VW 7	A	2100	1000	89	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	A	0.061	µL/L
	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.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Air | QC Matrix: Water | BatchID: 68918 | WorkOrder: 1207124

EPA Method: SW8260B | **Extraction: SW5030B** | **Spiked Sample ID: 1207061-035A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance 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 batch were ND less than the method RL with the following exceptions:
NONE

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

eurofins | Air Toxics

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,

Kyle Vagadori

Kyle Vagadori
Project Manager

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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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. 989 41st St.
DATE RECEIVED:	07/25/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/01/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
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: Heidi Hayes DATE: 08/01/12

Technical Director

Certfication 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

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	***TO-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.
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

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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

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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 AM**
Dil. Factor:	**2.22**	**Date of Analysis: 7/31/12 07:06 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.056	0.23	0.82	3.4

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	89	75-150

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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 (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.046	0.19	0.85	3.5

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	92	75-150

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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 (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 Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	92	75-150

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Client Sample ID: LCS

Lab ID#: 1207527A-04A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d073110**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 7/31/12 09:12 PM**

Compound	%Recovery
TPH (Gasoline Range)	102

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	91	75-150

Air Toxics

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,

Kyle Vagadori
Project Manager

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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:	510-658-6916	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. 989 41st St.
DATE RECEIVED:	07/25/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	08/01/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL 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: Heidi Hayes DATE: 08/01/12

Technical Director

Certfication 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

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# 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

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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

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Client Sample ID: VW4
Lab ID#: 1207527B-01A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j072621**	**Date of Collection:**	**7/20/12 9:39:00 AM**
Dil. Factor:	**8.88**	**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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: VW4-DUP

Lab ID#: 1207527B-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j072622**	**Date of Collection:**	**7/20/12**
Dil. Factor:	**14.9**	**Date 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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1207527B-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j072608**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of 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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1207527B-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j072602**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

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

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Client Sample ID: LCS

Lab ID#: 1207527B-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j072603**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCSD
Lab ID#: 1207527B-05AA
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j072604**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	100	70-130

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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,

Kyle Vagadori

Kyle Vagadori
Project Manager

eurofins | Air Toxics

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	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0304 California Linen Rental Co. 989 41st St.
DATE RECEIVED:	07/10/2012	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	07/17/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
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: Heidi Hayes DATE: 07/17/12

Technical Director

Certfication 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

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# 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

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.34	22
Nitrogen	0.34	77
Carbon Dioxide	0.034	0.68

Client Sample ID: VW6

Lab ID#: 1207155C-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.32	20
Nitrogen	0.32	78
Carbon Dioxide	0.032	2.2

Client Sample ID: VW7

Lab ID#: 1207155C-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	18
Nitrogen	0.26	77
Carbon Dioxide	0.026	4.6

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Client Sample ID: VW5

Lab ID#: 1207155C-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071620**	**Date of Collection: 7/5/12 2:44:00 PM**
Dil. Factor:	**3.35**	**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

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Client Sample ID: VW6

Lab ID#: 1207155C-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071621**	**Date of Collection: 7/6/12 10:05:00 AM**
Dil. Factor:	**3.22**	**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

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Client Sample ID: VW7

Lab ID#: 1207155C-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071622**	**Date of Collection: 7/5/12 3:03:00 PM**
Dil. Factor:	**2.58**	**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

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1207155C-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9071605**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**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

Container Type: NA - Not Applicable

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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
Carbon Dioxide	102

Container Type: NA - Not Applicable

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

Container Type: NA - Not Applicable

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
	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.

CHAIN OF CUSTODY RECORD

1207538

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. 989 41st ST OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES [signature]

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	ANALYSIS(ES): DIFLUOROETHANE								PRESERVATIVE	REMARKS
VW4	7/20/12	0925	AIR	SHROUD	1	X								NONE	NORMAL TURNAROUND

ICE / t° n/a
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB ____
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB ____
PRESERVATION VOAS | O & G | METALS | OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
[signature]	7/20/12	1500		Total No. of Samples (This Shipment): 1	LABORATORY: McCAMPBELL ANALYTICAL
				Total No. of Containers (This Shipment): 1	
RELINQUISHED BY: (SIGNATURE) [signature]	DATE 7/20/12	TIME 1535	RECEIVED BY: (SIGNATURE) [signature]	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (877) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (✓) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: DIFLUOROETHANE WAS OUR TRACER GAS.

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1207538 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **07/20/2012**
Date Printed: **07/20/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1207538-001	VW4	Air	7/20/2012 9:25	☐	A											

Test Legend:

1	8260VOC_A	2		3		4		5	
6		7		8		9		10	
11		12							

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.

McCampbell Analytical, Inc.
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http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**7/20/2012 4:12:24 PM**
Project Name:	**#0304; California Linen Rental Co.**	LogIn Reviewed by:	Melissa Valles
WorkOrder N°:	**1207538** Matrix: Air	Carrier:	Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp:		NA ☑
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☐	No ☑	

** NOTE: If the "No" box is checked, see 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 & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 07/20/12 Date Received: 07/20/12
	Client Contact: Paul King	Date Extracted 07/20/12
	Client P.O.:	Date Analyzed 07/20/12

Volatile Organics by P&T and GC/Msin PPMV*

Extraction method: SW5030B   Analytical methods: SW8260B   Work Order: 1207538

Lab ID	Client ID	Matrix	1,1-Difluoroethane as Dichlorodifluoromethane	DF	% SS	Comments
001A	VW4	A	990	1000	95	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	A	0.061	µL/L
	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.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

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
	Client Contact: Paul King	Date Extracted 07/20/12
Oakland, CA 94610	Client P.O.:	Date Analyzed 07/20/12

Volatile Organics by P&T and GC/MS*

Extraction method: SW5030B   Analytical methods: SW8260B   Work Order: 1207538

Lab ID	Client ID	Matrix	1,1-Difluoroethane as Dichlorodifluoromethane	DF	% SS	Comments
001A	VW4	A	5000	1000	95	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	A	0.25	µg/L
	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.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"
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http://www.mccampbell.com / E-mail: main@mccampbell.com

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	Acceptance Criteria (%)		
	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

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

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 AM	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   QA/QC Officer

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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
	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.

CHAIN OF CUSTODY RECORD

1206594

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. 989 41st ST. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES [signature]

ANALYSIS(ES): TPH-G BY EPA 5030 AND MODIFIED EPA 8015 WITH SILICA GEL CLEANUP; MBTEX BY EPA 8021B

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPH-G BY EPA 5030 AND MODIFIED EPA 8015 WITH SILICA GEL CLEANUP	MBTEX BY EPA 8021B	PRESERVATIVE	REMARKS
B94-1.0	6/28/12	1435	SOIL	940 40th ST.	1	X	X	ICE	NORMAL TURN AROUND
B94-8.0	6/28/12	1500	SOIL	" "	1	X	X	ICE	" " "

ICE/t° 3.4
GOOD CONDITION ____
HEAD SPACE ABSENT ____
DECHLORINATED IN LAB ____
APPROPRIATE CONTAINERS ____
PRESERVED IN LAB ____
PRESERVATION | VOAS | O&G | METALS | OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
[signature]	6/29/12	1418	[signature]	Total No. of Samples (This Shipment): 2 Total No. of Containers (This Shipment): 2	LABORATORY: McCAMPBELL ANALYTICAL
RELINQUISHED BY: (SIGNATURE) [signature]	6/29/12	1515	RECEIVED BY: (SIGNATURE)	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE) [signature]	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1206894 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **06/29/2012**
Date Printed: **06/29/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1206894-001	B94-1.0	Soil	6/28/2012 14:35	☐	A											
1206894-002	B94-8.0	Soil	6/28/2012 15:00	☐	A											

Test Legend:

1	G-MBTEX_S	2		3		4		5	
6		7		8		9		10	
11		12							

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.

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

Sample Receipt Checklist

Client Name: **P & D Environmental** | Date and Time Received: **6/29/2012 4:06:47 PM**

Project Name: **#0304; California Linen Rental Co.** | LogIn Reviewed by: Zoraida Cortez

WorkOrder N°: **1206894** | Matrix: Soil | Carrier: Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 3.4°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: WET ICE)

** NOTE: If the "No" box is checked, see 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 & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 06/28/12
		Date Received: 06/29/12
	Client Contact: Paul King	Date Extracted: 06/29/12
	Client P.O.:	Date Analyzed: 06/30/12

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

Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 1206894

Lab ID	Client ID	Matrix	TPH(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 above the reporting limit	W	50	5.0	0.5	0.5	0.5	0.5	ug/L
	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

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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 SW8021B/8015Bm

W.O. Sample Matrix: Soil | QC Matrix: Soil | BatchID: 68716 | WorkOrder: 1206894

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample 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)[£]	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 batch were ND less than the method RL with the following exceptions:
NONE

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.

DHS ELAP Certification 1644

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

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
	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.

CHAIN OF CUSTODY RECORD

1207481

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. 989 41st ST. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) Michael Deschenes [signature]

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPH-G BY EPA 5030 AND MODIFIED EPA 8015 W/ SILICA GEL CLEANUP	MBTEX BY EPA 8021B	PRESERVATIVE	REMARKS
B90-7	7/18/12	0940	SOIL	996 40th St, OAKLAND	1	X	X	ICE	NORMAL TURNAROUND

ICE/t° 3.2
GOOD CONDITION ____ APPROPRIATE
HEAD SPACE ABSENT ____ CONTAINERS ____
DECHLORINATED IN LAB ____ PRESERVED IN LAB ____
PRESERVATION ____ VOAS | O&G | METALS | OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
[signature]	7/18/12	1457	[signature]	Total No. of Samples (This Shipment) 1	LABORATORY: McCAMPBELL ANALYTICAL
				Total No. of Containers (This Shipment) 1	
RELINQUISHED BY: (SIGNATURE) [signature]	7/18/12	1400	RECEIVED BY: (SIGNATURE)	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE) [signature]	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1207481 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **07/18/2012**
Date Printed: **07/18/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
					Requested Tests (See legend below)											
1207481-001	B90-7	Soil	7/18/2012 9:40	☐	A											

Test Legend:

1	G-MBTEX_S	2		3		4		5	
6		7		8		9		10	
11		12							

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.

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

Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**7/18/2012 8:10:05 PM**
Project Name:	**#0304; California Linen Rental Co.**	LogIn Reviewed by:	Zoraida Cortez
WorkOrder N°:	**1207481** Matrix: Soil	Carrier:	Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

	Yes	No	
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	

Sample Receipt Information

	Yes	No	
Custody seals intact on shipping container/cooler?	☐	☐	NA ☑
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature	Cooler Temp: 3.2°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	☐	☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	☑	☐	
Metal - pH acceptable upon receipt (pH<2)?	☐	☐	NA ☑
Samples Received on Ice?	☑	☐	

(Ice Type: WET ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

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
	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: 1207481

Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	B90-7	S	770	ND<5.0	ND<0.50	ND<0.50	4.4	13	100	---#	d2,d9

Reporting Limit for DF =1; ND means not detected at or above the reporting limit		TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	Units
	W	50	5.0	0.5	0.5	0.5	0.5	ug/L
	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

Angela Rydelius, Lab Manager

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 SW8021B/8015Bm

W.O. Sample Matrix: Soil | QC Matrix: Soil | BatchID: 69203 | WorkOrder: 1207481

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample ID: 1207493-013A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
TPH(btex)£	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 batch were ND less than the method RL with the following exceptions:
NONE

BATCH 69203 SUMMARY

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.

£ 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.

DHS ELAP Certification 1644

QA/QC Officer

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

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
	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.

1207599

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO 989 41st St. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES Michael Deschenes

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPH-G BY EPA 5030 AND MODIFIED	EPA 8015 W SILICA GEL CLEANUP		W/BTEX BY EPA 8021B				PRESERVATIVE	REMARKS
B95B-1	7/20/12	1415	SOIL	940 40th St.	1	X			X				ICE	NORMAL TURNAROUND

ICE/t° 3.0
GOOD CONDITION ____ APPROPRIATE
HEAD SPACE ABSENT ____ CONTAINERS ____
DECHLORINATED IN LAB ____ PRESERVED IN LAB ____
VOAS | O&G | METALS | OTHER
PRESERVATION ____

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
Michael Deschenes	7/24/12	1325	
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
	7/24/12	1430	
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)

Total No. of Samples (This Shipment) 1
Total No. of Containers (This Shipment) 1

LABORATORY: McCAMPBELL ANALYTICAL

LABORATORY CONTACT: ANGELA RYDELIUS

LABORATORY PHONE NUMBER: (877) 252-9262

SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1207599 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Michael Deschenes
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Michael.Deschenes@p
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **07/24/2012**
Date Printed: **07/24/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
					Requested Tests (See legend below)											
1207599-001	B95B-1	Soil	7/20/2012 14:15	☐	A											

Test Legend:

1	G-MBTEX_S	2		3		4		5	
6		7		8		9		10	
11		12							

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.

McCampbell Analytical, Inc.
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Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**7/24/2012 2:45:27 PM**
Project Name:	**#0304; California Linen Rental Co.**	LogIn Reviewed by:	Zoraida Cortez
WorkOrder N°:	**1207599** Matrix: Soil	Carrier:	Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

	Yes	No	
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	

Sample Receipt Information

	Yes	No	
Custody seals intact on shipping container/cooler?	☐	☐	NA ☑
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature	Cooler Temp: 3°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	☐	☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	☑	☐	
Metal - pH acceptable upon receipt (pH<2)?	☐	☐	NA ☑
Samples Received on Ice?	☑	☐	

(Ice Type: WET ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

McCampbell Analytical, Inc.
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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 07/20/12 Date Received: 07/24/12
	Client Contact: Michael Deschenes	Date Extracted: 07/24/12
Oakland, CA 94610	Client P.O.:	Date Analyzed: 07/24/12

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

Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 1207599

Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	B95B-1	S	610	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 above the reporting limit	W	50	5.0	0.5	0.5	0.5	0.5	ug/L
	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

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
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QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Soil | QC Matrix: Soil | BatchID: 69383 | WorkOrder: 1207599

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample ID: 1207627-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
TPH(btex)£	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 batch were ND less than the method RL with the following exceptions:
NONE

BATCH 69383 SUMMARY

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.

£ 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.

DHS ELAP Certification 1644 QA/QC Officer

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

P & D Environmental 55 Santa Clara, Ste.240	Client Project ID: #0304; California Linen Rental Co. Oakland	Date Sampled: 09/16/11 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.

11094174

CHAIN OF CUSTODY RECORD

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES [signature]

NUMBER OF CONTAINERS

ANALYSIS(ES): TPH (G,D,MO,BO) WITH SILICA GEL CLEANUP; MBTEX BY 8021

PRESERVATIVE

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPH (G,D,MO,BO) WITH SILICA GEL CLEANUP	MBTEX BY 8021	PRESERVATIVE	REMARKS
B89-W	9/16/11	1515	H2O		6	X	X	ICE	NORMAL TURN AROUND

x10

ICE / t° 5.0
GOOD CONDITION ___ APPROPRIATE
HEAD SPACE ABSENT ___ CONTAINERS ___
DECHLORINATED IN LAB ___ PRESERVED IN LAB ___
PRESERVATION VOAS | O & G | METALS | OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
[signature]	9/16/11	[illegible]	[signature]	Total No. of Samples (This Shipment): 1	LABORATORY: McCAMPBELL ANALYTICAL
				Total No. of Containers (This Shipment): 6	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	LABORATORY CONTACT:	LABORATORY PHONE NUMBER:
[signature]	9/19/11	1515		ANGELA RYDELIUS	(925) 252-9262

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO
			[signature]	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: ALL BOTTLES PRESERVED WITH HCL.
5 VOAs
1 LITER AMBER

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1109474 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co. Oakland

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **09/19/2011**
Date Printed: **09/19/2011**

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	☐	B	A										

Requested Tests (See legend below)

Test Legend:

1	G-MBTEX_W	2	TPH(DMO)WSG_W	3		4		5	
6		7		8		9		10	
11		12							

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.

McCampbell Analytical, Inc.
"When Quality Counts"
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http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name: **P & D Environmental**

Date and Time Received: **9/19/2011 4:34:51 PM**

Project Name: **#0304; California Linen Rental Co. Oakland**

Checklist completed and reviewed by: Ana Venegas

WorkOrder N°: **1109474** Matrix: Water

Carrier: Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 5°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☑	No ☐	No VOA vials submitted ☐
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: WET ICE)

** NOTE: If the "No" box is checked, see comments below.*

Client contacted:

Date contacted:

Contacted by:

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

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

Extraction method: SW5030B   Analytical methods: SW8021B/8015Bm   Work Order: 1109474

Lab ID	Client ID	Matrix	TPH(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 above the reporting limit	W	50	5.0	0.5	0.5	0.5	0.5	μg/L
	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   Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
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http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co. Oakland	Date Sampled: 09/16/11
		Date Received: 09/19/11
	Client Contact: Paul King	Date Extracted: 09/19/11
	Client P.O.:	Date Analyzed: 09/27/11

Total Extractable Petroleum Hydrocarbons with Silica Gel Clean-Up*

Extraction method: SW3510C/3630C   Analytical methods: SW8015B   Work Order: 1109474

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 above the reporting limit					
	W	50	250	100	µg/L
	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

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http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 61173 | WorkOrder: 1109474

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample ID: 1109466-002A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
TPH(btex)£	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 Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

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.

£ 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

QA/QC Officer

McCampbell Analytical, Inc.
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http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8015B

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 61143 | WorkOrder: 1109474

EPA Method: SW8015B **Extraction: SW3510C/3630C** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	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 PM	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.

DHS ELAP Certification 1644

QA/QC Officer

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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
	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.

1206897

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. 989 41st St. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES [signature]

ANALYSIS(ES): TPH-G BY EPA 5030 AND MODIFIED EPA 8015 WITH SILICA GEL CLEANUP; MBTEX BY EPA 8021B

	SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPH-G BY EPA 5030 AND MODIFIED EPA 8015 WITH SILICA GEL CLEANUP	MBTEX BY EPA 8021B	PRESERVATIVE	REMARKS
X	B93-W	6/28/12	1330	H2O	940 40th St.	5	X	X	ICE	NORMAL TURN AROUND
X	B94-W	6/29/12	1000	H2O	" "	5	X	X	ICE	" " "

ICE/t° 3.4
GOOD CONDITION ____ APPROPRIATE
HEAD SPACE ABSENT ____ CONTAINERS ____
DECHLORINATED IN LAB ____ PRESERVED IN LAB ____
PRESERVATION | VOAS | O&G | METALS | OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
[signature]	6/29/12	1418	[signature]	Total No. of Samples (This Shipment): 2	LABORATORY: McCAMPBELL ANALYTICAL
RELINQUISHED BY: (SIGNATURE) [signature]	DATE 6/29/12	TIME 1515	RECEIVED BY: (SIGNATURE)	Total No. of Containers (This Shipment): 10	
				LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE) [signature]	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: ALL VOA's PRESERVED WITH HCL

McCampbell Analytical, Inc.

1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1206897 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **06/29/2012**
Date Printed: **06/29/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1206897-001	B93-W	Water	6/28/2012 13:30	☐	A											
1206897-002	B94-W	Water	6/29/2012 10:00	☐	A											

Test Legend:

1	G-MBTEX_W	2		3		4		5	
6		7		8		9		10	
11		12							

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.

McCampbell Analytical, Inc.
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Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**6/29/2012 5:43:06 PM**
Project Name:	**#0304; California Linen Rental Co.**	LogIn Reviewed by:	Zoraida Cortez
WorkOrder N°:	**1206897** Matrix: Water	Carrier:	Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 3.4°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☑	No ☐	No VOA vials submitted ☐
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: WET ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

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http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 06/28/12-06/29/12 Date Received: 06/29/12
	Client Contact: Paul King	Date Extracted: 07/02/12
	Client P.O.:	Date Analyzed: 07/02/12

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

Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 1206897

Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	B93-W	W	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 above the reporting limit								
	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
	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:

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water   QC Matrix: Water   BatchID: 68796   WorkOrder: 1206897

EPA Method: SW8021B/8015Bm   Extraction: SW5030B   Spiked Sample 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)£	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 batch were ND less than the method RL with the following exceptions:
NONE

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.

DHS ELAP Certification 1644   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

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
	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.

CHAIN OF CUSTODY RECORD

1207071

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL Co. 989 41st ST OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES Michael Deschenes

ANALYSIS(ES): TPHG BY EPA 5030 AND MODIFIED EPA 8015 WITH SILICA GEL CLEANUP; BTEX BY EPA 8021B

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPHG BY EPA 5030 AND MODIFIED EPA 8015 WITH SILICA GEL CLEANUP	BTEX BY EPA 8021B	PRESERVATIVE	REMARKS
B91-W	7/2/12	1350	H2O	990 40th st.	5	X	X	ICE	NORMAL TURN AROUND
B92-W	7/3/12	1300	H2O	984 40th st.	5	X	X	ICE	" " "

ICE/t° 2.4
GOOD CONDITION ___
HEAD SPACE ABSENT ___
DECHLORINATED IN LAB ___
APPROPRIATE CONTAINERS ___
PRESERVED IN LAB ___
PRESERVATION ___ VOAS | O&G | METALS | OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
Michael Deschenes	7/3/12	1545	
RELINQUISHED BY: (SIGNATURE)	7/3/12	1645	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)

Total No. of Samples (This Shipment): 2
Total No. of Containers (This Shipment): 10

LABORATORY: McCAMPBELL ANALYTICAL

LABORATORY CONTACT: ANGELA RYDELIUS

LABORATORY PHONE NUMBER: (925) 252-9262

SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: ALL VOA'S PRESERVED WITH HCL

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1207071 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Paul King
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **07/03/2012**
Date Printed: **07/03/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1207071-001	B91-W	Water	7/2/2012 13:50	☐	A											
1207071-002	B92-W	Water	7/3/2012 13:00	☐	A											

Test Legend:

1	G-MBTEX_W	2		3		4		5	
6		7		8		9		10	
11		12							

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.

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

Sample Receipt Checklist

Client Name: **P & D Environmental** Date and Time Received: **7/3/2012 9:48:26 PM**

Project Name: **#0304; California Linen Rental Co.** LogIn Reviewed by: Zoraida Cortez

WorkOrder N°: **1207071** Matrix: Water Carrier: Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 2.4°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☑	No ☐	No VOA vials submitted ☐
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET ICE)		

** NOTE: If the "No" box is checked, see comments below.*

Comments:

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P & D Environmental 55 Santa Clara, Ste.240	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 07/02/12-07/03/12 Date Received: 07/03/12
	Client Contact: Paul King	Date Extracted: 07/07/12
Oakland, CA 94610	Client P.O.:	Date Analyzed: 07/07/12

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

Extraction method: SW5030B   Analytical methods: SW8021B/8015Bm   Work Order: 1207071

Lab ID	Client ID	Matrix	TPH(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	ND	ND	ND	5.7	0.56	3.3	1	94	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit								
	W	50	5.0	0.5	0.5	0.5	0.5	μg/L
	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?)

DHS ELAP Certification 1644   Angela Rydelius, Lab Manager

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QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 68886 | WorkOrder: 1207071

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample 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)£	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 batch were ND less than the method RL with the following exceptions:
NONE

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.

£ 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 QA/QC Officer

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
	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.

CHAIN OF CUSTODY RECORD

1207486

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. 989 41st St. OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES [signature]

ANALYSIS(ES): TPH-G BY EPA 5030 AND MODIFIED EPA 8015 W/ SILICA GEL CLEANUP; MBTEX BY EPA 8021B

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPH-G BY EPA 5030 AND MODIFIED EPA 8015 W/ SILICA GEL CLEANUP	MBTEX BY EPA 8021B	PRESERVATIVE	REMARKS
+1 B90-W	7/18/12	1010	H2O	996 40th ST, OAKLAND	5	X	X	ICE	NORMAL TURNAROUND

ICE/t° 3.2
GOOD CONDITION ___ APPROPRIATE
HEAD SPACE ABSENT ___ CONTAINERS ___
DECHLORINATED IN LAB ___ PRESERVED IN LAB ___

PRESERVATION	VOAS	O&G	METALS	OTHER

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
[signature]	7/18/12	1451	[signature]
[signature]	7/18/12	1600	
			RECEIVED FOR LABORATORY BY: (SIGNATURE) [signature]

Total No. of Samples (This Shipment): 1
Total No. of Containers (This Shipment): 5

LABORATORY: McCAMPBELL ANALYTICAL

LABORATORY CONTACT: ANGELA RYDELIUS

LABORATORY PHONE NUMBER: (925) 252-9262

SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: ALL VOA's PRESERVED WITH HCL

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1207486 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Michael Deschenes
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Michael.Deschenes@p
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: 5 days

Date Received: 07/18/2012
Date Printed: 07/18/2012

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1207486-001	B90-W	Water	7/18/2012 10:10	☐	A											

Test Legend:

1	G-MBTEX_W	2		3		4		5	
6		7		8		9		10	
11		12							

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.

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Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**7/18/2012 8:47:11 PM**
Project Name:	**#0304; California Linen Rental Co.**	LogIn Reviewed by:	Zoraida Cortez
WorkOrder N°:	**1207486** Matrix: Water	Carrier:	Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

	Yes	No	
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	

Sample Receipt Information

	Yes	No	NA
Custody seals intact on shipping container/cooler?	☐	☐	☑
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	Other
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature	Cooler Temp: 3.2°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	☑	☐	No VOA vials submitted ☐
Sample labels checked for correct preservation?	☑	☐	
Metal - pH acceptable upon receipt (pH<2)?	☐	☐	NA ☑
Samples Received on Ice?	☑	☐	

(Ice Type: WET ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 07/18/12 Date Received: 07/18/12
	Client Contact: Michael Deschenes	Date Extracted: 07/21/12
	Client P.O.:	Date Analyzed: 07/21/12

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

Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 1207486

Lab ID	Client ID	Matrix	TPH(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 above the reporting limit								
	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
	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?)

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"
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http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 69353 | WorkOrder: 1207486

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample ID: 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)£	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	20	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 SUMMARY

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.

£ 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

QA/QC Officer

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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
	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.

CHAIN OF CUSTODY RECORD 1207600

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0304

PROJECT NAME: CALIFORNIA LINEN RENTAL CO. 989 41ST ST OAKLAND

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL DESCHENES Michael Deschenes

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TPH-G BY EPA 5030 AND MODIFIED EPA 8015 W/ SILICA GEL CLEANUP			MBTEX BY EPA 8021B					PRESERVATIVE	REMARKS
B95B-W	7/20/12	1645	H_2O	940 40th st	5	X			X					ICE	NORMAL TURNAROUND
B96-W	7/20/12	1000	H_2O	996 40th st	5	X			X					ICE	" "

ICE/t° 3.0
GOOD CONDITION ____ APPROPRIATE
HEAD SPACE ABSENT ____ CONTAINERS ____
DECHLORINATED IN LAB ____ PRESERVED IN LAB ____
VOAS | O&G | METALS | OTHER
PRESERVATION ____

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	
Michael Deschenes	7/24/12	1325		Total No. of Samples (This Shipment): 2; Total No. of Containers (This Shipment): 10
RELINQUISHED BY: (SIGNATURE)	DATE 7/24/12	TIME 1450	RECEIVED BY: (SIGNATURE)	LABORATORY: McCAMPBELL ANALYTICAL
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	LABORATORY CONTACT: ANGELA RYDELIUS; LABORATORY PHONE NUMBER: (877) 252-9262

SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (x) NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: ALL VOAS PRESERVED TO HCL

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1207600 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Michael Deschenes
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Michael.Deschenes@p
cc:
PO:
ProjectNo: #0304; California Linen Rental Co.

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara, Ste.240
Oakland, CA 94610

Requested TAT: **5 days**

Date Received: **07/24/2012**
Date Printed: **07/24/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
					Requested Tests (See legend below)											
1207600-001	B95B-W	Water	7/20/2012 16:45	☐	A											
1207600-002	B96-W	Water	7/20/2012 10:00	☐	A											

Test Legend:

1	G-MBTEX_W	2		3		4		5	
6		7		8		9		10	
11		12							

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.

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Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**7/24/2012 3:00:06 PM**
Project Name:	**#0304; California Linen Rental Co.**	LogIn Reviewed by:	Zoraida Cortez
WorkOrder N°:	**1207600** Matrix: Water	Carrier:	Rob Pringle (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 3°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☑	No ☐	NA ☐
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET ICE)		

** NOTE: If the "No" box is checked, see comments below.*

Comments:

McCampbell Analytical, Inc.
"When Quality Counts"
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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

P & D Environmental 55 Santa Clara, Ste.240 Oakland, CA 94610	Client Project ID: #0304; California Linen Rental Co.	Date Sampled: 07/20/12
		Date Received: 07/24/12
	Client Contact: Michael Deschenes	Date Extracted: 07/25/12-07/26/12
	Client P.O.:	Date Analyzed: 07/25/12-07/26/12

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

Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 1207600

Lab ID	Client ID	Matrix	TPH(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 above the reporting limit								
	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
	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

DHS ELAP Certification 1644

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QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 69403 | WorkOrder: 1207600

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample 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)£	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 batch were ND less than the method RL with the following exceptions:
NONE

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.

£ 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.

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QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 69444 | WorkOrder: 1207600

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample ID: 1207593-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
TPH(btex)£	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 batch were ND less than the method RL with the following exceptions:
NONE

BATCH 69444 SUMMARY

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.

£ 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.

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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**

Table G1
Arsenic Data Used for Fill Material Statistical Analysis

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 G2
Lead Data Used for Fill Material Statistical Analysis

Sample ID	Lead Concentration (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	Minimum of Log Data	1.253
Maximum	48	Maximum of Log Data	3.871
Mean	9.644	Mean of log Data	2.079
Geometric Mean	7.994	SD of log Data	0.542
Median	7.2		
SD	8.42		
Std. Error of Mean	1.444		
Coefficient of Variation	0.873		
Skewness	3.48		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.583	Shapiro Wilk Test Statistic	0.882
Shapiro Wilk Critical Value	0.933	Shapiro Wilk Critical Value	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	95% H-UCL	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	99% Chebyshev (MVUE) UCL	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		
MLE of Mean	9.644		
MLE of Standard Deviation	5.991		
nu star	176.2		
Approximate Chi Square Value (.05)	146.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0422	95% CLT UCL	12.02
Adjusted Chi Square Value	145.2	95% Jackknife UCL	12.09
		95% Standard Bootstrap UCL	12.01
Anderson-Darling Test Statistic	2.237	95% Bootstrap-t UCL	15.35
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	22.51
Kolmogorov-Smirnov Test Statistic	0.238	95% Percentile Bootstrap UCL	12.11
Kolmogorov-Smirnov 5% Critical Value	0.152	95% BCA Bootstrap UCL	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 >= 40)	11.6		
95% Adjusted Gamma UCL (Use when n < 40)	11.71		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	15.94
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

Table G4
UCL Calculation for Arsenic Concentrations in Fill Material Without Outlier, Pit Sample 2f

General Statistics			
Number of Valid Observations	33	Number of Distinct Observations	25
Number of Missing Values	1		
Raw Statistics		Log-transformed Statistics	
Minimum	3.5	Minimum of Log Data	1.253
Maximum	30	Maximum of Log Data	3.401
Mean	8.482	Mean of log Data	2.024
Geometric Mean	7.571	SD of log Data	0.447
Median	7.2		
SD	5.074		
Std. Error of Mean	0.883		
Coefficient of Variation	0.598		
Skewness	2.805		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.716	Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical Value	0.931	Shapiro Wilk Critical Value	0.931
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	9.978	95% H-UCL	9.719
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.27
95% Adjusted-CLT UCL (Chen-1995)	10.4	97.5% Chebyshev (MVUE) UCL	12.54
95% Modified-t UCL (Johnson-1978)	10.05	99% Chebyshev (MVUE) UCL	15.03
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.169	Data appear Lognormal at 5% Significance Level	
Theta Star	2.034		
MLE of Mean	8.482		
MLE of Standard Deviation	4.154		
nu star	275.2		
Approximate Chi Square Value (.05)	237.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0419	95% CLT UCL	9.935
Adjusted Chi Square Value	236	95% Jackknife UCL	9.978
		95% Standard Bootstrap UCL	9.87
Anderson-Darling Test Statistic	1.18	95% Bootstrap-t UCL	10.88
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	16.26
Kolmogorov-Smirnov Test Statistic	0.185	95% Percentile Bootstrap UCL	10.12
Kolmogorov-Smirnov 5% Critical Value	0.154	95% BCA Bootstrap UCL	10.37
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.33
		97.5% Chebyshev(Mean, Sd) UCL	14
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.27
95% Approximate Gamma UCL (Use when n >= 40)	9.817		
95% Adjusted Gamma UCL (Use when n < 40)	9.891		
Potential UCL to Use		Use 95% Student's-t UCL	9.978
		or 95% Modified-t UCL	10.05
		or 95% H-UCL	9.719
ProUCL computes and outputs H-statistic based UCLs for historical reasons only.			
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.			
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.			
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

Table G5

UCL Calculation for Arsenic Concentrations in Fill Material Without Outliers, Pit Samples 2f and 1g

General Statistics			
Number of Valid Observations	32	Number of Distinct Observations	24
Number of Missing Values	2		
Raw Statistics		Log-transformed Statistics	
Minimum	3.5	Minimum of Log Data	1.253
Maximum	19	Maximum of Log Data	2.944
Mean	7.809	Mean of log Data	1.981
Geometric Mean	7.253	SD of log Data	0.378
Median	7.15		
SD	3.342		
Std. Error of Mean	0.591		
Coefficient of Variation	0.428		
Skewness	1.623		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.862	Shapiro Wilk Test Statistic	0.971
Shapiro Wilk Critical Value	0.93	Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	8.811	95% H-UCL	8.832
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.1
95% Adjusted-CLT UCL (Chen-1995)	8.962	97.5% Chebyshev (MVUE) UCL	11.11
95% Modified-t UCL (Johnson-1978)	8.839	99% Chebyshev (MVUE) UCL	13.08
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	6.295	Data appear Gamma Distributed 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)	357.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0416	95% CLT UCL	8.781
Adjusted Chi Square Value	355	95% Jackknife UCL	8.811
		95% Standard Bootstrap UCL	8.785
Anderson-Darling Test Statistic	0.595	95% Bootstrap-t UCL	9.076
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	9.13
Kolmogorov-Smirnov Test Statistic	0.129	95% Percentile Bootstrap UCL	8.806
Kolmogorov-Smirnov 5% Critical Value	0.156	95% BCA Bootstrap UCL	8.969
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.38
		97.5% Chebyshev(Mean, Sd) UCL	11.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.69
95% Approximate Gamma UCL (Use when n >= 40)	8.804		
95% Adjusted Gamma UCL (Use when n < 40)	8.861		
Potential UCL to Use		Use 95% Approximate Gamma UCL	8.804
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

Table G6
UCL Calculation for Lead Concentrations in Fill Material

General Statistics			
Number of Valid Observations	41	Number of Distinct Observations	36
Raw Statistics		Log-transformed Statistics	
Minimum	4.6	Minimum of Log Data	1.526
Maximum	460	Maximum of Log Data	6.131
Mean	90.22	Mean of log Data	3.89
Geometric Mean	48.91	SD of log Data	1.256
Median	64		
SD	93.84		
Std. Error of Mean	14.66		
Coefficient of Variation	1.04		
Skewness	1.928		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.816	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
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	114.9	95% H-UCL	182.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	214.5
95% Adjusted-CLT UCL (Chen-1995)	119	97.5% Chebyshev (MVUE) UCL	262.2
95% Modified-t UCL (Johnson-1978)	115.6	99% Chebyshev (MVUE) UCL	355.9
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.895	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	100.7		
MLE of Mean	90.22		
MLE of Standard Deviation	95.34		
nu star	73.43		
Approximate Chi Square Value (.05)	54.69	Nonparametric Statistics	
Adjusted Level of Significance	0.0441	95% CLT UCL	114.3
Adjusted Chi Square Value	54.1	95% Jackknife UCL	114.9
		95% Standard Bootstrap UCL	113.7
Anderson-Darling Test Statistic	0.527	95% Bootstrap-t UCL	121.7
Anderson-Darling 5% Critical Value	0.781	95% Hall's Bootstrap UCL	125.8
Kolmogorov-Smirnov Test Statistic	0.111	95% Percentile Bootstrap UCL	115.3
Kolmogorov-Smirnov 5% Critical Value	0.142	95% BCA Bootstrap UCL	119
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	154.1
		97.5% Chebyshev(Mean, Sd) UCL	181.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	236
95% Approximate Gamma UCL (Use when n >= 40)	121.1		
95% Adjusted Gamma UCL (Use when n < 40)	122.4		
Potential UCL to Use		Use 95% Approximate Gamma UCL	121.1
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

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	290	Maximum of Log Data	5.67
Mean	80.97	Mean of log Data	3.834
Geometric Mean	46.24	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		
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	0.94	Shapiro Wilk Critical Value	0.94
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	100.6	95% H-UCL	163.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	191.4
95% Adjusted-CLT UCL (Chen-1995)	102.3	97.5% Chebyshev (MVUE) UCL	233.4
95% Modified-t UCL (Johnson-1978)	100.9	99% Chebyshev (MVUE) UCL	315.9
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.967	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 Significance	0.044	95% CLT UCL	100.2
Adjusted Chi Square Value	57.45	95% Jackknife UCL	100.6
		95% Standard Bootstrap UCL	99.78
Anderson-Darling Test Statistic	0.668	95% Bootstrap-t UCL	101.9
Anderson-Darling 5% Critical Value	0.778	95% Hall's Bootstrap UCL	102.5
Kolmogorov-Smirnov Test Statistic	0.12	95% Percentile Bootstrap UCL	99.73
Kolmogorov-Smirnov 5% Critical Value	0.144	95% BCA Bootstrap UCL	102.3
Data appear Gamma Distributed at 5% Significance Level		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 provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

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	39	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	260	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		
Std. Error of Mean	10.62		
Coefficient of Variation	0.878		
Skewness	0.907		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.893	Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical Value	0.939	Shapiro Wilk Critical Value	0.939
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	93.53	95% H-UCL	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	99% Chebyshev (MVUE) UCL	291.5
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.999	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	77.91		
Approximate Chi Square Value (.05)	58.58	Nonparametric Statistics	
Adjusted Level of Significance	0.0437	95% CLT UCL	93.09
Adjusted Chi Square Value	57.92	95% Jackknife UCL	93.53
		95% Standard Bootstrap UCL	93
Anderson-Darling Test Statistic	0.756	95% Bootstrap-t UCL	97.09
Anderson-Darling 5% Critical Value	0.777	95% Hall's Bootstrap UCL	95.04
Kolmogorov-Smirnov Test Statistic	0.125	95% Percentile Bootstrap UCL	94.25
Kolmogorov-Smirnov 5% Critical Value	0.145	95% BCA Bootstrap UCL	94.28
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	121.9
		97.5% Chebyshev(Mean, Sd) UCL	142
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	181.3
95% Approximate Gamma UCL (Use when n >= 40)	100.6		
95% Adjusted Gamma UCL (Use when n < 40)	101.7		
Potential UCL to Use		Use 95% Approximate Gamma UCL	100.6
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

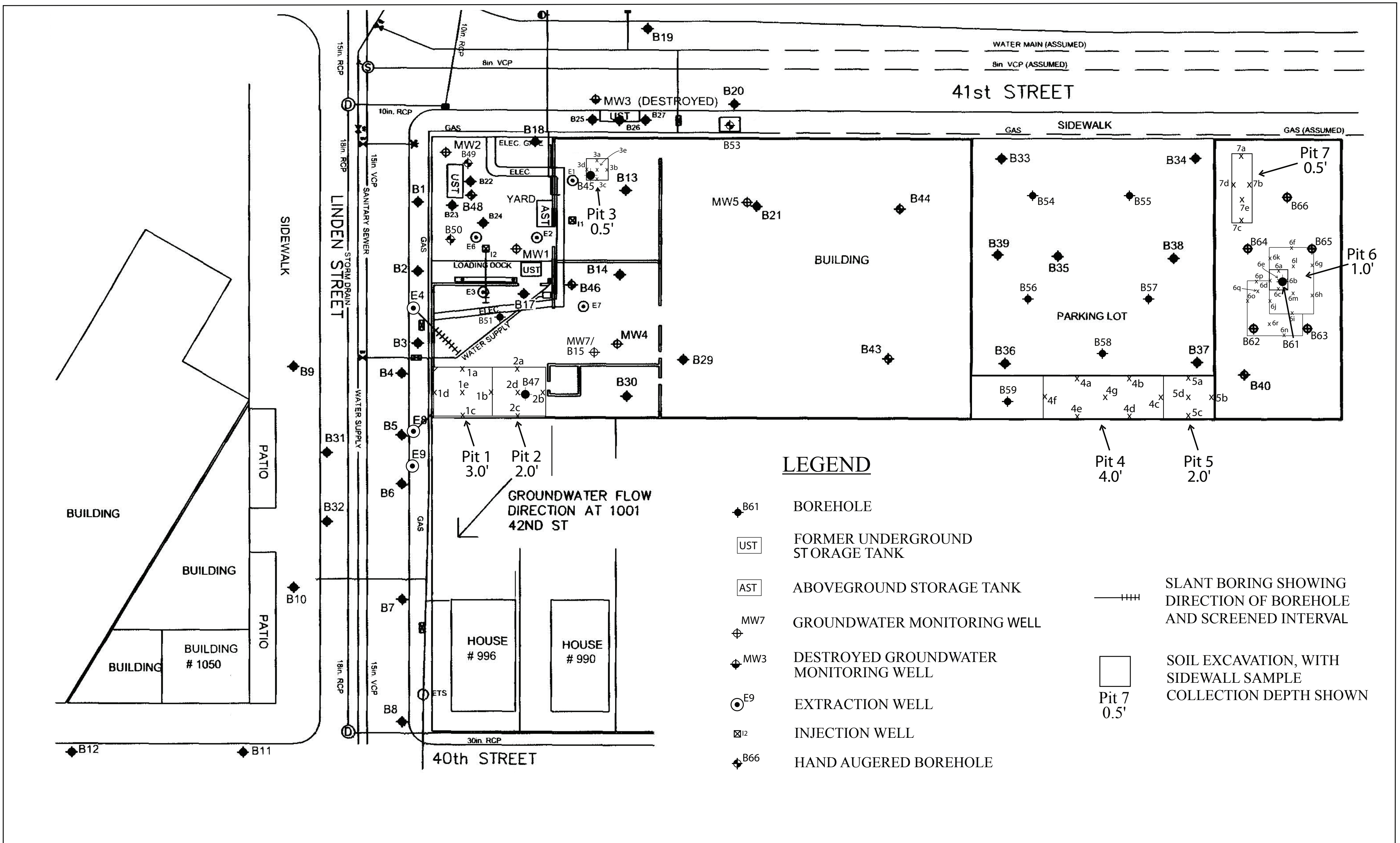

Figure G1
Soil Excavation and Confirmation Sample Locations
California Linen Rental Company
989 41st Street
Oakland, California

Base Map From: California Utility Survey Utility Sketch Plan, Feb. 14, 2005, Google Earth, June 2007, and JR Associates, June 2011	P&D Environmental, Inc. 55 Santa Clara Avenue, Suite 240 Oakland, CA 94610	0 30 60 Approximate Scale in Feet N

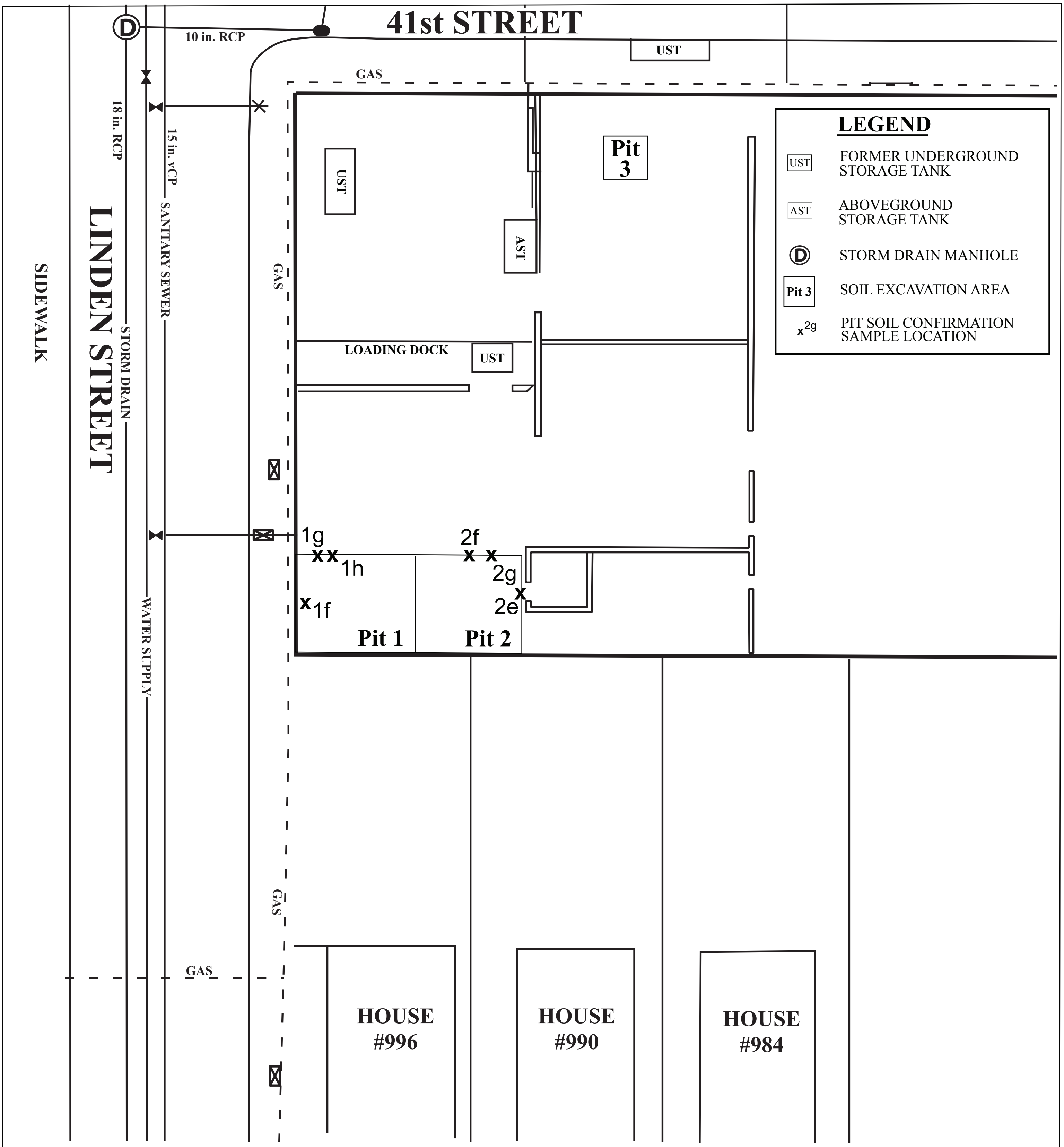

Figure G2
Site Plan Detail Showing Post-Excavation Pit Confirmation
Sample Locations in Pits 1 and 2
California Linen Rental Company
989 41st Street
Oakland, California

N

Base Map From: California Utility Survey Utility Sketch Plan Feb. 14, 2005	RGA Environmental, Inc. 1466 66th Street Emeryville, CA 94608	0 15 30 Approximate Scale in Feet

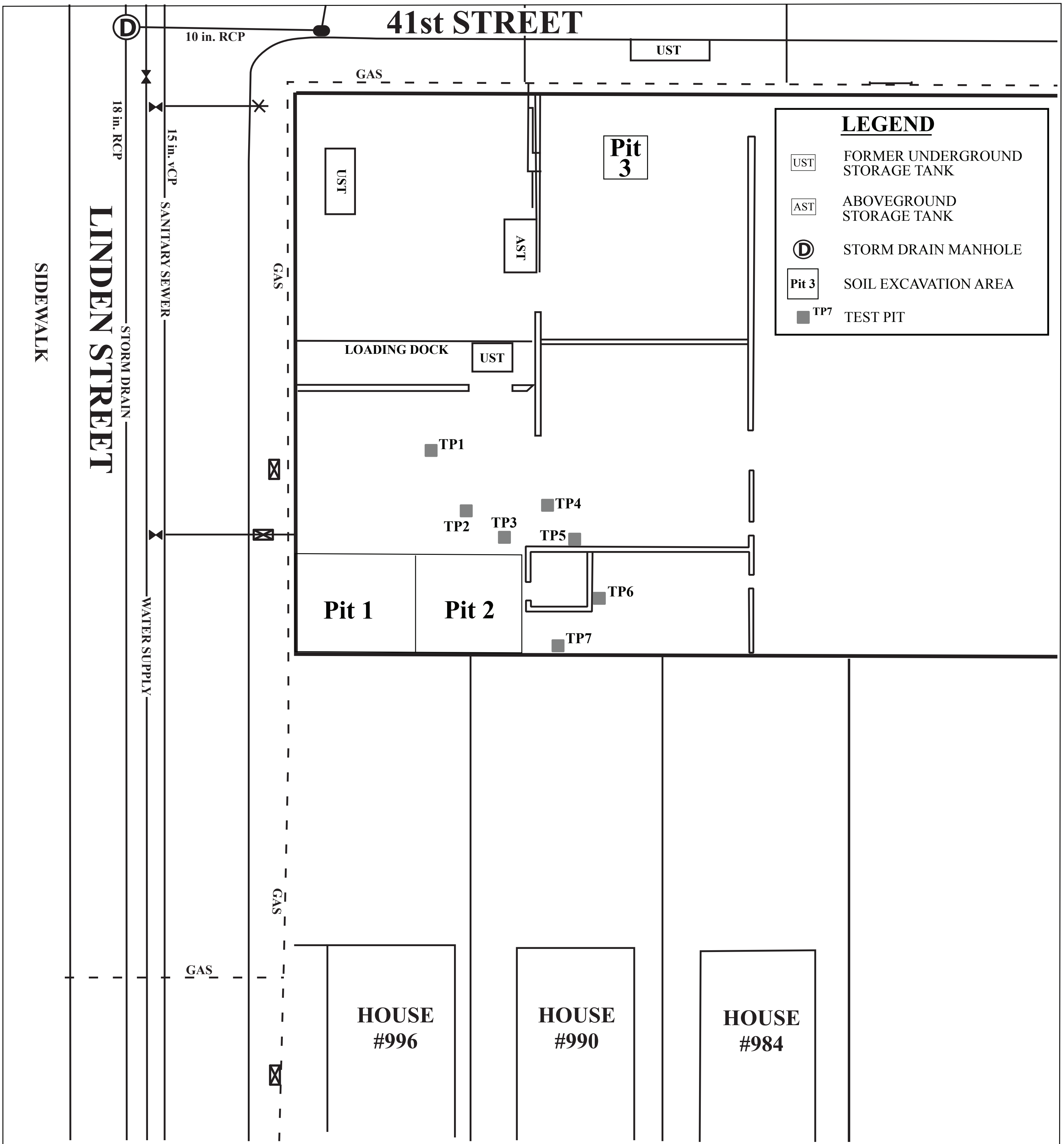

Figure G3
Site Plan Detail Showing Test Pits
California Linen Rental Company
989 41st Street
Oakland, California

Base Map From: California Utility Survey Utility Sketch Plan Feb. 14, 2005	RGA Environmental, Inc. 1466 66th Street Emeryville, CA 94608	0 15 30 Approximate Scale in Feet

APPENDIX H

HERD December 2011 Vapor Intrusion Risk and Hazard Calculation Work Sheets

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
60297	3.40E+03			TPH-Gasoline

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	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

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	4.9E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.1E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	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

Chemical Properties Lookup Table

CalEPA Toxicity Criteria in bold (last updated 12/02/2011 DTSC/HERO)

Original EPA Values

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Original EPA Values: Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Original EPA Values: Reference conc., RfC (mg/m^3)	Original EPA Values: URF extrapolated (X)	Original EPA Values: RfC extrapolated (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		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	**3.4E-04**	7.0E-04	4.10E+02			1.0E-04	7.0E-04		
58899	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	?	X	3.7E-04	1.1E-03	X	X
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		X	0.0E+00			X
60571	Dieldrin	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		X	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	**3.1E+01**	5.81E+01		X	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	**5.3E-06**	**3.0E-01**	1.19E+02			2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	**1.1E-05**	3.5E-03	2.37E+02		X	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	**2.9E-05**	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	**5.0E+00**	1.33E+02			0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		X	0.0E+00	1.8E-02		X
72559	DDE	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	X	
74839	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	5.0E-03		
74873	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	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	2.70E+01			0.0E+00	3.0E-03		
74953	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		X	0.0E+00	3.5E-02		X
75003	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	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	**7.8E-05**	1.0E-01	6.25E+01			8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00	6.0E-02		
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	25	313.00	510.00	6,706	**1.0E-06**	**4.0E-01**	8.49E+01			4.7E-07	3.0E+00		
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	7.0E-01		
75218	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	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	2.53E+02		X	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	**3.7E-05**	7.0E-02	1.64E+02	?	X	1.8E-05	7.0E-02	X	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		
75343	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		X	0.0E+00	5.0E-01		
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	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	1.21E+02			0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroetha	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	1.87E+02			0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	**1.2E-03**	1.8E-03	3.73E+02		X	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		X	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	**1.0E-05**	4.0E-03	1.13E+02	?		1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00	1.0E+00		
79005	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		X	1.6E-05	1.4E-02		X
79016	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-03**	1.31E+02			1.1E-04	4.0E-02	X	
79209	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		X	0.0E+00	3.5E+00		X
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		X	5.8E-05	2.1E-01		X
79469	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	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00	7.0E-01		
83329	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		X	0.0E+00	2.1E-01		X
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	1.66E+02		X	0.0E+00	1.4E-01		X
87683	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		X	2.2E-05	7.0E-04		X
88722	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
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		
91576	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		X	0.0E+00	7.0E-02		X
92524	Biphenyl	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	1.8E-01		X
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	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00	2.0E-01		
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	1.8E-02		X
95636	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		
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	4.9E-03	X	
96333	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	1.1E-01		X
97632	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	3.2E-01		X
98066	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
98828	Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00	4.0E-01		
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	3.5E-01		X
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	2.0E-03		
100414	Ethylbenzene	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	1.0E+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	1.0E+00		
100447	Benzylchloride	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	0.0E+00	X	
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		X	0.0E+00	3.5E-01		X
103651	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		X	0.0E+00	1.4E-01		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	1.4E-01		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	1.0E-01		
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	8.0E-01		

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	1.80E+02			Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.0E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)		ENTER Soil gas conc., C_g (ppmv)	Chemical
100414	3.30E+01	OR		Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI	OR	

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.5E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.2E-08	3.0E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106423	1.10E+02			p-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, $\rho_b{}^A$ (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w{}^V$ (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.0E-03

MESSAGE SUMMARY BELOW:

END

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
95476	3.90E+01			o-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.9E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
60297	3.50E+03			TPH-Gasoline

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	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

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	4.9E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.2E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	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

Chemical Properties Lookup Table

CalEPA Toxicity Criteria in bold (last updated 12/02/2011 DTSC/HERO)

Original EPA Values

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Original EPA: Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Original EPA: Reference conc., RfC (mg/m^3)	Original EPA: URF extrapolated (X)	Original EPA: RfC extrapolated (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		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	**3.4E-04**	7.0E-04	4.10E+02			1.0E-04	7.0E-04		
58899	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	?	X	3.7E-04	1.1E-03	X	X
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		X	0.0E+00			X
60571	Dieldrin	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		X	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	**3.1E+01**	5.81E+01		X	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	**5.3E-06**	**3.0E-01**	1.19E+02			2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	**1.1E-05**	3.5E-03	2.37E+02		X	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	**2.9E-05**	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	**5.0E+00**	1.33E+02			0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		X	0.0E+00	1.8E-02		X
72559	DDE	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	X	
74839	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	5.0E-03		
74873	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	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	2.70E+01			0.0E+00	3.0E-03		
74953	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		X	0.0E+00	3.5E-02		X
75003	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	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	**7.8E-05**	1.0E-01	6.25E+01			8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00	6.0E-02		
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	25	313.00	510.00	6,706	**1.0E-06**	**4.0E-01**	8.49E+01			4.7E-07	3.0E+00		
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	7.0E-01		
75218	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	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	2.53E+02		X	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	**3.7E-05**	7.0E-02	1.64E+02	?	X	1.8E-05	7.0E-02	X	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		
75343	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		X	0.0E+00	5.0E-01		
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	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	1.21E+02			0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroetha	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	1.87E+02			0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	**1.2E-03**	1.8E-03	3.73E+02		X	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		X	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	**1.0E-05**	4.0E-03	1.13E+02	?		1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00	1.0E+00		
79005	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		X	1.6E-05	1.4E-02		X
79016	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-03**	1.31E+02			1.1E-04	4.0E-02	X	
79209	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		X	0.0E+00	3.5E+00		X
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		X	5.8E-05	2.1E-01		X
79469	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	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00	7.0E-01		
83329	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		X	0.0E+00	2.1E-01		X
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	1.66E+02		X	0.0E+00	1.4E-01		X
87683	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		X	2.2E-05	7.0E-04		X
88722	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
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		
91576	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		X	0.0E+00	7.0E-02		X
92524	Biphenyl	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	1.8E-01		X
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	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00	2.0E-01		
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	1.8E-02		X
95636	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		
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	4.9E-03	X	
96333	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	1.1E-01		X
97632	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	3.2E-01		X
98066	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
98828	Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00	4.0E-01		
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	3.5E-01		X
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	2.0E-03		
100414	Ethylbenzene	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	1.0E+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	1.0E+00		
100447	Benzylchloride	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	0.0E+00	X	
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		X	0.0E+00	3.5E-01		X
103651	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		X	0.0E+00	1.4E-01		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	1.4E-01		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	1.0E-01		
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	8.0E-01		

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	1.70E+02			Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.6E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414	3.20E+01			Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2.5E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.1E-08	2.9E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106423	8.10E+01			p-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.5E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
95476	3.30E+01			o-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.3E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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DTSC
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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
60297	1.00E+04			TPH-Gasoline

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)	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

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	4.9E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.6E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	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

Chemical Properties Lookup Table

CalEPA Toxicity Criteria in bold (last updated 12/02/2011 DTSC/HERO)

Original EPA Values

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF (µg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Original EPA: Unit risk factor, URF (µg/m^3)$^{-1}$	Original EPA: Reference conc., RfC (mg/m^3)	Original EPA: URF extrapolated (X)	Original EPA: RfC extrapolated (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		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	**3.4E-04**	7.0E-04	4.10E+02			1.0E-04	7.0E-04		
58899	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	?	X	3.7E-04	1.1E-03	X	X
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		X	0.0E+00			X
60571	Dieldrin	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		X	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	**3.1E+01**	5.81E+01		X	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	**5.3E-06**	**3.0E-01**	1.19E+02			2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	**1.1E-05**	3.5E-03	2.37E+02		X	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	**2.9E-05**	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	**5.0E+00**	1.33E+02			0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		X	0.0E+00	1.8E-02		X
72559	DDE	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	X	
74839	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	5.0E-03		
74873	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	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	2.70E+01			0.0E+00	3.0E-03		
74953	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		X	0.0E+00	3.5E-02		X
75003	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	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	**7.8E-05**	1.0E-01	6.25E+01			8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00	6.0E-02		
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	25	313.00	510.00	6,706	**1.0E-06**	**4.0E-01**	8.49E+01			4.7E-07	3.0E+00		
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	7.0E-01		
75218	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	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	2.53E+02		X	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	**3.7E-05**	7.0E-02	1.64E+02	?	X	1.8E-05	7.0E-02	X	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		
75343	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		X	0.0E+00	5.0E-01		
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	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	1.21E+02			0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroethai	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	1.87E+02			0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	**1.2E-03**	1.8E-03	3.73E+02		X	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		X	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	**1.0E-05**	4.0E-03	1.13E+02	?		1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00	1.0E+00		
79005	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		X	1.6E-05	1.4E-02		X
79016	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-03**	1.31E+02			1.1E-04	4.0E-02	X	
79209	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		X	0.0E+00	3.5E+00		X
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		X	5.8E-05	2.1E-01		X
79469	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	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00	7.0E-01		
83329	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		X	0.0E+00	2.1E-01		X
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	1.66E+02		X	0.0E+00	1.4E-01		X
87683	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		X	2.2E-05	7.0E-04		X
88722	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
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		
91576	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		X	0.0E+00	7.0E-02		X
92524	Biphenyl	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	1.8E-01		X
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	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00	2.0E-01		
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	1.8E-02		X
95636	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		
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	4.9E-03	X	
96333	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	1.1E-01		X
97632	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	3.2E-01		X
98066	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
98828	Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00	4.0E-01		
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	3.5E-01		X
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	2.0E-03		
100414	Ethylbenzene	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	1.0E+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	1.0E+00		
100447	Benzylchloride	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	0.0E+00	X	
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		X	0.0E+00	3.5E-01		X
103651	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		X	0.0E+00	1.4E-01		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	1.4E-01		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	1.0E-01		
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	8.0E-01		

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)		ENTER Soil gas conc., C_g (ppmv)	Chemical
		OR		
108883	2.40E+02			Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
				OR	
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
Lookup Soil Parameters				
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.1E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414	2.40E+01			Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.5E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.8E-09	8.2E-06

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106423	1.30E+02			p-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.5E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
95476	7.00E+01			o-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.7E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
60297	7.40E+03			TPH-Gasoline

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	CL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	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

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	4.9E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.1E-04

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	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

Chemical Properties Lookup Table

CalEPA Toxicity Criteria in bold (last updated 12/02/2011 DTSC/HERO)

Original EPA Values

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	URF extrapolated (X)	RfC extrapolated (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		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	**3.4E-04**	7.0E-04	4.10E+02			1.0E-04	7.0E-04		
58899	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	?	X	3.7E-04	1.1E-03	X	X
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		X	0.0E+00			X
60571	Dieldrin	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		X	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	**3.1E+01**	5.81E+01		X	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	**5.3E-06**	**3.0E-01**	1.19E+02			2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	**1.1E-05**	3.5E-03	2.37E+02		X	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	**2.9E-05**	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	**5.0E+00**	1.33E+02			0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		X	0.0E+00	1.8E-02		X
72559	DDE	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	X	
74839	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	5.0E-03		
74873	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	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	2.70E+01			0.0E+00	3.0E-03		
74953	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		X	0.0E+00	3.5E-02		X
75003	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	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	**7.8E-05**	1.0E-01	6.25E+01			8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00	6.0E-02		
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	25	313.00	510.00	6,706	**1.0E-06**	**4.0E-01**	8.49E+01			4.7E-07	3.0E+00		
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	7.0E-01		
75218	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	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	2.53E+02		X	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	**3.7E-05**	7.0E-02	1.64E+02	?	X	1.8E-05	7.0E-02	X	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		
75343	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		X	0.0E+00	5.0E-01		
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	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	1.21E+02			0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroetha	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	1.87E+02			0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	**1.2E-03**	1.8E-03	3.73E+02		X	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		X	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	**1.0E-05**	4.0E-03	1.13E+02	?		1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00	1.0E+00		
79005	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		X	1.6E-05	1.4E-02		X
79016	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-03**	1.31E+02			1.1E-04	4.0E-02	X	
79209	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		X	0.0E+00	3.5E+00		X
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		X	5.8E-05	2.1E-01		X
79469	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	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00	7.0E-01		
83329	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		X	0.0E+00	2.1E-01		X
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	1.66E+02		X	0.0E+00	1.4E-01		X
87683	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		X	2.2E-05	7.0E-04		X
88722	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
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		
91576	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		X	0.0E+00	7.0E-02		X
92524	Biphenyl	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	1.8E-01		X
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	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00	2.0E-01		
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	1.8E-02		X
95636	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		
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	4.9E-03	X	
96333	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	1.1E-01		X
97632	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	3.2E-01		X
98066	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
98828	Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00	4.0E-01		
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	3.5E-01		X
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	2.0E-03		
100414	Ethylbenzene	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	1.0E+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	1.0E+00		
100447	Benzylchloride	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	0.0E+00	X	
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		X	0.0E+00	3.5E-01		X
103651	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		X	0.0E+00	1.4E-01		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	1.4E-01		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	1.0E-01		
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	8.0E-01		

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	1.20E+02			Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	CL		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.2E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414	1.00E+01			Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	CL		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.5E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.8E-09	7.3E-06

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106423	3.10E+01			p-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	CL		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.3E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
95476	3.20E+01			o-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	CL		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.6E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

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DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
60297	3.00E+03			TPH-Gasoline

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	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

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
NA	4.9E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.0E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	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

Chemical Properties Lookup Table

CalEPA Toxicity Criteria in bold (last updated 12/02/2011 DTSC/HERO)

Original EPA Values

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Original EPA Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Original EPA Reference conc., RfC (mg/m^3)	Original EPA URF extrapolated (X)	Original EPA RfC extrapolated (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		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	**3.4E-04**	7.0E-04	4.10E+02			1.0E-04	7.0E-04		
58899	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	?	X	3.7E-04	1.1E-03	X	X
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		X	0.0E+00			X
60571	Dieldrin	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		X	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	**3.1E+01**	5.81E+01		X	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	**5.3E-06**	**3.0E-01**	1.19E+02			2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	**1.1E-05**	3.5E-03	2.37E+02		X	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	**2.9E-05**	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	**5.0E+00**	1.33E+02			0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		X	0.0E+00	1.8E-02		X
72559	DDE	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	X	
74839	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	5.0E-03		
74873	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	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	2.70E+01			0.0E+00	3.0E-03		
74953	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		X	0.0E+00	3.5E-02		X
75003	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	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	**7.8E-05**	1.0E-01	6.25E+01			8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00	6.0E-02		
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	25	313.00	510.00	6,706	**1.0E-06**	**4.0E-01**	8.49E+01			4.7E-07	3.0E+00		
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	7.0E-01		
75218	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	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	2.53E+02		X	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	**3.7E-05**	7.0E-02	1.64E+02	?	X	1.8E-05	7.0E-02	X	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		
75343	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		X	0.0E+00	5.0E-01		
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	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	1.21E+02			0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroetha	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	1.87E+02			0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	**1.2E-03**	1.8E-03	3.73E+02		X	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		X	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	**1.0E-05**	4.0E-03	1.13E+02	?		1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00	1.0E+00		
79005	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		X	1.6E-05	1.4E-02		X
79016	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-03**	1.31E+02			1.1E-04	4.0E-02	X	
79209	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		X	0.0E+00	3.5E+00		X
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		X	5.8E-05	2.1E-01		X
79469	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	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00	7.0E-01		
83329	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		X	0.0E+00	2.1E-01		X
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	1.66E+02		X	0.0E+00	1.4E-01		X
87683	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		X	2.2E-05	7.0E-04		X
88722	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
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		
91576	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		X	0.0E+00	7.0E-02		X
92524	Biphenyl	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	1.8E-01		X
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	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00	2.0E-01		
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	1.8E-02		X
95636	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		
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	4.9E-03	X	
96333	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	1.1E-01		X
97632	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	3.2E-01		X
98066	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
98828	Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E-01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00	4.0E-01		
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	3.5E-01		X
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	2.0E-03		
100414	Ethylbenzene	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	1.0E+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	1.0E+00		
100447	Benzylchloride	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	0.0E+00	X	
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		X	0.0E+00	3.5E-01		X
103651	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		X	0.0E+00	1.4E-01		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	1.4E-01		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	1.0E-01		
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	8.0E-01		

VW7 4.1 ug/m^3 Benzene

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-08	5.3E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	1.50E+01			Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.9E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
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Reset to Defaults

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m³)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414	5.90E+00			Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2.5E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.2E-09	2.0E-06

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106423	1.60E+01			p-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^{o}C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, $\rho_b{}^A$ (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w{}^V$ (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.6E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
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DTSC
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(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)		ENTER Soil gas conc., C_g (ppmv)	Chemical
95476	6.00E+00	OR		o-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC	OR	

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.3E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
60297	1.00E+04			TPH-Gasoline

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	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

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	4.9E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.6E-05

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	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

Chemical Properties Lookup Table

												CalEPA Toxicity Criteria in bold (last updated 12/02/2011 DTSC/HERO)					Original EPA Values			
CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	Unit risk factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)	URF extrapolated (X)	RfC extrapolated (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		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	**3.4E-04**	7.0E-04	4.10E+02			1.0E-04	7.0E-04		
58899	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	?	X	3.7E-04	1.1E-03	X	X
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		X	0.0E+00			X
60571	Dieldrin	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		X	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	**3.1E+01**	5.81E+01		X	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	**5.3E-06**	**3.0E-01**	1.19E+02			2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	**1.1E-05**	3.5E-03	2.37E+02		X	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	**2.9E-05**	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	**5.0E+00**	1.33E+02			0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		X	0.0E+00	1.8E-02		X
72559	DDE	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	X	
74839	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	5.0E-03		
74873	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	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	2.70E+01			0.0E+00	3.0E-03		
74953	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		X	0.0E+00	3.5E-02		X
75003	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	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	**7.8E-05**	1.0E-01	6.25E+01			8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00	6.0E-02		
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	25	313.00	510.00	6,706	**1.0E-06**	**4.0E-01**	8.49E+01			4.7E-07	3.0E+00		
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	7.0E-01		
75218	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	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	2.53E+02		X	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	**3.7E-05**	7.0E-02	1.64E+02	?	X	1.8E-05	7.0E-02	X	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		
75343	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		X	0.0E+00	5.0E-01		
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	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	1.21E+02			0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroetha	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	1.87E+02			0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	**1.2E-03**	1.8E-03	3.73E+02		X	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		X	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	**1.0E-05**	4.0E-03	1.13E+02	?		1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00	1.0E+00		
79005	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		X	1.6E-05	1.4E-02		X
79016	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-03**	1.31E+02			1.1E-04	4.0E-02	X	
79209	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		X	0.0E+00	3.5E+00		X
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		X	5.8E-05	2.1E-01		X
79469	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	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00	7.0E-01		
83329	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		X	0.0E+00	2.1E-01		X
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	1.66E+02		X	0.0E+00	1.4E-01		X
87683	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		X	2.2E-05	7.0E-04		X
88722	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
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		
91576	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		X	0.0E+00	7.0E-02		X
92524	Biphenyl	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	1.8E-01		X
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	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00	2.0E-01		
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	1.8E-02		X
95636	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		
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	4.9E-03	X	
96333	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	1.1E-01		X
97632	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	3.2E-01		X
98066	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
98828	Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00	4.0E-01		
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	3.5E-01		X
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	2.0E-03		
100414	Ethylbenzene	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	1.0E+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	1.0E+00		
100447	Benzylchloride	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	0.0E+00	X	
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		X	0.0E+00	3.5E-01		X
103651	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		X	0.0E+00	1.4E-01		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	1.4E-01		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	1.0E-01		
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	8.0E-01		

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-08	5.3E-05

MESSAGE SUMMARY BELOW:

END

Highest Concentration Scenario
VW5 240 ug/m^3 Toluene

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	2.40E+02			Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

Highest Concentration Scenario
VW5 240 ug/m^3 Toluene

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.1E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414	3.30E+01			Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m³)	Bldg. ventilation rate, $Q_{building}$ (cm³/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_B (cm²)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m³)
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 factor, URF (μg/m³)⁻¹	Reference conc., RfC (mg/m³)
2.5E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.2E-08	3.0E-05

MESSAGE SUMMARY BELOW:

END

Highest Concentration Scenario
VW5 130 ug/m3 m,p-Xylene

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
106423	1.30E+02			p-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.5E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)		ENTER Soil gas conc., C_g (ppmv)	Chemical
		OR		
95476	7.00E+01			o-Xylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC	OR	

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.7E-04

MESSAGE SUMMARY BELOW:

END

APPENDIX I

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

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-08	5.3E-05

MESSAGE SUMMARY BELOW:

END

Scenario 2
VW7 4.1 ug/m^3 Benzene

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	15	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-08	5.3E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	S		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, $\rho_b{}^A$ (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w{}^V$ (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.66	0.375	0.054	5

Lookup Soil Parameters

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.7E-08	1.8E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SI		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.35	0.489	0.167	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.1E-08	1.4E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
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DTSC
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Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	76.2	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.7E-08	9.9E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
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DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. (μg/m^3)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
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 factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.0E-08	2.8E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	1.00E+00			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^{o}C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, $\rho_b{}^A$ (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, $\theta_w{}^V$ (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.9E-09	1.3E-05

MESSAGE SUMMARY BELOW:

END

Scenario 8
100 ug/m^3 Benzene

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 12/6/2011)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	1.00E+02			Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/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_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (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_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
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 factor, URF ($\mu g/m^3$)$^{-1}$	Reference conc., RfC (mg/m^3)
2.9E-05	3.0E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.9E-07	1.3E-03

MESSAGE SUMMARY BELOW:

END